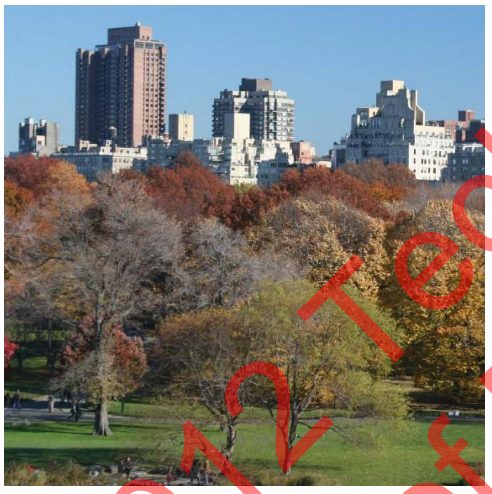
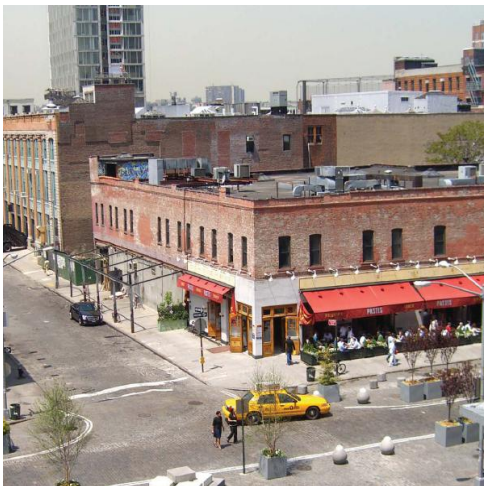
CEQR

City Environmental Quality Review

Technical Manual

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NYC Mayor's Office of Environmental Coordination

JANUARY 2012 EDITION (REV. 6/18/12)

Technical Analysis Areas

Land Use, zoning & Public Policy		Socioeconomic Conditions	Community Facilities & Services	Open Space
Shadows	Historic & Cultural Resources	Urban Design & Visual Resources	Natural Resources	
	Hazardous Materials		Water & Sewer Infrastructure	Solid Waste & Sanitation Services
Energy	Transportation	Air Quality		Greenhouse Gas Emissions
Noise		Public Health	Neighborhood character	Construction

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FOREWORD

The City of New York enjoys enormous richness and complexity, characteristics that also present challenges to maintaining its fragile environment. This is particularly true as the City strives to become a paradigm of sustainability.

The CEQR Technical Manual was initially written in 1993, soon after procedural changes were made in the City's environmental review process. It was revised in 2001 and again in 2010. The 2010 edition is the result of a thorough review and update performed by the City's technical agencies under the supervision of the Mayor's Office of Environmental Coordination.

While striving to maintain the highest technical and scientific standards, this edition also is intended to be more user friendly, particularly for smaller entities and the public, while ensuring a more efficient and predictable process for all participants. This January 2012 Edition reflects changes in laws and regulations and corrects and clarifies portions of the CEQR Technical Manual.

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CEQR TECHNICAL MANUAL CHANGES
JANUARY 2012 EDITION

This document summarizes the specific changes made in the 2012 Edition of the *CEQR Technical Manual*. The changes are indicated by page and section number. When deemed appropriate, an entire section or paragraph is presented below to provide context and indicate specific text changes. Deletions are indicated using a ~~strikethrough~~, and additions are indicated using double underline. Typographical or grammatical errors were also corrected. These changes are not indicated below and have no effect on the substance of the guidance in the *CEQR Technical Manual*.

CHAPTER 1, "PROCEDURES AND DOCUMENTATION"

Section 111 – Clarifies when it is appropriate to document an agency's consideration and determination of a Type II action in a memorandum for its files.

CHAPTER 3, "INTRODUCTION TO THE TECHNICAL GUIDANCE"

Replaces the Energy Division of the New York City Economic Development Corporation with the Mayor's Office of Environmental Coordination as an expert agency for the "Energy" technical area.

CHAPTER 4, "LAND USE, ZONING, AND PUBLIC POLICY"

Waterfront Revitalization Program

Section 120 – Clarifies that the comprehensive waterfront plan is a policy assessed under Section 121, Waterfront Revitalization Program, by deleting the reference to the Comprehensive Waterfront Plan in Section 120.

Section 121 – Revises the guidance to reference the updated Comprehensive Waterfront Plan, released March 2011, and to reference amendments to the Waterfront Zoning Regulations. Also, clarifies that Waterfront Revitalization Program policies, goals, and standards should be used as the basis for determining a project's consistency with the Waterfront Revitalization Program.

Section 332.1 – Clarifies that the detailed analysis considers all 10 Local Waterfront Revitalization Program (LWRP) policies with their standards and criteria, and assesses consistency with all those that are relevant to the project.

Sustainability/PlaNYC

Updates the guidance to reflect the updated PlaNYC, released April 2011.

Section 200 – Clarifies the types of projects that should be considered "large publicly sponsored projects" and when these are appropriately subject to a PlaNYC/Sustainability consistency assessment. The revised language is as follows:

> Until sustainability goals are more clearly defined through the incorporation of initiatives into codes, regulations and specific policies, there are few sustainability standards to apply appropriately in assessing a proposed project for the purposes of CEQR. As these initiatives become codified, privately sponsored projects would be presumed to comply with all codes and regulations. However, to en-

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sure that large publicly sponsored projects align with the broader sustainability priorities and goals the City has set for itself, it is appropriate that the PlaNYC initiatives (whether or not yet embodied in generally applicable codes or regulations) be considered in an environmental assessment for large publicly sponsored projects only, as these projects are often multi-faceted and touch upon many of the elements addressed by PlaNYC. If a publicly-sponsored project is, itself, implementing a PlaNYC initiative, such as repairing or replacing aging infrastructure, a PlaNYC/sustainability assessment would likely be inappropriate. ~~As these initiatives become codified, privately sponsored projects would be presumed to comply with all codes and regulations in effect at the time of compliance.~~ The discussion below details how sustainability, as encouraged through the goals and initiatives of PlaNYC, is considered in the environmental assessment of large publicly-sponsored projects.

Section 400 – Clarifies that, when conducting a PlaNYC assessment, every technical area may not have the potential to be affected, positively or adversely, by a proposed project.

Section 400 – Elaborates on the information that lead agencies should consider if an inconsistency with PlaNYC is identified. The new language is as follows:

If a project is found to be inconsistent, the lead agency should consider whether changes to the project could be made to make the project consistent with PlaNYC or changes could be made such that, while there may still be an inconsistency, the lead agency is able to make a determination that the inconsistency is not significant. If changes that would eliminate the inconsistency are not possible, the lead agency should consider whether the inconsistency is of such a degree as to be significant. In determining the significance of any inconsistencies, the lead agency should balance the policies that would be furthered by the project against those that would be hindered by the project. The lead agency may determine that some inconsistencies are not significant.

Section 400 – Clarifies that the goal to divert 75% of waste from landfills is a long-term goal applicable to both the public and private sectors, and the standard for assessing consistency with the solid waste reduction goals of PlaNYC.

CHAPTER 5, "SOCIOECONOMIC CONDITIONS"

Section 120 – Clarifies that, among other considerations, housing assessments should include consideration of investments in affordable housing by city, state and not-for-profit organizations.

Section 200 – Corrects and clarifies the threshold for when an assessment of indirect business displacement due to market saturation is appropriate:

The project would add to, or create, a retail concentration that may draw a substantial amount of sales from existing businesses within the study area to the extent that certain categories of business close and vacancies in the area increase, thus resulting in a potential for disinvestment on local retail streets. Projects resulting in less than 200,000 square feet of ~~regional-serving retail as in the study area or less than 200,000 square feet of local-serving or regional serving~~ retail on a single development site would not typically result in socioeconomic impacts. If the proposed development is located on multiple development sites located across a large project area, a preliminary analysis is likely only warranted for retail developments in excess of 200,000 sq. ft. that are considered regional serving (not the type of retail that primarily serves the local population). ~~Retail that is regional-serving draws primarily from a customer base located the immediate neighborhood.~~ For projects exceeding these thresholds, an assessment of indirect business displacement due to market saturation is appropriate.

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Section 310 – Notes that when an analysis of a subarea is deemed appropriate, the subarea should be comprised of at least one census tract that warrants special consideration due to land use characteristics or real estate trends, which are distinct from those in the rest of the study area.

Section 321.1 – Notes that the lead agency can consult the New York City Department of City Planning (DCP) on the methodology for determining the estimated incomes of the directly displaced and study area populations, if such data are not readily available.

Section 322.1 – Clarifies that relevant data on population and housing may vary depending on the proposed project, and that this information should be provided as it pertains to the preliminary assessment of indirect residential displacement.

Section 322.1 – Revises Step 1 to state the following:

STEP 1

Determine if the proposed project would add new population with higher average incomes compared to the average incomes of the existing populations and any new population expected to reside in the study area without the project. It is often helpful to break down income levels into a "market rate" category specific to the proposal and compare it with groupings that are commonly used in the city to define income levels for low, moderate, and middle income for eligibility for inclusionary housing and other public assistance programs. Income thresholds are typically based on a family of four. For a description of current definitions, refer to http://www.nyc.gov/html/hpd/html/developers/inclusionary.shtml. These typically change annually based on economic factors.

If the project would introduce a more costly type of housing compared to existing housing and the housing expected to be built in the No-Action condition, then the new population may be expected to have higher incomes. In some cases, the study area would already be experiencing socioeconomic change and the housing to be developed under a proposed project represents a continuation of an existing trend, and not a new trend.

If the expected average incomes of the new population would be similar to the average incomes of the study area populations, no further analysis is necessary. If the expected average incomes of the new population would exceed the average incomes of the study area populations, then Step 2 of the analysis should be conducted.

Section 322.1 – Revises Step 2 by (i) deleting the guidance that "a population increase of less than 5 percent may potentially affect real estate market conditions in situations where the study area or relevant subarea has not experienced an existing trend towards increasing rents and new market development"; and (ii) adding guidance that if the population increase is greater than 10 percent in the study areas as a whole or within any identified subarea, conduct a Detailed Analysis without conducting Step 3.

Section 322.1 – Revises Step 3 to state the following:

STEP 3

Consider whether the study area has already experienced a readily observable trend toward increasing rents and the likely effect of the action on such trends. Near is defined as within a half-mile of the study area boundary.

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- If the vast majority of the study area has already experienced a readily observable trend toward increasing rents and new market rate development, further analysis is not necessary. However, if such trends could be considered inconsistent and not sustained, the applicant should consult with the Department of City Planning on whether a detailed analysis is warranted.

- If no such trend exists either within or near the study area the action could be expected to have a stabilizing effect on the housing market within the study area by allowing for limited new housing opportunities and investment. In this circumstance further analysis is not necessary.

- If those trends do exist near to or within smaller portions of the study area the action could have the potential to accelerate an existing trend. In this circumstance a detailed analysis should be conducted.

Section 332.1 – Under the section, "Existing Conditions," it is noted that income levels are typically based on a family of four. Clarifies that an analysis of the number of privately held rental units should be estimated based on the number of units in structure. Provides guidance on when and how to characterize recent investments in market rate and affordable housing within a study area. Under the section, "With-Action Condition," the guidance on how to assess real estate market conditions in the study area was revised as follows:

- Assess how the real estate market conditions in the study area would change under the proposed project. If the project would introduce a mixed-income population into an area with a recent history of affordable housing investment, it is possible that the new population would serve to stabilize the real estate market rather than change it in such a way that rents would be expected to rise substantially in the surrounding area. If this is considered likely based on the analysis of existing conditions, the analysis should assess how the new housing would affect the existing real estate market. Sources of this information may include interviews with local real estate brokers and developers, as well as experts within the affordable housing community, such as city and housing officials, and those familiar with the affordable housing market within the study area. This might include leaders of local development corporations and other not-for-profits active in this area. If a vulnerable population exists in the study area, estimate the size and general location of the population at risk of displacement under the proposed project. The analyst should consider whether land use or real estate market conditions would reduce the likelihood that a vulnerable population would be at risk of indirect displacement. For example, a physical barrier within the study area, such as a railroad viaduct or river, may create distinct real estate markets that are unlikely to be affected by the proposed project. Similarly, if it is determined that a project, because of its mixed-income composition, would not cause drastic changes in the real estate market, it may not affect rents for some or all of the existing vulnerable units.

Section 332.3 – Under the section, "With-Action Condition," the final bullet was edited as follows:

- ~~No new~~ Limited demand for retail tenants is expected due to purchasing power in the trade area.

CHAPTER 6, "COMMUNITY FACILITIES"

Section 100 – Removes reference to charter schools from the definition of "public schools" to be consistent with the guidance in Section 322.1.

Section 310 to 322.1 – In the schools assessment, the references to the "local study area," which is often defined as a 0.5 or 1-mile radius from the project site, have been removed. The only study area for purposes of a schools assessment should be the school sub-district.

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Section 311 – Notes that, in order to determine the study area for the analysis of elementary and intermediate schools, GIS files for the sub-district boundaries ("regions" or "school planning zones") are available, upon request, from the Department of City Planning. This replaces the guidance that stated the sub-district boundaries can be found in the DCP publication, *NYC Public Schools: Demographic and Enrollment Trends, 1990-2002*.

Section 322.1 – Edits the guidance to determine a No-Action scenario for a schools assessment as follows:

> The SCA's designated enrollment projections should be obtained by contacting SCA and/or DCP. If possible, the projection series (*e.g. Actual 2007, Projected 2008-2018*) to be used should coordinate with the Utilization Profile data (*e.g. Utilization Profiles: Enrollment/Capacity/Utilization for 2007-2008*). Otherwise, use the latest available projection series and/or utilization data. The enrollment projections include a separate projection for ungraded special education (SE) students that are enrolled in the general education schools.

Section 322.1 – Notes that, when determining the No-Action scenario for the sub-district study area in the analysis of elementary and intermediate schools, major planned residential development projects that are in the sub-district area may also need to be considered in the No-Action scenario.

Section 322.1 – Edits the guidance for the With-Action Scenario to reflect project components intended to alleviate capacity constraints. The revised text is below:

> If the proposed project would include the construction of new schools or other measures that result in ~~the~~ additional seats, such seats should be included in the future capacity estimates, and the proposed school's location, number of seats, grades served, and other appropriate details, should be included. Similarly, if a project includes other measures intended to alleviate capacity constraints in the With-Action scenario, those measures should be disclosed and, based upon consultation with DOE and SCA, may be taken into account when determining whether the project would result in a significant adverse impact to schools.

Section 322.3 – Notes that, when determining the No-Action scenario for child care centers, major planned residential developments would include a substantial number of affordable housing units within the study area may also need to be considered.

Section 410 – Revises the significant impact criteria to note that a project may have an impact on schools if the collective utilization rate of an elementary or intermediate school in the sub-district study area that is equal to or greater than 100 percent in the With-Action Condition and the project increases the rate by 5 percent or more. The collective utilization rate of 105 percent in the With-Action Condition was previously used as the criteria to define significant impacts.

Section 410 – Illustrates application of the new significant impact criteria and notes that the lead agency may take into account project components to reduce school capacity constraints when determining whether a project would result in a significant adverse schools impact. The new text is as follows:

> To illustrate, if the collective utilization rate in the No-Action condition is 98% and the collective utilization rate in the With-Action condition is 103%, the project would result in a significant adverse schools impact. However, if a project includes components which do not provide additional capacity but are intended to reduce school capacity constraints, the lead agency, in consultation with DOE and SCA, may take these project components into account to determine whether an increase in the collective utilization rate under the above standards would cause a significant adverse impact.

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CHAPTER 7, "OPEN SPACE"

Section 100 – Edits and clarifies that public open space may include housing complex grounds, if they are publicly accessible.

Section 710 – Adds references to Title 18 of the Administrative Code of the City of New York and Title 56 of the Rules of the City of New York (Chapter 5), which address removal of trees under the jurisdiction of DPR and the determination of tree replacement values.

CHAPTER 8, "SHADOWS"

Section 200 – The guidance has been revised to more clearly allow a lead agency discretion to determine, in certain circumstances, whether a shadows assessment is needed. The revised text is as follows:

> The shadow assessment considers projects that result in new shadows long enough to reach a sunlight-sensitive resource. Therefore, a shadow assessment is required only if the project would either result in (a) new structures (or additions to existing structures including the addition of rooftop mechanical equipment) of 50 feet or more or (b) be located adjacent to, or across the street from, a sunlight-sensitive resource. However, where a project's height increase is ten feet or less and it is located adjacent to, or across the street from, a sunlight-sensitive open space resource, which is not a designated New York City Landmark or listed on the State/National Registers of Historic Places or eligible for these programs, the lead agency may determine, in consultation with DPR, whether a shadow assessment is required in that case. ~~Conversely, if the proposed project would not result in either of these conditions, a shadow assessment is not necessary.~~

Section 410 – For ease of reading and to clarify the guidance, the text, "[s]hadows occurring during the cold-weather months of interest generally do not affect the growing season of outdoor vegetation; however, their effects on other uses and activities should be assessed," was relocated from Page 8-27, Section 430 to page 8-24, Section 410. The following text, "[a]lthough shadows on project-generated open space are not considered significant under CEQR, the assessment of shadows on project-generated open space should be conducted and documented with the same level of detail as other sunlight-sensitive open space resources when such project generated open space is included qualitatively as part of a detailed analysis required Chapter 7, 'Open Space.'" was also relocated from Page 8-27, Section 430 to page 8-25, Section 410.

Section 412 – For ease of reading and to clarify the guidance, the text, "It should be noted that the shade created by trees and other natural features is not considered to be shadow of concern for the impact analysis; however, incremental shadow on a tree-shaded environment may create a significant impact as the incremental shadow is not redundant with tree shade, and the tree canopy may be considered a sunlight-sensitive resource," and the text, "[t]he significance of shadows cast on an open space should be closely examined in relation to the open space's utilization rates, as discussed in Chapter 7, "Open Space," in order to determine the potential for the shadows to affect the times of day the space is commonly used. This is particularly important when shadows are cast on open spaces that fall within an area without similar sunlit resources. Estimating the loss of sunlight on paved or hardscape open spaces that accommodate active uses–such as basketball and tennis courts–may be determined based on how the active area is used by the community and the utilization rate of such spaces as described and assessed in Chapter 7, "Open Space." While this loss of sunlight is generally not considered significant, the lead agency should consider how the area is used by the community and the utilization rate of such spaces as described and assessed in Chapter 7, "Open Space," in order to determine the significance of the incremental shadow," were edited for clarity and/or relocated from Page 8-27, Section 430 to pages 8-25 and 8-26, Section 412.

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Section 430 – The following text was edited to emphasize a lead agency's existing discretion to determine whether a project's incremental shadows on a sun-sensitive resource constitutes a significant adverse shadow impact. The edits also clarify the text and better explain and categorize the significant impact considerations.

430. DETERMINING IMPACT SIGNIFICANCE

The ~~guidance and~~ scenarios illustrated below provide general guidelines for determining impact significance and supplement the considerations described in Sections 410 and 420. As with every technical area,~~; however,~~ each ~~case~~ project must be considered on its own merits, taking into account its unique circumstances. For instance, the precise location of the incremental shadow within the sunlight-sensitive resource (or the presence of well-lit resources in close proximity to the affected resource) may be highly relevant because the incremental shadow may affect specific features that are key to the character, use, survival or enjoyment of the sun-sensitive resource. For the purposes of CEQR, the determination of impact significance on ambiguous cases should be done in a conservative manner. In all cases, the rationale for the determination of impact significance should be clearly presented in the resulting environmental review document.

In general, an incremental shadow is not considered significant when its duration is no longer than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact generally occurs when an incremental shadow of 10 minutes or longer ~~added by a proposed project~~ falls on a sunlight sensitive resource and results in one of ~~substantially reduces direct sunlight exposure, reduces direct sunlight to unacceptable levels, or completely eliminates all direct sunlight for longer than 10 minutes at any time of the year. This includes~~ the following ~~situations~~:

VEGETATION

- A substantial reduction in sunlight available to a ~~sensitive use~~ sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the future without the project).

- A ~~substantial~~ reduction in direct sunlight exposure where the sensitive ~~use~~ feature of the resource is already subject to substandard sunlight (*i.e.*, less than minimum time necessary for its survival).

HISTORIC AND CULTURAL RESOURCES

- A substantial reduction in sunlight available for the ~~use,~~ enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.

OPEN SPACE UTILIZATION

- A substantial reduction in the usability of open space as a result of increased shadow (should cross reference with information provided in Chapter 7, "Open Space," regarding anticipated new users and the open space's utilization rates throughout the affected time periods).

FOR ANY SUNLIGHT-SENSITIVE FEATURE OF A RESOURCE

- Complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or in the case of open space or natural resources, the use of the resource.

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CHAPTER 10, "URBAN DESIGN"

Section 100 – Removes the definition of sunlight from urban design to clarify that sunlight should not be a specific part of an urban design analysis or have its own thresholds for significance.

CHAPTER 11, "NATURAL RESOURCES"

Section 353.3 – Adds new language regarding trees under the jurisdiction of DPR, including reference to relevant rules and regulations for tree removal and replacement as required by Local Law 3 of 2010. The additional language is as follows:

> DPR has authority over all trees in any park, or any other property under its jurisdiction and generally over all trees in any street as such term is defined in Section 18-103 of the Administrative Code of the City of New York. Such trees are an integral part of the health, beauty, and vitality of the City and provide important benefits for its residents by absorbing gaseous air pollutants, capturing particulate matter, providing for cooler summer temperatures, and beautifying neighborhoods. Trees under the jurisdiction of DPR may not be removed without a permit pursuant to Title 18 of the Administrative Code of the City of New York. Chapter 5 of Title 56 of the Rules of the City of New York establishes rules for valuing trees that are approved for removal in order to determine the appropriate number of replacement trees.
>
> Any person or contractor wishing to remove or perform work on a tree under the jurisdiction of DPR is required to obtain a permit from DPR. Issuance of such permits followings a review process that may entail the submission of documentation and/or modification or alteration of the work plan. Information pertaining to such permits is available at: http://www.nycgovparks.org/services/forestry/tree-work-permit.

Section 550 – Adds reference to Title 56 of the Rules of the City of New York (Chapter 5), which establishes rules for valuing trees that are approved for removal.

Section 713 – Adds references to Title 18 of the Administrative Code of the City of New York and Title 56 of the Rules of the City of New York (Chapter 5), which address removal of trees under the jurisdiction of DPR and for determining tree replacement values.

Section 714 – Updates the section to reflect the *NYC Green Infrastructure Plan* and adds reference to the *2010 Sustainable Stormwater Management Plan Progress Report*.

CHAPTER 12, "HAZARDOUS MATERIALS"

Section 300 – Removes the following sentence to clarify the intent of the section:

~~If no potential REC's are identified at the conclusion of an ASTM E-1527 compliant Phase I ESA and DEP has also determined that no REC's exist at a site, then no further analysis is warranted.~~

CHAPTER 13, "WATER AND SEWER INFRASTRUCTURE"

Section 123 – Adds reference to Title 15 RCNY Chapter 31 (the "Rule Governing House / Site Connections to the Sewer System").

Section 220 and Table 13-1 – Clarifies the threshold for conducting a water and sewer infrastructure assessment by including a threshold for public facility, institutional, and community facility space.

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Section 322.1 – Removes the following paragraph to avoid unnecessary confusion:

> ~~If the proposed project is a large development and located within a WWTP drainage area that has limited excess loading capacity (*e.g.*, Owls Head, Newtown Creek or North River), estimate the solids loadings and concentrations and impacts on wastewater treatment plants per specific SPDES parameters and limits. If this project has an extended construction schedule, measures to ensure that solids loadings are avoided should be described. Simple calculations are preferred. BEPA should be contacted for assistance in determining whether the project would be consistent with a plant's SPDES effluent limits.~~

CHAPTER 14, "SOLID WASTE AND SANITATION SERVICES"

Section 111.4 – Updates the description of Designated Recyclable Materials to reflect the Electronic Equipment Recycling and Reuse Act, enacted in May 2010.

Section 112 – Updates the link to the current map of transfer station facilities.

CHAPTER 15, "ENERGY"

Section 310 – Clarifies when energy modeling is appropriate and allows for an applicant to calculate its energy consumption using energy use information compiled for comparable buildings. The revised text is below. Please note that many of the deletions and additions are a result of moving the text.

> ~~If sufficient information regarding the project is not available to model its probable operational energy consumption, the lead agency, within its discretion, may determine it is most appropriate to use the standard reference table below to estimate energy usage. It should be noted that p~~Projects subject to ~~the~~this GHG assessment in Chapter 18, "Greenhouse Gas Emissions," should estimate energy consumption using ~~either~~ energy modeling, ~~or~~ information from a project architect or engineer, or energy use information compiled for comparable buildings. ~~unless the project would result in changes to sites not controlled by the applicant, as is often the case in a rezoning.~~ If sufficient information regarding the project is not available to model its probable operational energy consumption or provide specific project energy consumption estimates, the lead agency, within its discretion, may determine it is most appropriate to use the standard reference table below to estimate energy usage. The standard reference table will often be used to estimate energy consumption on those sites not controlled by the applicant, as is often the case in a rezoning action.

Table 15-1 – Presents the "Average Annual Whole-Building Energy Use in New York City" in MBtu/sq ft (Thousand Btu/square foot) instead of Btu/square foot in order to conform to the unit of measurement most used by the United States Energy Information Administration (EIA).

Section 410 – Deletes reference to the New York City Economic Development Corporation, Energy Division, as a source for the State Energy Plan.

Section 420 – Deletes reference to the New York City Economic Development Corporation, Energy Division, as the entity in which coordinates energy policy in the City and which provides guidance on the energy conservation measures and techniques. Clarifies that questions regarding energy policy in the City should be directed to the Mayor's Office of Environmental Coordination.

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CHAPTER 16, "TRANSPORTATION"

Section 100 – Clarifies the definition of pedestrian facilities to additionally refer to intersection corners as corner reservoirs.

Table 16-1 – Clarifies the description of Zone 4 to include areas in Staten Island within 0.5 miles of subway stations and all other areas located within one mile of subway stations (except in Staten Island, Broad Channel, and the Rockaways, Queens).

Table 16-2 (corrected in March 2011) – Corrects the Saturday Daily Person Trip Generation Rate for local retail. The previous rate was 488 person trips per 1000 square feet. The corrected rate is 240 person trips per 1000 square feet.

Section 311.2 – Clarifies and edits the following text:

- Are the hours and operation of ~~that~~ the survey site ~~is open and active~~ similar to those of the proposed project?

Table 16-3 – Removes the "Vehicle Class" column from the table. Clarifies that waste collection vehicles have the same PCE factor as 'Trucks/Buses with 2 Axles' and assigns a PCE factor of 1.5 to such vehicles. Notes that the PCE factor for waste transfer trailers should be determined based on the number of axles.

Section 322 – Clarifies that the threshold for a detailed analysis is 50 vehicle trips during the peak hour.

Section 331 – Clarifies that analysis locations include highway ramps, not highways.

Section 332 – Clarifies that the standard weekday peak hours in Zone 1, as defined in Table 16-1, are 8:00 a.m. to 9:00 a.m., 12:00 p.m. to 1:00 p.m., and 5:00 p.m. to 6:00 p.m.

Section 342.2 – Clarifies that ATRs should be placed at sufficient numbers of locations covering all major street approaches as well as representative minor street approaches, and notes that, generally, ATRs should be placed on approach leg(s) of an intersection rather than the departure leg(s).

Section 342.4 – Clarifies that the lead agency should consult with DOT with regard to LOS calibration if the v/c ratio for a lane-group is greater than 1.05 under the existing condition. Also clarifies the following text:

> It is possible that ~~major~~ congestion occurring at an ~~intersection~~ upstream ~~of (above) the~~ intersection ~~being analyzed~~ does not allow traffic to proceed on to the next intersection in a normal manner.

Section 352.1.3 – Revises the guidance on Analysis of Platforms to clarify when consultation with New York City Transit is appropriate.

Section 352.1.3 – Revises the guidance on Analysis of Elevators to clarify when an analysis of elevator service is needed.

Section 363.1 – Revises this section to reflect changes in taking pedestrian counts. The revised section is reprinted in its entirety below:

> ***363.1. Assembly and Collection of Pedestrian Counts***
>
> Prior to collecting any new data, DCP and DOT should be contacted regarding the availability of any pedestrian studies as well as recently completed environmental assessments within the project study area that could be the source of available pedestrian count data and LOS analyses. However, the available data should not be more than three years old and care must be taken to ensure that

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the pedestrian travel patterns have not changed due to significant developments and/or modification to the existing pedestrian elements in the project study area.

New pedestrian counts should be taken for one "typical" mid-week day during representative peak periods (*i.e.,* morning, midday, evening, and/or other appropriate peak periods). Counts should be taken over the course of the full peak period and recorded in 15-minute intervals, since analyses to be conducted utilize a 15-minute analysis period for their evaluations. Counts taken during weekend peak periods or special times (such as game days or other events) should also be taken for one day. However, crosswalk counts at all study intersections should be collected for one additional mid-week day and one additional weekend day during representative peak periods to validate the data if counts for all three pedestrian elements (*i.e.,* crosswalk, sidewalk and corner) are collected. If a proposed action requires one pedestrian element, such as a sidewalk, to be analyzed, then counts for one additional mid-week day and one additional weekend day (if warranted) should be performed to confirm all the counts.

~~New pedestrian counts should generally be taken for three "typical" mid-week days and during representative peak periods. Counts are taken over the course of the full peak period and are recorded in 15-minute increments, since the LOS analyses to be conducted utilize a 15-minute analysis period for their evaluations. Counts taken during weekend peak periods or special times (such as game days or other events) should be taken for at least two days.~~

The pedestrian counts to be conducted depend on the pedestrian elements identified as constituting the pedestrian study area. They should include crosswalks, corner reservoirs at intersections where pedestrians queue up while waiting to cross the street and those moving between the adjoining sidewalks but not crossing the street, sidewalks, and other important routes if such are applicable (*e.g.,* bridges, mid-block arcades or plazas). Two-directional counts are needed to conduct the subsequent LOS analyses.

Sections 441.2 to 442.4 – Throughout these sections, the phrase, "If the average pedestrian flow rate under the With-Action condition deteriorates to mid-LOS D or worse," has been corrected. Throughout this section, this phrase now reads, "If the average pedestrian flow rate under the With-Action condition deteriorates to worse than mid-LOS D."

Tables 16-13 to 16-17 – Throughout the referenced tables, the formula for calculating the significant impact guidance for pedestrians has been corrected, resulting in a small change in the values. For example, in Table 16-13, the May 2010 CEQR Technical Manual states that, if "the No-Action condition is greater than 21.6 ft^2/p, then a decrease in pedestrian space under the With-Action condition to less than 19.5 ft^2/p worse than mid-LOS D) should be considered a significant impact." The correction in the formula changes the No-Action condition pedestrian space from 21.6 ft^2/p to 21.5 ft^2/p.

Section 500 – Corrects the example regarding mitigation for a pedestrian impact to reflect the proper numeric values based on the correction to Table 16-17.

Section 510 – Adds the following sentence to clarify the jurisdiction of the New York State Department of Transportation:

Since many of the City's highways are under NYSDOT jurisdiction, coordination and approval from that agency, in addition to NYCDOT, is required.

Table 16-18 – Edits the table to appropriately indicate the office within the New York City Department of Transportation that would need to approve any proposed mitigation measures.

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Equation 16-10 – Amends the equation to provide guidelines for determining the appropriate minimum time required for pedestrians when considering signal re-timing as a mitigation measure.

Section 512 – Removes the word, "install," from the last sentence.

Section 743 – Deletes LIB Operations Planning as the source for recent bus studies.

CHAPTER 17, "AIR QUALITY"

Table 17-1 – Revises the table to reflect the new National Ambient Air Quality Standards (NAAQS).

Section 122.2 – Deletes guidance on the 1-hour NAAQS for NO_2 from this section and adds a reference to the new location of the guidance in Section 123.

Section 123 – Revises this section to reflect the new 1-hour NAAQS for NO_2 and the new 1-hour NAAQS for sulfur dioxide (SO2).

Table 17-3 – Revises Table 17-3 to correct the industrial source screen, modeled on a 20-foot source height.

CHAPTER 18, "GREENHOUSE GAS EMISSIONS"

Revises the introduction to reflect the updated PlaNYC, April 2011.

Section 200 – Revises the applicability section to clarify when a GHG assessment is likely needed. Please note that the applicability thresholds have not changed. The revised Section 200, with the changes, is as follows:

> Currently, the GHG consistency assessment focuses on those projects that have the greatest potential to produce GHG emissions that may result in inconsistencies with the GHG reduction goal to a degree considered significant and, correspondingly, have the greatest potential to reduce those emissions through the adoption of project measures and conditions. Over time, as data improve and as GHG emissions standards and regulations evolve, MOEC will reevaluate and, as appropriate, revise the guidance to potentially expand the applicability of the guidance or refine methodologies. The assessment is currently limited to the projects with the characteristics described below.
>
> ~~***THE ENVIRONMENTAL ASSESSMENT STATEMENT ("EAS")***~~
>
> Generally, ~~a GHG emissions assessment under the CEQR Technical Manual is not warranted for projects that do not require preparation of an EIS.~~ a GHG emissions assessment is typically conducted only for larger projects undergoing an EIS, since these projects have a greater potential to be inconsistent with the City's GHG reduction goal to a degree considered significant. However, the nature or type of certain projects may warrant consideration of the project's GHG emissions and, consequently, an analysis of consistency with city policy to reduce GHG emissions, even where preparation of an EIS is not required. This should be determined by the lead agency on a case-by-case basis. In making such determination, the lead agency should consider the following:
>
> - For city capital projects subject to environmental review, it is often appropriate to examine the project's consistency with Executive Order 109 of 2007, which mandates formulation of a GHG reduction plan to reduce city building and operational emissions by 30 percent below Fiscal Year 2006 levels by 2017; or
>
> - A project that proposes either of the following may warrant assessment:

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- Power generation (not including emergency backup power, renewable power, or small-scale cogeneration); or
- Regulations and other actions that fundamentally change the City's solid waste management system by changing solid waste transport mode, distances, or disposal technologies.

- A project conducting an EIS that would also result in development of 350,000 square feet or greater.

~~APPLICABILITY OF THE GHG EMISSIONS ASSESSMENT IN AN ENVIRONMENTAL IMPACT STATEMENT~~

~~With the exception of city capital projects and projects proposing power generation or a fundamental change to the City's solid waste management system (discussed above), a GHG emissions assessment is typically conducted only for larger projects undergoing an EIS, since these projects have a greater potential to be inconsistent with the City's GHG reduction goal to a degree considered significant.~~ Currently, the GHG consistency assessment focuses on those projects ~~being reviewed in an EIS that would result in development of 350,000 square feet or greater~~ with the above characteristics. However, the need for a GHG emissions assessment is highly dependent on the nature of the project and its potential impacts and the lead agency should evaluate, on a case-by-case basis, whether an assessment of consistency with the City's GHG reduction goals should be conducted for other projects undergoing an EIS. For example, if a project would result in the construction of a building that is particularly energy-intense, such as a data processing center or health care facility, a GHG emissions assessment may be warranted, even if the project would be smaller than 350,000 square feet.

Table 18-5 – Revises the table to include average one-way taxi trip lengths for taxi trips with (1) a known origin but an unknown destination or (2) an unknown origin but a known destination.

Mobile Emissions Calculator (corrected in March 2011) – Corrects the underlying data in the table to reflect corrections to EPA's MOVES2010 model, which forms the basis of this calculator.

CHAPTER 22, "CONSTRUCTION"

Title – Changes the title of this section from "Construction Impacts" to "Construction."

Section 200 – In order to properly articulate the circumstances in which a preliminary assessment of construction activities for transportation is needed. The revised text is as follows:

TRANSPORTATION

Construction activities may affect several elements of the City's transportation system, including traffic, transit, pedestrians, and parking. A transportation analysis of construction activities is predicated upon the duration, intensity, complexity and/or location of construction activity.

Analysis of construction activities on transportation is often not required, as many projects do not generate enough construction traffic to warrant such analysis. However, due to the location, extent, and intensity of construction, this is not always the case. Therefore, the lead agency should consider a number of factors before determining whether a preliminary assessment of the effect of construction on transportation is needed. These factors include:

- Whether the project's construction would be located in a Central Business District (CBD) or along an arterial or major thoroughfare.

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- If 'yes', the duration and the nature of the construction activity (which could include, if known, the number of construction-related auto and truck trips (in PCEs), on-site vs. on-street staging area, hours of construction, *etc.*) should be considered to determine whether a preliminary assessment would be needed.

- ~~If so, a preliminary assessment of the effect of construction activities on transportation should be conducted.~~

- Whether the project's construction activities, regardless of where it will be located either in a CBD or along an arterial or major thoroughfare, would require closing, narrowing, or otherwise impeding moving lanes, roadways, key pedestrian facilities (*e.g.*, sidewalks, crosswalks, corners/corner reservoirs), parking lanes and/or parking spaces in on-site or nearby parking lots and garages, bicycle routes and facilities, bus lanes or routes, or access points to transit.

  - If so, would the ~~location be particularly sensitive to such a closure, such as in an area~~ closure be located in an area with high pedestrian activity or near sensitive land uses such as a school, hospital, or park?

    - If 'yes', ~~a preliminary assessment should be conducted unless this closure can be considered the type of routine closure typically fully addressed by a permit (and pedestrian access plan) required by New York City Department of Transportation (DOT) Office of Construction Mitigation and Coordination (OCMC) at the time of closure so that impacts are not expected to occur.~~ the proximity of the closure to the sensitive area(s), the extent of the rerouting of pedestrians, bicycles, or vehicular traffic, and the duration of the closure activity should be considered to determine whether a preliminary assessment would be needed.

- Whether the project would involve construction on multiple development sites, such that there is the potential for several construction timelines to overlap, and last for more than two years overall. If yes, then a preliminary assessment of the effect of construction on transportation is needed.

Section 200 – Edits the section to properly articulate the circumstances in which a preliminary assessment of construction activities for air quality or noise is needed. The revised text is as follows:

AIR QUALITY OR NOISE

Generally, if a transportation analysis is not needed with regard to construction activities, an air quality or noise assessment of construction vehicles is likely not warranted. With regard to the air quality and noise effects of other construction activities, the following should be considered by the lead agency in determining whether a preliminary analysis is needed. Often, this involves considerations of construction equipment and activities.

An assessment of air quality and noise for construction activities is likely not warranted if the project's construction activities:

- Are considered short-term;

- Are not located near sensitive receptors;

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- Do not involve construction of multiple buildings where there is a potential for on-site receptors on buildings to be completed before the final build-out; and

- The pieces of diesel equipment that would operate in a single location at peak construction are limited in number.

~~In addition,~~ If a project either does meet one or more of the criteria above or one of the above criteria is unknown at the time of review, a preliminary air quality or noise assessment is not automatically required. Instead, various factors should be considered, such as the types of construction equipment (gas, diesel, electric), ~~and~~ the nature and extent of any commitment to use the Best Available Technology (BAT) for construction equipment, the physical relationship of the project site to nearby sensitive receptors, the type of construction activity, and the duration of any heavy construction activity. ~~determining whether a preliminary air quality or noise assessment for construction activities is warranted.~~

To illustrate the above, construction noise, generated by pile driving, truck traffic, blasting, demolition, *etc.*, is generally analyzed only when it affects a sensitive receptor over a long period of time. Based upon experience, unless ambient noise levels are very low and/or construction source levels are very high, and there are no structures that provide shielding, it is unusual for construction sources to have significant impacts at distances beyond 1,500 feet in New York City. Therefore, further analysis should be performed if the proposed project would cause construction equipment to be operating within 1,500 feet of a receptor for a period of time exceeding two years. In some circumstances, however, even a shorter term construction phase may affect highly sensitive locations (such as schools, hospitals, *etc.*), warranting further quantitative analysis.

Section 310 – Edits the section in order to properly articulate the circumstances in which a detailed analysis of construction activities for transportation is needed. The revised text is as follows:

TRANSPORTATION

The volume of vehicular traffic (including trucks) expected to be generated during peak construction hours should be estimated in order to determine whether a detailed quantitative analysis is warranted. The assessment of construction-related traffic should consider vehicles generated by construction employees driving to and from the site, as well as trucks and other vehicles associated with project construction. Calculating the background information necessary for this assessment can be performed as follows:

1. Estimate the construction employee and construction-related vehicle trips (presented as PCEs) that would be generated during construction peak periods. This should include an estimate of the number of autos bringing construction workers to the site during the peak travel periods and the volume of trucks or other construction vehicles expected to access the site during those periods. This information is usually developed by, or in close coordination with, the project's engineers. Typically, construction peak hours take place earlier than the AM and PM traffic peak hours. For some projects, however, a portion of the employee- and construction-related vehicle trips will occur at the same time as peak commuting or traffic conditions in the area. For example, where the peak hour for the study area under current conditions is 8:00 a.m. to 9:00 a.m., the analysis may note that approximately 10 to 15 trucks and 50 autos are expected to bring construction workers to the site during the 7:00 a.m. to 8:00 a.m. peak arrival hour for construction-related activity, while 3 to 5 trucks and

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15 autos are expected to do likewise during the 8 to 9 AM peak travel hour for the study area.

2. Using the data gathered for the traffic analysis, assess whether the AM or PM peak hours for construction of the project will overlap with peak operational hours for the project.

If applicable, the preliminary assessment should also comment on the extent to which sidewalk, travel lane(s) or street closures would impact traffic and pedestrian flows, and it should assess whether capacity losses and/or full street closures would affect traffic patterns, create traffic diversions, cause backups or otherwise cause a significant deterioration in local or regional traffic flow. For multi-phase projects, potential construction impacts should be addressed for each phase. Note that the term "closure" is used broadly and includes the complete closure of a street or sidewalk for 24 hours a day, as well as the taking of one curb lane 24 hours a day to accommodate construction vehicles or field offices or the closure of a lane or lanes during parts of the day. Any impacts on parking supply caused by the taking of lanes or the removal of parking spaces in on-site or nearby parking lots and garages should also be disclosed, especially for active retail or residential areas where such losses may affect retail activity and residents.

No detailed traffic analysis for construction activities is needed if the construction peak would generate fewer than 50 vehicle trips (presented in PCEs). If the project involves multiple development sites over varying construction timelines, a preliminary assessment must take into account whether the PCEs associated with operational trips from completed portions of the project and construction trips associated with construction activities could overlap and exceed the 50 PCE threshold. If not, further analysis is not required.

If the project would exceed the 50 PCE threshold, t~~T~~he conclusion may be drawn that the project would have no significant impacts with regard to traffic and, therefore, no detailed traffic analysis for construction activities is needed if the following factors are all present:

1. The construction peak would generate fewer vehicle trips (presented as PCEs) than the operational project peak and the construction peak lane geometry, signal timing, and parking regulations are consistent with those of the operational ~~project~~ peak hours;

2. The construction would occur during off-peak hours or during hours comparable to the operational ~~project~~ peak hours;

3. The project has been determined not to produce the potential for significant adverse traffic impacts during the operational period; and

4. The preliminary assessment indicates that changes to the capacity of the roadway network related to construction activities are not likely to cause a significant deterioration in local or regional traffic flow.

Correspondingly, if construction would generate a number of vehicular trips similar to or greater than the proposed project and if the operational analysis indicates significant impacts, a more detailed construction traffic assessment may be necessary. In cases where the project's operational analyses do not identify significant traffic impacts but the project's construction-related activities could affect the capacity of the roadway network in an area and result in the potential for a significant impact, a detailed traffic analysis may be warranted.

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APPENDIX: TRANSPORTATION

Pages 31 to 50 – Adds tables showing the "Top High Accident Intersections" and "Top High Pedestrian Accident Intersections" for 2010, and deletes the 2008 versions of these tables.

APPENDIX: AIR QUALITY

Page 20 – Corrects a formula to indicate that the value should be squared instead of multiplied by the fourth power.

Pages 37 and 38 – Incorporates the most recent version of EPA's Compilation of Air Pollutant Emission Factors (AP-42) into the appendix.

Page 43 – Revises the table to correct the industrial source screen, modeled on a 20-foot source height.

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CEQR TECHNICAL MANUAL 2012 EDITION
REVISIONS (EFFECTIVE 6/18/12)

The Department of City Planning proposed a citywide text amendment to Section 11-15 and related Sections of the Zoning Resolution (ZR) to update the regulations governing Environmental "(E)" designations (see http://www.nyc.gov/html/dcp/html/e_designations/index.shtml). These zoning text changes were adopted by the City Council and became effective on March 28, 2012. To implement the (E) designation text amendment to the Zoning Resolution, the Office of Environmental Remediation ("OER") proposed to amend rules for property owners to comply with (E) designations in relation to potential hazardous materials, air quality and noise impacts. The amended rules became effective on June 18, 2012 and, in addition to other changes, clarify that Phase I testing is required during environmental review for lots under the ownership or control of an applicant for zoning text amendments or actions pursuant to the Zoning Resolution. Revisions to Chapters 12, 17 and 19 of the *CEQR Technical Manual* are, therefore, intended to provide guidance with respect to the new rules and text.

This document summarizes the revisions that were made to the 2012 Edition of the *CEQR Technical Manual*. The changes are indicated by section number. When deemed appropriate, an entire section or paragraph is presented below to provide context and indicate specific text changes. Deletions are indicated using a ~~striketh-rough~~, and additions are indicated using double underline. Typographical or grammatical errors were also corrected. These changes are not indicated below and have no effect on the substance of the guidance in the *CEQR Technical Manual*.

CHAPTER 12, "HAZARDOUS MATERIALS"

Introduction (second paragraph) – Clarifies that the lead agency, in coordination with DEP, determines whether an institutional control, such as an (E) designation, is required. The paragraph is revised as follows:

> As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide technical review, recommendations and approval relating to hazardous materials. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), ~~DEP~~the lead agency, in coordination with ~~the lead agency~~DEP, determines whether an institutional control (discussed in more detail in Sections 550 through 552), such as an (E) Designation, ~~Restrictive Declaration, or Memorandum of Understanding (MOU)~~ may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering ~~post-CEQR~~ (E) Designations and existing hazardous materials Restrictive Declarations recorded on privately-owned parcels as a result of zoning and/or variance actions approvals, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

Section 321 – Revises the guidance relating to the conclusions that may result from a Phase I ESA as follows:

> The conclusions of this assessment can fall into ~~four~~the following categories:

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- There is little or no likelihood of contamination, and therefore, there would be no significant adverse impacts resulting from hazardous materials, and no further investigation is warranted.

- ~~Contamination may exist, and there is a potential for significant adverse impacts. Enough is known at this point that potential worst-case impacts can be disclosed and mitigation developed. An example is a petroleum spill with substantial contamination that will require total removal of soil, and installation of a sub-slab depressurization system.~~

- ~~Contamination may exist, but not enough is known at this point to disclose the nature and extent of contamination to determine whether significant adverse impacts would occur. Additional work (Phase II ESA, described in Section 330) should be performed to determine the nature and extent of any contamination. At this point, it is strongly recommended that DEP be contacted.~~

- ~~Contamination is known to exist. More work is required to determine its nature and extent so that significant adverse impacts can be fully disclosed and mitigation developed as appropriate. It is strongly recommended that DEP be contacted. A Phase II ESA can be performed to determine the nature and extent of any contamination.~~

  Note that a Phase I ESA cannot entirely eliminate uncertainty regarding the potential for hazardous materials or a REC in connection with a property. Therefore, the preparer and reviewer must make certain that all due diligence measures have been undertaken before concluding that no potential adverse impact could occur.

- Contamination may exist or is known to exist. More work is required to determine nature and extent of the contamination so that the potential for significant adverse impacts can be fully disclosed and mitigation developed, as appropriate. A Phase II ESA (described in Section 330) should be performed to determine the nature and extent of any contamination.

The Phase I ESA should be summarized as part of the CEQR documentation, including a description of the scope of work, research and activities undertaken, findings, and conclusions.

~~Note that New York City's government information service (311) and/or DEP's Bureau of Environmental Compliance must be contacted immediately when potential significant adverse impacts are identified that present immediate potentially serious health impacts, such as a mercury spill in an occupied building.~~

Section 322 – Deletes this section.

Section 330 – Adds final sentence to clarify that when possible, the Phase II ESA should be conducted before a determination of significance is made at the EAS stage or, if a positive declaration is being issued, before the DEIS is completed.

Section 400 (last paragraph) – Clarifies that lead agencies should coordinate with DEP and, as appropriate, OER, in developing measures to avoid or mitigate potential impacts.

Section 500 (first paragraph) – Clarifies that DEP and OER recommend a "risk-based" approach in determining the proper course of mitigation.

Section 500 – Removes references to Restrictive Declarations from, and clarifies the list of, institutional controls.

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Section 500 (last paragraph) – Clarifies that a RAP should set out appropriate testing protocols and timely submission to DEP or OER, as applicable, of laboratory testing data, documenting both proper off-site disposal and compliant incoming fill materials.

Section 550 – Removes references to Restrictive Declarations from, and clarifies the list of, institutional controls. Adds references to the Zoning Resolution and Rules of the City of New York.

Section 551 – Revises guidance relating to (E) Designations, as follows:

The hazardous materials (E) Designation is an institutional control that ~~is implemented through~~ can be placed as a result of the CEQR review of a zoning map or text amendment or action ~~and~~pursuant to the Zoning Resolution. It provides a mechanism to ensure that testing for and mitigation and/or remediation of hazardous materials, if necessary, are completed prior to, or as part of, future development of ~~the affected site. It is typically used to designate sites that meet all four of the following criteria:~~an affected site, thereby eliminating the potential for a hazardous materials impact.

- ~~Projected to or potentially would be developed as a consequence of the proposed project;~~
- ~~Not publicly owned;~~
- ~~Not owned or controlled by the applicant; and~~
- ~~The analysis identified the potential presence of hazardous materials.~~

Chapter 24 of Title 15 of the Rules of the City of New York and Section 11-15 of the Zoning Resolution of the City of New York set out the procedures for placing (E) Designations, satisfying related requirements, and removing (E) Designations. Detailed requirements on how to investigate, remediate, satisfy, and receive appropriate sign-offs for sites with (E) ~~designations~~Designations are included in the Rules. ~~Applicants~~If necessary, the lead agency may consult with DEP during the CEQR process to identify sites requiring an (E) Designation. After a site has been identified or after the (E) has been placed, applicants are advised to ~~submit all~~provide the CEQR number to OER and, in order to facilitate OER's review of work proposed to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the hazardous materials CEQR review (~~*i.e.*~~*g.*, EAS/EIS, Phase I ESA, Phase II ESA Work Plan/HASP, Phase II ESA Report(s), RAP/CHASP, lead agency and DEP correspondences, Restrictive Declarations, Notices~~, *etc.*) to OER (or DEP, in consultation with OER, to the extent that investigations take place during CEQR), for review and approval. Because (E) Designations are developed on a site-specific basis, DEP works with the lead agency during the CEQR process to identify (E) sites. (E) Designations are shown on the Zoning Maps and are listed in a table appended to the Zoning Maps, and they also appear in DOB's online Building Information System (BIS).~~) to OER. With respect to an applicant-owned or -controlled site, if the lead agency determines that the proposed zoning action warrants a hazardous materials assessment and a Phase I ESA, the Phase I ESA must be completed during CEQR. If the Phase I shows that potential hazardous materials conditions exist, which will need to be addressed during development, the lead agency may assign an (E) Designation to the site, requiring a Phase II ESA and any necessary remediation prior to and/or during redevelopment of the site (see Section 330 above). It is possible that, based on the Phase I and consultation with DEP, the lead agency may determine that the identification and characterization in the EAS/EIS of the actual nature and degree of contamination is appropriate during CEQR. If a Phase II ESA is, therefore, completed during CEQR and remediation is required, the lead agency may assign an

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(E) Designation if such remediation will involve more than standard construction practices and the proper removal of soil and site preparation in accordance with applicable laws and regulations. Such (E) Designation will require the preparation of a Remediation Action Plan in consultation with OER. Otherwise, remediation proposed to be undertaken in accordance with standard construction practices should be reviewed and approved by DEP, and an (E) Designation may not be warranted.

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution and appear in DOB's online Buildings Information System (BIS).

With respect to lots with (E) Designations, DOB will not issue building permits or certificates of occupancy in connection with the following ~~permits~~actions until it receives an appropriate "Notice" from OER that the environmental requirements have been met:

- ~~Permits that would allow development;~~
- ~~Permits that would allow enlargement, extension~~Developments;
- Enlargements, extensions or ~~change~~changes of use, involving residential or community facility use; or
- ~~Permits~~Enlargements or alterations that ~~would allow enlargement that disturbs~~disturb the soil.

As appropriate, OER will issue the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction.

Section 552 – Revises guidance relating to Restrictive Declarations as follows:

~~When~~Historically – until the amendments to the (E) Rules, which became effective on June 18, 2012, allowing lead agencies to place (E) Designations on applicant~~owns~~-owned or -controlled sites and ~~controls the development site, a~~in connection with all zoning actions – Restrictive ~~Declaration may be~~Declarations were used as an institutional control to ensure that the required testing, remediation and/or mitigation ~~occur~~occurred prior to or as part of the development of applicant-owned or -controlled sites.

~~A Restrictive Declaration should not be used as a means to forego the CEQR investigation, and should only be used when testing is not feasible or possible or when residual impacts remain on site, requiring the protection of future uses. The lead agency should consult with DEP in determining whether a Restrictive Declaration is appropriate.~~

~~The~~ Restrictive Declaration are recorded instruments, ~~binds~~binding the applicant, as property owner and/or long-term lessee, future owners/lessees and other parties-in-interest, to investigation and/or remediation requirements at pre-determined stages of the project, as overseen by DEP during the CEQR review process or by OER during post-CEQR review ~~for approved zoning and variance actions.~~ In particular, ~~a~~ Restrictive Declarations require~~s~~ written notice from OER before DOB may issue building permits or certificates of occupancy in connection with the actions described above under (E) Designations.

- ~~Written notice from OER before DOB may issue certain permits (typically the three types described above under (E) Designations); and~~

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- ~~Written notice from OER (typically a Notice of Satisfaction, but sometimes a Notice of No Objection) before DOB may issue a Temporary Certificate of Occupancy or Permanent Certificate of Occupancy.~~

~~Because Restrictive Declarations and the other institutional controls are developed on a site-specific basis, DEP must approve the form and content of the document before it is executed. The~~ If an applicant ~~must submit acceptable proof of recording of an approved~~ proposes a Restrictive Declaration ~~prior~~with requirements to ~~DEP's issuance of a final determination to~~ address potential hazardous materials contamination as part of a proposed project, as described in Section 421.1 of Chapter 2, the lead agency may instead elect to incorporate such provisions in an (E) Designation.

CHAPTER 17, "AIR QUALITY"

Introduction (second paragraph) – Clarifies that the lead agency, in coordination with DEP, determines whether an institutional control, such as an (E) designation, is required. The paragraph is revised as follows:

> As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide technical review, recommendations and approval relating to air quality. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), ~~DEP~~the lead agency, in coordination with ~~the lead agency~~DEP, determines whether an ~~Institutional Control~~institutional control, such as an (E) Designation, ~~Restrictive Declaration, or Memorandum of Understanding~~ may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering post-CEQR (E) Designations and existing Restrictive Declarations recorded on privately-owned parcels, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

Section 540 – Renames the section as "(E) Designations," and revises the guidance relating to (E) designations, as follows:

> The (E) ~~designation~~Designation is an institutional control that is implemented through CEQR review of a zoning ~~action and~~ map or text amendment or action pursuant to the Zoning Resolution. It provides a mechanism to ensure that ~~testing~~ measures aimed at avoiding a significant adverse impact and, if necessary, remediation are completed ~~prior to or~~ as part of future development~~. It is typically used to designate sites that meet all four of the following criteria:~~
>
> - ~~Potential to be developed as a consequence of the proposed project;~~
> - ~~Not publicly owned;~~
> - ~~Not controlled by the applicant;~~
>
> ~~The analysis identified~~ , thereby eliminating the potential ~~significant adverse~~ for an air quality impact ~~related to HVAC emissions or industrial sources.~~.

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~~Because (E) designations are developed on a site-specific basis, DEP works with~~ If necessary, the lead agency may consult with DEP during the CEQR process to identify ~~(E)~~ sites~~.~~ requiring an (E). ~~As of May 11, 2009, t~~The Mayor's Office of Environmental Remediation (OER) is responsible for administering post-CEQR determinations for assigned (E) ~~designations~~Designations and existing Restrictive Declarations ~~recorded on privately-owned parcels.~~, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York ~~and Section 11-15 of the Zoning Resolution~~(Rules). If property owners have applied for an action that will result in placement of ~~the City of New York~~an (E) Designation, they are advised to provide the CEQR number to OER and, in order to facilitate OER's review of the proposed work to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the CEQR Air Quality analysis (*e.g.*, EAS/EIS, Technical Memoranda, CEQR determination, modeling results, lead agency and DEP correspondences, Restrictive Declarations, Notices) to OER. The Rules and Section 11-15 of the Zoning Resolution set out the procedures for placing, satisfying and removing (E) ~~designations~~Designations. OER should review and approve all ~~material~~documents needed to satisfy the requirement of the Air Quality (E) ~~designation (~~Designation (*e.g.,* boilers/HVAC ~~specs~~specifications, fuel usage, stack location~~,~~ *~~etc.~~*~~).~~ ~~On (E) designated lots,~~).

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution, and appear in the Department of ~~Buildings~~Buildings' (DOB) online Buildings Information System (BIS).

With respect to (E) designated lots, DOB will not issue ~~the following~~building permits or certificates of occupancy in connection with the following actions until ~~they receive~~it receives an appropriate "Notice" from OER ~~(or formerly by DEP)~~ that the (E) requirements have been met:

- ~~Permits that would allow development;~~Developments;
- Enlargements, extensions or

  ~~Permits that would allow enlargement, extension or change~~ changes of use ~~involving residential or community facility use.~~; or
- Alterations that involve ventilation or exhaust systems, including, but not limited to, stack relocation or vent replacement.

As appropriate, OER issues the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction. ~~(E) designations are shown on the Zoning Maps and are listed in a table appended to the Zoning Maps, and also appear in DOB's online Building Information System (BIS).~~

Section 552 – Deletes this section.

CHAPTER 19, "NOISE"

Introduction (third paragraph) – Clarifies that the lead agency, in coordination with DEP, determines whether an institutional control, such as an (E) designation, is required. The paragraph is revised as follows:

> As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide

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technical review, recommendations and approvals relating to noise. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), ~~DEP~~the lead agency, in coordination with ~~the lead agency~~DEP, determines whether an ~~Institutional Control~~institutional control, such as an (E) ~~designation, Restrictive Declaration, or Memorandum~~Designation, may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering post-CEQR (E) ~~designations and Restrictive Declarations recorded on privately-owned parcels~~Designations and existing Restrictive Declarations, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

Section 530 – Renames the section as "(E) Designations," and revises the guidance relating to (E) designations, as follows:

The ~~"~~(E~~"~~) Designation is an institutional control that is implemented through CEQR review of a zoning ~~project and~~map or text amendment or action pursuant to the Zoning Resolution. It provides a mechanism to ensure that measures aimed at avoiding a significant adverse ~~impacts and, if necessary, remediation~~ impact are part of future development~~. It is typically used to designate sites that meet all four of the following criteria:~~

- ~~Potential to be developed as a consequence of the proposed project;~~
- ~~Not publicly owned;~~
- ~~Not controlled by the applicant;~~

~~The analysis identified~~, thereby eliminating the potential ~~significant adverse~~ for a noise ~~impacts.~~impact.

~~Because (E) designations are developed on a site-specific basis, DEP works with~~ If necessary, the lead agency may consult with DEP during the CEQR process to identify ~~(E)~~ sites~~.~~ requiring an (E). ~~As of May 11, 2009, t~~The Mayor's Office of Environmental Remediation (OER) is responsible for administering post-CEQR determinations for projects with assigned (E) ~~designations~~Designations and existing Restrictive Declarations ~~recorded on privately-owned parcels.~~, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York ~~and Section 11-15 of the Zoning Resolution~~(Rules). If property owners have applied for an action that will result in placement of ~~the City of New York~~an (E) Designation, they are advised to provide the CEQR number to OER and, in order to facilitate OER's review of the proposed work to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the CEQR Noise analysis (*e.g.*, EAS/EIS, Technical Memoranda, CEQR determination, modeling results, lead agency and DEP correspondence, Restrictive Declarations, Notices) to OER. The Rules and Section 11-15 of the Zoning Resolution set out the procedures for placing, satisfying and removing (E) ~~designations~~Designations. OER reviews and approves all ~~material~~documents needed to satisfy the requirement of a noise (E) ~~designation. On "E" designated lots,~~ Designation.

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution, and appear in the Department of ~~Buildings~~Buildings' (DOB) online Buildings Information System (BIS).

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With respect to (E) designated lots, DOB will not issue ~~the following~~building permits or certificates of occupancy in connection with the following actions until ~~they receive~~it receives an appropriate "Notice" from OER ~~(or formerly DEP)~~ that the ~~"E" designation~~(E) requirements have been met:

- ~~Permits that would allow development;~~Developments;
- Enlargements, extensions or
- ~~Permits that would allow enlargement, extension or change~~ changes of use ~~involving residential or community facility use.~~; or
- Alterations that involve window or exterior wall relocation or replacement.

As appropriate, OER issues the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction.

~~(E) designations are shown on the zoning maps and are listed in a table appended to the zoning maps, and also appear in DOB's online Building Information System (BIS).~~

Section 540 – Deletes this section.

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INTRODUCTION

The CEQR Technical Manual (hereinafter "the Manual") provides guidance for city agencies, project sponsors, the public, and other entities in the procedures and substance of the City's Environmental Quality Review process. CEQR requires city agencies to assess, disclose, and mitigate to the greatest extent practicable the significant environmental consequences of their decisions to fund, directly undertake, or approve a project. The environmental assessment analyzes the project that is facilitated by the action or actions. An action is a discretionary agency decision (approval, funding or undertaking) needed in order to complete a project. As part of the Mayor's Office of Environmental Coordination (MOEC) mandate to assist agencies and other participants in the process, the Manual provides guidance to agencies in undertaking and completing the CEQR process and develops technical guidance and methodologies for environmental review. The Manual, as updated, provides a detailed and comprehensive discussion of the CEQR process, from simple environmental assessments to the more complex analyses appropriate for Environmental Impact Statements (EISs). Consequently, the Manual reflects changes in the environmental review process over time, development of new methodologies, changes in legislation, and other circumstances that affect the form or content of the City's environmental review process. In addition, city policies, environmental conditions, and the level of information available for assessing a project have changed since the last revision and the technical analyses have been updated and revised accordingly.

STRUCTURE OF THE MANUAL

The Manual presents its information in twenty-four chapters. Chapter 1 describes the regulatory requirements of the CEQR process and the various types of documentation applicable during environmental review. This chapter also offers a practical approach to determining the appropriate level of documentation. Chapter 2 provides guidance in structuring the environmental analyses. This framework includes defining and characterizing the proposed project so that it may be assessed, as well as evaluating and comparing environmental conditions for three specific scenarios—the existing condition, the future without the project, and the future with the project in place.

Chapter 3 introduces the technical analyses used to identify potential significant adverse impacts, the development of measures to mitigate such impacts, and the process for selecting alternatives. The technical analyses are presented in Chapters 4 through 22. Each chapter explains potential assessment methods for that technical area. These methodologies are considered appropriate for assessment of projects undergoing CEQR review, but are not required by CEQR. There may be specific projects that require additional analyses.

Chapter 23 describes the types of alternatives to be assessed and Chapter 24 explains the contents of the various summary chapters to be included when an EIS is required. A glossary and appendices containing relevant rules and regulations and other technical information are located in online appendices to the Manual.

ENVIRONMENTAL ASSESSMENT STATEMENT (EAS) SHORT AND FULL FORMS

The Environmental Assessment Form provides a template for the conduct of the environmental assessment. An EAS Short Form has been developed for the assessment of Unlisted actions only. This form provides a detailed checklist to assist the project proponent and lead agency in determining whether further detailed assessment is needed and whether the potential exists for significant adverse impacts. If no further assessment is needed, the EAS Short Form incorporates a template for issuance of a Negative Declaration. Note that the lead agency may require supplementation of information requested in the EAS Short Form in order to make its determination of significance.

The EAS Full Form, to be completed for assessment of all Type I actions and certain Unlisted actions, as appropriate, has been revised to include a checklist for determining the potential for significant adverse impacts.

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ACCESS TO THE ELECTRONIC CEQR TECHNICAL MANUAL

As part of the City's efforts to make information available to the public electronically and reduce the use of paper, the updated Manual is available in downloadable PDF format on the Mayor's Office of Environmental Coordination (MOEC) website. The Manual will not be printed. Where possible, hyperlinks to additional information have been included in each chapter, including links to external websites, as well as to additional information such as charts, tables, and further guidance regarding a specific topic. Please note that internet access is required to follow any of the externally referenced links in the chapters.

MOEC will review the CEQR Technical Manual periodically to determine whether updates or revisions are needed. Notices of revisions or updates will be announced on MOEC's website and reflected in the appropriate chapter(s) in the Technical Manual. Updated text will be highlighted and each updated page will be "date-stamped" to indicate when the guidance was issued. If necessary, MOEC will also update the Manual between scheduled reviews. For these reasons, it is recommended to always use the online chapters located on MOEC's website.

APPLICABILITY OF THE CEQR TECHNICAL MANUAL AND SUBSEQUENT UPDATES

The updated CEQR Technical Manual should be used as guidance for any environmental review commenced on or after the date of the release of the update. In the case of impact analyses commenced prior to this date of release that are not considered complete as of such date--through the issuance of a Negative Declaration, a Conditional Negative Declaration, or a Final Environmental Impact Statement--the lead agency should consider, taking into account as necessary the scheduled timing of completion of environmental review under the applicable regulatory approval process, whether supplementation of the impact analyses to reflect a methodology of the updated CEQR Technical Manual should be conducted.

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PROCEDURES AND DOCUMENTATION

CHAPTER 1

City Environmental Quality Review, or "CEQR," is New York City's process for implementing the State Environmental Quality Review Act (SEQRA), by which agencies of the City of New York review proposed discretionary actions to identify and disclose the potential effects those actions may have on the environment.

This chapter of the CEQR Technical Manual explains the CEQR process. Specifically, it addresses the types of projects subject to CEQR, the selection of the agency primarily responsible for the environmental review of the project, the participation of other agencies and the public in the review process, and the determinations and findings that are prerequisites for agency action. It also introduces the documentation used in CEQR, including the Environmental Assessment Statement (EAS) and the Environmental Impact Statement (EIS), and discusses CEQR's relationship with other common approval procedures, such as the Uniform Land Use Review Procedure (ULURP).

This chapter is not a definitive discussion of the legal issues that may be encountered in the CEQR process. The review of a specific project by an agency may, in many instances, require additional research and interpretation. In these cases, it may be useful to consult with legal counsel.

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A. OVERVIEW OF LEGISLATIVE HISTORY

100. NEPA

The preparation of an interdisciplinary, comprehensive environmental impact assessment was first required when the Congress of the United States of America included it in Section 102(2)(C) of the National Environmental Policy Act of 1969, known as "NEPA." NEPA and its regulations require all federal agencies to evaluate the environmental consequences of proposed projects and to consider alternatives.

200. SEQRA

In 1975, the New York State Legislature enacted SEQRA, which requires all state and local government agencies to assess the environmental effects of discretionary actions before undertaking, funding, or approving the project, unless such actions fall within certain statutory or regulatory exemptions from the requirements for review.

The provisions of SEQRA are found in Article 8 of the New York State Environmental Conservation Law (ECL §8-0101 *et seq.*). The New York State Department of Environmental Conservation (NYSDEC) has promulgated regulations, last amended in 2000, that guide the process of review (SEQR). These are published as Part 617 of Title 6 of New York Codes, Rules and Regulations (6 NYCRR 617) and are included in the Appendix to this chapter. Specific provisions of the SEQR regulations are hyperlinked throughout this chapter.

300. CEQR

SEQR permits a local government to promulgate its own procedures provided they are no less protective of the environment, public participation, and judicial review than provided for by the state rules. See 6 NYCRR 617.14(b). The City of New York has exercised this prerogative by promulgating its own procedures, known as CEQR, in order to take into account the special circumstances of New York City's urban environment.

In 1973, before SEQRA was enacted, New York City Mayoral Executive Order No. 87, entitled "Environmental Review of Major Projects," adapted NEPA to meet the needs of the city. After SEQRA was enacted, New York City revised its procedures in Mayoral Executive Order No. 91 of 1977, which established CEQR.

In 1989, amendments to the New York City Charter, adopted by referendum, established the Office of Environmental Coordination (OEC) and authorized the City Planning Commission (CPC) to establish procedures for the conduct of environmental review by city agencies where such review is required by law. The Charter directs that such procedures include: (1) the selection of the city agency or agencies that are to be responsible for determining whether an Environmental Impact Statement is required (*i.e.*, the "lead" agency); (2) the participation by the city in reviews involving agencies other than city agencies; and (3) coordination of environmental review procedures with the Uniform Land Use Review Procedure. The OEC was established by Executive Order within the Office of the Mayor as the Mayor's Office of Environmental Coordination (MOEC).

On October 1, 1991, the CPC adopted rules that were superimposed on Executive Order 91, fundamentally reforming the city's process. The additional rules, titled Rules of Procedure, are published in the Rules of the City of New York (RCNY) at 62 RCNY Chapter 5; the provisions of Executive Order No. 91 are published as an Appendix to 62 RCNY Chapter 5 and in 43 RCNY Chapter 6. Both the additional rules and the Executive Order are included in the Appendix to this chapter and are hyperlinked throughout this chapter. Executive Order No. 91 and the Rules of Procedure are hereinafter collectively referred to as the "CEQR rules."

The rules contain criteria for selecting the agency responsible for the conduct of environmental review of a given action, set forth a public scoping procedure to be followed by the city lead agency responsible for a project's environmental review, and define in greater detail the responsibilities of MOEC. One of MOEC's responsibilities is to assist city lead agencies in fulfilling their environmental review responsibilities.

In addition, CEQR's requirements are further defined through decisions of the state courts. Judicial review of CEQR determinations is provided for in Article 78 of the New York State Civil Practice Law and Rules (CPLR). If an agency fails to comply with CEQR, a court may invalidate that decision pursuant to Article 78 of the CPLR. Decisions on Article 78 petitions have established a substantial body of judicial guidance on the scope and requirements of environmental review. For this reason, it is often helpful to consult with legal counsel when making decisions related to environmental reviews.

B. CEQR PROCESS

In implementing SEQRA, the CEQR process requires city agencies to assess, disclose, and mitigate to the greatest extent practicable the significant environmental consequences of their decisions to fund, directly undertake, or approve a project. The environmental assessment analyzes the project that is facilitated by the action or actions. An action is a discretionary agency decision (approval, funding, or undertaking) needed in order to complete a project.

Review under CEQR should commence as early as possible in the formulation or consideration of a proposal for a project. An agency may, however, conduct environmental, engineering, economic, feasibility and other studies, and preliminary planning and budgetary processes necessary to the formulation of a project, without first beginning the CEQR process. Such activities are considered Type II actions. 6 NYCRR 617.5(c)(21). Typically, review begins at the stage of early design of a project or, in the case of city projects, at the planning stage or upon receipt of an application for a permit or other discretionary approval. In the case of city projects, an environmental assessment is not required until the specifics of the project are formulated and proposed. However, an agency may commence its review earlier to help in its examination of project options. Environmental review must be completed before any activity commits the city to engage in, fund, or approve a project.

Based on an initial evaluation, an agency determines whether or not a project is subject to environmental review. If the project is subject to environmental review, an initial assessment considers a series of technical areas, such as air quality, traffic, and neighborhood character, to determine whether the project may have a significant adverse impact on the environment. There may be specific projects that require additional analyses. If the project under considera-

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tion has the potential for a significant adverse environmental impact, then the lead agency conducts a detailed assessment to determine whether significant adverse environmental impacts would occur as a result of the project. If the agency identifies significant adverse impacts, the lead agency must consider alternatives which, consistent with social, economic, and other essential considerations, would avoid or minimize such impacts to the maximum extent practicable. A detailed outline of the CEQR process is shown in this chart.

CEQR includes certain requirements with regard to documentation of the study of effects on the environment. Under certain circumstances, CEQR also gives the public a role in the assessment of potential environmental impacts. The level of detail appropriate for such study, the type of documentation, and the extent of public involvement vary depending on the project and its context. The following describes the procedural steps through which an environmental review typically progresses.

100. APPLICABILITY OF CEQR

As early as possible in an agency's consideration of a discretionary action it proposes to approve, fund, or undertake, it determines whether the project is subject to CEQR. Proposed projects that are subject to CEQR include those:

1. Directly undertaken by a city agency;
2. For which the agency provides financial assistance; or
3. For which the agency issues permits or approvals.

Such projects must involve the exercise of discretion by the agency and may include approvals of construction projects (such as building a bridge) or adoption of regulations (such as a decision to rezone an area, *etc.*). A project may be initiated by the city or proposed by private applicants for approval by a city agency.

Within this group of discretionary actions, some categories of actions are subject to environmental review, while others are not. As defined by SEQR, and as described below, actions are broadly divided into three categories: Type II actions, Type I actions, and Unlisted actions.

110. ACTIONS NOT SUBJECT TO ENVIRONMENTAL REVIEW

111. Type II Actions

NYSDEC includes in its SEQR regulations a list of actions, identified as Type II actions, that it has determined would not have a significant impact on the environment or that are otherwise precluded from environmental review. See 6 NYCRR 617.5. SEQR regulations permit local agencies to promulgate their own Type II lists to supplement the state list. Because the city currently does not have a Type II list, only the state list need be consulted.

If a project corresponds to one or more of the identified Type II actions, the preparation of an Environmental Assessment Statement (EAS) or an EIS is not required. In some such cases, an agency may conclude that a Type II determination for a project may warrant further explanation and, therefore, it is appropriate for the agency to document its consideration and determination of the Type II action in a memorandum for its files ("Type II Memorandum"). Such a Type II Memorandum would be appropriate where a project-specific determination has been made as to whether the project falls within a Type II category. In contrast, the use of such a memorandum would be unnecessary for actions that have been routinely classified by the lead agency as falling within a Type II category and require no individualized determination whether the actions are Type II. If an agency documents its Type II determination in a Type II Memorandum, it should submit a copy of the memorandum to MOEC.

111.1. Common Type II Actions

Many governmental decisions and undertakings may be considered "routine or continuing agency administration and management, not including new programs or major reordering of priorities that

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may affect the environment." 6 NYCRR 617.5 (c)(20). Determination of whether a project fits within this Type II category often requires consideration of the agency's core mission, as stated in the City Charter, and the frequency or regularity with which the agency engages in similar projects. An example of routine or continuing agency administration and management includes adjustments the New York City Department of Sanitation (DSNY) makes to its collection routes. A Type II Memorandum may be appropriate to explain other agency actions that may not be readily apparent under this provision.

Another widely applicable Type II category concerns official acts of a ministerial nature involving no exercise of discretion. This category includes the New York City Department of Buildings' (DOB) issuance of building permits and the New York City Landmarks Preservation Commission's (LPC) issuance of certificates of appropriateness, where issuance is predicated solely on the applicant's compliance or non-compliance with the relevant local building or preservation code(s), 6 NYCRR 617.5(c)(19). Although the determination of whether the contemplated project complies with the applicable code may require considerable expertise, the decision to approve the project is nonetheless ministerial.

Two Type II categories, maintenance and repair involving no substantial changes in an existing structure or facility, 6 NYCRR 617.5(c)(1) and replacement, rehabilitation or reconstruction of a structure or facility in kind on the same site, 6 NYCRR 617.5(c)(2), may also apply to many governmental activities. Emergency projects that are immediately necessary on a limited and temporary basis for the protection or preservation of life, health, property, or natural resources are Type II actions as well; however, all activities after the emergency has subsided are subject to review under CEQR. 6 NYCRR 617.5(c)(33). The characteristics of these and other Type II categories require careful consideration and it is advisable for the agency to consult MOEC in making this determination.

120. ACTIONS SUBJECT TO ENVIRONMENTAL REVIEW

121. Type I Actions

Type I actions are described in the SEQR regulations as "those actions and projects that are more likely to require the preparation of an EIS than Unlisted actions." 6 NYCRR 617.4(a). A Type I action "carries with it the presumption that it is likely to have a significant adverse impact on the environment and may require an EIS." 6 NYCRR 617.4(a)(1). Before undertaking a Type I action, an EAS using the Full EAS Form is prepared. In certain instances, the lead agency may waive the requirement for an EAS if a draft EIS is prepared or submitted; in this case, the agency should treat the DEIS as an EAS for the purpose of determining significance. 6 NYCRR 617.6(a)(4). Although it is possible to conclude on the basis of an EAS that a Type I action would have no significant impact on the environment, such a determination is less likely than it is for an Unlisted action. A list of Type I actions appears in the SEQR regulations. See 6 NYCRR 617.4. The city has a supplementary list, which appears at 43 RCNY 6-15. Both lists should be consulted when determining action type.

122. Unlisted Actions

Unlisted actions are all actions that are not listed as either Type I or Type II. For any Unlisted action, an EAS must be prepared, and project proponents may elect to complete the Short EAS Form. As with Type I actions, the lead agency may waive the requirement for an EAS if a draft EIS is prepared and, in such cases, should treat the DEIS as an EAS for the purposes of determining significance. 6 NYCRR 617.6(a)(4).

130. SEGMENTATION

One of the early steps in the CEQR process is to define the scope of the project that is the subject of the environmental review (see also Chapter 2,"Establishing the Analysis Framework"). Segmentation, "the division of the environmental review of an action such that various activities or stages are addressed . . . as though they were inde-

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pendent, unrelated activities, needing individual determinations of significance," 6 NYCRR 617.2(ag), generally is not permissible. An example that raises segmentation issues is the construction of a highway in phases or sections when, until joined together with other sections of the highway, the individual sections would serve no purpose. If these separate actions were reviewed individually, the combined effects of the total project might be inadequately addressed.

In certain limited circumstances, it may be permissible to segment a review; however, an agency must be careful to avoid improper segmentation. To permissibly segment a project, each of the segments should also have independent utility and not commit the agency to continuing with the remaining segments. See 6 NYCRR 617.3(g)(1). If the lead agency believes segmented review may be permissible, it must document in its environmental review: (i) the reasons segmentation is warranted under the circumstances; (ii) the reasons for proceeding in a segmented manner; and (iii) a determination that the segmented review is no less protective of the environment than that of an unsegmented review. The lead agency must also identify and fully discuss the other segments in the individual environmental reviews for each segment.

The determination whether to segment a project may require expert guidance, particularly for the purpose of understanding judicial decisions that address this issue. One reference for guidance on this issue is the SEQR Handbook published by NYSDEC, which offers the following eight criteria that are considered in determining whether individual agency actions should be reviewed together:

1. Is there a common purpose or goal for each action?
2. Is there a common reason for each action being completed at about the same time?
3. Is there a common geographic location involved?
4. Do any of the activities being considered contribute toward significant cumulative or synergistic impacts?
5. Are the different actions under the same ownership or control?
6. Is a given action a component of an identifiable overall plan?
7. Can the interrelated phases of various projects be considered "functionally independent?"
8. Does the approval of one phase or action commit the agency to continuing with other phases?

As an example, the construction of a new highway interchange and additional widening of the highway may be interrelated to such an extent that the two actions must be examined together. In this example, it would be relevant to consider whether: (i) the highway is being widened for the sole purpose of accommodating the additional traffic entering the road via the new highway interchange; (ii) both actions are being completed at about the same time and in general proximity to each other; (iii) the additional traffic entering the highway via the new interchange greatly increases the congestion on that part of the highway just past the portion that has been widened; (iv) the same entity owns or operates the road areas where both actions are being conducted; (v) there is an overall plan to improve or increase the capacity of the highway system of which these two projects are each a component; and (vi) each of the actions would serve its purpose, even if the other one is never executed.

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200. CEQR REQUIREMENTS

If an agency determines that its project is subject to CEQR, it then seeks to identify whether the project may involve the approval, participation, or interest of one or more other agencies. This usually occurs as early as possible in the formulation of the review process.

210. TYPES OF AGENCIES

LEAD AGENCY. The agency "principally responsible" for carrying out, funding, or approving an action and the conduct of the environmental review of the project.

INVOLVED AGENCIES. Agencies, other than the lead agency, that have jurisdiction to fund, approve, or undertake an action.

INTERESTED AGENCIES. Agencies without jurisdiction to fund, approve, or undertake an action, but that wish to, or are requested to, participate in the review process because of their specific expertise or concern about the proposed project.

211. Establishing a Lead Agency

The CEQR rules provide that where only one city agency is involved in a proposed project, that agency shall be the lead agency for environmental review under CEQR. 62 RCNY § 5-03. Where more than one agency is involved, a single lead agency is usually selected. Exceptions to this rule include legislative action, where the City Council and the Office of the Mayor act as co-lead agencies, and situations where a city and state agency may act as co-lead agencies. CEQR rules address lead agency selection in detail for a number of city processes, including the enactment of local laws, actions involving franchises, applications for special permits from the Board of Standards and Appeals, and specific actions that require CPC approval under the New York City Charter, among others.

Where the CEQR rules do not identify a specific agency as the lead for the project, they provide criteria by which the involved agencies may choose the most appropriate agency to act as lead. The CEQR rules also establish a procedure by which the lead agency may be changed by transferring lead agency status to an involved agency.

The CEQR rules should be consulted to determine which agency is the appropriate lead in a given instance.

211.1. State and Federal Coordination

When both state and city agencies are involved agencies, SEQRA regulations allow for selection of an involved city agency as lead when the primary location of the project is local and/or the impacts are primarily of local significance. SEQRA regulations also impose a 30-day time limit on lead agency selection when a state agency is involved. If disputes occur among city and state agencies, one of the involved agencies or the applicant (if there is one) may request that the Commissioner of NYSDEC select an agency. After allowing a brief period for involved agency comment on the request, the Commissioner is required to select a lead agency within 20 calendar days of the date the Commissioner received the request.

If federal agencies are involved, MOEC is often contacted so that the federal review under NEPA may be coordinated. For further discussion of the interplay between NEPA, SEQRA, and CEQR, see Part C, Section 310 of this chapter.

211.2. CEQR Numbers

In order to identify and track the projects that undergo environmental review, a CEQR number is assigned to the project. This allows the various documents prepared in the course of the review to be maintained in an organized fashion. The protocol for assigning the CEQR number is:

- The first two digits identify the fiscal year in which the project was initiated.
- The next three alphabetic characters identify the lead agency.
- The next three numeric characters identify the sequence of the project for that lead agency in that fiscal year.
- The last alphabetic character identifies the geographic location of the project.

For example, a CEQR number of 10DME003K means that the project was initiated in fiscal year 2010; the lead agency is the Office of the Deputy Mayor for Economic Development; it is the third project

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of the Office of the Deputy Mayor for Economic Development undergoing environmental review in FY2010; and the project is located in Brooklyn (Kings County).

Geographic and agency codes may be found here.

212. Lead Agency Responsibilities

Under the CEQR rules, only the lead agency is responsible for determining whether a project, considered in its entirety, requires environmental review. 62 RCNY § 5-05(a). The lead agency is responsible for sending notice of its lead agency status, and preparing and distributing the EAS to all other involved agencies.

If the lead agency determines, on the basis of the EAS, that the proposed project may have a significant adverse effect on the environment requiring the preparation of an EIS, the lead agency is also responsible for circulating and making publicly available the Positive Declaration, scoping documents, notices of public meetings or hearings, Draft Environmental Impact Statement (DEIS), Final Environmental Impact Statement (FEIS), and Notices of Completion (all of which are discussed below) to the applicant, the regional director of NYSDEC, the commissioner of NYSDEC, the appropriate community board(s), MOEC, and all other involved agencies. In addition, it is important that the lead agency make every effort to keep the other involved and interested agencies informed of the progress of the CEQR process for projects within their jurisdiction.

213. Coordinated Review

When an agency proposes to directly undertake, fund or approve a Type I action, it must conduct a coordinated review if more than one agency is involved. 6 NYCRR 617.6(b)(3). If, however, an Unlisted action is under review, the lead agency may choose to commence its review under either a "coordinated review" process or an "uncoordinated review" process. Uncoordinated review may save time because there is no delay in establishing a lead agency because each involved agency makes its own separate determination of significance and decision about the project. However, without coordination, the decisions of the various involved agencies may conflict, which may cause confusion and delay in approving a project. For example, at any time prior to an agency's final decision, that agency's negative declaration may be superseded by a positive declaration by any other involved agency. For either type of review, it is recommended that an agency strive to identify all involved agencies as early as possible. The SEQRA regulations, 6 NYCRR 617.6(b)(3), further detail the process for both coordinated and uncoordinated reviews.

220. DETERMINATION OF SIGNIFICANCE

221. Preparation of the Environmental Assessment Statement

The EAS is intended to assist lead agencies and private applicants in identifying the potential impacts a project may have on the environment and assessing whether such impacts may be significant and adverse. The EAS should contain all the information the agency deems necessary to support its conclusions regarding the potential for significant adverse impacts. In addition, it is often the case that a more thorough EAS leads to a targeted EIS that focuses only on those issues where the potential for a significant adverse impact exists. This, in the long-term, may save time in completing an appropriate environmental review.

The lead agency begins its assessment of whether the proposed project may have a significant impact on the environment by preparing an EAS, using either the Short or Full EAS Form, as appropriate. Instructions for completing the EAS appear in the form itself. If an action is Unlisted, an applicant should complete a Short EAS Form, unless the lead agency has directed that the applicant use the Full EAS Form. The lead agency, upon reviewing the EAS and in making its determination of significance, may require an applicant to provide further information to support the Short EAS Form. The Full EAS Form must be used for all Type I actions. Please note that an agency may waive the requirement for an EAS if a DEIS is prepared or submitted, and would treat the DEIS as an EAS for the purpose of determining significance. 6 NYCRR 617.6(a)(4).

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222. Criteria for Significance

SEQRA regulations provide an illustrative list of criteria that are considered indicators of significant adverse impacts on the environment. This list, located at 6 NYCRR 617.7(c) and shown below, should be consulted when determining whether a proposed project may have a significant impact on the environment.

The city's rules also contain criteria for determining significance, which generally reflect the state's criteria but do not match word-for-word. SEQR regulations state that a project may have a significant effect on the environment if it may reasonably be expected to have any of the following consequences:

- A substantial adverse change in existing air quality, ground or surface water quality or quantity, traffic or noise levels; a substantial increase in solid waste production; a substantial increase in potential for erosion, flooding, leaching, or drainage problems;
- The removal or destruction of large quantities of vegetation or fauna; substantial interference with the movement of any resident or migratory fish or wildlife species; impacts on a significant habitat area; substantial adverse impacts on a threatened or endangered species of animal or plant, or the habitat of such a species; or other significant adverse impacts to natural resources;
- The impairment of the environmental characteristics of a Critical Environmental Area designated pursuant to 6 NYCRR 617.14(g). For a discussion of Critical Environmental Areas, see Chapter 11, "Natural Resources."
- The creation of a material conflict with a community's current plans or goals as officially approved or adopted;
- The impairment of the character or quality of important historical, archaeological, architectural, or aesthetic resources, or of existing community or neighborhood character;
- A major change in the use of either the quantity or type of energy;
- The creation of a hazard to human health;
- A substantial change in the use, or intensity of use, of land including agricultural, open space or recreational resources, or in its capacity to support existing uses;
- The encouraging or attracting of a large number of people to a place or places for more than a few days, compared to the number of people who would come to such place absent the project;
- The creation of a material demand for other projects which would result in one of the above consequences;
- Changes in two or more elements of the environment, no one of which has a significant effect on the environment, but when considered together result in a substantial adverse impact on the environment; or
- Two or more related actions undertaken, funded, or approved by an agency, none of which has or would have a significant impact on the environment, but when considered cumulatively would meet one or more of the above-stated criteria.

See 6 NYCRR 617.7.

The guidance and methodologies in the technical analysis chapters of this manual expand upon these criteria for purposes of determining whether a proposed project may have a significant impact on the environment in the context of New York City. The guidance in Section 400 of each technical analysis chapter should be used in conjunction with the SEQRA criteria to help determine whether a proposed project may have a significant impact on each particular area of analysis.

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In addition to using the above criteria to determine the potential significance of a project's impacts, the lead agency must consider the reasonably related short-term, long-term, direct, indirect, and cumulative impacts, including simultaneous or subsequent actions that are: (i) included in any long-range plan of which the action under consideration is a part; (ii) likely to be undertaken as a result thereof; or (iii) dependent thereon.

For any determination, the significance of a likely effect of a proposed project (*i.e.*, whether it is material, substantial, large or important) should be assessed in connection with the following:

- The setting in which the project occurs;
- The probability that an adverse impact would occur;
- The duration of the impact;
- Its irreversibility;
- The geographic scope of the adverse impact;
- Its magnitude; and
- The number of people affected.

223. Making the Determination of Significance

An EAS is considered complete when, in the judgment of the lead agency, it contains sufficient information to make a determination of significance based on the contents of the EAS and supplemental analyses, if necessary. Once the EAS is complete, the lead agency coordinates with other involved agencies, if any, in making its determination of significance. However, if an agency is conducting an uncoordinated review for an Unlisted action, it is not required to coordinate with other involved agencies. 6 NYCRR 617.6(b)(4). But, in this case it should be noted that a positive declaration by an involved agency supersedes a negative declaration issued by the agency conducting an uncoordinated review.

Based on the EAS, the lead agency must make one of three possible determinations of significance:

NEGATIVE DECLARATION

If, for each technical area, the lead agency determines that either the screening or detailed analyses show that no significant adverse impact on the environment would occur, it issues a Negative Declaration. A Negative Declaration describes the project and the reasons for the determination that the project would not have a significant adverse effect on the environment. For many projects, the EAS clearly shows that no significant impact would occur in any technical area assessed because a project's characteristics fall below the initial thresholds for determining whether more detailed technical analyses are required, as presented throughout the technical analyses chapters of this Manual and in the Short and Full EAS Forms. For other projects, a determination of no significant adverse impact is made following a more detailed analysis for one or more technical areas. To support the finding that a potential for significant adverse impact does not exist, the application of screening criteria or technical analyses must have been undertaken to a level of detail adequate to support that conclusion. Negative Declarations for Type I actions are required to be published, see Section 270, below. However, there is no such requirement for Negative Declarations for Unlisted actions (although the documents are publicly available upon request). The issuance of a Negative Declaration (for a Type I or Unlisted action) constitutes the completion of the CEQR process with respect to the proposed project.

CONDITIONAL NEGATIVE DECLARATION (CND)

If the lead agency determines that an Unlisted action proposed by a private applicant may have a significant impact on the environment, but that any such effect can be eliminated or avoided by incorporating mitigation or specific changes in the project, then the lead agency may issue a CND. Pursuant to SEQRA regulations, CNDs are permitted only for Unlisted actions, and only where the applicant is private and not a governmental party. The lead agency must require an EIS instead of issuing a CND if it is requested to do so by the private applicant. When a CND is to be issued, the analyses

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must be appropriate to support the recommendation of mitigation and the assurance that such mitigation would be effective and would be implemented. Conditions that require implementation by an agency other than the lead must be approved by the implementing agency in advance of issuing the CND. As a matter of practice, a letter of understanding between the lead agency and the implementing agency usually is obtained.

For example, a CND would be appropriate where a significant traffic impact is identified and the impact could be mitigated by such measures as retiming traffic lights or lane restriping, provided that this mitigation is fully documented and defined in both the EAS and the CND, and that the agency responsible for implementing the mitigation, in this case the New York City Department of Transportation (DOT), has agreed to evaluate the need for these mitigation measures at the time the project is operational.

It is also possible to issue a CND in instances where more information is needed to fully define the significant impact and precise mitigation, but where the potential impact is well understood, fully disclosed, and easily mitigated. Examples include projects requiring the excavation of soils near potential sites containing hazardous materials or archaeological resources where the full extent of the impact cannot be known without some site excavation, but the range of possibilities (from no impact to contaminated soils or the presence of an archaeological resource) are well known and the potential significant impact and appropriate mitigation measures may be presented to the decision-maker. Information on these specific examples is provided in Chapters 9, "Historic and Cultural Resources," and 12 "Hazardous Materials," respectively.

PUBLIC COMMENT ON A CND. SEQRA regulations provide for a 30-day public comment period (after publishing notice of the CND in NYSDEC's Environmental Notice Bulletin) before the CND becomes final. Pursuant to SEQR regulations, a lead agency must rescind a CND and issue a Positive Declaration requiring the preparation of a DEIS if it receives substantive comments that identify potentially significant adverse environmental impacts that (i) were not previously identified and assessed; (ii) were inadequately assessed in the review; or (iii) could not be substantially mitigated by proposed mitigation measures.

POSITIVE DECLARATION

If the lead agency determines that the project may have one or more significant adverse impacts, and that a CND is inappropriate, the agency issues a Positive Declaration. This describes the project, provides the reasoning for the determination that the proposed project may have a significant adverse effect on the environment, and states that a DEIS will be prepared before the agency approves, undertakes, or funds the project. Pursuant to SEQRA regulations, positive declarations (for either a Type I or an Unlisted action) become final upon issuance. The Positive Declaration may be documented in a separate document. If a separate document is prepared, the EAS should be expressly incorporated by reference. The publication requirements for issuing positive declarations are located in Section 270 below.

230. SCOPING

If a lead agency issues a Positive Declaration, CEQR rules require that the lead agency then conduct a public scoping process. 62 RCNY 5-07. The purpose of the scoping process is to focus the EIS on potentially significant adverse impacts by ensuring that relevant issues are identified early and studied properly and to eliminate consideration of those impacts that are irrelevant or non-significant. In addition, it allows the public, agencies and other interested parties the opportunity to help shape the EIS by raising relevant issues regarding the focus and appropriate methods of study. The scoping process begins by issuing a draft scope of work within 15 days after the issuance of a Positive Declaration. A public meeting to present and receive input on the draft scope of work must be conducted following appropriate notification as described in Subsection 232.1, below.

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Based on information in the completed EAS, the scope of work is a document that identifies in detail all topics to be addressed in the EIS, including an outline for how potentially-impacted analysis areas will be examined. The scope of work describes the proposed project with sufficient detail about the proposal and its surroundings to allow the public and interested and involved agencies to understand the environmental issues. For each area of analysis, the scope of work identifies study areas, types of data to be gathered, and how these data will be analyzed (including the preferred method of analysis). The scope of work also identifies reasonable alternatives to be evaluated and, if appropriate, an initial identification of proposed mitigation measures. The scoping process is described in detail below.

231. Determining the Scope of Work

The list of technical areas for which the Manual provides methodologies serves as a checklist for the initial identification of the issues to be addressed in the EIS. It is possible that a project would not require analysis in all of the technical areas. Conversely, the unique character of a given proposed project may require analysis in an area not included in this Manual. The technical areas and issues typically considered in the scoping process include, but are not necessarily limited to, the following:

- Land use, Zoning, and Public Policy;
- Socioeconomic Conditions;
- Community Facilities and Services;
- Open Space;
- Shadows;
- Historic and Cultural Resources;
- Urban Design and Visual Resources;
- Natural Resources;
- Hazardous Materials;
- Water and Sewer Infrastructure;
- Solid Waste and Sanitation Services;
- Energy;
- Transportation;
- Air Quality;
- Greenhouse Gas Emissions;
- Noise;
- Public Health;
- Neighborhood Character; and
- Construction Impacts.

For each of these topics, the scope indicates whether study is appropriate and, if it is, establishes the study areas and analysis methodologies to be used.

231.1. Targeted Scope of Work

In the course of preparing the draft scope of work and considering public comment thereon, the lead agency may determine that there is a potential for a significant adverse impact in particular technical areas, but not in others. For those areas where the potential for significant adverse impact exists, the level of detail required for the technical analysis in the EIS may vary. Therefore, as deemed appropriate based on the assessment provided in the EAS, the lead agency is encouraged to target the scope of work by excluding those issues that were found in the EAS to be unlikely to have potential significant adverse impacts. The rationale for excluding those issues or technical analysis areas should be documented in the scope of work.

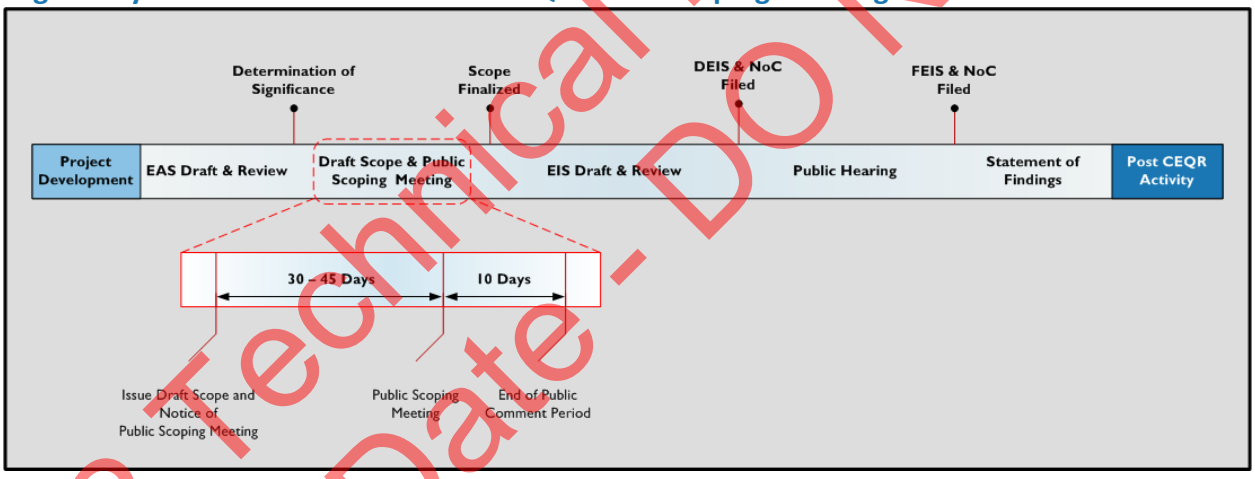
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By appropriately reducing the scope of the EIS and providing a focused assessment of the issues of concern, the lead agency avoids conducting unnecessary analyses and provides decision-makers and the public with a more useful environmental review. For example, if an EAS reveals that a project has the potential to cause only a significant adverse shadow impact, then only shadow impacts need to be assessed in an EIS. Conversely, if there is potential for significant adverse impacts in all analysis areas except infrastructure and natural resources, then neither infrastructure nor natural resources should be further assessed in an EIS that addresses the remaining technical areas of concern.

232. Public Review of the Draft Scope of Work

Pursuant to the CEQR rules, after the draft scope of work is issued, a public scoping meeting must be held to provide opportunity for input on the draft scope of work. All involved and interested city agencies, MOEC, the appropriate borough board, community boards that would be affected by the project, any private applicant, any interested civic or neighborhood groups, and members of the general public may attend the scoping meeting and provide comments. Comments received during the public scoping meeting and other comments received during the comment period are considered by the lead agency in the preparation of a final scope of work. The comment period may be extended beyond the required ten (10) days in specific circumstances in order to allow more time for comments. The regulatory timeframes for the public scoping meeting and public comment period on the draft scope of work are explained in Figure 1-1 below.

Figure 1-1
Regulatory Minimum Timeframes for CEQR Public Scoping Meeting



232.1. Notice of the Public Scoping Meeting

Not less than thirty (30) nor more than forty-five (45) days prior to holding the public scoping meeting described above, the lead agency must publish a notice of the meeting in the *City Record* and notify other involved and interested agencies of the meeting.

This notice must:

- Indicate that a DEIS will be prepared;
- Identify the date, time, and place of the scoping meeting;
- State that members of the public may inspect copies of the EAS and draft scope of work from the lead agency or MOEC (or online);
- Request public comment and indicate that written comments will be accepted by the lead agency through the tenth calendar day following the meeting; and

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- Indicate that guidelines for public participation will be available at the scoping meeting.

232.2. Public Comments on the Scope of Work

Because the scoping process allows the public, agencies, and other interested parties the opportunity to help shape the EIS by raising relevant issues regarding the focus and methods of appropriate study, the lead agency should, at a minimum, request public comment on the following general issues:

- Issues and analysis topics to be included in the scope of work;
- Methodologies for analysis (such as the size of a study area, the type of data to be gathered, or the type of analysis to be conducted);
- Alternatives to the proposed project; and
- Special conditions or concerns that the lead agency should consider.

The public comment period on the draft scope of work continues, at a minimum, through the tenth calendar day following the scoping meeting.

233. Final Scope of Work

The lead agency must consider the public comments before issuing a final scope of work that incorporates, as appropriate, the comments received and responses to them. All revisions should be indicated in the final scope of work by ~~striking out~~ the text deleted from the draft scope of work and underlining new text.

When a lead agency receives substantial new information after issuance of the final scope, it may amend the final scope to reflect such information. The lead agency should notify all those who received copies of the final scope, including MOEC, involved, and interested agencies, of any such change and provide copies of the amended final scope.

The final scope of work is considered complete when the lead agency has determined that the description of the proposed project and relevant methodologies are adequate and comments from the public and other agencies have been appropriately addressed.

240. PREPARATION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

241. Purpose of the DEIS

The next step in the CEQR process is the preparation of the DEIS. The DEIS is a "draft," in recognition that it is subject to modification in the FEIS, but must be a comprehensive document sufficient to afford the public opportunity to meaningfully comment on the potential for significant adverse impacts. The purpose of the DEIS is to disclose and discuss potential significant adverse environmental impacts so that a decision-maker may understand them and their context. It is analytic, but it is not a repository for all knowledge about a given technical area. The DEIS fully describes the project and its background; purpose; public need and benefits, including social and economic considerations; approvals required; and the role of the EIS in the approval process.

The EIS describes the potential significant adverse environmental impacts identified in the scoping process at a level of detail sufficient to enable the lead agency and other involved agencies to make informed decisions about those impacts for a proposed project, and, if necessary, how to avoid or mitigate those impacts to the maximum extent practicable. The lead agency should take care to explain the identified impacts in sufficient detail, considering the nature and magnitude of the proposed project and the significance of the potential impacts.

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242. Contents of a DEIS

CEQR rules prescribe the following minimum contents of an EIS:

- A description of the proposed project and its environmental setting;
- A statement of the environmental impacts of the proposed project, including short-term and long-term effects and any typical associated environmental effects;
- An identification of any adverse environmental effects that cannot be avoided should the proposal be implemented;
- A discussion of the social and economic impacts of the proposed project;
- A discussion of alternatives to the proposed project and the comparable impacts and effects of such alternatives;
- An identification of any irreversible and irretrievable commitments of resources that would be involved in the proposed project should it be implemented;
- A description of mitigation measures proposed to minimize significant adverse environmental impacts;
- A description of the growth-inducing aspects of the proposed project, where applicable and significant;
- A discussion of the effects of the proposed project on the use and conservation of energy resources, where applicable and significant; and
- A list of underlying studies, reports or other information obtained and considered in preparing the statement.

See 43 RCNY 6-09.

242.1. Reasonably Foreseeable Catastrophic Impacts

Depending on the nature of the project, and as may be required by SEQRA, an EIS may need to contain certain information regarding reasonably foreseeable catastrophic impacts. If information about reasonably foreseeable catastrophic impacts is unavailable or uncertain, and such information is essential to an agency's CEQR/SEQRA findings, the EIS should:

- Identify the nature and relevance of unavailable or uncertain information;
- Provide a summary of existing credible scientific evidence, if available; and
- Assess the likelihood of occurrence, even if the probability of occurrence is low, and the consequences of the potential impact, using theoretical approaches or research methods generally accepted in the scientific community.

A catastrophic impact analysis is likely necessary in the review of such projects as the siting of a hazardous waste treatment facility or liquid natural gas facility, and does not apply in the review of such projects as the siting of shopping malls, residential subdivisions, or office facilities. See 6 NYCRR 617.9(b)(6).

243. Format of the DEIS

243.1. Cover Page

The DEIS must have a cover page that sets forth the following information:

- The assigned CEQR number;

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- A statement that it is a Draft EIS;
- The name or title of the project;
- The location and street address, if applicable, of the project;
- The name and address of the agency that required its preparation, and the name, telephone number, and e-mail address of a person at the agency who can provide further information;
- The names of individuals or organizations that prepared any portion of the EIS;
- The date (day, month, year) of its acceptance as complete by the lead agency; and
- For an EIS longer than 10 pages, a table of contents following the cover page.

243.2. Executive Summary

Following the cover page, the EIS provides a concise summary that fully and accurately summarizes the EIS. 6 NYCRR 617.9(b)(4). In general, the executive summary should include:

- A brief project description;
- A list of actions;
- A summary of the significant adverse impacts, if any;
- A summary of the mitigation measures, if any, to reduce or eliminate any significant adverse impacts;
- A summary of the unmitigated adverse impacts, if any;
- A short discussion of alternatives;
- The analysis areas examined in the EIS; and
- A brief summary of the analysis areas eliminated in the EAS for further study, and the reason(s) why.

In order to ensure a clear and concise summary, the lead agency is strongly encouraged to limit the length of an executive summary to a maximum of thirty (30) pages.

243.3. Project Description

This section provides the reader and the decision-maker information to understand the project in its full context. Sufficient information should be provided to allow assessment of the project's impacts in later sections of the EIS. Typically, a project description includes text, graphics, and tables, and defines the project, its plan and form, its size, and its purpose and benefits.

243.4. Technical Analyses

The lead agency should analyze only those technical areas that were identified for analysis in the final scope of work. For those technical areas requiring further analysis, each technical chapter of the EIS assesses the following:

- The existing conditions;
- The future conditions without the proposed project (referred to as the No-Action condition); and
- The future conditions if the project is implemented (referred to as the With-Action condition).

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Comparison of the future No-Action and the future With-Action conditions allows the project's incremental impacts to be identified. When applicable and significant, CEQR requires analysis and disclosure of both the short-term, long-term, and cumulative impacts of a project.

Chapters 4 through 22 of this Manual provide guidance and methodologies for performing these technical analyses.

243.5. Mitigation

CEQR requires that any significant adverse impacts identified in the EIS be minimized or avoided to the greatest extent practicable. Mitigation measures must be identified in the EIS. A range of mitigation measures may be presented and assessed in the DEIS for public review and discussion, without the lead agency selecting one for implementation. Where no mitigation is available or practicable, the EIS must disclose the potential for unmitigatible significant adverse impacts.

243.6. Alternatives

SEQRA regulations require that "a description and evaluation of the range of reasonable alternatives to the action" be included in an EIS at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. The regulations specify that such alternatives include "the range of reasonable alternatives to the action which are feasible, considering the objectives and capabilities of the project sponsor." 6 NYCRR 617.9(b)(5)(v). If the environmental analysis and consideration of alternatives identify a feasible alternative that eliminates or minimizes adverse impacts, the lead agency may consider the alternative as the proposed project.

SEQRA regulations also requires that the range of reasonable alternatives include the "No-Action" alternative, which evaluates the adverse or beneficial site changes that are likely to occur in the foreseeable future in the absence of the proposed project. More guidance on alternatives that reduce or eliminate impacts in the various technical areas is found in Section 600 of each technical analysis chapter, and a general discussion of alternatives is provided in Chapter 23, "Alternatives."

243.7. Review and Completion of the Preliminary DEIS

As a matter of practice, a Preliminary Draft Environmental Impact Statement (PDEIS) may be prepared by the applicant and submitted to the lead agency. The PDEIS need not be submitted as a whole to the lead agency, and chapters may be submitted individually. The PDEIS or individual chapters are reviewed by the lead agency for adequacy, accuracy, and completeness with respect to the scope of work. If necessary, the lead agency comments on issues that were not adequately addressed in the PDEIS and the applicant revises the document accordingly. It is also common for a lead agency, in its discretion, to distribute a PDEIS for any project (public or private) to all involved and interested agencies for comment prior to issuance of the DEIS. This is often an iterative process, where the review and revision continues until the lead agency determines that the PDEIS is complete and ready for public circulation and comment as a DEIS.

244. Notice of Completion for the DEIS

The lead agency finds the DEIS to be complete and issues a Notice of Completion when the DEIS includes:

- A project description that provides sufficient information for a reader to understand the context for technical analyses that follow;
- Project objectives and actions required to implement the project that are clearly explained;
- An assessment of each technical area at a level of detail adequate to disclose potential impacts;
- Options for mitigation that are explained and assessed. For the DEIS, a range of mitigations may be presented for public review and discussion without the lead agency having selected one for implementation. If there is potential for an unmitigated impact, this should be disclosed here; and

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- The No-Action alternative and alternatives that meet project objectives, have the potential to reduce impacts, and have been assessed at a level of detail so that they can be appropriately compared to the proposed project.

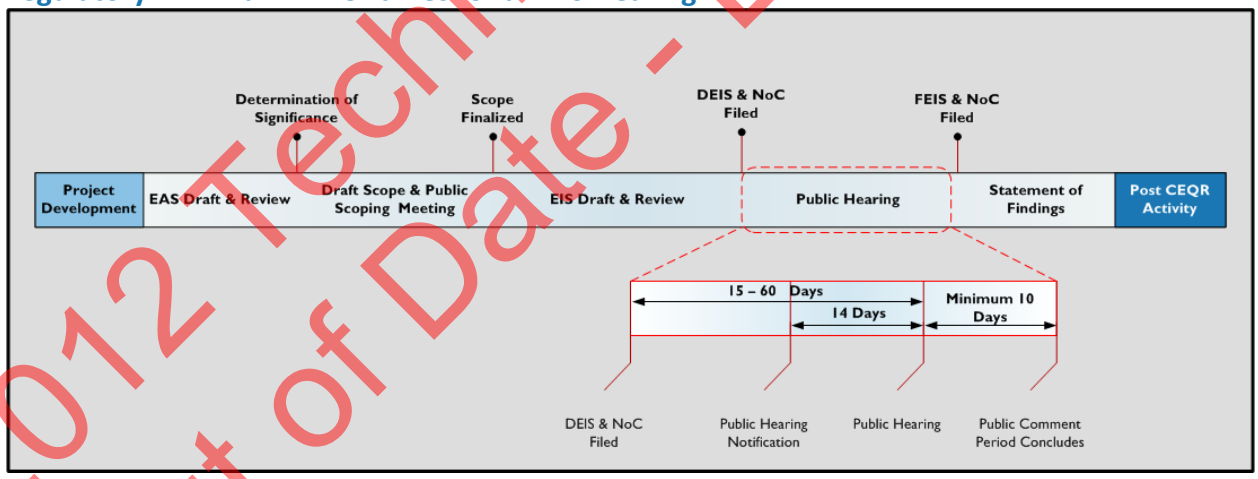
When the lead agency deems the DEIS to be complete, it prepares a Notice of Completion in accordance with 43 RCNY 6-10(a). This Notice describes the project, its potential impacts and effects and specifies the period of public review and comment. The publication requirements for issuing this notice are in Section 270, below.

245. PUBLIC REVIEW AND COMMENT PERIOD FOR THE DEIS

Publication of the DEIS and issuance of the Notice of Completion signal the start of the public review period. During this time the public may review and comment on the DEIS, either in writing and/or at a public hearing(s) that is convened for the purpose of receiving such comments. The comment period must extend for a minimum of thirty (30) calendar days from the publication of the DEIS and issuance of the Notice of Completion. All substantive comments received during the public comment period (either through the public hearing(s) and/or written comment) become part of the CEQR record and are summarized and responded to in the FEIS, as appropriate.

In certain circumstance, there may be projects that are particularly unusual or where the potential for environmental impacts is unclear when a DEIS is prepared. In these instances, public review and comment could present additional information that may affect the lead agency's determination of whether there is a potential for impacts or whether the impacts are adverse or significant. In this situation, the lead agency may find, following public comment and review, that no potential for significant adverse impacts exists, even though a DEIS was prepared and a public hearing was held. If this occurs, the lead agency may issue a Negative Declaration. Consequently, no FEIS need be prepared. The regulatory timeframes for the DEIS hearing and public comment period on the draft scope of work are explained in Figure 1-2 below.

Figure 1-2
Regulatory Minimum Timeframes for a DEIS Hearing



245.1. Public Hearing

The lead agency must hold a CEQR public hearing no less than fifteen (15) calendar days and no more than sixty (60) calendar days after the completion and filing of the DEIS, except when a different hearing date is required as appropriate under another law or regulation. For example, for projects simultaneously subject to the city's Uniform Land Use Review Procedure (ULURP), 43 RCNY 6-10(c)(4) provides that the public hearing on the ULURP application conducted by the appropriate community or borough board and/or the CPC shall satisfy the hearing requirement under CEQR for the DEIS. This chart explains the relationship between CEQR and ULURP. If more than one hearing is conducted by the aforementioned bodies, whichever hearing occurs last constitutes the CEQR hearing and may occur more than sixty (60) days after the issuance of the Notice of Completion.

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NOTICE REQUIREMENTS FOR THE PUBLIC HEARING

The lead agency must publish all required notices for the hearing at least fourteen (14) calendar days before the scheduled hearing. The Notice of Public Hearing may be contained in the Notice of Completion, or the lead agency may publish it as a separate document. In either case, the lead agency must publish a notice of the public hearing in the *City Record* and in a general circulation newspaper. For proposed projects with a large geographic impact, it may be necessary to publish the meeting notice in more than one newspaper. If published as a separate document from the Notice of Completion, the Notice of Public Hearing should also be distributed to the same parties who received the Notice of Completion of the DEIS (see Section 270, below).

ACCESS TO PUBLIC HEARINGS AND MEETINGS

The lead agency should hold public meetings and hearings that are accessible to all anticipated or potential participants at a location that is accessible by public transit or transportation. The lead agency should also carefully evaluate the timing and scheduling of the meeting to ensure that the meeting is not scheduled on or near a major public holiday or other events that could compromise public participation. Meeting participants are encouraged to provide their contact information (for distribution of future CEQR information for the project); however, they are not required to do so as a precondition of attending the meeting.

FORMAT OF PUBLIC HEARINGS AND MEETINGS

The public scoping meeting should be chaired by the lead agency; all other interested and involved agencies, the applicant, and MOEC may send representatives to participate. If requested by the lead agency, MOEC may chair the public scoping meeting. 62 RCNY 5-04(b).

Beyond the above requirements, there is no required format mandated for public meetings or hearings. Therefore, a broad variety of meeting formats may be acceptable to the lead agency. For example, meetings or hearings may feature discussions, questions or formal public speaking.

CEQR does not impose mandatory time limits for either the public hearing or the individual speakers. However, to ensure participation by all attendees desiring to speak, the lead agency should conduct the meeting in an efficient fashion. This may result in the lead agency restricting the individual speakers to a specified time limit. If a large number of attendees are anticipated, the lead agency may wish to consider scheduling additional meetings to ensure participation opportunities or hold concurrent input opportunities.

TRANSLATORS/INTERPRETERS

The lead agency should also anticipate whether translation services may be necessary at either the meeting or in other communications (including notice documents). Translation assistance may be provided by the citywide Language Bank. See Mayoral Executive Order 120, July 22, 2008.

245.2. Written Public Comments

The public is invited to send written comments to the lead agency and has a minimum of thirty (30) calendar days from the issuance of the Notice of Completion of the DEIS to do so. Written comments must be accepted from the date of publication of the Notice of Completion for the DEIS until at least ten (10) calendar days after the public hearing, but the comment period may be no less than thirty (30) days. See 6 NYCRR 617.9(a)(4)(iii). If a project is simultaneously subject to ULURP, the CPC hearing and the CEQR DEIS hearing are often run concurrently, as seen in this chart. In addition to DEIS comments received at the CPC hearing, the lead agency considers, as appropriate, the substantive DEIS comments received during the ULURP hearings that precede the CPC/DEIS hearing, including the Community Board and/or Borough Board, and the Borough President hearings.

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245.3. Formal Public Record

It is important that the lead agency maintains an accurate and complete public record throughout the CEQR process. The formal record includes any copies, transcripts and summaries of formal comments made by members of the public, interested agencies and other governmental entities. The record may be used by the public in an administrative or judicial review of CEQR findings, and may also be used by a lead agency to validate its findings or evidence the satisfaction of CEQR's public participation requirements.

The record may be maintained by a lead agency using a variety of methods, including recordings or transcriptions of public meetings and files (either electronic or hard copy) of written comments.

250. PREPARATION OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

251. Preparation of the FEIS

After the close of the public comment period for the DEIS, the lead agency prepares, or facilitates the preparation of, an FEIS. This document includes all of the contents of the DEIS as well as copies or a summary of the comments received at the hearing or in writing during the public comment period, and the lead agency's responses to substantive comments. Any revisions to the DEIS made in response to comments are set forth in the FEIS. Generally new analyses are not appropriate following the issuance of the DEIS, unless new information is discovered or comments raise an issue deemed by the lead agency to be relevant to the project and the analyses. Revisions to the DEIS are indicated by ~~striking out~~ deleted text and underlining new text in the FEIS. The cover page of the FEIS must indicate that it is the Final EIS and include all other information required for the DEIS.

252. Mitigation

Measures that minimize identified significant adverse impacts to the maximum extent practicable must be identified in the FEIS. If a range of possible mitigation measures for a given significant impact was presented in the DEIS, selected mitigation and its method of implementation must be disclosed in the FEIS. Certain mitigation measures that require implementation by, or approval from, city agencies (such as changes to traffic signal timing, which would be implemented by DOT) should be agreed to in writing by the implementing agency before such mitigation is included in the FEIS.

In addition, in the absence of a commitment to mitigation or when no feasible mitigation measures can be identified, a reasoned elaboration as to why mitigation is not practicable must be put forth, and the potential for unmitigated or unmitigatible significant adverse impacts must be disclosed.

253. Notice of Completion for the FEIS

The lead agency considers the FEIS complete when:

- A summary of all substantive CEQR-related comments on the DEIS, including a list of the commenters and responses to those comments is incorporated usually as a separate chapter;
- The text, figures, and tables of the FEIS reflect changes made in response to the public review and it is useful to provide a foreword to the document summarizing the changes made as a result of public review; and
- Mitigation issues are included and resolved to the extent possible. If a range of mitigations was presented in the DEIS, the lead agency must disclose the selected mitigation and describe its method of implementation in the FEIS. The potential for unmitigated or unmitigatible significant adverse impacts must be disclosed.

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Once the lead agency certifies that the FEIS is complete, it issues a Notice of Completion describing the FEIS, the project, and how to obtain copies of the FEIS. The agency then files this notice and a copy of the FEIS in accordance with Section 270, below.

260. STATEMENT OF FINDINGS

Pursuant to SEQR regulations, the lead and any involved agency must allow at least ten (10) calendar days after the publication of the Notice of Completion for the FEIS to consider the findings in the FEIS before it makes a decision regarding its action. To demonstrate that the responsible city decision-maker has taken a hard look at the impacts, alternatives, and mitigation measures, the lead and each involved agency must adopt a formal set of written findings, often termed a "Statement of Findings," setting forth its decision regarding the action it will take, drawing its conclusions about the significant adverse environmental impacts of the proposed project and how to avoid or mitigate them, and weighing and balancing the environmental consequences of the project to be undertaken with social, economic and other pertinent policy considerations. Depending upon the agency and its own protocols, the Statement of Findings may be included in another document (*e.g.* for ULURP actions approved by the CPC, the CPC Report and Resolution typically includes the Statement of Findings). Similarly, the BSA and the City Council may include their findings statements in other documents as well. However, regardless of the form of the findings document, all of the statements described below must be included. These CEQR findings must be adopted by the responsible decision-maker(s) of the lead or involved agency before, or concurrently with, making its final decisions to fund, approve or undertake its discretionary action.

Each lead or involved agency is responsible for adoption of its own Statement of Findings that explicitly sets forth the following statements:

- The agency has considered the relevant environmental impacts, facts and conclusions disclosed in the FEIS;
- A certification that all CEQR/SEQRA requirements have been met;
- A certification that, consistent with social, economic, and other essential considerations of state and city policy, from among the reasonable alternatives, the proposed project is one that minimizes or avoids significant adverse environmental effects to the maximum extent practicable, including the effects disclosed in the relevant EIS while still substantially meeting the purpose and benefit of the project;
- A certification that, consistent with social, economic, and other essential considerations, to the maximum extent practicable, significant adverse impacts disclosed in the FEIS would be minimized or avoided by incorporating as conditions to the decision those mitigation measures that are identified as practicable; and
- A rationale for the agency's decision.

Once the lead agency and each involved agency adopt their findings, the CEQR process is concluded and the agencies may then take their actions. Such CEQR findings must be filed with all involved agencies, MOEC, and the applicant, if any, at the time the findings are adopted.

261. Tracking Mitigation

MOEC is responsible for working with the appropriate city agencies to develop and implement a tracking system to ensure that mitigation measures are implemented in a timely manner and to evaluate and report on the effectiveness of mitigation measures.

270. AGENCY NOTICE AND PUBLICATION REQUIREMENTS

The state regulations require the lead agency to provide public notice by publication in DEC's *Environmental Notice Bulletin* for the following:

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- Conditional Negative Declaration;
- Negative Declaration for a Type I action;
- Positive Declaration for both Unlisted and Type I actions;
- Notice of Completion for a DEIS; and
- Notice of Completion for a FEIS.

It should be noted that a Negative Declaration for an Unlisted action need only be filed with the lead agency and MOEC.

To publish in the *Environmental Notice Bulletin*, DEC has provided a SEQRA Notice Publication Form on its website. The completed form may be sent via email or post to the following:

ENVIRONMENTAL NOTICE BULLETIN
NYS Department of Environmental Conservation
625 Broadway, 4th Floor
Albany, NY 12233-1750
E-mail: enb@gw.dec.state.ny.us
Questions: (518) 402-9167.

In addition, at least quarterly MOEC publishes a list of notices in the *City Record* that includes lead agency letters, determinations of significance, draft and final scopes, draft and final environmental impact statements and technical memoranda.

In 2005, SEQRA was amended to require that every Environmental Impact Statement – DEIS and FEIS – be posted on a publicly-accessible website. See Chapter 641 of the NYS Laws of 2005.

Positive declarations, notices of completion and the DEIS and FEIS should be submitted electronically and filed with, or distributed to, the following:

- Mayor's Office of Environmental Coordination (MOEC);
- The New York State Department of Environmental Conservation

  Division of Regulatory Services
  625 Broadway, 4th Floor
  Albany, NY 12233-1750;

- Region II Office of the New York State Department of Environmental Conservation

  1 Hunter's Point Plaza
  47-40 21st Street
  Long Island City, Queens, NY 11101-5407;

- Borough President(s), as applicable;
- Applicant, if any;
- All involved and interested agencies;
- All persons who have requested a copy;
- Affected community boards and borough boards; and
- In the case of projects in the Coastal Zone:

  New York State Secretary of State
  162 Washington Avenue

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Albany, NY 12231.

271. Public Access to Documents

All complete CEQR documents must also be sent to MOEC, which acts as the official repository for environmental review documents and maintains a database of such documents that are publicly available at its offices pursuant to 62 RCNY 5-04(c)(5). MOEC requests that all documents be sent in an electronic format. These documents and notices, including EASs, accompanying positive or negative declarations, and EISs and accompanying notices of completion must be maintained in files that are readily accessible to the public, and must be made available upon request. Copies of CEQR documents are often placed in a local library for public reference during a public comment period.

280. REGULATORY TIMEFRAMES

In order to facilitate a thorough and complete environmental review that includes adequate opportunity for public participation, SEQR and CEQR prescribe timeframes for certain activities. The rules also provide for sufficient flexibility to adjust such timeframes to ensure a full assessment. 6 NYCRR 617.3(i). Time frames prescribed by CEQR may also be extended where city procedures (such as ULURP) specify certain timeframes. 43 RCNY 6-10. When a time limit is specified as a minimum time period that must expire before the succeeding step in the CEQR process may be taken, for example where notice to the public must be given before an action may be taken, the lead agency must follow the prescribed procedure, and may extend (but not shorten) the timeframe. A summary of specified regulatory timeframes follows:

ESTABLISHMENT OF LEAD AGENCY

CEQR rules do not specify a time period for establishment of lead agency. SEQR rules provide a maximum of thirty (30) calendar days from the agency's notification of involved agencies of its intent to be lead, except if the lead agency is contested. 6 NYCRR 617.6(b)(3)(i).

DETERMINATION OF SIGNIFICANCE

The determination of significance is made within fifteen (15) calendar days from the lead agency's determination that the application (through an EAS) is complete. 43 RCNY 6-07(a).

SCOPE

- The draft scope of work is published within fifteen (15) days following publication of a Positive Declaration. 62 RCNY 5-07(a);
- The lead agency publishes a notice indicating a DEIS will be prepared, that a public scoping meeting will be held and requesting public comment not less than thirty (30) nor more than forty-five (45) calendar days prior to holding the public scoping meeting;
- The lead agency circulates the draft scope and EAS not less than thirty (30) calendar days nor more than forty-five (45) calendar days prior to the public scoping meeting;
- Written comments on the scope are received for ten (10) calendar days after the scoping meeting;
- Within thirty (30) calendar days after the public scoping meeting, the lead agency issues a final scope. The regulatory timeframes for the public scoping meeting and public comment period on the draft scope of work are explained in Figure 1-1; and
- If there is no private applicant, the time frames may be extended. 62 RCNY 5-07(f).

PREPARATION OF DEIS, INCLUDING DETERMINATION OF COMPLETENESS AND ACCURACY, AND FILING NOTICE OF COMPLETION

As needed for studies. The city's rules do not specify timeframes for the preparation and review of the DEIS.

PUBLIC COMMENT AND HEARING

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- The public comment period, which starts with the issuance of the Notice of Completion for the DEIS, is required to be at least thirty (30) calendar days;
- The hearing on the DEIS is held no less than fifteen (15) calendar days and no more than sixty (60) calendar days after the issuance of the Notice of Completion for the DEIS, with the exception of special circumstances such as ULURP, when the DEIS hearing may be held more than sixty (60) calendar days after the completion of the DEIS; and
- Written comments must be accepted and considered by the lead agency for no less than thirty (30) calendar days after the issuance of the Notice of Completion or for at least ten (10) calendar days following the public hearing, whichever is later. 6 NYCRR 617.9(a)(4)(iii). The regulatory timeframes for the DEIS hearing and the public comment period on the DEIS are explained in Figure 1-2.

PREPARATION OF FEIS, INCLUDING DETERMINATION OF COMPLETENESS AND ACCURACY, AND FILING NOTICE OF COMPLETION

The Notice of Completion must be filed within thirty (30) calendar days after the close of the public hearing. 43 RCNY 6-11(a).

CONSIDERATION OF COMPLETED FEIS BEFORE MAKING FINDINGS AND TAKING ACTION

A minimum of ten (10) calendar days from the filing of Notice of Completion of FEIS must elapse before the Statement of Findings may be issued. 6 NYCRR 617.11(a).

WRITTEN FINDINGS

The city rules do not specify a maximum period. Generally, for projects involving an applicant, the lead agency makes its findings within the maximum of thirty (30) calendar days from the Notice of Completion provided in the SEQRA rules. 6 NYCRR 617.11(b).

300. FEES

Pursuant to the Rules of the City of New York, the city lead agency charges a fee to a private applicant to recover the costs incurred in reviewing the EAS, DEIS, and FEIS of a project for which the applicant seeks approvals from the agency. The fee is payable upon filing Parts I and II of the EAS with the lead agency (or an agency that could be the lead). The CEQR fees are computed in accordance with 62 RCNY § 3-01.

400. SPECIALIZED ENVIRONMENTAL IMPACT STATEMENTS

There are two variations on the general pattern of EISs: the Generic EIS (GEIS) and the Supplemental EIS (SEIS). Each of these EISs is subject to the same procedures as other EISs, including a Positive Declaration, scoping, a DEIS and Notice of Completion, public review period, an FEIS and Notice of Completion, and written findings.

410. GENERIC EIS (GEIS)

GEISs are used for broad projects with diffuse, but potentially significant environmental effects. These include the following types of projects:

- a number of separate actions in the same geographic area that, if considered separately would pose insignificant effects, but taken together have a significant impact;
- a sequence of projects contemplated by a single agency or individual;
- separate projects that have generic or common impacts; or
- a program or plan having wide application or restricting the range of future alternative policies or projects. 6 NYCRR 617.10.

The GEIS is useful when the details of a specific impact cannot be accurately identified, as no site-specific project has been proposed, but a broad set of further projects is likely to result from the agency's action. The GEIS fol-

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lows the same format as the EIS for a more specific project, but its content is necessarily broader. Subsequent discretionary actions under the program studied in the GEIS require further review under CEQR. It is possible, however, to use the foundation of the GEIS for the subsequent environmental review for a site-specific project. Since the GEIS would have established the analysis framework, the subsequent supplemental environmental review need only target the specific narrow impacts associated with the subsequent action.

Comprehensive planning programs, new development programs, promulgation of new regulations, and revisions to such broadly applicable actions may be candidates for a GEIS.

420. SUPPLEMENTAL EIS (SEIS)

The SEIS is a flexible tool in the CEQR process. It is used to supplement or amend a previously prepared and circulated EIS. It provides decision-makers, interested and involved agencies, and the public with information about impacts not previously studied. The SEIS is used when:

- Changes are proposed for the project that may result in a significant adverse environmental effect not anticipated in the original EIS;
- Newly discovered information arises about significant adverse effects that was not previously analyzed; or
- A change in circumstances related to the project has occurred.

In considering the need to prepare an SEIS, in the case of newly discovered information, the agency should weigh the importance and relevance of the information and the current state of information in the EIS. 6 NYCRR 617.9(a)(7). The scope of the SEIS is targeted to specifically address only those issues that meet these requirements.

The need for an SEIS may become apparent after the acceptance of the DEIS and up to the time that agency findings are filed, following the completion of the FEIS. SEISs may also be prepared after findings have been made if changes are proposed for the project that requires additional discretionary approval. In this case, the assessment as to whether an SEIS is needed should also consider whether an aspect of the original EIS has grown stale, *i.e.*, whether the passage of time since the original environmental review was conducted has resulted in a change of circumstances, such as the existing traffic conditions or neighborhood character, that may now result in the project, as modified, causing significant adverse environmental impacts that were not sufficiently disclosed in the original EIS.

If the assessment indicates that the project may result in a new, previously undisclosed significant impact, an SEIS is appropriate and the agency would then prepare an SEIS. If the assessment indicates that it is unlikely that there will be new previously-undisclosed potential significant adverse impacts, the preparation of an SEIS is not required.

The preparation of an SEIS is subject to the full procedures that govern the preparation of an EIS, including the scoping process and required public hearings. In addition, supplemental findings statements may be necessary.

421. Technical Memoranda

In the event that the lead agency determines that it is appropriate to consider whether an SEIS is necessary, it is recommended that the lead agency document this assessment in a technical memorandum. In the event the technical memorandum assessment indicates that the preparation of an SEIS is or may be warranted, the lead agency should prepare an EAS or, if appropriate, may proceed to the issuance of a Positive Declaration. In the event the technical memorandum assessment indicates that the preparation of an SEIS is not warranted, no further documentation or analysis is needed. The technical memorandum should be prepared by the lead agency for its files and should bear the same CEQR number as that of the original EIS. A copy should also be sent to MOEC.

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C. CEQR'S RELATIONSHIP WITH OTHER APPROVAL PROCEDURES

100. CITY PROCEDURES

The CEQR review of a project may require coordination with other city procedures. Some of these are briefly described below:

110. UNIFORM LAND USE REVIEW PROCEDURE (ULURP)

Applications for city projects that must also be reviewed pursuant to ULURP are filed with the New York City Department of City Planning (DCP). For private applicants, DCP serves as the CEQR lead agency for projects subject to ULURP; DCP also serves as lead for some other city projects in ULURP (see 43 RCNY 5-03 for the exceptions). ULURP procedures are detailed in Sections 197-c and 197-d of the New York City Charter and should be consulted for the purpose of coordinating CEQR with ULURP. The timetable for ULURP begins once an application is certified as complete. A completed ULURP application must include one of the following: a Type II Determination, a Negative Declaration, a Conditional Negative Declaration, or a DEIS and Notice of Completion for the DEIS. This chart shows the relationship between CEQR and ULURP.

120. FAIR SHARE CRITERIA

The CPC adopted criteria, pursuant to the New York City Charter, to guide the siting of city facilities to advance the fair distribution of the burdens and benefits associated with such facilities among the communities of the city. The CPC considers these criteria, referred to as the *"Criteria for the Location of City Facilities"* (*Fair Share Criteria*), in acting on site selection and acquisition proposals subject to ULURP and in the review of city office sites pursuant to Section 195 of the Charter. The CEQR analyses may be coordinated with that assessment.

Sponsoring agencies also observe the *Fair Share Criteria* in projects that do not proceed through ULURP, such as city contracts, facility reductions, and closings. Although the *Fair Share Criteria* and CEQR criteria overlap to some extent, and both processes include procedures for the participation of the public, the *Fair Share Criteria* raise different issues and require a different perspective. For example, siting a facility in an area where similar facilities are located may avoid a neighborhood character impact for CEQR purposes, but raise issues as to fair distribution under the *Fair Share Criteria*. Where a project requires both an environmental assessment and a "Fair Share" analysis, an applicant or lead agency may find it helpful or efficient, with respect to the required analyses and procedural steps, to incorporate the "Fair Share" analysis into the CEQR analysis. However, this approach is not a requirement of either CEQR or the *Fair Share Criteria*.

130. BOARD OF STANDARDS AND APPEALS

Certain special use permits and variance applications are decided by the New York City Board of Standards and Appeals (BSA). When these applications are initially made to the BSA, CEQR applies to such projects and the normal CEQR process is required prior to BSA action. However, where there is an appeal from a discretionary city project that has been the subject of an environmental review, the BSA acts in a quasi-judicial capacity and its decision is, therefore, not subject to CEQR.

140. WATERFRONT REVITALIZATION PROGRAM

The New York City Waterfront Revitalization Program (WRP) is the city's principal coastal zone management tool. Originally adopted in 1982 and revised in 1999, the WRP establishes the city's policies for development and use of the waterfront and provides the framework for evaluating the consistency of all discretionary actions in the coastal zone with those policies. When a proposed project is located within the coastal zone and it requires a local, state, or federal discretionary action, a determination of the project's consistency with the policies and intent

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of the WRP must be made before the project may move forward. The New York City Coastal Zone Boundary Maps may be found here. For further information regarding a WRP assessment under CEQR, please see Chapter 4, "Land Use, Zoning, and Public Policy."

Local discretionary actions, including those subject to land use (ULURP), environmental review (CEQR) and BSA review procedures, are subject to a consistency analysis with the WRP policies. WRP review of local projects is coordinated with existing regulatory processes and in most instances occurs concurrently. For local projects requiring approval by the CPC, the Commission, acting as the City Coastal Commission, makes the consistency determination. For local projects that do not require approval by the CPC, but do require approval by another city agency, the head of that agency makes the final consistency determination. For federal and state projects within the city's coastal zone, such as dredging permits, DCP, acting on behalf of the City Coastal Commission, forwards its comments to the state agency making the consistency determination. Guidance for determining a project's consistency with the WRP may be found in Chapter 4, "Land Use, Zoning, and Public Policy."

150. JAMAICA BAY WATERSHED PROTECTION PLAN (JBWPP)

Local Law 71 of 2005 mandates that the city assess the "technical, legal, environmental and economical feasibility" of a diverse set of protection approaches for Jamaica Bay to develop a comprehensive approach toward maintaining and restoring the ecosystems within the bay. In October 2007, DEP published the JBWPP. The JBWPP is intended to provide an evaluation of the current and future threats to the bay and ensure that environmental remediation and protection efforts are coordinated in a focused and cost-effective manner. Under the JBWPP, MOEC should ensure that projects subject to CEQR address any potential impacts to Jamaica Bay and identify stormwater management measures that could be implemented as part of an environmental assessment. Consequently, all projects within the Jamaica Bay watershed that undergo CEQR review must complete the Jamaica Bay Watershed Form.

160. EMINENT DOMAIN (CONDEMNATION)

When New York City condemns private property for a public purpose, the decision by a city agency to act by eminent domain is an action subject to CEQR. The environmental review required by CEQR is typically conducted in conjunction with the ULURP approval for the property's acquisition. It should also be noted that the New York State Eminent Domain Procedure Law, adopted one year after SEQRA, overlaps with CEQR in requiring that environmental effects be identified. The CEQR public hearing may serve as the hearing required under the Eminent Domain Procedure Law, Section 204(B).

200. COORDINATION WITH STATE PROCEDURES

The CEQR review of a project may require coordination with state procedures if state funding or state agencies are involved. Some of these procedures are described briefly below.

210. CEQR-SEQR COORDINATION

All state agencies taking actions in New York City must follow SEQRA, but often employ the technical methodologies set forth in Chapters 4 through 22 of this Manual because of their applicability to the New York City setting. In addition, state agencies may be involved agencies in a project undergoing the CEQR process. Similarly, city agencies may be involved agencies in a project undergoing the SEQRA process. The city lead or involved agency may be required to coordinate with such state agencies and should be aware of procedures and requirements imposed by state law, some of which are described below. If a city agency becomes the lead agency, CEQR procedures would apply to the environmental review. Conversely, if a state agency becomes the lead agency, SEQRA procedures would apply. In either situation, each involved agency (city or state) is responsible for ensuring its compliance with all applicable requirements.

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220. PARKS, RECREATION AND HISTORIC PRESERVATION LAW – ARTICLE 14 REVIEW AND CONSULTATION

When a project involves an approval or funding by a state agency, Article 14 of the Parks, Recreation and Historic Preservation Law requires the state agency's preservation officer to consult in advance with the Commissioner of the New York State Office of Parks, Recreation and Historic Preservation, through the State Historic Preservation Office (SHPO), if it appears that any aspect of the project may cause any change, beneficial or adverse, in the quality of any historic, archaeological, or cultural property that is listed on the State or National Register of Historic Places, or is determined to be eligible for listing on the State Register by the Commissioner. While this duty to consult does not make SHPO an involved agency, the state lead or involved agency may not take its action, or complete its environmental review, without first consulting with SHPO.

230. PARKLAND ALIENATION

Government-owned parkland and open space (that has been dedicated as such) is invested with a "public trust" that protects it from being converted to non-parkland uses without state legislative authorization. Thus, when a project eliminates dedicated city-owned parkland or open space, or involves certain changes in use of dedicated city-owned parkland or open space, the city must have the authorization of the New York State Legislature and Governor to alienate the parkland or open space. For example, if land from a city-owned park was to be converted into a school or supermarket, this action would have to be authorized by the State Legislature and Governor. This authorization takes the form of a parkland alienation bill. In general, before it will pass such a bill, the State Legislature requires that the City Council pass what is known as a "home rule resolution," requesting state authorization of the change of use. Moreover, if state funding in the form of a grant has been invested in the park or open space, then the grant program will impose additional requirements that govern the alienation process.

240. NYSDEC PERMITTING: ENVIRONMENTAL JUSTICE

When a project requires a permit from NYSDEC, the city lead agency should be aware of the guidance provided in NYSDEC's Commissioner Policy 29 (CP 29). Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

If the impacts of a project may be felt in an "environmental justice community," CP 29 calls for providing enhanced public participation opportunities for the members of that community, often in addition to the public participation requirements of CEQR and SEQRA. When NYSDEC is involved as the regulator issuing a permit in a project, it looks to the permit applicant, often the city lead agency, to satisfy the requirements of CP 29. NYSDEC provides information and guidance on environmental justice on its website, http://www.dec.ny.gov/public/333.html.

300. COORDINATION WITH FEDERAL PROCEDURES

The CEQR review of a project may require coordination with federal procedures if federal funding or federal agencies are involved. Some of these procedures are briefly described below.

310. NEPA-SEQRA-CEQR COORDINATION

SEQRA regulations provide that as soon as an agency proposes a project or receives an application for a permit or for funding, it must determine whether the project is subject to SEQRA and determine whether it involves a federal agency. Federal agencies undertaking projects in New York City must comply with NEPA. When an EIS has been prepared under NEPA, a state or local agency has no obligation to prepare an additional EIS under SEQRA or CEQR, provided that the federal EIS is sufficient for an agency to make its SEQRA or CEQR findings. SEQRA regula-

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tions provide for coordination of environmental assessment provisions in New York with those required under NEPA for federal agencies. 6 NYCRR 617.15.

Agencies should note that city and federal decisions regarding the extent of environmental review obligations for the same project are independent of each other. In other words, a federal decision not to undertake environmental review or to prepare an EIS does not automatically support or require a similar decision by the city, and instead, SEQRA and CEQR should govern the decision as to whether an environmental review is conducted for a particular city agency action.

NEPA's regulations, found at 40 CFR Part 1506, provide for a process to coordinate the federal and state and/or city procedures to achieve savings of time and money and to avoid duplicative procedures. Federal agencies must cooperate with city agencies "to the fullest extent possible to reduce duplication between NEPA and state and local requirements," by such means as (1) joint planning processes, (2) joint environmental research and studies, (3) joint public hearings, and (4) joint environmental assessments.

Typically, the city agency enters into a written Memorandum of Understanding with the relevant federal agency to establish the terms of the collaboration. Joint studies, however, cannot oblige each agency to make the same decision. Each must meet its separate CEQR or NEPA and other statutory obligations.

320. NATIONAL HISTORIC PRESERVATION ACT – SECTION 106 REVIEW AND CONSULTATION

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects that their federal permits or federally-funded activities and programs have on significant historic properties and to give the Advisory Council on Historic Preservation a reasonable opportunity to comment. "Significant historic properties" are those properties that are included in, or eligible for listing in, the National Register of Historic Places. The federal agency coordinates with the SHPO and any other appropriate consulting parties—such as the local government, the applicant for a permit, and the interested public. The federal agency, in consultation with all other consulting parties, assesses the potential adverse impacts of the federal action on the historic property. The consultation process usually results in a Memorandum of Agreement among the federal agency and the consulting parties, which outlines agreed-upon measures that the federal agency will take to avoid, minimize, or mitigate the adverse effects of its project. This process may run concurrently with any environmental review conducted pursuant to NEPA, SEQRA, or CEQR.

330. PARKLAND CONVERSION

When a project involves the termination of outdoor recreation use of city-owned parkland that has received federal funds for acquisition or improvement under either the Land and Water Conservation Fund or the Urban Park Recreation and Recovery Program, the project requires the approval of the U.S. National Park Service (NPS) of the U. S. Department of the Interior (DOI). The conversion process is governed by rules and regulations of the NPS and requires the substitution of lands of at least equal fair market value that offer reasonably equivalent recreation opportunities as the parkland to be converted. The conversion process is in addition to the parkland alienation authorization required by state law.

340. HUD COMMUNITY DEVELOPMENT BLOCK GRANT AND THE RESPONSIBLE ENTITY

When funding for a project is provided through a Community Development Block Grant (CDBG) from the U. S. Department of Housing and Urban Development (HUD), a city or state agency may be responsible for performing all of HUD's NEPA obligations pursuant to 24 CFR Part 58. As the "responsible entity," the city or state agency would certify compliance with NEPA and be subject to the jurisdiction of the federal courts. As an example, the Lower Manhattan Development Corporation (LMDC) is funded through the CDBG program and acts as the responsible entity for HUD for all projects receiving those funds.

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350. ENVIRONMENTAL JUSTICE

In February 1994, President William J. Clinton issued Executive Order 12898, entitled *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."* The Presidential Executive Order mandates that each federal agency "identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The Environmental Justice Executive Order was created to combat the fact that poor and minority groups often have been exposed to greater human health and safety risks than society at large and have borne more than their share of the negative effects of development. The Executive Order directs federal agencies to disclose the distribution of social and environmental effects on minority and poor populations, and to ensure that such groups are afforded opportunities to participate fully in agency decision-making procedures. Each federal agency has developed its own procedures to incorporate consideration of environmental justice into its projects and decision-making.

If a project would involve a permit, funding, or a direct action by a federal agency, the CEQR lead agency should be aware that the environmental reviews performed by federal agencies pursuant to NEPA usually require consideration of environmental justice.

The U.S. Environmental Protection Agency (EPA) is the lead federal environmental justice agency and provides technical assistance, courses, guidance, and grants in support of environmental justice. EPA maintains an extensive environmental justice website: http://www.epa.gov/environmentaljustice/index.html.

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ESTABLISHING THE ANALYSIS FRAMEWORK

CHAPTER 2

CEQR requires all city agencies to determine whether discretionary actions they directly approve, fund, or undertake may significantly and adversely affect the environment. An action (or set of actions) is the vehicle that, if approved by the involved agency, would allow a project to proceed. Establishing the appropriate framework for analysis of the project allows the lead agency to make reasonable conclusions with regard to the project's likely effects. To determine the framework, this chapter should be used in conjunction with the Environmental Assessment Statement (EAS) forms (either the Short EAS Form or Full EAS Form), which contain a series of questions that serve to define the project and provide to the lead agency the detail needed to assess it. As described in the SEQRA regulations, actions requiring environmental review are considered either to be Unlisted or Type I. If the action is Unlisted, use of the Short EAS Form is generally appropriate. If the action is considered to be Type I, use of the Full EAS Form is required. The information below may be used to define the project's characteristics for analysis and guide completion of either EAS form.

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A. DEFINING THE ACTION FOR THE ENVIRONMENTAL ANALYSIS

100. CATEGORIES OF ACTIONS

There are two broad categories of actions—localized actions, which include site-specific actions and actions that apply to small areas, and generic actions that apply to entire neighborhoods or citywide. A Reasonable Worst Case Development Scenario (RWCDS) of the project is often defined for analysis. The methods for establishing the RWCDS depend on the type of action(s) being reviewed. Further information on establishing a RWCDS is explained throughout this chapter.

110. LOCALIZED ACTIONS

111. Site-Specific Actions

Site-specific projects are those proposed for a specific location, where approvals specific to the site are required to allow a particular project to proceed. Examples of site-specific projects include, among others, a proposed building that requires height and setback waivers, a change to the city map for a specific location (*e.g.*, the mapping of a street), a special permit for a public parking garage, approval of a solid waste transfer station, funding for a new cultural facility, the construction of police stations or firehouses, or the granting of a revocable consent. The physical characteristics of site-specific projects are usually well-defined, and the proposed project is itself generally considered to be the RWCDS, since in most cases no other potential development scenarios exist or any additional scenarios are extremely limited in nature. This is explained further in Section 211, below.

112. Actions that Apply to Small Areas

Projects that require a rezoning or other change in generic city controls for the area in which the site is located are not considered site-specific. A change in regulatory controls applying to a small area may allow a range of development scenarios to occur.

Examples that fall within this category include:

- Rezoning of a block or several blocks;
- Designation of an urban renewal area, or approval, alteration, or amendment of an urban renewal plan; or
- Zoning text amendment(s) or changes to Special Districts affecting a limited number of geographic areas.

These types of projects affect an area larger than an individual project site and have different environmental implications from site-specific projects. If approved, the change in regulations would allow development of a new type, use, form, or density on sites other than the project site, and future development on those sites would likely be able to proceed without need for further CEQR review.

Establishing the analysis framework for these types of projects involves developing a RWCDS that captures the upper range of development that would likely occur on both the project site and area affected by the project.

120. GENERIC ACTIONS

"Generic" actions are programs and plans that have wide application or affect the range of future alternative policies. Usually these actions affect the entire city or an area so large that site-specific description is not appropriate. Examples of generic actions undertaken in the city include:

- Zoning changes in one or more neighborhoods;
- Citywide programs or master plans, such as the Department of Sanitation's solid waste management plan (SWMP);
- Text changes to the Zoning Resolution that may affect a wide area; or
- Regulatory changes and local laws.

In the case of some generic actions, such as rezonings, future development allowed under the action may proceed as-of-right and without need for further CEQR review. Other generic actions, such as zoning text amendments that establish new special permit mechanisms, may require future discretionary actions as a condition of development that would be subject to further CEQR review. In either case, the generic environmental assessment is an important planning tool. It allows the agency to identify the range of impacts that may occur and to build into the plan or program the appropriate mitigation, thus ensuring that future actions arising from the plan or program do not have the potential for significant impact, whether or not they are subject to further CEQR review. As with actions that apply to small areas, generic actions require a RWCDS that captures the upper range of potential development.

200. IDENTIFYING PROJECT PURPOSE AND NEED

All proposed projects originate in a planning process of some sort, whether undertaken by a public agency or a private party that is seeking government approvals as an applicant, and are intended to fulfill certain goals, objectives, or mandates. Often, proposals are designed to meet public policies. Both the EAS and environmental impact statement (EIS) require a statement of the project's purpose and need—essentially, the planning impetus behind the proposal. Clear articulation of the project's objectives also allows definition of appropriate alternatives to the project.

210. PURPOSE AND NEED FOR PUBLICLY AND PRIVATELY SPONSORED ACTIONS

The purpose of and need for the project should be explained clearly at the beginning of the EAS or EIS, allowing the decision-makers to balance the goals of the project with environmental concerns, if any, in determining whether the project should be approved. For city-sponsored projects, this statement of objectives or purpose should be framed in terms of how the project meets public needs and responds to public policies, such as the provision of affordable housing, siting of a new school in an underserved area, promotion of environmental sus-

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tainability, just several of many other city policies and goals. Proposals by private applicants should be framed in terms of how the project would address the applicant's goals for development.

220. PROJECT OBJECTIVES AND THEIR ROLES IN DEFINING ALTERNATIVES

Defining the project's objectives is also important because it may help define the range of alternatives analyzed in the EIS. The EIS considers a range of reasonable alternatives to the project that have the potential to reduce or eliminate a proposed project's impacts and that are feasible, considering the objectives and capabilities of the project sponsor. Reasonable and feasible alternatives should not automatically be excluded from consideration simply because the applicant has not proposed to pursue them. Choosing reasonable alternatives is discussed in detail in Chapter 23, "Alternatives."

300. IDENTIFYING THE PROJECT FOR ANALYSIS AND ANALYSIS CONDITIONS

310. DEFINING PROJECT CHARACTERISTICS

The first step in an environmental assessment is to define project characteristics. Without adequate definition of project characteristics, reasonable assessments cannot be made as to the project's likely effects. The amount of detail needed to make reasonable assessments depends on the type of action, whether it is localized or generic, and Type I or Unlisted. The project definition also serves to inform all interested and involved persons and agencies about the proposal and is typically contained in a "Project Description." Both the Short and Full EAS Forms provide the initial steps and questions for developing the project description.

320. ESTABLISHING A REASONABLE WORST CASE DEVELOPMENT SCENARIO FOR ANALYSIS

Discretionary actions sometimes permit a range of project characteristics, or development scenarios, to occur even though the action may be sought in order to facilitate a specific development. From the range of possible scenarios that are considered reasonable and likely, the scenario with the worst environmental consequences is chosen for analysis. This is considered to be the RWCDS, the use of which ensures that, regardless of which scenario actually occurs, its impacts would be no worse than those considered in the environmental review.

The environmental assessment examines the incremental differences between the RWCDS of the future without the project in place (No-Action condition) and the future with the project in operation (With-Action condition). The methods for determining the RWCDS for the No-Action condition are described below in Section 410; Section 420 describes the methods for determining the RWCDS for the With-Action condition.

B. DEFINING ANALYSIS CONDITIONS

Once the project has been defined, its effects on its environmental setting may be considered. Regardless of the documentation required (EAS or EIS), the technical area being assessed, or the complexity of the analysis, the assessment is conducted under a three-part framework, set forth below. It should be noted that if the initial analysis indicates there is no potential for significant adverse impacts in a particular technical area, then only documentation of that finding—and no further analysis--is required for that technical area. For each technical area in which the potential for significant adverse impacts exists, the assessment includes:

- A description of existing conditions;
- A prediction of the future without the project for the year that it would be completed and operational (No-Action condition); and
- A prediction of the future with the project for the year it would be completed and operational (With-Action condition).

Comparing the two future scenarios identifies the project's impacts on its environmental setting. For each technical area being assessed, this same framework is used.

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100. CHOOSING THE ANALYSIS YEARS

CEQR requires analysis of the project's effects on its environmental setting. For those projects that would be implemented quickly following approval, the current environment would be the appropriate environmental setting. However, proposed projects typically are completed and become operational at a future date, and therefore, the environmental setting is the environment as it would exist at project completion and operation. Consequently, future conditions must be projected. This prediction is made for a particular year, generally known as the "build year." The build year is the year when the project would be substantially operational, since this is when the full effects of the project would occur.

For some generic actions or small area rezonings, where the build-out depends on market conditions and other variables, the build year cannot be determined with precision. A build year ten (10) years in the future is generally considered reasonable for these projects as it captures a typical cycle of market conditions and generally represents the outer timeframe within which predictions of future development may usually be made without speculation; however, generic actions that would facilitate large-scale development over a significant geographic area may sometimes warrant build years beyond a ten-year horizon.

For phased projects, interim build years are assessed in addition to the final build year when the entire project is scheduled to be completed. Interim build years are the first full year after each phase is completed. Large-scale projects that would be constructed over a long period, with the different elements becoming operational or occupied as they are completed, often assess interim build years as well. These interim build years are often assessed to ensure that impacts are identified at the earliest points in which they would occur in the course of development and that mitigations are implemented at that time, rather than at the complete build-out of the project, which may occur years later. Typically, one interim year is chosen, usually based on an estimate of the year when enough development to produce impacts requiring mitigation would have occurred.

200. DEFINING THE STUDY AREA

For each technical area in which an impact may occur, a study area must be defined for analysis. This is the geographic area likely to be affected by the proposed project for a given technical area, *i.e.*, the area in which impacts of that type could occur. Appropriate study areas differ depending on the technical area being analyzed. For urban design, for example, possible impacts generally do not extend beyond the area in which the project may be seen, while for traffic, worsened traffic conditions may occur at intersections some distance away. Often, it is appropriate to use primary and secondary study areas: the primary study area is closest to the project site and, therefore, most likely to be directly affected; the secondary study area is farther away and receives less detailed scrutiny, but could experience indirect effects, such as changes to area trends. Discussions of the methodology for choosing an appropriate study area are provided in each technical analysis chapter (Chapters 4 through 22). For a given technical area, the same study area is used for the assessment of existing, future No-Action, and future With-Action conditions.

300. EXISTING CONDITIONS

After the build year and study area have been established, the next step is to describe current conditions. This must be performed for each technical area that may be affected by the project. The assessment of existing conditions, which can be measured, observed, or otherwise be tested in the field, establishes a baseline from which future conditions may be projected.

Assessment of existing conditions may require data from other sources (such as the census), and, for some technical areas, use of mathematical computation or modeling. Timeliness of data is also important. If the review process becomes prolonged because of changes in the proposed project or other difficulties encountered during the approval process, changes in existing conditions may require further assessment.

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When performing studies of existing conditions, the conditions relevant to a "reasonable worst case" analysis of the effects of the project are generally selected for examination. For example, for transportation, the peak periods when the greatest number of new vehicular, pedestrian, and transit trips to and from the site would occur are examined under current conditions. This could be on weekdays, 8:00 to 9:00 a.m. and 5:00 to 6:00 p.m., for a typical office building; or on a weekend, Saturday 1:00 to 2:00 p.m., for a shopping complex. Then, the project effects are assessed for those peak times to determine what might be the worst possible effects of the project that might reasonably occur. Detailed guidance for establishing the appropriate peak hours for analysis for a transportation analysis may be found in Chapter 16, "Transportation."

400. CONSTRUCTING A REASONABLE WORST CASE DEVELOPMENT SCENARIO

A Reasonable Worst Case Development Scenario is broadly defined as the potential development under both the future No-Action and With-Action conditions that is used to determine the change in permitted development created by a discretionary action. The first step in constructing a RWCDS is generally to estimate the projected development in the future without the project (sometimes also referred to as the No-Action condition) for the area directly affected by the proposed project as well as the study area as a whole. The RWCDS analysis takes the existing observed condition and adds to it known or expected changes in order to arrive at a reasonable estimate of future conditions. After the baseline condition is established in the future without the project, the RWCDS for the project is established and compared to the No-Action condition for the environmental assessment. Guidance on developing the RWCDS for the both the No-Action and With-Action condition is below. Additionally, the New York City Department of City Planning (DCP) may be used as a resource to help construct a RWCDS.

410. THE FUTURE WITHOUT THE ACTION (NO-ACTION CONDITION)

The existing environmental setting is used as the basis from which future conditions without the proposed project are then predicted. This prediction is made for the year the project would be completed, using the data about existing conditions together with information about expected future growth and development. The scenario of the future without the proposed project (No-Action condition) provides a baseline condition against which the incremental changes generated by the project may be evaluated. For a phased project, the No-Action conditions do not contain any part of the project, so that the accumulating increment of the project phases may be assessed and disclosed. For example, assume a two-phased project is proposed with build years 5 and 10 years hence. The future without the project/No-Action condition would present conditions 5 and 10 years into the future, in both cases without the project. That is, the No-Action condition for the second phase would not contain the project's first phase.

For environmental impact statements, the No-Action condition also appears in the examination of alternatives, since a No-Action option must always be available to the decision-maker. The No-Action alternative compares the impacts of the project to future conditions without the project.

A future No-Action condition is constructed for all projects, whether for site-specific actions, actions that apply to a small area, or generic actions. Although it may not be possible to present the future No-Action for a generic action at the same level of detail as for site-specific actions or actions that apply to a small area (*e.g.*, details of building design are typically unavailable when considering the future No-Action condition in a large rezoning area), it is generally possible in the case of generic actions to provide an estimate of the amount, type, approximate location, and overall massing/form of future development. The general framework of impact analysis—comparing the future without the project to the future with it—thus applies equally to both site-specific and generic assessments.

The information that may be factored into developing a RWCDS scenario for the No-Action condition includes expected development, growth factors, and other expected changes. Each is discussed in turn below.

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KNOWN PROJECTS

These may include developments that are under construction, planned, or proposed, and are collectively termed No-Action projects. The following factors should be considered to determine whether a project should be included as a No-Action project:

APPROVAL PROCESS. Whether the project requires discretionary approvals and the status of that approval process should be considered in determining the appropriateness of including the project in the No-Action condition.

FINANCING AND TIMING OF PROJECT. If a project has been granted its required approvals or is an as-of-right project that has been publicly announced, but construction has not commenced according to schedule, market conditions have changed, *etc.*, the project may not be appropriate to include as a No-Action project if as a result it is unlikely to occur by the build year.

SOFT SITES OR NO-ACTION SITES

Sometimes, projections of development on "soft sites" are appropriate. Soft sites are sites where a specific development is not currently proposed or being planned, but may reasonably be expected to occur by the projected build year. In other words, it may be appropriate to project that development would occur on a site under existing zoning on an "as-of-right" basis in the future No-Action condition. An assumption that development would occur on an "as-of-right" basis in the future No-Action condition must be supported in the analysis based on consideration of relevant factors described below. The No-Action condition for a site is not automatically equivalent to its maximum development capacity under existing zoning, but is the future projected development that may reasonably be expected to occur on that site by the build year.

SOFT SITE CRITERIA. The following factors should be considered when evaluating whether some amount of development would likely be constructed by the build year. No one factor is determinative and these general indicators may be less applicable in some areas than others. Therefore, each factor below should be considered in both the context of the area and in terms of how it would affect the likelihood and amount of development on sites in the future:

- The uses and bulk allowed: Buildings built to substantially less than the maximum allowable floor area ratio (FAR) under the existing zoning are considered "soft" enough such that there would likely be sufficient incentive to develop in the future, depending on other factors specific to the area, listed below; and
- Size of the development site: Lots must be large enough to be considered "soft." Generally, lots with a small lot size are not considered likely to be redeveloped, even if currently built to substantially less than the maximum allowable FAR. A small lot is often defined for this purpose as 5,000 square feet or less, but the lot size criteria is dependent on neighborhood specific trends, and common development sizes in the study area should be examined prior to establishing this criteria.

If sites meet both of the criteria above, the likelihood that the site would be developed in the future without the project should be determined by considering the following:

- The amount and type of recent as-of-right development in the area;
- Recent real estate trends in the area;
- Recent and expected future changes in residential population and employment in the study area;
- Government policies or plans, such as a building on site being identified for a landmark designation, that may affect the development potential of a site or sites;
- Site specific conditions that make development difficult; and

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- Issues relating to site control or site assemblage that may affect redevelopment potential.

CONVERSION SITES. Existing buildings that would require little or no reinvestment in order to convert to the use permitted under the action provide the greatest potential to be redeveloped and are often considered as part of the RWCDS.

EXCLUDED SITES. The following uses and types of buildings that meet the soft site criteria are typically excluded from development scenarios because they are unlikely to be redeveloped as a result of the proposed project:

- Full block and newly constructed buildings with utility uses, as these uses are often difficult to relocate;
- Long-standing institutional uses with no known development plans; or
- Residential buildings with six (6) or more units constructed before 1974. These buildings are likely to be rent-stabilized and difficult to legally demolish due to tenant re-location requirements.

GROWTH FACTORS

No-Action analyses of some technical areas, such as traffic, may employ a background growth factor to account for a general increase expected in the future. Such growth factors may be used in the absence of, or in addition to, the traffic attributable to known projects. More information on No-Action analyses for each technical area is found in each of the technical chapters of this Manual.

OTHER EXPECTED CHANGES

No-Action analyses should also consider any other future changes that would affect the environmental setting, such as changes in technology. For example, an expected increase in the proportion of vehicles with pollution controls affects carbon monoxide concentrations and is accounted for in the air quality analyses. Other examples of changes to be considered include roadway improvements, implementation of recycling, and changes to city policies.

SITE-SPECIFIC NO-ACTION SCENARIOS

Sometimes, private applicants state an intention to develop their property in the future, with or without approval of a proposed project. In these cases, the lead agency should consider the reasonableness of the applicant's No-Action development scenario by utilizing the relevant factors listed under "Soft Site Criteria." If the lead agency determines it is reasonable to assume that the applicant's stated No-Action scenario would occur in the future without the proposed project, the scenario would constitute the No-Action scenario for analysis purposes.

In rare circumstances, trends and the other factors noted above may indicate a strong possibility of more than one clearly distinct future No-Action scenario. In such circumstances, the No-Action assessment should present a range of possibilities, describe the likelihood of the occurrence of each, and identify a corresponding range of increments between the various No-Action and With-Action scenarios.

420. FUTURE WITH THE PROPOSED ACTION (WITH-ACTION CONDITION)

The future with the proposed project, also known as the With-Action condition, is assessed and compared with the No-Action scenario. This assessment is performed for the same technical areas, using the same study areas, as the existing and No-Action assessments, and the factors used to determine the RWCDS for the future with the project are described below for both localized and generic actions.

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421. Localized Actions

421.1. Reasonable Worst Case Development Scenarios for Site-Specific Actions

Site-specific projects may be the simplest to define because the physical development or uses permitted by the action typically relate exclusively to the project being proposed (*i.e.*, a special permit for a particular site). The location and physical dimensions of the project must be presented, including the blocks and lots affected (or, if relevant, GIS shapefiles may also be provided). The project should be described in some detail, including proposed uses, site plan, design approach, and appearance of the proposed buildings, as appropriate. If a project is considered a Type I action, more detail may be required about certain aspects of the project to determine the appropriate framework for analysis.

In addition, certain aspects of the project may require more detailed information based upon the potential effects expected. For example, projects in historic districts or involving changes to historic buildings would require a more detailed explanation of the proposed architectural features because an important aspect of the analysis would assess any proposed changes to the existing architectural context. Timing and schedule of the project, including construction and operation phases, should also be described.

In some cases involving site-specific projects, the applicant's proposed use or design of the proposed development may only constitute one potential scenario of many that would be permitted by the action. For instance, a proposed zoning change applicable to the site only may allow for commercial and/or residential use, whereas the applicant's stated intention is to build a solely residential development. Alternatively, the applicant's proposed building design may be of a smaller size than what could be built pursuant to the proposed zoning. In these instances, a likely, reasonable scenario is chosen for analysis.

The following describes circumstances in such cases when the proposed project defines the Reasonable Worst Case Development Scenario:

THE PROJECT ITSELF DEFINES AN UPPER RANGE OF PERMITTED DEVELOPMENT FOR THE SPECIFIC PROJECT

As an example, if an applicant seeks a special permit that would allow up to fifty (50) parking spaces on a site because he/she plans to construct a 50-space parking lot, the proposed project and the RWCDS would be the same.

THE PROPOSED ACTIONS WOULD ALLOW FOR SCENARIOS WITH WORSE ENVIRONMENTAL EFFECTS THAN THE SPECIFIC PROJECT PROPOSED, BUT THOSE SCENARIOS ARE SHOWN TO BE UNLIKELY OR INFEASIBLE IN THE CIRCUMSTANCES

Some factors or circumstances that could make a development scenario unlikely or infeasible include site conditions such as:

- Constraints created by the configuration of the parcel, location of streets, or subsurface or topographical conditions;
- Market conditions;
- Adjacent uses and conditions, which could affect market perception and demand, particularly if they are incompatible with the proposal; or
- The type or density of development or activity that is typical in the particular area and borough.

Take as an example an application in Manhattan for a rezoning from M1-6 to C4-7 in order to develop a proposed mixed-use, primarily residential building. The rezoning is requested because residential use is not permitted in the existing M1-6 district and the owner proposes to build a residential building. Both the M1-6 and C4-7 districts permit office development at an FAR of 10, but the M1-6 dis-

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trict also provides for an as-of-right plaza bonus to an FAR of 12. An office use usually represents the "worst case" scenario for traffic and mobile source air quality. However, the office option may be unlikely because, due to the relatively small size of the development site, typical office floor plate sizes could not be achieved. The proposed zoning change would, therefore, produce new development, but it would likely contain a substantial proportion of residential use. Therefore, the proposed residential project, perhaps with some office space, would form the reasonable worst case for the environmental assessment.

ADDITIONAL ACTIONS OR CONTROLS WOULD RESTRICT DEVELOPMENT TO THE SPECIFIC PROJECT

In certain cases, an applicant seeking a discretionary approval is required to build a project in accordance with detailed specifications set forth elsewhere, such as in a companion discretionary approval being requested at the same time, a restrictive declaration, a lease or other agreement between the project sponsor and the city, or design and use restrictions under urban renewal plans. For example, concurrent with a rezoning that permits a range of uses and building envelopes, an applicant may also seek a large-scale permit that would use less than the maximum floor area permitted by the proposed zoning, and the large-scale permit would specify the use, floor area, building footprint, bulk, height, and setbacks for each planned building, as well as the location and amount of open space and parking. In this case, the project is limited by the restrictions in the permit, and therefore, the project and the reasonable worst case may be the same, depending in part on the extent to which development without use of the large-scale permit is possible.

Sometimes, specific project components are proposed as part of the project from the initial stages or in the course of ongoing development of project features. These often include features that seek to reduce environmental effects. Such components may be assumed in the environmental analysis of the project, and reflected in the RWCDS and thus factor in the conclusions of the impact analyses, provided they are also incorporated into the project approvals with mechanisms for their implementation.

421.2. Reasonable Worst Case Development Scenarios for Actions that Apply to Small Areas

Projects are often proposed that would facilitate both a site-specific development and affect multiple blocks or portions of neighborhoods. For those lots where no site-specific development is proposed, the project would allow subsequent, undefined future projects to proceed, often without further CEQR review. Consequently, the environmental assessment for the regulatory change must consider the change in development potential for all the sites. Although the physical form of a future project may be unknown, its potential characteristics must be identified for the analysis. This is done by predicting likely, reasonable scenarios that could result if the project is approved and implemented. From this range of realistic, reasonable scenarios, the scenario with the worst environmental consequences should be chosen for analysis.

The reasonable worst-case scenario in such situations must have enough detail to allow for environmental analysis in each impact category. The description of the reasonable worst-case scenario should include the buildings that could be built on a site in terms of their square footage, use, height, and bulk, and, as above, provide more information if needed for a specific technical area. As an example, for a proposal where commercial use has been determined to be the reasonable worst case, it may be necessary to determine the type of commercial uses that would represent the worst case scenario, depending on the market trends that have been observed in the surrounding area. To illustrate, because the type of commercial use or mix of uses affects the trip generation in the transportation analysis, and thus, has the potential to affect the potential for traffic impacts, it should be considered whether the commercial use would consist exclusively of office use or whether the development would likely include a mix of office and some other type of commercial use, such as a hotel, "destination" retail, or other uses. It is also possible that the RWCDS may differ according to impact category: for example, in the case of a rezoning proposal that would allow either commercial or resi-

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dential uses, commercial/office use would generate the highest number of transportation trips, but residential use would generate greater demands on local schools and publicly-accessible open space. In this case, two analysis scenarios would be appropriate if both residential and commercial development are reasonably likely to occur and both a predominantly residential and predominantly commercial scenario are possible.

For proposals where residential use has been determined to be the reasonable worst case, it is generally necessary to estimate the number of apartment units that would be built. For instance, trips are estimated on a per-unit basis when calculating the trips generated by the project in the transportation analysis. Consequently, the number of units assumed should be the greatest that can fit in the hypothetical building and conform to zoning regulations, *i.e.*, small units would be assumed for the analysis. However, if it is clear that small units are not the norm in the neighborhood and would not be likely to be marketable, fewer, larger units may be assumed.

For actions that apply to small areas, specific criteria are often used to define the location and density of development that is projected as a result of the proposed project. The type of development that is projected depends on the nature of the project that is being proposed (*e.g.*, whether it is a rezoning for residential, commercial or manufacturing uses), taking into account observed market trends and reasonable forecasting. These general criteria are described in the context of determining "soft sites," discussed above in Section 410, which may help to define the projected development as a result of the project. Sites that would meet the "Soft Site Criteria" above, as a result of the proposed project are often considered along with the site-specific project as part of the RWCDS for the With-Action condition.

422. Generic Actions

For generic actions, specific details about the kind of development that might reasonably be expected are often not available, or considering each particular site that could be affected would be redundant or impossible because of the scale of the project. However, the RWCDS must include sufficient detail regarding the overall amount, type and location of projected development to allow for impact analysis in density-related impact categories (*e.g.* traffic or schools). For other impact categories, the RWCDS may include, as appropriate:

- "Typical" cases, *i.e.*, several descriptions similar to those in a localized action for cases that may reasonably typify the conditions and impacts of the entire proposal; and/or
- A discussion of the range of conditions under which the action(s) may take place, so that the full range of impacts may be identified.

Specific criteria are often used to define the location and density of development that is projected as a result of the proposed project. The type of development that is projected depends on the nature of the project that is being proposed (*e.g.*, whether it is a rezoning for residential, commercial or manufacturing uses), taking into account observed market trends and reasonable forecasting. These criteria are described in detail in the context of determining "soft sites," discussed above in Section 410, which may help to define the projected development as a result of the project. Sites that would meet the "Soft Site Criteria" above, as a result of the proposed project are often considered the RWCDS for the With-Action condition.

423. Determining a Reasonable Amount of Future Development

For both actions that apply to a small area and generic actions, a number of sites in the area to be rezoned may meet the basic "soft site" criteria identified above (significantly underbuilt and of sufficient lot size to support development); however, it may be unlikely that all such sites would be developed as a result of the project because the overall market may not support that amount of new development. Consequently, it is often appropriate to categorize soft sites in the future With-Action as either "projected" or "potential" sites. Projected development sites are defined as those sites that are more likely to be developed as a result of the proposed project. The number of "projected" sites is determined by an evaluation of the likely reasonable

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maximum amount of development that may be expected in the period between the adoption of the project and the build year. Potential sites are defined as sites that could be developed but have been determined to have less development potential than the projected development sites, based on observed historic and current market conditions, location, site configuration, proximity to transit, infrastructure and other facilities, and other factors that affect the likelihood that they would be developed under the proposed project. Based on the estimated likely reasonable maximum amount of development that may be expected by the build year, it is further assumed that if that development does not occur on all the projected development sites to the degree projected, the same overall amount of development would nonetheless occur, but with some of it occurring on a number of potential development sites instead.

Because development of potential sites is less likely to occur, it is therefore not included in the total amount of development predicted to occur as a result of the proposed project. Consequently, typical CEQR practice analyzes projected sites for both density-related and site-specific impacts, whereas potential sites are analyzed for potential site-specific impacts only. Density effects are those that occur as a result of an increase or decrease in the population living in or going to and from a specific site or area, due to a change in the amount or type of development in the area. Site-specific effects are attributable to a building's specific design and location.

500. DEFINING PROJECT INCREMENTS

For most technical areas, the projection of the With-Action condition involves a calculation of the numeric increment that the project would add to the No-Action condition under the RWCDS—the number of new residents, new vehicle trips, new students in the school system, or additional wastewater flows to a water pollution control plant, for example. The Project Description table in the Full EAS Form presents the No Build, Build and Increment information for a project. For other areas, where quantitative predictions are inappropriate—such as land use or neighborhood character—more qualitative assessments of the project's effects are made by comparing the With-Action condition to the No-Action condition. Methodologies for determining this information are set forth in the technical analysis chapters (Chapters 4 though 22).

600. DETERMINING IMPACT SIGNIFICANCE

The next step is to assess whether the project increment would result in significant adverse impacts. Significant adverse impacts are substantial changes in environmental conditions that are considered adverse under CEQR thresholds and assessments. The impacts discussion may also, but is not required to, focus on the beneficial as well as adverse impacts of the project; in either case, the No-Action condition is the basis for comparison. Where significant adverse impacts are identified, the lead agency must consider mitigation measures that would mitigate the impact to the greatest extent practicable.

Many technical areas provide quantitative thresholds for what constitutes a significant impact; others require a more judgmental and qualitative assessment. The qualitative and quantitative information is used, as applicable, to determine the likelihood that an impact would occur, the timeframe in which it would occur, and its significance.

CEQR requires that the potential for impact be given a "hard look"—that is, the environmental review cannot simply acknowledge that there might be an impact; it must consider the likelihood and significance of that impact. Similarly, the environmental review cannot simply dismiss the likelihood of expected impacts occurring without reasoned elaboration. On the other hand, the analysis should examine only those impacts deemed reasonably likely to occur, rather than assess a checklist of every conceivable impact.

The impact analysis must consider both direct and indirect environmental effects of a project. These are sometimes called "primary" and "secondary" effects. Direct impacts are those that occur as a direct result of a proposed project—for example, demolition of a historic building on the site or increased carbon monoxide levels because of project-generated traffic. Indirect impacts are generally wider-range consequences and include such effects as changes in land use patterns that may result from a new development. The analysis must also consider short-term, long-term, and cu-

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mulative impacts of the project. Short-term impacts are those that happen for a short duration (generally due to construction) as a result of the project; long-term impacts are similar to indirect impacts—effects on the character of the community over the long-run, for example. Cumulative impacts are two or more individual effects on the environment that, when taken together, are significant or that compound or increase other environmental effects. Generally, they are the long-term impacts of either an individual action or a group of actions.

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INTRODUCTION TO THE TECHNICAL GUIDANCE

CHAPTER 3

Chapters 4 through 22 of this Manual provide guidance with respect to methodologies for assessment, the identification of significant adverse impacts, and development of mitigation measures for each technical area typically considered in environmental review. These methodologies generally are considered appropriate for assessment of projects undergoing CEQR, but are not required by CEQR. There may be specific projects that require different or additional analyses. For those projects requiring an EIS, the technical analysis chapters also describe the types of alternatives that are typically considered, and describe the EIS summary chapters that help focus the conclusions of the technical studies. Applicable regulations, coordination, and the location of background information are also described for each technical area.

It is important to note that the nature of the proposed project determines the level of detail required for analysis in a technical area. In some cases, the characteristics of a proposed project may allow for it to 'screen out' or be subject only to preliminary analysis for a technical area, while for other technical areas a more detailed analysis may be necessary. In other cases, analysis may only be required if the proposed project fits within certain threshold criteria (*e.g.*, see Chapter 18, "Greenhouse Gas Emissions"), or has the potential for significant adverse impacts in other areas (*e.g.*, see Chapter 20, "Public Health").

The technical analysis chapters are:

Chapter 4: Land Use, Zoning, and Public Policy
Chapter 5: Socioeconomic Conditions
Chapter 6: Community Facilities and Services
Chapter 7: Open Space
Chapter 8: Shadows
Chapter 9: Historic and Cultural Resources
Chapter 10: Urban Design and Visual Resources
Chapter 11: Natural Resources
Chapter 12: Hazardous Materials
Chapter 13: Water and Sewer Infrastructure
Chapter 14: Solid Waste and Sanitation Services
Chapter 15: Energy
Chapter 16: Transportation
Chapter 17: Air Quality
Chapter 18: Greenhouse Gas Emissions
Chapter 19: Noise
Chapter 20: Public Health
Chapter 21: Neighborhood Character
Chapter 22: Construction

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OVERVIEW AND APPROACH TO IMPACT ANALYSES

The guidance provided in each technical analysis chapter sets forth specific methods for assessing potential impacts of a proposed project. The guidance leads the analyst through a series of steps with ascending level of detail, aimed at permitting the lead agency to determine whether the potential for significant impact can be ruled out or confirmed. If at any point, a determination can be made that no significant impacts would occur with the project, then the analysis is complete.

Each chapter is organized so that existing conditions are determined first followed by determinations of the No-Action and With-Action scenarios in order to ascertain the incremental difference due to a proposed project. It is this incremental difference that is used when determining whether the project has the potential to cause significant adverse environmental impact.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the lead agency may determine it is appropriate to consult or coordinate with the city's expert technical agencies for a particular project. It is recommended that the lead agency consult with the expert agencies as early as possible in the environmental review process. The table below lists the expert agencies that are often consulted in CEQR assessments. This table is illustrative, and should not be considered an exhaustive list of City agencies involved in CEQR assessments.

Technical Areas	Expert Agencies
Land Use, Zoning, and Public Policy	New York City Department of City Planning
Socioeconomic Conditions	
Shadows	
Urban Design and Visual Resources	
Neighborhood Character	
Community Facilities and Services	New York City Department of City Planning New York City Administration for Children's Services New York City School Construction Authority New York City Fire Department New York City Police Department New York City Health and Hospitals Corporation
Open Space	New York City Department of City Planning New York City Department of Parks and Recreation
Historic and Cultural Resources	New York City Landmarks Preservation Commission
Natural Resources	New York City Department of Environmental Protection New York City Department of Parks and Recreation
Hazardous Materials	New York City Department of Environmental Protection
Water and Sewer Infrastructure	
Air Quality	
Noise	
Solid Waste and Sanitation Services	New York City Department of Sanitation
Energy	New York State Energy Research & Development Authority Mayor's Office of Environmental Coordination
Greenhouse Gas Emissions	Mayor's Office of Environmental Coordination
Transportation	New York City Department of Transportation (traffic, parking, or pedestrians) Metropolitan Transit Authority and New York City Transit (transit)
Public Health	New York City Department of Health and Mental Hygiene
Construction	New York City Department of Environmental Protection New York City Department of Transportation New York City Landmarks Preservation Commission New York City Department of Health and Mental Hygiene

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STRUCTURE OF THE TECHNICAL ANALYSES CHAPTERS

Most CEQR technical analyses apply a similar step-wise approach as described below:

APPROPRIATENESS OF AN ASSESSMENT (SECTION 200 OF EACH TECHNICAL CHAPTER):
The first step is a simple screen or series of questions aimed at determining whether a given technical area assessment is appropriate for a given proposed project. The preliminary screening questions are also presented in the Short and Long EAS Forms to assist the lead agency in determining whether further analysis is needed for a given technical area.

PRELIMINARY ASSESSMENT (OFTEN LOCATED AT THE BEGINNING OF SECTION 300 OF EACH TECHNICAL CHAPTER):
The next step is usually a qualitative or semi-quantitative analysis again aimed at determining whether an impact in the given technical area can be ruled out. These analyses are necessarily conservative—the rationale being that if the proposed project shows no significant adverse impact using simplified, but conservative, assumptions a detailed analysis would only confirm this conclusion. An assumption is considered conservative if the analysis tends to result in the overstatement of an impact.

DETAILED ANALYSIS (LOCATED IN SECTION 300 OF EACH TECHNICAL CHAPTER):
If a proposed project appears to have some potential for significant adverse impact based on the first two steps, then a more detailed analysis is undertaken. The purpose of this analysis is to be as realistic as possible in making assumptions so that an impact is neither over- nor under-predicted, and so that, should mitigation be warranted, appropriate, feasible, and workable measures may be developed. At this stage it is always appropriate to gather as much relevant project-specific data as possible. When information is unavailable, or the effort to gather the information appears unwarranted, reasonable, but conservative, assumptions should be made.

IMPACT ASSESSMENT (SECTION 400 OF EACH TECHNICAL CHAPTER):
When the analysis identifies that the project would cause a change in conditions, the next step is to determine whether that change would be adverse and significant. In technical areas that utilize quantitative thresholds (air quality, noise, and traffic are good examples), the presence of a significant impact generally can be determined with relative definiteness by applying objective criteria. However, in other areas, such as neighborhood character or urban design, a change may be identified, but its significance requires a more subjective evaluation. For these determinations, a series of questions may be posed that, if answered in the affirmative, typically signal significance. The lead agency may carefully consider public policy and public comments in addition to the technical studies in determining whether an impact may be considered significant and adverse.

MITIGATION (SECTION 500 OF EACH TECHNICAL CHAPTER):
Once it is determined that an impact is adverse and significant, mitigation to reduce or eliminate the impact must be considered. The technical analysis of mitigation must be sufficient to allow the lead agency to understand how effective the mitigation would be, what effort would be involved in implementing it, and whether it would produce any new significant impacts of its own. Usually, the technical analysis used to identify an impact provides sufficient information to develop and assess the mitigation of that impact. Various options for mitigation of a given impact may be presented in the DEIS. In the FEIS, the lead agency must choose from among these options the mitigation measures that reduce the impact to the greatest extent practicable. Where mitigation is not available, not practical, not implementable on schedule with the proposed project, or requires further discretionary projects, then the lead agency must disclose that the significant adverse impact may be unmitigated.

ALTERNATIVES TO THE PROJECT (SECTION 600 OF EACH TECHNICAL CHAPTER):
Where a potential significant adverse impact has been identified, alternatives to the proposed project to reduce or eliminate that impact should also be considered. As noted in Chapter 23, "Alternatives," CEQR alternatives are selected from among those that meet project objectives. The analysis of alternatives in the technical area in which a significant adverse impact has been identified should contain sufficient detail to clearly indicate the reduction in impact or in the need for mitigation.

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LAND USE, ZONING, AND PUBLIC POLICY

CHAPTER 4

Under CEQR, a land use analysis characterizes the uses and development trends in the area that may be affected by a proposed project, and determines whether a proposed project is either compatible with those conditions or whether it may affect them. Similarly, the analysis considers the project's compliance with, and effect on, the area's zoning and other applicable public policies. For projects that do not involve a change in land use or zoning, an analysis may not be required; however a brief description of the existing land uses and zoning designations in the immediate area, the policies, if any, affecting the area, and any changes anticipated to occur by the time the project is constructed, may be appropriate in order to inform the analyses of other technical areas described in this Manual.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of City Planning (DCP) often works with the lead agency during the CEQR process to provide information, recommendations and approvals relating to land use, zoning, and public policy. Section 700 further outlines appropriate coordination with DCP.

100. DEFINITIONS

110. LAND USE AND ZONING

111. Land Use

Land use refers to the activity that is occurring on land and within the structures that occupy it. Types of uses include residential, retail, commercial, industrial, vacant land, and parks. DCP's Primary Land Use Tax Lot Output (PLUTO) database provides data on the following land use types: one- and two-family residential buildings, multi-family walk-up residential buildings, multi-family elevator residential buildings, mixed residential and commercial buildings, commercial and office buildings, industrial and manufacturing, transportation and utility, public facilities and institutions, open space and outdoor recreation, parking facilities, and vacant land. Figure 4-1 shows a portion of a DCP Land Use map. Depending on the project, land uses can be aggregated into less-detailed groupings for analysis or other uses (a subset of heavy industry, for example) can be added.

112. Zoning

New York City's Zoning Resolution controls the use, density, and bulk of development within the entire City, with the exception of parkland, which does not have a zoning designation. The Zoning Resolution is divided into two parts: zoning text and zoning maps. The text establishes zoning districts and sets forth the regulations governing land use and development. The maps show the locations of the zoning districts. Figure 4-2 shows an example of the zoning maps.

The City is divided into three basic zoning districts: residential (R), commercial (C), and manufacturing (M). The three basic categories are further subdivided into lower, medium, and higher-density residential, commercial, and manufacturing districts, which may also be "contextual," "non-contextual," or special districts. Contextual zoning districts regulate the height and bulk of new buildings, their setback from the street line,

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and their width along the street frontage, to produce buildings that are consistent with existing neighborhood character. Medium- and higher-density residential and commercial districts with an A, B, D or X suffix, such as R6B or C6-4A, are generally considered contextual districts. "Non-contextual" districts have more permissive height and setback regulations. Special districts serve a diverse range of planning goals specific to the areas where the districts are mapped.

Development within each residential, commercial, and manufacturing district is regulated by use, bulk, and parking regulations. Each zoning district regulates permitted uses; the size (bulk) of the building in relation to the size of the lot; the required open space for residential uses on the lot; the maximum amount of building coverage allowed on the lot; the number of dwelling units permitted on the lot; the distance between the building and the street; the distance between the building and the other lot lines; height and setback of the building; the amount of parking permitted or required; and other requirements applicable to specific uses.

The nomenclature for zoning districts consists of a letter (R, C or M) followed by a number and, in some cases, additional numbers or letters. Special Mixed Use Districts have two sets of letters and numbers (*e.g.*, M1-2/R6A). The numbers refer to permitted bulk and density (with districts ending in -1 having the lowest density and districts ending -10 having the highest) and other controls such as parking.

RESIDENCE DISTRICTS. A residence district, designated by the letter R (R3-2, R5, R10A, for example), is a zoning district in which residences and community facilities are permitted.

COMMERCIAL DISTRICTS. A commercial district, designated by the letter C (C1-2, C3, C4-7, for example), is a zoning district in which commercial and community facility uses are allowed. Residential uses may also be permitted in certain commercial districts as well. A commercial overlay is a C1 or C2 district usually mapped within residential neighborhoods to serve local retail needs. Commercial overlay districts, designated by the letters C1-1 through C1-5 and C2-1 through C2-5, are shown on the zoning maps as a pattern superimposed on a residential district. For an example of a zoning map showing a commercial overlay, see Figure 4-2, below.

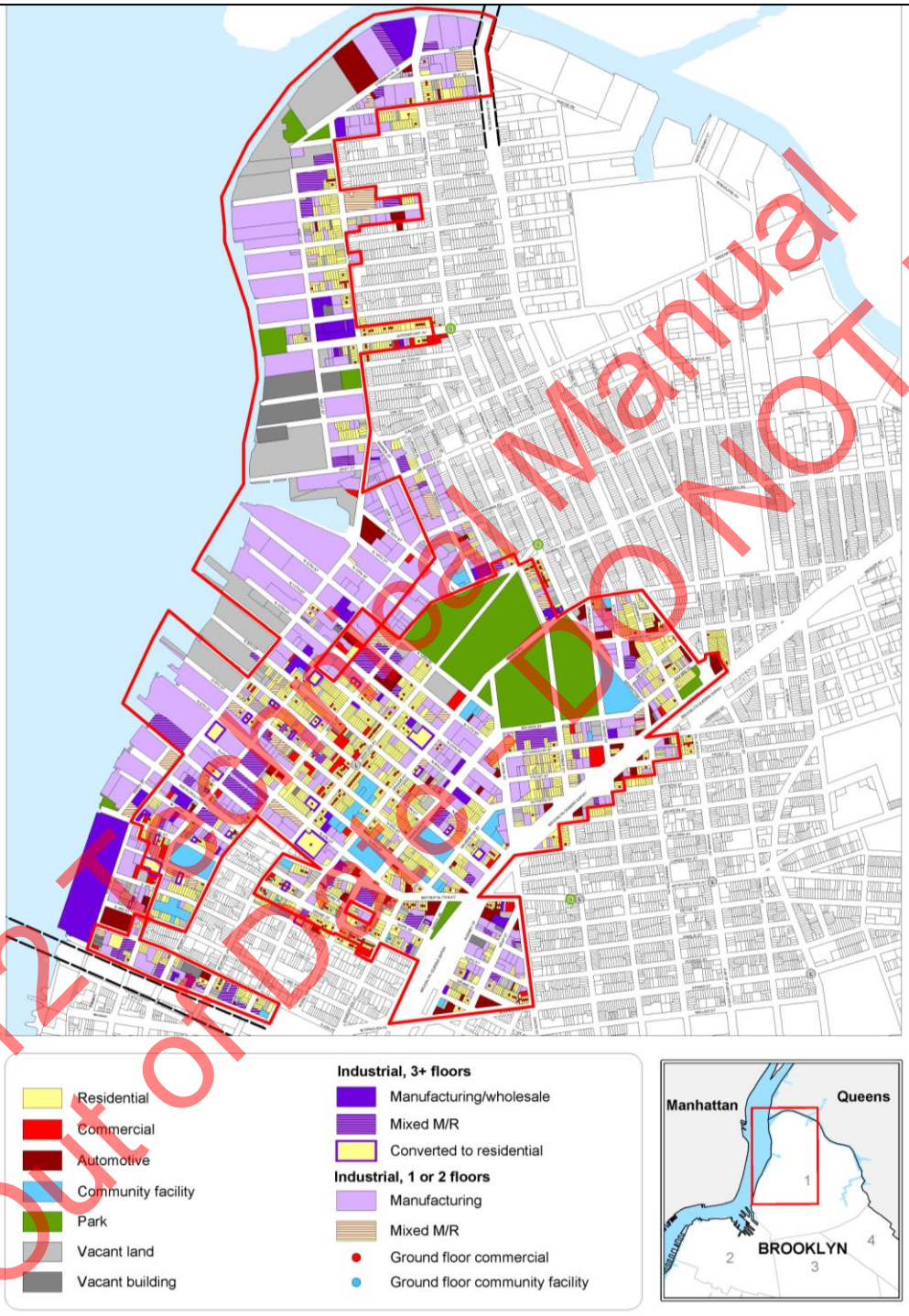
MANUFACTURING DISTRICTS. A manufacturing district, designated by the letter M (M1-1, M2-2, for example), is a zoning district in which manufacturing, other industrial, and many commercial uses are permitted. Community facilities are limited or excluded and new residential development is not allowed.

MIXED USE DISTRICT. A mixed use district is a special zoning district in which new residential and non-residential (commercial, community facility and light industrial) uses are permitted as-of-right.

Additional information on New York City's Zoning Resolution can be found at http://www.nyc.gov/dcp and in the Zoning Handbook, a guide to the Zoning Resolution available for purchase at the DCP bookstore. The Zoning Resolution should be consulted regarding the specific regulations applicable in the area of the proposed project.

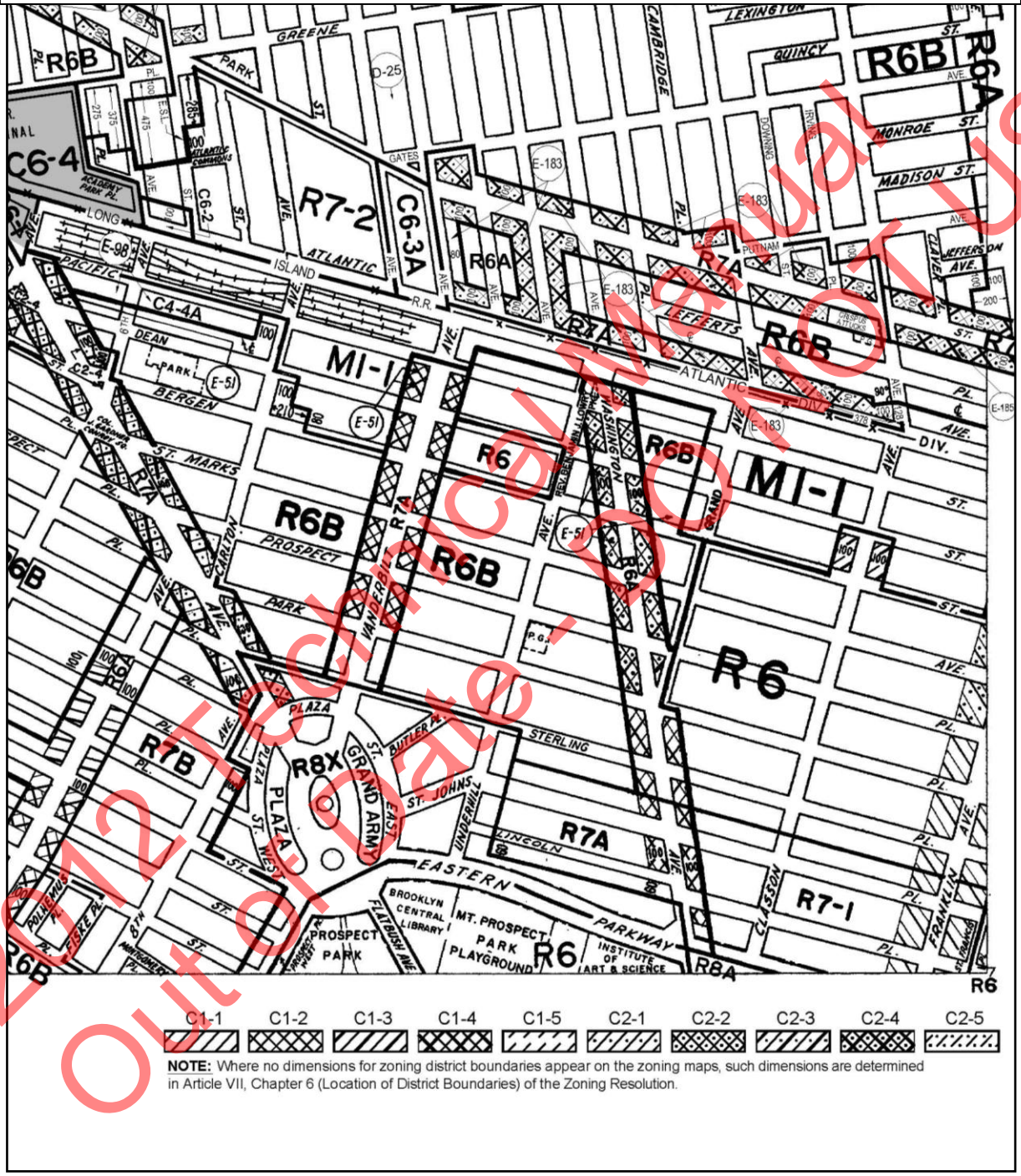
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Figure 4-1
Sample of a Land Use Map



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Figure 4-2
Sample of New York City Zoning Map



NOTE: Where no dimensions for zoning district boundaries appear on the zoning maps, such dimensions are determined in Article VII, Chapter 6 (Location of District Boundaries) of the Zoning Resolution.

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120. PUBLIC POLICY

Officially adopted and promulgated public policies also describe the intended use applicable to an area or particular site(s) in the City. These include Urban Renewal Plans, 197a Plans, Industrial Business Zones, the Criteria for the Location of City Facilities ("Fair Share" criteria), Solid Waste Management Plan, Business Improvement Districts, and the New York City Landmarks Law. Two other citywide policies, the Waterfront Revitalization Program (WRP) and Sustainability, as defined by PlaNYC, are discussed separately. The WRP is discussed separately under the Public Policy sections that follow, and guidance for conducting a sustainability (PlaNYC) consistency assessment is provided in Part B of this Chapter). Some of these policies have regulatory status, while others describe general goals. They can help define the existing and future context of the land use and zoning of an area. These policies may change over time to reflect the evolving needs of the City, as determined by appointed and elected officials and the public.

121. Waterfront Revitalization Program

Proposed projects that are situated within the designated boundaries of New York City's Coastal Zone must also be assessed for their consistency with the City's Waterfront Revitalization Program (See Figure 4-3). Preparation of a WRP assessment should begin with review of the New Waterfront Revitalization Program and completion of a NYC WRP Consistency Assessment Form.

The WRP was adopted by the City of New York in 1999, and subsequently approved by the New York State Department of State with the concurrence of the United States Department of Commerce pursuant to applicable state and federal law, including the Waterfront Revitalization of Coastal Areas and Inland Waterways Act (see Section 710, below). The WRP establishes the City's Coastal Zone and includes 10 policies dealing with: (1) residential and commercial redevelopment; (2) water-dependent and industrial uses; (3) commercial and recreational boating; (4) coastal ecological systems; (5) water quality; (6) flooding and erosion; (7) solid waste and hazardous substances; (8) public access; (9) scenic resources; and (10) historical and cultural resources. The ten policies are not presented in order of importance and are numbered only for ease of reference.

DCP's Comprehensive Waterfront Plan (1992) and reports prepared for each of the five boroughs (1993 and 1994) identified goals and objectives for the City's waterfront. These plans identified four principal waterfront functional areas: natural, public, working, and redeveloping. Revised in 2011, Vision 2020: New York City's Comprehensive Waterfront Plan builds on these policies and sets the stage for expanded use of the waterfront for parks, housing and economic development, and the waterways for transportation, recreation and natural habitats.

In 1993, to support the Comprehensive Waterfront Plan and the Waterfront Revitalization Program, New York City adopted the Waterfront Zoning Regulations (NYC Zoning Resolution, Article VI, Chapter 2). The regulations, which were amended in 2009, have the following stated purposes:

- To maintain and re-establish physical and visual public access to and along the waterfront;
- To promote a greater mix of uses in waterfront developments in order to attract the public and enliven the waterfront;
- To encourage water-dependent uses along the City's waterfront;
- To create a desirable relationship between waterfront development and the water's edge, public access areas and adjoining upland communities;
- To preserve historic resources along the City's waterfront; and
- To protect natural resources in environmentally sensitive areas along the shore.

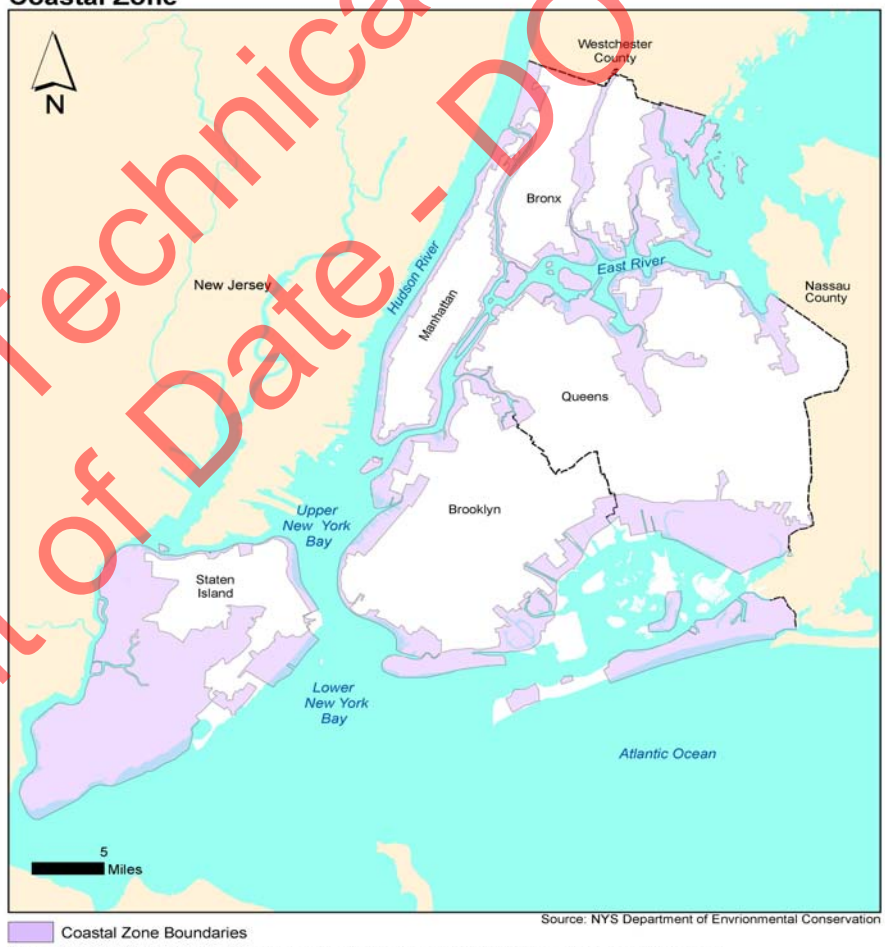
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The plan and adopted zoning regulations provide useful background information; however, WRP policies, goals, and standards should be used as the basis for determining a project's consistency with the Waterfront Revitalization Program.

The WRP consistency review includes consideration and assessment of other local, state, and federal laws and regulations governing disturbance and development within the Coastal Zone. Key laws and regulations include those governing wetlands, flood management, and coastal erosion. Although the consistency review is independent from all other environmental sections and must stand on its own, it is supported and conducted with consideration of all the other technical analyses performed as part of the project's environmental assessment under CEQR.

COASTAL ZONE. New York City's WRP establishes Coastal Zone boundaries (Figure 4-3), within which all discretionary actions must be reviewed for consistency with Coastal Zone policies. The Coastal Zone, which is mapped in the City's Coastal Zone Boundaries maps, is the geographic area of New York City's coastal waters and adjacent shorelands that have a direct and significant effect on coastal waters. It generally extends landward from the pierhead line or property line (whichever is furthest seaward) to include coastal resources and upland, usually at least to the first mapped street. The Coastal Zone includes islands, tidal wetlands, beaches, dunes, barrier islands, cliffs, bluffs, intertidal estuaries, flooding and erosion-prone areas, port facilities, vital built features (such as historic resources), and other coastal locations. The Coastal Zone should not be confused with the more limited areas of "waterfront blocks" or "waterfront lots" --terms defined in Article VI, Chapter 2 of the NYC Zoning Resolution.

Figure 4-3
Coastal Zone



Note: Upland Boundaries extend to the upland limit of zoning districts, natural area districts, and natural drainage basins. Federal Property is excluded.

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BASE FLOOD OR 100-YEAR FLOOD. A 100-year flood is one having a one percent (1%) chance of being equaled or exceeded in any given year. The Base Flood Elevation (BFE) is the elevation of the base flood, including wave height, as specified on FEMA Flood Insurance Rate Maps (FIRMs), relative to the National Geodetic Vertical Datum of 1929 (NGVD 1929). The NGVD 1929 elevation, the zero or sea level reference cited on FEMA's FIRMs is lower than the Borough Datum, frequently reported on surveys of properties within the five boroughs of NYC. For example, as shown in the following table, at an elevation point of 7.392 feet, the Bronx Borough Datum is equivalent to an elevation of 10 feet NGVD 1929 (7.392 plus the conversion figure for the Bronx, 2.608). Conversely, for example, given a NGVD elevation of 10 feet, subtract the conversion figure (2.608) to calculate the equivalent Bronx Borough elevation, 7.392 feet. FEMA's minimum standards refer to BFE requirements.

Table 4-1
Conversion of Borough Datum to NGVD

	BOROUGH ELEVATIONS (IN FEET)	TO OBTAIN EQUIVALENCY (IN FEET)	NGVD ELEVATION (IN FEET)
BRONX	7.392	+2.608	10.000
BROOKLYN	7.453	+2.547	10.000
MANHATTAN	7.248	+2.752	10.000
QUEENS	7.275	+2.725	10.000
STATEN ISLAND	6.808	+3.192	10.000

BULKHEAD LINE. The proposed or actual bulkhead line most recently adopted by the U.S. Army Corps of Engineers (USACE) and DCP, as shown on the City Map.

EROSION. The loss or displacement of land along the coastline because of the action of waves, currents running along the shore, tides, wind, runoff of surface waters, groundwater seepage, wind-driven water or waterborne ice, or other impacts of coastal storms (as established under the State Erosion Hazard Areas Act).

EROSION HAZARD AREAS. Those erosion prone areas of the shore, as defined in Article 34 of the Environmental Conservation Law (ECL), and the implementation of its provisions in 6 NYCRR Part 505, Coastal Erosion Management Regulations, that: (a) are determined as likely to be subject to erosion within a forty-year period, and; (b) constitute natural protective features (*i.e.*, beaches, dunes, shoals, bars, spits, barrier islands, bluffs, wetlands, and natural protective vegetation).

FLOODPLAINS. The lowlands adjoining the channel of a river, stream, or watercourse, or ocean, lake, or other body of standing water, which have been or may be inundated by floodwater (as established by the National Flood Insurance Act).

FREEBOARD. Freeboard is a factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, the hydrological effect of urbanization of the watershed, and climate change. Freeboard is not required by National Flood Insurance Program (NFIP) standards, but communities are encouraged to adopt at least a one-foot freeboard to promote safer de-

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velopment practices. New construction frequently incorporates freeboard on a discretionary basis while, in certain circumstances, the NYC Building Code mandates freeboard.

PIERHEAD LINE. The pierhead line is the proposed or actual pierhead line most recently adopted by the USACE and DCP as shown on the City Map.

PUBLIC ACCESS. Public access is any area of publicly accessible open space on waterfront property. Public access also includes the pedestrian ways that provide an access route from a waterfront public access area to a public street, public park, public place, or public access area. The NYC Zoning Resolution and the WRP encourage public access to the waterfront (both visual access and, where appropriate, physical access to the shoreline).

VISUAL CORRIDOR. The visual corridor is any area that provides a direct and unobstructed view to a waterway from a public vantage point within a public street, public park, or other public place.

WATERFRONT ZONING. The NYC zoning regulations adopted under Article VI, Chapter 2, (section 62-00) of the Zoning Resolution, guide development on the City's waterfront.

WATER-DEPENDENT USES. Uses that require direct access to a body of water to function or that regularly use waterways for transport of materials, products, or people.

WATERFRONT-ENHANCING USES. A group of primarily recreational, cultural, entertainment, or retail shopping uses that, when located at the water's edge, add to the public use and enjoyment of the waterfront.

122. Sustainability

Large, publicly-sponsored projects are assessed for their consistency with PlaNYC, the City's sustainability plan. Guidance for conducting this consistency review can be found in Part B (page 4-26) of this chapter.

200. DETERMINING WHETHER A LAND USE, ZONING OR PUBLIC POLICY ASSESSMENT IS APPROPRIATE

210. LAND USE AND ZONING

A preliminary assessment, which includes a basic description of existing and future land uses and zoning, should be provided for all projects that would affect land use or would change the zoning on a site, regardless of the project's anticipated effects. This information is often essential for conducting environmental analyses in other technical areas, and helps provide a baseline for determining whether detailed analysis is appropriate. Examples of discretionary actions that may affect zoning or land use include zoning map changes, zoning text changes, zoning special permits, BSA variances or special permits, and park mapping actions.

220. PUBLIC POLICY

Some assessment of public policy should accompany an assessment of land use and zoning. Therefore, a project that would be located within areas governed by public policies controlling land use, or has the potential to substantially affect land use regulation or policy controlling land use requires an analysis of public policy. Examples include creation or modification of Urban Renewal Plans and projects that are within areas covered by 197-a Plans.

221. Waterfront Revitalization Program

The WRP applies to all discretionary actions in the designated Coastal Zone. As described above, this zone is delineated in the Coastal Zone Boundaries maps published by DCP, and is illustrated in Figure 4-3, above. A more detailed map is located here. If the proposed project is located in the designated Coastal Zone, assessment of its consistency with the WRP is required. For generic actions, the potential locations likely to be affected within the coastal zone boundary should be considered.

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300. ASSESSMENT METHODS

Land use patterns are formed by various public policies, in concert with market forces for development. A change in land use on a single site is usually not enough to constitute a significant land use impact; however, such a change could create impacts in other technical areas such as traffic. In this case, a preliminary assessment should be conducted in order to characterize the land use changes associated with the proposed project to a level of detail sufficient to provide information to other technical areas requiring it. Often, the information provided in the project description is adequate to describe land use conditions for a preliminary assessment.

Changes in land use across a broader area, either because the project directly affects many sites or because the site-specific change is important enough to lead to changes in land use patterns over a wider area, generally requires an analysis detailed enough to determine whether and where these changes might occur. Although changes in land use–such as the introduction of a new residential use in an industrial area with existing hazardous materials–could lead to impacts in other technical areas, significant adverse land use impacts are extraordinarily rare in the absence of an impact in another technical area. For example, a project affecting the market forces that shape development can also change land use; in this situation, a more detailed assessment of land use is appropriate to supplement the socioeconomic conditions analysis (See Chapter 5, "Socioeconomic Conditions"). Technical analysis areas that often require land use information include socioeconomic conditions, neighborhood character, transportation, air quality, noise, infrastructure, and hazardous materials. The land use description should be detailed enough to determine whether changes in land use could affect conditions analyzed in other technical areas.

Although the proposed project may be important enough to potentially affect land use over a broader area, the characteristics of the affected area are critical in determining impact significance. If, for example, a proposed project would be of a type generally expected to promote residential development in an area, but the surrounding area does not contain any underutilized sites zoned for residential use, the likelihood of redevelopment for a new use would be diminished. In short, the potential for land use change depends as much on conditions in the affected area as on the proposed project itself.

The geographic area to be assessed, the categories of land use, and level of detail by which such uses, zoning, and public policies are studied depend on the nature of the proposed project and the characteristics of the surrounding area. The assessment usually begins with selection of a study area.

310. STUDY AREA DEFINITION

311. Land Use and Zoning

The appropriate study area for land use and zoning is related to the type and size of the project being proposed as well as the location and neighborhood context of the area that could be affected by the project. Unless the project involves a large scale, high density development or is a generic project, the study area should generally include at least the project site and the area within 400 feet of the site's boundaries. However, for small-scale, site-specific actions, a study area should generally include the project site and an area within 200 feet of the site's boundaries. A proposed project's immediate effects on an area of this size can be predicted with some certainty. When other, more indirect effects may also occur, a larger study area should be used. Typically, such secondary impacts can occur within a radius of 0.25 to 0.5 miles from the site of a proposed project.

These general boundaries can be modified, as appropriate, to reflect the actual context of the area by including any additional areas that would be affected by the project or excluding areas that would not be. For example, if a 0.25 mile radius from the project site is chosen as the general study area boundary, but that boundary would cut off portions of a block that is clearly part of the neighborhood, the study area can be expanded to include those portions. The study area does not have to be regular in shape. Such geographical and physical features as bodies of water, significant changes in topography, wide roads, and railroad easements often define neighborhood boundaries, and therefore, can be the appropriate delineation of the study

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area. Due to the specific characteristics of certain projects and the potential for geographically dispersed effects, even larger study areas may sometimes be appropriate. It should be noted, however, that using an inappropriately large study area can dilute or obscure a project's effects, particularly when those effects are localized in nature.

When determining the size of the land use and zoning study area, the requirements of the other technical areas required to be analyzed should also be considered. The land use and zoning study area can coordinate the required technical analysis study area for the purposes of data collection.

For area-wide or generic actions, it may be appropriate to provide prototypical assumptions or groupings of information, instead of lot-by-lot descriptions typical of site-specific actions, because the extent of physical and geographic areas affected by these types of actions is large. In that case, development projections or a development scenario would determine the appropriate study area boundaries (See Chapter 2, "Establishing the Analysis Framework," for more information on establishing the development scenario).

312. Public Policy

The study area for public policy is generally the same as that used for land use and zoning. For projects that could affect the regulations governing an urban renewal area, the entire urban renewal area should be included within the study area.

312.1. Waterfront Revitalization Program

The study area for an assessment of the WRP is defined by the site of the proposed project and those areas and resources within the Coastal Zone boundary that are likely to be affected by the proposed project. The study area may have to be enlarged for certain proposed projects to include resources that are part of a larger environmental system. For example, both natural drainage areas and potential erosion on downdrift properties (those properties located in the direction of predominant movement of material along a shoreline) may extend beyond the typical study area for a proposed project.

320. PRELIMINARY ASSESSMENT

321. Land Use and Zoning

A preliminary assessment that includes a basic description of existing and future land uses, as well as basic zoning information, is provided for most projects, regardless of their anticipated effects. For most projects the project description includes a detailed description of zoning changes. Therefore, this section should provide information on existing zoning to inform the description of land use and describe any changes in zoning that could cause changes in land use. This information is essential for conducting the other environmental analyses and provides a baseline for determining whether detailed analysis is appropriate. The following information should be provided:

IDENTIFICATION OF THE AFFECTED SITES OR PROJECT AREA, depicted on a map that has tax lots, land use and zoning district boundaries delineated. Clearly show the boundaries of the directly affected area or areas, and indicate the study area boundary drawn as a radius from the outer boundaries of the project site.

PHYSICAL SETTING (both developed and undeveloped areas), including total affected area, water surface area, roads, buildings and other paved areas.

PRESENT LAND USE, including existing residential, commercial, industrial, and community facility property, vacant land, and publicly accessible space. In each case, where appropriate, the number of buildings and their heights, the number of dwelling units, floor area, and gross square footage should be noted.

ZONING INFORMATION, including a description of existing and proposed zoning districts in the study area. A description or table comparing key elements of the existing and proposed zoning districts should be de-

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scribed. These elements can include permitted uses, maximum permitted Floor Area Ratio (FAR), building height and setback requirements, required open space or maximum lot coverage, front and side yard depths, minimum parking requirements, and other relevant zoning information.

Additionally, the preliminary assessment should include a basic description of the project facilitated by the proposed actions in order to determine whether a more detailed assessment of land use would be appropriate. Often, a Reasonable Worst Case Development Scenario, developed using guidance in Chapter 2, "Establishing the Analysis Framework," is prepared to estimate development patterns created by the proposed project. If a development scenario is prepared, it should be referenced in the description of proposed development.

- The description of potential development should include the following information:
- A summary of the amount and type of development or changes in use resulting from the proposed project;
- Identification of sites owned or controlled by the project sponsor or applicant;
- A determination of whether the proposed project involves changes in regulatory controls that would affect one or more sites not associated with a specific development. If it does, identify the location of these sites.
- For a project affecting a large area or multiple sites, a summary of expected development is typically adequate.

322. Public Policy

Similar to zoning, some assessment of public policy accompanies a land use assessment because such policies may help determine whether or where land uses might change as the result of a proposed project. In addition, some projects may affect other specific public planning efforts by changing land use in the area.

A preliminary assessment of public policy should identify and describe any public policies, including formal plans or published reports, that pertain to the study area. If the proposed projects could potentially alter or conflict with identified policies, a detailed assessment should be conducted. Otherwise, no further analysis of public policy is necessary.

322.1. Waterfront Revitalization Program

The first step for many projects is a preliminary evaluation of the project's potential for inconsistency with the WRP policies. A Consistency Assessment Form (NYC CAF) was developed by DCP to help an applicant identify which WRP policies apply to a specific project. Questions listed under the heading "C. Coastal Assessment" should be answered by applicants. The numbers in parentheses after each question indicate the policy or policies that are the focus of the question. These questions are designed to screen out those policies that would have no bearing on a consistency determination for a proposed project.

"Yes" answers to any of the questions indicate that a particular policy or policies of the WRP may be relevant and would warrant further examination. "No" answers indicate that the particular policy is not applicable to the proposed project. For any questions that warrant a "yes" answer or questions which cannot be answered definitively, an explanation should be prepared to assess the consistency of the proposed project with the noted policy or policies. Errors in the completion of a WRP assessment sometimes occur when an applicant completes a NYC CAF before a thorough appraisal of potential issues has been completed. For example, early in the environmental review process, an applicant may not know if a development site contains hazardous materials or has a history of underground fuel tanks, oil spills, or other form of petroleum product use or storage. If the applicant elects to prepare a NYC CAF before necessary testing has been completed, Question 40 on the CAF, which

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inquires whether the project would result in development of a site that may contain contamination or that has a history of underground fuel tanks, oil spills, or other form or petroleum product use or storage, must be answered "yes." The application then requires an explanation of the steps that the applicant will take to evaluate site conditions and assure consistency with the identified relevant policy--in this case Policy 7.2: Prevent and remediate discharge of petroleum products.

Applicants may be reluctant to answer "yes" to a policy question, mistakenly believing that an affirmative answer will suggest that a proposed project will be viewed as inconsistent with the WRP. To the contrary, a "yes" response provides an opportunity for an applicant to demonstrate that he or she understands the requirements of the WRP and the measures that will (or may) be required to ensure WRP policy consistency, in accordance with the standards and criteria within The New Waterfront Revitalization Program.

Impacts identified within other areas of environmental analysis may raise WRP consistency issues that should be identified through the WRP consistency assessment. For example, if the environmental analysis indicates that a project may result in a significant adverse impact in another technical area, such as open space, the WRP consistency assessment should identify a potential inconsistency with WRP Policy 1, relating to the adequacy of open space facilities and infrastructure in the area.

330. DETAILED ANALYSIS TECHNIQUES

Although changes in land use could lead to impacts in other technical areas, significant adverse land use impacts are rare in the absence of an impact in another technical area. Often, a preliminary assessment provides enough information necessary to conduct these technical analyses. However, for some projects, such as generic or area-wide zoning map amendments, more detailed land use, zoning or public policy information is necessary to sufficiently inform other technical reviews and determine whether changes in land use could affect conditions analyzed in those technical areas.

If the preliminary assessment cannot succinctly describe land use conditions in the study area, or if a detailed assessment is required in the technical analyses of socioeconomic conditions, neighborhood character, traffic and transportation, air quality, noise, infrastructure, or hazardous materials, a detailed land use assessment is appropriate. The detailed analysis builds upon the preliminary assessment and involves a more thorough analysis of existing land uses within the rezoning boundaries and the broader study area in light of changes proposed with the project. The detailed analysis seeks to describe existing and anticipated future conditions to a level necessary to understand the relationship of the proposed project to such conditions, assess the nature of any changes on these conditions that would be created by the proposed project, and identify those changes that could be significant or adverse.

331. Land Use and Zoning

The proposed project's effects on land use and zoning on the site of the project and in the study area are analyzed in the future With-Action condition and measured against future No-Action conditions. After describing existing conditions, the assessment should first consider the direct effects of the project: how would the project site be zoned; what use(s) would the proposed project create on the project site; and, would that use be different from the use that would otherwise be located on the site in the build year?

The analysis should then focus on the project's compatibility and consistency with surrounding uses and zoning as they would exist in the future without the project.

Finally, the analysis should determine whether the project would have the ability to generate land use change in the study area. This analysis addresses the interplay between the proposed project in its particular location and conditions in the surrounding area. As described in more detail in Section 331.1, below, the key conditions most often include the size; use; special characteristics of the development expected with the proposed project; the current and anticipated land use trends; linkages among land uses; presence (or absence) of un-

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derutilized properties appropriately zoned for the expected new use; and, zoning or other public policies in the area that promote, permit, or prohibit development of the expected new use.

332. Public Policy

The proposed project's effect on existing and planned policies and initiatives should be considered, and its consistency with any applicable policies should be addressed. The assessment of a project's consistency with WRP considers the future With-Action in comparison to the No-Action condition. For example, when considering whether the project would be consistent with the surrounding land uses in a small harbor area, consider the uses that are expected to exist in the future rather than only the existing uses.

332.1. Waterfront Revitalization Program

As directed by the NYC CAF, the detailed analysis considers all 10 Local Waterfront Revitalization Program (LWRP) policies with their standards and criteria, and assesses consistency with all those that are relevant to the project. This assessment may require additional information about the affected site and the project, such as the following:

- Piers, Platforms, or Floating Structures
- Mean High Water
- Mean Low Water
- Pierhead Line
- Bulkhead Line
- Water-Dependent and Water-Enhanced Uses
- Property Lines
- Depth to Water Table
- Ownership; Documentation of Lands Underwater
- Existing and Proposed Vegetation
- Existing and Proposed Stormwater Drainage
- Existing and Proposed Public Access
- Topography
- Wetlands (Freshwater and Tidal)
- Coastal Erosion Hazard Area
- Beach or Bank Profile
- Floodplains
- Base Flood Elevation
- Required or Proposed Freeboard
- Wildlife

As described below under Section 400, if a project would be inconsistent with a WRP policy, it is most often appropriate to determine whether it would also promote other WRP policies, so that these conflicting policies can be balanced against one another with regard to determining appropriate uses for the site in question.

The level of detail of the analysis depends on the nature of the project and the relevance of each policy to the project. Both qualitative and quantitative effects may be pertinent. It should be noted, however, that several policies require adherence to specific minimum standards. For each policy relevant to the proposed project, provide a brief description of how it relates to the project, and a statement as to whether or not the project is consistent with the policy.

Because the WRP review considers the many laws affecting the coastal area, consideration of a project's consistency with the WRP typically requires a comprehensive assessment that includes synthesis of different technical areas described in this Manual. Therefore, close coordination with the assessment of other technical areas is needed. The analysis of each of these technical areas—such as

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natural resources, air quality, land use and zoning, or historic resources—is summarized and presented below as it relates to the WRP policies. Although much of the detail of each technical chapter can be cross-referenced, it is important that the discussion of each policy be able to stand on its own in this chapter. In some cases, supplemental information to that provided in the technical analyses may be necessary to complete the WRP consistency evaluation.

The maps shown in Figures 4-4 through 4-7 may also assist applicants; however, these maps are simplified. More detailed maps are available through the sources listed in Section 700, Regulations and Coordination.

While lead agencies should conduct their own review of a project's consistency with the WRP during an environmental assessment, the City Planning Commission is required to make its own WRP consistency finding if it is an involved agency due to an action or number of actions associated with the project coming before the City Planning Commission. The City Coastal Commission may elect to adopt the consistency determination and environmental findings of the lead agency or adopt different WRP consistency findings.

331. Existing Conditions

331.1. Land Use and Zoning

The characterization of the study area for informational purposes should include general categories of land use (*e.g.*, residential, commercial, industrial, transportation, institutional, *etc.*), adding whatever information may be required for other technical analyses. Consideration of compliance and conformance with zoning in the study area may also be appropriate.

The extent and type of data to be collected depend on the project proposed and the area potentially affected. Typically, field surveys are conducted for the site and surrounding area. When larger study areas are used, particularly for generic or programmatic actions, secondary data can be helpful. The following sources are suggested:

FIELD SURVEY. Surveys of the land uses in the study area are performed through field visits. These can be made on foot or in a vehicle, depending on the size of the area and the level of detail required.

The entire study area—every street and every block—should be surveyed. The analyst should note the uses in the area, using such categories as residential, commercial, manufacturing, institutional, parks, or vacant land. More descriptive definitions can also be used: residential uses can be further categorized according to building types and form—detached, semi-detached, single-family, multifamily; commercial uses can be described as retail, office, *etc.*; and manufacturing and other industrial can be identified by category of business. It is sometimes difficult to discern the uses in a particular building, such as a residential use in converted manufacturing buildings. When there is some doubt as to a building's use, the analyst should look for visible signs, such as smoke being emitted from a stack, mailboxes or buzzers with tenants' names, or curtains in windows, *etc.* Consideration of compliance and conformance with zoning in the study area may also be appropriate.

AVAILABLE DOCUMENTATION. The information gathered in the field survey can be compared to available data sources to fill in missing details and verify questionable material. In some cases, particularly for generic or programmatic actions, the assessment can rely largely on secondary data, with spot field checks conducted to verify these data. It is often appropriate to use field survey data to complement maps and other secondary data to ensure that information is accurate and current. Other useful documentation includes various publications compiled by DCP and other City agencies, such as the New York City Housing Authority, and publications prepared by real estate services (see Section 730).

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Zoning information may also be relevant since changes to zoning can guide land use changes. This analysis should focus on any changes to the zoning regulations or zoning maps, as well as the project's compatibility with surrounding zoning districts. For example, it may be important to note if the project would result in the elimination of manufacturing zones, particularly if this could result in a change in land use. The assessment may include identification of sites that are (or are not) protected by zoning from conversion or redevelopment to a different use.

Next, based on the information gathered through field survey and available documentation, describe the land use in the study area. This description should focus on land use patterns, relationships, and trends. It is sometimes appropriate to describe the development history of an area to understand the area's development trends. The amount of detail required in the land use discussion depends on the project's potential for impacts and on the size of the study area. For example, if the project would alter the types and ranges of mixed-use development, it may be appropriate to describe the land use in sufficient detail to understand the relationships and character of the existing mixed-use development. For a small study area, such as a 0.25 mile radius, uses are often described in detail for every lot. For larger study areas, more general descriptions can often be used because a project's effect on a larger area may be more general than specific.

If necessary, the detailed land use assessment should augment or update maps of the uses in the area provided in the preliminary assessment, detailed as appropriate to the study in question.

331.2. Public Policy

The preliminary assessment should have identified existing public policies and plans within the study area (see Subsection 322, above). It is possible that more information is needed to determine whether the proposed project could potentially alter or conflict with identified policies.

More detailed information on policies can be identified through reviewing published reports and information describing their objectives. Additionally, officials at public agencies or other entities charged with administering or overseeing the relevant policies can be interviewed to better determine the goals and objectives of those policies and identify aspects of those policies that could potentially conflict with the proposed project.

332. Future No-Action Condition

332.1. Land Use and Zoning

The future No-Action condition analyzes land use and development projects, initiatives, and proposals that are expected to be completed by the project's build year (see Chapter 2, "Establishing the Analysis Framework," for more detail on the establishing the No-Action scenario and the build year). The scenario that is assessed in all the other technical areas is usually established in the land use analysis.

In the assessment of No-Action conditions, compile a list of all the proposals (including zoning and public policy) that can reasonably be expected to be completed, given market conditions, existing trends, and other constraints and incentives, by the build year. Information about future projects can be obtained from the appropriate borough office at DCP and from various real estate publications. Then, based on this inventory, describe the land use conditions that would exist in the build year. Depending on the anticipated impacts of the project in question (see existing conditions discussion, above), this assessment should address anticipated changes in land use and land use patterns as well as expected trends. Conditions in the future without the project can affect the potential effects of the project. For example, development may already be proposed for underutilized sites identified in the existing conditions analysis, and a review of proposed development may reveal an ongoing trend or acceleration of that trend that may diminish a project's influence on land use trends.

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The analysis should also consider additional zoning changes that could go into effect by the build year in order to describe conditions in the study area. Information on zoning plans and proposals are available through DCP, either on the agency's website or through contact with the borough offices.

332.2. Public Policy

The future No-Action condition sets the background for public policy affecting land use in the project's build year without the project. Information regarding public policies is available through DCP, and may also be available from other city, state, or federal agencies that are undertaking planning in the study area. The assessment of the future No-Action condition should continue the focus on relevant issues.

333. Future With-Action Condition

As the discussion of land use makes clear, issues of zoning are important to all land use analyses, and analyzing zoning, land use, and public policy together helps the analyst frame future land use conditions.

The future With-Action condition analysis of land use and zoning should include a detailed description of the type of development that would occur as a result of the proposal. Generally, a narrative summary of the With-Action development scenario is adequate, provided it considers the type, amount and location of any new development.

Based on this description of proposed development and information provided in the existing conditions and future No-Action description, the following analyses should be conducted for the future With-Action condition.

- Considering all general categories of land use, described in Section 111, above, identify the extent to which the proposed uses characterize the study area or would be consistent or inconsistent with existing uses. In what is sometimes called a "conformance analysis," the amount of the proposed use can be presented as a percentage of existing uses or in the aggregate.
- Determine whether the proposed project would create additional non-conformance or non-compliance of existing buildings or uses.
- Determine whether the proposed development would alter or accelerate existing development patterns.
- Consider any public policy that would affect the targeted land uses and determine whether any other public policy might affect the potential for land use change.
- Determine whether the proposed project would result in the direct displacement of any existing land uses.

340. ISSUES ASSOCIATED WITH OTHER TECHNICAL AREAS

Since changes in land use can lead to impacts in other technical areas, the information provided must be detailed enough to inform these analyses. In determining the types of information and level of detail appropriate when providing information for other technical areas, consider the following:

- Some technical areas may require the identification of land uses that are particularly sensitive to changes in environmental conditions, such as noise levels or air pollutant emissions from manufacturing facilities. The sensitive uses generally include housing, hospitals, schools, and parks. Often, land use investigations associated with this type of technical area coordination include consideration of whether the study area includes any sensitive uses with the potential to be affected by any project-related changes in air pollution or noise. This may include such tasks as:
  - Identifying sensitive uses adjacent to routes to be taken by traffic generated as a result of the proposed project in order to help locate receptor sites for the noise and air quality analyses.

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- If the use generated by the project–such as the introduction of a new residential population–would be sensitive or potentially affected by environmental conditions in the surrounding area, it may be appropriate to identify uses in the surrounding area that contribute to such conditions. This may include an inventory of all industrial uses within 400 feet of the project site to check for possible air pollution emissions from manufacturing facilities; locations of hazardous materials that could migrate onto the proposed project site; or identification of uses that may be noise or vibration sources affecting the site.

- If the project would likely affect demand for one or more community facilities (as defined in Chapter 6, "Community Facilities,"), such facilities should be identified in the land use study.

400. DETERMINING IMPACT SIGNIFICANCE

410. LAND USE AND ZONING

The analyses above identify land use changes anticipated with a proposed project. Many land use changes may be significant, but not adverse. For example, development of a large vacant site would constitute a significant land use change on that site and perhaps in the surrounding area, but if the site had been vacant and neglected, this change might be considered beneficial.

While changes in land use conditions could create impacts in other technical areas, it is rare that a proposed project would have land use impacts in the absence of impacts in other technical areas. A typical example is of an office building proposed for a densely developed commercial area. This land use change would not be significant; however, the workers and visitors coming to and from the building might create significant traffic, transit, or pedestrian impacts. The potential to create significant impacts in other technical areas should not necessarily be confused with a land use impact. The analysis of the effect of land use changes, then, is often used to determine whether the land use changes could lead to impacts in other technical areas. In making this determination, the following should be considered:

- If the proposed project would directly displace a land use and such a loss would adversely affect surrounding land uses, this displacement should be considered in Chapter 5, "Socioeconomic Conditions".

- In general, if a project would generate a land use that would be incompatible with surrounding uses, such a change should be considered in other technical areas if:

  - The new land use or new site occupants would interfere with the proper functioning of the affected use, or of land use patterns in the area. The relevant technical area may vary depending on the type of incompatible use identified. One example could be a new heavy manufacturing use near a residential area that might diminish the quality of residential use because of noise or air pollution. If so, the information provided in the land use analysis may be relevant for the noise or air quality analysis.

  - The incompatible use could alter neighborhood character and should be considered the neighborhood character analysis described in Chapter 21, "Neighborhood Character."

  - The project would create land uses or structures that substantially do not conform to or comply with underlying zoning. An example would be rezoning of several blocks from manufacturing to commercial use; such a change might permit development of desired residential uses on vacant or underutilized sites in the area, but it could turn existing manufacturing uses into non-conforming uses and might render their structures nonconforming as well. Such a project could affect operating conditions in a specific industry and may need to be considered in the Chapter 5, "Socioeconomic Conditions."

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- If a project would alter or accelerate development patterns, it could affect real estate market conditions in the area. If this is the case, this analysis should be considered in Chapter 5, "Socioeconomic Conditions."

420. PUBLIC POLICY

For public policy, the following should be considered in determining whether land use changes are significant and adverse:

- Whether the project would create a land use conflict or would itself conflict with public policies and plans for the site or surrounding area.
- Whether the project would result in significant material changes to existing regulations or policy. For example, this could include a proposed bulk variance within a special district that is in conflict with the goals and built form within the special district.

421. Waterfront Revitalization Program

As stated in the Short and Full EAS Forms, the lead agency should include an analysis of WRP consistency as part of the EAS. For any WRP policy, indicated as applicable on the NYC Consistency Assessment Form (CAF), the proposed project may advance that policy, be neutral to it, or hinder the policy. It is the last category—hindrance of a policy—that may result in an inconsistency, and therefore, requires more scrutiny in the policy assessment.

If the lead agency determines that the project is consistent with the applicable WRP policies, no further assessment is necessary. For projects determined to be consistent with WRP policies, the analysis should state that the project would not substantially hinder the achievement of any of the coastal policies.

If a project is inconsistent with a WRP policy, the lead agency and applicant, if applicable, should consider whether changes to the project could be made to make the project consistent with the WRP or to modify the project such that, while there may still be an inconsistency, the lead agency is able to make the four findings identified below in Section 500.

If changes that would eliminate the inconsistency are not possible, the lead agency should consider whether the inconsistency is of such a degree as to be significant. In determining the significance of any inconsistencies, the lead agency should balance the policies that would be furthered by the project against those that would be hindered by the project. The lead agency may determine that some inconsistencies are not significant. For example, a proposed new structure that would slightly block a view corridor toward the water may be found to be insignificant, depending on the existing width of that view corridor and other circumstances.

500. DEVELOPING MITIGATION

Mitigation for potential significant adverse land use, zoning, or public policy impacts could include the following types of measures, as appropriate:

- Establish a buffer between the new, incompatible land use and its surroundings.
- Where a project on a particular site might lead to an incompatible or otherwise significantly adverse land use, develop terms and conditions for appropriate regulatory controls, such as the special permit (if there is one), subject the project to a restrictive declaration limiting such a use (if it is a private applicant), or include language requiring the protective restrictions in leases, urban renewal plans, or other agreements (if it is a public project). It should be noted that, for zoning map amendments, restrictive declarations that specify use types are not preferred by DCP.
- If a zoning text change is proposed, the text language could be modified to mitigate potential impacts. However, substantial changes to the proposed project would typically be considered alternatives.

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Even in the absence of an impact on land use, zoning or public policy, the measures described above may also be appropriate to mitigate impacts in other technical areas if those impacts are related to land use.

510. WATERFRONT REVITALIZATION PROGRAM

When a project would result in significant adverse impacts related to inconsistencies with the WRP, those impacts must be mitigated to the greatest extent practicable. If the impacts can be appropriately mitigated, the project would then be consistent with the WRP. Appropriate mitigation measures vary, depending on the particular inconsistency. The measures must either be sufficient to address the policy inconsistency, or enable the lead agency to determine that:

- No reasonable alternatives exist that would permit the project to be taken in a manner that would not substantially hinder the achievement of the policy;
- The project would minimize all adverse effects related to the policy inconsistency to the maximum extent practicable;
- The project would advance one or more of the other coastal policies; and
- The project would result in an overriding local public benefit.

Proposed mitigation measures also must be assessed for consistency with the WRP to the same degree as the proposed project. Mitigation for a significant adverse impact related to the WRP may require coordination with other technical analyses.

Mitigation measures may include those described in Section 500 of the different technical chapters of this Manual. In some cases, those measures may have to be modified to provide appropriate mitigation for significant impacts related to the WRP's policies. For example, mitigation for significant impacts related to flooding and erosion (Policy 6) is discussed in Chapter 11, "Natural Resources."

In some cases, however, the significant adverse impact may be specific to the assessment of WRP and not identified in the analysis of another technical area, such as air quality or hazardous materials. For example, a reduction in existing or potential public access to or along coastal waters would be inconsistent with the WRP (Policy 8) and could constitute a significant adverse impact with respect to the WRP, although it might not constitute a significant adverse impact identified in the other technical analyses. If a project results in an unavoidable reduction of existing public access, mitigation could be proposed to create or significantly enhance public access near the project site.

600. DEVELOPING ALTERNATIVES

Alternatives that reduce or eliminate land use, zoning, or public policy impacts can include the following:

- Alternative site configuration to separate conflicting uses as much as possible.
- Alteration of the zoning proposal, or inclusion of provisions, to reduce non-conformance of uses and structures.
- Alternative site(s) for the project, particularly for public projects.
- Alternative uses that eliminate or reduce land use impacts.
- Alternative development proposals, such as projects that do not require modifications to the zoning (often called "as-of-right" alternatives).

For example, if a proposed project would result in an inconsistency with a policy of the WRP, consider how the inconsistency can be avoided through changes to the project. Such changes can include alternative uses (*e.g.*, water-dependent and enhancing uses rather than those that are not) or alternative design (*e.g.*, a different site plan to avoid development in the floodplain, or different building heights or site location to avoid a visual impact).

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Even in the absence of an impact on land use, zoning or public policy, the measures described above may also be appropriate as alternatives that reduce impacts in other technical areas.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

The New York City Zoning Resolution is the underlying regulation for land use in the City. Additionally, different parts of the City may also be affected by various other public policies, such as a 197-a plan.

New York City's Waterfront Revitalization Program was adopted in coordination with local, state, and federal regulatory programs. Consistency assessments consider the many federal, state, and local laws affecting the coastal area. For more information on the many rules and regulations affecting cultural resources, coastal erosion, flood management, natural resources, hazardous materials, and air quality, see Section 700 of the appropriate technical chapters of this Manual. Several significant laws and regulations are listed below.

711. Federal Laws and Regulations

- Coastal Zone Management Act (P.L. 92 583, 16 USC 1451 *et seq*.).
- Marine Protection, Research, and Sanctuaries Act of 1972 (Section 103; 33 USC 1413).
- National Flood Insurance Act of 1968.
- Flood Disaster Protection Act.
- Water Pollution Control Act.
- Clean Air Act.
- Clean Water Act, Section 404 (33 USC 1344).
- National Environmental Policy Act.
- Rivers and Harbors Act of 1899, Section 10 (33 USC 403).
- Fish and Wildlife Coordination Act.
- Endangered Species Act.
- National Historic Preservation Act.
- Deepwater Port Act.
- National Fishing Enhancement Act of 1984.
- Marine Mammal Protection Act.
- Federal Power Act.

712. New York State Laws and Regulations

- State Environmental Quality Review, Environmental Conservation Law, Part 617.
  - Part 617.11 (e) describes the linkage between SEQR and the coastal policies of Article 42 of the Executive Law, as implemented by 19 NYCRR 600.5.
  - Part 617.9 (b)(5)(vi) describes the inclusion of the state and local coastal policies in the preparation and content of Environmental Impact Statements.
- Waterfront Revitalization and Coastal Resources Act (New York State Executive Law, 1981; Sections 910 et seq. Article 42; and implementing regulations 19 NYCRR).
  - Part 600: Policies and Procedures.
  - Part 601: Local Government Waterfront Revitalization Programs.
  - Part 602: Coastal Area Boundary; Significant Fish and Wildlife Habitats

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- Important Agricultural Lands and Scenic Resources of Statewide Significance; Identification, Mapping, and Designation Procedures.
- State Guidelines for Federal Reviews: Procedural Guidelines for Coordinating New York State Department of State and New York City Waterfront Revitalization Program Consistency Review of Federal Agency Actions, Coastal Management Program, Department of State, State of New York, 1985.
- Guidelines for Notification and Review of State Agency Actions Where Local Waterfront Programs Are in Effect, Coastal Management Program, Department of State, State of New York.
- Coastal Zone Management Rules and Regulations (6 NYCRR 505).
- Coastal Erosion Hazard Areas Act.
- Flood Hazard Areas.
- Freshwater Wetlands Protection Program.
- Tidal Wetlands Protection Program.
- Classification of Waters Program.
- Endangered and Threatened Species Program.
- Historic Preservation Act.

713. New York City Laws and Regulations

- New York City Zoning Resolution
- Zoning Handbook, NYC Department of City Planning, (Guide to NYC Zoning Regulation, 2006).
- The New Waterfront Revitalization Program, 2002.
- Procedures for the City Planning Commission, acting as the City Coastal Commission, approved by the City Coastal Commission acting as the City Planning Commission, 1987.
  - This set of procedures links the Waterfront Revitalization Program with the ULURP process and describes the City Planning Commission's role in the state and federal actions that otherwise do not require local involvement.
- NYC Building Code, Flood-Resistant Construction (Appendix G).
- Grading and Drainage Rules—Local Law 7.

720. APPLICABLE COORDINATION

If any public policies would apply to the proposed project or the area affected by the proposed project, coordination with the responsible agency is advised. Some examples of the agencies and their respective policies are as follows:

- New York City Department of Housing Preservation and Development (HPD)—Urban Renewal Plans
- Department of Small Business Services—Industrial Business Zones
- New York City Department of City Planning—New York City Comprehensive Waterfront Plan, 197a Plans
- Agencies such as the New York City Departments of Transportation, Environmental Protection, Sanitation, or Parks and Recreation, the Police and Fire Departments, or the Board of Education, that may propose capital projects affecting land use.

This coordination is important to avoid the potential for conflicting policies, if overlapping plans are intended for a site or area. By coordinating the proposed project with the relevant agencies, provisions to accommodate potentially conflicting goals can be worked out and made to be part of the project and assessed accordingly.

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In addition, the assessment of the project's consistency with WRP relies primarily on information and analyses of the other technical areas discussed in this Manual. Thus, coordination with the other environmental analyses can be very useful.

721. City Coastal Commission

As indicated above, lead agencies conduct their own review of a project's consistency with the WRP during environmental assessment. If the City Planning Commission is an involved agency because the project will come before the City Planning Commission, the City Planning Commission acting as the City Coastal Commission is required to make a WRP consistency finding. The City Coastal Commission may elect to adopt the consistency determination and environmental findings of the lead agency or adopt different WRP consistency findings. For this reason, the lead agency may wish to consult with the Department of City Planning, Waterfront and Open Space Division, acting as advisors to the City Coastal Commission, prior to issuance of its CEQR determination.

The City Coastal Commission's involvement may occur for a variety of federal and state actions and actions subject to ULURP (Charter section 197-c) or Charter section 197-a or 200.

Once a determination is made by a lead agency that a project is consistent with the policies of the WRP, the lead agency is responsible for keeping a WRP file which will ensure a record of consistency between the City and the State.

730. LOCATION OF INFORMATION

- New York City Department of City Planning

  22 Reade Street
  New York, NY 10007

  - Map Sales:
    - Land Use Maps
    - Zoning Resolution
    - 197a Plans
    - Planning Reports
    - Waterfront Revitalization Program
  - Housing, Economic and Infrastructure Planning:
    - Housing Reports
    - Economic and Industry Reports
  - Database & Application Development:
    - PLUTO Data (PLUTO files are databases of developed properties, identified by tax block and lot number. The date of the structure, types of use, number of stories, and City or private ownership are identified.)
    - Sanborn Maps available for viewing
  - Calendar Officer:
    - City Planning Commission Reports
  - Zoning:
    - Zoning text changes, recently adopted and under consideration
  - Waterfront and Open Space Division:

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- Waterfront Studies
- State and Federal Coastal Zone Requirements
- Department of City Planning, Coastal Zone Boundary, City of New York.
- Department of City Planning, New York City Comprehensive Waterfront Plan:
- Reclaiming the City's Edge, 2002.
- Department of City Planning, New York City Waterfront Symbol, City of New York, 1989.
- New York City Zoning Resolution, Special Regulations Applying in the Waterfront Area (Article VI, Chapter 2).

- Technical Review:
  - ULURP applications and approvals
  - Zoning and Street Maps
  - Urban Renewal Area Designation and Plans

- Environmental Assessment and Review Division:
  - CEQR applications, approved and pending

- Department of City Planning, Borough Offices:
  - Planning Reports
  - Planning Initiatives

Manhattan
22 Reade Street
New York, NY 10007

Staten Island
130 Stuyvesant Street
Staten Island, NY 10301

Queens
120-55 Queens Boulevard
Queens, NY 11424

Brooklyn
16 Court Street
Brooklyn, NY 11241

Bronx
One Fordham Plaza
Bronx, NY 10458

- Economic Development Corporation

  Planning Division
  110 William Street
  New York, NY 10038

- Department of Housing Preservation and Development
  100 Gold Street

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New York, NY 10038
For:
Urban Renewal Plans
Urban Renewal Area Designations
Relocation Reports
Disposition Agreements

- Buildings Department

For:
Building Permits
Certificates of Occupancy

Manhattan
280 Broadway
New York, NY 10007

Brooklyn
Municipal Building
210 Joralemon Street
Brooklyn, NY 11201

Bronx
1932 Arthur Avenue
Bronx, NY 10457

Queens
120-55 Queens Boulevard
Kew Gardens, NY 11424

Staten Island
10 Richmond Terrace
Staten Island, NY 10301

- Board of Standards and Appeals

40 Rector Street
New York, NY 10006
For:
BSA Special Permits
BSA Reports

- New York State Department of Environmental Conservation, Region 2

47 40 21st Street
Long Island City, NY 11101
http://www.dec.ny.gov/about/605.html

For:
Coastal Erosion Hazard Area Maps
Tidal Wetland Maps.
Freshwater Wetlands Maps

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http://www.dec.ny.gov/outdoor/45415.html

- Department of Environmental Conservation, "Stormwater for New Development," a memorandum to Regional Water Engineers, Bureau Directors, Section Chiefs, dated April 1990.
- Department of Environmental Conservation, Floodplain Regulation and the National Flood Insurance Program: A Handbook for the New York Communities, Water Division, Flood Protection Bureau, State of New York, 1990.
- Significant Coastal Fish and Wildlife Habitat Designations.

- Federal Emergency Management Agency (FEMA)

  26 Federal Plaza
  New York, NY 10278

  - FEMA National Flood Insurance Program Map Service Center (1-800-358-9616)
  - Federal Emergency Management Agency, Flood Insurance Rate Maps, National Flood Insurance Program. See http://www.fema.gov/hazard/flood/info.shtm.
  - Federal Emergency Management Agency, Flood Insurance Study: City of New York, New York, Community Number 360497, Revised, September 5, 2007.

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B. SUSTAINABILITY

In CEQR reviews, certain public policies are assessed to determine if land use changes created by the project could substantially affect land use regulation or policy. Accordingly, public policy analysis has focused on Urban Renewal Plans, 197-a Plans, the WRP and similar land use-based public policies.

In 2007, the City adopted wide-ranging sustainability policies through PlaNYC, the City's long-term sustainability plan, that apply to the city's land use, open space, brownfields, energy use and infrastructure, transportation systems, water quality and infrastructure, and air quality, and also make the city more resilient to projected climate change impacts. The Plan brought together over 25 City agencies to work toward a greener, greater New York. Over 97% of the 127 initiatives in PlaNYC were launched within one-year of its release and almost two-thirds of its 2009 milestones were achieved or mostly achieved. The updated plan, issued in April 2011, includes 132 initiatives and more than 400 specific milestones for December 31, 2013, and can be found here. The term "sustainability" can carry many meanings and interpretations, and therefore, needs to be carefully defined in the context of an environmental assessment. Currently, the City's sustainability policies are guided by PlaNYC and are used to define sustainability for the purposes of CEQR.

100. DEFINITIONS

The genesis of PlaNYC lies in the rebound in New York City's population to 8.36 million in 2008 from just 7.1 million residents in 1980. By 2030, the City's population is predicted to surge past 9 million – an addition of over 1 million people since 2002. PlaNYC recognizes that this future growth will require new investments in housing, parks, transportation, and drinking water and wastewater infrastructure, as well as additional public health measures, and that these must be implemented in a sustainable fashion. Its structure sets broad-based targets to be reached by 2030. To implement this overall strategic vision, PlaNYC adopts 10 goals to be achieved through 132 separate initiatives and a number of subsidiary plans such as the Sustainable Stormwater Management Plan. Many of the sustainability goals are to be achieved through a set of public sector projects, including incorporating PlaNYC initiatives into local laws or the City's regulatory frameworks governing both private and public actions.

200. APPLICABILITY OF A SUSTAINABILITY ASSESSMENT

Until sustainability goals are more clearly defined through the incorporation of initiatives into codes, regulations and specific policies, there are few sustainability standards to apply appropriately in assessing a proposed project for the purposes of CEQR. As these initiatives become codified, privately sponsored projects would be presumed to comply with all codes and regulations in effect. However, to ensure that large publicly sponsored projects align with the broader sustainability priorities and goals the City has set for itself, it is appropriate that the PlaNYC initiatives (whether or not yet embodied in generally applicable codes or regulations) be considered in an environmental assessment for large publicly sponsored projects only, as these projects are often multi-faceted and touch upon many of the elements addressed by PlaNYC. If a publicly-sponsored project is, itself, implementing a PlaNYC initiative, such as repairing or replacing aging infrastructure, a PlaNYC/sustainability assessment would likely be inappropriate. The discussion below details how sustainability, as encouraged through the goals and initiatives of PlaNYC, is considered in the environmental assessment of large publicly-sponsored projects.

300. ASSESSMENT APPROACH

While it is city policy to encourage every project, whether or not subject to CEQR, to incorporate general measures of sustainability, such as energy efficiency, water conservation, stormwater management, *etc.*, into its projects, this assessment necessarily focuses on the extent to which the stated goals and objectives of a large publicly sponsored project are consistent with the City's sustainability policies and goals, as encouraged through PlaNYC. Because PlaNYC promotes broad and wide-ranging sustainability goals, no one project can advance all of its initiatives. Therefore, a consistency analysis compares the attributes of the project with the overarching goals and initiatives of PlaNYC that are

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germane to the project. The determination of which PlaNYC goals and initiatives should be examined for a particular project is a decision for the lead agency.

PlaNYC's initiatives touch upon several technical areas, including Open Space, Natural Resources, Infrastructure, Energy, Construction, Transportation, Greenhouse Gas Emissions (GHG), and Air Quality. Many of these technical areas, and whether a project would affect them, are often considered in a CEQR assessment, and are defined and described individually in other chapters of the Manual. While the assessment of a particular technical area focuses on the project's impact on that area of concern, the sustainability assessment considers the combination of project elements discussed in the technical areas as related to the City's current sustainability policy benchmark, PlaNYC. Therefore, the analyses and conclusions for each relevant technical area above can be used to provide the context in which to assess a publicly-sponsored project's consistency with relevant sustainability goals or initiatives as described in PlaNYC.

To illustrate, a large publicly-sponsored project may have the potential to affect the City's achievement of PlaNYC's water quality goals, and particularly the management of stormwater and wet weather flows of sewage. In Chapter 13, "Water and Sewer Infrastructure," the project may therefore identify best management practices to manage its predicted storm and sanitary flows and incorporate measures to ensure that these flows would not exceed sewer system capacity. The sustainability assessment would discuss those best management practices measures that reduce or control stormwater runoff and examine whether additional sustainability measures could be incorporated into a project to ensure consistency with the City's sustainability policies. Such measures may include adding vegetation to reduce or filter stormwater runoff by increased tree planting on a development parcel or within parking lots. These project elements may also align with sustainability principles by considering the full range of co-benefits; project design elements intended to offset increased stormwater runoff demands could also reduce the Urban Heat Island Effect, energy demand in the summer, and air pollutants, and could even add to open space. It may be the case that the project elements discussed in infrastructure reflect the City's sustainability policies and no further assessment is required. Consideration of these issues should be balanced with consideration of other public policy objectives and the project's purpose and need.

400. DETERMINING CONSISTENCY WITH PLANYC

The following provides a guide to PlaNYC initiatives that would be most relevant to a CEQR assessment. Although the consistency review is independent from all other environmental sections and must stand on its own, it is supported and conducted with consideration of all the other technical analyses performed as part of the project's environmental assessment under CEQR. In addition, many of the PlaNYC initiatives overlap and it is recommended to consider the project holistically, as every technical area listed below may not have the potential to be affected, positively or adversely, by a proposed project. In addition, note that one goal of PlaNYC is to reduce City building and operational GHG emissions by 30 percent below Fiscal Year 2006 levels by 2017 (and reduce citywide GHG emissions by 30 percent below 2005 levels by 2030). While many of the initiatives below would reduce GHG emissions, both the GHG emissions associated with a project and specific measures to reduce GHG emissions are discussed in Chapter 18, "Greenhouse Gas Emissions." PlaNYC 2011 Update has expanded the City's goals for increased climate resilience. The discussion of climate change and increased climate resilience is located in Chapter 18 as well.

If a project is found to be inconsistent, the lead agency should consider whether changes to the project could be made to make the project consistent with PlaNYC or changes could be made such that, while there may still be an inconsistency, the lead agency is able to make a determination that the inconsistency is not significant. If changes that would eliminate the inconsistency are not possible, the lead agency should consider whether the inconsistency is of such a degree as to be significant. In determining the significance of any inconsistencies, the lead agency should balance the policies that would be furthered by the project against those that would be hindered by the project. The lead agency may determine that some inconsistencies are not significant.

AIR QUALITY

PlaNYC sets forth the goal of achieving the cleanest air quality of any big U.S. city. To reach this goal – and to overcome the City's current non-attainment with federal standards for $PM_{2.5}$ and ozone –

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PlaNYC sets forth a multi-pronged strategy to reduce road vehicle emissions, reduce other transportation emissions, reduce emissions from buildings, pursue natural solutions to improve air quality, to better understand the scope of the challenge, and update codes and standards accordingly. Publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they include use of one or more of the following elements:

- The promotion of mass transit
- The use of alternative fuel vehicles
- The installation of anti-idling technology
- The use of retrofitted diesel trucks
- The use of biodiesel in vehicles and in heating oil
- The use of ultra-low sulfur diesel and retrofitted construction vehicles
- The use of cleaner-burning heating fuels
- The planting of street trees and other vegetation

ENERGY

PlaNYC sets forth the goals of reducing energy consumption and making the city's energy systems cleaner and more reliable. To reach these goals, PlaNYC sets forth a multi-pronged strategy to improve energy planning, increase energy efficiency, provide cleaner, more reliable, and affordable energy, reduce New York City's energy consumption, expand the city's clean power supply, and modernize the city's electricity delivery infrastructure. Publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they maximize their use of one or more of the following elements:

- Exceed the energy code
- Improve energy efficiency in historic buildings
- Use energy efficient appliances, fixtures, and building systems
- Participate in peak load management systems, including smart metering
- Repower or replace inefficient and costly in-city power plants
- Build distributed generation power units
- Expand the natural gas infrastructure
- Use renewable energy
- Use natural gas
- Install solar panels
- Use digester gas from sewage treatment plants
- Use energy from solid waste
- Reinforce the electrical grid

WATER QUALITY

PlaNYC sets forth the goal of improving the quality of New York City's waterways to increase opportunities for recreation and restore coastal ecosystems. To reach this goal, PlaNYC sets forth a multi-pronged strategy to improve water quality by removing industrial pollution from waterways, protecting and restoring wetlands, aquatic systems and ecological habitats, continuing construction of infrastructure upgrades, and using "green" infrastructure to manage stormwater. Publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they include use of one or more of the following elements:

- Expand and improve wastewater treatment plants
- Protect and restore wetlands, aquatic systems, and ecological habitats
- Expand and optimize the sewer network
- Build high level storm sewers
- Expand the amount of green, permeable surfaces across the city

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- Expand the Bluebelt system
- Use "green" infrastructure to manage stormwater
- Are consistent with the Sustainable Stormwater Management Plan
- Build systems for on-site management of stormwater runoff
- Incorporate planting and stormwater management within parking lots
- Build green roofs
- Protect wetlands
- Use water efficient fixtures
- Adopt a water conservation program

LAND USE

PlaNYC sets forth the goals of creating homes for almost a million more New Yorkers, while making housing more affordable and sustainable. To reach these goals, PlaNYC sets forth a multi-pronged strategy of publicly-initiated rezonings, creating new housing on public land, exploring additional areas of opportunity, encouraging sustainable neighborhoods, and expanding targeted affordability programs. Other relevant elements of PlaNYC include initiatives to further brownfield, open space, and transportation goals. Publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they include use of one or more of the following:

- Pursue transit-oriented development
- Preserve and upgrade current housing
- Promote walkable destinations for retail and other services
- Reclaim underutilized waterfronts
- Adapt outdated buildings to new uses
- Develop underused areas to knit neighborhoods together
- Deck over rail yards, rail lines and highways
- Extend the Inclusionary Housing program in a manner consistent with such policy
- Preserve existing affordable housing
- Redevelop brownfields

OPEN SPACE

PlaNYC sets forth the goal of ensuring that all New Yorkers live within a 10-minute walk of a park. To reach this goal, PlaNYC sets forth a multi-pronged strategy of making existing sites available to more New Yorkers, expanding usable hours at existing sites, targeting high-impact projects in neighborhoods underserved by parks, creating destination-level spaces for all types of recreation, converting former landfills into public space and parkland, promoting and protecting nature, ensuring the long-term health of parks and public space, and re-imagining the public realm. Publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC and other related initiatives if they include use of one or more of the following elements:

- Complete underdeveloped destination parks
- Provide more multi-purpose fields
- Install new lighting at fields
- Create or enhance public plazas
- Plant trees and other vegetation
- Upgrade flagship parks
- Convert landfills into park land
- Increase opportunities for water-based recreation
- Conserve natural areas

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NATURAL RESOURCES

The protection of natural resources is woven throughout PlaNYC. The many ecological services provided by natural resources are recognized and promoted within the open space, water quality, air quality, and brownfields chapters of PlaNYC. In recognition of the many co-benefits provided by natural resources, publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they include use of one or more of the following elements:

- Plant street trees and other vegetation
- Protect wetlands
- Create open space
- Minimize or capture stormwater runoff
- Redevelop brownfields

SOLID WASTE

PlaNYC sets a long-term goal of diverting 75% of public and private sector solid wastes from landfills. The multi-pronged strategy to meet this goal includes increasing the recovery of resources from the waste stream, improving the efficiency of the waste management system, and reducing the city government's solid waste footprint. It should be noted that for the PlaNYC Solid Waste policy area, there is a substantial overlap with New York City's adopted Solid Waste Management Plan (SWMP). Accordingly, a large, publicly-sponsored project that is consistent with the SWMP would also generally be consistent with PlaNYC. A publicly-sponsored project that improves the infrastructure for the City's solid waste collection and recycling operations would also generally be consistent with PlaNYC. The 75% diversion goal is to be achieved by many individual projects making progress towards this goal over time. In general, a large, publicly-sponsored project that is likely to undergo CEQR review would further the goals of PlaNYC with respect to solid waste if it includes one or more of the following elements and does not significantly impede other listed elements:

- Promote waste prevention opportunities
- Increase the reuse of materials
- Improve the convenience and ease of recycling
- Create opportunities to recover organic material
- Identify additional markets for recycled materials
- Reduce the impact of the waste system on communities
- Remove toxic materials from the general waste system

TRANSPORTATION

PlaNYC sets forth two related transportation goals: expand sustainable transportation choices and ensure the reliability and high quality of the City's transportation network. PlaNYC sets forth a multi-pronged strategy to reach these goals by building and expanding transit infrastructure, improving transit service on existing infrastructure, promoting other sustainable modes, improving traffic flow by reducing congestion on roads, bridges, and airports, maintaining and improving the physical condition of our roads and transit system, and developing new funding sources. The specific initiatives in PlaNYC's transportation chapter may be found here. A key theme in PlaNYC is to reduce congestion and vehicle traffic on our roads, particularly in our most congested areas. Accordingly, publicly-sponsored projects that are likely to undergo CEQR review would generally be consistent with PlaNYC if they include use of one or more of the following elements:

- Promote transit-oriented development
- Promote cycling and other sustainable modes of transportation
- Improve ferry services
- Make bicycling safer and more convenient
- Enhance pedestrian access and safety

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- Facilitate and improve freight movement
- Maintain and improve roads and bridges
- Manage roads more efficiently
- Increase capacity of mass transit
- Provide new commuter rail access to Manhattan
- Improve and expand bus service
- Improve local commuter rail service
- Improve access to existing transit

500. DEVELOPING MITIGATION

When a large publically sponsored project would result in inconsistencies with PlaNYC, and such inconsistencies are of such a degree as to be significant, those impacts must be mitigated to the greatest extent practicable, consistent with social, economic and other essential considerations. If the impacts can be appropriately mitigated, the project would then be consistent with PlaNYC. Appropriate mitigation measures will vary depending on the particular inconsistency. Mitigation measures include many of the initiatives listed above. Further sustainability and efficiency measures may also mitigate the inconsistency and can be found here.

600. DEVELOPING ALTERNATIVES

Sometimes, a proposed project would result in an inconsistency with PlaNYC that can be avoided through changes to the project. Such changes can include many of the mitigation measures described above.

700. AGENCY COORDINATION

If a lead agency is unsure of the applicability of the sustainability assessment to the proposed project, or has questions with regard to the consistency assessment, it should contact the Mayor's Office of Environmental Coordination (MOEC). For questions regarding the PlaNYC initiatives or measures to mitigate an inconsistency, the lead agency should consult with both MOEC and the Mayor's Office of Long Term Planning and Sustainability.

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SOCIOECONOMIC CONDITIONS

CHAPTER 5

The socioeconomic character of an area includes its population, housing, and economic activity. Socioeconomic changes may occur when a project directly or indirectly changes any of these elements. Although socioeconomic changes may not result in impacts under CEQR, they are disclosed if they would affect land use patterns, low-income populations, the availability of goods and services, or economic investment in a way that changes the socioeconomic character of the area. In some cases, these changes may be substantial but not adverse. In other cases, these changes may be good for some groups but bad for others. The objective of the CEQR analysis is to disclose whether any changes created by the project would have a significant impact compared to what would happen in the future without the project.

The assessment of socioeconomic conditions usually separates the socioeconomic conditions of area residents from those of area businesses, although projects may affect both in similar ways. Projects may directly displace residents or businesses or may indirectly displace them by altering one or more of the underlying forces that shape socioeconomic conditions in an area. Usually, economic changes alone need not be assessed; however, in some cases their inclusion in a CEQR review may be appropriate, particularly if a major industry would be affected or if an objective of a project is to create economic change.

As with each technical area assessed under CEQR, the applicant should work closely with the lead agency during the entire environmental review process. If the lead agency determines that it is appropriate to consult or coordinate with the City's expert technical agencies and service providers on the socioeconomic conditions assessment, it should consult the New York City Department of City Planning (DCP) as early as possible in the environmental review process for information, technical review, recommendations, and mitigation relating to socioeconomic conditions. Section 700 further outlines appropriate coordination with DCP and other expert agencies.

100. DEFINITIONS

110. DIRECT AND INDIRECT DISPLACEMENT

Direct displacement (sometimes called primary displacement) is the involuntary displacement of residents or businesses from a site or sites directly affected by a proposed project. Examples include a proposed redevelopment of a currently occupied site for new uses or structures, or a proposed easement or right-of-way that would take a portion of a parcel and thus render it unfit for its current use. The occupants and the extent of displacement are usually known, and the disclosure of direct displacement can therefore focus on specific businesses, employment, and a known number of residents and workers.

In contrast, for a project covering a large geographic area, such as an area-wide rezoning, the precise location and type of development may not be known because it is not possible to determine with certainty the future projects of private property owners, whose displacement decisions are tied to the terms of private contracts and lease terms between tenants and landlords existing at the time of redevelopment. Therefore, sites are analyzed to illustrate a conservative assessment of the potential effects of the proposed project on sites considered likely to be redeveloped, and examines whether existing businesses and residents on those sites may be displaced.

Indirect displacement (also known as secondary displacement) is the involuntary displacement of residents, businesses, or employees that results from a change in socioeconomic conditions created by the proposed project. Examples include lower-income residents forced out due to rising rents caused by a new concentration of higher-

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income housing introduced by a proposed project; a similar turnover of industrial to higher-paying commercial tenants spurred by the introduction of a successful office project in the area or the introduction of a new use, such as residential; or increased retail vacancy resulting from business closure when a new large retailer saturates the market for particular categories of goods. The assessment of indirect displacement usually identifies the size and type of groups of residents, businesses, or employees affected. In keeping with general CEQR practice, the assessment of indirect displacement assumes that the mechanisms for such displacement are legal. For information on applicable laws and regulations affecting residents, see Subsection 711, below.

120. POPULATION AND HOUSING

Population and housing assessments focus on the residents of an area and their housing conditions. If a socioeconomic assessment is appropriate, a profile of a residential population typically includes the following characteristics: total numbers, household size, income, and any other appropriate indicators of the economic conditions of residents. It is often helpful to break down income levels into groupings that are commonly used in the city to define income levels, such as low, moderate, and middle income. For a description of these income levels, refer to Section 23-911 of the New York City Zoning Resolution or here. These definitions typically change annually based on economic factors. A more detailed assessment also includes some or all of the following characteristics: average income of households living in small and large buildings, poverty status, education, and occupation.

The housing profile typically characterizes the type and condition of the housing stock, units per structure, whether owner-occupied or rented, vacancy rates, recent real estate trends, investments in affordable housing by city, state and not-for-profit organizations, and housing costs and values. As appropriate, single room occupancy (SRO) units, group quarters, shelters, and hotel units that contain year-round, permanent residents may be included in the housing unit count. Housing may also be characterized according to the income of its occupants (*e.g.*, low-, moderate-, or high-income housing). Regulations that protect tenants' continued occupancy and the availability of housing subsidies are identified and disclosed where residential displacement is a possibility.

130. ECONOMIC ACTIVITIES: BUSINESS AND EMPLOYMENT

Economic activities that characterize an area generally include the businesses or institutions operating there and the employment associated with them. Depending on the project in question, those people who are served by the businesses may also be considered in the assessment. Also, if there are groups of businesses that depend on the goods and services of businesses that are likely to be affected by the project, it may be appropriate to consider the effects on those businesses as well.

The businesses may be classified as commercial (office-based services, retailing, transient hotels, and other business activities typically found in urban commercial districts), industrial (manufacturing, construction, wholesale trade, warehousing, transportation, communications, and public utilities—activities typically found in manufacturing districts), or institutions (schools, hospitals, community centers, government centers, and other like facilities with a charitable, governmental, public health, or educational purpose).

140. INDUSTRY ASSESSMENTS

A project may not displace, but may affect, the operation of a major industry or commercial operation in the City. In these cases, the lead agency assesses the economic impacts of the project on the industry in question.

200. DETERMINING WHETHER A SOCIOECONOMIC ASSESSMENT IS APPROPRIATE

A socioeconomic assessment should be conducted if a project may be reasonably expected to create socioeconomic changes within the area affected by the project that would not be expected to occur without the project. The following circumstances would typically require a socioeconomic assessment:

- The project would directly displace residential population to the extent that the socioeconomic character of the neighborhood would be substantially altered. Displacement of less than 500 residents would not typically

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be expected to alter the socioeconomic character of a neighborhood. For projects exceeding this threshold, assessments of the direct residential displacement, indirect residential displacement, and indirect business displacement are appropriate.

- The project would directly displace more than 100 employees. If so, assessments of direct business displacement and indirect business displacement are appropriate.
- The project would directly displace a business that is unusually important because its products or services are uniquely dependent on its location; based on its type or location, it is the subject of other regulations or publicly adopted plans aimed at its preservation; or it serves a population uniquely dependent on its services in its present location. Information provided in Chapter 4, "Land Use, Zoning, and Public Policy," may be useful to help determine whether an assessment is appropriate. If any of these conditions is considered likely, assessments of direct business displacement and indirect business displacement are appropriate.
- The project would result in substantial new development that is markedly different from existing uses, development, and activities within the neighborhood. Such a project may lead to indirect displacement. Typically, projects that are small to moderate in size would not have significant socioeconomic effects unless they are likely to generate socioeconomic conditions that are very different from existing conditions in the area. Residential development of 200 units or less or commercial development of 200,000 square feet or less would typically not result in significant socioeconomic impacts. For projects exceeding these thresholds, assessments of indirect residential displacement and indirect business displacement are appropriate.
- The project would add to, or create, a retail concentration that may draw a substantial amount of sales from existing businesses within the study area to the extent that certain categories of business close and vacancies in the area increase, thus resulting in a potential for disinvestment on local retail streets. Projects resulting in less than 200,000 square feet of retail on a single development site would not typically result in socioeconomic impacts. If the proposed development is located on multiple sites located across a project area, a preliminary analysis is likely only warranted for retail developments in excess of 200,000 sq. ft. that are considered of regional-serving (not the type of retail that primarily serves the local population). For projects exceeding these thresholds, an assessment of the indirect business displacement due to market saturation is appropriate.
- If the project is expected to affect conditions within a specific industry, an assessment is appropriate. For example, a citywide regulatory change that would adversely affect the economic and operational conditions of certain types of businesses or processes may affect socioeconomic conditions in a neighborhood in two ways: (1) if a substantial number of residents or workers depend on the goods or services provided by the affected businesses; or (2) if it would result in the loss or substantial diminishment of a particularly important product or service within the City. Since the range of possible types of projects that may require an analysis of specific industries varies, the lead agency, in consultation with the Mayor's Office of Environmental Coordination (MOEC), should provide guidance as to whether an analysis is warranted.

The above thresholds are based on a review of recent applications that included detailed assessments or resulted in significant, adverse impacts on socioeconomic conditions, and would, for most projects, serve as an indication of when further analysis is recommended. However, certain circumstances may warrant different thresholds. Since the socioeconomic assessment seeks to determine the effect of the proposed projects relative to the expected No-Action conditions of the study area, the proposed threshold may be too high or low depending on the characteristics of the study area. For example, the introduction of 300,000 square feet of retail across several development sites in a dense neighborhood, such as Downtown Brooklyn, would be unlikely to result in the saturation of the marketplace for particular goods to the extent that the project would result in increased vacancies on local commercial streets. Most likely the population density and aggregate incomes in the area are sufficiently high to absorb additional sales. Furthermore, any increase in population associated with the project would be expected to generate additional demand for retail. In contrast, a 175,000 square foot discount department store at a single location may have a different effect in a lower density neighborhood, such as on Staten Island, where total consumer expenditures are not as high for particular categories

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of goods. In these circumstances, the lead agency may determine that a lower or higher threshold is appropriate for a specific project.

300. ASSESSMENT METHODS

The nature of the proposed project determines the geographic area and socioeconomic conditions to be assessed, the methods to use, and the level of detail by which they are studied. By comparing the characteristics of the proposed project to the circumstances in Section 200 above, the lead agency can identify the socioeconomic assessment issues that apply. If a determination on the appropriateness of further assessment is not evident without further study, a preliminary assessment (see Section 320, below) may be warranted. In most cases, a preliminary assessment is conducted because the detailed assessment builds upon the information provided in the preliminary assessment. Any assessment, preliminary or full, usually begins with selection of a study area. After the preliminary assessment, or as a result of a detailed assessment, the size of the study area may be enlarged or reduced.

310. STUDY AREA DEFINITION

Typically, the socioeconomic study area boundaries are similar to those of the land use study area, as described in Chapter 4, "Land Use, Zoning, and Public Policy." The study area encompasses the project site and adjacent area within 400 feet, 0.25 mile, or 0.5 mile, depending on project size and area characteristics. The socioeconomic assessment seeks to assess the potential to change socioeconomic character relative to the study area population. For projects that result in an increase in residential population, the scale of the relative change is typically represented as a percent increase in population.

A project that would result in a relatively large increase in population may be expected to affect a larger study area. Therefore, a 0.5 mile study area is appropriate for projects that would increase population by 5 percent compared to the expected No-Action population in a quarter-mile (0.25 mile) study area. When the percent increase will not be known until after a preliminary analysis is conducted, the applicant may begin with a 0.25 mile study area for the preliminary analysis and then increase it to a 0.5 mile study area if the analysis reveals that the increase in population would exceed 5 percent in the 0.25 mile study area. If the data includes geographic units such as census tracts or zip-code areas, it may be appropriate to adjust the size of the study area to make its boundaries contiguous with those of the data sets.

For projects covering a large area, it may be appropriate create subareas for analysis if the project affects different portions of the study area in different ways. Subareas are locations of at least one census tract that warrant special consideration because they are locations where land use characteristics or real estate trends are distinct from the rest of the study area. For example, if a project concentrates development opportunities in one portion of the study area, and would result in higher increases in population in that portion, it may be appropriate to analyze the subarea most likely to be affected by the concentrated development. Distinct sub-areas should be based on recognizable neighborhoods or communities in an effort to disclose whether a project may have disparate effects on distinct populations that would otherwise be masked or overlooked within the larger study area.

Some projects may result in direct or indirect effects that are either beyond the half-mile boundary or are such that typical site-specific study areas are not appropriate. For example, a proposal for a large retail use may change shopping patterns in a trade area that extends well beyond the typical half-mile. In this case, depending on the types of goods to be sold, the study area could comprise all shopping strips within a three-mile radius of the site. In short, there is no established "area" applicable to all socioeconomic analyses. A study area(s) should be developed that reflects the areas likely to be affected by the project. Generic actions may result in socioeconomic changes that would affect numerous locations throughout the city. In these cases, multiple or prototypical study areas may be appropriate. Other generic actions, such as a regulatory change that may affect operating conditions in a specific industry, may affect the city as a whole.

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320. PRELIMINARY ASSESSMENT

A preliminary assessment addresses socioeconomic conditions that may be affected by the proposed project. For example, if a project may affect employment patterns, the preliminary assessment would provide a greater level of detail in describing and assessing economic activities and employment profiles. The purpose of the preliminary assessment is to determine whether a proposed project has the potential to introduce or accelerate a socioeconomic trend. If this is the case, a more detailed assessment may be necessary. The approach of the analyses presented below is to learn enough about the effects of the proposed project in order to either rule out the possibility of significant impact or determine that more detailed analysis is required. A list of data sources that may be useful in completing the assessment is available in Section 730.

321. Direct (or Primary) Displacement

In most cases, direct displacement would not constitute a significant adverse socioeconomic impact under CEQR. Projects that involve the large scale, direct displacement of residents that is sufficient to warrant a detailed environmental assessment are relatively rare. A recent example of a detailed assessment of direct business displacement is the 2008 Willets Point Development Plan, Final Generic Environmental Impact Statement, which can be reviewed here.

321.1. Residential Displacement

Direct residential displacement is not by itself a significant socioeconomic impact under CEQR. Impacts from residential displacement may occur if the numbers and types of people being displaced would be enough to alter the socioeconomic character of a neighborhood and perhaps lead to indirect displacement of remaining residents. Historical examples that might have warranted a detailed assessment under contemporary environmental review practices include urban renewal projects such as Lincoln Square in the 1950's. This project relocated thousands of low-income persons and introduced a more affluent population. Another example is a road construction project, like the one to build the Cross Bronx Expressway in the late 1940's and 1950's, which required the clearance of tenement buildings in the Tremont section of the South Bronx. Although these types of projects are now rare, it is possible that the displacement of more than 500 residents may potentially alter a neighborhood's socioeconomic character and, therefore, require further analysis of direct residential displacement.

For all projects the number of residents to be directly displaced by a project should be disclosed, whether or not the displacement impact is considered significant. The analysis should determine the amount of displacement relative to the study area population, and compare and contrast the average incomes of displaced residents with the average income of all residents in the study area population. The following analysis should be considered when conducting a preliminary assessment of direct residential displacement. The thresholds provided below provide guidance and serve as a general rule; however, the lead agency may determine that lower or higher thresholds are appropriate under certain circumstances.

- The first step is to determine whether the displaced population represents a substantial or significant portion of the population within the study area. Displacement of less than 5 percent of the primary study area population would not typically represent a substantial or significant portion of the population.
- If the displaced population represents greater than 5 percent of the primary study area population, the analyst should then determine whether the average income of the displaced residents is markedly less than the average income of residents of the overall study area.

A detailed assessment should be conducted if preliminary analysis shows that:

- More than 500 residents would be directly displaced by a proposed project;

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- The displaced residents represent more than 5 percent of the primary study area population; and
- The average income of the directly displaced population is markedly lower than the average income of the rest of the study area population. The lead agency may consult DCP on the methodology to determine the estimated incomes of the directly displaced and study area populations, if such data are not readily available.

Sources of information to use in this assessment include the U.S. Census and the *NYC Housing and Vacancy Survey*.

321.2. Business Displacement

For all projects the type and extent of businesses and workers to be directly displaced by a project should be disclosed, whether or not there would be a significant displacement impact. A preliminary assessment to determine the potential for significant displacement should consider the following circumstances:

- Whether the businesses to be displaced provide products or services essential to the local economy that would no longer be available in its "trade area" to local residents or businesses due to the difficulty of either relocating the businesses or establishing new, comparable businesses. The "trade area" may be the study area or, depending on the size of the area from which the majority of customers or clients of the businesses are drawn, a broader area.

  The analysis should focus on businesses for which comparable goods or services may not be found within the study area, either under existing conditions or in the future with the proposed project. For example, the displacement of a grocery store on a local retail strip would not be expected to result in impacts because it is generally likely that similar stores exist within the study area or would locate there to meet demand. On the other hand, an example of direct displacement that would warrant additional analysis might be the demolition of buildings on a local retail corridor for a highway project or other non-retail uses. If comparable retail does not exist within the project study area, more analysis would be necessary to assess the likelihood of an impact.

  Sources of information to use in this assessment include *Zip Code Business Patterns*, a product of the U.S. Census, as well as information from Journey-to-Work data from the U.S. Census, or the Quarterly Census of Earning and Wages (QCEW) from the New York State Department of Labor (NYSDOL). Local development corporations or business improvement districts may also collect data or publish reports on businesses within the study area.

- Whether a category of businesses is the subject of other regulations or publicly adopted plans to preserve, enhance, or otherwise protect it. An example would be the displacement of an industrial business in Long Island City's Industrial Business Zone to develop a non-industrial use that would not be permitted under current land use policies. More analysis would be necessary to assess the likelihood of an impact. Information provided in the Chapter 4, Land Use, Zoning, and Public Policy, above, should be helpful in determining whether any of the displaced businesses are the subject of other regulations or publicly adopted plans to preserve, enhance, or otherwise protect them.

If any of the conditions listed above are possible, then a detailed assessment is appropriate.

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322. Indirect Displacement

322.1. Indirect Residential Displacement

The objective of the indirect residential displacement analysis is to determine whether the proposed project may either introduce a trend or accelerate a trend of changing socioeconomic conditions that may potentially displace a vulnerable population to the extent that the socioeconomic character of the neighborhood would change. Generally, an indirect residential displacement analysis is conducted only in cases in which the potential impact may be experienced by renters living in privately held units unprotected by rent control, rent stabilization, or other government regulations restricting rents, or whose incomes or poverty status indicate that they may not support substantial rent increases. Examples of projects where a detailed assessment was conducted include the Greenpoint-Williamsburg Land Use and Waterfront Plan, which can be found at http://nyc.gov/html/dcp/pdf/greenpointwill/gw_feis_ch_03.pdf, and the 125th Street Corridor Rezoning, which can be found at http://nyc.gov/html/dcp/pdf/env_review/125th/0302_feis.pdf.

In all cases, the potential for indirect displacement depends not only on the characteristics of the proposed project, but on the characteristics of the study area. Usually, the characteristics of the proposed project are known--the objective of the preliminary assessment, then, is to gather enough information about conditions in the study area so that the effect of the change relative to expected future conditions in the study area can be better understood. At this stage an analysis of data at the study area level is generally adequate for the preliminary analysis, and detailed census tract-level descriptions are not necessary. Although relevant data on population and housing may vary depending on the proposed project, information on study area characteristics typically include the following:

- ***TOTAL POPULATION BY CENSUS TRACT, FOR THE STUDY AREA, FOR THE BOROUGH, AND FOR THE CITY.*** To understand trends, it is useful to include data from the most recent census and from the previous decade. If there is reason to believe that longer-term trends should be assessed, then the data from the most recent census and the previous two decades may be presented. Where available, data on the number of permits issued for new or demolished housing units may be used to estimate changes in population since the previous U.S. Census. Data for the city, borough, or Public Microdata Use Area (PUMA) from the ACS may also be used to supplement census data and provide information on current conditions. The data should also include the projected change in population in the study area in the future without the project so that the project's addition may be expressed as a percent increase over existing and future No-Action conditions.

- ***HOUSING VALUE AND RENT.*** The U.S. Census provides information on median housing value and median contract rent. This information reflects the range of rents for both units of different sizes and ages and occupants who may have moved in recently or lived in their units for a long time. However, these data are of limited use because they fail to distinguish between units subject to market rents and those under some form of rent regulation. To understand current trends, particularly trends affecting unregulated rental housing, this information may be supplemented by discussions with real estate brokers and examination of current apartment listings. The key for this analysis is to understand the extent to which the market-rate rents and sales prices for new housing and existing unregulated rental housing in the future with the project would differ from, or conform to, the existing trends of market-rate rents and sales. Housing sales are recorded and available through various real estate publications.

- ***COOPERATIVES AND CONDOMINIUM CONVERSION.*** In some neighborhoods the conversion of units to cooperatives or condominiums is an indication of upgrading trends. Information is available through various real estate publications.

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- ***ESTIMATES OF THE NUMBER OF HOUSING UNITS NOT SUBJECT TO RENT PROTECTION***
- ***MEDIAN HOUSEHOLD INCOME AND OTHER INDICATORS OF ECONOMIC CONDITIONS OF RESIDENTS, SUCH AS PERCENT OF PERSONS LIVING BELOW THE POVERTY LEVEL***

The aforementioned information should be provided as it pertains to the following step-by-step analysis for a preliminary assessment of indirect residential displacement:

STEP 1

Determine if the proposed project would add new population with higher average incomes compared to the average incomes of the existing populations and any new population expected to reside in the study area without the project. It is often helpful to break down income levels into a "market rate" category specific to the proposal and compare it with groupings that are commonly used in the city to define income levels for low, moderate, and middle income for eligibility for inclusionary housing and other public assistance programs. Incomes thresholds are typically based on a family of four. For a description of current definitions, refer to http://www.nyc.gov/html/hpd/html/developers/inclusionary.shtml. These typically change annually based on economic factors.

If the project would introduce a more costly type of housing compared to existing housing and the housing expected to be built in the No-Action condition, then the new population may be expected to have higher incomes. In some cases, the study area would already be experiencing socioeconomic change and the housing to be developed under a proposed project represents a continuation of an existing trend, and not a new trend.

If the expected average incomes of the new population would be similar to the average incomes of the study area populations, no further analysis is necessary. If the expected average incomes of the new population would exceed the average incomes of the study area populations, then Step 2 of the analysis should be conducted.

STEP 2

Determine if the project's increase in population is large enough relative to the size of the population expected to reside in the study area without the project to affect real estate market conditions in the study area.

- If the population increase is less than 5 percent within the study area, or identified subareas, further analysis is not necessary as this change would not be expected to affect real estate market conditions.
- If the population increase is greater than 5 percent in the study area as a whole or within any identified subareas, move on to Step 3.
- If the population increase is greater than 10 percent in the study areas as a whole or within any identified subarea, move on to a Detailed Analysis.

STEP 3

Consider whether the study area has already experienced a readily observable trend toward increasing rents and the likely effect of the action on such trends. Near is defined as within a half-mile of the study area boundary.

- If the vast majority of the study area has already experienced a readily observable trend toward increasing rents and new market rate development, further analysis is not necessary. However, if such trends could be considered inconsistent and not sustained, the applicant should consult with the Department of City Planning on whether a detailed analysis is warranted.

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- If no such trend exists either within or near the study area the action could be expected to have a stabilizing effect on the housing market within the study area by allowing for limited new housing opportunities and investment. In this circumstance further analysis is not necessary.

- If those trends do exist near to or within smaller portions of the study area the action could have the potential to accelerate an existing trend. In this circumstance a detailed analysis should be conducted.

322.2. Indirect Business Displacement

The objective of the indirect business displacement analysis is to determine whether the proposed project may introduce trends that make it difficult for those businesses meeting the criteria set forth in Subsection 321.2, above, to remain in the area. The purpose of the preliminary assessment is to determine whether a proposed project has potential to introduce such a trend. If this is the case, a more detailed assessment may be necessary. An example of a project that includes a detailed assessment of indirect business displacement is the Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development Final Environmental Impact Statement, which can be reviewed at http://nyc.gov/html/dcp/pdf/env_review/manhattanville/04.pdf.

In most cases, the issue for indirect displacement of businesses is that a project would markedly increase property values and rents throughout the study area, making it difficult for some categories of businesses to remain in the area. An example would be industrial businesses in an area where land use change is occurring, and the introduction of a new population would result in new commercial or retail services that would increase demand for services and cause rents to rise.

Additionally, indirect displacement of businesses may occur if a project directly displaces any type of use that either directly supports businesses in the area or brings a customer base to the area for local businesses, or if it directly or indirectly displaces residents or workers who form the customer base of existing businesses in the area.

Often, enough information is known about the proposed project to understand whether the new land use would introduce a trend that may increase property values. Information provided in Chapter 4, Land Use, Zoning, and Public Policy is often adequate to determine whether the study area is likely to contain certain categories of businesses, such as industrial firms, that may face increase in rents due to the proposed project. Additionally, general information on employment patterns may be available at the zip code level from the U.S. Census or from the NYSDOL to identify such businesses. Local development corporations or business improvement districts may also collect data or publish reports on businesses within the study area. If an assessment of the businesses in the study area reveal the potential for the project to introduce trends that make it difficult for those businesses to remain in the area, a detailed assessment is appropriate.

322.3. Indirect Business Displacement due to Retail Market Saturation

Occasionally, development activity may create retail uses that draw substantial sales from existing businesses. While these economic pressures do not necessarily generate environmental concerns, they become an environmental concern when they have the potential to result in increased and prolonged vacancy leading to disinvestment. Such a change may affect the land use patterns and economic viability of the neighborhood. Indirect displacement due to market saturation is rare in New York City, where population density, population growth, and purchasing power are often high enough to sustain increases in retail supply. The purpose of the preliminary analysis is to determine whether the project may capture the retail sales in a particular category of goods to the extent that

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the market for such goods would become saturated as a result, potentially resulting in vacancies and disinvestment on neighborhood commercial streets.

A retail capture rate analysis typically includes the following steps:

- Determine if the categories of goods to be sold at the proposed development are similar to the categories of goods sold in stores found on neighborhood retail streets within the study area. Categories of retail goods for which a high share is purchased online, such as computer hardware and software or consumer electronics, would not typically be considered businesses that are likely to affect the types of stores that are most prevalent on local commercial streets. If the proposed retail is of a type that is primarily competitive with online retailers, no further analysis is necessary. Estimates of online retail spending for specific categories of goods are available from the *Statistical Abstract of the United States*, an annual U.S. Census publication.
- Determine the primary trade area for the proposed "anchor" stores – the largest stores in the proposed development that are expected to be the primary sources of added retail sales. The primary trade area is the area from which the bulk of the store's sales are likely to be derived. The trade area may be expressed in either mileage (*e.g.*, a 1.5 to 2-mile radius from a site is a typical primary study area for a large supermarket; a larger trade area would be typical for a department store) or travel time.
- Through data available from the Census of Retail Trade or other proprietary sources, estimate sales volume of relevant retail stores within the trade area. Relevant retail stores include those establishments that would be expected to sell categories of goods similar to those sold in anchor stores in the project.
- Through data available from the census and from the U.S. Department of Commerce or other proprietary sources on retail spending, determine the expenditure potential for relevant retail goods of shoppers within the primary trade area. Expenditure potential is the amount that customers in the trade area – typically residents and workers – may be expected to spend on the relevant categories of retail goods.
- The sales generated by key retailers developed in item 3 and the expenditure profile developed in item 4 may be compared to determine whether the trade area is currently saturated with retail uses or whether there is likely to be an outflow of sales from the trade area. This assessment is based on the percentage of available sales currently derived by existing stores (the capture rate) and the residue of dollars left unspent.
- For the project's build year, determine whether any factors would emerge that would affect conditions within the trade area. These may include factors not associated with the proposal, such as projected increases in population that would provide a stronger base of shoppers, other projected retail developments, or anticipated store closings or rising incomes.
- Project the sales volume for the project's anchor tenants. This would be based on the size of the store and on industry standards for sales derived from the Urban Land Institute's Dollars and Cents of Shopping Centers or another appropriate source.
- Compare the project sales volume with the dollars available within the trade area. If the capture rate for specific, relevant categories of goods would exceed 100 percent, it may have the potential to saturate the market for particular retail goods and a detailed assessment is warranted.

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323. Adverse Effects on Specific Industries

It may be possible that a given project may affect the operation and viability of a specific industry not necessarily tied to a specific location. An example would be new regulations that prohibit or restrict the use of certain processes that are critical to certain industries. If the following questions cannot be answered with a clear "no," then a detailed investigation is appropriate:

- Would the project significantly affect business conditions in any industry or any category of businesses within or outside the study area? It may be necessary to refer to information provided in Chapter 4, "Land Use, Zoning, and Public Policy," to make this determination.
- Would the project indirectly substantially reduce employment or impair the economic viability in the industry or category of businesses?

The industries or categories of businesses that should be considered in this assessment are those specified in the North American Industry Classification System (NAICS) as promulgated by the U.S. Census Bureau. This analysis should focus on the potential effects upon specific industries that are not related to the displacement of businesses or residents, as this should be considered in the direct and indirect displacement analyses above.

330. DETAILED ANALYSIS TECHNIQUES

If it has been determined that a socioeconomic impact may be likely or cannot be ruled out based on the preliminary assessment, a detailed analysis is conducted. The analysis aims to describe existing and anticipated future conditions to a level necessary to understand the relationship of the proposed project to such conditions by assessing the change that the project would have on these conditions and identifying any changes that would be significant and potentially adverse. The discussions of information and analyses set forth below offer guidance, some or all of which is useful for a range of projects. Since it is not possible to anticipate all projects that might affect socioeconomic conditions, it may be that some proposed projects require more or different information and analyses than are suggested here. In all cases, however, the analysis should allow the lead agency to understand the potential for, and extent of, a significant adverse impact to a level that allows appropriate mitigation to be considered. If specific information is not available, it may be necessary to make assumptions. As described in Chapter 2, "Establishing the Analysis Framework," these assumptions should reflect the worst case of the range of conditions that can reasonably be anticipated.

331. Direct Displacement

331.1. Direct Residential Displacement

EXISTING CONDITIONS

The detailed assessment of residential displacement focuses on the socioeconomic characteristics of the residents that would be displaced as these relate to the housing profile of the neighborhood. If the preliminary assessment indicates that a detailed analysis is needed, the detailed analysis then would determine whether relocation opportunities exist within the study area for these displaced households. Building on information provided in tasks conducted in the preliminary assessment, the following information should be described:

- The prevailing trends in vacancies and rental and sale prices of units on-site and within the neighborhood are identified. This information serves to identify the potential for the types of residents to be displaced to be relocated within the study area. For example, if the housing to be directly displaced is of a type and cost that is limited in amount in the neighborhood, it is unlikely that the displaced tenants would be able to relocate in the study area. Sources for data on housing prices and trends include the U.S. Census of Population and Housing, real estate reference services, and local realtors.

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FUTURE NO-ACTION CONDITION

For the project's build year, assess conditions related to demographic and housing characteristics of the study area or neighborhood. Relevant information might include whether: the housing stock in the area is expected to expand or decrease; the number of residents on the site is expected to increase or decrease; rents are expected to increase or remain stable; population and land use changes are expected; any other relocation is anticipated; the tenants' conditions would change (*e.g.*, rent increases, family size increase). This information may be obtained through interviews with real estate brokers or persons expert in local conditions, and through coordination with the land use analysis (see Chapter 4, "Land Use, Zoning, and Public Policy"). The conclusions of the existing conditions analysis are then revised to include relevant information about the future No-Action condition.

WITH-ACTION CONDITION

For the project's build year, determine how information described in the No-Action condition would change as a result of the proposed project. The analysis of With-Action conditions considers the effects of the project in concert with No-Action trends and conditions. If the number of low income residents to be displaced exceeds 5 percent of the primary study area population–or relevant subareas, if the displaced population is located within the subarea identified–and the displaced population could not be relocated within the larger study area, the project may result in a significant change in the socioeconomic character of the study area, and a potential significant adverse impact may occur.

331.2. Direct Business Displacement

EXISTING CONDITIONS

The detailed assessment of direct business displacement focuses on the specific conditions that describe the businesses to be displaced and the characteristics of the study area related to the displacement. The objective of the detailed assessment is to better understand the operational characteristics of the displaced businesses, determine whether they can be relocated, and assess whether the product or service they provide would continue to be available. One or more of the following tasks may be appropriate:

- Describe the operational and financial characteristics of the business to be displaced. Also describe the products, markets, and employment characteristics. Describe the effects of this business on the City's economy. Information on retail sales, employment, wages, and other indicators of business performance and characteristics can be obtained online or in publications from the U.S. Census Bureau, the Bureau of Labor Statistics, the Bureau of Economic Analysis, and the NYSDOL. Useful data sources available from the U.S. Census Bureau include the Economic Census, which include the Census of Retail Trade, County Business Patterns, the Annual Survey of Manufactures, Non-Employer Statistics, and the Survey of Business Owners. Special economic reports are also available from the Census Bureau's Center for Economic Studies. In addition to data on employment in New York State, the NYSDOL also provides industry projections and special industry-specific reports.
- Determine whether the business to be displaced has an important or substantial economic value to the City. Describe its products and services and its economic value. This analysis should consider who the customers are of these products or services and whether similar products or services would continue to be available to these customers. Describe location needs, if any.
- Assess whether the business would be able to relocate in the study area or elsewhere in the City. This assessment is based on a comparison of the products, services, and location needs of the business with the consumer base and available properties in the study area.

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FUTURE NO-ACTION CONDITION

For the project's build year, assess conditions related to the site and the study area in the future. Relevant information may include: any changes in the uses on-site; if the available commercial or industrial space in the area is expected to expand or decrease; if rents are expected to increase or remain stable; if the tenants' conditions would change (*e.g.*, rent increases, lease expiration, *etc.*). This information is obtained from persons with expertise in the local conditions, through interviews with real estate brokers, and through coordination with the land use analysis (see Chapter 4, "Land Use, Zoning, and Public Policy"). The conclusions of the existing conditions analysis are then revised to include relevant information about the future No-Action condition.

WITH-ACTION CONDITION

Describe the likely effects on the businesses being displaced, and on the character of the study area, as relevant. This analysis is based largely on the analysis of existing conditions, adjusted to account for future trends that would occur without the project. If the business is of a category of businesses described above in Subsection 321.2 and it could not be relocated within the trade area or, within the City if it does not have specific location needs, there may be a significant adverse impact.

332. Indirect Displacement

332.1. Indirect Residential Displacement

The objective of the indirect residential displacement analysis is to determine whether the proposed project may introduce a trend or accelerate a trend of changing socioeconomic conditions that may potentially displace a population of renters living in units not protected by rent stabilization, rent control, or other government regulations restricting rents. The purpose of the detailed assessment is to determine whether the population living within the unprotected units may be at risk of indirect displacement under the proposed project because its incomes are too low to afford increases in rents.

The approach to the detailed assessment of indirect residential displacement builds upon information provided in the preliminary assessment, but requires more in-depth analysis of census information and may include extensive field surveys as well. Unlike the preliminary assessment, which provided data at the study area-level, it may be necessary to distinguish areas within the broader study area. Therefore, data may need to be provided for census tracts or other smaller geographies within the study area, depending on the availability of data. Additionally, it may be necessary to provide comparative data for the borough and city.

The analysis should characterize existing conditions of residents and housing in order to identify populations that may be vulnerable to displacement ("populations at risk"), assess current and future socioeconomic trends in the area that may affect these populations, and examine the effects of the proposed project on prevailing socioeconomic trends and, thus, its impact on the identified populations at risk.

EXISTING CONDITIONS

Depending on the proposed project in question, characterizing existing conditions in a study area includes examination of census data and may require consideration of additional data sources, interviews, surveys, and fieldwork. A narrative is provided describing housing and population characteristics and trends over time. Major indicators of growth and decline in the total population or specific age groups or other subcomponents are described, as appropriate. It is helpful to consider what statistical parameters are most appropriate in describing population characteristics. In some cases, averages are more reflective of the population; in other cases, a median is a better indicator. For example, the average household size in an area that contains a range of household sizes, with a few households that are substantially larger than the vast majority, would not appropriately describe the

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typical household. In this case, the median would be more useful in describing household size. In addition, it is often helpful to break down income levels into groupings that are commonly used in the city to define income levels for low, moderate, and middle income for eligibility for inclusionary housing and other public assistance programs. Income levels are typically based on a family of four. For a description of current definitions, refer to http://www.nyc.gov/html/hpd/html/developers/inclusionary.shtml. These typically change annually based on economic factors.

The following provides guidance in how to conduct a detailed analysis of indirect residential displacement and includes a reasonably comprehensive list of information that may be required for the analysis.

- *DETERMINE THE AMOUNT AND GENERAL LOCATION OF PROTECTED AND UNPROTECTED HOUSING UNITS WITHIN THE STUDY AREA.* The data used to provide a housing profile are found in the U.S. Census, in DCP's housing permit data files, from agencies owning or operating housing in the area, and through surveys, as indicated below:
  - Housing units. The U.S. Census provides information on numbers of housing units, their size, occupancy (by renters or owners), and size of structures in which the units are located. As with population information, it is useful to compare census tracts within the study area, the total study area, the borough, and the City, to understand the particular conditions of the study area. Trends in housing can also be obtained by comparing the most recent census with the previous one or two decades. Where there is reason to suspect that the latest census data are out of date, annual information on new housing units can be obtained from DCP.
  - Group quarters, hotels, and single-room occupancy hotels (SROs). If there is reason to believe that SRO units, group quarters, shelters, or hotel units contain a sizable population of year-round, permanent residents in the study area, it may be appropriate to inventory these units and estimate their residential population. This can be done using a field survey, interviews with managers or even desk clerks, and observing the people entering and exiting the building.
  - Housing status. The rent levels of many of the housing units in the City are controlled through several mechanisms:
    - Rent control, which applies to units that are located in buildings built before 1947 with three or more units and that have been occupied by the same tenant since 1971;
    - Rent stabilization, which sets the rent of units in buildings of six units or more that were built before 1974 or that have received tax abatements or exemptions under one of several city programs;
    - Direct public subsidies to the landlord through such means as rent subsidy payments, low-interest mortgages, and/or partial real estate tax exemptions; and
    - Public ownership.

    The privately held rental units not subject to rent control, rent stabilization, or other forms of government regulation, are estimated from census data on the number of units in structure.
- *DETERMINE WHETHER THE UNPROTECTED HOUSING IS LIKELY OCCUPIED BY LOW-INCOME TENANTS WHO COULD NOT AFFORD INCREASES IN RENT AND THEREFORE WOULD BE VULNERABLE TO INDIRECT DISPLACEMENT.* The following information may be used to estimate the general size and location of

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such a population. Available sources of these data are the U.S. Census, the *American Community Survey* and the *NYC Housing and Vacancy Survey*:

- Household information (total households, household size, individuals), by census tract, study area, borough, and city.
- Age. The median age and age groupings in an area may be useful in defining the population profile.
- Economic status. Income and poverty status, in combination with other characteristics and trends noted above may help to define vulnerable populations. It may be helpful to examine median household income, the distribution of income (*e.g.*, do all households have incomes close to the median or are there sizable segments with incomes much lower or much higher than the median), and proportion of individuals living below the poverty level.
- Labor force characteristics are typically not necessary, but may be used as appropriate. Available information includes the percentage of the population in the labor force, workers per household, and occupation. This information may be useful to further characterize the population, particularly if the area shows an increase in working-age people or if an examination of economic status indicates that unemployment may be high. Occupation may also identify residents who may work in the area.
- Income of renter occupied households in small buildings. The census presents the number of rental units (and population) in structures of one and two units, three and four units, five to nine units, and so on. Those units in buildings of five or fewer units can be assumed not to be subject to rent stabilization. It is also conservatively assumed that none of these units are subject to rent control, either. Data on the average incomes of renters living in these buildings may also available be available through a special tabulation of census data. Based on the study area in question, the average household incomes of renter-occupied households in buildings with fewer than 5 units should be calculated to determine the approximate size and location of a low income population living in unprotected units. Requests for the data may be coordinated through DCP.

- *CHARACTERIZE THE RECENT INVESTMENTS IN MARKET RATE AND AFFORDABLE HOUSING WITHIN THE STUDY AREA.* It is sometimes the intent of a project to build on previous efforts to stabilize a community with a history of disinvestment. Typically, these projects are expected to result in new mixed-income development and are located in a study area where the city, state or not-for-profits have invested substantially in affordable housing development. If this applies to the project, the analysis should include the following:
  - An explanation of the types of affordable housing development that have occurred in the last 10 to 15 years, including information about the tenants of the housing. Sources of this information may include data on publicly-assisted housing from the Department of Housing, Preservation and Development, as well as interviews with individuals from organizations with knowledge of the local affordable housing market, including local development corporations, not-for-profits, affordable housing developers and city and state officials.
  - Indicators that would demonstrate that the effect of the project would likely be to stabilize a distressed real estate market rather than to accelerate or enhance an influx of higher income households. Such indicators might include the absence of recent market rate housing development or rehabilitations aimed at a higher

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income population. Other information could include indications of economic distress, such as a high incidence of building code violations, foreclosures or vacancy.

- *DETERMINE WHETHER UNPROTECTED UNITS POTENTIALLY CONTAINING A VULNERABLE POPULATION HAVE BEEN TURNED OVER TO HIGHER INCOME HOUSEHOLDS.* If the analysis described above discloses a low-income population in unregulated rental housing units, based on the most recent data available from the Census, the *American Community Survey* or the *Housing and Vacancy Survey*, further analysis may be necessary to determine whether conditions in the study area, and consequently, the size of the population at risk, have changed since the date of the data used in the detailed analysis described above. Therefore, the detailed analysis should consider whether recent trends indicate the introduction of a higher income population in areas with a vulnerable population. The analysis should consider evidence of recent investment, including the type and amount of new housing development and major alterations of existing buildings.

- *IDENTIFY POPULATION AT RISK.* Using some or all of the information listed above, or any other information that would be relevant, the analyst identifies whether a population that would be vulnerable to secondary displacement exists, and if so, its general location and size. The population at risk is renters living in privately held units unprotected by rent control, rent stabilization, or other government regulations that limit rents, whose incomes or poverty status indicate that they could not support substantial rent increases.

FUTURE NO-ACTION CONDITION

Since impacts of the proposed project are assessed in relation to the Future No-Action, it is necessary to project existing conditions for the project's build year. The objective is to identify, as appropriate, the trends affecting rents and displacement that may be in effect in the future without the project. This analysis includes the following:

- Identification of other projects and developments proposed, approved, or under construction in the area (see Chapter 4, Land Use, Zoning, and Public Policy).
- Description of future investments in affordable housing if the project is expected to stabilize the housing market, as described above in Step 3 of the existing conditions assessment. Identification of anticipated population changes, if any.
- Based on recent and current trends in the area, assessment of future trends and conditions.
- Consideration of economic trends within the City.

WITH-ACTION CONDITION

The objective of the With-Action Condition analysis is to determine whether a vulnerable population would be at risk of displacement under the proposed project. This analysis includes the following steps:

- Describe the type of development expected under the proposed project.
- Estimate the project's population characteristics, particularly including size, age, and income.
- Assess how the real estate market conditions in the study area would change under the proposed project. If the project would introduce a mixed-income population into an area with a recent history of affordable housing investment, it is possible that the new population would serve to stabilize the real estate market rather than change it in such a way

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that rents would be expected to rise substantially in the surrounding area. If this is considered likely based on the analysis of existing conditions, the analysis should assess how the new housing would affect the existing real estate market. Sources of this information may include interviews with local real estate brokers and developers, as well as experts within the affordable housing community, such as city and housing officials, and those familiar with the affordable housing market within the study area. This might include leaders of local development corporations and other not-for-profits active in this area. If a vulnerable population exists in the study area, estimate the size and general location of the population at risk of displacement under the proposed project. The analyst should consider whether land use or real estate market conditions would reduce the likelihood that a vulnerable population would be at risk of indirect displacement. For example, a physical barrier within the study area, such as a railroad viaduct or river, may create distinct real estate markets that are unlikely to be affected by the proposed project. Similarly, if it is determined that a project, because of its mixed-income composition, would not cause drastic changes in the real estate market, it may not affect rents for some or all of the existing vulnerable units.

If the detailed assessment identifies a vulnerable population potential subject to indirect displacement that exceeds 5 percent of the study area population--or relevant sub-areas, if the vulnerable population is located within the subarea identified--the project may result in a significant change in the socioeconomic character of the study area, and a potential significant adverse impact may occur.

332.2. Indirect Business Displacement

The objective of the indirect business displacement analysis is to determine whether the proposed project may introduce trends that make it difficult for those businesses meeting the criteria set forth in Subsection 321.2, above, to remain in the area. If a detailed analysis is being conducted, the analyst would have concluded in the preliminary assessment that the project has the potential to introduce such a trend. The purpose of the detailed assessment, then, is to determine whether the project would increase property values and thus increase rents for a potentially vulnerable category of businesses, and whether relocation opportunities exist for those firms.

The assessment approach varies depending on the particular indirect displacement issue identified in the preliminary assessment.

INCREASES IN PROPERTY VALUES AND RENTS

Whatever the actual cause (*e.g.*, the introduction of new economic activity or new population groups) the assessment of indirect displacement depends on developing an understanding of which sectors of an area's economic base may be most vulnerable to indirect displacement.

EXISTING CONDITIONS

The first step is to develop a profile of the study area to determine whether it includes any potentially vulnerable category of businesses.

ECONOMIC PROFILE. Some or all of the following tasks may be applied to construct an economic profile of the study area.

- If the area is large enough, gather zip code employment data available from NYSDOL, or other available source of employment data, such as County and Zip Code Business Patterns, products of the U.S. Census. This provides a picture of an area's employment base by key industry sector and, through the use of multi-year data, trends in employment.
- Determine whether any relevant studies that provide relevant, current data have already been conducted. The most likely sources of data are found through DCP and the New York

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City Economic Development Corporation. Local community boards, local development corporations, or business improvement districts may also have appropriate data.

- Generally, to supplement secondary data as appropriate, an up-to-date profile may be developed by collecting primary data. This may include conducting a building-by-building field survey of the relevant area. The survey should focus on the number and types of firms; indicators, if any, of recent trends (*e.g.*, are there already signs of new business investment or disinvestment); and available space, as well as real estate brokers active in the area. Real estate brokers are often excellent sources of trends in tenancy and rental and sale prices for space and whether there are special relationships among the activities of the area's businesses.
- The survey data and other data gathered may also be supplemented through interviews with other relevant public officials (*e.g.*, particular industry specialists), trade associations, local development corporations, and/or merchant associations. In some instances, interviews with selected businesses identified in the field survey may be used to gain important insights into trade areas, customer base, unusual linkages, relocation possibilities, *etc.*
- Identify trends and conditions in the underlying economy.

REGULATORY PROTECTIONS. Determine how existing regulations and laws may affect possible shifts in the economic base of the area.

DETERMINE WHETHER LAND USE, BUILDING STOCK, TRANSPORTATION, AND OTHER SERVICES REQUIRED TO SUPPORT THE POTENTIALLY DISPLACED ECONOMIC ACTIVITY EXIST IN THE STUDY AREA. This is undertaken first by identifying the elements necessary and then by coordinating with the land use analysis or other appropriate technical area.

IDENTIFY CATEGORIES OF BUSINESSES AT RISK. Using the information gathered, characterize the existing economic profile, focusing on categories of businesses that may be vulnerable to displacement if property values and rents were to rise. Assess this likelihood, given public policy and other factors that affect economic conditions in the area.

DESCRIBE THE OPERATIONAL AND FINANCIAL CHARACTERISTICS OF THE BUSINESS TO BE DISPLACED. Also describe the products, markets, and employment characteristics. Describe the effects of this business on the City's economy. Information on retail sales, employment, wages, and other indicators of business performance and characteristics can be obtained online or in publications from the U.S. Census Bureau, the Bureau of Labor Statistics, the Bureau of Economic Analysis, and NYSDOL. Useful data sources available from the U.S. Census Bureau include the Economic Census, which include the Census of Retail Trade, County Business Patterns, the Annual Survey of Manufactures, Non-Employer Statistics, and the Survey of Business Owners. Special economic reports are also available from the Census Bureau's Center for Economic Studies. In addition to data on employment in New York State, NYSDOL also provides industry projections and special, industry-specific reports.

DETERMINE WHETHER THE BUSINESS TO BE DISPLACED HAS AN IMPORTANT OR SUBSTANTIAL ECONOMIC VALUE TO THE CITY. Describe what economic value it has and the effects of its products and services. This analysis should consider who the customers are of these products or services and whether similar products or services would continue to be available to these customers. Describe location needs, if any.

FUTURE NO-ACTION CONDITION

For the project's build year, determine whether any factors would emerge that would affect the underlying economic base of the target area. This may include the influences of specific development projects, the enactment or expiration of relevant regulations and laws, and an assessment of underlying trends as identified above and in the land use analysis (see Chapter 4). Also, assess conditions related to the study area in the future to determine relocation opportunities. Relevant information

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may include: whether the available commercial or industrial space in the area is expected to expand or decrease within the City or trade area and whether rents are expected to increase or remain stable for comparable properties. This information is obtained from experts in the local conditions, through interviews with real estate brokers, and through coordination with the land use analysis (see Chapter 4, "Land Use, Zoning, and Public Policy"). The conclusions of the existing conditions analysis are then revised to include relevant information about the future No-Action condition.

WITH-ACTION CONDITION

The assessment of existing and future No-Action conditions provides a picture of the local economic base, changes that have occurred over the years, and changes, if any, that may be expected in the future. Qualitatively assess, based on historical patterns of development in comparable neighborhoods and the strength of the underlying trends, whether and under what conditions the project would stimulate changes that would raise either property values or rents and, if so, whether this would make existing categories of tenants vulnerable to displacement. The basis for this conclusion is that the businesses would be displaced by legal means. The analysis should also consider whether relocation opportunities exist for the affected categories of businesses. If the indirectly displaced businesses are of a category of businesses described above in Subsection 321.2 and could not be relocated within the trade area or the City, there may be a significant adverse impact.

332.3. Indirect Business Displacement Due to Retail Market Saturation

If the preliminary assessment identifies the potential for a proposal to create market saturation for particular categories of retail goods, a detailed assessment is necessary to assess whether the project may result in an increase in vacancy in retail store fronts, affecting the viability of neighborhood shopping areas in the study area.

EXISTING CONDITIONS

The detailed analysis of the potential effects of market saturation builds upon the preliminary analysis and is intended to identify retail areas that directly overlap with the proposed retail anchors. The following tasks may be appropriate.

- Develop a profile of the retail environment within the trade area. This requires locating key retail concentrations within the trade area; creating, usually through field surveys, an inventory of their retail uses; and, through visual observation or through discussions with local realtors, development corporations, or merchant associations, developing an understanding of recent trends and overall conditions.
- Profile stores that provide goods similar to those of the project anchors. For example, in the case where the shopping center would be anchored by a supermarket, this profile should include the location, size, characteristics (e.g., availability of parking, hours of operation), and sales volume of trade area supermarkets. These data can be collected through field observations (for availability of parking and hours of observation); detailed real estate atlases, such as Sanborn maps (for size); and from standard references, such as *The Dollars and Cents of Shopping Centers,* published by the Urban Land Institute (for estimated sales volume). The number of other food stores should also be identified though, because of their sheer number, a detailed profile may not be necessary. Where there are other anchors, similar procedures may be followed. Key competitors can be identified and profiled.

FUTURE NO-ACTION CONDITION

For the project's build year, determine whether any factors would emerge that would affect conditions within the trade area. These may include projected increases in population that would provide a stronger base of shoppers, other projected retail developments, or anticipated store closings or ris-

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ing incomes. Additionally, it should be acknowledged that New York City's commercial streets are dynamic and potential turnover due to changes in consumer spending, shopping trends, demographics, and population growth independent of the proposed project should be considered.

WITH-ACTION CONDITION

Add the proposed project to the baseline established in the future No-Action conditions. Assess impacts on local shopping areas. Consider the proposed project's effect on the demand for new retail businesses that could locate on the commercial street, based on increased purchasing power within the trade area resulting from a new population.

There may be a potential for a significant adverse impact on retail businesses if a project would result in decreased shopper traffic on neighborhood commercial streets that causes increased vacancy that would affect the economic viability of retail business in the study area. This should be considered likely if all of the following conditions are expected:

- The proposed anchor stores have the potential to affect the ability of stores selling similar categories of goods located on neighborhood commercial strips to capture sufficient sales volume to remain in operation;
- These stores draw a substantial share of shopper traffic to the neighborhood commercial strips or the street contains a concentration of businesses that sell the relevant categories of retail goods; and
- Limited demand for retail tenants is expected due to purchasing power in the trade area.

333. ADVERSE EFFECTS ON SPECIFIC INDUSTRIES

EXISTING CONDITIONS

The key to understanding potential impacts on specific industries or categories of businesses is to develop an understanding of the relationship between the proposed project and the business conditions experienced by potentially vulnerable industries or categories of businesses. This may require field observation and interviews with select business owners and other persons with relevant expertise. For non-location-specific actions, such as changes in regulations for particular industries, it is important to understand the relationship between the processes intended for regulation and the operation of the businesses. Again, this may require either special research or interviews with potentially affected businesses.

Industries and categories of businesses may be affected by structural changes in the city, national and global economies, altering the demand for the product or service they provide and the relative cost of doing business at their current location, compared with other possible locations where these industries or categories of businesses could operate. In addition, technological changes and tax or regulatory policies at the state and federal level may affect the operational characteristics of industries or categories of businesses. In a detailed analysis, it is important to develop an understanding of the underlying trends that exist independently of the proposed project.

FUTURE NO-ACTION CONDITION

Determine any factors that would affect the future operations of vulnerable businesses identified in the analysis of existing conditions. For example, it may be possible that technological advances may phase out the types of processes proposed for regulation.

WITH-ACTION CONDITION

Potential effects may range from changes in operations that may be of little overall consequence to the individual businesses, changes that may add costs but would not cause displacement or relocation, or changes that would result in displacement or relocation. For example, for changes in regula-

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tions that affect the basic processes conducted by a business, the analysis may consider whether that process is critical for the operation of the business, whether there are acceptable substitutes that would not materially affect the operations of the businesses, and whether relocation to other areas with less string-gent regulations would be a more viable option. In some cases, the project may directly or indirectly affect businesses that support or interact with other businesses or industries in the area, which would then be secondarily affected. If there is potential for these businesses to be affected, this should be de-scribed and analyzed. A significant adverse impact may occur if it is determined that the proposed project would affect operating conditions for any category of business described in Subsection 321.2, above.

400. DETERMINING IMPACT SIGNIFICANCE

This section proposes specific thresholds to offer guidance on when a significant adverse impact may reasonably be expected. However, certain circumstances may warrant different thresholds. The lead agency should determine whether the specific circumstances of the proposed project warrant a determination of significance, even if the impact thresholds in this section have not been reached.

410. DIRECT DISPLACEMENT

411. Residential Displacement

Impacts of direct residential displacement are usually considered significant if they would markedly change the socioeconomic character of the study area by dislocating substantial numbers of lower-income households that could not relocate within the study area. Generally, if the number of low income residents to be displaced exceeds 5 percent of the primary study area population – or relevant sub-areas, if the displaced population is located within the subarea identified – and the displaced population could not be relocated within the study area, a potential significant adverse impact may occur. In these cases, mitigation should be considered.

412. Business Displacement

For businesses with the characteristics discussed in Subsection 321.2, above, a situation in which such businesses would be displaced by the project and could not relocate into suitable space according to their reasonable vocational needs may be considered a significant adverse impact warranting consideration of mitigation.

420. INDIRECT DISPLACEMENT

421. Residential Displacement

Generally, if the detailed assessment identified a vulnerable population potentially subject to indirect displacement that exceeds 5 percent of the study area – or relevant sub-areas, if the vulnerable population is located within the subarea identified – it may substantially affect the socioeconomic character of the study area and a significant adverse impact may occur.

422. Business Displacement

Generally, if a proposed project would trigger a socioeconomic change that would result in displacement of a category of businesses with the characteristics set forth in Subsection 321.2; if those businesses are powerless to prevent their displacement; if they would not be likely to receive any relocation assistance; and, given the trend created or accelerated by the proposed project, they would not be likely to find comparable replacement space in their market area, the impact would be considered significant and adverse and mitigation should be considered.

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423. Retail Market Saturation

If development activity creates retail uses that draw substantial sales from existing businesses to the extent that it results in increased and prolonged vacancies leading to disinvestment, thereby affecting the land use and economic viability of the neighborhood, the impact may be considered significant and adverse, and mitigation should be considered.

430. EFFECTS ON SPECIFIC INDUSTRIES

An impact of a project that would substantially impair the ability of a specific industry or category of businesses described above in Subsection 321.2 to continue operating within the City may be considered significant and adverse, requiring consideration of mitigation.

500. DEVELOPING MITIGATION

510. DIRECT DISPLACEMENT

511. Residential Displacement

For significant impacts that result from direct residential displacement, mitigation would consist of relocation of the displaced residents within the neighborhood. Possible measures include provision of relocation assistance, including lump sum payments, payment of moving expenses, payment of brokers' fees, and payment of redecorating expenses. When direct displacement would cause a significant impact, the mitigation may also be to create or replace affordable units elsewhere in the study area to offset the effects of the project. The extent of mitigation may be limited by overall project feasibility. If all significant impacts cannot be feasibly mitigated, then an unmitigated impact should be identified.

512. Business Displacement

Mitigation for business displacement is similar to residential mitigation, but the opportunities can be more limited, depending on the nature and extent of the impact. Measures include helping to seek out and acquire replacement space inside or outside the study area; provision of relocation assistance, including lump sum payments, payment of moving expenses, payment of brokers' fees, and payment for improvements to the space (if the new landlord is not providing for improvements). The extent of mitigation may be limited by overall project feasibility. In such cases, an unmitigated impact should be identified.

520. INDIRECT DISPLACEMENT

521. Residential Displacement

Similar to the mitigation for direct residential displacement discussed above, mitigation for indirect residential displacement would consist of creating housing within the study area with specific opportunities for residents identified as potentially vulnerable to indirect displacement. Mitigation measures for indirect residential displacement include: providing appropriate, comparable space as part of the project, either on-site or off-site but within a reasonable distance of the current location of the units that would be displaced; creating new rent-regulated units through programs such as inclusionary housing, preservation of existing rent-stabilized units, or the development of new publicly assisted units within the study area. Full mitigation of an indirect residential displacement impact may not be possible given the difficulty of identifying the population affected by the project. In these cases a partially unmitigated impact should be identified.

522. Business Displacement

Mitigation measures for indirect displacement of businesses include enactment of regulations and policy. For example, the Special Garment Center District zoning requires the preservation of space for manufacturing

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uses in the event of conversion to office uses in an effort to limit displacement of industrial businesses. Similar to direct business displacement, measures also include helping to seek out and acquire replacement space inside or outside the study area; provision of relocation assistance, including lump sum payments, payment of moving expenses, payment of brokers' fees, and payment for improvements to the space (if the new landlord is not providing for improvements).

523. Retail Market Saturation

For adverse impacts on local commercial streets, mitigation includes funding for local commercial revitalization efforts and capital improvements or funding for efforts to attract new businesses in an effort to reduce vacancy. For example, funds that enhance the streetscape along a commercial strip may encourage patrons to continue shopping there, despite new shopping options.

530. EFFECTS ON SPECIFIC INDUSTRIES

For specific industries affected by changes in regulations, mitigation include financial assistance that reduces operating costs and offsets impacts, or lifting of other regulations.

600. DEVELOPING ALTERNATIVES

610. DIRECT DISPLACEMENT

611. Residential Displacement

For a project that would result in significant impacts because of direct displacement of residences, a smaller project or an alternative configuration that avoided them may be considered if the residences to be displaced occupy only a portion of the study area. Other alternatives include a project that included appropriate housing units, or in some cases, particularly public projects, different sites that would reduce or eliminate residential displacement may be considered.

612. Business Displacement

Similarly, for projects that would result in significant impacts because of direct displacement of businesses, a smaller project or an alternative configuration that avoided displacement may be considered if those businesses occupy only a portion of the project site. In some cases, particularly public projects, different sites that would reduce or eliminate business displacement may be considered.

620. INDIRECT DISPLACEMENT

621. Residential Displacement

For residential projects, alternatives that avoid indirect residential displacement would include a different housing mix as part of the project—for example, including more affordable units that replace those to be affected in the study area. A different mix of uses, or less dense uses, may also be considered. In some cases, particularly public projects, different sites may be considered.

622. Business Displacement

Where indirect displacement of businesses is at issue, alternatives are similar to those for indirect residential displacement: altered mix of uses, perhaps to include some space for those uses that would be indirectly displaced; less intense uses; or, if appropriate, alternative sites.

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630. EFFECTS ON SPECIFIC INDUSTRIES

It is difficult to be specific as to alternatives in the case of impacts on specific industries, since the cases are so disparate. If promulgation of regulations is the project, a change to the regulations or to the timing may be an appropriate alternative. Other alternatives depend on the specific circumstances of each project.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

711. Regulations Affecting Residents

As discussed above, residential tenants are afforded protection against displacement through state rent regulations, regulations guiding the conversion of rental units to co-operatives or condominiums, and provisions against the harassment of tenants. For those being displaced by a city project or from a property owned or managed by the City, relocation benefits are provided. These regulations are summarized below.

711.1. Rent Regulation

DHCR administers both rent control and rent stabilization, two programs aimed at regulating the rents paid by tenants. Rent control covers tenants in rental buildings constructed prior to February 1947 who moved in prior to July 1971. Rent stabilization generally applies to buildings with six or more units constructed before 1974 or those buildings that receive benefits of a tax abatement program. Rent adjustments for rent-controlled apartments are made based on a determination of a maximum base rent, *i.e.*, the rent that would be required to operate the unit under prevailing cost conditions and to provide the owner an 8.5 percent return on the equalized assessed value of the building. Rents in controlled units may be adjusted to account for increases in heating fuel costs.

Rent stabilization also applies to single room occupancy (SRO) dwellings in buildings constructed before July 1, 1969 with six or more units and renting for less than $350.00 per month or $88.00 per week on May 31, 1968.

For information on the current permitted annual rent increases for rent-stabilized tenants, see http://www.housingnyc.com/.

The Department for the Aging administers the Senior Citizen Rent Increase Exemption Program (SCRIE), which regulates rents for tenants 62 years old and over whose household income is $20,000 or less. For these tenants, annual rent payments cannot exceed 33 percent of annual income.

711.2. Co-op and Condominium Conversion

The conversion of rental units to co-ops or condominiums was a strong phenomenon of New York City's real estate market during the 1980's. Two routes to conversion are possible—eviction plans, which require the approval of 51 percent of the tenants in the building and which allow for the eviction of tenants who do not purchase their apartments once the conversion plan has been declared effective; and non-eviction plans, which require the approval of only 15 percent of the tenants and which do not allow the eviction of tenants who do not purchase their units. Disabled persons and senior citizens are protected from eviction regardless of the kind of plan offered, their income level, or the length of residency in the building. Since virtually all offering plans in New York City have been non-eviction plans, co-op and condominium conversion activity does not pose a strong displacement threat to tenants.

711.3. Additional Protection for SRO Tenants

Since residents of SRO units have at times been subject to displacement (see Subsection 711.4, below), it should be noted that there are other provisions in the law (also administered by DHCR), other than rent stabilization, which provide an added degree of protection to SRO tenants. These cover the

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following: the provision of basic services, such as heat, hot water, janitorial services, maintenance of locks and security devices, repairs and maintenance and painting; and evictions, including those required as a result of plans for demolition. In the case of demolition, the owner is responsible for the relocation of tenants to suitable housing at the same or lower regulated rent in a closely proximate area and for paying moving expenses.

711.4. Anti-Harassment Provisions

Despite the protection afforded tenants under rent control and rent stabilization, tenants can be forced out of their apartments through illegal activities, such as harassment by landlords. Both the New York City Department of Housing, Preservation and Development (HPD) and DHCR administer measures against harassment that, in the more severe cases, provide very strong penalties for persons found guilty of harassment and illegal eviction. With regard to SRO dwellings, no plans for demolition or alteration may be approved by the Commissioner of Buildings unless the Commissioner of HPD either has certified that there has been no harassment of lawful occupants within the 36-month period prior to the date of submission of an application for certification of no harassment or has issued a waiver of such certification.

- ***LOCAL LAW 7***. This law creates civil penalties for certain types of tenant harassment. Some of the actions that qualify as harassment under this legislation include: using force or making threats against a lawful occupant, repeated or prolonged interruptions of essential services; using frivolous court proceedings to disrupt a tenant's life or force an eviction; removing the possessions of a lawful tenant; removing doors or damaging locks to a unit; or, any other acts designed to disturb a lawful occupant's residence. The law also prevents similar actions by third parties working on the landlord's behalf.

711.5. Relocation Assistance for Direct Residential Displacement

If a city project results in the acquisition of properties containing residential tenants, HPD will offer relocation assistance to any site occupants in compliance with city and state law. For those who are to be displaced under an Urban Renewal Plan, relocation will comply with all applicable laws and regulations including, but not limited to, Section 505 (4)(e) of the Urban Renewal Law. If federal funding is involved, HPD will provide benefits and services under the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601), as amended (Uniform Relocation Act). If feasible, HPD will relocate families and individuals to be displaced into "decent, safe, and sanitary dwellings, which are or will be provided [on-site] or in other areas not generally less desirable in regard to public utilities and public and commercial facilities, at rents or prices within the financial means of such families or individuals, and reasonably accessible to their places of employment."

712. Regulations Affecting Businesses

Regulations, such as rent regulations, to prevent involuntary, indirect displacement, are not available to businesses. However, the City does offer incentives and payments in selected areas to help offset economic trends that may displace certain types of businesses. Eligible categories of businesses thus receive some measure of protection against economic displacement. For information on specific incentive programs available to businesses, see Subsection 712.1, below. In addition, businesses directly displaced by city projects may receive benefits and services under state and federal law, as applicable.

712.1. City Commercial and Industrial Programs and Incentives

The City offers a number of programs and incentives to commercial and industrial businesses designed to help retain and expand such businesses at their current locations or in New York City. Most of the programs and incentives are administered by the New York City Economic Development Corporation (EDC). Information on these programs can be obtained from EDC and is summarized below.

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TAX REDUCTION PROGRAMS

The City offers a variety of tax-reduction programs to commercial and industrial businesses, as follows.

- Industrial and Commercial Assistance Program (ICAP). This program offers tax abatements for varying periods up to 25 years for the significant renovation of older commercial or industrial buildings. For commercial buildings, the timing and conditions of the abatement depend on the location of the building in the City. Locations outside of the central business district receive the most favorable terms. Industrial renovations receive the maximum benefit regardless of location, and industrial buildings are also exempt from tax increases that result from reassessing the property at its higher market value.
- Industrial Business Zones (IBZ) Tax Credit. A one-time tax credit of $1,000 per relocated employee is available to help industrial and manufacturing firms that relocate to one of the City's sixteen IBZs. Only firms that moved into an IBZ after July 1, 2005 are eligible.
- Relocation Employment Assistance Program (REAP). If a firm is moving from the area south of 96th Street in Manhattan to a location north of 96th Street or to any of the other boroughs, it can receive a 12-year, $3,000-per-employee annual credit applied against the City's general corporation tax, unincorporated business tax, or financial corporation tax for businesses that relocate within a revitalization zone; for businesses locating to eligible areas outside of a revitalization zone, the annual, 12-year tax credit is $1,000 per employee. For additional information, see http://www.nyc.gov/html/dof/html/property/property_tax_reduc_reap.shtml.
- Commercial Rent Tax Reduction. Businesses located north of 96th Street in Manhattan or in the four other boroughs are automatically eligible an exemption from the City's commercial rent tax.
- Empire Zones. If an industry expands or relocates within one of 85 state-designated EDZs, it can receive substantial tax incentives and utility discounts, including wage tax credits, investment tax credits, sales tax credits, utility reductions, land tax abatement, and real property tax exemptions.

RELOCATION ASSISTANCE

Eligible manufacturers, warehousers, and distributors that relocate within the City can receive financial assistance from the Industrial Development Agency (IDA). IDA tax benefits assist operators and developers seeking to enter into long term lease agreements and make investments on their property. EDC will assist eligible relocating industries with services, including planning and feasibility studies, financial analyses, guidance through approval processes, location of relocation space, *etc.*

ENERGY COST SAVINGS PROGRAMS

New York City, Con Edison, and National Grid offer a number of programs to reduce the costs of electricity and gas usage for eligible businesses. For addition information, see http://www.nyc.gov/html/sbs/nycbiz/html/summary/incentives.shtml.

FINANCING ASSISTANCE

Businesses that move or expand in the City may be eligible for one or more financing programs, including low-cost, tax-exempt bond financing through the Industrial Development Agency (IDA); loans from the New York City Micro Loan Program, or New York City Small Business Administration. For additional information, click here.

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712.2. Relocation Assistance for Direct Business Displacement

As described in Subsection 711.5, "Relocation Assistance for Direct Residential Displacement," if a city project results in the acquisition of commercial properties, HPD will relocate site occupants in compliance with state law. Businesses displaced under an Urban Renewal Plan will be relocated in accordance with all applicable laws and regulations, including, but not limited to, the State's Urban Renewal Law. If federal funding is involved, site occupants will receive benefits and services in compliance with the Uniform Relocation Act.

720. APPLICABLE COORDINATION

Socioeconomic conditions analyses often use information gathered for assessments in other technical areas. Similarly, data gathered for the socioeconomic analyses may be useful for other technical areas. Therefore, the lead agency should coordinate environmental review among those conducting the different technical analyses.

In addition, coordination with government agencies may be required when their polices apply to the proposed project. These include the New York State Division of Housing and Community Renewal, which administers rent regulations, and the New York State Attorney General's Office, which regulates cooperative and condominium offering plans.

730. LOCATION OF INFORMATION

731. Census of Population and Housing and American Community Survey

- New York City Department of City Planning

  Housing, Economic, and Infrastructure Planning Division
  Population Division
  22 Reade Street
  New York, NY 10007
  http://www.nyc.gov/html/dcp/

- U.S. Department of Commerce

  Bureau of the Census
  395 Hudson Street, Suite 800
  New York, NY, 10014-7451
  www.census.gov.
  http://factfinder.census.gov
  http://www.census.gov/acs/www/

732. Other Population, Economic, and Land Use Data

- *Annual Report on Social Indicators*. Provides summary data for the City, and, where available, for boroughs and community districts. **Source**: DCP, Housing, Economic, and Infrastructure Planning Division.
- *Consolidated Plan*, published annually. Provides information on specific programs and on available funding for government-assisted housing. **Source**: DCP, Housing, Economic, and Infrastructure Planning Division.
- *Housing Supply Report*. Annual reports and database for new housing completions. **Source**: Rent Guidelines Board, http://www.housingnyc.com/.
- Data on the estimated number of protected housing units by study area. **Source**: New York State Division of Housing and Community Renewal, compiled by DCP's Housing, Economic, and Infrastructure Planning Division.

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- Employment and unemployment data, number of firms and total payroll. **Source**: New York State Department of Labor (NYSDOL), http://www.labor.state.ny.us/.
- Economic databases, as follows:
  - QCEW (Quarterly Census of Employment and Wages) Data. Employment, annual payroll, average annual pay per employee, and number of establishment data for New York City, each borough, and the United States. Data are tabulated at the industry division, 2-digit, and 3-digit SIC levels, subject to confidentiality requirements. Recent data are available by year.
  - Economic Census Data. Census of Manufacturing, Census of Wholesale Trade, Census of Retail Trade, The data are for New York City, each borough, and the United States, and include number of establishments, employment, annual payroll, average annual (and hourly for manufacturing) pay per employee, and a measure of value of output (sales, receipts, value added). **Source**: U.S. Census Bureau, http://www.census.gov/econ/.
  - Bureau of Economic Analysis Data. The Bureau of Economic Analysis CA5 Local Area Employment series, 1969 to most recent year, by industry division and type (wage and salary, self-employed, *etc.*) for New York City, each borough, the metropolitan area, and the United States. Data are for those working in New York City. **Source**: Bureau of Economic Analysis, http://www.bea.gov/.
  - The Bureau of Economic Analysis CA25 Local Area Personal Income series, 1969 to most recent year, by industry division and type (wages and salaries, transfer payments, dividends interest, and rent, *etc.*), for New York City, each borough, the metropolitan area, and the United States. Includes overall per capita income as well as the sources of aggregate income. Data are for New York City residents in some cases, and those working in New York in other cases.
  - Current Employment Survey (Non-Agricultural Data). Annual average employment data. New York City and United States at the industry division level, 1958-present.

    Current employment survey annual average employment data. New York City, the metropolitan area (by PMSA), the Northeast (and each component state), and the United States at the industry division level, 1983 to present. New York City and the United States at the 2-digit SIC level, as far back as the 1987 SIC change will allow.

    Monthly current employment survey employment estimates for New York City, 1987 to the present. Data are for total employment, private, government, and selected 2-digit industries.

    Source: U.S. Bureau of Labor Statistics
    Division of Current Employment Statistics
    2 Massachusetts Avenue, NE
    Washington, DC 20212-0001
    http://www.bls.gov/ces/

- *Statistical Abstract of the United States*. Compendium of statistical tables at the state and national level. Includes information on online retail expenditures. **Source**: U.S. Census Bureau, http://www.census.gov/compendia/statab/.
- IPIS property management data. Inventory of city-owned property.

  Source: Department of Citywide Administrative Services
  One Centre Street, 20th Floor
  New York, NY 10007
  http://www.nyc.gov/html/dcas/html/home/home.shtml

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- Real estate publications.
- *NYC Housing and Vacancy Survey* conducted by U.S. Census Bureau for NYC every three years. Contains information on housing units, building and neighborhood conditions, and household and population characteristics.

  Source: New York City Department of Housing Preservation and Development
  100 Gold Street
  New York, NY 10038
  http://www.nyc.gov/html/hpd

  City Bookstore
  Municipal Building
  One Centre Street
  New York, NY 10007
  http://a856-citystore.nyc.gov/

- *Dollars and Cents of Shopping Centers*, published by the Urban Land Institute.
- Assessed values and tax rates.

  Source: New York City Department of Finance
  66 John Street
  New York, NY 10038

- Expenditure potential for retail goods, models for determining the direct and indirect jobs generated by given construction activity.

  Source: U.S. Department of Commerce
  1401 Constitution Ave., NW
  Washington, DC 20230
  http://www.commerce.gov/

- Information on relocation assistance.

  Source: New York State Division of Housing and Community Renewal (DHCR)
  Hampton Plaza
  38-40 State Street
  Albany, NY 12207
  http://www.dhcr.state.ny.us/

  New York City Economic Development Corporation (EDC)
  110 William Street
  New York, NY 10038
  http://www.nycedc.com

733. Information on Publicly Subsidized Housing

- New York City Department of Housing

  Preservation and Development (HPD)
  100 Gold Street
  New York, NY 10038
  http://www.nyc.gov/html/hpd

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- New York State Division of Housing and Community Renewal (DHCR)

  Hampton Plaza
  38-40 State Street
  Albany, NY 12207
  http://www.dhcr.state.ny.us/

- New York City Economic Development Corporation (EDC)

  110 William Street
  New York, NY 10038
  http://www.nycedc.com

- New York State Urban Development Corporation d/b/a Empire State Development Corporation (ESDC)

  633 Third Avenue
  New York, NY 10017
  http://www.empire.state.ny.us

- New York City Housing Authority (NYCHA)

  250 Broadway
  New York, NY 10007
  www.nyc.gov/nycha

- U.S. Department of Housing and Urban Development (HUD)

  Region II, Regional Office
  26 Federal Plaza
  New York, NY 10278
  http://www.hud.gov/

- Human Resources Administration (HRA)

  250 Church Street
  New York, NY 10013
  http://www.nyc.gov/html/hra

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COMMUNITY FACILITIES AND SERVICES

CHAPTER 6

As defined for CEQR analysis, community facilities are public or publicly funded schools, libraries, child care centers, health care facilities and fire and police protection. Certain community facilities, such as facilities relating to the City's management of its solid waste, are separately assessed in Chapter 14, "Solid Waste and Sanitation Services." The CEQR analysis looks at a project's potential effect on the services provided by these facilities. A project can affect facility services when it physically displaces or alters a community facility or causes a change in population that may affect the services delivered by a community facility, as might happen if a facility is already over-utilized, or if a project is large enough to create a demand that could not be met by the existing facility.

The CEQR analysis examines potential impacts on existing facilities and generally focuses in detail on those services that the City is obligated to provide to any member of the community. These services also have precisely defined measures of utilization (*e.g.*, enrollment/available seats for public education). The CEQR analysis is not a needs assessment for new or additional services. Service providers like schools or libraries conduct their own needs assessments on a continuing basis.

As with each technical area assessed under CEQR, the applicant should work closely with the lead agency during the entire environmental review process. The lead agency may determine it is appropriate to consult or coordinate with the City's expert technical agencies and service providers for the community facilities assessment. If so, the New York City Department of City Planning (DCP), the New York City Department of Education (DOE), the New York City School Construction Authority (SCA), the New York City Administration for Children's Services (ACS), the New York City Police Department (NYPD), the New York City Fire Department (FDNY), the New York Public Library (NYPL) and the New York City Health and Hospitals Corporation (HHC) should be consulted, as appropriate, for information, technical review, recommendations, and mitigation relating to community facilities. These expert agencies should be contacted as early as possible in the environmental review process. Section 700 further outlines appropriate coordination with these expert agencies.

100. DEFINITIONS

Although many projects include some level of analysis of community facilities, not every environmental assessment examines every community facility. The community facilities (or resources) that may be addressed in environmental assessments include the following:

PUBLIC SCHOOLS. CEQR analyzes potential impacts only on public schools operated and funded by the New York City Department of Education. This analysis generally relates only to public elementary and intermediate schools, which serve a local population, and rarely to high schools, which have a borough-wide or citywide population base. Schools are analyzed based on the potential for the project to cause overcrowding (*i.e.*, a shortage of seats for an age group within the district).

LIBRARIES. Public libraries as analyzed under CEQR are branch libraries operated by the New York Public Library, the Queens Borough Public Library, and the Brooklyn Public Library systems. The primary purpose of libraries is to provide information services, including written documents and computer resources, reference materials, audio and visual references, and educational services. The analysis of libraries generally focuses on the resources available to the population within the service area(s) of the library or libraries nearest to the proposed project.

CHILD CARE CENTERS. Publicly financed child care centers, under the auspices of the ACS's Division of Child Care and Head Start, provide care for the children of income-eligible households. A space for one child in a child care center

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is called a "slot." These slots may be in contracted group child care or Head Start centers. Slots may also be in private homes licensed to provide child care services to small numbers of unrelated children. Two types of these services exist: "group family child care," which serves 6 to 12 children; and "family child care," which serves 3-6 children. Projects that would create a large number of subsidized residential units are examined for potential impacts on the number of slots available at contracted group child care and Head Start centers in the vicinity of the project (*i.e.* the study area). In certain instances, vouchers may be provided that allow an eligible child to access care from private providers. However, because the specific locations of family day care and voucher slots cannot be identified, they are not suitable for a study area analysis.

HEALTH CARE FACILITIES. Health care facilities include public, proprietary and non-profit facilities that accept public funds (usually in the form of Medicare and Medicaid reimbursements) and that are available to any member of the community. Generally, a detailed assessment of service delivery is conducted only if a proposed project would affect the physical operations of, or access to and from, a hospital or a public health clinic, or where a proposed project would create a sizeable new neighborhood where none existed before.

FIRE PROTECTION. Fire protection services include fire stations that house engine, ladder and rescue companies. Units responding to a fire are not limited to those closest to it. Normally, more than one engine company and ladder company respond to each call and rescue companies also respond to fires or emergencies in high-rise buildings. The Fire Department does not allocate resources based on proposed or projected developments, but continually evaluates the need for changes in personnel, equipment or locations of fire stations and makes any adjustments necessary. Generally, a detailed assessment of fire protection service delivery is conducted only if a proposed project would affect the physical operations of, or access to and from, a station house (see Section 210) or where a proposed project would create a sizeable new neighborhood where none existed before (*e.g.* Hunters' Point South).

POLICE PROTECTION. The ability of the police to provide public safety for a new project usually does not warrant a detailed assessment under CEQR. The Police Department independently reviews its staffing levels against a precinct's population, area coverage, crime levels, and other local factors. A detailed assessment of service delivery is usually only conducted if a proposed project would affect the physical operations of, or access to and from, a precinct house (see Section 210) or where a proposed project would create a sizeable new neighborhood where none existed before (*e.g.* Hunters' Point South).

OTHER COMMUNITY FACILITIES. Other community facilities, such as homeless shelters, jails, community centers, colleges and universities, or religious and cultural facilities are analyzed only if the facility itself is the subject of the proposed project or would be physically displaced or altered by the project. Assessments for direct effects for these kinds of facilities should be developed in consultation the lead agency and the appropriate city agencies. City-owned recreation centers are considered within the analysis of open space due to their location on parkland.

200. DETERMINING WHETHER A COMMUNITY FACILITIES ASSESSMENT IS APPROPRIATE

A community facilities analysis is needed if there would be potential direct or indirect effects on a facility. Detailed community facilities analyses are most commonly associated with residential projects because demand for community services generally results from the introduction of new residents to an area.

The community facilities analysis assesses the ability of community facilities to provide services both with and without the proposed project. Whether the project would have a potential impact is based on the likelihood that the project would create demand for services greater than the ability of existing facilities to provide those services. This can result from displacement of an existing facility, thereby increasing service demand at another facility, or by an increase in population.

The following provides guidance in determining whether a community facilities assessment is necessary.

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210. DIRECT EFFECTS

If a project would physically alter a community facility, whether by displacement of the facility or other physical change, this "direct" effect triggers the need to assess the service delivery of the facility and the potential effect that the physical change may have on that service delivery. Temporary direct effects should also be considered (for example, the temporary closing of a facility during a phase of construction). (See Section 300, "Assessment Methods and Detailed Analysis Techniques").

220. INDIRECT EFFECTS

New population added to an area as a result of the project would use existing services, which may result in potential "indirect" effects on service delivery. Depending on the size, income characteristics, and age distribution of the new population, there may be effects on public schools, libraries, or child care centers.

In general, the following thresholds may be used to make an initial determination of whether detailed studies are necessary to determine potential indirect impacts.

Table 6-1
Community Facility Thresholds for Detailed Analyses

	Public Schools	Group Child Care and Head Start Centers (publicly funded)	Libraries	Police/Fire Services and Health Care Facilities
Thresholds for Detailed Analyses	50 or more elementary/ middle school students (total of elementary and intermediate) or 150 or more high school students based on # of residential units (based on Table 6-1a) OR Direct Effect	20 or more eligible children under age 6 based on # of low or low/moderate income residential units (based on Table 6-1b) OR Direct Effect	More than 5% increase in ratio of residential units to library branches (see below) OR Direct Effect	Introduction of Sizeable New Neighborhood (*e.g.* Hunters' Point South) OR Direct Effect

Minimum Number of Residential Units that Trigger Detailed Analyses

	Public Schools		Child Care (publicly funded)	Libraries (5% increase in Units/Branch)	Police	Fire	Health Care Facilities
	Elementary/ Intermediate	High School					
Bronx	90	787	141	682	n/a	n/a	n/a
Brooklyn	121	1,068	110	734	n/a	n/a	n/a
Manhattan	310	2,492	170	901	n/a	n/a	n/a
Queens	124	1,068	139	622	n/a	n/a	n/a
Staten Island	165	1,068	217	652	n/a	n/a	n/a

Notes:
The number of residential units that a project generates is the increment between the No-Action and the With-Action Scenarios, as determined by the Lead Agency-approved Reasonable Worst Case Development Scenario (RWCDS). Projects generating fewer residential units, per the approved RWCDS, than listed for each category in this table do not need to conduct a detailed analysis for these categories.
Table 6-1a provides the borough-based multipliers for conducting a detailed analysis of public schools for both the No-Action and With-Action Scenarios.
Table 6-1b provides the borough-based multipliers for conducting a detailed analysis of publicly funded child care centers for both the No-Action and With-Action Scenarios.
Thresholds for library analyses are based on *Census 2000*, total occupied housing units and NYC Department of City Planning's *Selected Facilities and Program Sites in NYC*, 1999, branch and central/reference libraries.

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Table 6-1a
Multipliers for Estimating Public School Students Generated by New Housing Units of All Sizes

Borough	Elementary level per unit (Age 4-10)	Middle school level per unit (Age 11-13)	High school level per unit (Age 14-17)
BRONX	0.39	0.16	0.19
BROOKLYN	0.29	0.12	0.14
MANHATTAN	0.12	0.04	0.06
QUEENS	0.28	0.12	0.14
STATEN ISLAND	0.21	0.09	0.14

Note: Housing units exclusively for seniors, aged 55 or older, or New York City Housing Preservation and Development (HPD) supportive housing facilities for special needs populations may be excluded from the analysis. HPD supportive housing facilities consist of studios for single adults who are referred to HPD by the Department of Homeless Services.
Source: New York City School Construction Authority, 2008.

Table 6-1b
Multipliers for Estimating the Number of Children Eligible for Publicly Funded Child Care and Head Start

Borough	Children under 6 years old per unit	Minimum number of DUs to yield 20 children under 6
BRONX	0.139	141
BROOKLYN	0.178	110
MANHATTAN	0.115	170
QUEENS	0.140	139
STATEN ISLAND	0.090	217

Notes: The multipliers are based on 2005-2007 American Community Survey data for children under age 6 at 200% Federal Poverty Level or below, and have been adjusted to account for the proportion of Group Child Care and Head Start slots relative to ACS' Child Care and Head Start total capacity (*i.e.*, excludes Family Day Care Network and Voucher capacity from ACS' total capacity since locational data for Network and voucher slots is not readily available for study areas).
Source: NYC Department of City Planning and NYC Administration for Children's Services, Division of Child Care and Head Start.

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221. Public Schools

Potential impacts on schools may result if there would be insufficient seats available to serve the population. Because it is rare that a project physically displaces an operating school, impacts are more likely to occur when a project introduces school-age children to an area.

The basic analysis begins with a calculation of the additional school-age population that would be introduced by a project. Table 6-1 above calculates by borough the minimum number of housing units that could yield at

least 50 elementary/ intermediate school children, based on Table 6-1a. To estimate the student age population of a project, first determine the number of residential units of the project. Projects that would add housing units designed exclusively for seniors or single adults (HPD supportive housing) need not assess public school impacts. With this information, Table 6-1a should be used to estimate the number of elementary, middle and high school students likely to be generated by the proposed project.

In general, if a project would introduce more than 50 school-age children (elementary and intermediate grades), significant impacts on public schools may occur and further analysis of schools may be appropriate. Since high school-level students can usually elect to attend high schools outside their neighborhood, an analysis of high school impacts is rarely necessary. However, if the project would generate 150 or more high school students, there may be an impact on borough high schools, and further analysis may be appropriate.

222. Libraries

Potential impacts on libraries may result from an increased user population. A noticeable change in service delivery is likely to occur only if a library is displaced or altered, causing people to use another library in the area, or if a project would introduce a large resident population (*i.e.*, greater than a five percent increase in housing units served).

Table 6-1 lists the average number of residential units per library branch in each borough. If the proposed project would increase the average number of residential units served by library branches in the borough in which the project is located by more than five percent, the project may cause significant impacts on library services, indicating the need for further analysis.

223. Child Care Centers

Publicly financed child care services are available for income-eligible children through the age of 12. The CEQR analysis focuses on services for children under age 6 because eligible children aged 6-12 are expected to be in school for most of the day.

Families eligible for subsidized child care must meet financial and social eligibility criteria established by ACS. In general, children in families that have incomes at or below 200 percent Federal Poverty Level (FPL), depending on family size, are financially eligible, although in some cases eligibility can go up to 275 percent FPL. The family must also have an approved "reason for care," such as involvement in a child welfare case or participation in a "welfare-to-work" program. Projects that would produce substantial numbers of subsidized, low- to moderate-income family housing units may therefore generate a sufficient number of eligible children to affect the availability of slots at publicly funded group child care and Head Start centers. If the project would generate 20 or more eligible children under age 6, further analysis may be appropriate.

Table 6-1 above calculates by borough the minimum number of low- to moderate-income housing units that could yield at least 20 children under 6 eligible for publicly financed child care, based on Table 6-1b.

The City's affordable housing market is pegged to the Area Median Income (AMI) rather than the Federal Poverty Level (FPL). Lower-income units must be affordable to households at or below 80 percent AMI. Since family incomes at or below 200 percent FPL fall under 80 percent AMI, for the purposes of CEQR analysis, the number of housing units expected to be subsidized and targeted for incomes of 80 percent AMI or below should be used as a proxy for eligibility. This provides a conservative assessment of demand, since eligibility for subsidized child care is not defined strictly by income (generally below 200 percent of poverty level), but also takes into account family size and other reasons for care (*e.g.,* low-income parent(s) in school; low-income parent(s) training for work; or low-income parents who are ill or disabled).

300. ASSESSMENT METHODS

If the preliminary analysis (Section 200) indicates more detailed analyses are necessary for certain community facilities, the following approach may be used. This approach generally consists of delineating one or more study areas for the

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potentially affected community facilities, gathering information on current and future utilization levels and any plans for expansion, and, finally, assessing the potential impact of the project on community facilities.

310. STUDY AREAS

The study areas for detailed analyses are different for each type of facility and are described below (Subsections 311-315). The community facilities examined in detailed analyses should be identified on maps that show the project site and area facilities, with the study area delineated (*e.g.,* a line showing 0.5 mile radius from the project site). For a generic or programmatic project, a map for each neighborhood or district affected by the proposed project may need to be provided for those areas where the thresholds for preliminary analyses have been exceeded.

In addition, if a community facility is to be directly affected by the proposed project, such as the taking of land area or portion of a building used by the facility, it is sometimes helpful to provide a site plan or floor plan of the facility that shows the nature of the direct impact.

Information on community facilities for the initial identification may be obtained from the *Selected Facilities and Program Sites in New York City* database and the *Gazetteer of City Property* (See Section 737). This information may be verified through field surveys and contact with relevant oversight agencies (see Section 730).

311. Public Schools

The study area for the analysis of elementary and intermediate schools should be the school district's "sub-district" in which the project is located. The GIS files for the sub-district boundaries ("regions" or "school planning zones") are available, upon request, from the Department of City Planning. If the project or area rezoning straddles two or more school districts or sub-districts, the SCA's Capital Planning Division should be consulted to determine the appropriate study areas for analysis. The locations of the elementary and intermediate schools should be shown on a map of the school district, with the sub-district study area delineated on the map. A scale bar should be provided on the map. If necessary, a separate map for elementary schools should be provided. If the threshold for examination of potential impacts on high schools has been exceeded, the study area for the high school analysis should be the borough in which the project is located. In addition, the location of the high school(s) near the area in which the project is located (within approximately a mile) should also be shown.

312. Libraries

The focus of the analysis is on branch libraries and not on the major research libraries that may fall within the study area. Library branch catchment areas are typically not more than three-quarters of a mile, which is the distance that one might be expected to travel for such services. If no library branch exists within a three-quarter-mile radius of the project site, the study area should be extended until the nearest library branch is identified. If the study area includes more than one branch, all branches of approximately equal distance should be considered. Each identified branch library within the study area should be shown on a map.

313. Child Care Centers

The locations of publicly funded group child care and Head Start centers within approximately 1.5 miles of the project site should be shown. The size of the study area in transit-rich areas may, in consultation with the lead agency and ACS, be somewhat larger than 1.5 miles. Since there are no locational requirements for enrollment in child care centers, some parent/guardians choose a child care center close to their employment rather than their residence. Nevertheless, the centers closest to the project site are more likely to be subject to increased demand.

314. Health Care Facilities

In general, the location of hospitals and public health clinics serving the site should be indicated on the community facilities map only if it would be physically affected by the proposed project (*i.e.,* Direct Effect), or if

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the proposed project would introduce a sizeable new neighborhood where none existed before. If an analysis is being conducted, identify the locations of these facilities on a community facilities map (or on a separate Health Care Facilities map).

315. Fire Protection

In general, the location of the fire station(s) serving the site should be indicated on the community facilities map only if it would be physically affected by the proposed project (*i.e.,* Direct Effect), or if the proposed project would introduce a sizeable new neighborhood where none existed before. If an analysis is being conducted, identify the locations of these facilities on a community facilities map (or on a separate Fire/Police Protection Services map).

316. Police Protection

In general, the location of the police station(s) serving the site should be indicated on the community facilities map only if it would be physically affected by the proposed project (*i.e.,* Direct Effect) or if the proposed project would introduce a sizeable new neighborhood where none existed before. If an analysis is being conducted, identify the locations of these facilities on a community facilities map (or on a separate Fire/Police Protection Services map).

320. DETAILED ANALYSIS TECHNIQUES

Detailed community facilities analyses are often conducted for individual facilities that may be affected by a project; for large residential projects, multiple facilities may need to be analyzed. The following process may be followed in conducting these detailed analyses.

321. Direct Potential Impact

If the proposed project would displace or alter a community facility (*i.e.,* Direct Effect), it is expected that the affected agency may conduct its own assessment to determine the impact of the proposed project on its facility and its constituents. The CEQR analysis should be coordinated with the affected agency's assessment. At a minimum, the analysis should document the name and location of the facility, as well as its type (*i.e.*, school, *etc.*, including a description of services), its size (*e.g.*, 600 seats, square footage, *etc.*), and its hours of operation. The population and/or area served by the facility (*e.g.*, income level, age groups, residents vs. workers, repeat or one-time users) and the facility's capacity, including excess or deficiency of capacity (*e.g.*, school seats, volumes per capita, *etc.*), should be determined. It may be helpful to provide a site plan or floor plan of the facility that shows the amount of land area or portion of a building that would be directly affected. Based on how the project would change the affected facility, determine the extent to which service would be disrupted or precluded. If elimination or disruption of service would place additional demand on other nearby facilities, it may be appropriate to examine the indirect effects on those facilities caused by the initial direct impact, following the methodology described in Subsection 322.

322. Indirect Potential Impact

The following methodologies may be used to assess increased demand on community facilities.

322.1. Public School Analysis

EXISTING CONDITIONS

Identify the elementary and intermediate schools within the sub-district study area. For assistance in identifying the schools, contact SCA or DCP. The following information for each school should be provided:

- School identification by number (*e.g.*, P.S. 24) and address;
- Current enrollment;

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- Target Capacity (which assumes maximum classroom capacity of 20 children per class for grades K-3; 28 children for grades 4-8; and 30 children for grades 9-12);
- Number of available seats;
- Target utilization rate; and
- Grades served.

In addition to the sub-district study area schools, identify, for informational purposes, the "zoned" elementary and intermediate schools that would serve students generated by the proposed project. These may be different from those that fall within the sub-district study area, as specified in Subsection 311. Identify any unusual school zone situations. For instance, students living within a relatively small area in Flushing are not zoned to the nearest or nearby elementary schools, but are zoned to one of several elementary schools located in other parts of the school district. If the school district has a program of "middle school choice," this should also be noted in the text.

The latest available data on enrollment, capacity, available seats and utilization rates for all elementary and all intermediate/middle schools within the sub-district study area should be provided, including any Transportable Classroom Units (TCUs), Mini-Schools, and Annexes that are part of these school organizations. Total enrollment, capacity, available seats and utilization rates for the school district as a whole should also be provided. Enrollment, capacity and utilization information is available in the DOE's Utilization Profiles: Enrollment/Capacity/ Utilization "Classic Edition" publication, which is updated annually and is available here. This information may be easier to comprehend when presented in a table.

If there are PS/IS or IS/HS schools in a school district, it may be necessary to request additional information from the SCA or DCP in order to align the enrollment projections with the capacity data in the Utilization Profiles.

Charter schools, including charter schools housed in DOE buildings, should not be included in the impact analysis, although information on them (name, address, and enrollment) may be provided in the text. Charter school enrollments are based on lotteries, with preferences made for students living within the school districts in which they are located, and not to smaller areas. Charter school enrollments are not included in DOE enrollment projections. If charter schools are co-located in DOE buildings, exclude the charter school enrollment and capacity from the impact analysis. Similarly, elementary and intermediate schools that draw students from a large area (*i.e.,* borough) such as Mark Twain Gifted and Talented in Brooklyn or PS 499 in Queens should be excluded from the analysis. If such schools are co-located in DOE buildings, exclude the organization's enrollment and capacity from the impact analysis.

If a high school analysis is warranted, similar information may be provided for high schools in or near the project area, as well as for the borough as a whole. Borough high school data may need to be compiled from several sections of the Utilization Profiles "Classic Edition" which currently organizes high schools by school district geography.

NO-ACTION SCENARIO

The SCA's designated enrollment projections should be obtained by contacting SCA and/or DCP. If possible, the projection series (*e.g., Actual 2007, Projected 2008-2018*) to be used should coordinate with the Utilization Profile data (*e.g., Utilization Profiles: Enrollment/Capacity/Utilization for 2007-2008*). Otherwise, use the latest available projection series and/or utilization data. The enrollment projections include a separate projection for ungraded special education (SE) students that are enrolled in the general education schools. For CEQR analysis, these SE students should be added (proportionally) to the projections for elementary (grades PK-5) and intermediate (grades 6-8) for the appropriate projected Build Year. The following method should be used to proportionally distribute

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the SE students to the elementary and intermediate projections: Divide the PK-5 enrollment (without SE) by the total District enrollment (without SE) and apply the resulting percentage to the SE enrollment. Add the product to the PK-5 enrollment to calculate the total PK-5 enrollment; intermediate enrollment projections should be handled the same way.

Example: Using Grier Enrollment Projection Series (Actual 2007, Projected 2008-2017), CSD 30's 2017 projected elementary (PK-5) is 18,480, the intermediate (6-8) is 7,591, the total enrollment (without SE) is 26,071, and the SE (ungraded) is 3,308.

Calculation:

Step 1: 18,480 / 26,071 = 0.709

Step 2: 0.709 x 3,308 = 2,345

Step 3: 2,345 + 18,480 = 20,825 (Projected PS enrollment -including SE- for 2017 Build Year)

The projected enrollment for the sub-district study area and the school district form the base of the No-Action analysis. SCA-approved percentages for calculating sub-district enrollment projections should be obtained from the SCA or DCP.

The number of students generated by the No-Action Scenario for the sub-district study area should be obtained from DCP or the SCA. These numbers are derived from the SCA's Projected New Housing Starts for the 2010-2014 Five Year Capital Plan. The SCA has developed these estimates for their capital planning purposes. Consultation with the SCA may be necessary to ensure that known development projects have been included in their estimates.

In addition to enrollment projections, information on projected changes that may affect the availability of seats in the schools within the study area in the future without the project, including plans for changes in capacity, new programs, capital projects, and improvements, should be obtained from the SCA, DOE or DCP.

- Since the DOE is actively engaged in an ongoing process of repurposing underutilized school space, either for its own programs or for Charter Schools, a school building that may be significantly underutilized in the existing condition may be programmed to include a new school organization in the near future. In this case, the available capacity may be radically altered within a few months of when the assessment is made. Information on proposed and adopted "Significant Changes in School Utilization" should be obtained from the Panel for Education Policy's public notice website, http://schools.nyc.gov/AboutUs/leadership/PEP/publicnotice/default.htm. Only adopted "Significant Changes in School Utilization" plans can be *used to adjust available ca*pacity within the sub-district study area.
- The DOE's *Five Year Capital Plan* may provide for new capacity for the study area and/or the school district. New seats should be included in the quantitative analysis for projects in the *Five Year Capital Plan* that have commenced construction. If construction has not commenced, new seats for projects in the *Five-Year Capital Plan* may be included in the quantitative analysis if the lead agency, in consultation with SCA, concurs that it is appropriate under the circumstances.
- The capacity of Transportable Classroom Units (TCUs), Mini-schools, and Annexes within the study area(s) should, for the most part, be excluded from the future No-Action and future With-Action condition because the capacity is temporary. A list of these temporary facilities that should be excluded may be obtained from DCP or SCA.

If a more detailed assessment is needed for high schools, it should be handled using the same general method as the elementary/intermediate school district level analysis for the high schools within the

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borough in which the project is located. The No-Action RWCDS for a borough high school analysis should be obtained from the SCA's *Projected New Housing Starts* for the 2010-2014 Five Year Capital Plan. Aggregate the school districts into borough totals (*i.e.,* CSDs 1-6 in Manhattan; CSDs 7-12 in the Bronx; CSDs 13-23 and 32 in Brooklyn; CSDs 24-30 in Queens; and CSD 31 in Staten Island). Use the borough total for the No-Action borough high school analysis.

WITH-ACTION SCENARIO

To estimate the number of elementary- and intermediate-level school children who would be generated by a project, use Table 6-1a. Add the projected demand (number of students generated by the proposed project) to the projected enrollment for the sub-district study area and the school district in the future No-Action. This assessment becomes the With-Action Scenario projection. The available capacity or resulting deficiency in school seats for the sub-district study area and the school district as a whole in the case of elementary and intermediate schools, or for the borough at the high school level, should be calculated.

If the proposed project would include the construction of new schools or other measures that result in additional seats, such seats should be included in the future capacity estimates, and the proposed school's location, number of seats, grades served, and other appropriate details, should be included. Similarly, if a project includes other measures intended to alleviate capacity constraints in the With-Action scenario, those measures should be disclosed and, based upon consultation with DOE and SCA, may be taken into account when determining whether the project would result in a significant adverse impact to schools.

In the event the proposed project would eliminate a school without proposing a replacement, those students from the affected facility would be allocated to nearby schools, and the effect on the schools receiving the students would then be analyzed. It is recommended that this allocation be made with direct input from DOE.

322.2. Libraries

EXISTING CONDITIONS

The detailed analysis of libraries includes a brief description of existing libraries within the study area their information services, and user population. The population profile developed for the economic assessment in Chapter 5, "Socioeconomic Conditions," may be used to describe the existing population served. The relevant library system (New York Public Library, Queens Library, or Brooklyn Public Library), or DCP, should be contacted to obtain available information on services provided and circulation, as well as an assessment of existing conditions and levels of utilization. At a minimum, the branch holdings (books, CD-roms, DVDs, Videotapes, *etc.*) and circulation data (from DCP's Selected Facilities and Program Sites Database) should be identified.

"Holdings" per resident may be estimated to provide a quantitative gauge of available resources in the applicable branch libraries in order to form a baseline for the analysis.

NO-ACTION SCENARIO

To determine the future No-Action Scenario, estimate the future population in the study area based on information in the demographic and socio-economic analyses (*i.e.,* average household size). Information from the New York Public Library, Queens Library, or Brooklyn Public Library, as appropriate, concerning any planned new branches serving the study area and changes to existing branches, including building additions, the size of collections and special programs, should be obtained.

Using the information gathered for the existing conditions, "holdings" per resident in the No-Action Scenario is then estimated.

WITH-ACTION SCENARIO

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The estimated population to be added by the proposed project should be determined. Add the future population to that of the No-Action population and determine the project's effects on the library's ability to provide information services to its users.

"Holdings" per resident in the With-Action Scenario should be estimated and compared to the No Action "holdings" estimate. This information may be easier to comprehend when presented in a table.

If the proposed project would directly affect a library branch, a qualitative assessment of the effects of that change should be provided. With input from management staff at the affected library branch and the branches that would be expected to absorb the demand, the effects of the added population (including the No-Action and With-Action Scenarios) on special programs, facilities, or collections should be qualitatively discussed.

322.3. Child Care Centers

EXISTING CONDITIONS

Existing publicly funded group child care facilities (including Head Start facilities) within the study area obtained from ACS' Division of Child Care and Head Start should be provided, including the location, number of slots (capacity), and enrollment (utilization). Care should be taken to avoid double counting capacity at the same locations since ACS and Head Start funding may be used for the same "slot."

NO-ACTION SCENARIO

Since enrollment projections for child care facilities are not available, CEQR analysis assumes that the existing enrollment and capacity would stay the same for the build year and be the baseline for the No-Action Scenario (unless affordable housing is identified, see below). However, ACS should be contacted to obtain information on any changes planned for child care programs or facilities in the area of the proposed project, including closing or expansion of existing facilities and establishment of new facilities that would affect capacity in the build year. If changes are planned, they are incorporated into the No-Action Scenario's capacity.

The number of eligible housing units, as outlined in the RWCDS for the No-Action Scenario should be identified. Table 6-1b should be used to estimate the number of eligible children under age 6 based on the No-Action RWCDS. For example, a 200-unit low-income project in the Bronx may be expected to yield 28 children under the age of 6. Major planned residential development projects that include a substantial number of affordable housing units within the study area should also be considered in the No-Action Scenario.

Add the projected demand (number of eligible children generated by the No-Action Scenario) to the existing group child care and Head Start enrollment for the study area. The available capacity or resulting deficiency in "slots" and the utilization rate for the study area should be calculated. This assessment becomes the No-Action Scenario projection.

WITH-ACTION SCENARIO

Table 6-1b should be used to estimate the number of eligible children generated by the proposed project. Add the projected demand (number of eligible children generated by the proposed project) to the projected group child care and Head Start enrollment for the study area in the future No-Action. The available capacity or resulting deficiency in "slots" and the utilization rate for the study area should be calculated. This assessment becomes the With-Action Scenario projection.

322.4. Health Care Facilities

EXISTING CONDITIONS

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If the proposed project would displace or alter a hospital or public health clinic, the analysis should document the name and location of the facility, its size, and its population and/or service area. If the proposed project would either introduce a sizeable new neighborhood where one has not previously existed or displace or alter a hospital or public health clinic, the location of hospitals and public health clinics that would be directly affected by the proposed project, in terms of adjustments to service areas, should be documented.

NO-ACTION SCENARIO

The Health and Hospitals Corporation (for hospitals) or the Department of Health and Mental Hygiene (for public health clinics) should be contacted for information that may be useful in assessing the future No-Action Scenario. Documentation of physical changes planned for hospitals or public health clinics expected in the future No-Action Scenario may be appropriate for the assessment. In addition, new projects and population that would be added to the service area in the future No-Action Scenario should be summarized.

WITH-ACTION SCENARIO

The Health and Hospitals Corporation or the Department of Health and Mental Hygiene (as appropriate) should be consulted to develop the appropriate assessment for determining the effects of a proposed project. The following information should be provided:

- Location of project site or affected area (address and tax blocks and lots);
- Physical size of the proposed project's land area (square feet);
- Predominant building types expected for project and No-Action Scenario projects;
- Number of residential units; and
- Description of uses and activity patterns (see Chapter 4, "Land Use, Zoning, and Public Policy").

The appropriate agency's assessment, which should be provided in a letter or other official documentation, is then used by the lead agency in making its own assessment of the project's effects.

322.4. Fire Protection

EXISTING CONDITIONS

If the proposed project would displace or alter a fire protection services facility, the analysis should document the name and location of the facility, its size, and its population and/or catchment area. If the proposed project would either introduce a sizeable new neighborhood where one has not previously existed or displace or alter a fire protection services facility, the location of those stations serving the area in which the proposed project would be located or that would be directly affected by the project should be documented. Other information, such as the type of equipment at those stations, may also be useful. The Fire Department should be contacted for the appropriate information (*i.e.,* service area, service issues, *etc.*).

NO-ACTION CONDITION

The Fire Department should be contacted for information that may be helpful to document physical changes planned for station houses or equipment additions to the service area for the future No-Action scenario. In addition, summarize new projects and population that would be added to the service area in the future No-Action condition.

WITH-ACTION CONDITION

The Fire Department should be consulted to develop the appropriate assessment for determining the effects of a proposed project. The following information should be provided:

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- Location of project site or affected area (address and tax blocks and lots);
- Physical size of the proposed project's land area (square feet);
- Predominant building types expected for project and No-Action projects;
- Number of residential units; and
- Description of uses and activity patterns (see Chapter 4, "Land Use, Zoning, and Public Policy").

The Fire Department's assessment, which should be provided in a letter or other official document, is then used by the lead agency in making its own assessment of the project's effects.

322.5. Police Protection

EXISTING CONDITIONS

If the proposed project would displace or alter a police services facility, the analysis should document the name and location of the facility, its size, and its population and/or service area. If the proposed project would either introduce a sizeable new neighborhood where one has not previously existed or displace or alter a police services facility, the location of precinct houses that would be directly affected by the proposed project, in terms of adjustments to service areas, should be documented.

NO-ACTION CONDITION

The NYPD should be contacted for information that may be useful in assessing future No-Action conditions. Documentation of physical changes planned for station houses expected in the future No-Action scenario may be appropriate for the assessment. In addition, new projects and population that would be added to the service area in the future No-Action condition should be summarized.

WITH-ACTION CONDITION

The Police Department should be consulted to develop the appropriate assessment for determining the effects of a proposed project. The following information should be provided:

- Location of project site or affected area (address and tax blocks and lots);
- Physical size of the proposed project's land area (square feet);
- Predominant building types expected for project and No-Action projects;
- Number of residential units; and
- Description of uses and activity patterns (see Chapter 4, "Land Use, Zoning, and Public Policy").

The Police Department's assessment, which should be provided in a letter or other official documentation, is then used by the lead agency in making its own assessment of the project's effects.

400. DETERMINING IMPACT SIGNIFICANCE

The determination of whether an impact on a community facility would be significant is based on whether the people in the area would have adequate service delivery in the future with the project. Generally, the same assessment of service delivery is appropriate whether the potential effects of the project would either be direct or indirect. If service delivery would deteriorate to unacceptable levels as a result of a substantial (more than five percent) increase in population served by a facility, a significant impact may result.

410. PUBLIC SCHOOLS

For the purposes of CEQR analysis, a utilization rate of 100 percent is the utilization threshold for overcrowding.

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A significant adverse impact may result, warranting consideration of mitigation, if the proposed project would result in both of the following:

- A collective utilization rate of the elementary or intermediate schools that is equal to or greater than 100 percent in the With-Action Condition; and
- An increase of five percent or more in the collective utilization rate between the No-Action and With-Action conditions.

To illustrate, if the collective utilization rate in the No-Action condition is 98% and the collective utilization rate in the With-Action condition is 103%, the project would result in a significant adverse schools impact. However, if a project includes components which do not provide additional capacity but are intended to reduce school capacity constraints, the lead agency, in consultation with DOE and SCA, may take these project components into account to determine whether an increase in the collective utilization rate under the above standards would cause a significant adverse impact.

NOTE: Elementary and intermediate schools should be handled separately. In addition, a determination of impact significance for high schools is conducted at the borough level.

420. LIBRARIES

Generally, if a proposed project would increase the study area population by five percent or more over No-Action levels, and it is determined, in consultation with the appropriate library agency that this increase would impair the delivery of library services in the study area, a significant impact may occur, warranting consideration of mitigation.

430. CHILD CARE CENTERS

A significant adverse impact may result, warranting consideration of mitigation, if the proposed project would result in both of the following:

- A collective utilization rate of the group child care/Head Start centers in the study area that is greater than 100 percent in the With-Action Scenario; and
- An increase of five percent or more in the collective utilization rate of the child care/Head Start centers in the study area between the No-Action and With-Action Scenarios.

For example, a significant adverse impact would be identified if there was a No Action Scenario utilization rate of 96 percent and a With Action Scenario utilization rate of 101 percent.

For the purposes of CEQR analysis, a No-Action base utilization rate of 100 percent is the utilization threshold for overcrowding for child care centers. This takes into account the fact that child care centers have a maximum number of slots that they may accommodate, based on the square footage of the child care center and the staffing levels, as prescribed by Article 47 of the NYC Health Code.

440. HEALTH CARE FACILITIES

The Health and Hospitals Corporation or the Department of Health and Mental Hygiene (as appropriate) should each be contacted for their assessment of the project's effects on their operations. This information may be used in the determination of the potential significant impacts to their operations. A written statement from these departments should be obtained regarding their recommendations. The lead agency must then weigh these data and come to its own determination as to significance, using the guidance criteria for determining significance, as outlined in 6 NYCRR Part 617.7.

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450. FIRE AND POLICE PROTECTION

The Police and Fire Departments should each be contacted for their assessment of the project's effects on their operations. This information may be used in the determination of the potential significant impacts to their operations. A written statement from these departments should be obtained regarding their recommendations. The lead agency must then weigh these data and come to its own determination as to significance, using the guidance criteria for determining significance, as outlined in 6 NYCRR Part 617.7.

500. DEVELOPING MITIGATION

In most cases, mitigation measures for significant impacts on a community facility require the commitment from the agency or institution having jurisdiction over the facility. For this reason, early coordination is advised.

Following are some examples of mitigation measures for community facilities impacts.

510. SCHOOLS

Measures to mitigate a significant impact on schools vary based on the size of the project and the capacity of the school sub-district. In general, the following potential measures should be explored: relocating administrative functions to another site, thereby freeing up space for classrooms; making space within the buildings associated with the proposed project or elsewhere in the school study area available to DOE; and/or restructuring or reprogramming existing school space within a district; or providing for new capacity (seats) by constructing a new school or an addition to an existing school. Other measures may be identified in consultation with SCA and DOE that do not create additional capacity but may nevertheless serve to alleviate capacity constraints.

All potential mitigation should be reviewed with DOE and SCA to determine its feasibility.

520. LIBRARIES

If the proposed project is expected to have a significant impact on libraries within the study area, mitigation should be targeted to alleviate the impact created (*e.g.*, by adding volumes if adequate space within the library branch exists, adding building space to accommodate more users, or creating programs to accommodate new users). Appropriate mitigation should be developed in consultation with the relevant library agency. To mitigate the significant impact, the improvements must occur within the service area of the impacted library.

530. CHILD CARE CENTERS

Mitigation for a significant child care impact, developed in consultation with ACS, may include provision of suitable space on-site for a child care center, provision of a suitable location off-site and within a reasonable distance (at a rate affordable to ACS providers), or funding or making program or physical improvements to support additional capacity.

Potential mitigation should be reviewed with the ACS's Division of Child Care and Head Start to determine its feasibility, particularly when a project by ACS is required to facilitate the mitigation.

540. HEALTH CARE FACILITIES

If a significant adverse impact is identified, potential mitigation measures include the upgrading of other existing facilities, the provision of new facilities, or other measures as deemed suitable by the appropriate agency. Provision of space on-site for a hospital-related outpatient facility or public health clinic may be considered appropriate mitigation. Potential mitigation should be reviewed with the Health and Hospitals Corporation or the Department of Health and Mental Hygiene (as appropriate) to determine its feasibility and appropriateness.

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550. FIRE AND POLICE PROTECTION

Potential mitigation measures for inadequate police and fire protection as a result of the proposed project include upgrading existing equipment, acquisition of new equipment, or construction of a new firehouse or police precinct building. Construction of new facilities is typically the responsibility of the Fire or Police Department. Provision of land on-site for a Fire or Police Department facility may be considered appropriate mitigation. Potential mitigation should be reviewed with the Fire and Police Departments to determine its feasibility and appropriateness.

600. DEVELOPING ALTERNATIVES

Alternatives that would reduce or eliminate significant impacts on community facilities include incorporation of the potential mitigation options discussed above, redesigning or relocating a project to avoid having direct effects on existing facilities, or developing a smaller project that would result in a smaller population that would not cause a significant adverse impact on the facilities.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are no specific City, State, or Federal statutory regulations or standards governing the analysis of community facilities.

720. APPLICABLE COORDINATION

It is best to consult with those agencies that operate or have jurisdiction over the affected facilities early in the CEQR process because they have the most up-to-date information regarding existing operations and capacity, as well as future condition projections for their facilities. Such agencies should also be consulted in assessing impacts and developing mitigation, if required, because mitigation would typically require the approval or commitment of the operating agency.

730. LOCATION OF INFORMATION

Publications, maps, annual reports, and projections are prepared and made available by the agencies and institutions described below.

731. Public Schools

Information on enrollment projections, existing and planned school facilities (Five Year Capital Plan and amendments), and DOE's "Utilization Profile Reports" with data on schools by district:

- The NYC School Construction Authority

  Capital Planning Division
  30-30 Thomson Avenue
  Long Island City, NY 11101
  http://www.nycsca.org/Community/CapitalPlanManagementReportsData/Pages/default.aspx

- Department of City Planning

  Planning Coordination Division
  22 Reade Street
  New York, NY 10007

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732. Libraries

Information requests for library branches should be directed to each of the system's public relations offices:

- New York Public Library (serves the Bronx, Manhattan and Staten Island)

  Office of Public Relations
  8 West 40th Street
  New York, NY 10018

- Queens Borough Public Library

  Office of Public Relations
  89- 11 Merrick Boulevard
  Jamaica, NY 11432

- Brooklyn Public Library

  Office of Public Relations
  Grand Army Plaza
  Brooklyn, NY 11238

733. Child Care Centers

Information on publicly funded and operated child care and Head Start centers is available from the Administration for Children's Services. The Department of City Planning's Planning Coordination Division or Environmental Assessment and Review Division may be consulted for assistance with contacting the appropriate ACS personnel.

- For Publicly Funded Group Child Care facilities:

  Executive Director, Child Care Services & Administration
  Division of Child Care and Head Start
  Administration for Children's Services
  66 John Street - 8th floor
  New York, NY 10038

- For ACS Head Start facilities:

  Assistant Director, Head Start Planning & Analysis
  Division of Child Care and Head Start
  Administration for Children's Services
  66 John Street - 8th floor
  New York, NY 10038

734. Health Care Facilities

- New York City Health and Hospitals Corporation

  Division of Corporate Planning, Community Health and Intergovernmental Relations
  125 Worth Street
  New York, NY 10013
  New York City Department of Health and Mental Hygiene
  125 Worth Street
  New York, NY 10013

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735. Fire Protection

The Commissioner's Office of the Fire Department of New York is consulted for information and determination related to fire protection assessment. This office is located at:

- New York City Fire Department

  9 Metrotech Center
  Brooklyn, NY 11201

736. Police Protection

The Precinct Commanding Officer at the local precinct of the New York City Police Department that would serve the site is consulted for information and determination related to police protection assessment.

737. Other Information

- *Selected Facilities and Program Sites in New York City*: information on public and private schools, libraries, child care and other community facilities by address, block/lot and community district; updated periodically, and available for free download on DCP's website: http://www.nyc.gov/html/dcp/html/bytes/applbyte.shtml.
- *Citywide Statement of Needs* (published annually): Proposed expansions, relocations, closings, and new City facilities for the next two fiscal years. Available for purchase in DCP Bookstore or for free download on DCP's http://home.nyc.gov/html/dcp/html/pub/cdnd12.shtml.
- *Gazetteer* and *Atlas of City Property* (published every two years): Information on all City-owned and -leased property by block/lot and community district. Available for purchase in DCP's Bookstore. The Gazetteer is also available for free download on DCP's website: http://home.nyc.gov/html/dcp/html/pub/publist.shtml.
- Department of City Planning Bookstore

  22 Reade Street
  New York, NY 10007
  Phone: 212-720-3667

- Annual Capital Budget and 3-Year Capital Plan: Appropriations for City capital projects. Budget publications are available on OMB's website: http://www.nyc.gov/html/omb/html/publications/publications.shtml.

  Office of Management & Budget
  75 Park Place
  New York, NY 10007

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OPEN SPACE

CHAPTER 7

Under CEQR, an analysis of open space is conducted to determine whether or not a proposed project would have a direct impact resulting from the elimination or alteration of open space and/or an indirect impact resulting from overtaxing available open space. Open space is defined as publicly or privately owned land that is publicly accessible and operates, functions, or is available for leisure, play, or sport, or set aside for the protection and/or enhancement of the natural environment. An open space analysis focuses on officially designated existing or planned public open space.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency during the entire environmental review process. The lead agency may determine it is appropriate to consult or coordinate with the city's expert technical agencies for a particular project. If so, the New York City Department of City Planning (DCP) and the New York City Department of Parks and Recreation (DPR) should be consulted for information, technical review, and recommendations for mitigation relating to open space. It is recommended that the lead agency coordinate with these expert agencies as early as possible in the environmental review process. Section 700 further outlines appropriate coordination with these (and other) expert agencies.

100. DEFINITIONS

Open space may be public or private and may include active and/or passive areas:

PUBLIC OPEN SPACE

Open space that is accessible to the public on a constant and regular basis, including for designated daily periods, is defined as "public" and analyzed under CEQR. Public open space may be under government or private jurisdiction and may include, but is not limited to, the following:

- Parks operated or managed by the City, State, or Federal governments and include neighborhood and regional parks, beaches, pools, golf courses, boardwalks, playgrounds, ballfields and recreation centers that are available to the public at no cost or through a nominal fee, as in the case of recreation centers and golf courses;
- Open space designated through regulatory approvals (such as zoning), including large-scale permits that prescribe publicly accessible open space, such as public plazas;
- Outdoor schoolyards if available to the public during non-school hours;
- Publicly-accessible institutional campuses;
- Esplanades;
- Designated greenways, as shown on the City's Bike Map, and defined as multi-use pathways for non-motorized recreation and transportation along natural and manmade linear spaces such as rail and highway rights-of-way, river corridors and waterfront spaces;
- Landscaped medians with seating;
- Housing complex grounds, if publicly accessible;
- Nature preserves, if publicly accessible;
- Gardens, if publicly accessible;

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- Church yards or cemeteries with seating; or
- Waterfront piers used for passive or active recreation, defined below.

Public open space does not include greenstreets, malls without seating, or sidewalks.

PRIVATE OPEN SPACE

Open space that is not publicly accessible or is available only to limited users and is not available to the public on a regular or constant basis is defined as "private." It is not included in the quantitative analysis but may be considered in the qualitative assessment of potential open space impacts. Private open space may include, but is not necessarily limited to, the following:

- Private-access fee-charging spaces, such as health clubs;
- Yards or rooftop recreational facilities used by community facilities, such as public and private educational institutions, where the open space is accessible only to the institution-related population;
- Natural areas or wetlands with no public access;
- Arcades;
- Stoops;
- Vacant lots;
- Front and rear yards; and
- Private open space is considered only after an assessment of the proposed project's effects on public open space has been completed. If the project is likely to have indirect effects on public open space (such as greater utilization demands), the ability of private open space to influence or alter those effects may be considered.

Open space includes both "active and "passive" categories as described below:

ACTIVE OPEN SPACE

Open space that is used for sports, exercise, or active play is classified as "active open space," and consists mainly of recreational facilities, and includes the following: playgrounds with playground equipment, playing fields (baseball, soccer, football, track), playing courts (basketball, handball, tennis), beach areas (swimming, volleyball, frisbee, running), pools, ice skating rinks, greenways, mountain biking trails, and esplanades (used for running, biking, rollerblading or other active play), multi-purpose play areas (open lawns and paved areas for active recreation, such as running games, informal ball-playing, skipping rope, *etc.*), and golf courses, including pitch and putt.

PASSIVE OPEN SPACE

Open space that is used for relaxation, such as sitting or strolling, is classified as "passive," and includes the following: plazas or medians with seating, a percentage of beach areas (sunbathing), picnicking areas, greenways and esplanades (sitting, strolling), paths, accessible restricted use lawns, gardens, and church yards or cemeteries with seating, and publicly accessible natural areas used, for example, for strolling, dog walking, and bird watching.

In many cases, open space may be used for both active and passive recreation. These include lawns and beaches, which permit both sunbathing and *ad hoc* ball or frisbee games.

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A proposed project's effects on open space may be either direct or indirect. These are defined as follows:

DIRECT EFFECTS

Direct effects may occur when the proposed project would encroach on, or cause a loss of, open space. Direct effects may also occur if the facilities within an open space would be so changed that the open space no longer serves the same user population. Limitation of public access and changes in the type and amount of public open space may also be considered direct effects. Other direct effects include the imposition of noise, air pollutant emissions, odors, or shadows on public open space that may alter its usability. Assessment of these effects is addressed in the relevant technical chapters of the manual and should be referenced for the open space analysis. It should be noted that direct effects may not always result in adverse effects to open space. Alterations and reprogramming of parks may be beneficial or may result in beneficial changes to some resources and may or may not have an adverse effect on others.

INDIRECT EFFECTS

Indirect effects may occur when the population generated by the proposed project overtaxes the capacity of existing open spaces so that their service to the future population of the affected area would be substantially or noticeably diminished.

200. DETERMINING WHETHER AN OPEN SPACE ASSESSMENT IS APPROPRIATE

An open space assessment may be necessary if a project potentially has a direct or indirect effect on open space. In determining whether or not to prepare an open space assessment, consider whether the changes are likely to adversely affect utilization of existing resources or specific users of these resources.

210. DIRECT EFFECTS

If a proposed project would have a direct effect on an open space, an assessment of the effects on open space and its users may be appropriate. Direct effects occur if the proposed project would:

- Result in a physical loss of public open space (by encroaching on an open space or displacing an open space);
- Change the use of an open space so that it no longer serves the same user population (*e.g.*, elimination of playground equipment);
- Limit public access to an open space; or
- Cause increased noise or air pollutant emissions, odors, or shadows on public open space that would affect its usefulness, whether on a permanent or temporary basis.

However, when the direct effect would be so small that it would be unlikely to change use of the open space, an assessment may not be needed. For example, the loss of a small amount of open space to support infrastructure related to park purposes may not warrant a full open space analysis. When few users or a limited age group of users would be affected, new and comparable open space would be provided at the same location, or the proposed alterations to an existing open space would be improvements that create comparable or better facilities, significant adverse impacts are unlikely and a full assessment may not be needed. A simple comparison of conditions with and without the project and a discussion of the users affected may be adequate. However, most direct effects on open space do require some assessment, particularly when more information on users of that open space may be appropriate or there is ambiguity as to whether the project would reduce the usability of an open space, detract from its aesthetic qualities, or impair its operation.

Consideration of these effects during the construction phase of a project should also be taken into account when determining whether an open space assessment is required. Chapter 22, "Construction Impacts," should be consulted for assessing the effects of construction activities on open space.

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211. Parkland Alienation

In addition to direct effects on open space, if a project entails the use of parkland for a non-parkland purpose or the conveyance of municipal parkland, it may constitute "parkland alienation" in New York State, requiring state legislative authorization. Similarly, when a project involves the termination of use for outdoor recreation of city owned parkland that has received federal funds for acquisition or improvement, the project may also involve "conversion," and requires the approval of the National Park Service of the U.S. Department of the Interior. For more information on how to proceed when a project may result in parkland alienation or conversion, please see Section 730.

220. INDIRECT EFFECTS

If a project may add population to an area, demand for existing open space facilities would typically increase. Indirect effects may occur when the population generated by the proposed project would be sufficiently large to noticeably diminish the ability of an area's open space to serve the future population.

For the majority of projects, an assessment is conducted if the proposed project would generate more than 200 residents or 500 employees, or a similar number of other users (such as the visitor population that might be introduced by a large shopping area). However, the need for an open space assessment may vary in certain areas of the city that are considered either underserved or well-served by open space.

- **Underserved areas** are areas of high population density in the City that are generally the greatest distance from parkland where the amount of open space per 1000 residents is currently less than 2.5 acres.
- **Well-served areas**
  - Have an open space ratio above 2.5 accounting for existing parks that contain developed recreational resources; or
  - Are located within 0.25 mile (approximately a 10-minute walk) from developed and publicly accessible portions of regional parks.

The areas considered underserved or well-served by open space for each borough may be found using maps in the Appendix for the Bronx, Brooklyn, Manhattan, Queens, and Staten Island, and the methodologies for determining both underserved and well-served areas can be found here.

THRESHOLDS FOR ASSESSMENT:

- If a project is located in an underserved area, an open space assessment should be conducted if that project would generate more than 50 residents or 125 workers.
- If the project is located in a well-served area, an open space assessment should be conducted if that project would generate more than 350 residents or 750 workers in a well-served area.
- If a project is not located within an underserved or well-served area, an open space assessment should be conducted if that project would generate more than 200 residents or 500 employees.

If a proposed project would generate 50 residents or 125 workers or more in an underserved area, an open space assessment should be conducted. If the proposed project would generate 350 residents or 750 workers or more in a well-served area, an open space assessment should be conducted.

Higher thresholds in areas well-served by open space are appropriate because the area contains existing park resources that provide for the existing population and likely for a nominal amount of added population, while regional parks contain a wide variety of recreational facilities intended to serve many users at a given point in time.

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300. ASSESSMENT METHODS

If the project exceeds the thresholds outlined in Section 200, above, a preliminary assessment is warranted, and, depending on the results of that assessment, a more detailed analysis may also be required. A full, detailed open space analysis is necessary if the project would displace a highly utilized open space (direct effect) or introduce a large population in an area underserved by open space (indirect effect). In some cases, however, the need for a detailed analysis may be less clear, and a preliminary assessment may be useful in determining the need for a more detailed analysis of open space.

The first step in any open space analysis is to define and map a study area. Once the study area is defined, the next step is to determine which analysis is required through calculating the percentage change in the open space ratio between the No-Action condition and the future With-Action condition.

310. STUDY AREAS AND MAPPING OF EXISTING OPEN SPACE

Open space study areas are defined to allow analysis of both the nearby open spaces and the population using those open spaces. They are generally defined by a reasonable walking distance that users would travel to reach local open space and recreation areas—typically a 0.5 mile for residential users and 0.25 mile from commercial projects with a worker population. However, the boundaries of the study area should reflect existing conditions and may be irregularly shaped. For projects that would result in mixed-use projects (*e.g.*, residential/commercial buildings), it may be appropriate to analyze two study areas—one for residential users and another for nonresidential users, such as workers. The following steps may be used to define an open space study area:

- Use a legible map of appropriate scale, such as a census tract map or DCP's Bytes of the Apple map as a base map. Locate the site of the proposed project and draw the physical boundary of the area affected by the project.
- From the boundary of all sites that would be developed as a result of the proposed project, delineate a radius of 0.25 mile for commercial projects or 0.5 mile for residential projects to create the generalized open space study area boundaries. As noted, it may be appropriate to define two study areas for mixed-use projects—one for residential users and another for commercial users.
- Identify all census tracts with at least 50 percent of their area within the generalized study area. The study area should include each of those census tracts in their entirety. Exclude all census tracts that have less than 50 percent of their area within the study area. Outline all census tracts to be included to refine the boundaries of the study area.
- Identify all open spaces within the defined study area. Field surveys of the study area are usually important to be certain that all appropriate open spaces are included. Determine the acreage for each of the open spaces within the study area as well.

  If a project would result in an extremely large development or displace an open space, the boundary may also need to be adjusted to reflect additional open space resources likely to be affected. For example, if a tot lot 9a playground facility designed for children less than 4 years old) would be eliminated under a proposed project, other existing tot lots should be included in the map, even if they are located beyond a 0.5 mile radius. If only direct effects from the project are expected, it may be possible to target the assessment to spaces that would be similar to those affected by the project. If the project is programmatic or generic, prototypical sites may have to be chosen for the analysis.
- Other boundary adjustments may be necessary to account for natural boundaries (ravines, rock outcrop-pings, water bodies, very steep slopes, wetlands) or built features (depressed highways, canals, railroad rights-of-way, etc.) that preclude access to open spaces within the study area. A written rationale for any adjustment of the boundary should be provided, and the acreage for any open space not

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accessible due to physical or natural barriers should not be included in the preliminary assessment, described below in Section 330.

320. ANALYSIS TECHNIQUES

The open space assessment examines the type of open space and user population affected by the proposed project. Overall, the goal of this assessment is to determine the significance of the change in either the availability of open space relative to the demand from the new population or the usability of the open space affected by the proposed project. For example, a commercial or mixed-use project may introduce a large worker population, which tends to place demands on passive open space. The analysis would examine in further detail the amount of passive open space available with and without the project to quantify the impact, and if necessary, the mitigation.

For projects that would have a direct effect on a specific type of open space without introducing a significant new user population, it may be possible to target the assessment. The open space analysis may be targeted toward those open space resources that are similar to the space that would be eliminated or altered by the project. For example, if the direct effects are limited to an open space resource targeted for a certain age group, such as a tot lot for toddlers and preschoolers, the impact assessment may be targeted to assess only that age group and nearby tot lots.

321. Open Space Ratios and Planning Standards

In New York City, local open space ratios vary widely, and the median ratio at the Citywide Community District level is 1.5 acres of open space per 1,000 residents. Typically, for the assessment of both direct and indirect effects, citywide local norms have been calculated for comparison and analysis. As a planning goal, a ratio of 2.5 acres per 1,000 residents represents an area well-served by open spaces, and is consequently used as an optimal benchmark for residential populations in large-scale plans and proposals. Ideally, this would comprise 0.50 acres of passive space and 2.0 acres of active open space per 1,000 residents. For such large-scale projects (and for planning purposes), the City also seeks to attain its planning goal of a balance of 80 percent active open space and 20 percent passive open space. The City's planning goal is based, in part, on National Recreation and Park Association guidelines from 1.25 to 2.5 acres per 1,000 residents of neighborhood parks within one-half mile, 5 to 8 acres per 1,000 residents of community parks within one to two miles, and 5 to 10 acres per 1,000 residents of regional parks within a one-hour drive of urban areas. Studies have shown that nonresidents, specifically workers, tend to use passive open space. The optimal ratio for worker populations is 0.15 acres of passive open space per 1,000 nonresidents.

Although a typical population mix may call for such a goal, it may not be attainable for some areas of the City, such as Midtown Manhattan, or for certain populations skewed toward certain age groups. Therefore, the City does not consider these ratios as its open space policy for every neighborhood, and consequently, these ratios do not constitute an impact threshold. Rather, the ratios are benchmarks that represent how well an area is served by its open space.

330. PRELIMINARY ASSESSMENT

A preliminary assessment may be useful when the open space assessment can be targeted to a particular user group, or if it is not clear whether a full, detailed open space analysis is necessary.

The following methodology examines the change in total population relative to total open space in the study area to determine whether the elimination of open space and/or increase in user population would significantly reduce the amount of available open space for the area's population:

- Calculate total population in the study area at the time of the most recent decennial census, with a population adjustment based on subsequent population estimates.
    - ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN RESIDENTIAL POPULATION***. Calculate the residential population of the study area. If the project would occur in an area with a substantial nonresiden-

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tial population (*i.e.*, employees, visitors, students, *etc.*), the nonresidential population of the study area should also be calculated.

- ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN NONRESIDENTIAL POPULATION (I.E., EMPLOYEES, VISITORS, STUDENTS, ETC.)***. Calculate the nonresidential population. If the project would occur in an area with a substantial residential population, the residential population of the study area should also be calculated.
- ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN BOTH RESIDENTIAL AND NONRESIDENTIAL POPULATION***. Calculate the residential and nonresidential population of the study area.

- Calculate total open space in the study area using the information gathered in Section 310.
- Determine the open space ratio (R) in the study area, using the information from steps 1 and 2. The open space ratio is expressed as the amount of open space acreage per 1,000 population, and is calculated as follows:

$$R = \frac{\text{acres of open space}}{\text{population}} \times 1000$$

- ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN RESIDENTIAL POPULATION.*** Calculate the open space ratio for the residential population. If the project would occur in an area with an existing substantial nonresidential population, the open space ratio for the nonresidential population should also be calculated.
- ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN NONRESIDENTIAL POPULATION (I.E., EMPLOYEES, VISITORS, STUDENTS, ETC.).*** Calculate the open space ratio for the nonresidential population. If the project would occur in an area with an existing substantial residential population, the open space ratio for the residential population of the study area should also be calculated.
- ***PROJECTS THAT WOULD RESULT IN AN INCREASE IN BOTH RESIDENTIAL AND NONRESIDENTIAL POPULATION.*** Calculate the open space ratio for both the residential and nonresidential populations of the study area.

- Add the population expected with the proposed project to the total population calculated in step 1, above.
- Calculate any changes in the acreage of open space in the future With-Action (accounting for increases and/or decreases resulting from the project).
- Calculate the With-Action open space ratio.

If the open space ratio would increase or remain substantially the same in the With-Action condition compared to the No-Action condition, no further analysis of open space is needed (unless direct, qualitative changes to an open space may occur because of the project). Decreases in the open space ratio would generally warrant a more detailed analysis under the following conditions:

- If the decrease in the open space ratio approaches or exceeds 5 percent, it is generally considered to be a substantial change warranting more detailed analysis.
  - The closer the ratio is to 2.5 acres per 1,000 residents, or when the open space in the area exceeds this ratio, a greater percentage of change (more than 5 percent) may be tolerated.
- If the study area exhibits a low open space ratio (*e.g.*, below the citywide average of 1.5 acres per 1,000 residents or 0.15 acres of passive space per 1,000 nonresidential users), indicating a shortfall of open space, even a small decrease (less than 5%) in that ratio as a result of the project may require detailed analysis.

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- Detailed analysis of open space effects on residents is generally unnecessary if the open space ratio decreases by less than 1 percent. However, the existing open space ratio may be so low that even an open space ratio change of less than 1 percent may result in potential significant open space impacts. In that case, the potential for open space impacts should be further assessed.
- Similarly, the more the open space ratio drops below 0.15 acres of passive space per 1,000 population, the more likely the project is to have an effect on the nonresidential population's use of open space.

This assessment may also consider and compare the amount of open space in the study area relative to the community district and the borough to assess the relative shortfall or availability of open space in the study area.

If this analysis suggests the need for additional assessment, proceed to the detailed analysis.

340. DETAILED ANALYSIS

A detailed open space analysis typically breaks down study area population by age group and details the amount and quality of various types of open space to assess the availability of particular types of open space for particular age groups. In conducting this assessment, the analysis focuses on where shortfalls in open space exist now (or in the future), to identify whether the shortfalls are a result of the project. Where it is clear from the outset that the project would affect a particular type of open space or particular age group, the analysis may focus on those issues.

341. Identify Study Area Population

Using the total study area population calculated in the Preliminary Assessment (Section 330), break down the population by age group and list age groups as both total persons and as a percentage of total population in study area, as shown in Table 7-1.

These age groups represent different types of open space users. For example, the 4-year-old-and-younger age group typically uses tot lots, while other age groups may use a variety of active and passive facilities. If it is clear that the area supports a substantial weekday (nonresidential) population, such as workers, college students, or visitors, data on the size of such population and the source of this data should be obtained using the following sources:

- Data on daytime worker population may be obtained from DCP here.
- Daytime college population may be determined by contacting administrative officers of colleges and other post-secondary educational institutions in the study area.
- Visitor population may be estimated using information from visitor attractions and major shopping attractions--this may include daily, weekend, or annual visitor counts and estimates of daily or weekend shoppers.

For an analysis targeting a specific open space and user population, the assessment may focus only on that user population comparable to the population that would be displaced. For example, if only a tot lot is to be affected by the proposed project, the demographic analysis may focus on the appropriate age group 4 years old and younger.

342. Identify and Describe Study Area Open Spaces

Next, identify and describe open spaces included in the study area through data collection and site visits to determine the types of facilities, utilization levels, accessibility, and condition. This description may also note any major regional facilities that may be proximate to the study area boundary. A list of regional parks may be found here.

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342.1. Field Surveys

Data collection should include field surveys of the open space resources if relevant data are not readily available. In these cases, it is recommended that information be obtained from at least two site visits, at least one of which is at the peak hour of use and in good weather. Information regarding the appropriate timing of a field visit may be obtained through conversations with community groups and facility operators. For designated greenways, in particular, field visits assist in assessing the portion of the open space utilized as active versus passive open space. For example, a field visit to the greenway along Route 9A will likely determine that 100% of the greenway is active, while a field visit to the greenway in Manhattan's Riverside Park will result in a distribution of both active and passive activities. Peak hour varies for different users and open space facilities. Commercial areas tend to have a peak hour at lunch time - noon to 2:00 p.m. Residential neighborhoods often have peak hours on weekends and after school, but verification with park operators may be useful. For example, some schools use parks for recess, and certain facilities in parks may attract users at any time to create other peak hours. Greenways may see peak use for recreation on weekends and peak use for transportation purposes during work rush hours. For beach areas, consider seasonal issues when including such areas in an open space inventory.

342.2. Data Collection

In general, the following data are useful in assessing open space conditions in an area. For projects that may affect a specific type of user or specific type of open space, this assessment may be tailored for that group. A sample format for gathering and organizing this information is found in Table 7-2.

- ***NAME AND ADDRESS OF EACH OPEN SPACE FACILITY***.
- ***MAP KEY NUMBER***. This indicates the location and description each open space facility on the open space map described in Section 310.
- ***OWNER (PUBLIC/PRIVATE)***.
- ***ACREAGE.*** Acreage for lands underwater at beaches or waterfront parks should not be included, but may be considered when performing the assessment of the adequacy of open space described in Subsection 343.
- ***PERCENT OF AREA (AND ACREAGE) DEVOTED TO ACTIVE AND PASSIVE USES.*** Estimates based on the facility type and equipment should be provided. In general, the following assumptions of active and passive uses may be appropriate:
  - Esplanades are typically 50 percent active, 50 percent passive;
  - Beaches may be considered 20 to 40 percent active, and 60 to 80 percent passive;
  - Sitting areas are 100 percent passive;
  - Ball fields are 100 percent active;
  - Multipurpose play areas are generally 100 percent active, unless field surveys confirm limiting conditions;
  - Greenways are 100 percent active;
  - Greenways within park boundaries that utilize an existing esplanade are 70 percent active and 30 percent passive;
  - Golf courses, including pitch and putt courses, tend to serve a very limited portion of the population. The assessment should consider the fact that a golf course may contribute a substantial amount of open space acreage, but due to

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its limited function, it may not serve a comparable amount of the study area population's active open space needs.

- The lead agency may determine that other active versus passive percentages for the affected resources may be more appropriate based on information obtained from sites visits and consultation with DPR for city parks. Analyzing the use of open space into the categories of passive and active uses often requires judgment, and for any particular case, typical open space resources may be used differently.

- ***OPEN SPACE FEATURES, TYPES OF EQUIPMENT, FACILITIES, ETC.*** In many cases, the features of an open space area (or lack thereof) may be important in assessing how the open space is used currently, and how it may be used in the future With-Action condition. For example, a passive open space area with no seating may not be useful while provision of seating and other attractive features, such as planters, may make that area more useable by both the existing community and any future population. Facilities within public parks managed by DPR may be verified by searching a park by name or zip code here.

- ***THE QUALITY OF AN OPEN SPACE IS GENERALLY RATED AS ACCEPTABLE OR UNACCEPTABLE FOR OVERALL CONDITION AND CLEANLINESS.*** The quality of the open space's features and conditions is important in the assessment of the usability of the open space. This information may be useful when a lead agency is determining impacts or considering mitigation for open space impacts, if any. Inspection ratings for parks maintained and operated by DPR are accessible here, searching by park name, and then clicking on Inspections. Information on DPR's Inspection Program is found here.

- ***HOURS OF OPERATION AND ACCESS.*** Many public open spaces, such as school playgrounds or public plazas, are open and accessible only during specified hours. This information is obtained through site visits, where required signage describes the hours of operation; discussions with operators; conversations with building superintendents; or, in the case of public plazas, either the operators or DCP. Public parks operated by DPR are generally open from 6:00 a.m. until 1:00 a.m., unless park signage indicates otherwise. In addition, the PlaNYC Schoolyards to Playgrounds initiative expands the public use of schoolyards by adding additional schoolyards for joint use that are currently not part of the program. These playgrounds are jointly operated by the Department of Education (DOE) and DPR, and are available for public use during non-school hours weekdays and on weekends. A search for a jointly operated playground may be made by performing a "Find Your Park" search and looking up the playground name. A list of schoolyards added to the program through PlaNYC may be found here.

- ***USER GROUPS***. One assessment of the overall quality of an area's public open space facilities is based on how well those facilities fulfill the recreational needs of each age group. Recreational facilities typically used by different age groups are as follows:

  - *AGES 4 AND YOUNGER*. Typically, children 4 years old or younger use traditional playgrounds that have play equipment for toddlers and preschool children.

  - *AGES 5 TO 9*. Children ages 5 through 9 use traditional playgrounds with play equipment suitable for school-age children, as well as grassy and hard-surfaced open spaces, which are important for ball playing, running, skipping rope, *etc.*

  - *AGES 10 TO 14*. Children ages 10 through 14 use playground equipment, court spaces, and ball fields.

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- *AGES 15 TO 19.* Teenagers' and young adults' tend to use court facilities such as basketball and field sports such as football or soccer.
- *AGES 20 TO 64*. Adults continue to use court facilities and fields for sports, as well as more individualized recreation, such as rollerblading, biking, and jogging, which require bike paths, esplanades, and vehicle-free roadways. Adults also gather with families for picnicking, *adhoc* active sports such as frisbee, and recreational activities in which all ages may participate.
- *AGES 65 AND OVER*. Senior citizens engage in active recreation such as handball, tennis, gardening, and swimming, as well as recreational activities that require passive facilities.

The facility/age worksheet (Table 7-3) may be useful in determining which of the study area's open spaces are appropriate for a given age group. For projects that may affect a specific type of open space or introduce a specific user group, the assessment may be targeted to that group.

In some cases — particularly when an open space would be directly affected — it may be necessary to conduct a user survey to understand more fully the potential impacts on the users of the open space. User surveys may take the form of systematic interviews or observations of the users. These should be conducted when the open space is accessible during the day (and during the peak periods of usage), on weekdays and weekends, in good weather, and account for seasonal variations in use of open space. Documentation for surveys typically includes the date, time of day, and weather at the time the survey is taken.

Observation surveys may include the following questions:

- What age user groups are using the open space?
- How many are using the open space?
- What facilities are being used?
- What facilities are not being used?
- Is the space adaptable for both active and passive uses?

Interview surveys may include the following questions:

- How frequently do people use the open space during the course of a day, week, month, or season?
- How long do the users stay?
- What other facilities do the users currently use?
- Where are the users coming from and how do they get to the facility?
- What parts of the facility do people use?
- What attracts or detracts from the use of the open space?

- ***UTILIZATION LEVEL***. The level of use an open space receives—low, moderate, or heavy—is also noted, as follows:
  - *LOW UTILIZATION*: 25 percent capacity or less utilization at the peak hour, meaning that much of the space, facility, or equipment is available for use.

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- *MODERATE UTILIZATION*: 25 to 75 percent capacity utilization at peak hour, meaning that some passive spaces and/or active facilities are available for use.
- *HEAVY UTILIZATION:* 75 percent or greater capacity utilization at peak hours, meaning that few or none of the open space facilities are available for use.

This information is obtained by site visits and by conversations with operators of the open space and the community. Factors that may be important in determining the utilization include the following:

- Benches filled (General rule: 3 linear feet per person).
- Lines to use equipment or facilities.
- People leaving because it is crowded.
- People leaving before entering because it is too crowded.
- Multiple activities occurring and conflicting with each other.
- Inappropriate age groups using equipment and preempting appropriate age groups (*e.g.*, teenagers using playground equipment, skateboarding in passive areas).
- Litter overflowing (may indicate capacity as well as maintenance management).
- Competition for use of facilities (*i.e.* demand for field permits).
- Active field sports on undesignated areas.

- ***OTHER FACTORS AFFECTING UTILIZATION.*** Low utilization is not always an indicator of low demand. Some factors, either permanent or temporary, may create underutilization. These factors are often related to shadows, wind, air quality, noise, safety, and conflicting uses in a multi-use area, as described below. In some cases, a detailed utilization study may be appropriate.
  - *SHADOWS*. Shadows on sun-sensitive uses, such as botanical or landscape attractions, swimming pools, or benches, may affect use of an open space. This information may be noted during the field survey. If a shadow assessment is being performed for the proposed project (see Chapter 8, "Shadows"), the technical analyses and graphics presented in that chapter should be considered and referenced in the open space assessment.
  - *AIR QUALITY/ODORS.* These may also affect use of an open space. If the project is likely to have a significant air quality/odor impact on open space resources, the technical analyses presented in Chapter 17, "Air Quality," should be referenced and considered in the open space analysis.
  - *NOISE*. Excessive noise, including traffic noise, may prohibit specific types of use in an open space. If the project is likely to have a significant noise impact on open space resources, the technical analyses presented in Chapter 19, "Noise," should be referenced and considered in the open space analysis.
  - *SAFETY.* Poor safety conditions may also deter use. These may be because of design (*e.g.*, equipment with poor spacing or appropriate surface treatment) or conditions. Typically, important factors include access, crime, pedestrian safety, and other transportation issues such as a lack of (or poor condition of) park perimeter sidewalks or no crosswalks at high demand park entrances, *etc.*

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343. Assess the Adequacy of Open Space

Use the data gathered in the tasks above to provide an evaluation of the study area's existing open space conditions relative to the open space needs of the study area users. The assessment should include a quantitative and qualitative assessment, using the following guidance.

First, calculate the existing active open space, passive open space, and total open space ratios for the study area, using the population and open space acreage data identified in Subsections341.1 and 341.2 above. The open space ratio is expressed as the amount of open space acreage per 1,000 population.

This ratio may be tailored to age groups and types of facilities that would be affected by the proposed project. For example, one playground per 1,250 children is a goal delineated in PlaNYC. Therefore, a ratio of the number of playgrounds per 1,250 children may be an appropriate assessment for new residential developments in areas in which the age group analyses indicate a large percentage of children in comparison to the borough or city's population age distribution.

Typically, it is appropriate to provide the following information when calculating the open space ratio:

PROJECTS THAT WOULD RESULT IN AN INCREASE IN RESIDENTIAL POPULATION

Calculate the open space ratio for the residential population:

1. Number of acres of active open space per 1,000 residents;
2. Number of acres of passive open space per 1,000 residents; and
3. Number of acres of total open space per 1,000 residents.

If the project is in an area with a substantial nonresidential population, the open space ratio for the nonresidential population of the study area should also be calculated.

1. Number of acres of passive open space per 1,000 nonresidents.

PROJECTS THAT WOULD RESULT IN AN INCREASE IN NONRESIDENTIAL POPULATION (I.E., EMPLOYEES, VISITORS, STUDENTS, ETC.)

Calculate the open space ratio for the nonresidential population:

1. Number of acres of passive open space per 1,000 nonresidents.

If the project is in an area with a substantial residential population, the open space ratio for the residential population should also be calculated:

1. Number of acres of active open space per 1,000 residents;
2. Number of acres of passive open space per 1,000 residents; and
3. Number of acres of total open space per 1,000 residents.

PROJECTS THAT WOULD RESULT IN AN INCREASE IN BOTH RESIDENTIAL AND NONRESIDENTIAL POPULATION

Calculate the open space ratio for the residential and nonresidential populations of the study area:

1. Number of acres of active open space per 1,000 residents;
2. Number of acres of passive open space per 1,000 residents;
3. Number of acres of total open space per 1,000 residents; and
4. Number of acres of passive open space per 1,000 nonresidents.

To then assess the adequacy of existing open space within the study area, consider the following factors:

- Is the open space ratio for the population of the study area less than 2.5 acres per 1,000 residents, the City's planning goal? Is the project site located in an area deemed underserved by DPR?

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- Do effects of air quality or noise, shadows, extreme wind conditions, or issues of safety, such as the siting of facilities within parks with poor spacing or design features, or the lack of safe nonmotorized access to or within open space resources, cause a decrease in the usability of the open space supply?
- Is the proportion of active and passive open space appropriate for the population and age groups served? Note that for areas in which there is a substantial worker, student, or visitor population, there is typically a need for more passive space resources.
- Other data gathered in Subsection 342, including the following: user population by age; fees or other charges; types of facilities available to serve needs of different age groups; the variety of active and passive uses; conditions of facilities; utilization levels; and factors that may encourage or deter use, including accessibility of different types of open space (physical location and barriers to access), competing uses, fee or hour restrictions.
- Other factors, such as the availability of any major regional park, as detailed here, the predominant housing type, and the availability of private open space facilities to serve the existing population.

These questions should be evaluated in the context of the study area and the neighborhood.

The type of project proposed also affects the factors considered. The data gathered in the detailed analysis may be helpful in determining the adequacy of the open space and whether it is a "good fit" with the With-Action population. For instance, residential projects typically focus on the appropriateness of an area's open spaces for the different age groups in the study area; commercial projects typically describe the adequacy of available open space for office workers, who may use passive facilities within 0.25 mile for sitting, socializing, eating lunch, and strolling. Mixed-use projects should describe the adequacy of available open space for residential users as well as commercial workers.

For projects that would have direct effects on specific facilities, the assessment should focus on only those open spaces that are comparable to those that would be displaced.

344. Future No-Action Condition

The future No-Action analysis projects conditions in the study area for the build year without the proposed project, providing a baseline condition against which the impact of the project may be measured. The analysis includes data on projected population, as well as recreational facilities/open space facilities built or approved to be constructed by the build year. The analysis considers any changes to the following factors expected in the future without the project.

STUDY AREA POPULATION

Based on the development and population projected for the future build year, estimate the projected population in the study area by age group. Identify changes in daytime population for projects that would increase the nonresidential population.

IDENTIFY AND DESCRIBE STUDY AREA OPEN SPACES

Identify any changes to open space anticipated by the future build year. Include new open space and alterations/deletions to existing open space. Also include changes that have been adopted or officially approved by a public agency. This inventory may include projects under construction, public open spaces that have been approved as mitigation for other projects, or open spaces that are committed in DPR's capital budget. The same information gathered above in Subsection 342.2 is also appropriate for this inventory (with the exception of facility conditions, utilization levels, and, possibly, factors influencing utilization levels).

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ASSESS THE ADEQUACY OF OPEN SPACE

The purpose of this step is to determine the open space conditions in the future No-Action condition as it relates to the needs of the number and types of users predicted for the future No-Action condition. This assessment is performed in the same way as the assessment of existing adequacy, described above. This includes calculating the open space ratio for the future No-Action condition and qualitatively assessing whether or not the area is sufficiently served by open spaces, given the types of open space and the profile of the study area population.

345. Future With-Action Condition

The future With-Action assessment analyzes conditions in the study area for the build year with the proposed project. Both the quantitative and qualitative factors are considered in the assessment to the extent to which the project may affect the existing open space resources and their capacity to serve the study area population.

This assessment typically begins with a brief description of the project, and how it might affect open space—by displacing or encroaching on open space, introducing a population that would place demands on open space, *etc.* Then, the analysis is performed using the same methodology as for existing conditions and for future No-Action conditions, described above. This includes the following.

IDENTIFY CHANGES TO STUDY AREA POPULATION

This projection is based on population projections for the proposed project together with future No-Action conditions determined above. For the project population, provide a breakdown by age, and a description of the estimated daytime population (workers, students, tourists), as appropriate.

IDENTIFY AND DESCRIBE CHANGES TO STUDY AREA OPEN SPACES

Describe the open space changes from the No-Action condition, both on site and off site, which would occur as a result of the proposed project. Describe the open space that would be eliminated, altered, created and/or improved as a result of the project.

ASSESS THE ADEQUACY OF OPEN SPACE

Calculate the ratio of acres of open space per 1,000 population. Indicate the additional users as a result of the proposed project and assess the adequacy of open space resources to accommodate these users. Note whether the project would provide on-site open space resources in sufficient quantity and quality to serve the needs of its users adequately (offsetting any effect of the anticipated increase in population). This may be private as well as public open space. For example, the zoning requirements for Quality Housing mandate indoor recreational space as well as exterior open space. This space would typically satisfy some of the demand created by such a project.

If the project is likely to have potential significant shadow, air quality/odor, or noise effects on open space resources, discuss those effects as well. Refer to the appropriate technical analyses.

400. DETERMINING IMPACT SIGNIFICANCE

In this step, the significance of a project's effects on an area's open spaces is determined using both qualitative and quantitative factors, as compared to the No-Action condition. As discussed below, the determination of significance is based upon the context of a project, including its location, the quality and quantity of the open space in the future With-Action, the types of open space provided, and any new open space provided by the project.

410. QUANTITATIVE IMPACT

The proposed project may result in a significant adverse open space impact under the following circumstances:

- There would be a direct displacement/alteration of existing open space within the study area that has a significant adverse effect on existing users, unless the proposed project would provide a comparable re-

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placement (size, usability, and quality) within the study area (*i.e.,* there is a net loss of publicly accessible open space).

- The project would reduce the open space ratio by more than 5 percent in areas that are currently below the City's median community district open space ratio of 1.5 acres per 1,000 residents. In areas that are extremely lacking in open space, a reduction as small as 1 percent may be considered significant, depending on the area of the City. These reductions may result in overburdening existing facilities or further exacerbating a deficiency in open space.

As noted above in Section 321, the ratios are often not feasible for many areas of the City, and the City does not consider these ratios as its open space policy for every neighborhood. Consequently, the ratios do not constitute an absolute impact threshold. Rather, these are benchmarks that represent how well an area is served by its open space. Local open space ratios vary widely, and the median ratio at the citywide community district level is 1.5 acres of open space per 1,000 residents.

When assessing the effects of a change in the open space ratio, consider the balance of passive and active open space resources appropriate to support the affected population. A larger percent of active space is usually preferred, because the physical space requirements for active open space uses are significantly greater. That is, a greater number of passive open space users, such as those sitting on a park bench to enjoy fresh air, may be accommodated within a smaller space. Active open space users have greater physical space needs for the movement and activity required for active recreation, such as children's play equipment, organized or spontaneous sports such as frisbee or ball playing, hopscotch, or other outdoor exercise.

As noted earlier, for large-scale projects (and for planning purposes), the City seeks to attain a planning goal of a balance of 80 percent active open space and 20 percent passive open space. Although a typical population mix may call for such a goal, it may not be attainable for some areas of the city or for certain areas with populations skewed toward certain age groups. Analyzing the breakdown of open space into the categories of passive and active uses often requires judgment, and for any particular case, typical open space resources may be used very differently.

For the project study area, the lead agency should review existing open space conditions, including the type of recreation facilities (passive vs. active), the City's median community district open space ratio of 1.5 acres per 1,000 residents, and the City's optimal benchmark of 2.5 acres of open space per 1000 residents to aid in the determination of a significant quantitative impact on existing open space. Projects that may result in significant quantitative impacts on open space resources, or projects that would exacerbate an existing underserved area in relation to open space, are typically further assessed in the qualitative assessment approach (described below) to determine overall significance of the impact.

420. QUALITATIVE IMPACT

The adequacy of the open space in the study area should be considered in order to determine whether these change in open space conditions and/or utilization results in a significant adverse effect to open space. To make this determination, the type of open space (active or passive), its capacity and conditions, the distribution of open space, whether the area is considered "well-served" or "underserved" by open space, the distance to regional parks, the connectivity of open space, and any additional open space provided by the project, including rooftop gardens, greenhouses, new active or passive open space, should be considered in relation to the quantitative changes identified above. These considerations may vary in importance depending on the project and the area in which it is located. For instance, provisions of new active open space may carry more weight in an area where a large residential population would be added as a result of the project.

The following are useful in determining whether there is a significant impact to open space conditions:

- If a proposed project results in a significant physical effect on existing open space by increasing shadow, noise, air pollutant emissions, or odors compared to the future No-Action condition, then there may be a significant impact requiring mitigation.

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For example, a significant impact may occur if a project causes a significant incremental shadow on a park facility, such as a spray shower at a playground or a lawn area used for sunbathing, because the facilities may not be able to be used as intended.

- If a proposed project does not affect quantitative open space needs, but causes a qualitative impact compared to the No-Action condition, then there may be a significant impact on open space requiring mitigation. This may occur in those instances when the overall open space ratio is adequate, but a specific user group (such as young children or bocce players) would be adversely affected by being underserved or there would be conflicts in the utilization of open space as a result of the proposed project.

  For example, open space planned for a large-scale development may include more passive open space (such as a plaza) than active, which may not provide an appropriate mix of active and passive recreational facilities typically required by the residential population.

500. DEVELOPING MITIGATION

If the proposed project results in a significant adverse open space impact, on-site or off-site measures to mitigate the impact to the greatest extent practicable are identified. Some ways in which open space impacts may be mitigated are as follows:

- Create, on-site, new public open space of the type needed to serve the proposed population and to offset the proposed project's impact on existing open space in the study area.
- Create new public open space elsewhere in the study area of a type needed to serve the needs of the added population.
- Improve existing open spaces in the study area to increase their utility, safety, and capacity to meet identified needs in the study area. The creation or enhancement of active open space facilities may be achieved by adding field lighting to allow for extended hours of play, the rehabilitation of an existing field with synthetic turf treatment to allow for expanded use, or adding playground equipment to an underutilized passive area within a park. DPR should be consulted for consideration of any of these possibilities or for any additional means to improve the active components of an existing park.
- The provision of maintenance equipment, such as a power washer or off-road vehicle, to enable increased park usage within an existing park or recreation center.
- Mitigation for the alienation or conversion of public parkland typically involves the acquisition of replacement parkland of equal or greater size and value servicing the same community of users.
- Capital improvements to a poorly maintained open space may increase its usefulness and mitigate a significant impact.
- Implement missing segments of the City's greenway network to enable safe, non-motorized access to existing open space resources within the study area or a nearby major recreational facility.

600. DEVELOPING ALTERNATIVES

Alternatives to the proposed project that would avoid significant impacts on open space resources may include a smaller project (creating less demand for open space) or an alternate site (transferring the open space demand to an area with sufficient supply to accommodate the added demand). If a project may involve the alienation or conversion of parkland, the possible use of alternative sites should be given consideration as early as possible in the planning process.

Alternatives to the proposed project are analyzed using the methodology described under the future With-Action condition and impacts are compared to those of the proposed project.

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700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

SEQR (6 NYCRR 617.11(a)(8)) and the 1977 Mayoral Executive Order 91, as amended, both state that a significant impact would occur if a project resulted in "a substantial change in the use, or intensity of use, of land including agricultural, open space or recreational resources, or in its capacity to support existing uses."

Trees under the jurisdiction of DPR. Title 18 of the Administrative Code of the City of New York, and Chapter 5 of Title 56 of the Rules of the City of New York detail the requirements and rules for applying for permission to remove trees under the jurisdiction of DPR and for determining tree replacement values.

720. PROJECTS WITH U.S. DEPARTMENT OF TRANSPORTATION FUNDING

The U.S. Department of Transportation Act of 1966 Section 4(f) requires the Federal Highway Administration (FHWA) to assess the environmental effects of a project through the NEPA process. The FHWA is directed not to approve any program or project that requires the use of any publicly owned public park, recreation area, or wildlife or waterfowl refuge, or any land from an historic site of national, state, or local significance, unless there is no feasible and prudent alternative to the use and all possible planning to minimize harm resulting from such use is included. The environmental regulations for applying 4(f) to transportation project development are found at 23 CFR 771.135.

730. ALIENATION AND CONVERSION OF PARKLAND

Government-owned parkland and open space (that has been dedicated as such) is invested with a "public trust" that protects it from being converted to non-parkland uses without State legislative authorization. Thus, when a project eliminates dedicated City-owned parkland or open space, or involves certain changes in use of dedicated City-owned parkland or open space, the City must have the authorization of the New York State Legislature and Governor to alienate the parkland or open space. For example, if land from a City-owned park was to be converted into a school or supermarket, this project would have to be authorized by the State Legislature and Governor. This authorization takes the form of a parkland alienation bill. In general, before it will pass such a bill, the State Legislature requires the City Council to pass what is known as a "home rule resolution," requesting state authorization of the change of use. Moreover, if state funding in the form of a grant has been invested in the park or open space, then the grant program may impose additional requirements that govern the alienation process.

When a project involves the termination of use for outdoor recreation of City-owned parkland that has received federal funds for acquisition or improvement under either the Land and Water Conservation Fund or the Urban Park Recreation and Recovery Program, the project may also involve "conversion," and requires the approval of the National Park Service of the U.S. Department of the Interior. The conversion process is governed by rules and regulations of the National Park Service and requires the substitution of lands of at least equal fair market value that offer reasonably equivalent recreation opportunities as the parkland to be converted. The conversion process is in addition to the parkland alienation authorization required by state law.

The project sponsor should contact the DPR Parklands Office as soon as possible to determine whether state or federal funds have been used in the development or acquisition of a public park. The project sponsor should also review the *Guide to the Alienation or Conversion of Municipal Parklands* from the NYS Office of Parks, Recreation and Historic Preservation (OPRHP). Contact information for DPR and the regional office of OPRHP is included in Section 750 of this Chapter, "Location of Information."

Additionally, if there is a possibility that a project involves alienation or conversion of parkland, it is advisable to consult with legal counsel to decide how to proceed. In most cases, the requirement to obtain legislative authorization for the alienation of parkland is found in case law, not statutes, with the exception of statutory requirements relating to specific state grants programs. New York courts consistently have held that land that is dedicat-

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ed for park purposes cannot be conveyed or used for another purpose without an authorizing act of the State legislature.

Specific statutory provisions relating to the alienation of parklands that have received state grant funding or the conversion of parklands that have received federal funding are set forth in:

- Article 15 of the New York Parks, Recreation and Historic Preservation Law, the Park and Recreation Land Acquisition Bond Acts of 1960 and 1962.
- Article 17 of the New York Parks, Recreation and Historic Preservation Law, the Outdoor Recreation Development Bond Act of 1965.
- Title 9 of Article 52 of the New York Environmental Conservation Law, the Environmental Quality Bond Act of 1986.
- Section 6(f) of the Federal Land and Water Conservation Fund Act of 1965, P.L. 88-578.
- Environmental Conservation Law Section 56 – 0309 (12) of the Clean Water/Clean Air Bond Act of 1996 prohibits the sale, lease, exchange, donation, or other disposal of land acquired, developed, improved, restored or rehabilitated for parks projects or use for other than public park projects without express authority of the State legislature. Legislative approval of parkland alienation includes specific requirements, such as substitution of property.
- Sections 432.4 and 432.5 of Title 9 of the New York Codes, Rules and Regulations ("NYCRR") set forth the procedures and requirements for alienation of Bond Act project parklands.

740. APPLICABLE COORDINATION

Coordination with other agencies and open space experts may be appropriate for gathering information needed for the CEQR review. In particular, coordination with DPR is appropriate for proposed projects that occur on parkland or other public open space under its jurisdiction, or require mitigation for significant open space impacts that occur on parkland or other open space under its jurisdiction.

750. LOCATION OF INFORMATION

For gathering open space information, many sources are available to lead agencies and CEQR applicants, including maps, property data, guidelines, reports, documents, files, and base maps of various parks and public open spaces.

The following is a list of agencies that have relevant information with respect to open space resources and policies.

- New York City Department of Parks and Recreation

  The Arsenal
  830 Fifth Avenue
  New York, NY 10065

  Natural Resources Group: 212-360-1417
  Operations & Management Planning: 212-360-8234
  Parklands: 212-360-3411
  Planning: 212-360-3403

- Operation Green Thumb

  49 Chambers Street, Room 1020
  New York, NY 10007
  212-788-8068

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- Department of Parks and Recreation, Operations and Management Planning, *Parks Inspection Manual*, City of New York, as amended.
- Department of Parks and Recreation, Parkland Sectional Maps, City of New York, reference material only. Provides delineated parkland on maps.
- Department of Parks and Recreation, Property Lists, City of New York, reference material only. Provides name of park, acreage, facilities within park and Jointly Operated Playground sites, *etc.*
- Department of Parks and Recreation, "Property Folders," City of New York, reference material only. Provides real estate, historical, and natural history information.
- New York State Office of Parks, Recreation and Historic Preservation

  New York City Office
  Adam Clayton Powell, Jr. State Office Building
  163 W. 125th Street
  New York, NY 10027
  212-886-2740

- National Park Service of the U.S. Department of the Interior

  Manhattan Site:
  26 Wall Street
  New York, NY 10005
  212-825-6990

  Gateway National Recreation Area:
  Headquarters, Building 69
  Floyd Bennett Field
  Brooklyn, NY 11234
  718-338-3687

- New York City Department of City Planning

  22 Reade Street
  New York, NY 10007
  212-720-3300

  Demographics Division: 2000 Census and demographic data. Population and age data available by census tract.
  Waterfront and Open Space Division: Information on parks and open space programs and policies.

  Book and Map Sales Office
  Hours: 10 AM – 1 PM & 2 – 4 PM, Monday-Friday
  212-720-3667
  http://www.nyc.gov/html/dcp/html/priv/priv.shtml

INFORMATION AVAILABLE ON STATE PARKS IN NEW YORK CITY

- Office of Parks, Recreation and Historic Preservation, Guide to the Alienation or Conversion of Municipal Park-lands, State of New York, Revised 1990.

INFORMATION ON PUBLIC PLAZAS

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- Department of City Planning, Bytes of the Big Apple: Tax Block Base Maps in DXF Format, City of New York, March 1991.
- Department of City Planning, Bytes of the Big Apple: Tax Block Base Maps in Illustrator Format, City of New York, June 1992.
- Department of City Planning, Bytes of the Big Apple: LION Single Line Street Base Map in MapInfo format, on diskette, City of New York, March 1992.
- Department of City Planning, Recreation and Open Space in New York City: Community Districts with Lowest Parkland/Population Ratios, City of New York, January 1992.

INFORMATION ON DESIGNATED GREENWAYS, EXISTING AND PROPOSED

- Abeles Schwartz Associates, Inc., *Open Space and the Future of New York: How to Analyze Community Open Space and Recreational Needs*, The New York City Open Space Task Force, Department of City Planning, City of New York, 1988.
- Department of City Planning, A Greenway Plan for New York City, City of New York, Fall 1993. http://www.nyc.gov/html/dcp/html/bike/gp.shtml
- Department of City Planning and Department of Transportation, New York City Bicycle Master Plan, May 1997.

MAPS SHOWING RECOMMENDED BIKE ROUTES THROUGHOUT THE FIVE BOROUGHS

- Department of City Planning and Department of Transportation, NYC Cycling Map, 2010.

INFORMATION ON THE PROVISION OF OPEN SPACE IN ECONOMIC DEVELOPMENT PROJECTS

- Department of City Planning & Municipal Art Society: 2000 Study of Public Plazas.

  New York City Department of City Planning
  Manhattan Office
  22 Reade Street, 6th Floor
  New York, NY 10007
  212-720-3542

- New York City Economic Development Corporation

  110 William Street
  New York, NY 10038
  212-619-5000

INFORMATION ON OPEN SPACES IN HOUSING PROJECTS AND ON INTERIM SITE IMPROVEMENTS

- New York City Department of Housing Preservation and Development

  Division of Property Management
  100 Gold Street
  New York, NY 10038
  212-863-7087

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FOR PUBLIC SCHOOL PLAYGROUNDS AND OPEN SPACE OR RECREATIONAL FACILITIES, REQUESTS MAY BE MADE FOR SQUARE FOOTAGE OF SPECIFIC SITES. FOR JOINTLY OPERATED PLAYGROUNDS (JOPS), WHICH ARE OPERATED BY BOTH THE BOARD OF EDUCATION AND DPR, CONTACT THE RELEVANT COMMUNITY SCHOOL DISTRICT OFFICE FOR INFORMATION ON FACILITIES, ACCESSIBILITY, HOURS OF OPERATION, ETC.

- New York City Board of Education

  Division of School Facilities
  44-36 Vernon Boulevard,
  Long Island City, NY 11101
  718-349-5799

INFORMATION ON THE PROVISION OF OPEN SPACE IN HOUSING AUTHORITY PROJECTS

- New York City Housing Authority

  5 Park Place
  New York, NY 10007
  212-306-3000

INFORMATION ON THE SHORT- AND LONG-TERM LEASES OF CITY-OWNED LAND FOR OPEN SPACE USES

- Department of Citywide Administrative Services

  Division of Real Estate Services
  20th Floor, Municipal Building
  New York, NY 10007
  212-669-8888

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SHADOWS

CHAPTER 8

Within urban environments, the structures constituting the city's built fabric constantly cast shadows in their immediate vicinity. As the city develops and redevelops, the extent and duration of the shadows cast are altered. As this process continues, direct sunlight exposure becomes an increasingly scarce resource for people and nature. This chapter focuses on the interaction between proposed new and altered structures and the shadows they may cast on open space, historic and cultural resources and natural areas.

Sunlight and shadows affect people and their use of open space all day long and throughout the year, although the effects vary by season. Sunlight can entice outdoor activities, support vegetation, and enhance architectural features, such as stained glass windows and carved detail on historic structures. Conversely, shadows can affect the growth cycle and sustainability of natural features and the architectural significance of built features.

The purpose of this chapter is to assess whether new structures may cast shadows on sunlight sensitive publicly-accessible resources or other resources of concern such as natural resources, and to assess the significance of their impact. Potential mitigation strategies and alternatives are also presented and should be examined when significant adverse shadow impacts are identified. Because of the sunlight-sensitive nature of many open spaces, historic, cultural, and natural resources, this chapter is closely linked to the data and analyses from Chapter 7, "Open Space," Chapter 9, "Historic and Cultural Resources," and Chapter 11, "Natural Resources."

The majority of projects subject to CEQR do not require a detailed shadow analysis. Section 200 describes the first tier of analysis to screen most projects for the purpose of assessing shadow impacts. As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency during the entire environmental review process. As appropriate, the lead agency may determine it is appropriate to consult or coordinate with the city's expert technical agencies for a particular project. Here, the New York City Department of City Planning (DCP) should be consulted for information, technical review, and recommendations relating to shadows. With regard to mitigation, the New York City Landmarks Preservation Commission (LPC), the New York City Department of Environmental Protection (DEP), and the New York City Department of Parks and Recreation (DPR) may also be of assistance. As needed by the consultation, it is recommended that these expert agencies be contacted as early as possible in the environmental review process. Section 700 further outlines appropriate coordination with these expert agencies.

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100. DEFINITIONS

SHADOW. A shadow is the condition that results when a building or other built structure blocks the sunlight that would otherwise directly reach a certain area, space or feature.

INCREMENTAL SHADOW. An incremental shadow is the additional, or new, shadow that a building or other built structure resulting from a proposed project would cast on a sunlight-sensitive resource during the year.

SUNLIGHT-SENSITIVE RESOURCES OF CONCERN. The sunlight-sensitive resources of concern are those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. The following are considered to be sunlight-sensitive resources:

PUBLIC OPEN SPACE. All public open space as identified in Chapter 7, "Open Space" (*e.g.* parks, beaches, playgrounds, plazas, schoolyards, greenways, landscaped medians with seating).

ARCHITECTURAL RESOURCES. Architectural resources are those features of architectural resources identified in Chapter 9, "Historic and Cultural Resources," that depend on direct sunlight for their enjoy-

ment by the public. Only the features that are sunlight-sensitive (described below) should be considered, as opposed to the entire architectural resource:

- Buildings containing design elements that are part of a recognized architectural style that depends on the contrast between light and dark design elements (*e.g.* deep recesses or voids such as open galleries, arcades, recessed balconies, deep window reveals, and prominent rustication).
- Buildings distinguished by elaborate, highly carved ornamentation.
- Buildings with stained glass windows.
- Exterior materials and color that depend on direct sunlight for visual character (*e.g.* the polychromy (multicolored) features found on Victorian Gothic Revival or Art Deco facades).
- Historic landscapes, such as scenic landmarks including vegetation recognized as an historic feature of the landscape (*e.g.* weeping beeches or pansy beds).
- Features in structures where the effect of direct sunlight is described as playing a significant role in the structure's significance as an historic landmark. Examples include the William Lescaze House and Office, 211 E. 48 St. in Manhattan, significant as the first modern (1933) rowhouse in New York, noted for its early use of glass block, glass bricks, and ribbon windows (LPC and S/NR listed), and LPC designated housing projects such as the Williamsburg Houses in Brooklyn and the Cherokee Apartments in Manhattan, both of which were planned to maximize light by use of site planning and architectural features, such as open stair towers and balconies.

NATURAL RESOURCES. Natural resources identified in Chapter 11, "Natural Resources," where the introduction of shadows may alter the resource's condition or microclimate:

- Surface water bodies.
- Wetland resources.
- Upland resources.
- Significant, sensitive or designated resources; such as coastal fish and wildlife habitats.

OTHER RESOURCES.

- Greenstreets (planted areas within the unused portions of roadbeds that are part of the Greenstreets program).

NON SUNLIGHT-SENSITIVE RESOURCES. For the purposes of CEQR the following are not considered to be sunlight-sensitive resources and their assessment for shadow impacts is not required:

- City streets and sidewalks (except when improved as part of a greenstreet).
- Buildings or structures other than those defined above.
- Private open space as defined in Chapter 7, "Open Space" (*e.g.* not publicly accessible private open space, front and back yards, stoops, vacant lots).
- Project-generated open space. Shadows on project-generated open space are not considered significant under CEQR. However, when the condition of the project-generated open space is included as part of the qualitative open space analysis in Chapter 7, "Open Space," a discussion of how shadows would affect the new space may be warranted.

SHADOW IMPACT. In general, a significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct

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sunlight exposure, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the results of the shadow assessment (Section 300) and the guidance provided in Section 400, "Assessment of Shadow Impacts."

200. DETERMINING WHETHER A SHADOW ASSESSMENT IS REQUIRED

The shadow assessment considers projects that result in new shadows long enough to reach a sunlight-sensitive resource. Therefore, a shadow assessment is required only if the project would either result in (a) new structures (or additions to existing structures including the addition of rooftop mechanical equipment) of 50 feet or more or (b) be located adjacent to, or across the street from, a sunlight-sensitive resource. However, where a project's height increase is ten feet or less and it is located adjacent to, or across the street from, a sunlight-sensitive open space resource, which is not a designated New York City Landmark or listed on the State/National Registers of Historic Places or eligible for these programs, the lead agency may determine, in consultation with DPR, whether a shadow assessment is required in that case.

300. SHADOW ASSESSMENT

The shadow assessment begins with a preliminary screening assessment (Section 310) to ascertain whether a project's shadow may reach any sunlight-sensitive resources at any time of the year. If the screening assessment does not eliminate this possibility, a detailed shadow analysis (Section 320) is required in order to determine the extent and duration of the incremental shadow resulting from the project. The detailed shadow analysis provides the necessary information for the assessment of shadow impacts, which describes the effect of shadows on the sunlight-sensitive resources and their degree of significance. The results of the screening assessment and the detailed shadows analysis should be documented.

The effects of shadows on a sunlight-sensitive resource are site-specific; therefore, the screening assessment and subsequent shadow assessment (if required) are performed for each of the sites where a new structure could be built as a result of a project (*e.g.* for projected and potential development sites). The following discussion outlines the approach and framework of the shadow assessment. A hypothetical example is illustrated throughout this chapter to describe the analysis.

310. PRELIMINARY SCREENING ASSESSMENT

311. Base map

The first step in conducting the screening assessment is to develop a base map that illustrates the proposed site location in relationship to the sunlight-sensitive resources. The base map includes the location of the proposed project, the street layout, and the locations of the sunlight-sensitive resources defined previously in Section 110. The base map should be drawn at a scale appropriate for the proposed project's size and the number and location of sunlight-sensitive resources. The map should be oriented with true north at the top of the map and display a true north arrow and a graphic scale bar.

The base map should also contain topographic information, either from a site survey or from a readily available source like the USGS topographic maps. Topography is critical to determining possible shadow impacts because the height of a structure is affected by the site elevation. To illustrate, a 100 foot structure at ±0 elevation is lower in height than an identical structure on a site with an elevation of +30 feet and, therefore, its shadow effect would be less in most cases.

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FIGURE 8-1 - BASE MAP



Figure 8-1 shows the base map for the example with the location of a hypothetical building site and a number of sunlight-sensitive resources (labeled 1 through 6) in proximity to the site.

312. Tier 1 Screening Assessment

After the base map is developed, the longest shadow study area is determined. The longest shadow study area encompasses the site of the proposed project and a perimeter around the site's boundary with a radius equal to the longest shadow that could be cast by the proposed structure (see Section 314.8), which is 4.3 times the height of the structure and occurs on December 21, the winter solstice. To find the longest shadow length, multiply the maximum height of the structure (including any rooftop mechanical equipment) resulting from the proposed project by the factor of 4.3. That is, if the project would result in a building 100 feet high, its longest possible shadow would be approximately 430 feet.

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FIGURE 8-2 - LONGEST SHADOW STUDY AREA FOR SINGLE SITE PROJECTS



The example in Figure 8-2 illustrates a hypothetical proposed project that would result in a building with a total height of 303 feet including mechanical space. The longest shadow study area for this site would be a perimeter around the site with a radius of 1,303 feet (4.3 x 303).

The results of the Tier 1 screening assessment for the example confirm that two of the six sunlight-sensitive resources in proximity to the proposed project site lie outside the longest shadow study area, and therefore, shadow from the proposed building could not reach them. No further analysis would be required for the sunlight-sensitive resources labeled 5 and 6.

The remaining four sunlight-sensitive resources lay within the longest shadow study area, and therefore, the next tier of screening assessment should be conducted.

For projects involving more than one site, the longest shadow study area is the combination of each individual site's study areas. This is illustrated in Figure 8-3.

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FIGURE 8-3 - LONGEST SHADOW STUDY AREA FOR MULTIPLE SITE PROJECTS



Figure 8-3 illustrates a hypothetical proposed project involving three building sites, each site with a building that could rise up to 195 feet in total height. The longest shadow study area for each site would be a perimeter around the site with a radius of approximately 839 feet (4.3 x 195). The combined perimeters would form the longest shadow study area.

As shown in Figures 8-2 and 8-3, locate the site of the proposed project and plot its longest shadow study area. If any portion of a sunlight-sensitive resource lies within the longest shadow study area, a Tier 2 screening assessment should be performed. If none of the sunlight-sensitive resources lay within the longest shadow study area, no further assessment of shadows is necessary. Document the screening assessment with the illustrated base map.

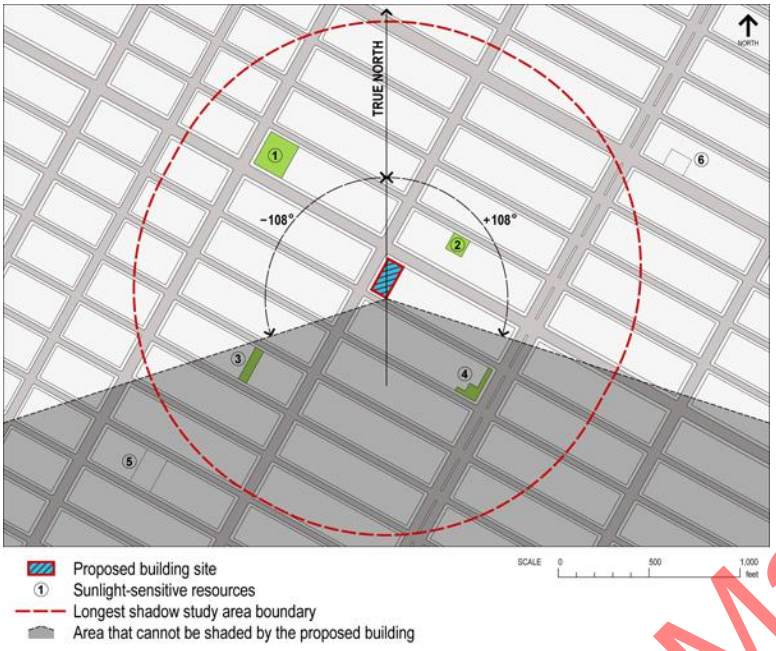
313. Tier 2 Screening Assessment

If any portion of a sunlight-sensitive resource lies within the longest shadow study area, the following screening assessment should be performed.

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given project site. In New York City, this area lies between -108 and +108 degrees from true north. Therefore, on the base map, locate the triangular area that cannot be shaded by the proposed project site starting from the southernmost portion of the site, covering the area between -108° degrees from true north and +108 degrees from true north as illustrated in Figure 8-4. The complementing portion to the north within the longest shadow study area is the area that can be shaded by the proposed project.

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FIGURE 8-4 - AREA THAT CANNOT BE SHADED BY THE PROPOSED PROJECT



The results of the Tier 2 screening assessment for the example confirm in Figure 8-4 that the sunlight-sensitive resources labeled 3 and 4 lie within the area that cannot be shaded by the proposed building, and therefore, no further analysis would be required for these two resources. The sunlight-sensitive resources labeled 1 and 2 lie within the area that could be shaded by the proposed building, and therefore, the next tier of screening assessment should be conducted.

It should be noted that if a sunlight-sensitive feature on an architectural resource is located on a facade that faces directly away from the proposed project site (*i.e.* when an architectural resource is west of the proposed project site and the sun-sensitive feature is on the west facade of that structure), no further shadows assessment is needed for that particular resource because no shadows from the proposed project could fall on that sunlight-sensitive face. For all other cases, continue the screening assessment.

If none of the sunlight-sensitive resources lay within the area that can be shaded by the proposed project, no further assessment of shadows is necessary. Provide the base map illustrating the screening assessment.

314. Tier 3 Screening Assessment

Based on the results of the Tier 2 screening assessment, a Tier 3 screening assessment should be performed if any portion of a sunlight-sensitive resource is within the area that could be shaded by the proposed project.

The Tier 3 screening assessment is used to determine if shadows resulting from the proposed project can reach a sunlight-sensitive resource. Because the sun rises in the east and travels across the southern part of the sky to set in the west, a project's earliest shadows would be cast almost directly westward. Throughout the day, they would shift clockwise (moving northwest, then north, then northeast) until sunset, when they would fall east. Therefore, a project's earliest shadow on a sunlight-sensitive resource would occur in a similar pattern, depending on the location of the resource in relation to the project site.

The screening assessment described here introduces the use of three-dimensional computer modeling software with the capacity to accurately calculate shadow patterns. This software is widely available and commonly used by architects. As of March 2010, some software platforms commonly used for these purposes include Google's Sketchup; Autodesk's AutoCAD and 3ds Max; AutoDesSys' FormZ and Bonzai3d; Bentley's Microstation; and others (with some platforms offering freeware versions). It should be noted that software is

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constantly upgraded, renamed, or new platforms are introduced. Therefore, consultation with the Environmental Assessment and Review Division of the Department of City Planning regarding current software is recommended. If access to this software is not available, the screening can be carried out manually through a graphic analysis without the need of a computer. The manual procedure is explained in the Appendix.

314.1. Use of three-dimensional computer modeling

The model should include (1) three-dimensional representations of the elements of the base map described above; (2) a "reasonable worst case" three-dimensional representation of the proposed project as described below; and (3) the three-dimensional representation of the topographic information within the area being analyzed. At this stage of the assessment, the surrounding buildings should not be included in the model so that it may be determined whether shadows from the proposed project would reach a sunlight-sensitive resource. The surrounding built context is included in the next tier of analysis.

In order for the computer software to accurately represent sunlight shadows, the three-dimensional model should be set up as follows:

- All the three-dimensional objects must be at the same scale.
- Ensure the direction of true north is correctly setup.
- The geographic location data for New York City is entered as:

  New York City, City Hall.
  Latitude: 40°42'23" north (40.706389°)
  Longitude: 74°0'29" west (74.008056°)

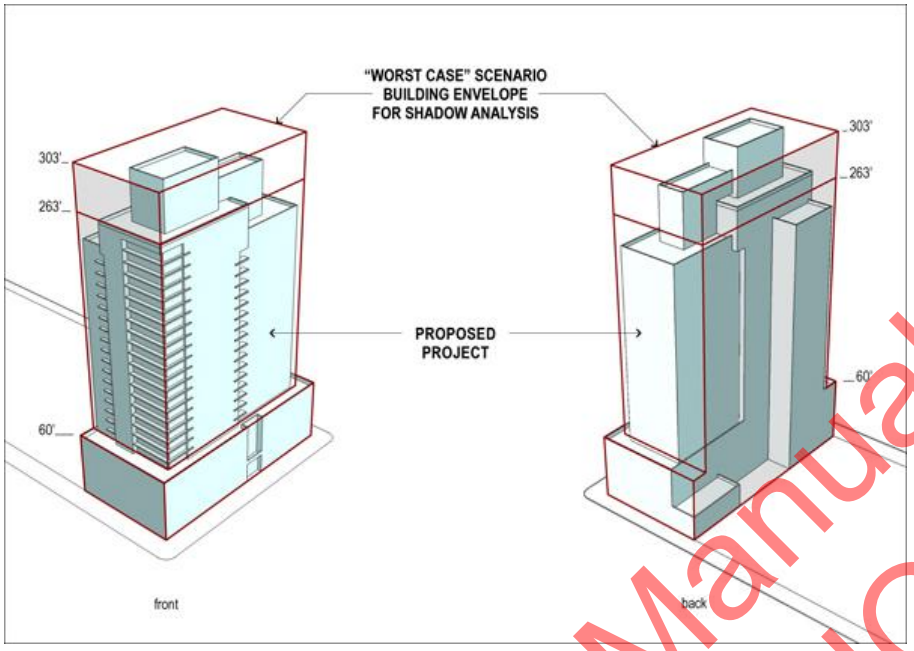
- The selected time zone is Eastern Standard Time. Daylight savings time should not be used.

314.2. Determining the "worst case" scenario for shadows

The three-dimensional model of the proposed project must depict a "worst case" scenario for shadows from the building resulting from the proposed project. Since the allowable building envelope generally allows for multiple configurations of a building with the same floor area, a "worst case" scenario is constructed for a shadows assessment that combines the worst possible features, in terms of casting shadows, of all possible configurations. This eliminates the need for multiple analyses and would allow for the eventual selection among these possible configurations. This is illustrated in Figure 8-5. If the proposed project includes special permits or similar actions that relate to the building envelope, the "worst case" should include such allowances or restrictions on the building form. The building envelope depicting the worst case scenario must include the maximum allowed floor area, all rooftop mechanical equipment, parapets and any other parts of the building. If the proposal contemplates a tower above a base, for example, then the position of the tower on the site would be critical for locating the shadow and the worst case should be illustrated. Generally, where the building is close, or adjacent, to an open space or architectural resource, a bulkier building would produce the worst case shadows. Where the building is farther from the open space or resource a taller tower would constitute the worst case. In the case of an expansion to an existing structure, only the effect of the proposed additional space is considered.

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FIGURE 8-5 - EXAMPLE OF "WORST CASE" SCENARIO BUILDING ENVELOPE



The example in Figure 8-5 illustrates a hypothetical proposed project of a tower 263 feet in height on a 60 foot high building base with a 40 foot tall mechanical bulkhead on top of the tower and setbacks from the street. The building would have a total height of 303 feet including mechanical space. The "worst case" scenario building envelope includes all portions of the site that could be occupied by the building, configured in all possible ways.

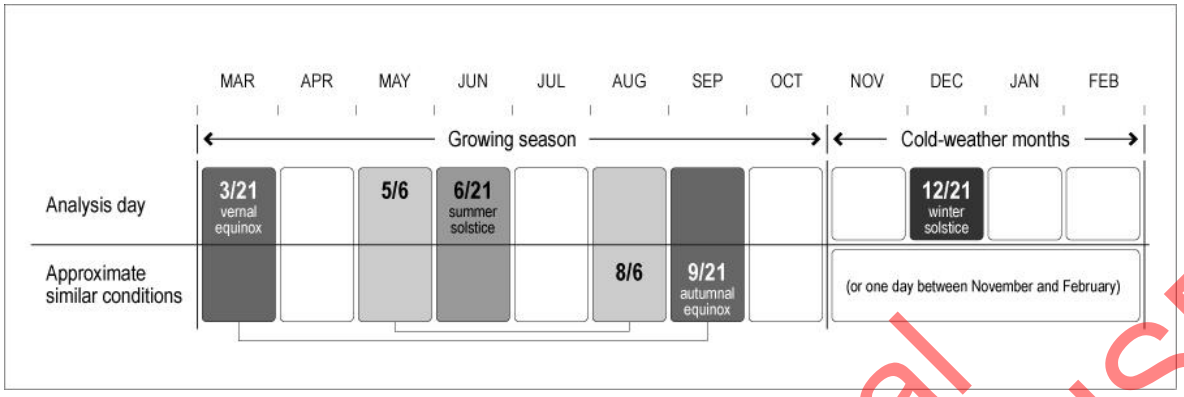
314.3. Months of interest and representative days for analysis

The assessment determines whether shadows from the proposed project would fall on a sunlight-sensitive resource at any time throughout the year. Because the direction and length of shadows vary throughout the course of the day and the time of the year, the assessment of shadows is focused on representative times of the year relevant to the use and function of the identified sunlight-sensitive resources.

For the New York City area, the months of interest for an open space resource encompass the growing season (March through October) and one month between November and February (usually December) representing a cold-weather month. Representative days for the growing season are generally the March 21 vernal equinox (or the September 21 autumnal equinox, which is approximately the same), the June 21 summer solstice, and a spring or summer day halfway between the summer solstice and equinoxes such as May 6 or August 6 (which are approximately the same). For the cold-weather months, the December 21 winter solstice is usually included to demonstrate conditions during cold-weather when people who do use open spaces rely most heavily on available sunlight for warmth. Project shadows that reach a sunlight-sensitive resource during any of these months could be of concern. As representative of the full range of possible shadows, these months and days are also used for assessing shadows on historic or natural sunlight-sensitive resources.

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FIGURE 8-6 - MONTHS OF INTEREST AND REPRESENTATIVE DAYS FOR ANALYSIS



For the representative growing season months, it is not necessary to analyze those months where it is found that no shadow from the project would reach a sunlight-sensitive resource.

For the cold-weather months, if it is found that no shadow from the project would reach a sunlight-sensitive resource on the December 21 analysis day, then the assessment should be performed for a representative day in either November, January or February in order to confirm that no shadow from the project would reach a sunlight-sensitive resource during any of those months.

314.4. Timeframe window of analysis

The shadow assessment considers those shadows occurring between 1.5 hours after sunrise and 1.5 hours before sunset. Shadows occurring earlier and later are long, move fast, and generally blend with shadows from existing structures. At times outside the timeframe window of analysis, the sun is located near the horizon and the sun's rays reach the Earth at close to tangential angles diminishing the amount of energy delivered by the sun's rays and producing shadows that grow in length exponentially until the sun reaches the horizon and sets. Because of these conditions, the shadows occurring between 1.5 hours after sunrise and 1.5 hours before sunset are not considered significant under CEQR, and their assessment is not required. For the assessment, standard, not daylight savings, time is used. Table A1 (Shadow Factors and Time of Day for Each Shadow Angle, June 21, May 6, March 21, December 21) in the Appendix lists all times within the timeframe window of analysis for four representative days.

314.5. Conducting the shadow assessment

Once the three-dimensional computer model has been set up, shadow analyses should be performed for each of the representative days for analysis in the months of interest within the timeframe window of analysis, as described in Subsections 314.3 and 314.4.

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FIGURE 8-7 - THREE-DIMENSIONAL COMPUTER MODEL SET UP FOR TIER 3 SCREENING ASSESSMENT



Figures 8-7a, 8-7b, 8-7c and 8-7d illustrate the range of shadows that would occur from the proposed building in the example (303 feet tall) on four representative days for analysis. Each figure shows the shadows occurring approximately every 60 minutes from the start of the analysis day (1.5 hours after sunrise) until the end of the analysis day (1.5 hours before sunset).

FIGURE 8-7A - TIER 3 SCREENING ASSESSMENT FOR THE DECEMBER 21 ANALYSIS DAY



The results of the screening assessment for the December 21 analysis day show that shadows from the proposed building would be cast on the sunlight-sensitive resource labeled 1 from the start of the analysis day at 8:51 a.m. and would remain on the resource until sometime before 10:00 a.m. Shadows from the proposed building would not reach the sunlight-sensitive resource labeled 2 on the analysis day.

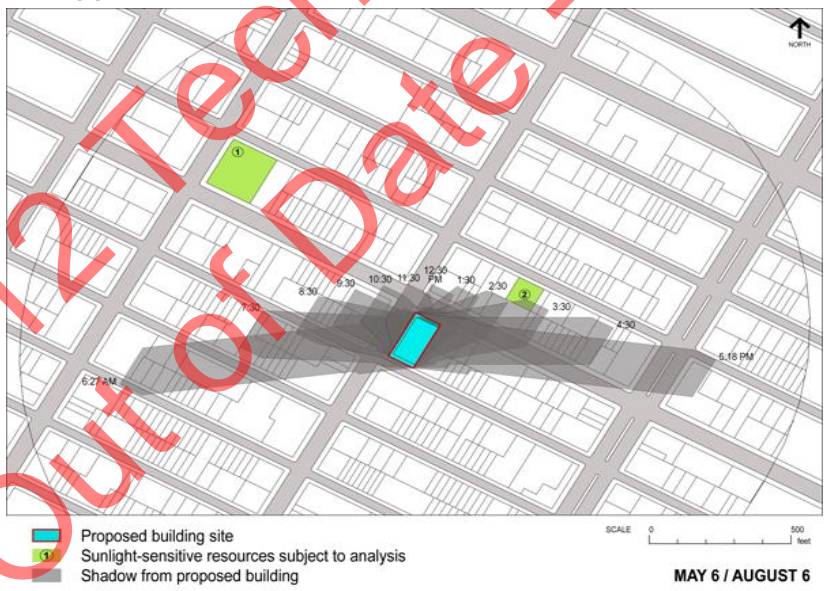
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FIGURE 8-7B - TIER 3 SCREENING ASSESSMENT FOR THE MARCH 21/SEPTEMBER21 ANALYSIS DAY



The results of the screening assessment for the March 21/September 21 analysis day show that shadows from the proposed building could reach the sunlight-sensitive resource labeled 2 sometime after 2:30 p.m. and would remain on the resource up to the end of the analysis day at 6:29 p.m. Shadows from the proposed building would not reach the sunlight-sensitive resource labeled 1 on the analysis day.

FIGURE 8-7C - TIER 3 SCREENING ASSESSMENT FOR THE MAY 6/AUGUST 6 ANALYSIS DAY



The results of the screening assessment for the May 6/August 6 analysis day show that shadows from the proposed building could reach a small portion of the sunlight-sensitive resource labeled 2 sometime between 2:30 p.m. and 4:30 p.m. Shadows from the proposed building would not reach the sunlight-sensitive resource labeled 1 on the analysis day.

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FIGURE 8-7D - TIER 3 SCREENING ASSESSMENT FOR THE JUNE 21 ANALYSIS DAY



The results of the screening assessment for the June 21 analysis day show that no shadows from the proposed building could reach either of the sunlight-sensitive resources labeled 1 or 2 on the analysis day.

The Tier 3 screening assessment for the example shows that, in the absence of intervening buildings, shadows from the proposed building would reach two sunlight sensitive resources on three of the representative analysis days, and therefore, a detailed shadow analysis is warranted for those three days. If this assessment determines that no shadows from the proposed project reach any of the sunlight-sensitive resources on any of the representative analysis days, no further assessment for those days is needed. The necessary documentation to support this conclusion illustrating the screening assessment should be provided.

320. DETAILED SHADOW ANALYSIS

A detailed shadow analysis is warranted when the screening analyses described above does not rule out the possibility that project-generated shadows would reach any sunlight-sensitive resources. The detailed shadow analysis establishes a baseline condition (future No-Action) that is compared to the future condition resulting from the proposed project (future With-Action) to illustrate the shadows cast by existing or future buildings and distinguish the additional (incremental) shadow cast by the project. The purpose of the detailed analysis is to determine the extent and duration of new incremental shadows that fall on a sunlight-sensitive resource as a result of the proposed project. To evaluate the extent and duration of new shadow that would be added to a sunlight-sensitive resource as a result of the proposed project, shadows that would exist in the future without the proposed project are also defined. Because existing buildings may already cast shadows on a sun-sensitive resource (or a future building could be expected to cast shadows), the proposed project may not result in additional, or incremental, shadows upon that resource.

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FIGURE 8-8 - EFFECTS OF EXISTING BUILDINGS

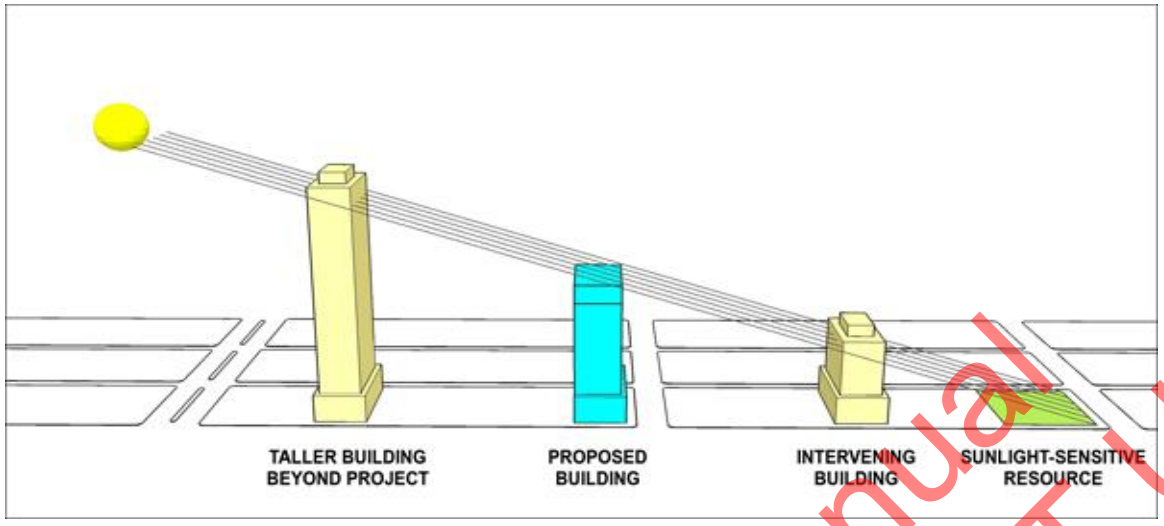


Figure 8-8 illustrates the effect of a taller existing building beyond the proposed project and a shorter existing building located between the proposed project and the sunlight sensitive resource being analyzed. In this example, both the intervening building and the building beyond the project would cast shadows such that the proposed project does not result in incremental shadow.

321. Future No-Action conditions

The future No-Action conditions include existing buildings or structures plus any identified proposed or planned developments in the No-Action study area. This would include any planned new sun-sensitive resources as well.

322. Future With-Action conditions

The future With-Action conditions include the future No-Action conditions plus the new structures and open spaces (if any) created pursuant to the proposed project.

323. Use of three-dimensional computer modeling

In order to carry out the detailed shadow analysis, the three-dimensional computer model used for the previous screening assessment should be augmented by adding the existing and future buildings near the project site that could cast shadows on any of the sunlight-sensitive resources. The added buildings should be represented as accurately as possible including their height, setbacks and any rooftop structures like water tanks or mechanical equipment. If no access to three-dimensional computer modeling software is available, the analysis may be carried out manually through a graphic analysis explained in Part B of the Appendix.

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FIGURE 8-9 - THREE-DIMENSIONAL COMPUTER MODEL OF FUTURE NO-ACTION CONDITIONS



Figure 8-9 provides an example of shadows that would exist without the project under the future No-Action scenario.

FIGURE 8-10 - THREE-DIMENSIONAL COMPUTER MODEL OF FUTURE WITH-ACTION CONDITIONS



FIGURE 8-10 provides an example of the shadows produced by the proposed project in addition to those cast by existing structures, thus illustrating future With-Action conditions.

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324. Performing the detailed analysis

Once the three-dimensional computer model has been set up, shadow analyses should be performed within the timeframe window of analysis only for each of the representative days in the months of interest, where

the Tier 3 screening assessment could not rule out the possibility of shadows reaching a sunlight-sensitive resource.

The shadow attributable to the project is the increment beyond shadows that would be cast in the existing or future No-Action condition. The objective of the detailed analysis is to identify incremental shadows and document the time at which incremental shadows enter and exit the sunlight-sensitive resource in order to determine the total time that incremental shadows are cast on the resource.

325. Documenting the extent and duration of incremental shadows

The results of the detailed shadow analysis should be documented in graphic form and accompanied by a table summarizing the extent and duration of incremental shadows.

Graphic material documenting the conditions on each of the sunlight-sensitive resources at which an incremental shadow occurs should be submitted. The graphic material should include:

- The base map illustrating the proposed project site location in relation to the sunlight-sensitive resources.
- A site plan of the affected sunlight sensitive resources at an appropriate scale to illustrate incremental shadows on the resources in question that includes:
    - Shadows resulting from the future No-Action conditions
    - Shadows resulting from the future With-Action conditions
    - The incremental shadow on the sunlight-sensitive resource highlighted in a contrasting tone (*i.e.* red) with its outline delineated.
    - In the case of incremental shadows on sunlight-sensitive features of historic resources it may be necessary to provide axonometric drawings documenting conditions on those features (such as windows) that cannot be assessed from a site plan.

The material should include a graphic scale bar and identify the direction of true north as well as the representative analysis day and time being illustrated.

The summary table should include the following information for each of the sunlight-sensitive resources on which an incremental shadow occurs:

- Name of the sunlight-sensitive resource.
- Representative analysis days.
- Timeframe window of analysis (1.5 hours after sunrise and 1.5 hours before sunset) for the day analyzed.
- Time of incremental shadow entering the sunlight-sensitive resource (enter time).
- Time of incremental shadow exiting the sunlight-sensitive resource (exit time).
- Total duration of incremental shadow in hours and minutes.
- A note confirming that daylight savings time has not been used.

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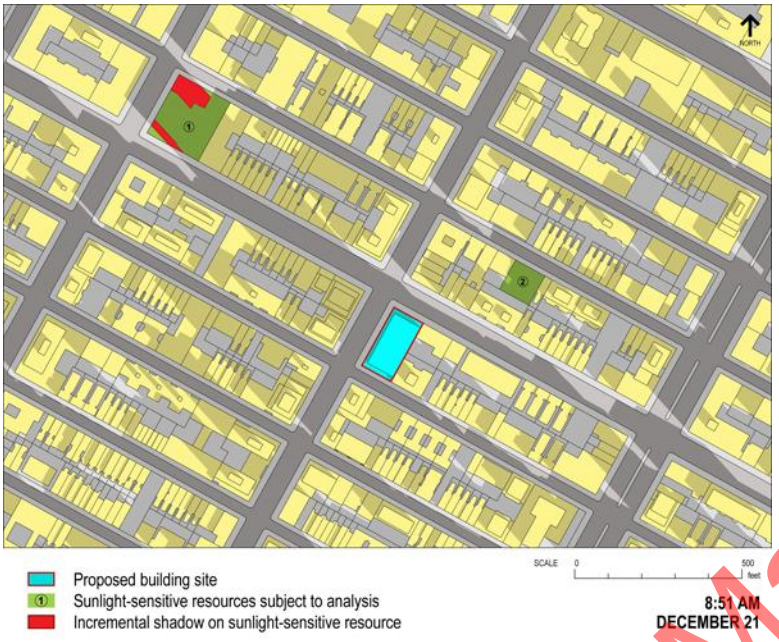
Table 8-1
Analysis summary for the example

Analysis day	December 21	March 21/ September 21	May 6 / August 6	June 21
Timeframe window	8:51 a.m. - 2:53 p.m.	7:36 a.m. - 4:29 p.m.	6:27 a.m. - 5:18 p.m.	5:57 a.m. - 6:01 p.m.
①				
Shadow enter - exit times	8:51 a.m. - 9:41 a.m.	-	-	-
Incremental shadow duration	50 min	-	-	-
②				
Shadow enter - exit times	-	2:39 - 4:29 p.m.	3:17 p.m. - 3:48 p.m.	-
Incremental shadow duration	-	1 hr 50 min	31 min	-
Note: Daylight savings time not used				

The results of the Tier 3 screening assessment for the example showed that on the June 21 analysis day no shadows from the proposed building could reach any of the sunlight sensitive resources. The Tier 3 screening assessment showed that shadows from the proposed building could reach the sunlight-sensitive resources on the December 21, March 21 and May 6 analysis days. Accordingly, the detailed shadow analysis for the example focuses only on these months; its results are summarized in Table 8-1 above and illustrated in Figures 8-11 through 8-22 below.

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FIGURE 8-11 - DECEMBER 21 - 8:51A.M.



On the December 21 analysis day, the shadow from the proposed building enters the sunlight-sensitive resource labeled 1 at 8:51 a.m. (the start of the analysis day, 1.5 hours after sunrise). Shadows from existing buildings cover large portions of the sunlight-sensitive resource, and only a small portion receives direct sunlight at this time.

FIGURE 8-12 - DECEMBER 21 - 9:08 A.M.



By 9:08 a.m., the extent of the incremental shadow on the sunlight-sensitive resource covers a larger area because the shadows from existing buildings have become shorter.

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FIGURE 8-13 - DECEMBER 21 - 9:24 A.M.



By 9:24 a.m., as the sun travels towards the south west and rises higher in the sky, the incremental shadow on the sunlight-sensitive resource has shifted to the northern portion of the resource.

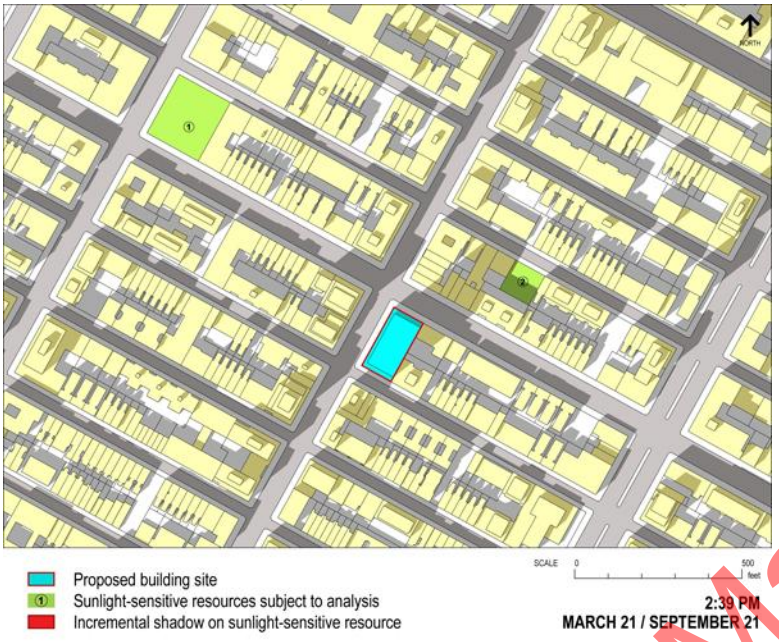
FIGURE 8-14 - DECEMBER 21 - 9:41A.M.



By 9:41a.m., the shadow from the proposed building exits the sunlight-sensitive resource labeled 1. Shadows from the proposed building do not reach the sunlight sensitive resource labeled 2 on this analysis day.

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FIGURE 8-15 - MARCH 21 / SEPTEMBER 21 - 2:39 P.M.



On the March 21/September 21 analysis day, the shadow from the proposed building enters the sunlight-sensitive resource labeled 2 at 2:39 p.m. Shadows from existing buildings cover the southern half portion of the resource at this time.

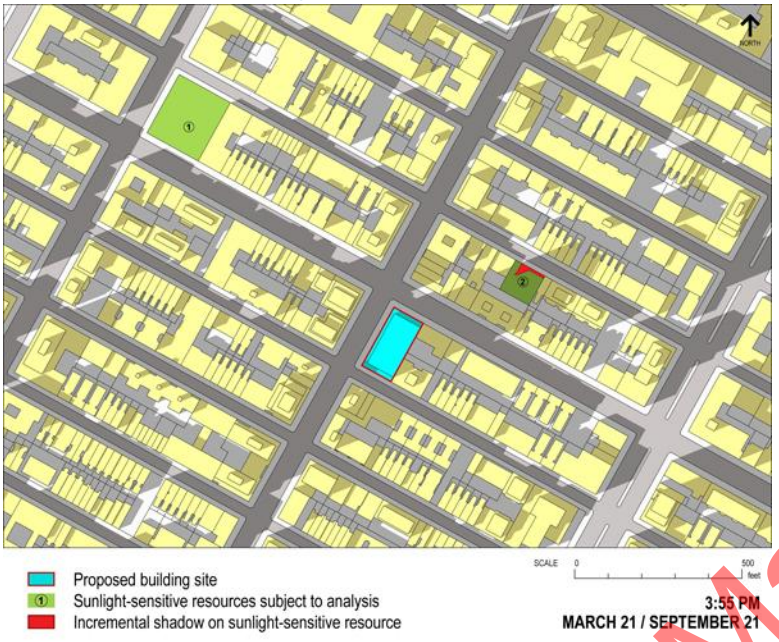
FIGURE 8-16 - MARCH 21 / SEPTEMBER 21 - 3:15 P.M.



By 3:15 p.m., the incremental shadow from the proposed building covers the northern portion of the sunlight-sensitive resource effectively eliminating all direct sunlight that the resource would otherwise receive in the absence of the proposed building.

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FIGURE 8-17 - MARCH 21 / SEPTEMBER 21 - 3:55 P.M.



By 3:55 p.m., the extent of the incremental shadow from the proposed building has become smaller, but continues to eliminate all direct sunlight that the resource would otherwise receive in the absence of the proposed building.

FIGURE 8-18 - MARCH 21 / SEPTEMBER 21 - 4:29 P.M.



By the end of the analysis day, at 4:29 p.m. (1.5 hours before sunset), the shadow from the proposed building exits the sunlight-sensitive resource. Shadows from existing buildings cover the majority of the resource at this time. Shadows from the proposed building do not reach the sunlight sensitive resource labeled 1 on this analysis day.

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FIGURE 8-19 - MAY 6 / AUGUST 6 - 3:17 P.M.



On the May 6/August 6 analysis day, the shadow from the proposed building enters the sunlight-sensitive resource labeled 2 at 3:17 p.m. Shadows from existing buildings cover a sliver of the resource at this time and the incremental shadow from the proposed building is virtually imperceptible.

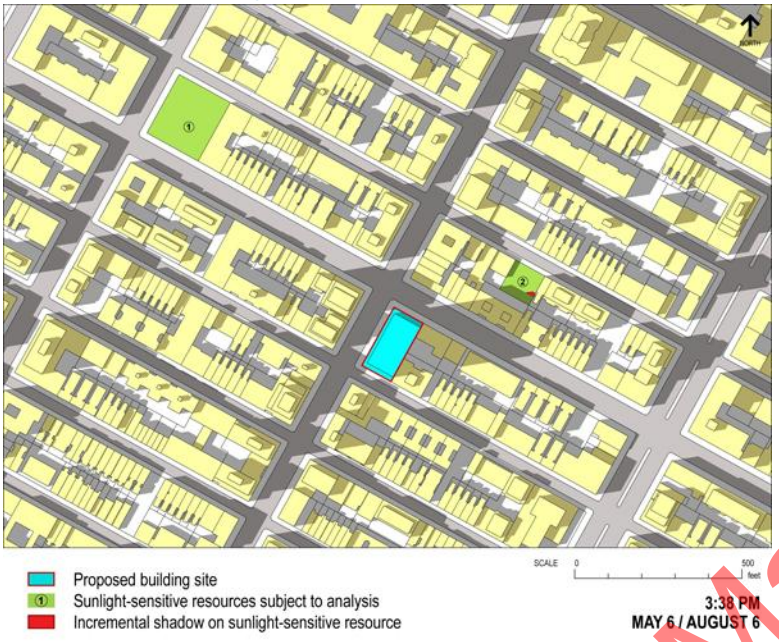
FIGURE 8-20 - MAY 6 / AUGUST 6 - 3:27 P.M.



By 3:27 p.m., the incremental shadow from the proposed building covers a small sliver of the sunlight-sensitive resource.

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FIGURE 8-21 - MAY 6 / AUGUST 6 - 3:38 P.M.



By 3:38 p.m., the extent of the incremental shadow from the proposed building has become smaller and shifted towards the east.

FIGURE 8-22 - MAY 6 / AUGUST 6 - 3:48 P.M.



By 3:48 p.m., the shadow from the proposed building exits the sunlight-sensitive resource labeled 2. Shadows from the proposed building do not reach the sunlight sensitive resource labeled 1 on this analysis day.

The graphic material depicts shadow conditions during an instant in time. Because shadows are in constant movement, there may be cases when the graphic material is not sufficient to clearly illustrate how incremental shadows occur on a sunlight-sensitive resource. In order to assess conditions at several times or throughout a certain period, the assessment of shadows for certain complex projects benefits from assembling a computer animation showing how shadows occur throughout a certain period of time (Subsection 314 in-

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cludes a list of different software platforms with this capacity). The use of such computer animation might be requested by the lead agency responsible for reviewing the shadow analysis. For guidance on appropriate software to use, the lead agency should consult with DCP.

FIGURE 8-23 - ANIMATION OF SHADOW SWEEP OVER A PERIOD OF TIME (PLEASE CLICK HERE FOR ANIMATION)



400. DETERMINING IMPACT SIGNIFICANCE

The determination of significance of shadow on a sunlight-sensitive resource is based on (1) the information resulting from the detailed shadow analysis describing the extent and duration of incremental shadows and (2) an analysis of the resource's sensitivity to reduced sunlight. The goal of the assessment is to determine whether the effects of incremental shadows on a sunlight-sensitive resource are significant under CEQR.

A shadow impact occurs when the incremental shadow from a proposed project falls on a sunlight-sensitive resource or feature and reduces its direct sunlight exposure. Determining whether this impact is significant or not depends on the extent and duration of the incremental shadow and the specific context in which the impact occurs.

410. OPEN SPACE AND NATURAL RESOURCES

The uses and features of open space or a natural resource indicate its sensitivity to shadows. Shadows occurring during the cold-weather months of interest generally do not affect the growing season of outdoor vegetation; however, their effects on other uses and activities should be assessed. Therefore, this sensitivity is assessed for both (1) warm-weather-dependent features like wading pools and sand boxes, or vegetation that could be affected by a loss of sunlight during the growing season; and (2) features, such as benches, that could be affected by a loss of winter sunlight.

Uses that rely on sunlight include: passive use, such as sitting or sunning; active use, such as playfields or paved courts; and such activities as gardening, or children's wading pools and sprinklers. Where lawns are actively used, the turf requires extensive sunlight. Vegetation requiring direct sunlight includes the tree canopy, flowering plants and plots in community gardens. Generally, four to six hours a day of sunlight, particularly in the growing season, is often a minimum requirement. Consequently, the assessment of an open space's sensitivity to increased shadow focuses on identifying the existing conditions of its facilities, plantings, and uses, and the sunlight requirements for each.

For open space resources within the jurisdiction of the Department of Parks and Recreation (DPR), DPR should be consulted in order to verify existing sun-sensitive areas and obtain information on current recreational and pas-

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sive activities in sunlit areas of the park, as well as planned capital projects that may result in a change to existing sunlight-sensitive features.

Although shadows on project-generated open space are not considered significant under CEQR, the assessment of shadows on project-generated open space should be conducted and documented with the same level of detail as other sunlight-sensitive open space resources when such project generated open space is included qualitatively as part of a detailed analysis required Chapter 7, "Open Space."

411. Assessment

A site plan and inventory of the features that constitute the open space or natural resource as well as a survey detailing existing conditions, quality and levels of use of the open space are needed to determine the significance of the shadow cast in the future With-Action. The majority of this information may be already available through the analysis in Chapter 7, "Open Space," and Chapter 11, "Natural Resources," respectively, and should be used as part of the assessment.

The site plan should show the boundary and layout of the open space or natural resource, the location of vegetation and sunlight-sensitive features, its built structures, and other features of the open space, including paved areas. The site plan should identify the direction of true north and include a graphic scale bar, and may be complemented by an aerial photograph and photographs of the open space features. Figure 8-24 below provides an example of an open space site plan.

To carry out the assessment, the composite shadows obtained from the detailed shadows analysis are overlaid on the open space site plan in order to determine the areas and sunlight-sensitive features of the open space that would be cast in the project's incremental shadow. The assessment is performed for all the months of interest when incremental shadows are predicted to be cast on the open space or natural resource.

In the area that would be cast in the project's incremental shadow, it may be necessary to inventory vegetation, noting species, caliper, height, and age. Such inventory may be presented in the site plan. It may be advisable to use the services of a recreation planner, landscape architect, or horticulturist to inventory, survey, and assess the sensitivity of the open space to shadow. When the sunlight-sensitive resource is under the jurisdiction of DPR, determinations about the relative shade tolerance of existing vegetation should be reviewed by DPR.

If the open space or natural resource supports activities that rely on sunlight and would be cast in project shadow, it is also appropriate to survey its use. This should be done on a sunny day in the spring, summer, or fall, preferably on the weekend or at the time of peak use. Based on this work, the activities, plants, or other facilities in the open space that need sunlight and may be affected by project shadows should be identified and may be identified in the site plan. To the extent possible, the acceptable and minimum amounts of daily sunlight required for the plants or activities should be estimated.

412. Estimating the relative loss of sunlight from incremental shadows

Where the incremental shadows from the project fall on sunlight-sensitive features or uses, additional analysis is required to assess the loss of sunlight relative to sunlight that would be available without the project. It is necessary to estimate shadow patterns on the affected area of the open space or resource throughout the day in order to assess how shadows, both incremental shadows from the project and shadows cast by existing structures, affect the sensitive features. It should also be assessed whether these sensitive features are already subject to substandard sunlight conditions in the absence of additional incremental shadows from the project. The assessment should consider all shadows on the portion of the sunlight-sensitive features or uses affected by the project's incremental shadow throughout the day. The analysis should be undertaken for each of the months of interest where the effects of incremental shadows from the project could be significant.

It should be noted that the shade created by trees and other natural features is not considered to be shadow of concern for the impact analysis; however, incremental shadow on a tree-shaded environment may create a

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significant impact as the incremental shadow is not redundant with tree shade, and the tree canopy may be considered a sunlight-sensitive resource.

Consideration of this inventory of available open space resources within the Open Space study area outlined in Chapter 7, "Open Space," may be helpful in assessing the significance of the loss of sunlight for active or passive recreational uses. For example, if many of the parks in the study area already have shadows on similar sun sensitive features, the additional loss of sunlight in parks may be more critical.

Some open spaces contain facilities that are not sensitive to sunlight. These are usually paved, do not contain sitting areas, vegetation or unusual or historic plantings that necessitate sunlight, and do not accommodate active uses. Incremental shadows on these portions of an open space resource should be documented and disclosed but are not generally considered significant under CEQR.

The significance of shadows cast on an open space should be closely examined in relation to the open space's utilization rates, as discussed in Chapter 7, "Open Space," in order to determine the potential for the shadows to affect the times of day the space is commonly used. This is particularly important when shadows are cast on open spaces that fall within an area without similar sunlit resources. Estimating the loss of sunlight on paved or hardscape open spaces that accommodate active uses–such as basketball and tennis courts–may be determined based on how the active area is used by the community and the utilization rate of such spaces as described and assessed in Chapter 7, "Open Space." While this loss of sunlight is generally not considered significant, the lead agency should consider how the area is used by the community and the utilization rate of such spaces as described and assessed in Chapter 7, "Open Space," in order to determine the significance of the incremental shadow.

420. HISTORIC RESOURCES

The shadow sensitivity of the sunlight-sensitive features of an historic structure depends on its design and setting. If any of the characteristics or elements that make the resource historically significant depend on sunlight, it is necessary to inventory those features to determine their sensitivity to a reduction in sunlight. The assessment should consider the specific context in which the incremental shadow occurs and provide an analysis of how other shadows from existing structures affect the sunlight-sensitive features of the historic resource throughout the day.

Additional guidance regarding the identification of sunlight-sensitive features and assessment of stained glass windows can be found in the National Park Service (NPS) Preservation Brief 17, "Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character,", and NPS Preservation Brief 33: "The Preservation and Repair of Historic Stained and Leaded Glass."

421. Assessment

The assessment of shadows on an historic resource focuses only on those features or portions of the historic resource that are sunlight-sensitive and can be enjoyed by the public. Only the incremental shadow duration on the sun-sensitive features of the historic resource is of concern. The assessment of shadows on an historic resource requires a site plan and inventory of the sunlight-sensitive features. The inventory discusses the historic significance of the affected features and how the features are enjoyed by the public, including views from streets and other publicly accessible places. The sunlight-sensitive features should be described in detail and illustrated as necessary with drawings and/or photographs, including axonometric drawings when the affected features cannot be assessed on a site plan. The majority of this information may be already available in Chapter 9, "Historic and Cultural Resources," and should be used as part of the assessment.

The inventory of sunlight-sensitive features may also be determined by checking the LPC designation report for LPC designated properties, scenic landmarks, and (publicly accessible) interiors, or the State/National Register nomination form for State/National Register listed properties. The State/National Register listings comprise the entirety of the building and/or structure and do not distinguish between publicly and privately ac-

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cessible interiors. Building interiors that are State/National Register listed or eligible, or LPC designated, are included in the types of resources that may receive potential shadow impacts. All other interiors are not considered under this type of analysis. Consult with the staff of the LPC to confirm presence or absence of sunlight-sensitive features on LPC and S/NR eligible properties.

430. DETERMINING IMPACT SIGNIFICANCE

The scenarios illustrated below provide general guidelines for determining impact significance and supplement the considerations described in Sections 410 and 420. As with every technical area, each project must be considered on its own merits, taking into account its unique circumstances. For instance, the precise location of the incremental shadow within the sunlight-sensitive resource (or the presence of well-lit resources in close proximity to the affected resource) may be highly relevant because the incremental shadow may affect specific features that are key to the character, use, survival or enjoyment of the sun-sensitive resource. For the purposes of CEQR, the determination of impact significance on ambiguous cases should be done in a conservative manner. In all cases, the rationale for the determination of impact significance should be clearly presented in the resulting environmental review document.

In general, an incremental shadow is not considered significant when its duration is no longer than 10 minutes at any time of year and the resource continues to receive substantial direct sunlight. A significant shadow impact generally occurs when an incremental shadow of 10 minutes or longer falls on a sunlight sensitive resource and results in one of the following:

VEGETATION

- A substantial reduction in sunlight available to a sunlight-sensitive feature of the resource to less than the minimum time necessary for its survival (when there was sufficient sunlight in the future without the project).
- A reduction in direct sunlight exposure where the sensitive feature of the resource is already subject to substandard sunlight (*i.e.*, less than minimum time necessary for its survival).

HISTORIC AND CULTURAL RESOURCES

- A substantial reduction in sunlight available for the enjoyment or appreciation of the sunlight-sensitive features of an historic or cultural resource.

OPEN SPACE UTILIZATION

- A substantial reduction in the usability of open space as a result of increased shadow (should cross reference with information provided in Chapter 7, "Open Space," regarding anticipated new users and the open space's utilization rates throughout the affected time periods).

FOR ANY SUNLIGHT-SENSITIVE FEATURE OF A RESOURCE

- Complete elimination of all direct sunlight on the sunlight-sensitive feature of the resource, when the complete elimination results in substantial effects on the survival, enjoyment, or, in the case of open space or natural resources, the use of the resource.

In determining impact significance, it is appropriate to consult with the appropriate government agency in which the affected sunlight-sensitive resource jurisdiction falls, including DPR, LPC, or other agencies, as required. Below is a non-exclusive list of examples of significant impacts caused by incremental shadows.

EXAMPLES

A chapel attached to a 19th century cathedral that is designated as a New York City Landmark, listed in the State and National Register of Historic Places, and a designated National Historic Landmark would receive incremental shadows on some of its stained glass windows from a proposed building. The review finds that the interiors of such religious structures are important to their character and that the qualities that the stained glass windows impart to the interior are a major part of the overall architectural intent in this church

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and part of the Gothic Revival style. After assessing the extent and duration of the incremental shadow, it is determined that the darkening would occur for a substantial part of the day on the stained glass windows and would constitute a significant impact. In addition, the impact would occur regardless of whether the cathedral holds services when the incremental shadow is cast.

A 19th century scenic landmark that is designated as a New York City Landmark, listed in the State and National Register of Historic Places, and a designated National Historic Landmark would receive incremental shadow from a proposed building. After taking into account the time of the year, shadow duration during the day and the number of days a years of the incremental shadow, the review finds that the park is sensitive to the incremental shadows because they detract from the experience of a seemingly naturalistic environment that was part of the design intent of the park, that the addition of incremental shadow would endanger the rare and exotic plant species that were part of its original horticultural design, and that the incremental shadows could therefore constitute a significant impact.

A 20th century office building that is designated a New York City Landmark that also has a publicly accessible interior garden atrium that is designated as a New York City interior landmark would receive incremental shadow from a proposed structure. The full height atrium is considered an outstanding and unique example of an "urban greenhouse." After taking into account the extent and duration of the incremental shadow, the review finds that the incremental shadow that would be cast on the atrium would detract from the public's appreciation and enjoyment of the space and could therefore result in a significant shadow impact.

DETERMINING IMPACT SIGNIFICANCE FOR THE EXAMPLE USED THROUGHOUT THE CHAPTER

The results of the example's detailed shadow analysis document the extent and duration of the incremental shadows that the proposed project would cast on two sunlight-sensitive resources, summarized in Table 8-1 and illustrated in Figures 8-11 through 8-22.

SUNLIGHT-SENSITIVE RESOURCE EXAMPLE 1:

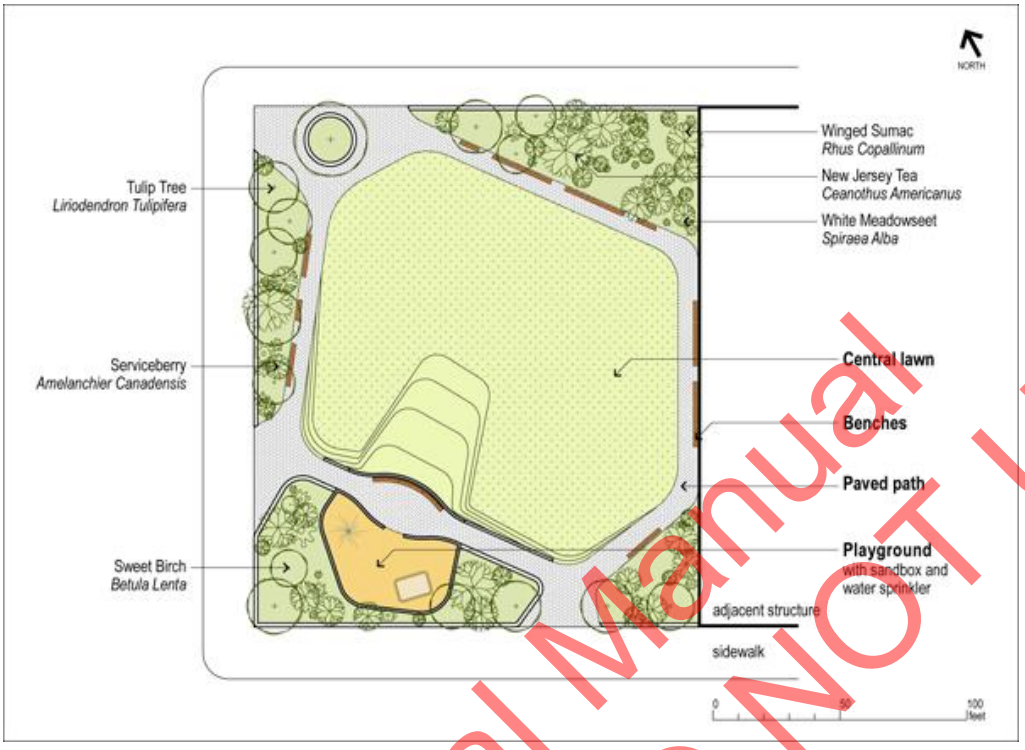
Incremental shadows from the proposed building would reach the sunlight-sensitive resource labeled 1 only on the December 21 analysis day. No incremental shadows from the proposed building would reach the resource on other analysis days.

On the December 21 analysis day, incremental shadows from the proposed building would enter the sunlight-sensitive resource at 8:51 a.m. (the start of the analysis day) and would exit the resource at 9:41 a.m., remaining in the resource for a total of 50 minutes.

At the start of the analysis day at 8:51 a.m. (Figure 8-11) the resource is almost covered in shadows from both the proposed building and from existing buildings. By 9:08 a.m. (Figure 8-12), both shadows have shifted north allowing sunlight to reach the south east corner of the resource where the playground is located (see site plan in Figure 8-23). By 9:24 (Figure 8-13), both shadows have shifted further north and to the east allowing sunlight to reach approximately half of the resource, including a large portion of the central lawn area. By 9:41 a.m. (Figure 8-14), the incremental shadow exits the resource and although the existing building to the east casts some shadow on it, sunlight reaches the majority of the resource.

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FIGURE 8-24 – ILLUSTRATED SITE PLAN FOR THE SUNLIGHT-SENSITIVE RESOURCE LABELED 1



In conclusion, the overall duration of the incremental shadows cast on the sunlight-sensitive resource would be short and occur during a small portion of the day. Upon examination of the site plan in Figure 8-24, the incremental shadows would not affect areas of the resource with sensitive uses such as the playground, nor would affect the vegetation as December is not part of the growing season. Therefore, the proposed building would not result in a significant shadow impact on the sunlight-sensitive resource labeled 1.

SUNLIGHT-SENSITIVE RESOURCE EXAMPLE 2:

Incremental shadows from the proposed building would reach the sunlight-sensitive resource labeled 2 only on the March 21/September 21 and May 6/August 6 analysis days (see Figures 8-16 through 8-20). No incremental shadows from the proposed building would reach the resource on other analysis days.

Even though a site plan for this resource is not available, it is known that the resource contains non shade-tolerant vegetation and sunlight-sensitive uses such as benches.

On the May 6/August 6 analysis day, incremental shadows from the proposed building would enter the sunlight-sensitive resource at 3:17 p.m. and would exit the resource at 3:48 p.m., remaining in the resource for a total of 31 minutes. As discussed and illustrated in Figures 19 - 22, the incremental shadow from the proposed building would cover only a small portion of the resource and the majority of the resource would continue to receive direct sunlight during this period of time. Given the marginal extent and relatively short duration of the incremental shadow on this analysis day, the incremental shadow is not considered significant.

On the March 21/September 21 analysis day, incremental shadows from the proposed building would enter the sunlight-sensitive resource at 2:39 p.m. (the start of the analysis day) and would exit the resource at 4:29 p.m., remaining in the resource for a total of 1 hour and 50 minutes.

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As discussed and illustrated in Figures 15 - 18, the incremental shadow from the proposed building would substantially reduce and eventually eliminate the sunlight that would reach the resource during a relatively long period of time. The shadow would affect the resource's vegetation as March is part of the growing season and would affect sunlight-sensitive uses in the resource. Therefore, the proposed building would result in a significant shadow impact on the sunlight-sensitive resource labeled 2.

500. MITIGATION

Where a significant impact is identified, potential mitigation strategies must be assessed to reduce or eliminate, to the greatest extent practicable, the effects caused by incremental shadows.

In all cases, additional mitigation strategies that involve modifications to the height, shape, size or orientation of the proposed building may be explored and include:

- The reorientation of building bulk to avoid incremental shadow on sunlight-sensitive features of the open space, natural or historic resource.
- The reduction of the overall height of the project.
- Exploring the use of alternative technologies that may reduce the height of the project and reduce shadow impacts (*i.e.* the use of dry cooling towers vs. wet cooling towers).
- The relocation of the project to a different site, when appropriate.

For open space resources, the types of mitigation that may be appropriate include relocating sunlight-sensitive features within an open space to avoid sunlight loss, relocating, replacing or monitoring vegetation for a set period of time, undertaking additional maintenance to reduce the likelihood of species loss, or providing for replacement facilities on another nearby site. Other potential mitigation strategies include the redesign or reorientation of the open space site plan to provide for replacement facilities, vegetation or other features. Where the affected open space is a city park, it is appropriate for the lead agency to coordinate mitigation options with the Department of Parks and Recreation (DPR). The lead agency may also wish to coordinate with DPR as an expert agency on open spaces that are not city parks.

For historic resources, potential mitigation strategies include the use of artificial lighting to simulate the effect of sunlight on features such as stained glass windows. Where the affected historic resource is a New York City landmark, a LPC-calendared or eligible property or a National Register listed or eligible structure or property, it is appropriate for the lead agency to coordinate mitigation options with LPC. The lead agency may also wish to coordinate with LPC as an expert agency on historic resources that are not NYC landmarks.

Potential mitigation strategies to reduce or eliminate a significant shadow impact on natural resources may be coordinated with the Department of Environmental Protection (DEP).

These mitigation strategies can become alternatives to be analyzed in accordance to the project's goals and objectives.

600. ALTERNATIVES

Where a significant shadow impact is identified, potential alternatives to reduce or eliminate significant impacts should be explored, including:

- The reorientation of building bulk to avoid incremental shadow on sunlight-sensitive features of the open space, natural or historic resource.
- The reduction of the overall height of the project.
- Exploring the use of alternative technologies where substituting one technology for another may reduce the height of the project and reduce shadow impacts (*i.e.* the use of dry cooling towers vs. wet cooling towers).

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- The relocation of the project to a different site, when appropriate.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are no specific city, state, or federal statutory regulations or standards governing the analysis and assessment of shadows.

720. APPLICABLE COORDINATION

Coordination with DCP is required when it is an involved agency and the project includes an action subject to approval by the City Planning Commission. The lead agency should coordinate with those agencies that identify, operate, or have jurisdiction over the sunlight-sensitive resources identified in this chapter is recommended. The assessment of shadow impacts on a sunlight-sensitive resource and the development of mitigation strategies should be coordinated with the appropriate agency with jurisdiction over the resource. Mitigation would typically require the approval or commitment of such agency. Agencies typically consulted include the Department of Parks and Recreation for sunlight-sensitive open space resources, the Landmarks Preservation Commission for historic and cultural sunlight-sensitive resources, and the Department of Environmental Protection for sunlight-sensitive natural resources.

730. LOCATION OF INFORMATION

- The Department of City Planning maintains copies of the Sanborn maps, Fire Insurance Underwriters maps, and tax maps for the entire city. These sources are also available online (except Sanborn maps) and in local public libraries. City Maps are available for viewing in the Borough President's office in each borough and at the Department of City Planning.

  New York City Department of City Planning
  22 Reade Street
  New York, NY 10007
  www.nyc.gov/dcp
  Online publications: http://www.nyc.gov\html\dcp\html\subcats\products.shtml
  Bookstore: www.nyc.gov/html/dcp/html/pub/publist.shtml

- The Department of Parks and Recreation maintains a database of the City's public open spaces available online. For additional information see also Section 730 (Location of Information) of Chapter 7, "Open Space," for a detailed list of informational resources regarding open space.

  New York City Department of Parks and Recreation
  The Arsenal
  830 Fifth Avenue
  New York, NY 10065
  www.nyc.gov/parks

- The Landmarks Preservation Commission maintains a database of the City's historic and cultural landmarks with a variety of information available online including historic district maps and designation reports.

  New York City Landmarks Preservation Commission
  Municipal Building
  1 Centre Street, 9th Floor
  New York, NY 10007
  www.nyc.gov/landmarks

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- New York City Department of Environmental Protection

  59-17 Junction Boulevard, 13th Floor
  Flushing, NY 11373
  www.nyc.gov/dep

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HISTORIC AND CULTURAL RESOURCES

CHAPTER 9

Environmental review for historic and cultural resources includes a survey and planning process that helps protect New York City cultural heritage from the potential impacts of projects undergoing CEQR. Historic resources and archaeological sites are identified and evaluated, and if impacts are found, they are mitigated or avoided to the greatest extent practicable.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency during the entire environmental review process. As appropriate, the lead agency may determine it is appropriate to consult or coordinate with the city's expert technical agencies for a particular project. Here, the New York City Landmarks Preservation Commission (LPC) should be consulted for information, technical review, and recommendations for mitigation relating to historic and cultural resources. As needed by the consultation, it is recommended that LPC be contacted as early as possible in the environmental review process. Section 700 further outlines appropriate coordination. This chapter first defines historic and cultural resources, as well as the criteria used to determine eligibility of an historic resource (Section 100). Then, if it is determined that a project might be of a type that may impact historic and cultural resources (Section 200), a survey is conducted to identify both known and potential resources (Section 300). Next, the impact of the project on these resources is analyzed (Section 400), and if significant impacts are identified, then mitigation measures are discussed and considered (Section 500). Alternatives (Section 600) are also discussed.

100. DEFINITIONS

Historic and cultural resources include both architectural and archaeological resources. Architectural resources generally include historically important buildings, structures, objects, sites, and districts. They also may include bridges, canals, piers, wharves, and railroad transfer bridges that may be wholly or partially visible above ground. Archaeological resources are physical remains, usually subsurface, of the prehistoric, Native American, and historic periods—such as burials, foundations, artifacts, wells, and privies. As a general rule, archaeological resources do not include 20th and 21st Century artifacts.

110. BUILDINGS

A building is a structure created to shelter human activity. The historical or architectural value of individual buildings may range from the monumental, such as the American Museum of Natural History, to the modest or unique, such as the Fraunces Tavern block in Lower Manhattan.

120. STRUCTURES

A structure is a built work composed of interdependent parts or elements in an organized pattern. A structure is distinct from a building, which is a construction for the purpose of shelter. A structure is a functional construction made for a purpose other than shelter, such as a bridge, wharf or other engineering project. The "Cyclone" roller coaster at Coney Island is an example of a structure, as are military fortifications, such as Fort William and Fort Jay on Governors Island or the batteries at Fort Wadsworth on Staten Island.

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130. OBJECTS

An object is an item of functional, aesthetic, cultural, historical, or scientific value that may be movable, but is related to a given environment or setting. The designated sidewalk clocks in Manhattan and Queens, or Native American stone tools are examples of objects.

140. SITES

A site is a location or place that possesses historic, cultural, or archaeological value, either because a significant event or sequence of events took place there, or because an important building or structure, whether now standing, ruined, or vanished, is or was, located there. A site can be important because of its association with significant historic (or prehistoric) events or activities, buildings, structures, objects, or people, or because of its potential to yield information important in prehistory or history. Examples of sites include a Native American habitation site or a battlefield.

Urban landscape features are also a type of site and include parks, gardens, or streetscapes that are planned open spaces within a built urban environment. Examples include Central Park, Prospect Park, and the historic street plan of Lower Manhattan streets.

150. DISTRICTS

A district is a geographically definable area that possesses a significant concentration of associated buildings, structures, urban landscape features, or archaeological sites, united historically or aesthetically by plan and design or physical development and historical and/or architectural relationships. Although composed of many resources, a district derives its importance from having a coherent identity. A district may consist of historic or archaeological resources. The African Burial Ground and The Commons Historic District is an example of a district with archaeological resources.

The Central Park West-West 73rd-74th Street Historic District (which is within the larger Upper West Side-Central Park West Historic District) is an example of a district unified by plan or design. This district reflects the vision of Edward Clark, president of the Singer Sewing Machine Company, and his heirs, who used restrictive covenants governing height and setbacks to create homogeneous residential streetscapes surrounding the monumental buildings that define Central Park West (*e.g.*, the New-York Historical Society, the Dakota, the American Museum of Natural History). An example of a district notable for its historical and/or architectural relationships is the Brooklyn Heights Historic District, which comprises a concentration of buildings of several styles predating the Civil War, including Federal, Gothic Revival, and Italianate.

160. HISTORIC AND CULTURAL RESOURCES UNDER CEQR

For the purposes of CEQR, the following are always considered historical and cultural resources:

- Designated New York City Landmarks, Interior Landmarks, Scenic Landmarks, and properties within designated New York City Historic Districts.
- Resources calendared for consideration as one of the above by LPC.
- Resources listed on, or formally determined eligible for inclusion on, the State and/or National Register of Historic Places, or contained within a district listed on, or formally determined eligible for listing on, the State and/or National Register of Historic Places.
- Resources recommended by the New York State Board for listing on the State and/or National Registers of Historic Places.
- National Historic Landmarks.
- Resources not identified by one of the programs listed above, but that meet their eligibility requirements.

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161. Eligibility requirements for the national or state register or local landmark designation

The U.S. Secretary of the Interior has established criteria of eligibility for listing on the National Register of Historic Places. See 36 CFR Part 60. New York State and LPC have adopted these criteria for use in identifying significant historic resources for SEQRA and CEQR review.

It should be noted that even if a property is excluded from eligibility for the National or State Register(s), it may be eligible for designation under the New York City Landmarks Law, which has different criteria for eligibility from those of the National Register. Consequently, the New York City Landmarks Law criteria are also applicable in assessing historic resources that may be affected by the project. For example, if a property is not eligible for the National Register for any reason, but it is eligible for designation under the New York City Landmarks law, the potential for impacts to this historic resource must be considered under CEQR. Below are the criteria for eligibility for both the National Register and New York City Landmarks.

161.1. National Register Criteria

To be considered eligible for the National Register, a property must represent a significant part of the history, architecture, archaeology, engineering, or culture of an area, and it must have the characteristics that make it a good representative of properties associated with that aspect of the past. The scope of significance may be local, state, regional, or national. The consideration of whether a property represents an important aspect of an area's history or prehistory is related to its associative values; the consideration of its characteristics is related to its integrity. Described below are the National Register's criteria for associative values and measures of integrity, both of which must be met in order to be eligible for listing. These criteria apply to both archaeological and architectural resources. More guidance on the National Register criteria described below is provided in the U.S. Department of the Interior's "National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation," as well as numerous other National Register Bulletins.

161.1.1. ASSOCIATIVE VALUES

The National Register criteria for evaluation identify the values that make a building, structure, object, site, or district significant. To be significant, property must meet at least one of these criteria:

- Be associated with events that have made a significant contribution to the broad patterns of history.
    - For example, the Bowne House in Flushing, Queens, possesses important historical associations because it contains the kitchen wing of the oldest house in Queens, built by John Bowne in 1661 with additions that date to 1680 and 1696. Similarly, Flushing's second oldest house, the Kingland Homestead Museum, which dates to ca. 1774, is an important example of an otherwise lost building tradition, the English vernacular tradition.
- Be associated with the lives of persons significant in the past.
- Embody distinctive characteristics that possess high artistic values and/or are representative of a type, period, method of construction, work of a master, or a significant and distinguishable entity whose components may lack individual distinction.
    - Architectural significance can range from buildings that are examples of an architectural style, such as the Greek Revival residences in Brooklyn Heights; that are monumental, such as the American Museum of Natural History; or that represent the work of a renowned architect, such as the Bayard Condict Building at 65-69 Bleecker Street in Manhattan, which is the only building in New York City by the well-known architect Louis H. Sullivan.

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- Have yielded, or have the potential to yield, information important in prehistory or history.
    - As applied in practice, this means that potential resources are more important if they can provide information about the past that cannot be determined from other sources. Significance for archaeological sites is usually related to this criterion. For example, Five Points, an archaeological site that was adjacent to Foley Square in Manhattan, was significant because the archaeological assemblage provided a profile of this 19th century neighborhood that belied the Victorian description of it as nothing but a notorious slum.

161.1.2. INTEGRITY

To be eligible for the National Register, a property must not only be significant under one of the four associative criteria for eligibility listed above, but it also must have integrity. Integrity is the ability of a property to convey its significance. It is defined in the federal guidelines as "the authenticity of a property's historic identity, evidenced by the survival of physical attributes that existed during the property's historic or prehistoric period." The National Register criteria recognize seven measures that define integrity, as follows:

LOCATION. Location is the place where the historic property was constructed or the place where the historic event occurred. The location of a property, together with its setting (see below), is important in recapturing a sense of history.

SETTING. Setting is the physical environment of an historic property. While location refers to the specific place where a property was built or an event occurred, setting refers to the character of the place in which the property played its historical role. It involves the relationship of the property to its surrounding features (such as topography, vegetation, and other buildings or open spaces).

DESIGN. Design is the combination of elements that create the form, plan, space, structure, and style of a property. It includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials (and thus, massing, pattern of fenestration, textures and colors of surface materials, *etc.*).

MATERIALS. These are physical elements combined or deposited during a particular period of time and in a particular pattern. A property must retain the key exterior materials dating from the period of its significance. If the property was altered *before* the period that gave it significance, the materials of the alteration, rather than the original materials, are important. According to the *Secretary of the Interior's Standards for Rehabilitation* (36 CFR Part 68), significant historic alterations are defined as "changes which may have taken place in the course of time and are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right and this significance shall be recognized and respected." Consultation with the State Historic Preservation Officer (SHPO) at the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and LPC is helpful in determining if significant alterations or additions have occurred.

WORKMANSHIP. This is the physical evidence of the crafts of a particular culture or people or the labor and skill in constructing or altering a resource. Examples of workmanship in historic buildings include tooling, carving, and painting.

FEELING. Feeling is the physical characteristics that evoke the aesthetic or historic sense of a particular period of time.

ASSOCIATION. This is the direct link between an historic property and an important historic event or person. Like feeling (above), association requires the presence of physical features that convey this relationship.

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To retain integrity, a property possesses at least one and typically several of these aspects. Which of these qualities are important to a particular property depends on why the property is significant. The property must retain the aspects for which it is significant and the essential physical features that contribute to a property's significance must continue to be present and visible. For example, a building considered significant as an example of a particular architectural style must retain the distinctive design characteristics of that style. The measures of integrity relate to the period for which the resource is significant – if the resource was altered, *etc.*, before that period, its integrity is not affected (see the discussion of significant alterations above).

161.1.3. SPECIAL CONSIDERATIONS

Certain kinds of individual properties may qualify for listing on the National Register if they are integral parts of districts that meet the eligibility criteria, but are not usually considered for individual listing on the National Register. These types of properties include: properties less than 50 years old, religious properties, moved properties, birthplaces and graves, cemeteries, reconstructed properties, and commemorative properties. However, these properties may be eligible for the National Register in certain circumstances, described below. These "criteria considerations" are found in 36 CFR Part 60.

Although properties typically must be at least 50 years old to be eligible for the National Register, younger properties that are of exceptional local, state, regional, or national importance may still be eligible. The 50-year criterion was created as guidance, to ensure that sufficient time has passed to allow an evaluation of the historical value of a place. However, a property less than 50 years old may be eligible for the National Register if its exceptional contribution to an area's history, architecture, archaeology, engineering, and/or culture can clearly be demonstrated. Examples of properties in New York City determined eligible for listing or listed on the National Register before they were 50 years old include the following:

- The Chrysler Building (completed in 1930), which was listed on the Register because it is considered the epitome of "style moderne" architecture.
- The Whitney Museum of American Art (completed in 1966), which is considered exceptionally important as the work of an internationally renowned architect (Marcel Breuer), and representative of modern architecture during the 1950's and 1960's.
- The Lever House building (completed in 1952), which is important as one of the first corporate expressions of the International style of architecture in America.
- The Municipal Asphalt Plant (completed in 1944), which was the first successful American use of the parabolic arch form in reinforced concrete.
- The other kinds of properties typically not eligible for the National Register —cemeteries, birthplaces or graves of historical figures, properties primarily religious in nature, commemorative properties, and moved or reconstructed buildings or structures—can qualify for the National Register if they have achieved additional significance, as follows:
- Religious properties deriving primary significance from architectural or artistic distinction or historical importance; cemeteries that derive their primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events. For example, Trinity Church and Graveyard in Manhattan are both listed on the National Register. The church, the third to stand at this site for Trinity Parish, which was formed in 1697, is an outstanding example of Gothic Revival style. The graveyard's antiquity gives it importance, and it forms an integral and historical component of the setting in which the church now stands.

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- A cemetery can be considered significant if it contains headstones of aesthetic significance, such as headstones inscribed with early death heads or skulls and bones, or important funereal statuary. New York's 18th century African Burial Ground was designated a National Historic Landmark and listed on the National Register based on two criteria of significance: it has the potential to yield information important in history and, because it is associated with exceptionally significant events in United States history. For burial sites, please see Section 511 below; reference may also be made to the U.S. Department of the Interior's "National Register Bulletin 41: Guidelines for Evaluating and Registering Cemeteries and Burial Places."
- A building or structure removed from its original location, but that is significant primarily for architectural value or is the surviving structure most importantly associated with an historic person or event.
- A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan and when no other building or structure with the same association has survived.
- A birthplace or grave of an historical figure of outstanding importance, if no other appropriate site or building directly associated with his or her productive life exists.
- A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance.

The U.S. Department of the Interior's "National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation" provides more information about these criteria considerations.

161.2. New York City Landmarks Law Criteria

Even if a property is excluded from eligibility for the National or State Register(s), it may be eligible for designation under the New York City Landmarks Law, which has different criteria for eligibility from those of the National Register. For further information on LPC designated properties and historic districts, see the LPC website.

The New York City Landmarks Law establishes criteria for designation of significant cultural resources. That law was established to achieve the following goals, among others:

Effect and accomplish the protection, enhancement, and perpetuation of such buildings, structures, places, works of art, and objects (collectively termed, "improvements"); landscape features; and districts that represent or reflect elements of the City's cultural, social, economic, political, and architectural history.

Safeguard the City's historic, aesthetic, and cultural heritage, as embodied and reflected in such improvements, landscape features, and districts.

The New York City Landmarks Law recognizes several types of resources:

LANDMARK. A property is eligible for designation as a Landmark if it meets the following criteria: any improvement (building, structure, place, work of art, and/or object), any part of which is 30 years old or older, that has a special character or special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the City, State, or nation.

INTERIOR LANDMARK. A property is eligible for designation as an Interior Landmark if it meets the following criteria: it is an interior (the visible surfaces of the interior of an improvement) or part thereof, any part of which is 30 years old or older, and that is customarily open or accessible to the public, or to which the public is customarily invited, and that has a special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the City, state, or nation.

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SCENIC LANDMARK. A New York City-owned property is eligible for designation as a Scenic Landmark if it meets the following criteria: it is a landscape feature (any grade, body of water, stream, rock, plant, shrub, tree, path, walkway, road, plaza, fountain, sculpture, or other form of natural or artificial landscaping) or an aggregate of landscape features, any part of which is 30 years old or older, that has or have a special character of special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the City, State, or nation.

HISTORIC DISTRICT. An area is eligible for designation as an Historic District if it is: any area that contains improvements that have a special character or special historical or aesthetic interest or value; and that represent one or more periods or styles of architecture typical of one or more eras in the history of New York City; and that cause such area, by reason of such factors, to constitute a distinct section of the City.

200. DETERMINING WHETHER AN HISTORIC AND CULTURAL RESOURCES ASSESSMENT IS APPROPRIATE

210. ARCHAEOLOGICAL RESOURCES

Archaeological resources usually need to be assessed for projects that would result in any in-ground disturbance. In-ground disturbance is any disturbance to an area not previously excavated, including new excavation that is deeper and/or wider than previous excavation on the same site. Examples of projects that typically require assessment are:

- Above-ground construction resulting in-ground disturbance, including construction of temporary roads and access facilities, grading, or landscaping.
- Below-ground construction, such as installation of utilities or excavation, including that for footings or piles.

Analysis of archaeological resources typically is not necessary in the following circumstances:

- Projects that would not result in ground disturbance.
- Projects that would result in disturbance only of areas that have already been recently excavated for other purposes, such as basements, concourses, sunken plazas, etc. However, if the area proposed to be excavated exceeds the previous disturbance in depth or footprint, archaeological assessment may be appropriate.

For any projects that would result in new ground disturbance (as described above), assessment of both prehistoric and historic archaeological resources is appropriate.

220. ARCHITECTURAL RESOURCES

Generally, architectural resources should be surveyed and assessed if the proposed project would result in any of the following, whether or not any known historic resources are located near the site of the project:

- New construction, demolition, or significant physical alteration to any building, structure, or object.
- A change in scale, visual prominence, or visual context of any building, structure, or object or landscape feature. Visual prominence is generally the way in which a building, structure, object, or landscape feature is viewed. For example, a building may be part of an open setting, a tower within a plaza, or conforming or not conforming with the streetwall in terms of its height, footprint, and/or setback. Visual context is the character of the surrounding built or natural environment. This may include the following: the architectural components of an area's buildings (*e.g.*, height, scale, proportion, massing, fenestration, ground-floor configuration, style), streetscapes, skyline, landforms, vegetation, and openness to the sky.

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- Construction, including but not limited to, excavating vibration, subsidence, dewatering, and the possibility of falling objects.
- Additions to or significant removal, grading, or replanting of significant historic landscape features.
- Screening or elimination of publicly accessible views.
- Introduction of significant new shadows or significant lengthening of the duration of existing shadows on an historic landscape or on an historic structure if the features that make the structure significant depend on sunlight. For example, stained glass windows that cannot be seen without sunlight, or buildings containing design elements that are part of a recognized architectural style that depends on the contrast between light and dark design elements, such as deep window reveals and prominent rustication. Please refer to Chapter 8 of this Manual, "Shadows," for further guidance.

300. ASSESSMENT METHODS

For projects that may affect historic resources (see Section 200), the first step in evaluating a project's potential effects on historic resources is to consider what area the project might affect and then identify historic resources—whether officially recognized or eligible for such recognition—within that area. (See Section 120 for a discussion of the standards for eligibility for listing on the National or State registers and local landmark designation.) The methods of choosing a study area and identifying and evaluating historic resources within that study area are explained in this section. LPC should be consulted as early as possible in this process.

310. STUDY AREAS

311. Archaeological Resources

The area of subsurface work for the proposed project is considered the impact area. However, environmental review for archaeological resources is a predictive endeavor. Unlike architectural resources, which are evident and can be immediately evaluated, potential archaeological resources are hidden below ground. Therefore, to assess whether the impact area may contain significant archaeological resources, data must be gathered from the surrounding area to predict the likelihood of archaeological resources existing in the impact area. For prehistoric resources, it is appropriate to determine whether there are known prehistoric archaeological resources within a half-mile radius of the site. For historic archaeological resources, it is appropriate to determine if there are known historic archaeological resources in the nearby area, such as on the present-day full tax lot or within the boundaries of the nearest adjacent mapped streets.

312. Architectural Resources

For architectural resources, the study area is the area in which any resources may be affected by the project. The size of the study area directly relates to the anticipated extent of the project's potential impacts, and should be large enough to permit examination of the relationships between the proposed project and the existing historic resources. These relationships may be:

PHYSICAL (*e.g.*, a project may require alteration of a resource or may threaten a resource's structural integrity during construction);

VISUAL (*e.g.*, a project may alter the streetscape or background context in which a resource is viewed and understood); or

HISTORICAL (*e.g.*, a project may change the historical context of a resource if it changes its historic character, feeling, association, or the way it is understood by the public. This may occur if a formerly public building, such as a library or recreational facility, became private, or if obvious and tangible links to the resource's history were removed, such as if bustling meat market activity within a building that is historically significant *because* of that association with the meat market was replaced by another activity).

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For most proposals, a study area defined by the radius of 400 feet from the borders of the project site is adequate. However, study areas of different sizes are sometimes appropriate. If a project involves only limited construction visible from few locations, for example, a smaller study area may be appropriate. Examples of situations for which a larger study area may be appropriate include:

- Projects that affect historic districts.
- Projects that involve construction in areas with difficult subsurface conditions (*e.g.*, where dewatering could change the water table over a wider area and affect historic buildings some distance from the project site).
- Projects that result in changes over a larger area (*e.g.,* a large-scale development or an area rezoning). For generic actions, it may be appropriate to identify any "soft" sites that may be developed because of the project (see Chapter 2, "Establishing the Analysis Framework") and then consider study areas for each of those sites that are appropriate in size for the expected changes.
- Projects that result in changes that are highly visible and can be perceived from farther than 400 feet *and* could affect the context of historic resources some distance away (*e.g.*, changes to the skyline around Central Park, or shadows from a new skyscraper that may extend outside a 400' radius and affect sun-sensitive features of historic resources).

320. ANALYSIS TECHNIQUES

321. Archaeological Resources

After the study areas have been established, all known archaeological resources within those areas are identified, and the potential for unknown resources are investigated.

LPC is the only City agency that has archaeologists on staff. At any agency's request, LPC can review projects undergoing CEQR. To do so, LPC should be provided with a site plan, an explanation of the proposed project, and photographs of the site. For more detailed information, consult LPC's 2002 "Guidelines for Archaeological Work in New York City." It is recommended that lead agencies and applicants contact LPC as early as possible when planning a project.

321.1. Identifying Known Resources

Some archaeological resources have already been identified through City, state, or federal processes identified above in Section 120. These are listed on, or have been determined eligible for, the State and/or National Registers of Historic Places; designated New York City Landmarks or Historic Districts or properties calendared for such designation; properties listed on, determined eligible for, or recommended by the New York State Board for listing on the State and/or National Registers; or National Historic Landmarks. In addition, the SHPO and LPC maintain records of known archaeological sites and areas that are considered likely to contain archaeological resources referred to as archaeologically "sensitive."

If LPC indicates that a known archaeological site or known sensitive area is located near the project site, the possibility that the site itself may also contain such resources should be explored as described in Subsection 321.2, below. If LPC indicates that a known site or sensitive area is located on the project site, then further analysis of the project's impact on those archaeological resources must be performed.

321.2. Investigating Unknown Resources

The next step in the assessment of archaeological resources is to identify unknown resources that may exist on the site. If documented disturbances on the site exceed depths at which archaeological resources have been found in the immediate vicinity, then further investigation is likely not neces-

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sary. However, if any part of the site has not been excavated to this depth, analysis continues for that part of the site, as described below. If the extent of disturbance on the site is unknown, analysis continues for the entire site as described below. At this point in the analysis, the lead agency may wish to contact LPC to determine whether the consideration of archaeological resources on the site is appropriate.

Appropriate methodologies for identifying potential archaeological resources, based on federal standards and guidelines—particularly the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*, *Federal Register*, Vol. 48, No. 190—as well as LPC's "Guidelines for Archaeological Work in New York City," 2002, are summarized in this subsection. Use of an archaeologist may be appropriate for an evaluation of unknown archaeological resources.

Typically, the initial analysis of unidentified archaeological resources consists of two parts, often performed simultaneously:

1. A determination of the potential for any prehistoric or historic material remains (artifacts, structures, refuse, etc.) existing on the site of the project. This depends on the site's past uses, as well as whether those remains, if any, would have survived subsequent disturbance by other activities, such as construction of later buildings.
2. An evaluation of the potential significance of any such remains. For this step, the National Register criteria for evaluation (Subsection 121, above) are applied. Archaeological sites are most likely to be found significant under the fourth criterion—having the potential to yield information important in prehistory or history—but the other criteria may also be applicable. As a general rule, archaeological resources do not include 20th and 21st Century artifacts.

A site that is found likely to contain significant material remains is considered to be potentially "archaeologically sensitive." The site's actual, rather than potential, sensitivity cannot be ascertained without some field testing or excavation. However, in New York City, the initial assessment of a site's archaeological sensitivity is typically made through background or archival research, without excavation. This documentary research phase should be extensive enough to allow the lead agency to evaluate the likelihood that significant resources are located on the site, and then whether these resources would be affected by the proposed project (Section 500, below). Field work (archaeological testing or excavation) is most often not needed until after this initial evaluation of sensitivity and determination of the project's significant impacts.

The following research steps are appropriate to determine the potential sensitivity of a project site.

DETERMINE PAST USES ON THE SITE

STEP 1:

Contact the appropriate agencies and other sources to determine whether any known prehistoric archaeological resources are located near the project site (see Subsection 321.1, above). Presence of other prehistoric resources in the vicinity is used as an indicator of the site's potential sensitivity for prehistoric resources.

STEP 2:

Determine the original topography of the project site. Early historical maps and documentary sources may be used. This step helps assess prehistoric and other archaeological historic resources. If the site was once located near a water source, on a well-drained elevated site, or near a wetland, it is more likely to have been utilized by prehistoric and Native American groups. On project sites near the waterfront that are the result of landfilling operations since the 1600's, original land surface may be deeply buried. Additionally, the extent to which the shoreline has altered over the last 14,000 years as a result of climatic changes is also considered.

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STEP 3:

Research the development history of the site, as far back in time as possible to determine whether the site had any historic uses that may be of archaeological interest (such as 17th, 18th, or 19th century uses). What is of archaeological interest depends on current research issues in New York City, and therefore involves some judgment. This is discussed further in step 5, below. The development history also provides information about more recent uses and the extent to which these uses may have disturbed the site (step 4, below). For this step, historic maps and buildings department records may be helpful, as well as other documentary sources when available.

DETERMINE DISTURBANCE ON THE SITE

STEP 4:

If there is evidence of several cycles of construction and demolition, consider whether later construction or demolition episodes disturbed any remains from past uses (identified in step 3). Excavation of late 19th and 20th century building foundations and/or basements, filling, grading, and construction of utility lines may have disturbed earlier, potentially significant archaeological resources. Typically, construction records filed at the Department of Buildings are a good source of this information; historic maps may also be useful.

Determination of the extent to which later land modification activities have affected earlier archaeological resources requires comparing the documented depth of disturbance with the depths at which archaeological resources would be expected. This depth depends on the original topography (step 2, above) and the amounts of filling and alteration that have occurred (step 3). The depths at which archaeological resources from the same period have been found in the vicinity are a good indicator. Depths at which significant archaeological resources have been found in New York City vary, and 17th century remains have been identified below 19th century foundations in Lower Manhattan, so the mere presence of later basements may not have disturbed potentially significant archaeological resources. If documented disturbance clearly exceeds depths at which archaeological resources might be expected, then no further work may be necessary.

DETERMINE SIGNIFICANCE OF PAST USES THAT MAY REMAIN

STEP 5:

If any past uses of interest are identified during step 3, intensive research may address whether these uses would be likely to result in meaningful archaeological resources: are there activities that have a discernible or physical signature? And do these remains provide information that answers important research questions?

Significance is a function of whether the resource is likely to contribute to current knowledge of the history of the period in question. Because research issues change as the knowledge base increases, consultation with LPC is recommended in determining significance of potential resources.

For prehistoric archaeological resources, research cannot directly determine prehistoric use of the site. Rather, it is used to predict the likelihood of prehistoric use. Any identified potential for prehistoric archaeological resources is considered significant at the initial, research level, since few prehistoric sites have been documented in New York City.

For archaeological resources of the historic period, archival research can ascertain the history of uses on the site and their potential significance. Examples of uses currently of potential interest from the historic period include:

- Early landfilling techniques (relevant on sites within a few blocks of the current waterfront through much of the City, where filling created new land surfaces in submerged areas).

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- Buried derelict ships or hulls (relevant on similar sites to those of landfilling techniques; often incorporated into the landfill as part of the fill-retaining structures).
- Any uses during the 17th and 18th centuries, including colonial and Federalist residences and businesses, and Revolutionary War remains.
- 19th century residences or workplaces where deposits containing refuse associated with occupants may be preserved. Such refuse can provide important information on consumer preferences, differential access to consumer goods, diet, and other topics of current research interest. Remains related to house-lot infrastructure, including wells, cisterns, and privies, may have research potential in that they provide information about access to services and public health issues during the period before public utilities were available to residents; such features also often contain significant domestic refuse deposits. Residences constructed after City services (water and sewer) were available are generally not considered archaeologically significant. For residences that predate extension of urban services that continued to be used after City water and sewer were available, the archival phase may involve collecting information about the occupants through such sources as early deeds, tax records, and census lists. On the other hand, if the archival phase demonstrates that no potentially significant uses were located on the site, this additional research may not be necessary.

CONCLUSIONS ABOUT POTENTIAL ARCHAEOLOGICAL SENSITIVITY OF SITE

Based on the information provided in steps 1 through 5, above, the lead agency can draw conclusions as to the potential archaeological sensitivity of the site. Consultation with LPC as early as possible is recommended for this evaluation. If past uses may have left remains on the site that were not later disturbed, and if these remains may be important according to the National Register criteria for eligibility (see Subsection 161, above), then the site may host significant archaeological resources, or may be archaeologically "sensitive." The locations of potential sensitivity should be pinpointed as much as possible. The effects on those potential resources are then assessed (see Section 420, below).

If no known or potential archaeological resources are identified on the site, consideration of archaeological resources is complete. If resources were identified, the project's effects on those resources must be evaluated (see Section 410, below). LPC should be consulted in this evaluation as early as possible because it is the only city agency that has an archaeologist on staff.

321.3. Future No-Action Condition

To assess the future No-Action condition, consider and note whether any changes to the existing and potential archaeological resources (identified above in Subsections 321.1 and 321.2) are likely to occur in the future without the project.

321.4. Future With-Action Condition

The proposed project's effects on any designated or potential archaeological resources identified above in Subsections 321.1 and 321.2 are then analyzed in the With-Action condition. The assessment specifically considers whether the project may result in disturbance or destruction of those archaeological resources.

322. Architectural Resources

322.1. Identifying Known Resources

As described in Section 120, designated architectural resources include (1) designated New York City Landmarks, Interior Landmarks, and Scenic Landmarks, and properties within designated New York City Landmark Historic Districts; (2) properties calendared for consideration as one of the above by the New York City Landmarks Preservation Commission; (3) properties listed on or formally determined eligible for inclusion on the State and/or National Register of Historic Places, or contained

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within a district listed on or formally determined eligible for the State and/or National Register of Historic Places; (4) National Historic Landmarks; and (5) properties recommended by the New York State Board for listing on the State and/or National Registers of Historic Places. The information on listed resources is available from the New York City Landmarks Preservation Commission and the New York State Office of Parks, Recreation and Historic Preservation.

If any listed historic resources are located in the study area, then further analysis of the project's impact on these resources must be performed. In addition whether or not the study area includes any listed resources, potential resources should be investigated.

322.2. Identifying Potential Resources

Any potentially eligible architectural resources that may be affected by the project should be identified. Identification of potential historic resources requires some knowledge of an area's history, the broad patterns of historical development in New York City, and the various architectural styles represented in the city. Therefore, the lead agency should consult with LPC for assistance in making determinations of eligibility on the basis of federal, state, and local criteria. Architectural resources are usually identified through a combination of field surveys and documentary research. It should be noted that the passage of time or changing perceptions of significance may justify reevaluation of properties that were previously determined ineligible for the State and/or National Register or for designation as City Landmarks or Historic Districts. Records and documentation of this research effort should be prepared for the lead agency's files or for submission to the reviewing agency, if appropriate.

As described in Section 100, above, historic resources are considered significant if they meet the criteria for eligibility for the National Register, established by the U.S. Secretary of the Interior, or criteria for local designation set forth in the New York City Landmarks Law. Efforts to identify potential architectural resources generally follow the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and the criteria of the New York City Landmarks Law. The National Register and the New York City Landmarks Law's criteria, described in Subsections 161 and 122, respectively, are then applied to determine if these potential resources may be eligible for the National Register or for local designation by the Landmarks Preservation Commission. This methodology is summarized below.

More information on surveying historic resources and applying the National Register criteria is available in the federal regulations and in numerous bulletins published by the National Park Service at www.nps.gov/history and the Advisory Council on Historic Preservation at www.achp.gov.

FIELD SURVEY

The survey for unidentified resources begins with field inspection of the study area, including the project site. During this inspection, structures that appear to have particular cultural, architectural, or historical distinction are identified. This survey requires careful judgment and knowledge about current perceptions of significance and about the history and architecture of New York City. Consultation with LPC or SHPO is encouraged.

RESEARCH

Documentary research of resources' historical and cultural significance is often needed to supplement visual inspections. An assessment of the development history of the study area before field surveys are performed helps identify resources in the area; a post-field survey analysis may provide additional information about any specific resources identified. For example, this information may be used to ascertain a property's association with important events or persons, or its architect and date of construction. A scan of historic records, maps and photographs is also useful for determining the property's integrity: alterations and changes may be traced through the use of these documents.

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- The information needed to evaluate significance depends on the property's history and reason for significance. The following information can assist in determining significance:
- Historically significant events and/or patterns of activity associated with the property.
- Periods of time during which the property was in use.
- Specific dates or periods of time when the resource achieved its importance (*e.g.,* date of construction, date of a specific event, period of association with an important person, period of an important activity).
- Information about any alterations.
- Historically significant persons associated with the property (*e.g.*, its tenants, visitors, or owner).
- Representation of a style, period, or method of construction.
- Persons responsible for the design or construction of the property (*e.g.*, architect, builder).
- Quality of style, design, workmanship, or materials.
- Historically or culturally significant group associated with the property and the nature of its association.
- Information the property has yielded or may be likely to yield.

DOCUMENTATION

For any properties in the study area that appear to be important, information provided should be sufficient to enable the lead agency or coordinating agencies (LPC and/or SHPO) to make a decision concerning the significance of the resources using National Register and local criteria.

For all potentially important resources, the date or approximate date of construction, the name of the architect or builder, the architectural style, and the approximate dates of alterations to the resource should be provided to the lead and interested agencies when possible. Depending on the reasons for importance, additional information should also be provided. Maps indicating the location of the resource(s) and black-and-white photographs of the resources are also helpful. For historically important resources, this includes any available information about that history, such as important occupants or events. For architecturally important resources, all those design elements that contribute to the building or structure's architectural importance should be noted. For example, for a building that may be a fine representation of the Gothic Revival style, those features for which that style is known—such as pointed gables, steep roof pitch, and board and batten siding—should be documented. Features that may contribute to a resource's value, and therefore should be noted, may include the following:

- Type of structure (*e.g.*, dwelling, church, shop, apartment building).
- Building placement (detached, row, flush to the street, set back, *etc.*).
- General characteristics, including overall shape of plan (rectangle, side hall, center hall), number of stories, structural system, number of vertical divisions or bays, construction materials (*e.g.*, brick, stone, poured concrete), wall finish (*e.g.*, kind of bond, coursing, shingle, half-timber), and roof shape.
- Specific features, including location, number, and appearance of porches (*e.g.*, stoops, porte-cocheres), windows, doors, chimneys, and dormers.
- Materials of roof, foundation, walls, and other structural features.

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- Important exterior decorative elements (facades, lintels, cornices, *etc.*).
- Interior features that contribute to the character of the building or that may possess significance independent of the value of the exterior of the building.
- Number, type, and location of outbuildings or dependencies.
- Important features of the immediate environment, including proximity to the street or sidewalk, landscaping, and views.

For potential historic districts, in addition to the information considered for individual resources, other considerations include the qualities that give the district coherence distinct from its surroundings, the boundaries of the district, the individual or groups of buildings that contribute to the character of the district, and the buildings or structures that detract from or diminish its coherence. Therefore, descriptions of potential districts may also include the following types of information:

- General description of the natural and manmade elements of the district including structures, buildings, sites, objects, prominent geographical features, density, and landscaping.
- Numbers of buildings, structures, sites, and objects that contribute to the character of the proposed district, and those that do not contribute to, or may detract from, it.
- General description of types, styles, or periods of architecture represented in the district, including scale, proportions, materials, color, decoration, workmanship and design.
- General description of physical relationships of the buildings to each other and to the physical environment, including facade lines, street plans, parks, squares, open spaces, density, landscaping, roof lines, and massing.
- General description of the district during the period or periods during which it achieved significance.
- Current and original uses of buildings and any adaptive uses.
- General description of the existing condition of buildings, restoration or rehabilitation activities, and alterations.
- Qualities that make the district distinct from its surroundings, including intangible characteristics such as socioeconomic or ethnic affiliations of the residents.
- Description of the qualities that give the district its special character or special historical or aesthetic interest or value.
- Description of the period or style of architecture represented by the district.

CONCLUSIONS ABOUT UNKNOWN ARCHITECTURAL RESOURCES

Based on the information gathered in the steps above, the lead agency determines whether any previously unidentified architectural resources are located in the study area. If the lead agency uses an environmental or architectural consultant, the consultant conducting the assessment should meet the professional standards set forth in the Secretary of the Interior's Standards and Guidelines "Professional Qualifications Standards" (see 48 FR 44716, September, 1983). A private applicant or agency can make a preliminary assessment of potential importance, but the final recommendation under CEQR is made by LPC as the local expert agency, which also possesses additional proficiency by means of its Certified Local Government (CLG) status under Section 106 of the National Historic Preservation Act.

If potential architectural resources are identified, the project's effects on those resources must be assessed (see Section 420, below). This involves considering the future No-Action condition (Subsec-

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tion 322.3, below) and With-Action conditions (Subsection 322.4). If no known or potential resources were identified, the evaluation of architectural resources is complete, and no further historic and cultural resources assessment is needed.

322.3. Future No-Action Condition

To assess the future No-Action condition, consider whether any changes to the existing or eligible architectural resources (identified in Subsections 322.1 and 322.2) are likely to occur without the proposed project. These changes may be physical (*e.g.*, demolition, alteration), visual (*e.g.*, changes to the resource's setting or context), or historical (*e.g.*, change in use that affects its context).

322.4. Future With-Action Condition

The proposed project's effects on any designated or potential architectural resources identified in Subsections 322.1 and 322.2 are then assessed in the future With-Action condition. The analysis considers the potential for physical and contextual effects on those resources. In the assessment of contextual effects, the appearance of any proposed new structures may be important (See Subsection 420).

400. DETERMINING IMPACT SIGNIFICANCE

Federal regulations, which have become a widely recognized standard, define an adverse effect as the introduction of tangible and intangible elements that compromise or diminish the characteristics for which an historic or cultural resource has been determined significant. The project's effects on resources should be compared with the future No-Action conditions to assess impacts. Thus, impact assessment is directly related to the proposed project and how it would affect the distinguishing characteristics of any resources identified. The assessment asks three major questions: (1) would there be a physical change to the property?; (2) would there be a physical change to its setting, such as context or visual prominence (also known as indirect impacts)?; and (3) if so, is the change likely to alter or eliminate the significant characteristics of the resource that make it important? Put another way, except for this project, would there be an impact on historic resources? Impacts may result from both temporary (*e.g.*, related to the construction process) and permanent (*e.g.*, related to the long-term or permanent result of the proposed project or construction project) activities. The lead agency should consult with LPC (for City Landmarks) and/or the SHPO for State or National Register resources in making this determination. Section 700, below, provides more information on the regulations governing designated resources.

410. ARCHAEOLOGICAL RESOURCES

Significant adverse impacts on archaeological resources are physical—disturbance or destruction—and typically occur as a result of construction activities. If any potential significant archaeological resources were identified on the site of the proposed project (Subsection 321.2, above), and the project may disturb or destroy those resources in any way, a significant adverse impact would occur. Possible impacts may occur under the following circumstances:

- Construction resulting in ground disturbance, including construction of temporary roads and access facilities, grading, landscaping; or
- Below-ground construction, such as excavation or installation of utilities.

If a project does not have a physical impact on archaeological resources, no significant adverse impact would occur, and no further archaeological work is necessary.

420. ARCHITECTURAL RESOURCES

Assessment of the magnitude of the impact is a matter of informed judgment, based on the proposed project and the reasons for which a resource was determined important. If the project would affect those characteristics that make a resource eligible for listing on the State and/or National Register or for New York City designation, this

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would most likely be a significant adverse impact. Most important are the characteristics of association and integrity, described in Subsection 161, above.

Possible impacts to architectural resources may include the following:

- Physical destruction, demolition, damage, alteration or neglect of all or part of an historic property. For example, alterations that would add a new wing to an historic building or replacement of the resource's entrance may result in adverse impacts, depending on the design.
- Changes to the architectural resource that cause it to become a different visual entity, such as a new location, design, materials, or architectural features. An example would be recladding an architectural resource with new brickwork.
- Isolation of the property from, or alteration of, its setting or visual relationships with the streetscape. This includes changes to the resource's visual prominence so that it no longer conforms to the streetscape in terms of height, footprint, or setback; is no longer part of an open setting; or can no longer be seen as part of a significant view corridor. For example, if all the buildings on a block, including an architectural resource, are four stories high, and a proposed project would replace most of those with a 15-story structure, the four-story architectural resource would no longer conform to the streetscape. Another example would be a proposed project that would result in a new building at the end of a street so that views of an historic park beyond were blocked.
- Introduction of incompatible visual, audible, or atmospheric elements to a resource's setting. An example would be construction of a noisy highway or factory near a resource noted for its quiet, such as a park.
- Replication of aspects of the resource so as to create a false historical appearance. If a house was built during the Revolutionary War but later underwent extensive alteration, re-creation of its 18th-century appearance may have an adverse impact on that resource.
- Elimination or screening of publicly accessible views of the resource. For example, if a resource is located along the waterfront and is visible across the water, tall new buildings proposed between the architectural resource and the water that would block views of the resource may result in an adverse impact.
- Construction-related impacts, such as falling objects, vibration (particularly from blasting or pile-driving), dewatering, flooding, subsidence, or collapse. Such impacts may occur to an architectural resource adjacent to a construction site if adequate precautions are not taken.
- Introduction of significant new shadows, or significant lengthening of the duration of existing shadows, over an historic landscape or on an historic structure (if the features that make the resource significant depend on sunlight) to the extent that the architectural details that distinguish that resource as significant are obscured. For example, if a resource is noted for its stained glass windows, and those windows are only visible in the sunlight, significant blocking of that sunlight may result in a significant adverse impact. For more information, see Chapter 8, "Shadows."

500. DEVELOPING MITIGATION

Mitigation measures for historic resources are based on the nature of the impact as well as the significant attributes of the historic resource at risk. They are developed on a case-by-case basis; typical measures are described below. Consultation with LPC and/or SHPO on designing mitigation measures is required when significant impacts occur to architectural or archaeological resources.

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510. ARCHAEOLOGICAL RESOURCES

511. Human Remains

LPC regulates all work (including subsurface work) in the African Burial Ground and The Commons Historic District and within landmarked cemeteries. The protocols for work within these areas are prescribed in LPC's 2002 *The Guidelines for Archaeological Work in New York City*. It is a general principle of these protocols that every effort be made to ensure that burials will not be disturbed and, in the event that burials are found in these areas, they be preserved in place.

For work outside these landmarked areas, but within an area thought to contain human remains, LPC shall be consulted to develop appropriate methodologies. For work within private cemeteries, the State Division of Cemeteries must be contacted about relevant regulations.

If unexpected human remains are encountered during any phase of work on any site, all construction work must cease and the police and medical examiner must be contacted immediately.

512. Redesign

To mitigate a project's significant adverse impact on potential archaeological resources, the project may be redesigned so that it does not disturb the resources. For example, if potential resources may be located only in one corner of the site, that corner may be left undeveloped.

513. Fieldwork

Often, only the potential for significant prehistoric or historic archaeological resources is established when determining a project's impacts. Mitigation of significant adverse impacts on potential resources often calls for archaeological testing to determine whether archaeological resources are, in fact, present. If any such resources are found, archaeological testing may also be used to determine their extent and significance.

If this testing program indicates that significant resources are present, further measures are required. These are either the avoidance of the resource through redesign (Subsection 512), or mitigation through data recovery (Subsection 514). For example, if an archaeological site is located at the periphery of the construction area and may be disturbed during construction staging activities but not by the project itself, then enclosing the site with temporary fencing and adjustment of the construction program to avoid the site may be sufficient. If avoidance is not feasible, then a data recovery program is implemented (Subsection 514).

Field testing is done by scientifically examining the subsurface conditions through borings, small hand excavated trenches, or mechanical excavation. The type of testing that should be used is dependent upon site conditions and the type of resource. The testing must be supervised by a professional archaeologist who has the qualifications outlined above in Subsection 513. The archaeologist submits a scope of work to the lead agency and LPC for review and approval before any work may be undertaken. This document sets forth how the work will be accomplished and what tests the potential resources should meet to be considered significant. If artifacts are uncovered, the archaeologist must stabilize and analyze them. The archaeologist is required to submit a report outlining his or her findings, including: site plans detailing where the work was undertaken; an explanation of what any analysis yielded; and a discussion about whether significant, or potentially significant, resources were encountered. Artifacts recovered from such sites must be stabilized and deposited in an appropriate repository as explained in Subsection 514. If the study concludes that no archaeological resources are present or significant no further work is needed. The lead agency consults with LPC for assistance in reviewing and approving the field testing report.

If the preliminary determination of the site's potential sensitivity and the project's potential for significant impact is made through an Environmental Assessment Statement, and if field research is determined to be appropriate mitigation, a Conditional Negative Declaration may be appropriate or the project description may be altered, to provide for necessary field research to be conducted concurrently with or subsequent to environmental review, but prior to site disturbance. However, a Conditional Negative Declaration may not be

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used if the affected resource is designated, calendared for designation, listed on or formally determined eligible for inclusion on the Registers, recommended by the New York State Board for such listing, or a National Historic Landmark (See Chapter 1, "Procedures and Documentation," for a discussion of Conditional Negative Declarations and Type I actions).

514. Excavation

When avoidance of significant archaeological resources is not an option, then a data recovery program is appropriate mitigation. As the value or significance of the archaeological resource relates to its potential to provide important information, the adverse effects of the project on the resource are considered mitigated when the information has been recovered through systematic archaeological investigation. The process is similar to that of testing. The lead agency reviews and approves the scope of work after consultation with LPC. This document specifies the level of field effort, identifies the research issues, details the treatment of artifacts, and outlines the content of the final report. For guidance please see LPC's 2002 "The Guidelines for Archaeological Work in New York City."

Once the fieldwork has been completed, the archaeologist must stabilize and analyze the artifacts in accordance with professional standards. The archaeologist should submit a final report to the lead agency for review and approval after consultation with the LPC. This document: summarizes the significance of what was found; provides detailed descriptions of all excavation work area by area; describes laboratory techniques; outlines the analysis; and synthesizes all analysis undertaken. Mitigation is not considered to be complete until the final report has been reviewed and approved and the artifacts are curated in an appropriate repository (see Subsection 515).

515. Repositories

Artifacts recovered from significant archaeological sites should be curated in an appropriate repository. The City of New York does not currently maintain an archaeological repository. Artifacts should be curated in an appropriate facility that will curate the artifact collection to professional standards and make it available to researchers. Please see LPC's 2002 "The Guidelines for Archaeological Work in New York City" for guidance.

520. ARCHITECTURAL RESOURCES

Possible mitigation measures for significant adverse effects on architectural resources include redesign; adaptive reuse; protective measures, including construction monitoring; and, as a last resort, documentation or relocation.

521. Redesign

This is the preferred mitigation measure for significant impacts on historic resources. Redesign techniques are devised in consultation with the appropriate consulting agency (LPC and/or SHPO).

521.1. Relocating the Project

This mitigation measure involves avoiding the resource altogether by moving the proposed project away from the resource. When the relocated project would remain close to the architectural resource, this mitigation also calls for sympathetic contextual design of the redesigned project (see the discussion below under Subsection 521.2).

521.2. Contextual Redesign

When a proposed project would alter the setting of an architectural resource that is not physically affected, appropriate mitigation involves redesign of the proposal to be more compatible with the resource. This is a function of the distinguishing characteristics of the resource and the magnitude of impact. Possibilities include rearranging the proposed building's massing so that important views are not blocked or adding design elements that complement or echo the features of the architectural resources. New design should be compatible with the size, scale, color, material, and character of the

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property, neighborhood, streetwall or environment. Particular attention to fenestration, setbacks, roof lines, and massing of the new structure as well as other aspects of design is advised. The new building should be clearly distinguishable from, although compatible with, the existing historic property.

An example of sympathetic design with an existing architectural resource is Carnegie Hall Tower, designed to be sympathetic to historic Carnegie Hall. The tower, immediately east of the original building, is clad in the same color brick, and through its decorative treatment of the facade, doorways, and fenestration, echoes the organization of the adjacent marquee and grand entrance to the concert hall. Horizontal bands of brick and stucco extend the horizontal lines of the old building to the new, but a very narrow separation distinguishes the old building from the new. The platform of the new building is level with the roofline of the original eight-story hall, and the tower is set back from the street.

522. Adaptive Reuse

Redesign can include incorporating the resource into the project rather than demolishing it. This is known as "adaptive reuse." Adaptive reuse is the fitting of new requirements, functions, or uses into an existing historic space. It is acceptable only if it does not affect the structure or character of the historic resource. Adaptive reuse is common in New York City. Successful adaptive reuse projects in New York include the Puck Building on Lafayette Street and Jefferson Market Library in Greenwich Village.

When adaptive reuse involves repairs or alterations to the historic resource, distinctive stylistic features should be treated with sensitivity so that the form and integrity of the historic structure is not materially affected by the new construction. Repair of the original is always preferred. When replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Replacement or repair should be an accurate duplication of the original, based on evidence (*e.g.*, historic photographs, blueprints) and not on conjectural designs or availability of different architectural elements from other buildings and structures (refer to the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, available from the U.S. Department of the Interior, National Park Service, Preservation Assistance Division—see Subsection 732.2, below).

523. Construction Protection Plan

A construction protection plan should be used to protect historic resources that may be affected by construction activities related to a proposed project. The plan should be developed in coordination with the appropriate consulting agency (LPC and/or SHPO) and fulfilled by a foundation and structural engineer. Elements of the plan may include the following:

- Borings and soil reports of the water table establishing composition, stability, and condition;
- Existing foundation and structural condition information and documentation for the historic property;
- Formulation of maximum vibration tolerances based on impact and duration and considerations using accepted engineering standards for old buildings;
- Dewatering procedures, including systematic monitoring and recharging systems;
- Protection from falling objects and party wall exposure; and
- Monitoring during construction using tell-tales, seismographic equipment, and horizontal and lateral movement scales.

Reference should also be made to "New York City Landmarks Preservation Commission Guidelines for Construction Adjacent to a Historic Landmark," “Protection Programs for Landmark Buildings” (both on file with LPC) and "Technical Policy and Procedures Notice No. 10/88, Procedures for the Avoidance of Damage to Historic Structures Resulting from Adjacent Construction" (on file with the New York City Department of Build-

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ings). Additional reference documents that may prove helpful: "The Secretary of the Interior's Standards for Blasting," by Michael Lynch, on file at SHPO and LPC; and "Protecting a Historic Structure During Adjacent Construction," by Chad Randl.

524. Data Recovery

For projects that involve significant alterations or demolition of historic resources for which other mitigation measures are not feasible, data recovery or recordation of historic structures is the last resort. This measure is not usually considered full mitigation for New York City Landmarks or for properties calendared for consideration as Landmarks. Data recovery mitigation typically requires coordination with LPC and/or SHPO. Demolition of a New York City landmark requires LPC approval prior to any demolition work. In addition, LPC must approve the proposed scope of work for Historic American Buildings Survey (HABS) recordation prior to any demolition work.

Recordation projects typically follow agreed-upon standards, such as those established by the HABS or Historic American Engineering Record (HAER). This is a documentation program administered by the National Park Service. Recordation projects frequently select this program since it provides a uniform and widely accepted standard for the documentation, monitored by professional staff, and resulting in materials that are then housed at the Library of Congress, where they are accessible to a broad range of researchers. The resulting documentation comprises a verbal description of the interior and exterior of the building(s); a discussion of the historical development of the resource and its context, including significant alterations to it; measured drawings (*e.g.*, site plan, elevations, interior plans, *etc.*); and a series of large format black-and-white photographs illustrating the existing structure. Text, drawings, and photographs are submitted on archivally stable materials following a prescribed format. Guidance is obtained from the National Park Service, Mid-Atlantic Regional Office in Philadelphia.

525. Relocating Architectural Resources

This measure is the least preferred of all mitigation measures, and is typically considered when there is no other prudent or feasible alternative, because it can have significant adverse impacts on the resource as well. Relocation may endanger the resource and, by removing it from its original context and setting, may threaten its integrity and the reasons for its significance. As noted earlier, relocated resources are not normally accepted for listing on the State and/or National Register. Relocation of historic resources cannot be undertaken without a permit from LPC (for designated New York City Landmarks or properties in Historic Districts) and consultation with SHPO, and/or the Federal Advisory Council on Historic Preservation.

According to guidelines issued by the Federal Advisory Council on Historic Preservation, historic properties that are movable by their nature (*e.g.*, ships or machinery) can normally be moved to avoid project impacts on them without adverse effect, unless their current location is historically or culturally significant, their structural integrity would be impaired by the relocation, or their new location would make them vulnerable to deterioration or damage.

600. DEVELOPING ALTERNATIVES

610. ARCHAEOLOGICAL RESOURCES

Alternatives that reduce or avoid impacts on archaeological resources are those that would allow the archaeological resource to remain in place, undisturbed and undestroyed. Any project alternative that achieved this result is suitable. Most often, these alternatives include relocation of any proposed excavation or other activity to another part of the site, or to another site altogether.

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620. ARCHITECTURAL RESOURCES

Alternatives for significant adverse impacts on architectural resources typically involve incorporation of some of the mitigation measures described above. These include relocating the project, or redesigning the project in a more contextual manner. Often, smaller projects or projects redesigned to incorporate different massing, scale, material, or other design characteristics may be appropriate alternatives. Coordination with LPC may be helpful in identifying appropriate alternatives.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

711. Federal Regulations

711.1. National Historic Preservation Act of 1966

If the project also falls within federal jurisdiction (that is, it is federally funded, licensed, or regulated), then the requirements of the National Historic Preservation Act of 1966, as amended (NHPA), and implemented by procedures set forth in 36 CFR Part 800 (*Protection of Historic Properties*), apply. Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects that their federal permit or federally funded activities and programs have on significant historic properties and to give the Advisory Council on Historic Preservation a reasonable opportunity to comment. "Significant historic properties" are those properties that are included in, or eligible for, the National Register of Historic Places. The federal agency coordinates with the State Historic Preservation Officer (SHPO) and any other appropriate consulting parties—such as the local government, the applicant for a permit, and the interested public. The federal agency, in consultation with all other consulting parties, assesses the potential adverse impacts of the Federal action on the historic property. The consultation process usually results in a Memorandum of Agreement between the Federal agency and the consulting parties that outlines agreed-upon measures that the Federal agency will take to avoid, minimize, or mitigate the adverse effects of its action. This process may run concurrently with any environmental review conducted pursuant to NEPA, SEQRA, or CEQR.

In addition, Section 111 of the NHPA mandates that federal agencies may lease and exchange historic properties and enter into contracts for the management of historic properties only after the agencies determine that the lease, exchange, or management contract will adequately ensure the preservation of the historic property.

711.2. Federal Department of Transportation Act

Other regulations that can apply include Section 4(f) of the Federal Department of Transportation Act of 1966 (DOTA), which applies to transportation projects (usually highways) funded by the Federal Department of Transportation. This law requires the federal agency responsible for the project to consider whether the project would infringe on publicly owned land or any site of national, state, or local historic significance, as determined by the appropriate officials. Such an infringement can occur only if there is no feasible and prudent alternative and if such program includes all possible planning to minimize harm to such properties.

711.3. Other Federal Laws

In addition to the DOTA, other similar laws dealing with specific modes of transportation also require protection of historic resources unless there is no feasible and prudent alternative and unless all possible minimization of harm is planned. These include the Airport and Airway Development Act of 1970, the Federal-Aid Highway Act of 1968, and the Urban Mass Transit Act. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), a six-year, $151 billion transportation program, gives

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states and municipalities a major role in decisions about transportation-related issues, and provides funds for enhancements related to the quality of life, including historic preservation.

In addition to all of the federal protections described above, archaeological resources are given special protection under the Archaeological Resource Protection Act of 1979. This act regulates the taking of archaeological resources on federal land. Other federal protections for archaeological resources are provided by the Historic Sites Act of 1935, the Antiquities Act of 1906, the Archaeological Recovery Act, the National Environmental Policy Act of 1969, and the Abandoned Shipwreck Act of 1987.Finally, the National American Graves Protection and Repatriation Act of 1990 includes a process for museums and Federal agencies to return certain Native American cultural items -- human remains, funerary objects, sacred objects, or objects of cultural patrimony -- to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. It includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional and inadvertent discovery of Native American cultural items on Federal and tribal lands.

712. State Regulations

For projects within state jurisdiction (that is, it is funded, licensed, or regulated by a state agency), the governing regulation is Article 14 of the New York State Historic Preservation Act of 1980 (SHPA). This law requires that state agencies must avoid or mitigate any significant adverse impacts on historic properties to the fullest extent practicable, feasible, and prudent. These requirements are the same as those of the State Environmental Quality Review Act, or SEQRA. The SHPA mandates consultation with the State Historic Preservation Officer (see discussion on coordination, below).

713. City Regulations

The New York City Landmarks Law establishes LPC and gives it the authority to designate City Landmarks, Interior Landmarks, Scenic Landmarks, and Historic Districts, and to regulate any construction, reconstruction, alteration, or demolition of such Landmarks and Districts. Under the Landmarks Law, no new construction, alteration, reconstruction, or demolition can take place on Landmarks, Landmark sites, or within designated New York City Historic Districts until the LPC has issued a Certificate of No Effect on protected architectural features, Certificate of Appropriateness, or Permit of Minor Work. Projects reviewed under CEQR that physically affect Landmarks or properties within New York City Historic Districts require mandatory review by LPC, in the case of private properties, and in the case of certain City property, approval of LPC. See N.Y.C. Admin. Code § 25-300 *et. seq*. for further information.

Both private applicants and public agencies must apply to LPC for any work on designated structures, sites, or structures within historic districts. The LPC issues permits to private applicants and reports to public agencies. No work on these protected resources may proceed prior to the issuance of a Landmarks Preservation Commission permit or report.

720. APPLICABLE COORDINATION

Applicable coordination ultimately depends upon the following factors: the type of resource involved (Federal or City listed or eligible), the oversight legislation involved (Federal, State, and/or City), and the relationship among multiple agencies in the cases of large scale actions (such as Citywide actions or actions requiring a number of funding sources or discretionary approvals). The lead agency is the primary agency responsible for coordination. Examples of such types of coordination are listed below.

- When designated New York City Landmarks, properties already calendared for designation, or identified properties eligible for LPC designation may be affected by a project, the lead agency coordinates with LPC.
- When properties listed on, or determined eligible for, the State and/or National Registers, recommended by the New York State Board for listing on the Registers, or National Historic Landmarks are involved, the lead agency coordinates with either LPC or SHPO, depending upon whether it is a Federal, State, or City ac-

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tion. The final determination of eligibility and/or treatment rests with the SHPO if it is a Federal or State action, and LPC if it is a CEQR action.

- In some cases, it is possible that coordination with both LPC and SHPO may be required. For example, some large scale projects involve Federal, State and City agencies and a number of discretionary actions. In this case, the SHPO would be the expert agency responsible for identification and treatment of State and National Register listed properties. LPC would be the expert agency responsible for identifying LPC designated and eligible properties. LPC also consults with the appropriate Federal, State and City agencies involved with the project regarding treatment of LPC eligible properties. When consultation with the Advisory Council on Historic Preservation (ACHP) is part of the project, SHPO is responsible for overall coordination with the ACHP; however if LPC is a consulting party to a Federal action, LPC comments are considered separately from those of SHPO.
- Occasionally a lead and/or expert agency or a member of the public will request comments from SHPO on projects undergoing CEQR review. As a matter of policy, SHPO only consults informally and verbally on these actions and typically defers to the LPC.

730. LOCATION OF INFORMATION

731. Expert Agencies

New York City Landmarks Preservation Commission

One Centre Street
9th Floor North
New York, NY 10007
www.nyc.gov/landmarks
Files on properties that have been designated New York City Landmarks or listed on the State and National Registers of Historic Places, and on the location of known archaeological sites in the City.

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Service Bureau
Peebles Island
Box 189
Waterford, NY 12188-0189
http://nysparks.state.ny.us/shpo/
Information about properties listed on or determined eligible for listing on the State and/or National Registers of Historic Places, as well as the location of known archaeological sites in the State.

732. Other Resources

When a survey is appropriate to identify unknown potential historic resources, useful sources can include local academic institutions and museums (such as the Museum of the City of New York), historical societies (such as the New York Historical Society, the Bronx County Historical Society, the Brooklyn Historical Society, the Queens Historical Society, and the Staten Island Historical Society), and the City's public libraries. Both LPC and the SHPO should be consulted as to the likelihood that a site contains archaeological resources. Sources for detailed historical research include historic maps, which can be found at the New York Public Library, 42nd Street Branch, and the libraries and historical societies that have already been listed. Deeds and other land ownership records are housed at the various borough halls; Buildings Department records are also located in each Buildings Department borough office. Tax records, 19th century Buildings Department records, and early plans and maps can be found at the Municipal Archives in Manhattan.

732.1. Museums and Historical Societies

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Museum of the City of New York

Fifth Avenue at 103rd Street
New York, NY 10029
http://www.mcny.org/

New York Historical Society

170 Central Park West
New York, NY 10024
https://www.nyhistory.org/web/

Bronx County Historical Society

3309 Bainbridge Avenue
Bronx, NY 10467
http://www.bronxhistoricalsociety.org/

Brooklyn Historical Society

128 Pierrepont Street
Brooklyn, NY 11201
http://www.brooklynhistory.org/default/index.html

Queens Historical Society

143-35 37th Avenue
Flushing, NY 11354
http://www.queenshistoricalsociety.org/

South Street Seaport Museum

207 Front Street
New York, NY 10038
http://www.southstreetseaportmuseum.org/

Staten Island Historical Society

441 Clarke Avenue
Richmondtown, Staten Island, NY 10306
http://www.historicrichmondtown.org/

732.2. Other Sources

New York City Municipal Archives

31 Chambers St.
New York, NY 10007
http://www.nyc.gov/html/records/html/about/archives.shtml

New York Public Library: http://www.nypl.org/

Brooklyn Public Library: http://www.brooklynpubliclibrary.org/

Queens Public Library: http://www.queenslibrary.org/

Local, community-based preservation groups

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732.3. Publications

Publications that can be helpful in evaluating potential historic resources are available from the National Register of Historic Places, National Park Service, U.S. Department of the Interior, P.O. Box 37127, Washington, DC 20013-7127. The *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* http://www.nps.gov/history/local-law/arch_stnds_0.htm and the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* http://www.nps.gov/history/hps/TPS/tax/rhb/can also be obtained from the National Park Service.

732.4. Websites

Advisory Council on Historic Preservation: www.achp.gov

National Park Service, History and Cultural Division: www.nps.gov/history

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URBAN DESIGN AND VISUAL RESOURCES

CHAPTER 10

In an urban design assessment under CEQR, one considers whether and how a project may change the experience of a pedestrian in the project area. The assessment focuses on the components of a proposed project that may have the potential to alter the arrangement, appearance, and functionality of the built environment. The analysis of urban design relies on drawings, maps, renderings, and most importantly, photographs and photographic montages taken from pedestrian eye level. These representations allow the public to see what a project would look like. Materials required for the urban design analysis are similar to those necessary to file an application under the Uniform Land Use Review Procedure (ULURP).

As indicated throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of City Planning (DCP) often works with the lead agency during the CEQR process to provide technical review, assistance, and recommendations relating to urban design.

100. DEFINITIONS

Urban design is the totality of components that may affect a pedestrian's experience of public space. The following elements play an important role in that experience.

STREETS. For many neighborhoods, streets are the primary component of public space. The arrangement and orientation of streets define the location and flow of activity in an area, set street views, and create the blocks on which buildings and open spaces are organized. The apportionment of street space between cars, bicycles, transit, and sidewalk is critical to making a successful streetscape, as is the careful design of street furniture, grade, materials used, and permanent fixtures, including plantings, street lights, fire hydrants, curb cuts, or newsstands.

BUILDINGS. Buildings support streets. A building's streetwalls form the most common backdrop in the city for public space. A building's size, shape, setbacks, lot coverage, placement on the zoning lot and block, the orientation of active uses, and pedestrian and vehicular entrances all play major roles in the vitality of the streetscape. The public realm also extends to building façades and rooftops, offering more opportunity to enrich the visual character of an area.

VISUAL RESOURCES. A visual resource is the connection from the public realm to significant natural or built features, including views of the waterfront, public parks, landmark structures or districts, otherwise distinct buildings or groups of buildings, or natural resources.

OPEN SPACE. For the purpose of urban design, open space includes public and private areas such as parks, yards, cemeteries, parking lots and privately owned public spaces.

NATURAL FEATURES. Natural features include vegetation and geologic, topographic, and aquatic features. Rock outcroppings, steep slopes or varied ground elevation, beaches, or wetlands may help define the overall visual character of an area.

WIND. Channelized wind pressure from between tall buildings and downwashed wind pressure from parallel tall buildings may cause winds that jeopardize pedestrian safety.

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200. DETERMINING WHETHER A URBAN DESIGN AND VISUAL RESOURCES ASSESSMENT IS APPROPRIATE

In general, an assessment of urban design is needed when the project may have effects on one or more of the elements that contribute to the pedestrian experience described above. There is no need to conduct an urban design analysis if a proposed project would be constructed within existing zoning envelopes, and would not result in physical changes beyond the bulk and form permitted "as-of-right."

210. PRELIMINARY ANALYSIS THRESHOLDS

A preliminary assessment is appropriate when there is the potential for a pedestrian to observe, from the street level, a physical alteration beyond that allowed by existing zoning, including the following:

1. Projects that permit the modification of yard, height, and setback requirements;
2. Projects that result in an increase in built floor area beyond what would be allowed 'as-of-right' or in the future without the proposed project.

However, certain projects that may affect buildings, such as a variance of a rear yard requirement, does not require any assessment of urban design because the project does not result in a change to the experience of a pedestrian since it is located in a rear yard. Another example would be a change in use that does not change the bulk controls of a block, such as a special permit to allow an accessory parking garage to operate as a public parking garage.

To complete a preliminary assessment, the analyst should use the checklist in Section 320. The checklist forms a "snapshot" of the project and provides the minimum amount of information necessary to determine whether a potential for significant adverse impacts exists and, consequently, whether further analysis is needed. If a preliminary assessment determines that a change to the pedestrian experience is minimum and unlikely to disturb the vitality, the walkability, or the visual character of the area, then no further assessment is necessary.

220. DETAILED ANALYSIS THRESHOLDS

The lead agency must use its discretion to determine if a more detailed analysis is needed. Examples may include projects that would allow a project to potentially obstruct view corridors, compete with icons in the skyline, or make substantial alterations to the streetscape of a neighborhood by noticeably changing the scale of buildings.

230. PEDESTRIAN WIND CONDITIONS

The construction of large buildings at locations that experience high wind conditions may result in an exacerbation of wind conditions due to 'channelization' or 'downwash' effects that may affect pedestrian safety. If appropriate, the lead agency should consult with DCP or the Mayor's Office of Environmental Coordination (MOEC) to determine whether a pedestrian wind condition analysis is warranted for a proposed project. Factors that may be considered in making this determination include, but are not necessarily limited to:

- Locations that could experience high wind conditions, such as along the waterfront, or other locations where winds from the waterfront are not attenuated by buildings or natural features;
- The size and orientation of the buildings that are proposed to be constructed;
- The size of the project (generally only projects of a substantial size have the potential to alter wind conditions);
- The number of proposed buildings to be constructed; and
- The site plan and surrounding pedestrian context of the project.

If determined to be necessary, analysis may include computer modeling or the use of a wind tunnel, as appropriate, and should focus on the extent to which the massing and orientation of buildings and other features of the

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proposed development contribute to an exacerbation of pedestrian wind conditions. In the event that studies indicate the potential for exacerbation of pedestrian wind conditions that could affect pedestrian safety, modifications to the urban design features of the project, including changes to building massing, landscaping and other measures, that are consistent with the overall urban design objectives of the project, should be considered.

300. ASSESSMENT

310. STUDY AREAS

The study area for urban design is the area where the project may influence land use patterns and the built environment, and is generally consistent with that used for the land use analysis. For visual resources, the view corridors within the study area from which such resources are publicly viewable should be identified. The land use study area may serve as the initial basis for analysis; however, in many cases where significant visual resources exist, it may be appropriate to look beyond the land use study area to encompass views outside of this area, as is often the case with waterfront sites or sites within or near historic districts.

311. Describing the Existing Area

Both graphics and text may be used to describe the area affected by a project. This assessment should be organized to identify those elements of urban design in the area.

The information required in both the preliminary and detailed assessments help describe the existing urban design of the area. For example, the affected areas may be described by the regularity of street grid, building form, site planning and configuration, parking, and streetscape, as well as by predominant land use(s): low-rise, residential, medium-density residential, commercial, industrial, or undeveloped.

320. PRELIMINARY ASSESSMENT

The purpose of the preliminary assessment is to determine whether any physical changes proposed by the project may raise the potential to significantly and adversely affect elements of urban design.

The preliminary analysis, therefore, should provide the following information, if known:

- A concise narrative of the existing project area, the future With-Action condition, and the future No-Action condition;
- Aerial photograph of the study area (a current online map is sufficient);
- Zoning calculations of existing and the future With-Action conditions;
- Floor area calculations;
- Lot and tower coverage;
- Building heights;
- Ground-level photographs of the site area with the immediate context (three is sufficient);
- A three-dimensional representation of the future With-Action condition streetscape – (lines drawn over a photograph indicating the location size and general shape is sufficient, see illustration below); and
- If view corridors exist within the study area, describe the proposed project as it relates to visual resources including, as appropriate, proximity, orientation, height, bulk, *etc*.

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EXISTING SITE AND CONTEXT PROPOSED PROJECT

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If the preliminary assessment shows that changes to the pedestrian environment are sufficiently significant to require greater explanation and further study, then a detailed analysis is appropriate. Detailed analyses are generally appropriate for all area-wide rezonings that include an increase in permitted floor area or changes in height and setback requirements, general large scale developments, or projects that would result in substantial changes to the built environment of a historic district or components of an historic building that contribute to the resource's historic significance.

Conditions that merit consideration for further analysis of visual resources include:

- When the project partially or totally blocks a view corridor or a natural or built visual resource and that resource is rare in the area or considered a defining feature of the neighborhood; or
- When the project changes urban design features so that the context of a natural or built visual resource is altered (for example, if the project alters the street grid so that the approach to the resource changes; if the project changes the scale of surrounding buildings so that the context changes; if the project removes lawns or other open areas that serve as a setting for the resource).

330. DETAILED ANALYSIS

To complete a detailed analysis, use the checklist below to compile the information, if applicable and known, needed for review. This checklist requests drawings and other information that provide an objective and clear representation of the intention and likely effect of the proposed project on the pedestrian's experience of the public realm. If feasible, the analyst should compile these items for the existing condition, the future No-Action condition, and the future With-Action condition, and annotate these as necessary to identify potential positive and significant adverse impacts of design.

- Concise narratives of existing project area condition, future No-Action condition, and future With-Action condition.
- Context plan – 1: 500.
- Site plans – 1: 100 (multiple as necessary).

- For those instances when a proposed project does not include a specific development site, but applies to a large area (such as an area-wide rezoning), include a series of potential site plans covering a range of possibilities.
- Photographs of existing conditions.
- At a minimum, views should include each street intersection bounding and within the site.
- Photographs should be taken from the sidewalk at pedestrian height.
- Sketches or renderings of the future With-Action condition for each existing view.
- Architectural and landscape detail is not required, unless the details are to be approved as part of the project (i.e. required components of a site plan, architectural designs that are mandated through the approval process, etc.). Any details that are shown on sketches and renderings that would not be required as part of the project should be noted as illustrative on the figures, and should be understood to be placeholders.
- Completed chart of building massing.
- Floor area calculations.
- Lot and tower coverage.
- Street-wall heights.
- Open area.
- Building heights.
- Average floor-plate sizes.
- Building setbacks.
- Proposed program and use distribution.
- Birdseye views of the entire project area. The views should be taken at 90 degrees from each other to surround entire project area.
- Elevations along all street fronts showing street wall heights, setbacks, recesses and transparencies. All should be clearly labeled.
- Detailed landscape plans of the future With-Action condition public areas showing paving, lighting, planting, seating and other elements.
- Sections through street and other pedestrian areas showing sidewalk widths, plantings, furnishings, and other elements of pedestrian streetscape for the future With-Action condition. Sections should extend to surrounding buildings on both sides.
- An area map showing existing view corridors and access to visual resources both within and outside the project area.
- Wind assessment study, if required.
- NOTE: For all drawings, all significant dimensions should be labeled clearly. Dimensions should be given in feet and inches. Drawings should be printed on 8.5" x 11" paper or be able to be folded easily to that size. All drawing should be clearly labeled with titles from the checklist. All annotations should be legible. All drawings and renderings should be readable in a black and white printed format.

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340. FUTURE NO-ACTION CONDITION

Using the information gathered above, assess whether and how the urban design conditions of the neighborhood are expected to change in the future No-Action condition. The assessment should reference the figures provided and explain the specific changed conditions that the figures illustrate.

350. FUTURE WITH-ACTION CONDITION

To determine how the proposed project may affect urban design relative to the No-Action conditions, the assessment describes the proposed project in terms of how it would affect the area's defining elements of urban design in the With-Action condition compared to the future No-Action condition. The assessment should reference the figures provided and explain the specific changed conditions that the figures illustrate.

Generic actions can be assessed in much the same way, with somewhat less detail than site-specific actions' assessments. In some cases, when less detail about the project is available, the assessment considers the circumstances or issues that may affect the urban design in the study area.

400. DETERMINING IMPACT SIGNIFICANCE

Determining the significance of an urban design impact requires consideration of the degree to which a project would result in a change to the built environment's arrangement, appearance, or functionality such that the change would negatively affect a pedestrian's experience of the area. One important consideration is a project's context -- for example, the scale and use of surrounding buildings. However, matching context is not necessarily the sole benchmark for measuring urban design impacts, and this subject is further assessed in the Chapter 21, "Neighborhood Character."

All changes should be clearly denoted on the drawings in which they are shown to determine the impact, and whether that impact is significant. See the drawing below for an example. The proposed streetwall (1) has a different street wall height than its neighbors (2). This may be considered a negative urban design impact in some zoning districts.

Key considerations in the assessment of the significance of a visual resource impact may include whether the project obstructs important visual resources and whether such obstruction would be permanent, seasonal, or temporary; how many viewers would be affected; whether the view is unique or do similar views exist; or whether it can be seen from many other locations.



PROPOSED PROJECT

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500. DEVELOPING MITIGATION

Because significant adverse impacts on urban design relate to projects that physically change a site (or provide an opportunity for physical change, such as through a rezoning) in terms of the project's appearance, location, placement on the block, effect on the street grid, or alteration of topography, *etc.*, mitigation of these impacts may involve changes to these features that would better complement the area. If a significant adverse impact is identified, project changes necessary to avoid the impact may be examined as described in Section 600, below.

600. DEVELOPING ALTERNATIVES

Alternatives that reduce or eliminate significant adverse impacts on urban design may be classified into two major types: those that involve substantial design changes to the proposed project (beyond those appropriate as mitigation) and those involving alternative sites. Project alternatives usually include a different physical design that would not result in the same impacts as the project as proposed. These physical changes may include a reduction in size, major alterations to the site plan, changes in the orientation of buildings, or alterations to proposed street mappings or demappings.

Alternative site analyses may involve the examination of a different site for the proposed project, which would result in a project more in keeping with the streetscape of the alternative site's surrounding area, or one that would not block important view corridors, eliminate important natural areas, *etc.*

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are no specific city, state, or federal statutes, regulations, or standards governing the analysis of visual character.

720. APPLICABLE COORDINATION

Coordination with DCP may be useful in any streetscape assessment, but is required only when the DCP is an involved agency. This occurs if the project includes an action subject to approval by the City Planning Commission.

If a project may affect public waterfront views, consultation with the Waterfront and Open Space Division of DCP is recommended. Similarly, if a project may cause obstruction of a view of a landmark (see Chapter 9, "Historic Resources"), consultation with the Landmarks Preservation Commission (LPC) is recommended.

730. LOCATION OF INFORMATION

DCP maintains copies of the Zoning Resolution, Sanborn maps, Fire Insurance Underwriters maps, and tax maps for the entire city. These resources are also available online (except Sanborn maps) and in local public libraries. City maps are available for viewing in the Borough President's office in each borough and at DCP.

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NATURAL RESOURCES

CHAPTER 11

A natural resource is defined as (1) the City's biodiversity (plants, wildlife and other organisms); (2) any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and (3) any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability. Under CEQR, a natural resources assessment considers species in the context of the surrounding environment, habitat or ecosystem and examines a project's potential to impact those resources.

Resources such as ground water, soils and geologic features, numerous types of natural and human-created aquatic and terrestrial habitats (including wetlands, dunes, beaches, grasslands, woodlands, landscaped areas, gardens, parks and built structures) and any areas used by wildlife may be considered, as appropriate, in a natural resources analysis. Stormwater runoff may also be considered in a natural resources assessment and evaluated in the context of its impact on local ecosystem functions and on the quality of adjacent waterbodies. More information regarding stormwater is located in Chapter 13, "Water and Sewer Infrastructure." Although any aspect of the City's biodiversity may be considered in a CEQR evaluation, those species classified as sensitive, vulnerable, rare, special concern, threatened, endangered or otherwise worthy of protection are to be given individual consideration within the context of New York City's environment.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency throughout the environmental review process. The lead agency may determine it is appropriate to consult or coordinate with the New York City Department of Environmental Protection (DEP) or the New York City Department of Parks and Recreation (DPR) for the natural resources analysis. It is recommended that these expert agencies be contacted as early as possible in the environmental review process. Section 700 further outlines appropriate coordination with both DEP and other expert agencies. In addition, there are many specific federal, state, and city rules and regulations governing human interaction with natural resources. Although the permitting process is often undertaken after the CEQR process is complete, applicants requiring further permit approvals are encouraged to contact the regulatory agencies as early as possible to be certain the project is permittable and to ensure the environmental review informs the regulators' decisionmaking.

The numerous sources of information available from local, state and federal agencies that provide greater detail on the City's natural resources should be consulted for a CEQR natural resources evaluation. Table 1 provides a list of current online and print resources that offer information useful for natural resources reviews under CEQR, including species lists (including state and federally listed species), habitat communities, protective legislation and management/restoration plans targeting the City's critical habitat communities and ecosystems, interactive maps and other sources.

100. DEFINITIONS

A critical source of information on habitat communities present in New York City is the New York Natural Heritage Program's Ecological Communities of New York State. These publications provide detailed information on both the species associations and environmental conditions (*e.g.*, soils, hydrology or geology) that are characteristic of a particular habitat community. All characteristic species noted for a particular plant community, however, are not required to be present at each location to classify the presence of that community. Within the urban ecosystems of New York City, it is important to note that environmental conditions and species compositions at any location may be substantially altered from a past condition, and each location must be reviewed for evidence of recent or historic site disturbance, filling or

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depletion of soils and hydrologic alterations to the site and adjacent areas. Collection of field data on dominant and co-dominant vegetation, understory species composition, soils, and hydrology provides critical information when determining the appropriate ecological community classification. In addition, detailed life history information, profiles and checklists for plant, animal and other species present in New York City are offered by the New York State Department of Environmental Conservation's (NYSDEC) New York Natural Heritage Program.

110. WATER RESOURCES

New York City is situated on a large, natural, shallow-water harbor estuary complex, and has extensive open marine waters and numerous tidal marsh, freshwater wetland and stream systems. Although these systems have been significantly altered over time, these areas contain important aquatic habitats and physical features that provide food, protection and breeding habitat for aquatic organisms. Near-shore wetland habitats also provide protection from storm surges, retain stormwater, protect water quality, mitigate against urban heath island impacts, and prevent damage to existing infrastructure from the effects of a changing climate

111. Water Bodies

In the City, surface water bodies are important natural resources that serve as: (1) habitat for a wide variety of aquatic life, including finfish and bottom organisms ("benthic organisms"); (2) resources for shipping and boating; (3) recreational resources; and (4) in limited cases, water supply. Figure 1 provides a map of major estuarine resources (rivers, bays), major freshwater areas (ponds, lakes, rivers), and watersheds and drainage areas for each of the City's waterbodies.

The City contains a wide variety of water bodies. A nonexclusive list of the City's water bodies can be found here.

112. Ground Water

The water that is contained beneath the surface in various types of soils, fill, and rock is ground water; the geologic systems containing ground water are called aquifers. Ground water is usually fresh water and, in the City, is primarily recharged through rainfall that percolates into pervious areas and infiltrates through the soil. Along the coast, harbor, and river waterfronts, the tides influence ground water; in these areas ground water can be saline or partially saline (brackish). The importance of ground water as a resource is: (1) as a source of water supply for drinking water, domestic applications, business, and industry; (2) as a source of water recharge for surface water bodies and sustaining the hydrology of many wetlands; (3) to serve critical geotechnical functions related to structural load bearing capacity (lowering the water table may cause subsidence); and (4) as a barrier to salt water intrusion.

Although all five boroughs contain ground water, the major resources in the City lie beneath Brooklyn, Queens, and Staten Island. The major aquifers in the City include the Raritan formation beneath Staten Island, southeastern Brooklyn, and the eastern half of Queens; the Lloyd and Magothy aquifers beneath southern and central Brooklyn, eastern Queens, and Staten Island; and the Jameco aquifer beneath limited areas of Brooklyn and southern Queens. Ground water between these aquifers may or may not be connected. According to the Brooklyn Queens Aquifer Feasibility Study, DEP established a pilot ground water testing program at Station 6 in Jamaica, Queens and plans to develop a ground water treatment plant that would produce high quality drinking water, control ground water flooding and provide educational resources and community meeting space.

120. WETLAND RESOURCES

Wetlands are considered a subset of "waters of the United States" and are subject to Section 404 of the Clean Water Act. They are defined as "…areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions" 40 C.F.R. §230.3(t). There are two types of wetlands:

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freshwater and tidal. Freshwater wetlands are lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation. Tidal wetlands are those areas that border on or lie beneath tidal waters, such as banks, bogs, salt marsh, swamps, meadows, flats or other low lands subject to tidal action, and those areas now or formerly connected to tidal waters. Figure 2 is a representation of city-wide historical and current freshwater and tidal wetlands.

Wetlands provide myriad functions not only for wildlife habitat but also for humans. Wetlands help improve water quality and control floods by trapping pollutants, capture stormwater runoff, sequester carbon dioxide, moderate storm surges, provide habitat for local and migratory birds, fish and other wildlife, and in some areas, permit ground water or surface water recharge. Wetlands are often important to the public for recreation and open space and to commercial operations as sources of food or other materials. The City owns and manages thousands of acres of wetlands as open space and the National Park Service (NPS) controls extensive tracts of wetlands in and around Jamaica Bay and Staten Island.

Wetlands are highly sensitive resources, and as such the upland areas adjacent to them are included when assessing potential impacts on wetlands. The following definitions are grouped into two major wetland types: those containing fresh water and those influenced by tides and salt water.

122. Freshwater Wetlands

Freshwater wetlands can be found adjacent to freshwater ponds and streams (often the smaller water bodies themselves are included in the wetland definition), sometimes in low-lying areas, areas of poor soil drainage or high ground water elevation areas. In the City, freshwater wetlands can be found in the coastal zone, close by, but unconnected to, a tidal water body. Brackish wetlands occur where salinity levels are oligohaline (intermediate between fresh and marine waters), and some tidal influence may exist within these wetlands. Freshwater wetlands may also be found perched in an upland environment. Perched wetlands are those that are trapped above an impermeable layer so that the water in the wetlands does not feed the ground water system. Wetlands can either be covered with water permanently, can hold water within a few inches of the surface, and can experience times when soils are dry or when soils are inundated. In addition, they can be unvegetated, contain floating or submerged plants, herbaceous (non-woody) plants, or contain a mixture of herbaceous and woody (trees and shrubs) plants. Approximately 2,000 acres or 1% of the original 224,000 acres of freshwater wetlands remain within New York City.

The majority of the City's freshwater wetlands are located in Staten Island and Queens, but can be found citywide, including in Seton Falls, Riverdale Parks, Mariner's Marsh, Graniteville Swamp, Goethals Bridge Pond, and Alley Pond Park.

Freshwater wetlands are regulated by New York State in 6 NYCRR Parts 662-665. Under this regulation, freshwater wetlands of 12.4 acres or larger are protected, although smaller wetlands can also be protected if the NYSDEC commissioner has determined that they have unusual local importance. Wetlands smaller than 12.4 acres are often classified as “isolated wetlands” and are the most common NYSDEC regulated freshwater wetland system in the City, and have received increasing focus as contributors to local biodiversity and hydrology. In addition to the wetland itself, a buffer area of 100 feet around the freshwater wetland, called the "adjacent area," is also protected. The freshwater wetland “adjacent area” refers to the contiguous upland area that may affect conditions in the wetland. Sometimes, a larger wetland buffer is provided when critical hydrological, habitat, and other ecological functions related to the wetland are outside the 100 foot regulated adjacent area.

For further wetland information, please see the following: New York City’s 2009 New York City Wetlands: Regulatory Gaps and Other Threats, Wetlands Transfer Task Force’s “Recommendations for the Transfer of City-Owned Properties Containing Wetlands” report (September 2007); Local Law 31 of 2009, which creates a comprehensive wetlands protection strategy for New York City; USDA-Plants Database for further information regarding a list of characteristic plant species in the New York City area used to define the presence of wetlands; Ecological Communities of New York State, 2nd Edition (2002) “Forested Mineral Soil Wetlands”; and

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USDA's Plants Database and USFWS Biological Report 88 (26.9) (1988), which help determine the wetland status of plant species.

123. Tidal Wetlands

Tidal wetlands are found along the shores of the City's tidal water bodies. The City has more than 500 miles of tidal waterfront and still contains substantial and functional tidal wetlands. Most of these are located in Jamaica Bay, northwestern Staten Island, and in the inlets and coves that line the shores of northern Queens and east and southeastern Bronx, particularly at Udall's Cove, Alley Pond Park, Pelham Park, and the mouths of the Bronx and Hutchinson Rivers.

Tidal wetlands are regulated in New York State by 6 NYCRR Parts 660-661. As with freshwater wetlands, an "adjacent area" buffer that includes the landward area within 150 feet of the wetland or elevation 10 ft above mean sea level, whichever occurs first, is also protected. A larger protective buffer is sometimes appropriate based on the relationship of the wetland and its surrounding area. State regulations group tidal wetlands according to characteristic ecological zones, as follows:

LITTORAL ZONE. The littoral zone is the tidal wetlands zone that includes all lands under tidal waters, to a depth of six feet at mean low water, that are not included in any of the other categories listed below.

COASTAL SHOALS, BARS, AND FLATS. The wetland zone that (1) at high tide is covered by water; (2) at low tide is exposed or is covered by water to a maximum depth of approximately one foot; and (3) is not vegetated by low marsh cordgrass.

INTERTIDAL MARSH. The vegetated wetland zone lying generally between average high and low tidal elevations. Thus, this area is subject to inundation by tidal flows twice daily. This and the coastal fresh marsh tidal wetlands defined below are generally considered the most biologically productive of all tidal wetlands areas. Intertidal marsh is suitable for fish spawning, and, where the area is also rocky, it supports encrusting organisms as well. Intertidal marsh is also very effective for flood and hurricane storm protection.

COASTAL FRESH MARSH. The tidal wetland zone found primarily in the upper tidal limits of riverine systems where significant fresh water inflow dominates the tidal zone. The grasses that typify the coastal fresh marsh are different from those of the intertidal marsh. Like the intertidal marsh, the coastal fresh marsh is biologically productive and effective in flood and storm protection.

HIGH MARSH OR SALT MEADOW. The uppermost tidal wetland zone that is periodically flooded by spring and storm tides and is usually dominated by salt hay and spike grasses. Also, high marshes are particularly efficient at absorbing silt and organic material, and are extremely valuable for flood and hurricane and storm control. High marshes cycle nutrients for the benefit of intertidal marshes, near which they are often located.

FORMERLY CONNECTED TIDAL WETLANDS. The tidal wetlands zone in which normal tidal flow is restricted by man-made causes. These wetlands normally occur in lowland areas, in which connections to tidal waters have generally been limited by construction of dikes, roads, and other structures. These areas, however, may still function as productive natural resources and are considered on a case-by-case basis for their value as resources.

See 6 NYCRR 661.4.

124. Surface Water Hydrology

Surface water hydrology is a field of study that addresses how precipitation runoff from impervious land surfaces contribute to wetland systems. Surface water hydrology is an important factor to consider when assessing water resources and wetlands because, depending on the land use of the source, surface water hydrology runoff can contain pollutants that could negatively affect water quality of surrounding waterbodies and wetland systems, especially if the runoff is untreated. Such polluted runoff is directed to centralized Water Pollution Control Plants (WPCPs) and waterways, short-circuiting the soils that, in the absence of the WPCPs, would used to store and filter it. To reduce the negative effects of polluted runoff on existing natural re-

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sources, a new approach is preferred that features low impact development (LID) technologies and best management practices (BMPs) to decentralize surface water hydrology runoff treatment by capturing and treating surface water hydrology runoff at the source. This method of surface water hydrology treatment provides greater benefit and treatment by handling lower volumes and overall pollutants before they can be released into adjacent waterbodies. Through many concurrent initiatives, the City is making strong progress towards treating surface water hydrology runoff--not as waste, but as a valuable resource that helps support a more sustainable city and protects the environment.

An example of LID is the development of the Bluebelt program, which preserves natural drainage corridors, including streams, ponds and other wetland areas. Preservation of these wetland systems allows them to perform their functions of conveying, storing, and filtering surface water hydrology runoff. The current Bluebelt system drains 15 watersheds clustered at the southern end of Staten Island, plus the Richmond Creek watershed. The combined area of these 16 watersheds totals approximately 10,000 acres. The system includes constructed wetlands, storm water detention ponds, and stream restoration projects, and is explained here.

Surface water hydrology runoff can be conveyed from collection points through a system of natural and built channels and pipes to a receiving waterbody or wetland ecosystem. The term "watershed drainage area" encompasses the manner in which surface water hydrology runoff is conveyed to a receiving waterbody. It refers to the physical configuration of the watershed, including those elements that determine the volume and velocity of flow for a given rainfall: its slope, soils, vegetative cover, and extent of impervious surfaces. Surface water hydrology runoff that is routed directly into a wetland may degrade water quality and habitat for the invertebrates, amphibians, and fish inhabiting the wetland. The potential impacts of increased or decreased surface water hydrology runoff inputs to small streams and wetlands should be carefully evaluated before making decisions regarding engineered solutions to surface water hydrology problems. In particular, headwater streams and isolated wetlands are extremely sensitive to changes in surface water hydrology. The quality and quantity of the surface water hydrology that flows to a water body or wetland is in large measure determined by: (1) the amount of impervious cover within a specific watershed, (2) uses and activities that take place in the watershed; (3) extent and condition of sediment and erosion control measures; (4) the type and extent of vegetation; (5) ground water elevations; (6) soils; and (7) the configuration of the drainage infrastructure (how impervious areas are drained to receiving waters and whether any detention, retention, storage, or filters are in place).

Within a watershed system, an important consideration is that portion of the watershed that is low enough to hold surface water hydrology (*e.g.*, flooding) during large storms. When the banks of rivers or streams overflow during a storm, the wide, flat floodplain allows the water to dissipate over a larger land area, thereby reducing its velocity and force so that it flows more slowly to the stream or river. The extent and condition of soils and vegetation within the watershed also contributes to removing pollutants, allowing infiltration and trapping sediments before they can be discharged to the local waterbody. Thus they are a very important element in protecting water resources and wetland systems. The floodplain has been defined by regulation (see Section 710) and includes the areas that flood during storms of a statistical frequency occurrence of once in 100 years (the 100-year storm) and once in 500 years. These are referred to as zones A and B, respectively, in federal legislation. The City's Administrative Code restricts uses in the 100-year floodplain (Zone A). NYC Admin. Code 27-316. Information and detailed data on the 100-year and 500-year floodplains within the City are available through FEMA.

130. UPLAND RESOURCES

Upland resources include all natural areas that are not water resources or wetlands. Upland habitat communities, including wildlife habitat associations, are defined in the New York Natural Heritage Program's Ecological Communities of New York State.

In New York City, upland resources are enormously diverse. Although the function, productivity, and value of specific uplands may vary considerably, these resources generally provide wildlife habitat, open space and recrea-

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tional opportunities, and particular ecosystem functions such as storm and flood control or wetland protection. Upland resources are generally described by their vegetation, although soils, topography and the degree of human impact may also be important descriptors. Descriptions of the various communities highlighted below provide a broad composition of a particular plant community and as a result of local environmental conditions can vary widely with respect to the species composition from one location to another.

131. Beaches, Maritime Dunes, and Erosional Slopes/Bluffs

Sand beaches are sparsely vegetated communities that occur on unstable sandy shores of large freshwater and tidal waterbodies, where the shore is formed and continually modified by wave action and wind erosion. Sand beaches provide feeding areas for migratory birds and nesting habitat for shorebirds such as spotted sandpiper. Some examples of sand beaches in the City are located in Coney Island, Brooklyn, South Beach, Staten Island, Breezy Point, Queens, and Old Orchard Beach, Bronx.

Maritime dune is a community dominated by grasses and low shrubs. This community consists of a mosaic of vegetation patches that occurs on active and stabilized dunes along the Atlantic coast. This mosaic reflects past disturbances such as sand deposition, erosion, and dune migration. The composition and structure of the vegetation is variable depending on stability of the dunes, amounts of sand deposition and erosion, and distance from the ocean. Vegetation of active and stabilized maritime dunes often consists of beachgrass, beach pea, seaside goldenrod, beach pinweed, jointweed, sand-rose, bayberry, beach-plum, and poison ivy. Breezy Point, Queens and Conference House/Wards Point, Staten Island contain good examples of maritime dune habitat within the City.

Erosional Slopes/Bluffs are sparsely vegetated communities that occur on vertical exposures of unconsolidated material, such as small stone, gravel, sand and clay, that is exposed to erosional forces, such as water, ice, or wind. The "maritime bluff" variant is present in the City, adjacent to maritime and marine communities. Mount Loretto Unique Area in Staten Island contains maritime bluff habitat.

132. Shrublands

Shrublands generally include communities that are dominated by shrubs (more than 50% cover of shrubs). Shrublands are found most frequently on dunes, particularly where they face away from the sea, on the toe and tops of bluffs, and on the islands in Jamaica Bay. Like grasslands, the low-lying plant life supports insects, small mammals, birds, snakes and other reptiles, and provide forage for larger animals and birds. There are numerous types of shrublands in the City, including maritime shrublands, successional blueberry heath, and successional shrublands.

A maritime shrubland is a community that occurs on dry seaside bluffs and headlands that are exposed to offshore winds and salt spray. Characteristic woody species include bayberry, black cherry, and shining sumac, beach-plum, sand-rose, eastern red cedar, and sassafras. Characteristic vines include poison ivy, Virginia creeper, greenbrier, oriental bittersweet, and Japanese honeysuckle. The herb layer may include flat-topped goldenrod and little bluestem. Birds that may occur in the maritime shrubland include black-crowned night-heron, fish crow, and yellowbreasted chat and migratory songbirds. Maritime shrublands are present in the Plum Beach and Canarsie Pol areas of Brooklyn.

A successional blueberry heath is a shrubland dominated by ericaceous shrubs that occurs on sites with acidic soils that have been cleared or otherwise disturbed. Characteristic plant species include blueberries, black huckleberry, wintergreen, trailing arbutus, poverty-grass, and common hairgrass. An example of a successional blueberry heath in Staten Island is represented in Clay Pits Pond Park Preserve.

A successional shrubland is a community that occurs on sites that have been cleared or otherwise disturbed, with at least a 50% cover of shrubs. Characteristic shrubs include gray dogwood, eastern red cedar, raspberries, choke-cherry, wild plum, sumac, and multiflora rose. Birds that may occur in this community include brown thrasher, blue-winged warbler, golden-winged warbler, chestnut-sided warbler, yellow-breasted chat,

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eastern towhee, field sparrow, song sparrow, and indigo bunting. Successional shrubland are located at North 40 of Floyd Bennett Field in Brooklyn, Ocean Breeze in Staten Island, and Pelham Bay Park in the Bronx.

133. Grasslands

Grasslands include communities that are dominated by grasses and sedges. They may also include scattered shrubs (never more than 50% cover of shrubs) and scattered trees (usually less than one tree per acre, or 3 trees per hectare).

Grasslands are plant communities in which grasses and limited herbaceous plants are dominant and trees and shrubs are sparse or absent. In the City, maritime grasslands contain those species that can survive in the harsh environmental conditions that are created by strong winds and salt spray. This community is dominated by grasses that usually collectively have greater than 50% cover. Dominant grasses are little bluestem, common hairgrass, and poverty-grass. Other characteristic species include Pennsylvania sedge, rush, Indian grass, Atlantic golden aster, flat-top goldenrod, white-topped aster, bayberry, and shining sumac. Various wildlife species may use grassland areas (*e.g.*, some are grassland obligates, such as voles, upland sandpipers, and short-eared owls). Birds of prey and some larger species also forage in grasslands.

Native grassland habitats still exist in scattered areas, such as the Harlem Meadows in northern Manhattan, Ocean Breeze Park in Staten Island, and Vault Hill in Van Cortlandt Park in the Bronx. While fire ecology is the preferred management tool, some grasslands within the City are partially maintained through intentional management that includes mowing and land clearing. Examples include the grasslands at Floyd Bennett Field in Brooklyn and Mount Loretto on Staten Island. Grassland acreages in the City are one of the most under represented ecosystems, are relatively limited, and include maritime grasslands at Breezy Point and on the islands in Jamaica Bay; former agricultural fields (NYSDEC's Mount Loretto Unique Area, Staten Island), on serpentine soils (Latourette Park, Staten Island), on sand dredge spoils (Marine Park, Brooklyn), on restored landfills (Fresh Kills, Staten Island, Fountain Avenue Landfill, Queens, Pennsylvania Landfill, Brooklyn and Pelham Landfill, Bronx) and on thin mineral soils (Pelham Bay Park, and Van Cortlandt Park the Bronx).

134. Meadows and Old Fields

Meadows and old fields are successional communities where forbs, grasses, sedges, and shrubs are codominant--scattered trees may also be present. The dominant community of this type present in the City is the successional old field—a meadow dominated by forbs and grasses that occurs on sites that have been cleared or plowed, and then abandoned. Characteristic herbs include goldenrods, bluegrasses, timothy, quackgrass, smooth brome, sweet vernal grass, orchard grass, common chickweed, common evening primrose, oldfield cinquefoil, calico aster, New England aster, wild strawberry, Queen-Anne'slace, ragweed, hawkweeds, and dandelion. Shrubs may be present, but collectively they have less than 50% cover in the community. Shrubs may include dogwood, arrowwood, raspberries), sumac, and eastern red cedar.

Examples of this habitat in New York City are the wildflower meadows in Central Park, Vault Hill in Van Cortlandt Park, and Alley Pond Park. Examples of successional old field communities are present in the Jamaica Bay Wildlife Refuge, in Brookyn/Queens, vacant land in Charleston on Staten Island, and Flushing Meadows, in Queens.

Without maintenance, woody species eventually begin to colonize, and a natural process of foresting the land, called succession, takes over. However, while these fields still offer only low cover for wildlife, they provide habitats similar to other grasslands and grassy areas. A characteristic bird species present in successional old field habitat is the field sparrow.

135. Upland Forests, Woodlands and Barrens

There are many diverse forests within New York City, including oak forests on dry ridges and tulip tree forests on richer soils. In between are mesic oak-hickory forests containing American beech and maples.

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Maritime forests, generally in immediate proximity to marine communities, are heavily influenced by coastal processes, including strong salt spray, high winds, dune shifting, and deposition and overwash processes. These forests generally contain stunted "salt pruned" trees and a dense vine layer.

Coastal forests occur within the Coastal Plain and are generally not in immediate proximity to marine communities. At most they are lightly influenced by coastal processes including minor salt spray associated with severe storms (*e.g.*, hurricanes).

Barrens and woodlands are typically upland communities that are structurally intermediate between forests and open canopy uplands. Woodlands include communities with a canopy of stunted or dwarf trees (less than 16 ft or 4.9 m tall), and wooded communities occurring on shallow soils over bedrock with numerous rock outcrops. The term "barrens" is commonly applied to certain types of woodlands (*e.g.*, pine barrens) that are rare within the City. Woodlands offer shelter and food for a broad array of wildlife, including forest interior bird species (*e.g.*, red-eyed vireo, wood thrush), mammals (*e.g.*, white-tailed deer, white footed mouse), reptiles (*e.g.*, eastern box turtle), amphibians, insects and other species.

Examples of woodlands and upland forests are present in Pelham Bay Park, Bronx Park, and Van Cortlandt Park in the Bronx, Central Park in Manhattan, Prospect Park, in Brooklyn, Staten Island Greenbelt, and Willowbrook Park in Staten Island and Alley Pond Park and Cunnigham Park in Queens. Clay Pits Pond Park Preserve in Staten Island is a good example of a reference site that contains both barrens and woodland communities within the City.

For additional information on the diverse Forested Uplands, Woodlands and Barrens that occur within New York City, please see Ecological Communities of New York State for information on specific forest types.

136. Terrestrial Cultural

Terrestrial cultural communities include those that are substantially different from the character of the substrate or resident community as it existed prior to human influence. Due to the developed and human-dominated characteristics of the City's landscapes, terrestrial cultural communities (*e.g.*, flower and herb gardens, mowed lawn with trees, paved and unpaved roads and paths, and urban vacant lot) are prevalent in all five boroughs.

A variety of gardens, landscaped areas, and small parks are found throughout the City, as well as larger, landscaped parks, such as Central Park, Prospect Park, and the many cemeteries in Queens and Brooklyn. Vegetation here is usually present as a result of landscaping activity, but these areas are nonetheless useful resources for recreation and some bird, small mammal, and insect habitat.

Caution should be exercised when applying terrestrial cultural habitat designations for natural areas present within the City. For instance, historic land use involving landfilling and other human disturbance at a site may meet the subsurface conditions of the "urban vacant lot" designation; however, the existing plant communities and existing fauna should be considered when applying a habitat community designation from Ecological Communities of New York State.

140. BUILT RESOURCES

Some native and introduced wildlife species have adapted to the City's built environment, and a number of species live not only in "natural" areas, but also use built structures such as piers, bridges, buildings, and other structures as foraging and nesting habitat and for shelter. In addition, a variety of structures have been built to replace some of the environment's natural functions for flood and erosion control. These built resources include the following:

PIERS AND OTHER WATERFRONT STRUCTURES. Most of the City's waterfront structures, whether functioning or not, provide foraging habitat and shelter for numerous marine species. These may include: plankton; encrusting organisms, such as algae, mussels, and barnacles, which live on the structures and are food sources for creatures higher on the food chain; benthic species such as clams; and fish, including striped bass, winter and summer flounder,

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American eel, Atlantic herring, white perch, bay anchovy, and many others, depending on the location of the habitat.

OLD PIERS, PILE FIELDS, AND OTHER RUINS. Many waterfront and other structures that have been abandoned by humans are now in active use by a range of wildlife. In addition to the species that use active waterfront structures (see above), the lack of human activity makes pile fields and old piers attractive to a number of birds, which nest and/or forage there. The pile fields and decaying piers, particularly on the Brooklyn and Staten Island waterfronts, are favorite living places for cormorants. At Shooters Island in the Kill Van Kull, hundreds of abandoned marine vessels attract many species of herons, kingfishers, cormorants, and gulls for foraging and, in some cases, nesting. On North Brother Island and Roosevelt Island, ruins of hospital and other public buildings are now the home for bats, snakes, heron colonies, and feral animals.

BEACH PROTECTION STRUCTURES. Many of the City's beaches are protected by groins, jetties, and breakwaters that break the force of ocean waves and slow the drift of sand. Groins in New York City, such as those at Coney Island and Rockaway and the abandoned groins along the south shore of Staten Island, are typically stone and timber structures perpendicular to the beach, and are erected to minimize erosion. Jetties, such as those in Rockaway Inlet, are larger rock structures used to stabilize inlets. Other protection structures used in the City include small timber wave breaks used to prevent waves and ship wakes from disturbing moored boats in marinas, and breakwaters, which are larger structures constructed of stone, timber cribs, and/or steel, that serve a similar purpose.

FLOOD PROTECTION STRUCTURES. In several low-lying areas, flood protection structures have been installed. These include tide gates (such as at the mouth of Flushing Creek), weirs (such as along Wolfe's Pond Creek in Staten Island), and pumps (such as in the College Point area along the shores of Flushing Bay).

OTHER STRUCTURES. A wide variety of structures in the City may offer habitat for some species. One example is the peregrine falcon's use of tall buildings and bridge towers. These birds prefer to nest in high places within sight of water. The number of peregrine falcons has grown steadily since 1983, when the first peregrines in decades returned to nest on bridges in the City. They can now be found once again on building ledges and other tall structures around the City, such as skyscrapers in Midtown Manhattan and the Marine Parkway Bridge in Brooklyn. For additional information on minimizing mortality to migrating birds and bats from building collisions, identifying strike hazards and "bird safe" building recommendations, please see NYC Audubon's Bird Safe Building Guidelines and in the scientific literature.

150. SIGNIFICANT, SENSITIVE, OR DESIGNATED RESOURCES

The City, state, and federal governments recognize the value, rarity, and sensitivity of many of the City's natural resources. State and federal interest is generally focused on the City's coastal areas, but the City also recognizes a number of natural habitats as having significant value. Most often, these areas combine several of the natural resources defined above. Examples of these include Significant Coastal Fish and Wildlife Habitats and Critical Environmental Areas.

The resources listed here are designated significant, sensitive, or worthy of protection within New York City. The legal protections for these natural resources are described below in Section 710. In addition to particular areas of the City that are recognized as unique, certain species and habitats are also considered important and worthy of protection, wherever they may occur.

PROTECTED SPECIES. Both the federal and state laws designate certain species of plants and animals as protected, because they are rare or in danger of extinction. Certain habitats are also designated as rare. Under federal law, plant or animal species can be considered endangered or threatened; under state law, animal species can be considered endangered, threatened, or of special concern, and plant species can be considered endangered, threatened, exploitably vulnerable, or rare. Other species that are not in these categories can also be protected. Protected species that may be found in New York City include such bird species as piping plover, least tern, common tern, northern harrier, peregrine falcon, osprey, Coopers hawk, short-eared owl, least bittern, upland sandpiper, and grasshopper sparrow; marine turtles; eastern mud turtle; amphibians such as southern leopard frogs; and

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such fish as shortnose sturgeon. Various designations for listed species under Federal and State jurisdiction are available from the USFWS and NYSDEC. The NYS Comprehensive Wildlife Conservation Strategy (CWCS) provides further detail on the status of fish and wildlife species in New York State.

NEW YORK STATE NATURAL HERITAGE PROGRAM. The New York Natural Heritage Program maintains a database of information on rare animals, rare plants, and significant natural communities of New York State, including a series of conservation guides. This includes an inventory of all the different ecological communities—rare and common—that occur in New York State, representing the full array of biological diversity in the State. It also includes an inventory of rare plants, fish, and wildlife in the State, including some that are not currently protected by State law. All of the habitats and species listed in the program are given a ranking indicating their rarity, both globally and in the State. Although the Natural Heritage Program rankings do not provide legal protection, they can be used for assessment of a project's impacts on rare species.

200. DETERMINING WHETHER A NATURAL RESOURCES ASSESSMENT IS APPROPRIATE

Two possibilities determine whether an adverse impact on a natural resource might occur, and therefore, whether an assessment may be appropriate: (1) the presence of a natural resource on or near the site of the project; and (2) disturbance of that resource caused by the project. The types of disturbances, both direct and indirect, are listed in Subsection 341.

If the following are all true for a given project, then no natural resources assessment is necessary:

- The site of the project and the immediate adjacent area is substantially devoid of natural resources, as defined in Section 100 above. Or, the project site either contains, or is near or contiguous to, natural resources or important subsurface conditions, but no activity associated with the project (see Subsection 341) would disturb them, either directly or indirectly.
- The project site contains no "built resource" that is known to contain or may be used as a habitat by a protected species as defined in the Federal Endangered Species Act (50 CFR 17) or the State's Environmental Conservation Law (6 NYCRR Parts 182 and 193).
- The project site contains no subsurface conditions, the disruption of which might affect the function or value of an adjacent or nearby natural resource (for more information, see Chapter 12, "Hazardous Materials").
- As determined by satisfying all of the above criteria, the proposed project involves the disturbance of a natural resource, but that disturbance has been deemed insignificant by a government agency with jurisdiction over that resource and conditions have not changed significantly since the permit was issued. An example would be the repair or replacement of piers, piles, bulkheads, and other waterfront structures. These types of projects have been classified as environmentally insignificant in the U.S. Army Corps of Engineers' (USACE) "Nationwide Permit" (see Section 710 below).

If the project does not meet all of these conditions or if it is unknown whether the project meets one or more of these conditions, some assessment of natural resources is appropriate.

300. ASSESSMENT METHODS

The assessment of potential impacts on any natural resources contains three basic elements. The level of detail may vary depending on whether the project is classified as site-specific, area-wide, or generic. The elements are as follows:

- For existing and future No-Action conditions, at least 2 seasonal (late spring/early summer and early fall) surveys should be conducted, depending on the habitat type, as demonstrated by the uniqueness, variety, and density of its species; its use for recreation, open space, or commerce; its relationship to neighboring resources and to the overall area ecosystem; or its role in promoting ecosystem services or storm and flood management. Additional seasonal surveys may be warranted as determined by the information generated from these seasonal surveys.

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- Examine the environmental systems that support the natural resources in the study area as referenced above. As described in Subsection 143, these are most often the water resource systems that transport or retain water to maintain vegetation and provide aquatic habitat. For example, an intertidal wetland flushed twice daily by the tide becomes the source from which vegetative and organic materials are transported to adjacent waters for use in the estuarine food chain.
- Describe in appropriate detail the construction and operational activities associated with the project and analyze their interaction with the resource itself as referenced above and the environmental systems that support it.

These three elements are interrelated, and therefore, the order in which the analyses are conducted may vary with a particular project. For example, it is often most efficient to evaluate the resource first. This helps set the level of detail required for the analysis of the project and of the underlying elements serving the resource. However, if an assessment is required because the lead agency or applicant is unsure of the extent of disturbance that a project would cause, then part of the third task (describing the project disturbance in detail) would be completed first. If completion of that task identifies the potential for an indirect effect, such as a change in drainage patterns near a running stream, then the second task might be undertaken before the first. Before determining the value of that stream, it might be most prudent to examine the drainage system serving the stream. If the project changes drainage patterns, but this change would be minimal to the surface and ground waters serving the stream, then the project's impact would not be significant and no further analysis is needed.

Regardless of which task is conducted first, a natural resources assessment always begins with selection of a study area. The following discussion addresses the study area and then describes each of the three general tasks listed above—evaluation of the resource; assessment of environmental support systems; and assessment of probable impacts of the project. These sections are followed, in Section 350, with discussions of specific issues for each resource type defined in Section 100.

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310. DEFINE THE STUDY AREA

Determination of the study area for the assessment of natural resources depends on the potential effects of the project and the resource(s) in question. The study area should include the project site and resources (including surrounding adjacent areas with land use descriptions, as applicable) that may be directly or indirectly affected by activities on the project site. It may include similar, non-contiguous resources within the immediate area of a proposed project (such as undeveloped properties within one mile), or a contiguous area surrounding the proposed project (such as all natural resources within a 0.5 mile radius). Where a resource is small enough that the proposed project would affect it in its entirety, the study area may encompass the entire resource. For example, if a portion of a small pond's surface water, surrounding wetland, and adjacent area lie within the site, the proposed project may directly affect only those portions of the pond within the site; however, the overall function or value of the remainder of the pond may also be altered by the activity (for example, loss of minimum area to provide wildlife habitat). To understand impacts on this resource, it may be necessary to assess conditions in the complete aquatic, wetland, and adjacent habitat, and therefore, the study area should include the entire pond and related habitats. Similarly, where a small portion of a very large resource (such as Jamaica Bay) is located within the project site, it may not be necessary to include the whole resource; instead, it may be more appropriate to focus on the portion of the resource within and adjacent to the project site, while providing a more general discussion of the larger resource for context.

320. INFORMATION AND BACKGROUND SEARCH

Research is useful in helping to assess conditions, making an evaluation, and in supplementing the field assessment of existing conditions. The research may include locating the study area on a U.S. Geological Survey (USGS) topographic map and/or identifying and outlining potential natural resource areas. The USGS maps are most useful for the less developed areas of the City. The following describes the specific research tasks that may be conducted:

- Submit letters to appropriate agencies, including U.S. Fish and Wildlife Service (USFWS) (New York Field Office), the New York Natural Heritage Program and the National Oceanic and Atmospheric Administration (NOAA) - National Marine Fisheries Service (Northeast Region), to request a file review on any rare, special concern, threatened, endangered or candidate species in the project area, as well as any unique associations or habitat communities in the project area (see Section 730 for contacts and addresses). In select cases, requests made to DPR and the NPS may also be required. The request letter should contain a copy of the project location indicated on a USGS topographic map and a description of the project in question.

- Review sources of information that identify natural resources of interest in the study area, including any protected species. These resources include those designated resources listed in Section 150, above, as well as any other designated or important resources. Sources of information to be reviewed would include, as appropriate: the City's Comprehensive Waterfront Plan and the Waterfront Revitalization Program, both of which identify particularly valuable habitats in coastal areas; the DEC's maps of regulated freshwater and tidal wetlands; federal flood hazard area maps; City zoning maps; DPR GIS maps; New York City soil survey maps; results from DEC's Breeding Bird and Herpetological Atlases; information on any designated significant coastal fish and wildlife habitats (*e.g.*, Essential Fish Habitat, or EFH) or critical environmental areas; coastal erosion hazard area maps; National Wetland Inventory (NWI) maps (prepared by the USFWS from aerial photographs as part of the National Wetland Inventory Program), *etc.* (see Section 730). The State's list of protected fish and wildlife is located in 6 NYCRR Part 182; the list of protected plants and trees is in 6 NYCRR Part 193. In addition, local universities and organizations can be a good source of information, as these groups often sponsor or conduct ecological studies in the City and the Harbor. An expanded list of online resources and databases may be found in Table 1.

- Review specialized maps, where available. Examples are nautical charts, drainage maps, New York City soil surveys, soil and ground coverage diagrams, and plots of slopes.

- Review recent aerial photographs or advanced infrared and other photo imaging. These help in pinpointing the extent of vegetated and wetland areas and show disturbed areas. However, before examining photographs, evaluate local climatological data to determine whether the photo year had normal or abnormal precipitation within the year prior to the date of the photograph. If the resource is affected by tides, the stage of the tide when the image was formed needs to be determined from Tide Tables.

- Review available site-specific information, if any. New York City has many specialized libraries that hold reports, theses and dissertations, and peer-reviewed journal articles that can contain valuable local studies. Section 730 lists several of these public and university libraries, organizations, and other borough historical societies and public libraries. Online databases, including those available through public or university libraries (Proquest, Biosis, Jstor and ISI Web of Science) and regional databases (*e.g.*, the Jamaica Bay Research and Management Information Network), may be used to retrieve reports and publications related to natural resources that may apply to the site; there are also many databases and open access journals that are published or reproduced in electronic format online, and may be located through the use of search engines.

321. Assess Existing Conditions

This task assesses a natural resource in order to understand its value for one or more functions, as determined by appropriate seasonal surveys referenced in Section 300, including but not limited to habitat for flora and fauna, ecosystem services, ground water recharge, flood and storm control, erosion control, recreation, open space, and visual quality. This includes learning what site or study area features would be present on a yearly seasonal basis in the future without the project (*e.g.*, spring, summer, fall and winter), and determining which of these are most important to maintaining natural resource functionality. As with all technical analysis areas, the level of detail required corresponds to the anticipated effect of the project. Here, however, the resource is usually presumed to be important and valuable, absent any specific information to the contrary. The evaluation of the resource should either confirm this assumption or show the extent to which the presump-

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tion of value cannot be confirmed. The tasks below outline general approaches to evaluating the City's natural resources. It is particularly important to start by setting a reasonable and ecologically responsible level of investigation effort to assess existing conditions, as warranted by a proposed project, because resources may vary in level of importance for a site or region, and from context to relative quality. For most of the work outlined below, a certified ecologist, biologist or discipline-specific specialist should be used.

322. Field Reconnaissance

Field observations are an early and critical step in determining the scope of a natural resources assessment. In limited cases, evidence gathered in initial field reconnaissance at appropriate seasonal times may support an assessment showing that a resource is of limited value and/or that a project's disturbance would not be significant. Field reconnaissance of a project site and/or study area should be designed to include the following three considerations: (1) the level of effort (number of hours, days or seasons; number and experience of observers) should be consistent with the size and complexity of the study area; (2) reconnaissance should occur at a resource's biologically relevant periods (*e.g.*, within the growing season for a particular plant, during a period of activity for a wildlife species, or during nocturnal or diurnal periods); and (3) if previous reconnaissance has been conducted for a project site, then the data should be collected in a manner consistent with the previous work to allow for comparison.

It is important to note that the appropriate level of field reconnaissance informs the assessment of impacts. The presence or absence of a resource may be assumed, based on landscaped features, without field verification; however, if the resource is sufficiently critical, such as the probable presence of a state and federally endangered species or a unique wetland habitat, then a higher level of investigation may be required. Discussion and substantive input from managing and associated agencies early in the process is required to clearly define the level of investigation expected for field reconnaissance.

These decisions allow the analyst to understand the extent of the presence of natural resources, determine the context of its surroundings, and sufficiently describe the area where the project would take place. Field reconnaissance by a certified ecologist or discipline-specific specialist can include one or more of the following tasks, as appropriate:

- Identification of major resource or habitat types during appropriate seasons for that particular resource. The reconnaissance can identify major resource types and locate these on a map (although boundary conditions would be approximate). Except under rare conditions, an initial reconnaissance is likely not sufficient to identify subtle differences within resource types and expected seasonal variations. For example, the distinction between the various types of fresh marshes often requires a number of site visits to determine the marsh's physical characteristics under varying weather conditions and a detailed listing of specific vegetative species.

- Initial characterization of resource type and condition during appropriate seasons for that particular resource. The analyst notes as much as possible in an attempt to characterize the resource(s) in the study area. Important to these observations are date and time of field visit; weather, and, if appropriate, tidal stage; general type and approximate size of each resource area; plant and animal species observed; indigenous soil types that are important for supporting diverse or unique high value vegetation; presence of wet or poorly drained areas, rock outcrops, steep slopes, and other topographic features; conditions suggesting the presence of human disturbance disturbed; and use (what types of activities the resource is subject to—such as passive or active recreation, commercial use, or unauthorized uses like dumping or off-road vehicles).

- Organization of field notes and observations. The field reconnaissance is documented with a field log including the items listed in item 2. A copy of all field notes of the site reconnaissance along with dates, name of analyst and list of equipment used should be included with the assessment to support the formal write up of the natural resources summary of the site. Photographs (color), written documenta-

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tion with the date the photograph was taken, and an accompanying site diagram indicating the direction of the photograph should also be submitted to support the observations.

- Assessment and conclusions. Based on the observations from a reasonable field effort described above, the analyst assesses general conditions of natural resources in the study area. If conclusions about the value of a natural resource are clear from the reconnaissance (*e.g.*, the vegetated area is highly disturbed and unlikely to offer significant habitat, to function as a buffer for higher quality habitat, or to provide recreational opportunities—or the resource, such as a dune, is clearly present, clearly undisturbed, and hence clearly highly valuable), then this part of the analysis need go no further. More often, the conclusions of the reconnaissance would indicate a need for more detailed study. For example, reconnaissance could reveal that the site is partially forested and could potentially support valuable species that are only observable during specific conditions (*e.g.*, herbaceous plants during the growing season; nocturnal animals at night; migrating birds in the spring and fall), and therefore, further observation under the appropriate conditions is needed to determine if that species is present. There are also situations where a potentially valuable habitat is seen, but its value cannot be deduced solely on the site reconnaissance without observations of the larger surrounding area. For example, if the survey reveals that the site contains a barrens habitat, a wider area would be surveyed to determine the extent of this habitat.
- Prepare with written reconnaissance information, GIS shapefiles of project boundaries and the study area evaluated under this review.

323. Detailed Site Analysis

323.1. Characterization of Habitat

In a detailed site analysis, the habitat within, and adjacent to, the project site should be characterized first. A habitat type is defined as an area with distinct vegetative and abiotic attributes that support a specific grouping of species. Past disturbances to site elements such as soil and/or hydrology alterations must be taken into consideration when evaluating habitat composition. Habitat characterization is the procedure of identifying the dominant vegetative and physical characteristics of an area to assess its value. Habitat types are primarily described by their dominant vegetation, sources and permanence of water, and relationship to other habitat types. In addition, the site's history, geomorphology, soils or sediments, climate, past and present human disturbance, and other abiotic features are important.

Habitat characterization guides the remainder of a natural resources assessment because it provides information for regulatory approval, particularly if unique habitats, wetlands, or watercourses are involved. Consequently, when characterizing the habitat at a site, determine whether the habitat is capable of supporting aquatic and/or terrestrial biota, including special concern, threatened and endangered species.

Prior to conducting a habitat survey, the following general steps should be followed:

- Based on the preliminary field reconnaissance, subsequent research, and a complete understanding of the location and extent of disturbance associated with the proposed project, identify the resource areas of concern on an accurate map with clearly shown off-site reference points, such as a USGS topographic map, New York City soil survey map, City map, Sanborn map, or map prepared by site engineers. GIS shapefiles of project boundaries and the study area evaluated under this review should also be included.
- Estimate the size of the area to be studied.

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- Determine as much about the area as possible from the initial field reconnaissance and subsequent research; tentatively map using GIS the types of resources and habitats that may be present.
- Identify using GIS mapping areas where previous disturbance has occurred.
- When field surveys are being conducted, damage to soils and vegetation and the disturbance of wildlife, including cutting of brush, compaction from heavy equipment or other vehicles, and activities near nests of sensitive bird species during nesting seasons, should be minimized. This includes supervision of contractors and sub-contractors to ensure that they are not damaging soils or vegetation or disturbing wildlife.

Once these steps have been followed, focused field studies can be performed to characterize the habitat.

TIMING OF FIELD STUDIES

Depending on the ecosystem being evaluated, field studies for habitat assessment and vegetative communities are best conducted when growth is most evident and identifiable, typically mid-May to mid-September or during traditionally wet seasons (*e.g.*, April) if habitat types such as vernal pools may be present. Several surveys spaced over the growing season are recommended because some species are only present seasonally or are more identifiable at certain times when vegetative growth, flowers, or seeds are present. When this is not feasible, a written explanation is necessary listing the reasons why an appropriate seasonal survey could not be performed. Inferences based on the site's overall characterization should be made about the potential presence of seasonal vegetation. Surveys of nontidal watercourses should be conducted during both low-flow and high-flow periods (*e.g.*, late spring or early summer). Surveys during low-flow conditions facilitate observations of streambank conditions, channel morphology and in-stream plant growth, while surveys conducted during high-flow periods allow observations of intermittent streams and vernal pools. Surveys of intertidal wetlands should be carried out throughout the tidal regime to facilitate observations of inundation and intertidal versus high marsh vegetation. Since vegetative succession on abandoned sites in the City tends to proceed rapidly, habitat types can change in a matter of several years. Thus, depending on the length of the review process and construction schedule, habitat characterization surveys may need to be conducted over several years.

CHARACTERIZING HABITAT

A number of factors should be considered when characterizing a habitat, including size, shape, and the relationship of the habitat to adjacent areas. Rounder natural areas tend to be more valuable than oblong or linear areas of the same size (area) and vegetative composition because round habitat patches possess more interior space. For example, a two-acre round patch of shrubland may provide a better buffer with more interior space, and hence better habitat, for more yellow warblers than a five-acre narrow rectangle. Larger areas also tend to be more valuable than smaller areas of the same shape and vegetative composition. A large, blocky natural area, even one with low vegetative diversity, can be valuable. For example, large disturbed sites dominated by common reed or mugwort serve as good winter foraging habitat for raptors, can ameliorate the urban heat-island effect, and can buffer or connect to higher quality natural areas.

In addition, disparate habitat patches are more valuable if they are linked by corridors of appropriate vegetative cover. For example, Forest Park, Queens contains 413 acres of forest that is connected by a predominantly wooded parkway (the Jackie Robinson Parkway) to a golf course, several cemeteries, Highland Park, and three vegetated, inactive reservoirs. The ecological value of the 413 acre core is greatly augmented by the adjacent, contiguous habitat corridor as well as by its proximity to the Jamaica Bay Wildlife Refuge to the south and Flushing Meadow/Corona Park to the north. Because Forest Park is in the middle of a wide vegetated corridor that crosses Long Island from north to south, it is

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a major migratory bird stop-over. In this way, a natural area must be evaluated in the context of contributions it makes to the ecological function and biodiversity of adjacent and proximal natural areas of higher value.

Several habitat evaluation procedures, such as Habitat Evaluation Procedure (HEP) and the Wetland Evaluation Technique (WET), are available, but are generally not appropriate for CEQR evaluations because they were developed for, and validated in, non-urban environments. For CEQR habitat evaluations, input from managing and associated agencies involved with a project should be requested during the scoping process to assure that the required level of investigation is conducted. For appropriate methods to characterize habitat under CEQR, please click here.

323.2. Characterization of Aquatic and Terrestrial Biota

If the results of the habitat characterization indicate that the site contains no supporting habitat for fish, invertebrates, or wildlife, then an animal characterization survey is not necessary. If, however, it is determined that the site is valuable for fish, invertebrates, or wildlife, or if it cannot be determined whether the site would have supporting habitat value for these organisms based on vegetation or other site characteristics, a survey of aquatic and/or terrestrial biota should be conducted. It should be noted that some species live in degraded habitats.

The level of detail and types of data to be obtained must be determined before any survey of aquatic and/or terrestrial biota is conducted. Many different types of data can be collected for a variety of objectives, goals and priorities. General characterizations about animals on a site can be made from either knowledge about the site's available habitat or literature documenting animal species in an area. In the absence of animal surveys detailing the use of animal species at a site, conservative assumptions should be made about animal presence or absence based on vegetative data and the available literature. Surveys of aquatic and/or terrestrial biota should be used to confirm the potential for a significant impact if there is doubt concerning the available data or if data is conflicting.

TIMING OF SURVEY

Depending on the level of detail required, surveys may entail a single observation period (if an experienced observer notes that a particular habitat could not support a species of concern), or they may require more lengthy observation periods in one or more seasons of the year. For very small projects with little ground disturbance, a limited, appropriate seasonally based survey for the affected resources may be sufficient, even in sensitive areas. With mammals, reptiles, birds, amphibians, invertebrates, and finfish, it could be necessary to make observations during spawning/breeding seasons and times of migration if information is not available from existing sources. For example, a three-day late spring and early summer survey for birds, mammals, and invertebrates might provide sufficient information to describe the resources accurately and provide a basis for determining the potential impact the project would have on them. Different bird species are present at different times of the year so a limited survey may not account for all species using a site. For example, winter waterfowl species are found in New York City from December through February/March and shorebirds pass through before the neotropical migrants are seen in the late spring and fall. If the organism(s) being surveyed have short life cycles and/or are prevalent during known periods of time, a two-time sampling event at the appropriate time and place may be adequate. For larger projects in or near sensitive resources, as described above in Section 150, surveys in the spring, summer, and autumn might be necessary to adequately describe the animal resources. In the most complex cases, animal surveys can take place in three or four seasons of the year for up to three years. This is generally only applicable for very large, complex, City-wide or Harbor-wide projects.

METHODS FOR COLLECTING INFORMATION

In addition to the type and amount of data to be collected, the methods used to collect that data must also be determined. This includes both the sampling distribution and sampling techniques. A variety of

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sampling distributions are used in habitat and wildlife surveys. Some of the more common distributions suggested for CEQR evaluations are listed and described below. This is not intended to be an all-inclusive list, but rather provides guidance as to the most common sampling plans used for CEQR evaluations. Peer-reviewed ecological literature and accepted standards for sampling should be consulted for additional guidance on these and other sampling plans, as may be appropriate for the proposed project.

Habitat-specific. In these searches, selected habitats are searched because certain species and groups can only be found, or the probability of a sighting is greatly increased, in certain habitats. In addition to threatened and endangered species, these searches are useful when surveying reptiles (snakes and turtles), amphibians (frogs, toads, and salamanders), and colonially nesting birds. Examples of specific habitats include wetlands, vernal pools, and certain beach areas. The number of individuals found and the time spent in each search should be recorded. GIS maps of search areas should be developed.

Point stations. Point stations can be located evenly or randomly along a transect line or on a grid. At each point, the species observed and numbers of each are recorded. The time spent at each station as well as the distance and direction of the observation in relation to the station should also be recorded. GIS maps of point stations should be developed.

Transects. The transect method involves travel along a line or transect (usually through a large area) and recording the species wildlife observed. Transects need not be straight; they can follow paths, trails, roads, *etc.* Depending on the size of the project site or the diversity of habitats, transects can be closely spaced (*e.g.*, every fifty feet) or widely spaced (*e.g.*, every quarter mile). Transects can also be set up with perpendicular transects spaced at intervals along the baseline transect. GIS maps of transects should be developed.

Plots. Plots are generally used for sessile animals or animal sign. A plot is generally a rectangle or a square (quadrat), although circles or other shapes can sometimes be used. GIS maps of plot areas should be developed. The area within the shape is surveyed for animals or animal sign. Plots can be randomly selected within a grid-like framework that covers either the entire project site or a particular habitat type or types. Plots can be very small (*e.g.*, one square meter) to very large (*e.g.*, 0.25 acre).

In addition to the sampling distributions described above, a number of sampling techniques are available. Descriptions of some animal sampling techniques are provided here for invertebrates, fish, and wildlife (wildlife includes amphibians, reptiles, birds, and mammals). This is not intended to be an all-inclusive list, but rather it should serve to provide examples of and distinguish between some of the techniques that are more commonly used in CEQR evaluations and those that would only be used under special circumstances. The ecological literature should also be consulted for additional explanation of these and other methods.

Many animal sampling techniques require special permits, licenses, and/or authorization letters from any or all of the following resource agencies: the NYSDEC, the USFWS, the NPS, and the NMFS. Prior to conducting an animal survey, each of these agencies should be contacted for the appropriate requirements. In addition, certain site-specific permits may also be required. For example, permits should be obtained from DPR if work is to be conducted in a city park. In addition, the DEP should also be contacted for any additional local requirements. All survey activities in aquatic habitats must conform to the guidelines regarding minimization of cross-contamination of habitats with pathogens and invasive aquatic species outlined by the NYSDEC Bureau of Fisheries "Sampling, Survey, Boat and Equipment Protocol" and "Biosecurity Protocol" for all aquatic surveys as well as the Declining Amphibian Populations Task Force field work standards for amphibian surveys.

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Original data forms should be maintained for future reference and may be required in appendices to reports prepared for CEQR assessments.

323.3. Analysis of Data

Data collection should involve a quantitative or qualitative assessment of the value, resilience, uniqueness, and function of the resource. From the literature search and multiple appropriately-timed field surveys, the natural functions of the resource can be established. Some resources have multiple functions while others have only one. A wetland can serve as flood control, water cleansing, ground water recharge, and specialized habitat for plants and animals. Beaches can serve as erosion protection, bird breeding and foraging territory, and an area for human recreation. An open site in a densely developed area could serve as a foraging area for certain birds. Natural resources' different functions are a prime consideration later when assessing a proposed project's effect on the resource.

Some resources are known to be valuable prior to any survey effort. These are generally those designated resources listed in Section 150, above. However, the designated resources tend to focus primarily on the larger coastal and other wetland areas. There are a number of other, primarily terrestrial resources that do not have designation but are nonetheless very valuable. Some contain rare plant and animal species. In addition, there are resources and species that are valuable or sensitive because they are rare in New York City, although they may be common elsewhere (*e.g.*, northern plants at their southern range and southern plants at their northern range). Therefore, each analysis of existing conditions must consider each resource encountered on its own merits, whether or not its value has already been recognized by others.

A number of factors help determine the value or extent of the resource. The results of the literature searches and background research (see Subsections 321 and 322) can provide much information on the value of the habitat. The results of the habitat characterization, if performed, further define the ability of the habitat(s) to support invertebrates, fish, or wildlife. Factors to consider when assessing the value of a habitat are discussed in Subsection 324. Finally, if animal surveys are conducted, the value of a habitat can be further defined. This requires an analysis of the data collected from these surveys. Data from wildlife surveys can be analyzed at both the species and community levels.

Some examples of data endpoints that can be calculated and used to assess the value of a habitat for CEQR evaluations are described for species and communities below. This is not intended to be an all-inclusive list, but rather should guide the reader to those data endpoints that would be most appropriate for CEQR evaluations. The ecological literature should also be consulted for additional information on these and other data endpoints, as should texts or scientific literature on biostatistics (See Section 730).

SPECIES

PRESENCE/ABSENCE. Presence/absence is a simple type of data analysis that entails identifying whether a species is present in a particular habitat type. Here, the number of individuals is not calculated. This data type is useful in verifying whether a particular species uses a habitat or a project site. Such information can be useful by itself, or it may help focus a survey to site-specific areas, such as an area where a threatened or endangered species (TES) or species of special concern might be located. This method is useful when detailed ecological information is not necessary or when identifying the presence or absence of a TES or species of special concern. However, the results from this type of data analysis can change seasonally or from year to year. Furthermore, presence/absence data depends largely on the skill of the observers, timing, weather conditions, survey methods, and other factors. Therefore, multiple presence/absence surveys should be conducted using skilled observers and proper sampling techniques.

ABUNDANCE. Species abundance is the number of individuals in a population of a certain species. Data collection for species abundance is widely used for ecological surveys and is often expressed per unit

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time (time-restraint) or distance (linear transects). Absolute abundance, or the actual number of individuals in a species, is rarely measured, nor is it recommended, since it is extremely time- and labor-intensive, and methods to accurately estimate abundance are readily available. Estimates of abundance are calculated using indices that are correlated to population size. For example, a common index used with mark-recapture data is the Lincoln-Petersen index.

DENSITY. Species density is the number of individuals in a species expressed per unit area. The area can be naturally or artificially ascribed and can be project specific. Usually, density would be calculated for a project location or habitat type within a project location. Similar to abundance, estimates of density should be calculated by using indices that are correlated to population size rather than by attempting to measure absolute density. Absolute density should only be considered in rare cases, such as for TES or species of special concern.

SPATIAL ARRANGEMENT AND MOVEMENT. This type of data describes the location of individuals or species as well as their movements within a community or habitat type or from one community or habitat type to another. This type of data is rarely needed, unless very specific information is needed, usually for TES or species of special concern.

COMMUNITIES

Community measurements are data collected on groups of species. Logical groupings may include groupings by habitat use or guild, taxonomic classification, habitat type, or any other logical grouping. The following data endpoints can be calculated to describe communities:

SPECIES RICHNESS. Species richness is the total number of species in a community, habitat type, or other logical grouping. To determine species richness, all the species present in the community, habitat type, or other logical grouping should be identified. Species richness is useful in comparing the richness of different habitat types or project locations. Generally, the total number of species on a site is never known without exhaustive fieldwork. Consequently, species richness is based mostly on existing habitat valuation and size and is largely qualitative.

RELATIVE ABUNDANCE. Relative abundance is the abundance of a species relative to the total abundance (number of individuals) of all species in a community, habitat type, or other logical grouping. Relative abundance provides an indication of the degree of dominance of a species in the community, habitat type, or other logical grouping being studied.

SPECIES DIVERSITY. When it is possible to gather data on abundances of each species in a community, habitat type, or other logical grouping, a species diversity index can be calculated. The most commonly used diversity index is the Shannon-Wiener index (see Section 730). This index provides an indication of the number of species, together with their respective abundances, in a single number. Species diversity information is rarely required for a CEQR evaluation because gathering data on abundances of all species in a community is extremely time- and labor- intensive. Furthermore, diversity indices should be interpreted cautiously, as they often obscure rather than reveal patterns of conservation interest.

A site with high species richness is usually valuable because it supports many different types of organisms. A site with low richness and high abundance of one species usually indicates high disturbance and low current habitat value. These sites are often dominated by common reed and purple loosestrife in wet areas, and sumac and tree-of-heaven in upland areas. However, the potential for improved ecosystem services and diversity is possible. Areas with low diversity, however, are not always low quality, and care should be taken to interpret diversity values. For example, headwater streams have low invertebrate diversity, but are often high quality and support populations of breeding salamanders that may not survive further downstream. Marginal or harsh environments often support rare or endangered species that are excluded by competition or predation from more diverse habitats.

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323.4. Assess Ecosystem Services

A natural resource does not exist alone but is part of a larger inter-connected ecosystem that includes the biotic community (living) and the surrounding abiotic environment (non-living) from which it gains and gives support. To understand fully the potential impact of a project on such resources, the biotic and abiotic systems supporting them are assessed.

An important step in the assessment is choosing the size of the system to analyze. Only the part of the system that is likely to be affected by the project is included. If too much of the system is analyzed, impacts of the project could be diluted by the larger system and appear insignificant. For a surface water hydrology analysis, for example, the only included areas would be the affected downstream and/or upstream portions of the system (stream, wetlands, and slopes) until the watercourse enters a large water body, such as New York Harbor. For wetlands, the adjoining wetland area and the immediately contiguous uplands and water body would generally be analyzed. For upland habitat, the limit of the system would usually be the area containing similar vegetation. Some examples of systems include the following:

SURFACE WATER HYDROLOGY

The potential impacts on water quality, and of changes in flow as it relates to flooding, wetlands, and water bodies, are the most commonly assessed aspects of an environmental support system. This analysis is typically performed as follows.

- Define the whole watershed basin. For most streams, the overall watershed basin has been mapped, but the mapping tends to be generalized and does not contain sufficient detail for environmental impact analyses. Further, construction that has taken place since the mapping may have changed the contours. The USGS's topographic maps are the basis for mapping the watershed basin. The site on the topographic map is located and the direction water flows onto and off of the site is determined. Streambeds, gullies, ravines, and other watercourses can be identified on the topographic maps where contour lines appear to form a V, which points upstream. The watershed basin can be mapped by following the streams up the contours to the high points (divides), and following the contours downstream to the receiving water body.
- Define the analysis conditions. This depends on the issues of concern. For example, for an assessment of a project's effects on flooding, the analysis would consider how the project could affect flooding during 1-, 5-, and 10-year storms (storms that have a statistical frequency of occurrence of once in 1, 5, or 10 years). It considers whether more areas would be regularly flooded during these storms if the project is implemented. The 100-year flood is also considered for a project to conform with regulations (see Section 710). The analysis should be consistent with the conditions identified in any infrastructure analysis. For instance, in assessments of erosion, a short, intense rainstorm is analyzed because it causes greater erosion than a larger storm of longer duration.
- Determine spatial and functional relationships of the wetland system and project site. This analysis relates how the wetland system as a whole functions, and the site's role in that function. Both the location of the site in the wetland system and its size relative to the system are considered. The location of the site has an effect on its value in the functioning of the wetland system. For example, a site along a steep slope above a stream would have more effect on that stream in terms of hydrology than a flat site at a distance from the stream. The size of the site relative to the whole system is also important--a large site is normally more important to the overall system than a small site. However, small sites can sometimes be crucial and their importance can be determined only by a system-specific analysis. As an example, for stream erosion and flooding, a site's characteristics (flat, steep, with wetlands and hydric soils or rock outcrops) are considered in the context of the system's characteristics. A flat, wide site in a

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steep drainage system could be a valuable flood storage area, but stormwater would pass quickly through a rocky steep site. The rocky steep site, however, could have highly erodible soils that could cause downstream siltation. The current drainage from the site is plotted, and its contribution to the system calculated using standard engineering techniques. The soil types (see New York City Soil Survey maps) and slopes are analyzed to determine erodibility and the velocity of the flows into the drainage system. Then, the downstream area is examined to determine its size. All sources and volumes of water added to the downstream area are plotted. The point at which the site's contribution becomes minimal is estimated, and at that point the system analysis is ended.

COASTAL EROSION

The analysis for coastal erosion includes an assessment of winds, waves, fetch (distance over open water), and shoreline configuration, all of which can affect erosion. Two aspects are examined in a coastal erosion analysis: 1) is the site subject to erosion to the degree that property and life could be endangered in the foreseeable future; and 2) would the project increase erosion at other locations. To answer the first question, a design storm (usually the USACE 100-year storm) is considered. Such a "design" storm would feature particular wind speeds and other meteorological characteristics. The wave heights and storm surge at the site are calculated with the waves coming from the site's most exposed direction. Based on the energy in the waves and the types of soils at the site, the amount of erosion is calculated and the danger of loss or damage to the property assessed. For potential erosion that might be caused at other locations by the project, the dominant direction of sand movement along the beach is determined. The size and location of the site affected by the project are both important in this assessment. For example, a site at the end of a coastal erosion zone would not affect sand movement at downstream sites, but a site at the beginning of the erosion zone would.

SOILS

Soils are potentially significant in determining a site's ability to support plant cover, its erosion potential, and its capacity for ground water recharge. Soils are an integral component of any habitat type, as they play a significant role in determining the type and quality of the vegetative composition, amount, and nutritive value of vegetation at a site, and they provide habitat for microbes and invertebrates that are important food sources for upper trophic level wildlife. When describing the chemical and physical properties of soil, methods outlined in the U.S. Department of Agriculture's (USDA) Soil Testing Procedures for the Northeast should be used. In New York City, the USDA's Natural Resources Conservation Service (NRCS) has undertaken a program of Reconnaissance and Intensive Surveys and has identified and characterized new soil classifications for anthropogenic and disturbed soils. For important sites in New York City, NRCS's New York City Soil Survey team may undertake a special survey on request, after a review of applications by the New York City Soil & Water Conservation District and the NRCS's State Soil Scientist in Syracuse. The New York City Soil Survey map that classifies the various urban soil types should also be used.

Other examples of environmental support systems that are sometimes assessed are ground water and vegetative buffers.

330. FUTURE NO-ACTION CONDITION

The impact assessment for natural resources compares the effects of the proposed project to the future without the project. It is probable that many resources will change in the absence of the proposed project. This depends not only on future development or public works projects (without the project), but also on expected overall growth and natural ecological processes. In some cases, resources may be expected to improve over time under the future No-Action condition due to other environmentally beneficial projects that are taking place concurrently.

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The future No-Action condition in the study area should be evaluated for the build year. It should be noted that anticipated changes to resources outside of the study area can affect the future No-Action condition within the study area. Therefore, it is important to consider all applicable projects and future anticipated changes both in and around the study area in order to accurately evaluate future conditions in the absence of the project. In some cases, information to support this evaluation may be available from other technical areas, particularly land use, traffic, air quality, noise, and hazardous materials. Most often, the analysis of the future No-Action condition should be qualitatively discussed. Where another environmental assessment has been completed, it may be appropriate to utilize its conclusions. However, in some instances, it may be necessary to reassess conditions quantitatively, depending on both the nature, scope, and scale of the project and the anticipated development, other projects, or expected future changes in the resource. An example of a quantitative assessment is the use of water quality modeling (see Chapter 13, "Water and Sewer Infrastructure").

340. ASSESS WITH-ACTION CONDITION (ASSESSMENT OF IMPACTS)

Assessing impacts of a project begins with understanding the extent to which the project would disturb or alter a resource in the short- and long-term. Impacts can be categorized into direct and indirect effects. Direct effects are relatively straightforward; indirect effects may require more analysis.

341. Effects of the Project

341.1. Direct Effects

Direct effects of a project include the category of activities that directly alter the condition of a resource. Direct effects include, but are not limited to:

- Removal of vegetation.
- Altering on-site hydrology or effects on hydrology to sites downstream.
- Changing one habitat type to create another.
- Filling, draining, dewatering, or dredging of a water body or wetland.
- Development of roadways, parking lots, buildings, and other paved surfaces on previously vegetated or unpaved surfaces.
- Construction of new marine structures, such as bulkheads, piers, piles, groins, jetties, *etc.*, or floating structures that disturb existing habitat, change water flow patterns, and/or change sediment transport patterns, *etc.*
- Stream channel changes, such as bank stabilization, widening, narrowing, straightening, culverts, *etc.*
- Installation of drainage systems, including sewers, culverts, retaining basins, recharge wells, *etc.*
- Introduction of buildings or structures that cast prolonged shadows on a natural resource, or otherwise alter its microclimate (see also Chapter 8, "Shadows").
- Introduction of new (particularly non-native) plant or animal species that out-compete for resources.
- Alteration of soil pH, destruction of structural properties of soil, changes to the microclimate, alteration of soil compaction, *etc.*
- Introduction of noise at the site, either temporarily during construction or permanently during operation (see also Chapter 19, "Noise").

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- Landscaping with non-native vegetation.
- A change in air quality that may adversely affect native species, either temporarily or permanently (see also Chapter 17, "Air Quality").
- Increased lighting at the site, either temporarily during construction or permanent during operation.
- Alteration of physical and chemical quality of waterbodies on the site, including increased turbidity, temperature, nutrients, biological oxygen demand, pesticides, *etc.*
- Alteration in the water level or surface area of an existing water body on the site.
- Construction of a structure that may impede animal migration and movements.
- Compaction of soil and/or loss of adequate soil structure from construction vehicles and heavy equipment.
- Removal of soil during construction, either directly or due to erosion.
- Construction of storm or sewer outfalls.
- Construction or removal of bulkheads, piers, and other structures in the water.
- Introduction of contaminants or contaminated materials to a natural resource.

Usually, the description of direct effects includes a calculation of the area to be affected (in square feet or acres, for example), or volume of soils to be removed. It may also entail describing methods and types of construction at a level appropriate to understand the extent of an effect. This means that the proposed activities or assumed development scenario are defined in some detail. Where specifics are not known, a conservative but reasonable assumption is made. Furthermore, even if compensatory mitigation is planned, the calculation of affected area includes those areas required for construction activities, even if the long-term plan is to restore these areas.

341.2. Indirect Effects

Indirect effects occur when the changes on a site alter conditions to adjacent or nearby resources or on the site itself after construction has ended. Indirect effects include, but are not limited to:

- A change, such as loss and/or health of vegetation, dewatering, soil compaction, site clearance, excavation, introduction of impervious surfaces, or any other change in drainage patterns that would alter the way in which surface or ground water flows from the project site to a nearby natural resource or vice versa.
- A change that would influence the degree or period of tidal inundation of a natural resource.
- A change, such as exposure or movement of contaminated sediments or soils, that would render organisms on-site or in nearby natural resources more likely to be exposed to contaminants.
- A change that would decrease the quality of surface or ground water that currently supports a natural resource.
- A change in on-site activities that would either increase the number of people or domestic animals or increase noise, thereby increasing disturbance to on-site or nearby natural resources.
- A change in on-site conditions that would alter the amount of light that reaches natural resources on or near the site.

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- An activity or a change in conditions that would introduce or facilitate colonization by new (particularly non-native) plant or animal species that could overtake existing (particularly native) species either on-site or in nearby resources.
- An activity or change in conditions that would transform stable interior vegetation into potentially unstable edge vegetation (*e.g.*, trees subject to increased wind stress, increased soil evaporation, *etc.*).
- A change that would increase scouring, erosion, or transport of soil, silt, and sediments and alters the quality of an on-site or nearby natural resource.
- A change that would increase sediment deposition on-site or in a nearby natural resource.
- A change that would impact the movements or migration of animals between or within habitats.
- A change that would encourage the spread of exotic species such as wooly adelgids and/or Asian longhorned beetles.
- A change that would increase the frequency of bird collisions with built structures due to increase in height, architectural design or lighting infrastructure.

If the project under study may potentially indirectly affect a resource, the assessment attempts to describe and measure the extent of that effect. In some cases, this amounts to nothing more than comparing the proposed landscaping to the surrounding area to determine if it would be a similar habitat. In others, it may be necessary to analyze subsurface geology in a small area to track with some accuracy the flow of ground water to a wetland and estimate the extent to which the project may alter the volume, quality, or direction of that flow.

342. Effect on the Functioning of a Natural Resource

The evaluation of the natural resources in the study area identifies the functions of a resource (under existing and No-Action conditions) and the elements that are critical to these functions. For example, ground water flow may be essential to a particular freshwater wetland; in that wetland, the soft soil and fern-lined stream banks may provide essential habitat to an important amphibian. If a project would decrease the ground water flow to the wetland or somehow compact the soil surrounding it, the water quality and habitat quality may be compromised. In another example, a stand of trees may shade an area, allowing for increased cover and a cool microclimate for small mammals, birds, plants and other organisms. The loss of the trees would remove a specific habitat. Based on this type of analysis, the assessment identifies the loss associated with the project and the importance of that loss for the critical functions of the habitat.

A critical facet of the assessment is determining the extent of habitat impairment. As described earlier, resources' resiliency, or ability to accommodate change, are key to the assessment of habitats. The project being analyzed and the resiliency of the resource are compared to determine whether the resource would retain its functions, or whether, and by how much, those functions would be impaired by the project. Impairment can range from destruction of the habitat altogether to its partial degradation to minimal impairment. Destruction includes complete elimination of a habitat or removal of a species or a condition (such as regular inundation) essential to its existence. Degradation involves the removal or alteration of a portion of a resource, where the resource may retain some ecological value, but its function would be limited. For example, if the size and shape of a woodland area is changed, interior habitat may be effectively diminished for species that require large or contiguous patches (*i.e.*, forest interior birds), while other species adapted to “edge” habitats may persist or increase. Depending on the extent, location and relative abundance or rarity of the habitat within the City, this may represent a significant adverse impact. Minimal impairment would include minor or temporary disturbances that would allow for a reasonable recovery to initial conditions over a short period of time (*i.e.*, temporary land disturbance within a successional habitat type). The parameters to be examined are

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physical (*e.g.*, temperature, volume of water, soil types), biological (*e.g.*, diversity, abundance, community structure), and situational (*e.g.*, size, distribution, and shape).

343. Context of the Resource Change

In addition to evaluating direct and indirect impacts as described above, the severity of the impact should also be addressed in terms of the context of the resource change. This evaluation has three components. First, if a resource would be impacted or lost due to project-related activities, these losses must be evaluated in terms of how much of that resource is left in the City. A project that would remove an acre of a habitat that is very abundant throughout the City may be less significant than a project that would remove an acre of an extremely scarce habitat. In considering the context of a resource change, it is always important to remember that many of New York City's resources may be abundant throughout the region or state, but scarce in the City's dense urban environment.

Second, each individual resource impact must be evaluated in the context of other resource impacts from the project. Impacts to each individual resource or habitat may be seemingly insignificant, but the cumulative total of the impacts may nevertheless be significant. Furthermore, the impacts to one resource could potentially affect the impacts to other resources, and the overall impacts may be synergistic. Thus, a careful evaluation of the sum of all the impacts considered together must be performed to accurately evaluate how natural resources would be affected by a project.

Finally, project-related impacts must also be evaluated in the context of both spatial and temporal changes in natural resources that will occur in the absence of the project. In other words, the anticipated changes in natural resources, both on- and off-site, that were evaluated for the future No-Action scenario must also be evaluated together with the impacts of the project in question. For example, if it is determined that a resource would be adversely impacted, not only should it be put into the context of how much of that resource is left in the study area, but also how much of that resource would be left based on what is currently known about future conditions. Again, the project-related and non-project related impacts could potentially be synergistic such that the overall impacts are greater than the sum of their parts. A careful evaluation of the sum of all the impacts, both project and non-project related, must be performed to evaluate accurately the impacts on natural resources from a project.

350. ASSESSMENT ISSUES FOR SPECIFIC NATURAL RESOURCES

351. Water Resources

351.1. Surface Water Bodies

The appropriate function and optimum condition of surface water bodies in the City are set by DEC and appear as water quality standards (see Section 710, below). NYSDEC sets these goals depending on conditions and actual function of a water body, as well as its water quality potential. Surface waters are classified as suitable for some or all of the following functions: water supply, contact recreation, fishing and boating, fish habitat, and fish passage. Each classification has a specific set of water quality standards, designed to protect the waters for the designated uses. These standards are expressed as minimum levels of dissolved oxygen that must be present, the acceptable range of pH, maximum coliform levels, and maximum amounts of toxic wastes and deleterious substances. Although these classifications do not necessarily reflect existing conditions, they express public environmental policy for the City's water bodies and, as such, serve as a basis for comparison in the analysis of impacts on surface water resources. Information on water quality standards and sampling data are provided by the NYSDEC and DEP.

Further, an order of consent between DEP and NYSDEC, published January 14, 2005, identified 18 drainage areas for which CSO facility planning studies would be utilized to develop a set of feasible alternatives to control CSO in each drainage area. These 18 Waterbody/Watershed (WB/WS) Facility

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Plan Reports will become a part of the final City-wide Long Term Control Plan (LTCP) for all watersheds within the City of New York, scheduled for completion in 2017. The classification of the waters within the City can be found here.

Examples of projects that indirectly affect water bodies are listed in 351.3, below. Examples of projects that directly affect surface water bodies and issues for the assessment include:

- A project that would add to the discharges of pollutants to a surface waterbody. Generally, this activity is limited to industrial discharges, sewage treatment plants subject to the State Pollutant Discharge Elimination System (SPDES) permitting procedure (see Section 710, below) and large-area land use changes. When water quality is an issue, the analysis can include one or more of the following:
    - Collecting available data on water quality. DEP, the Interstate Environmental Commission (IEC), NPS and DPR all maintain sampling programs in the City's major waterways (see above and Table 1). EPA and NYSDEC also perform more limited sampling. Parameters for which data may be available include dissolved oxygen (DO), which indicates the level at which fish life can be maintained; biochemical oxygen demand (BOD), which indicates presence of organic pollution; fecal coliform, which indicates the presence of pathogens that spread disease; heavy metals, such as iron, manganese, copper, zinc, and lead, which are indications of industrial pollution; nutrients, such as phosphorus, ammonia, nitrite, and nitrates, which are discharged from wastewater treatment plants and, in excess, allow algal growth that results in a reduction of oxygen levels; suspended solids; secchi transparency; pH; and chlorophyll 'a,' an indicator of the presence of algae.
    - Where sampling data are not available or where information for smaller areas of a larger water body is required, it may be necessary to take water quality samples. This can range from one-time sampling and testing for the parameters discussed above, to a yearlong survey with samples taken at multiple locations. Generally, runoff or drainage from a small residential development into a water body with good tidal flushing would need only one sample. If the runoff is into water with poor tidal flushing (such as Spring Creek), samples at several locations would be needed to characterize the area's water quality. A large development near a sensitive resource would require a full program. To determine the worst-case water quality conditions, sampling should be conducted during the late summer, when water quality, especially dissolved oxygen, is at its lowest. The program should not be conducted after a recent large storm, which would affect the water quality, if the project does not alter runoff or potential combined sewer overflows (CSO's) or sanitary system overflows (SSO's). Sampling after storms should be performed when stormwater discharges, CSO's, or SSO's are potentially affected by the project. Data collected in Chapter 13, "Water and Sewer Infrastructure," may be of assistance.
    - In some cases, the new pollutants could be expected to affect water quality over a wider area; for these projects, application of a computer-simulated water quality model may be appropriate to assess impacts. A report by the Water Environment Research Foundation (WERF), "Water Quality Models: A Survey and Assessment," provides descriptions of the types of models as well as modeling software, including relevant model features. This reference is useful in defining the capabilities and limitations of available water quality models and in guiding the selection of a model to meet the objectives of the environmental assessment. Data collected in Chapter 13, "Water and Sewer Infrastructure," may be of assistance.

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- For water bodies that contain finfish and other aquatic or amphibian species that are considered significant, the assessment of changes in water quality parameters is also applied to the understanding of the potential for a change in habitat (see discussion in Section 310, above).

- A project, such as the introduction of a new stormwater outfall or construction of a bulkhead, pier, or other waterfront structure, may disturb a portion of the environment, particularly the benthic community. A stormwater outfall could increase the location and velocity of stormwater as it enters the water body, which could scour the bottom of sediments and consequently change the environment for the bottom (benthic) organisms that live there. Placing a new bulkhead or pier could also disturb the bottom, if only during construction, with similar, albeit short-term effects. In rare cases, it may be necessary to assess the impact on finfish and other vertebrates from the bottom sediments if they are suspended in the water. A bioassay test, which determines the potential uptake of pollutants in the sediment by animals, is performed in such cases.

- A project, such as maintenance dredging that would disturb the bottom sediments on a regular basis, altering the composition of the bottom and the volume of suspended solids in the water column. Sediment sampling and bioassay tests are appropriate so that the effects of dredging on water quality and aquatic life, including the potential release (resuspension) of contaminants into the water, can be assessed. Disposal of dredged materials is also an issue, but this activity is regulated by the USACE and EPA, who review the test data and decide where the materials can be placed without causing environmental impact or whether restrictions are needed. See USACE Dredging Operations Technical Support Program Reports. Approximately ten percent of such dredged materials require restrictions, such as capping with clean materials. Dredged materials from certain locations require special investigations and handling. These include dioxins in the sediments at the convergence of the Kill Van Kull and the Arthur Kill, and the very high pollutant levels in industrialized basins with poor or closed circulation, such as the Gowanus Canal and Newtown Creek. Such issues are disclosed in CEQR review; however, compliance with appropriate regulations would ensure appropriate disposal, based on dredge spoil quality, without creating a significant adverse impact.

- A project that would change a physical condition of the water, such as temperature, currents, flow, channel shape, *etc.* Examples include installation of piers or platforms that permanently shade portions of the water; cooling water discharges, wave curtains for marinas, culverts and channels often included in roadway design, *etc.* For certain projects, mathematical modeling may be required to determine if circulation may change, leading to an effect on water quality. Several models for the entire New York Harbor and the adjoining Long Island Sound and New York Bight are appropriate for very large projects, such as a large industrial facility, that could have Harborwide effects. For smaller projects, models are available as described in the WERF report. (See Section 730). The potential impacts from marina wave breaks and new piers can be analyzed by hydrodynamic models, several of which were evaluated in the WERF report.

- A project that would result in the draining or filling of a water body or a portion of a water body. Examples include culverts or channel modifications that direct flow away from a pond and filling to create land (such as Battery Park City) or even out a shoreline in creating a bulkhead. These projects affect water circulation and could lead to increased flooding, both off- and on-site. The potential effects on circulation can be analyzed using the models discussed above. Flooding potential can be analyzed using either hand calculations or computer models, depending on the complexity of the situation.

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351.2. Ground Water

NYSDEC sets water quality standards for ground water based on its potential use. Fresh ground water is generally classified as having the potential to provide potable water supply. However, in New York City, only portions of the Lloyd, Jameco, and Magothy Aquifers are used as drinking water supply. The Jameco and Magothy Aquifers are designated as sole source aquifers in Brooklyn and Queens and are thus afforded special protection. Most projects would not have an impact on these aquifers unless wells are installed or subsurface waste disposal is part of the project. On Staten Island, the underlying aquifers are used for process water or irrigation supplies by private interests, but the aquifers are not considered to be sole source. Although some small water-bearing areas can be found beneath Manhattan and the Bronx, these are not used for drinking water supply. Throughout New York City, the Upper Pleistocene soils contain ground water, which also feeds surface water bodies. Ground water quality is of concern for natural resources where it supplies water to sensitive habitats and water bodies. Ground water quality is particularly important to maintain freshwater wetlands located in Staten Island and Queens. The analysis of ground water quality is similar to that of surface water quality. Samples are obtained, in this case by establishing a sampling well, and chemical tests are undertaken.

The quantity of ground water can also be important because it supplies water to wetlands and surface water bodies during dry periods. In a contrasting example, ground water is such a small component of the waters of the lower East River that its flow would not be a concern there. The analysis of ground water quantity and flow is geotechnical and involves establishing the characteristics of the aquifer (the material through which the ground water moves), the direction and rate of flow, and the rate of recharge. Activities that could affect ground water quality or quantity and the assessment issues associated with these activities include the following:

INSTALLATION OF INDUSTRIAL OR RESIDENTIAL WATER SUPPLY WELLS

The issue in this case is the potential that pumping would alter the flow of ground water in a specified area, possibly altering flows to another resource. If pumping takes place close enough to a source of contamination, the project could draw pollutants (such as salt) into the aquifer (See Chapter 12, "Hazardous Materials," for further information on potential contamination). To assess such potential impacts, several wells would need to be installed, and the water levels recorded. These readings are plotted and drawn as contours to create a piezometric surface, which shows the direction and strength of ground water flow. If the site is close to a tidal water body, the water levels need to be recorded for an entire tidal cycle to establish the tidal influence on the ground water flow.

DEWATERING OF A CONSTRUCTION SITE

This is similar to the installation of wells, in that the activity may alter flow of ground water in a specified area or to adjacent or nearby wetlands. However, it is a temporary condition.

PERMANENT DEWATERING

In some instances, as when all or part of a building or subway tunnel is constructed below the water table, dewatering pumps are installed to prevent flooding within the structure. This dewatering condition alters the ground water table and direction of flow on a permanent basis.

REMOVAL OF VEGETATION AND/OR PLACING AN IMPERVIOUS SURFACE ON LAND USED FOR THE RECHARGE OF GROUND WATER

This would diminish the replenishment and ultimately the total volume of ground water available. Usually as a part of site planning, current runoff and runoff with the project in place are calculated. A number of methods can be used to make this estimate, including the "rational method;" TR-20 and TR-55, computerized models developed by the USDA's Natural Resources Conservation Service; and EPA's Storm Water Management Model (SWMM). These methods calculate the volume of runoff, given the volume of rainfall and the area of impermeable surface. They typically use runoff coefficients based on types and areas of different ground surface on the project site. Using this formula and the

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mean annual precipitation (approximately 44 inches in New York City), the current recharge and recharge with the project can be calculated. The significance of the change caused by the project can be assessed by comparing the loss or increase in recharge volume to the volume from the recharge area.

INSTALLATION OF GROUND WATER RECHARGE WELLS OR OTHER RECHARGE FACILITIES

Where increased impervious surfaces are proposed, they are often accompanied by a plan for recharging ground water through wells. These wells return the precipitation to the ground water. Generally, the runoff is collected directly from rooftops and other impervious surfaces. Such recharge wells do not function properly unless the distance from the bottom of frozen soil (3 feet in New York City) to the top of the water table is more than 2 feet; therefore the depth to the water table is considered when assessing the wells.

CONSTRUCTION OF FOOTINGS, CAISSONS, BASEMENTS, AND OTHER SUBSURFACE IMPEDIMENTS TO GROUND WATER FLOW

Deep foundations can occasionally create wet spots and low-level flooding if they impede the flow of ground water. The impediment to flow can become noticeable near tidal water bodies with fluctuating ground water levels.

INTRODUCTION OF AN ACTIVITY ON-SITE WITH THE POTENTIAL TO CONTAMINATE GROUND WATER

Such activities include industries involved in the transport, processing, storage, or disposal of hazardous or toxic materials. In this case, the assessment first addresses the question of whether ground water on the site is important for on-site or off-site water supply or resource replenishment. If so, the assessment then considers the existing quality of the ground water, its flow direction and rate, and the pathways to contamination. The analysis undertaken for hazardous materials is described in Chapter 12, "Hazardous Materials."

351.3. Other Water Resource Systems

The quality of the surface water hydrology flow and its velocity and volume as it moves across the land affect the physical and chemical characteristics of water bodies and receiving waters. This is determined by the slope and coverage of the land, the uses on the land, the presence of built systems to convey stormwater flows, the types of storms to which the area is subject, and the ability of the low-lying floodplains to retain stormwater and diffuse the force of its flows. Other natural phenomena that strongly affect the environment include the action of tides and waves, which shape the land through erosion or accretion of sand and other materials carried in the waters. A proposed project can alter these systems or combine with them for unexpected results. Examples are as follows:

- Projects that would alter the way in which surface water hydrology flows overland or is absorbed to recharge ground water. These include activities that displace heavier vegetation (such as woodlands) with lighter vegetation (such as lawns) or add impervious surfaces to the land; alter the shape of the land (cut or fill it to build a road, for example); or introduce a built storm drainage system. Any of these activities may increase the volume of water that arrives at a water body or wetland as surface flow; increase the velocity with which it flows; create an earlier and substantially greater "peak" flow to the receiving water; or change the speed and direction of flow. The analysis of such projects includes assessing the area draining to the water body, as described in Section 330, above. Figure 3 illustrates the affects of increasing impervious surface cover on water quality.

- Changes to the floodplain, including the following: placement of structures in the floodplain that reduce its capacity for flood retention or alter stormwater flow characteristics; removal of vegetation that would otherwise reduce flow velocities and promote recharge; and removal of stream bank vegetation, which may destabilize the stream channel or increase water temperatures. The analysis of the floodplain uses engineering techniques similar to those pre-

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sented for the assessment of overland runoff. To estimate the potential for increased flooding because of a project, the volume of the floodplain occupied by any buildings facilitated by the project is compared with the total volume of the floodplain. Along small streams, such as Lemon Creek on Staten Island, a small project in the floodplain could cause flooding elsewhere. The discussion in Chapter 13, "Water and Sewer Infrastructure," may be of assistance.

352. Wetlands

USACE has jurisdiction over virtually all freshwater and tidal wetlands. As discussed in Section 710, NYSDEC and the USACE require permits for certain projects that would take place in or affect most wetlands and the areas adjacent to them. NYSDEC also takes jurisdiction over all tidal wetlands and all freshwater wetlands greater than 12.4 acres; smaller freshwater wetlands may also fall under DEC jurisdiction if they are deemed by the Commissioner to be of unusual local importance. As discussed in Subsections 122 and 123, NYSDEC's jurisdiction extends to buffer area known as the "adjacent area." In New York City, the adjacent area is usually the area within 150 feet of a tidal wetland or 100 feet of a freshwater wetland. For tidal wetlands, this area can be smaller if, in general, a 10 foot rise in elevation occurs less than 150 feet from the wetland or if a functional and substantial fabricated structure of at least 100 feet in length serves to bound the wetland. In these cases, the adjacent area would be the area between the wetland boundary and the 10 foot contour or the fabricated structure. However, in many circumstances it is also appropriate to examine impacts within areas larger than 100 and 150 feet from the wetland boundary. For example, beaches, dunes, bluffs, upland nesting habitat for water birds, and other critical watershed components are often adjacent to but further than 150 or higher than 10 feet from the tidal wetland boundary. In this and many other cases, it may not be appropriate to limit the CEQR impact assessment to the adjacent area definition that constitutes NYSDEC's jurisdictional boundary. Larger areas may need to be evaluated since effects on wetland resources could be overlooked. The assessment may be based more on the ecological boundary of the impacted system.

In addition, for freshwater wetlands, it is often appropriate to consider wetlands that are smaller than the 12.4 acres. Many vernal pools, bogs, and other freshwater wetlands that are smaller than 12.4 acres are critical to regional biodiversity. Vernal pools, for example, are often smaller than 0.5 acres and are hydrologically isolated from one another, although several may be interspersed across the same local landscape. Because these systems are devoid of fish, they serve as important breeding grounds for amphibians. Amphibians migrate over land from one pool to another to breed. Although these pools are isolated and relatively small, they form an integrated wetland system at the landscape scale. In many cases, especially in fragmented urban ecosystems such as New York City, wetland value is derived from the spatial integration of small wetland units into a whole wetland system that is greater than the sum of its parts. Thus, effects on all wetland systems, regardless of size, should be considered in a CEQR evaluation. Wetland values should be rated according to function, both at the individual and the study area/ecosystem level. In all cases, it is essential for the analyst to define the area in which activities could adversely affect the resource.

NYSDEC and USACE have established technical procedures for the definition and evaluation of wetlands. Both procedures acknowledge that three elements work together to create and maintain wetlands: wetland hydrology (the movement of water to and through the wetlands that creates saturated conditions for at least one week during the growing season); hydric soils (generally dark, mucky soils with chemical and organic characteristics that reflect the lack of oxygen [anaerobic conditions] resulting from inundation); and hydrophytic vegetation (plants that can tolerate or that require periodically saturated or inundated conditions and/or anaerobic soil conditions). Tidally influenced wetlands are delineated using the vegetation and hydrologic criteria described in 6 NYCRR Part 661.2. For freshwater wetlands, the USACE technical approach emphasizes determination of soil types in delineating wetlands, while NYSDEC stresses identification of vegetation in delineating and characterizing wetlands (see 6 NYCRR Parts 660¬665 for guidance). Relying on vegetation identification to delineate wetlands is usually more expansive than relying on soils identification because wetland vegetation is often found growing in soils that are adjacent to wetlands soils but are not classified as such. Therefore, a reliance on vegetation most often results in the delineation of a larger area as wetlands.

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Most of the city's remaining freshwater wetlands occur on Staten Island. Peculiar soil and hydrophytic plant factors on Staten Island, however, contribute to under-delineation of these wetlands. Standard wetland delineation protocols call for the identification of hydric soils, wetland hydrology, and hydrophytic plants. First, on Staten Island, most woody plants that are adapted to wetland conditions, including red maple, sweet gum, sycamore, tupelo, swamp white oak, pin oak, swamp azalea, high bush blueberry, and others, are equally well distributed in uplands. As a consequence, wetland delineators may underestimate the extent of forested wetlands on Staten Island. Second, a key indicator used to identify hydric soils is the presence of vertical red streaks in the soil. These are interpreted as channels of oxidation running along the roots of plants that have developed in a low-oxygen, water-logged context. Because Staten Island soils are generally derived from a red parent rock, in many areas the soils themselves tend to appear red, thereby potentially masking a key hydric soil indicator. These Elkton soils exist only on Staten Island and are not included on the state wetland soil list. Some of these reddish Staten Island soils, however, are recognized as wetland soils in other mid-Atlantic states. For example, soils in the Elkton series are identified as wetland soils on lists in New Jersey, Maryland, and Delaware. Inclusion on the lists allows wetland delineators to rely upon Elkton soils criteria when it is difficult to interpret other delineation criteria at a particular wetland site.

NYSDEC uses its March 1995 delineation manual for freshwater wetlands. The USACE and EPA have agreed to use the Corps of Engineers Wetlands Delineation Manual, 1987 (Technical Report Y-87-1) for purposes of administering the program under Section 404 of the Clean Water Act. However, in New York City, soil disturbance, past land use history, and soils on Staten Island derived from red parent rock can create ambiguity in the delineation process that often results in under-representation of wetlands when using the 1987 USACE manual. Therefore, caution should be exercised when using the 1987 USACE manual to delineate wetlands for a CEQR evaluation. In some cases, especially on Staten Island and in areas of the City in which soils are known to have been disturbed, it may be appropriate to place more emphasis on vegetation than would normally be the case for wetlands elsewhere in the state. In 2009, the USACE (in conjunction with EPA, USDA's NRCS, and the Fish and Wildlife Service) released a draft form of the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region. Once accepted, this manual would be more appropriate for use in the City than the existing 1987 manual; a change in the standard data form would also follow. Until that time, numerous reports have been published by NRCS that provide descriptions, tests and guidance for problem soils. Currently, DPR is formulating a protocol for a Wetland Rapid Assessment under EPA's WPDG grants. See the DPR website for future updates on this information.

When a project requires permits from both NYSDEC and USACE, consultation with the USACE and NYSDEC is recommended prior to fieldwork when wetland delineations are necessary. If permits are required from both NYSDEC and USACE, it may be necessary to assess and identify two different wetland boundary conditions. In this case, the larger of the two areas may be identified for use in the CEQR assessment. Projects that might affect wetlands either directly or through changes to their adjacent areas are the same as those discussed above under water resources (Subsection 361) and may fall into the following general categories:

- Any form of draining, dredging, excavation, or removal of soil, mud, sand, shells, gravel, or other aggregate, either directly or indirectly.
- Any form of dumping, filling, or depositing of any soil, stones, sand, gravel, mud, rubbish, or fill of any kind, either directly or indirectly.
- Erecting any structures or roads, the driving of pilings, or the placing of any other obstructions, whether or not changing the ebb and flow of the water.
- Hydrologic alteration or introduction of chemicals or additional sediment.
- Any form of pollution.
- Any other activity that may substantially alter or impair the natural condition or function of a wetland.

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In addition, the NYSDEC regulations group freshwater wetlands into four classifications based on their intrinsic value, and the tidal wetlands regulations also offer insight into the comparative value of such wetlands, as summarized below.

352.1. Freshwater Wetlands Classifications

6 NYCRR Part 664.5 denotes four wetlands classifications for New York waters as different wetlands provide different functions and benefits and in varying degrees. These classes range from Class 1, which represents the greatest benefits and is the most restrictive, to Class IV. The permit requirements are more stringent for a Class I wetland than for a Class IV wetland.

352.2. Tidal Wetlands Evaluation

6 NYCRR Part 661.2 provides a useful reference for understanding the relative value of tidal wetlands. The discussion notes that all tidal wetlands are potentially extremely valuable. Within this overall evaluation, however, intertidal wetlands and coastal fresh marsh are considered the most biologically productive and worthy of the most stringent protections.

Coastal shoals, bars, flats, and littoral zones can vary widely in their value and contribution to productivity. The discussion acknowledges that biological productivity in these wetlands may have been impaired by pollution; such areas contain few benthic organisms and show little primary productivity. However, where this has occurred, the other important functions of these wetlands (flood, hurricane, and storm control) remain intact.

High marshes or salt meadows are considered valuable, particularly for absorption of silt and organic materials and storm control. Their location near the upland makes them important for cleansing ecosystems. They also provide substantial habitat and feeding area for birds, reptiles, and insect populations.

Formerly connected tidal wetlands are variable in their contributions and functioning and are evaluated on a case-by-case basis. They are generally described by whichever of the wetlands categories (intertidal wetlands, high marsh, *etc.*) they most closely resemble.

353. Uplands

Upland habitats in the City are extremely diverse, and issues for their assessment vary widely. All provide habitat for wildlife, and most function to offer scenic, if not also recreational, opportunities for the public. Some upland habitats, including sand beach, maritime dunes, erosional bluffs, and some shrublands, are also important in controlling erosion and protecting the City's shoreline. The discussion below divides uplands into three major groups, as follows:

353.1. Sand Beach, Maritime Dunes, Erosional Bluffs, and Shrublands

These features are protected under NYSDEC's Coastal Erosion Management program (see Section 710). Few types of projects are now permitted in these areas, but they may include the following:

- Construction of walkways, pathways, boardwalks, or stairs over dunes and bluffs to the beach or along the beach.
- Construction of sheds, cabanas, and other small structures to accommodate equipment and activities at or near a beach.
- "Nonmajor" additions to existing structures.

Usually, the disruption caused by these activities is limited. However, it is appropriate to consider such possibilities as the loss of vegetation, including plant species that are endangered, threatened, exploitably vulnerable, or rare; reduction or loss of wildlife habitat; effect of increased public use; and compaction of soils or erosion from construction activities. In addition, where substantial develop-

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ment is proposed upland of a beach or dunes or atop a bluff, it is possible that issues of major erosion control protection may arise.

353.2. Maritime Grasslands and Sandy Oak Barrens

Except as listed in Section 150, above, these habitats are afforded no special regulatory protections. However, their fragility makes them susceptible to impact. They cannot tolerate much loss of vegetation; changes in adjacent habitats that act as buffers between these systems and more developed areas can lead to adverse impacts; and changes in drainage can be problematic.

When a project is proposed in or near one of these habitats, a detailed assessment is often appropriate. This may include identifying plant species and delineating the habitat; determining whether any species that are endangered, rare, or of special concern are present; characterizing the "buffer" habitats and their role in protecting the grasslands or barrens; and analyzing drainage patterns serving the habitat(s).

353.3. Meadows or Old Fields, Woodlands, and Gardens

These habitats are usually considered to be common and therefore are not often protected by specific regulation. For these as well as all other habitats discussed in this section, the CEQR analysis begins by assuming that they are valuable. Using the approach outlined in Sections 320 through 340, above, the resource is characterized according to its vegetation, potential for wildlife habitat, current use, and, as appropriate, the environmental systems that support it. It is then assessed giving consideration to the context of similar habitat in the area, and how the area is used by wildlife. For example, a small park with low shrubs that is located in a densely developed urban area could provide important habitat for nesting birds, but the same park located in a low-density area (such as R1 or R2 zones) would not necessarily be used for nesting.

As another example, in New York City mostly small patches of forest remain, although they are common Statewide. Only a handful of forests, mostly in parks, are large enough to support interior habitat. Thus, a relatively large wooded area, including its buffer—mowed lawn, weedy or shrubby edge, *etc.*—are important as wildlife habitat and refuge. The survival of forest communities rests on protecting large patches and their buffers, and also on protecting smaller patches that serve as wildlife corridors and seed sources.

DPR has authority over all trees in any park, or any other property under its jurisdiction and generally over all trees in any street as such term is defined in Section 18-103 of the Administrative Code of the City of New York. Such trees are an integral part of the health, beauty, and vitality of the City and provide important benefits for its residents by absorbing gaseous air pollutants, capturing particulate matter, providing for cooler summer temperatures, and beautifying neighborhoods. Trees under the jurisdiction of DPR may not be removed without a permit pursuant to Title 18 of the Administrative Code of the City of New York. Chapter 5 of Title 56 of the Rules of the City of New York establishes rules for valuing trees that are approved for removal in order to determine the appropriate number of replacement trees.

Any person or contractor wishing to remove or perform work on a tree under the jurisdiction of DPR is required to obtain a permit from DPR. Issuance of such permits followings a review process that may entail the submission of documentation and/or modification or alteration of the work plan. Information pertaining to such permits is available at: http://www.nycgovparks.org/services/forestry/tree-work-permit.

354. Built Resources

Built resources may support species that are rare, threatened or endangered; such built resources are considered valuable, and their loss may constitute a potential significant adverse impact. Therefore, the assessment of such resources is focused on determining the extent to which such species may rely on these re-

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sources, and whether the loss of all or a part of the resource would result in a real loss of habitat, in the context of all such available habitat.

355. Significant, Sensitive, or Designated Resources

Where a project may affect one or more of the resources listed in Section 150, above, a detailed assessment is usually appropriate. This assessment can make use of information that is already available (many of these resources are the subject of ongoing study), but it may also require considerable field work. Before determining the scope of the assessment, it is recommended that the lead agency consult with either DEP or with the agency with jurisdiction over the resource.

400. DETERMINING IMPACT SIGNIFICANCE

The approach to determining impact significance takes into account that the City's natural resources are relatively scarce and precious, and any disturbance of their existing conditions may result in impacts to their ecological function. In general, if a resource has been found to serve one or more of a number of natural or recreational functions, and a project would directly or indirectly diminish its size or its capacity to function (as determined in Section 300), the impact is considered to be significant. The following list is not all-inclusive, but serves as guidance in considering impact significance. An impact may be significant if any of the following are be true:

- A project would likely render a water resource unfit for one or more uses for which it is classified and/or cause or exacerbate a water quality violation.
- A project would, directly or indirectly, be likely to adversely affect a significant, sensitive, or designated resource as listed in Section 150, above.
- A project would likely diminish habitat for a resident or migratory endangered, threatened, or rare animal species or species of special concern.
- A project would likely result in the loss of plant species that are endangered, threatened, rare, vulnerable or rare for the City.
- A project would likely result in the loss of part or all of a resource that is important because it is large, unusual, the only one remaining in the area where the project is to take place, or occurs within a limited geographic region.
- A project would, either directly or indirectly, be likely to cause a noticeable decrease in a resource's ability to serve one or more of the following functions: wildlife habitat; food chain support; physical protection (flood protection, *e.g.*); water supply; pollution removal; recreational use; aesthetic or scenic enhancement; commercial productivity; or microclimate support.
- A project that would either directly or indirectly be likely to contribute to a cumulative loss of habitat or function which diminishes that resource's ability to perform its primary function; and that would be inconsistent with the current natural resources policies of the City.

500. DEVELOPING MITIGATION

If a significant impact on a natural resource is identified, then measures to mitigate or avoid the impact should be assessed. Mitigation measures fall under five general categories: avoidance, minimization, restoration, reduction, and compensation. The latter (compensation) should be used as a last resort to compensate for the unavoidable impacts remaining after the first four types of mitigation are investigated and implemented to the extent practicable. The five types of mitigation are discussed in more detail below.

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510. AVOIDANCE

Avoidance techniques involve avoiding the impact by not taking a project or part of a project, or by simply relocating the project or part of a project. Avoidance techniques need to be identified very early in the design phase of a project when alternatives are being considered. Adequate seasonal field assessments prior to developing site designs are critical in assessing specific information with respect to potential design alterations. Avoidance techniques are also employed during the construction phase of the project. These generally involve temporal or spatial constraints on construction. These include, but are by no means limited to, the following:

- Delaying or halting construction during ecologically sensitive time periods, such as fish spawning or wildlife breeding periods. These periods are often referred to as "environmental windows."
- Avoiding construction in ecologically important or sensitive areas by either eliminating a portion of a project or relocating it to a non-sensitive area.
- Avoiding the removal or disturbance of specific trees or plants that are known to be ecologically valuable.
- Avoiding the use of heavy equipment in areas vulnerable to the effects of compaction. For example, construction-related activities should not occur within a minimum of three times (3X) the dripline of any tree, and heavy equipment and stored materials should not be placed or used within a minimum of three and one-half times the dripline of any tree.
- Restricting dredging to areas of low current velocity.
- Avoiding the removal, disturbance, or compaction of vegetation along stream banks and other shorelines.
- Limiting cleared areas to those required for construction and staging only; selecting the least vulnerable areas for clearing to the extent possible.

520. MINIMIZATION

Minimization involves minimizing the impact by limiting the degree or magnitude of the project and its implementation. Like avoidance techniques, minimization techniques also need to be employed very early in the design phase of a project when alternatives are being screened and eliminated. Minimization techniques can also be employed later in the process during the detailed design phase of the selected project. For example, fewer units in a development project, a building that is shorter or takes up less surface area (depending on the resource of concern), shallower dredging, or a parking lot with fewer or smaller parking spaces are all examples of limiting the degree or magnitude of a project to minimize impacts on natural resources. Often, engineering solutions can be employed to redesign a project so that the desired benefits can still be obtained from a project of smaller scale.

530. RESTORATION

Restoration involves minimizing the impact by restoring or enhancing the affected environment. This type of mitigation generally applies to reducing short-term construction related impacts, if possible. Examples of such restoration techniques include, but are not limited to: revegetation of denuded surfaces using indigenous plants; placement of appropriate soil that fully meets the requirements of the targeted restoration communities; removal of temporary structures, equipment, and other materials related to construction; and repairing accidental damage incurred during construction.

GENERAL RESTORATION GUIDELINES

The quality and appropriateness of a particular natural area landscape restoration depends on many factors. The creation and restoration of wetland (fresh and tidal) and upland ecosystems often fail because too little attention was given to some fundamental elements. To help improve the effectiveness of developing a long-term functioning target ecosystem, attention to the following is important:

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- The proposed site for a restoration project must be capable of supporting the targeted ecosystem (*e.g.*, proposed creation of freshwater wetlands should include sufficient watershed area for proper hydrological conditions).
- Plant selection for a given restoration should be suitable and capable of thriving under proposed conditions (examples of improper plant selection include: placement of high shade requirement plants in full sun, placement of high moisture plants in dry locations, and placement of drier plants in too moist locations).
- The soil substrate must be suitable for the targeted ecosystem. The appropriate soil depth is crucial, and a restoration site should have sufficient soil depth for type of vegetation proposed (min. 3.5' for trees, 2' for shrubs and 1.5' for native grasses). In addition, the characteristics of the soil, including pH, organic matter, nutrients, salinity, *etc.*, should all be considered.
- Implementation of and adherence to appropriate ecological landscape specifications and the use of effective erosion control measures are crucial in habitat restoration (*e.g.*, seeding or planting only within specified times, use of seed and plant material from local provenance, use of indigenous plant material, and replacement and maintenance of erosion control measures regularly).
- Appropriate soil nutrient levels that are suitable and capable of supporting the targeted ecosystem should be established (*e.g.*, when planting a plant community with low nutrient requirements, avoid using high fertility soils and applying fertilizers or existing soils not suitable for targeted ecosystem).
- Construction fill derived soils must not be used to construct a habitat, as these soils are limited in the plant communities that they can support (they have a high pH, often drain poorly or too much, contain high nutrients, and non-indigenous plants often colonize these soils). Frequent testing of soils is necessary to ensure appropriate growing conditions.

The following general techniques help to establish a functioning, biologically diverse wetland:

- Establish gently rising slopes from the center of the wetland and stabilize these slopes with grasses and shrubs (this pertains only to the wetland itself; the area outside of the wetland boundary can have steeper slopes).
- Plant trees on the wetland boundary for slight shading.
- Maintain varying sediment depths in order to diversify plant communities.
- Build isolated islands in the middle of the wetland.
- Include some open water in the wetland.
- Add boulders or logs as perching habitat for waterfowl.
- Provide a properly maintained and functional goose exclusion fence. This is necessary to prevent geese predation until the plants have fully established themselves and have minimized exposed soil.

Monitoring and follow-up maintenance during the establishment period (3-5 years) are critical to the success of any restoration project (*e.g.*, proper watering, regular removal of invasive weeds, replacement of plant material or seeding at next available season and not at the end of the maintenance period).

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540. REDUCTION

Reduction techniques involve reducing or eliminating the impact over time by preserving and maintaining the ecological integrity of the site and its surrounding areas to the extent practicable. Reduction techniques can be categorized into short-term or long-term methods. Such techniques include, but are not limited to, the following:

541. Short-term Reduction Techniques

- Use of properly installed and maintained silt fences, hay bales, mulches, temporary seeding of non-invasive grasses and other covers to limit areas of soil exposure and to stabilize slopes. Sediment and erosion control measures are often required by the City and State but are a frequently overlooked construction component. In all cases, if over one acre of upland construction disturbance is proposed, a "Stormwater Notice of Intent, Transfer, or Termination" form must be filed with the state and regional NYSDEC office citing the location of the site and compliance with any local or municipal erosion and sedimentation control techniques. Guidelines for sediment and erosion control can be found in the New York Standard and Specifications for Erosion and Sediment Controls (August 2005).
- Installing temporary drainage systems, including sediment traps, for the duration of construction.
- Limiting the use of chemicals and other potential pollutants for dust control and other construction activities.
- Strict control of the storage, handling, and transport of construction wastes.
- Limiting dewatering to the extent possible; disposing of such waters to maintain the existing drainage system and avoid surface water pollution.
- Incorporating noise or vibration controls in areas containing noise-sensitive species.
- Using environmentally friendly dredging techniques and equipment, such as silt screens, clamshell buckets or hydraulic dredging, no-barge-overflow or shunting, and split-hull barges, where appropriate.
- Frequent monitoring and observance of water quality conditions and standards.
- Employment of fish deterrent systems, if applicable.
- Employing monitoring and maintenance measures to ensure that control devices and other reduction techniques operate effectively during the period of disturbance.

542. Long-term Reduction Techniques

- Use of indigenous plant material requiring minimal use of supplemental watering, fertilizing, and herbiciding; use of pervious materials (e.g., gravel instead of blacktop) to promote infiltration of stormwater.
- Retention of stormwater on site and its slow recharge to the ground or overland to surface waters.
- Slope and surface protection, such as physical stabilization, or diversion of drainage around steeply sloped areas, grassed swales, or waterways.
- Streambank protection, such as physical stabilization.
- Water pollution controls including sediment traps or basins and drain inlet sediment filters or other stormwater best management practices.
- Use of pile foundations instead of regrading.
- Provision of tunnels under roadways for wildlife.

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550. COMPENSATION

Compensation refers to replacing or substituting for the affected resource. This method of mitigation is often referred to as "compensatory mitigation" and should only be used as a last resort to mitigate for the unavoidable impacts remaining after the first four types of mitigation have been fully employed to the extent practicable. However, in all cases, sound scientific principles outlined by the Society of Ecological Restoration (SER) should direct all mitigation efforts.

There are three types of compensatory mitigation: creation, restoration, and acquisition. Creation refers to the creation of the same or similar type of habitat as that which is lost due to the project impacts. The creation of new habitats is recommended in areas of diminutive ecological value. Restoration refers to the improvement of a degraded but still partially functional habitat that is of the same or similar type as the habitat type that would be impacted. Acquisition refers to acquiring a parcel of land of the same or similar habitat type and protecting it from development in the future. Acquisition can also include a restoration component if the acquired property is degraded and can be improved to increase its habitat value. Measurements to ensure the protection of the resulting improved habitat should be undertaken.

All three types of compensatory mitigation should be accompanied by a commitment to monitor to ensure that the goals of the mitigation plan are met and the impacts from the project are fully compensated. Generally, monitoring is necessary for wetlands or forested areas to determine whether the system that is created or restored will eventually develop the full complement of intended ecological functions.

Compensatory mitigation can be either in-kind or out-of-kind. In-kind compensation refers to the creation, restoration, or acquisition of the same habitat type as the disturbed habitat type. Out-of-kind compensation refers to the creation, restoration, or acquisition of a habitat type that is different from the disturbed habitat type. In-kind compensation is preferred over out-of-kind compensation because it results in a more direct replacement of the lost resource. As a result, it is easier to determine that the value of the replaced or restored resource is equivalent to the value of the disturbed or impacted resource. Out-of-kind compensation may be selected on an individual case-by-case basis if in-kind compensation is not feasible. In addition, a combination of in-kind and out-of-kind techniques may be appropriate. In either case, the habitat value gained due to creating, restoring, or acquiring habitat should have as its objective to replace equivalent value lost due to the project impacts.

In addition to the preference for in-kind mitigation, it is also often preferred that mitigation activities take place as close as possible to the projected impacts. The possibility of mitigating for impacts on-site should first be explored. If this is not possible, then mitigation should take place as close as possible to the site. For example, if aquatic impacts are projected to occur as a result of a project, potential mitigation sites should be explored within the same waterbody. If this is not possible, mitigation sites should be selected within the same watershed.

When considering habitat creation as a compensatory mitigation technique, it is important to consider the existing habitat type from which the new habitat type would be created. Like the assessment of impacts of the project, an assessment of impacts of the compensatory mitigation activities must also be performed to ensure that the habitat to be created is not at the expense of another valuable habitat type that has its own ecological value. The objective is for the net increase in habitat value to replace the value of the impacted resource. Therefore, it is usually necessary for habitat creation to take place in existing degraded habitats that are of little to no ecological value. Similarly, when considering habitat restoration, it is important to consider the value of the existing habitat in order to determine the net increase in value that would occur from restoration and whether or not this increase would fully compensate for the project impacts.

The determination of habitat value is usually largely qualitative. One exception is the valuation of trees on land under the jurisdiction of DPR, for which a quantitative calculation for replacement value of trees has been established. Chapter 5 of Title 56 of the Rules of the City of New York establishes rules for valuing trees that are approved for removal in order to determine the appropriate number of replacement trees. For impacts to other habitats and trees on land not under DPR jurisdiction, DEP, or another applicable expert agency may be consulted for guidance.

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Another factor that must be considered in weighing the various compensatory mitigation techniques is the likelihood for success. Both restoration and creation can entail drastic changes in soil, hydrology, and vegetation. For example, some sites may require denuding and/or revegetating large areas or rechannelizing water courses. The proper soil conditions are essential to the success of a habitat creation or restoration project. When evaluating soils, the USDA Northeastern testing procedures, rather than the American Society for Testing and Materials (ASTM) testing procedure, should be used to determine whether existing soil conditions are appropriate for creation or restoration, or whether modified soil conditions are likely to support the intended habitat and its functions.

Although these activities may appear to be successful on a gross structural level, the system may take a long time to develop the full complement of ecological functions that a high quality natural area would have or it may never develop such functions. As mentioned previously, it is imperative that long-term monitoring (for at least five years) be an integral component of any compensatory mitigation plan to determine the success of a habitat creation or restoration effort.

Acquisition, the third type of compensatory mitigation, largely eliminates the uncertainty regarding the success of a compensatory mitigation effort, since the habitat, its necessary hydrological and soil characteristics, and its ecological functions often already exist (unless the site to be acquired is degraded, in which case restoration would also be a component of the proposed mitigation plan). However, since this technique neither increases the net acreage of the habitat in question nor does it always increase the value of the habitat (unless restoration is a component), mostly those sites that are in danger of development or degradation in the future should be considered as potential acquisition sites.

The Regional Plan Association, Trust for Public Land, HRE Comprehensive Restoration Program, Hudson River Foundation, NYC OASIS, the New York/New Jersey Harbor Estuary Program (HEP)'s Habitat Work Group (HWG) and numerous other environmental groups have identified a series of priority wetlands acquisition and restoration sites within the Harbor. Other sources that also contain lists of potential mitigation sites include the New York Open Space Plan and regional or project-specific mitigation plan reports. While these are excellent sources of potential mitigation sites that have already been identified and prioritized, they are not exhaustive lists. Furthermore, these sources may not identify sites that are of the same habitat type as, or in the vicinity of, the impacted habitat. For example, some of the HEP HWG priority list focus on wetland systems and therefore may not be applicable for compensatory mitigation for impacts on upland habitats. Therefore, it is necessary at least to attempt to identify appropriate mitigation sites that would provide in-kind mitigation in the vicinity of the impacts, if such potential sites are not already identified in other sources.

600. DEVELOPING ALTERNATIVES

Alternatives that can avoid or minimize impacts to natural resources and avoid the need for mitigation should be given first consideration. Such alternatives can include different sites as well as changes to project layout, design, and density.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are many specific federal, state, and city rules and regulations governing natural resources. These permits are independent of CEQR, and may require their own environmental review. Typically, the permitting process is undertaken after the CEQR process is completed. However, applicants are encouraged to contact the regulatory agencies as early as possible to be certain the project is permittable and any mitigation aspects are identified. Since many projects undergoing CEQR review may be affected by permit requirements and conditions, applicants and lead agencies need to be aware of them. Those most commonly applicable for projects in New York City are described below.

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711. Federal Regulations

- Section 404 of the Federal Clean Water Act: Dredge and Fill. Section 404 of the Federal Clean Water Act (33 USC 1344, jointly administered by EPA and the USACE) prohibits the discharge of dredged or fill material into the waters of the United States (including wetlands) without a permit from the USACE. These activities are regulated through Nationwide, Regional General, or Individual Permits.

- Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403). Section 10 requires a permit for construction of structures on or affecting navigable waters of the United States. For the permit to be issued, the project must not obstruct or alter navigable waters, present a significant adverse effect on the aquatic environment, or result in violations of water quality criteria. As for Section 404 of the Clean Water Act, these activities can be authorized by Nationwide, Regional General, or Individual Permits, described above.

- Section 401 of the Clean Water Act (33 USC 1341). Section 401 requires a Water Quality Certificate to be issued for all discharge activities within the waters of the United States (including wetlands). In New York State, this certificate is issued by NYSDEC. This certification requires evidence that the project would not cause a violation of water quality standards. This certification is required for Individual Permits issued by the USACE (see above); it has already been issued for some of the Nationwide and Regional General Permits.

- Section 402 of the Clean Water Act: National Pollutant Discharge Elimination System (NPDES) Program (33 USC § 1342). Under the NPDES program, any point source discharge and storm-water discharges associated with industrial activities and municipal separate storm sewer systems require a permit. The State of New York is authorized to administer the NPDES program under its own State program (see the discussion of SPDES, below).

- Flood Insurance Acts. The National Flood Insurance Act of 1968 and National Flood Insurance Reform Act of 1994 (42 USC § 4001) and the Flood Disaster Protection Act of 1973 (Public Law 93-234). These acts designate coastal high hazard areas and floodways and make federal flood insurance available to buildings and structures within those areas that are constructed so as to minimize danger to human lives, in accordance with federal guidelines.

- Essential Fish Habitat (EFH) Portions of the New York Harbor waterways are listed by the National Marine Fisheries Service (NMFS) as essential for one or more life stages of commercially and/or recreationally important fishes. This designation can limit, typically via the permitting process, the types and timing of in-water work. Early coordination with NMFS as part of the CEQR process can identify potential constraints on work schedules (environmental windows) or the need for additional habitat protection techniques, such as silt curtains or environmentally friendly dredging techniques.

- Coastal Zone Management Act of 1972 (16 USC §§ 1451 to 1465). The Coastal Zone Management Act of 1972 established a voluntary participation program to encourage coastal states to develop programs to manage development within the state's designated coastal areas to reduce conflicts between coastal development and protection of resources within the coastal area. Federal permits issued in New York State must be accompanied by a Coastal Zone Consistency Determination that evaluates consistency with New York State's federally approved coastal zone management program.

- Magnuson-Stevens Act (16 USC §§ 1801 to 1883). Section 305(b)(2)-(4) of the Magnuson-Stevens Act outlines the process for NMFS and the Regional Fishery Management Councils (in this case, the Mid-Atlantic Fishery Management Council) to comment on activities proposed by federal agencies that may adversely impact areas designated as Essential Fish Habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC §1802(10)). Adverse impacts, as defined in 50 CFR 600.910(A), include any impacts that reduce the quality and/or quantity of EFH. Examples include: direct impacts, such as physical disruption or the release of contaminants; indirect impacts, such as the loss of prey or reduction in the fecundity (number of offspring

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produced) of a managed species; and site-specific or habitat-wide impacts that may include individual, cumulative or synergistic consequences of a Federal action.

- Endangered Species Act of 1973 (16 USC §§ 1531 to 1544). The Endangered Species Act of 1973 recognizes that endangered species of wildlife and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. The Act provides for the protection of these species, and the critical habitats on which they depend for survival.
- Fish and Wildlife Coordination Act (PL 85-624; 16 USC §§ 661-667d). The Fish and Wildlife Coordination Act entrusts the Secretary of the Interior with providing assistance to, and cooperating with, federal, state and public or private agencies and organizations, to ensure that wildlife conservation receives equal consideration with other water-resource development programs. These programs can include the control (such as a diversion), modification (such as channel deepening), or impoundment (through the construction of a dam) of a body of water.
- Executive Order 11988 (Flood Plain Management). Executive Order 11988 requires that agencies provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.
- Executive Order 11990 (Protection of Wetlands). This Executive Order directs federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance wetland quality. New activities in wetlands, either undertaken or supported by a federal agency, are to be avoided unless there is no practicable alternative and all practical measures have been taken to minimize the potential impacts to the wetlands.

712. State Regulations

- Protection of Waters, Article 15, Title 5, New York State Environmental Conservation Law (ECL), Implementing Regulations 6 NYCRR Part 608. NYSDEC is responsible for administering Protection of Waters regulations to prevent undesirable activities within surface waters (rivers, streams, lakes, and ponds). The Protection of Waters permit program regulates five different categories of activities: disturbance of stream beds or banks of a protected stream or other watercourse; construction, reconstruction or repair of dams and other impoundment structures; construction, reconstruction or expansion of docking and mooring facilities; excavation or placement of fill in navigable waters and their adjacent and contiguous wetlands; and Water Quality Certification for placing fill or other activities that result in a discharge to waters of the United States in accordance with Section 401 of the CWA.
- State Pollutant Discharge Elimination System (SPDES) (N.Y. Environmental Conservation Law [ECL] Article 3, Title 3; Article 15; Article 17, Titles 3, 5, 7, and 8; Article 21; Article 70, Title 1; Article 71, Title 19; Implementing Regulations 6 NYCRR Articles 2 and 3) Title 8 of Article 17, ECL, Water Pollution Control, authorized the creation of the State Pollutant Discharge Elimination System (SPDES) to regulate discharges to the state's waters. Activities requiring a SPDES permit include: point source discharges of wastewater into surface or ground waters of the State, including the intake and discharge of water for cooling purposes; constructing or operating a disposal system (sewage treatment plant); discharge of stormwater; and construction activities that disturb one acre or more.
- Waterfront Revitalization of Coastal Areas and Inland Waterways Act (Sections 910-921, Executive Law, Implementing Regulations 6 NYCRR Part 600 *et.seq*.) Under the Waterfront Revitalization of Coastal Areas and Inland Waterways Act, NYSDOS is responsible for administering the Coastal Management Program (CMP). The Act also authorizes the State to encourage local governments to

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adopt Waterfront Revitalization Programs (WRP) that incorporate the state's policies. New York City has a WRP administered by the Department of City Planning.

- Tidal Wetlands Act, Article 25, ECL, Implementing Regulations 6 NYCRR Part 661. Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis. In New York State, tidal wetlands occur along the salt-water shore, bays, inlets, canals, and estuaries of Long Island, New York City and Westchester County, and the tidal waters of the Hudson River up to the salt line. NYSDEC administers the tidal wetlands regulatory program and the mapping of the state's tidal wetlands. A permit is required for most activities that would alter wetlands or the adjacent areas (up to 300 feet inland from wetland boundary or up to 150 feet inland within New York City).

- Freshwater Wetlands Act, Article 24, ECL, Implementing Regulations 6 NYCRR Part 662 The Freshwater Wetlands Act requires NYSDEC to map freshwater wetlands protected by the Act (12.4 acres or greater in size containing wetland vegetation characteristic of freshwater wetlands as specified in the Act). Around each mapped wetland is a protected 100-foot buffer. In accordance with the Act, the NYSDEC ranks wetlands in one of four classes that range from Class 1, which represents the greatest benefits and is the most restrictive, to Class IV. The permit requirements are more stringent for a Class I wetland than for a Class IV wetland. Certain activities (*e.g.*, normal agricultural activities, fishing, hunting, hiking, swimming, camping or picnicking, routine maintenance of structures and lawns, and selective cutting of trees and harvesting fuel wood) are exempt from regulation. Activities that could have negative impact on wetlands are regulated and require a permit if conducted in a protected wetland or its adjacent area.

- Floodplain Management Criteria for State Projects (6 NYCRR 502). Under 6 NYCRR 502, all state agencies are required to ensure that the use of state lands, and the siting, construction, administration and disposition of state-owned and state-financed projects involving any change to improved or unimproved real estate, are conducted in ways that would minimize flood hazards and losses. Projects are required to consider alternative sites on which the project could be located outside the 100-year floodplain. Projects to be located within the floodplain are required to be designed and constructed to minimize flood damage, and to include adequate drainage to reduce exposure to flood hazards. All public utilities and facilities associated with a project are also required to be located and constructed to minimize or eliminate flood damage. The regulations specify that for nonresidential structures, the lowest floor should be elevated or flood-proofed to not less than one foot above the base flood level, so that below this elevation the structure, together with associated utility and sanitary facilities, is watertight, with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. No project may be undertaken unless the cumulative effect of the proposed project and existing developments would not cause material flood damage to the existing developments.

- Freshwater Wetlands Protection Program—Article 24 of the New York State Environmental Conservation Law (ECL); implementing regulations 6 NYCRR, Parts 662-665. To implement the State policy to preserve, protect, and conserve freshwater wetlands, and to regulate the use and development of such wetlands, NYSDEC created the Freshwater Wetlands Protection Program, which protects freshwater wetlands of 12.4 acres or larger. Smaller wetlands can also be protected if the Commissioner of NYSDEC has determined that they have unusual local importance. All of the protected wetlands are identified on maps prepared by the NYSDEC. The Freshwater Wetlands Act provides for the regulation of activities in freshwater wetlands and adjacent areas. Adjacent areas are the areas outside the wetlands that extend 100 feet from the wetland boundary. Permits are required for most activities within the wetlands and adjacent areas.

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- Tidal Wetlands Protection Program—ECL Article 25; 6 NYCRR Parts 660 and 661. To implement the State policy to preserve and protect tidal wetlands, NYSDEC created the Tidal Wetlands Protection Program, which regulates all tidal wetlands identified on maps prepared by the NYSDEC and adjacent areas. For New York City, adjacent areas generally include the area within 150 feet of the most landward boundary of the tidal wetland, with certain exceptions. Roadways (built prior to August 20, 1977), railroad lines, bulkheads, and a ten foot rise in elevation are examples of physical conditions that can limit the extent of the buffer or adjacent area (6 NYCRR Part 661.4). Permits are required for most activities within tidal wetlands and adjacent areas.
- Classification of Waters—Article 6 of the New York State Public Health Law; 6 NYCRR Part 800. Under this program, the State Water Pollution Control Board adopts and assigns classifications and standards on the basis of the existing or expected best usage of the State's waters.
- Use and Protection of Waters Program—Article 15, ECL Title 5; 6 NYCRR Part 608. The Protection of Waters Program regulates the following types of activities: disturbance of the bed or banks of a protected stream or other watercourse (those classified as AA, A, B, or C; lower classifications are not regulated under the Protection of Waters Program); construction and maintenance of dams or artificial obstructions in or across a natural stream or watercourse; excavation and/or filling in navigable waters, including adjacent marshes and wetlands. This includes conducting any activity that may result in any discharge or runoff into navigable waters. Any work in the water, even if undertaken under a Nationwide Permit (see the federal regulations, above), requires a Protection of Waters permit.
- State Pollutant Discharge Elimination System (SPDES) Program—Water Pollution Control Act (ECL Article 17); 6 NYCRR Parts 750-757. The SPDES Program is designed to regulate the discharge of pollutants into New York waters and to maintain the highest quality of water possible, consistent with public health and enjoyment of the resource, protection and propagation of fish and wildlife, and industrial development in the state. SPDES permits are required for construction or use of an outlet or discharge pipe (referred to as "point sources") of wastewater discharging into the surface waters or ground waters of the State; or construction or operation of disposal systems, such as sewage treatment plants, or subsurface systems with a usage of 1,000 gallons per day or more.
- Endangered and Threatened Species Program—ECL Articles 9 and 11; 6 NYCRR Parts 182 and 193. Similar to the federal protections, DEC maintains a list of plant and animal species that are protected. Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern (ECL, Sections 11-0535[1]-[2], 11-0536[2], [4], Implementing Regulations 6 NYCRR Part 182). These regulations prohibit the taking, import, transport, possession or selling of any endangered or threatened species of fish or wildlife, or any hide, or other part of these species, as listed in 6 NYCRR §182.6. Plants listed in 6 NYCRR Part 193 and animals listed in 6 NYCRR Part 182 or 6 NYCRR Parts 182 and 193 are protected by State law: it is illegal to pick, damage, or destroy any protected plants on property not owned by the individual, to apply any defoliant or herbicide, or to carry these plants away without the owner's consent; it is also illegal to hunt, import, export, or possess protected animals.
- Coastal Management Program (CMP). The CMP established 44 policies that are applicable to development and use proposals in the state's coastal area and allowed local municipalities to enact their own local waterfront revitalization programs to implement these and other applicable policies. New York City's Waterfront Revitalization Program was established under the CMP (see discussion below).
- Coastal Erosion Hazard Areas Act—ECL Article 34; 6 NYCRR Part 505. Under this Act, NYSDEC established a Coastal Erosion Hazards Area, identified on maps. Activities in this area are regulated to minimize or prevent damage or destruction to structures, buildings, property, natural protective

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features, and other natural resources, and to protect human life. Permits are required for most activities in a designated Coastal Erosion Hazard Area.

- Flood Hazard Areas—ECL Article 36; 6 NYCRR Part 500. A permit is required for any development within the federally designated flood hazard areas.
- New York Natural Heritage Program. The Natural Heritage Program is administered by the NYSDEC and is intended to identify all natural and artificial ecological communities and rare species that represent the full array of ecological and biotic diversity in New York State. The program focuses on the status and distribution of rare plant and animal species and valuable natural communities because they are most at risk of elimination in the State and globally. All of the habitats and species listed in the program are given a ranking indicating their rarity both globally and in the state. Although the Natural Heritage Program rankings do not provide legal protection, they can be used for assessment of a project's impacts on rare species and recommended environmental studies for the CEQR and permitting process.
- Significant Coastal Fish and Wildlife Habitats— Waterfront Revitalization and Coastal Resources Act (Executive Law of New York, Article 42). Under this program, NYSDEC recommends for designation by the Department of State areas it considers significant coastal fish and wildlife habitats. These are habitats that are essential to the survival of a large portion of a particular fish and wildlife population; that support populations of protected species; that support fish and wildlife populations that have significant commercial, recreational, or educational value; and/or that are types not commonly found in the state or region.
- Critical Environmental Areas—6 NYCRR Part 617.14 (g). A state or local agency may designate a specific geographic area as having exceptional or unique characteristics that make the area environmentally important. The impairment of the environmental characteristics of a critical environmental area is one of the criteria for determining the significance of a project pursuant to Part 617.7(c)(1)(iii).

713. New York City Regulations and Policy Documents

- Waterfront Revitalization Program (WRP). The City's WRP also established a Coastal Zone, within which all discretionary waterfront projects must be reviewed for consistency with coastal zone policies. This program is administered by the New York City Department of City Planning. This is discussed in detail in Chapter 4 of this Manual.
- Local Law 33 of 1988. This law requires that all habitable space be built at an elevation at or above the 100-year flood level.
- New York City Zoning Resolution. The Zoning Resolution includes several districts with special zoning designed to preserve unique natural features. These include the Special Natural Area Districts (Staten Island, Queens and the Bronx), the Special Hillsides Preservation District (Staten Island), and the Special South Richmond Development District (Staten Island).
- 197-a Plans and Other Planning Initiatives. Other plans and public policies can also include regulations to protect natural resources.
- Trees under the jurisdiction of DPR. Title 18 of the Administrative Code of the City of New York and Chapter 5 of Title 56 of the Rules of the City of New York detail the requirements and rules for applying for permission to remove trees under the jurisdiction of DPR and for determining tree replacement values.

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714. Public Policies

The City has addressed or is addressing other aspects of wetlands and natural area protection through other planning processes, reports, and policies. These include (1) The New York City Wetlands: Regulatory Gaps and Other Threats (January 2009), with suggestions for the identification and protection of urban wetland systems; (2) The Wetlands Transfer Task Force (WTTF) report issued in September 2007 pursuant to Local Law 83, recommending the transfer of city-owned properties containing wetlands to DPR; (3) DEP's Jamaica Bay Watershed Protection Plan in October 2007, with an update in October 2008; (4) The City's Sustainable Stormwater Management Plan in December 2008 to help reduce sources of point and non-point stormwater pollution; and (5) the City's comprehensive planning effort to adapt wetlands and other critical infrastructure to sea level rise and other effects of climate change.

- No Net Increase in Nitrogen. New York, New Jersey, and Connecticut have agreed to keep the level of nitrogen discharged into the waters that affect Long Island Sound at or below 1990 levels, to avoid the negative effects that can result from excess nitrogen. This is important in areas of the Bronx and Queens that border the Sound or the Upper East River, which directly affects the Sound.
- *PlaNYC*. PlaNYC is a comprehensive sustainability plan for the City's future, and is discussed in Chapter 4, "Land Use, Zoning, and Public Policy."
- *2008 Sustainable Stormwater Management Plan* (2008 Sustainable Stormwater Management Plan) and *2010 Sustainable Stormwater Management Plan Progress Report*. The Sustainable Management Plan is a key initiative of PlaNYC, the City's plan for a greener, greater New York. PlaNYC's water quality goal is to improve public access to our tributaries from 48 percent today to 90 percent by 2030. The Plan is the product of an interagency task force. It is the City's first comprehensive analysis of the costs and benefits of those alternative methods for controlling stormwater. The Plan provides a framework for testing, assessing, and implementing small installations to control stormwater at its source, which are known by various terms – source controls, green infrastructure, low impact development, best management practices, or BMPs.
- *NYC Green Infrastructure Plan*. This plan builds upon and extends the commitments made in PlaNYC and the Sustainable Stormwater Management Plan to provide a detailed framework and implementation plan to meet the twin goals of better water quality in New York Harbor and a livable and sustainable New York City in a cost-effective manner through optimization of the existing wastewater system, controlling runoff from impervious surfaces using green infrastructure, reducing urban heat island effects, carbon sequestration and providing urban wildlife habitats.
- *2009 New York City Wetlands: Regulatory Gaps and Other Threats*. This report provides a summary of current federal, state and local rules and regulations regarding wetlands. The current regulatory structure does provide some protection for certain wetlands in New York City. The somewhat overlapping Federal, State, and local regulatory regimes, however, contain gaps that may leave critical remaining wetlands vulnerable to a variety of direct and indirect pressures. This white paper identifies those gaps and suggests general approaches to adequately preserve and protect the City's wetlands.
- *Jamaica Bay Protection Plan (JBWPP).* Local Law 71 of 2005 mandates that the City asses the "technical, legal, environmental and economical feasibility" of a diverse set of protection approaches for Jamaica Bay to develop a comprehensive approach toward maintaining and restoring the ecosystems within the bay. In October 2007, NYCDEP published the JBWPP. The JBWPP is intended to provide an evaluation of the current and future threats to the bay and ensure that environmental remediation and protection efforts are coordinated in a focused and cost-effective manner. Under the JBWPP, the Mayor's Office of Environmental Coordination should ensure that actions subject to CEQR address any potential impacts to Jamaica Bay and identify stormwater management measures that could be implemented as part of an environmental assessment. Consequently, all projects within the Jamaica Bay watershed that undergo CEQR review must complete the Jamaica Bay Watershed Form.

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720. APPLICABLE COORDINATION

When a project is subject to any of the regulations listed above, coordination with the appropriate regulatory agency is required.

730. KEY SOURCES OF INFORMATION

- Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2002. *Ecological Communities of New York State*. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. (Draft for review). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.
- Zar, J.H. 2009. *Biostatistical Analysis*, 5th Edition. Prentice Hall, New York, NY. 960pp.
- Shannon-Weiner Index: Weiner, N. 1948. *Cybernetics, or Control and Communication in the Animal and the Machine*. The M.I.T. Press, Cambridge, MA
- Water Environment Research Federation (WERF), *Water Quality Models: A Survey and Assessment*.

740. LOCATION OF INFORMATION

731. Regulatory Agencies

- New York City Environmental Protection

  59-17 Junction Boulevard
  Flushing, Queens, NY 11373
  Phone: 212-639-9675
  www.nyc.gov/dep

- New York City Department of Parks and Recreation

  The Arsenal, Central Park
  830 Fifth Avenue
  New York, NY 10065
  Phone: 212-360-8111
  www.nycgovparks.org

- New York State Department of Environmental Conservation (NYSDEC)

  Regional Office, Region 2
  Hunters Point Plaza
  47-40 21st Street
  Long Island City, NY 11101-5407
  Phone: 718-482-4900

- NYSDEC- Division of Fish, Wildlife and Marine Resources (DFWMR)

  New York Natural Heritage Program-Information Services
  625 Broadway, 5th Floor
  Albany, NY 12233-4757

- New York State Department of State

  99 Washington Avenue, Suite 1010

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Albany, NY 12231

- U.S. Army Corps of Engineers

  Department of the Army
  ATTN: Chief, Regulatory Branch
  New York District, Corps of Engineers
  26 Federal Plaza, Suite 2109
  New York, NY 10278-0090
  Phone: 212-264-6730 or 0182
  www.usace.army.mil

- U.S. Environmental Protection Agency

  Region 2
  290 Broadway
  New York, NY 10007
  Phone: 212-637-3000
  www.epa.gov/region02

- United States Fish and Wildlife Service (NYC Projects)

  Long Island Field Office
  3 Old Barto Road
  Brookhaven, NY 11719

- U.S. Fish and Wildlife Service

  300 Westgate Center Drive
  Hadley, MA 01035-9587
  Phone: 413-253-8200
  For National Wetlands Inventory and Endangered Species Program information

- National Park Service

  Gateway National Recreation Area
  Headquarters, Building 69, Floyd Bennett Field
  Brooklyn, NY 11234
  Phone: 718-354-4520
  www.nps.gov

- National Oceanic and Atmospheric Administration (NOAA); National Marine Fisheries Service (NMFS)

  Assistant Regional Administrator for Habitat Conservation
  Habitat Conservation Division
  Attention: EFH Coordinator
  1 Blackburn Drive
  Gloucester, MA 01930

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- NOAA-NMFS-Protected Resources Division

  Assistant Regional Administrator for Protected Resources
  NOAA National Marine Fisheries Service
  Protected Resources Division
  Attention: Endangered Species Coordinator
  1 Blackburn Drive
  Gloucester, MA 01930

- Federal Emergency Management Agency

  500 C Street SW
  Washington, DC 20472
  Phone: 202-646-2500
  www.fema.gov

732. Other Sources

- Agencies and Foundations

  U.S. Department of Agriculture
  Soil Conservation Service
  1400 Independence Ave, SW
  Washington, D.C. 20250
  Phone: 202-720-7327
  www.usda.gov

- United States Department of Agriculture - Natural Resources Conservation Service (NRCS)

  1400 Independence Ave, SW
  Washington, DC 20250
  Phone: 202-720-7246
  www.nrcs.usda.gov

- Hudson River Foundation for Environmental Research

  17 Battery Place
  Suite 915
  New York, NY 10004
  Phone: 212-483-7667
  www.hudsonriver.org

- Society for Ecological Restoration

  285 W. 18th Street
  Suite 1
  Tucson, Arizona 85701
  Phone: 520-622-5485
  www.ser.org

- SER Mid-Atlantic Chapter: http://www.ser.org/midatl/default.asp

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- New York Public Library – Science, Industry and Business Library

  188 Madison Avenue
  New York, NY 10016
  Phone: 212-592-7000
  www.nypl.org/research/sibl

- City University of New York – Graduate School Library

  365 Fifth Avenue
  New York, NY 10016-4309
  Phone: 212-817-7000
  www.gc.cuny.edu

- Queens College Library

  65-30 Kissena Boulevard
  Flushing, NY 11367-1597
  Phone: 718-997-3700
  http://qcpages.qc.cuny.edu/Library

- Brooklyn Botanic Garden Library

  900 Washington Avenue
  Brooklyn, NY 11225
  718-623-7200
  http://www.bbg.org/research/library/

- New York Botanical Garden – Mertz Library

  Bronx River Parkway at Fordham Road
  Bronx, NY 10458
  718.817.8700
  http://library.nybg.org/

- American Museum of Natural History Research Library

  Central Park West at 79th Street
  New York, NY 10024-5192
  (212) 769-5400
  http://library.amnh.org/index.php

- Rutgers University Library of Science and Medicine

  Rutgers, The State University of New Jersey
  165 Bevier Road
  Piscataway, New Jersey 08854-8009
  (732) 445-4322
  www.rutgers.edu

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- New York City Department of City Planning Bookstore

  22 Reade Street
  New York, NY 10007-1216
  Phone: 212-720-3667 or 3668
  www.nyc.gov/html/dcp/html/pub/publist.shtml

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HAZARDOUS MATERIALS

CHAPTER 12

For hazardous materials, the goal for CEQR is to determine whether the proposed project may increase the exposure of people or the environment to hazardous materials, and, if so, whether this increased exposure would result in potential significant public health or environmental impacts. If significant adverse impacts are identified, CEQR requires that the impacts be disclosed and mitigated or avoided to the greatest extent practicable.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide technical review, recommendations and approval relating to hazardous materials. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), the lead agency, in coordination with DEP, determines whether an institutional control (discussed in more detail in Sections 550 through 552), such as an (E) Designation, may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering (E) Designations and existing hazardous materials Restrictive Declarations recorded on privately-owned parcels as a result of zoning and/or variance actions approvals, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

100. DEFINITIONS

110. HAZARDOUS MATERIALS

A hazardous material is any substance that poses a threat to human health or the environment. Substances that may be of concern include, but are not limited to, the following:

HEAVY METALS. These include lead, cadmium, mercury, arsenic, chromium, *etc.*, that are used in smelters, foundries, platers, and metal works, and may be components in paint, ink, petroleum products, and coal ash. Heavy metals may be toxic to humans and cause serious physical impairment.

VOLATILE ORGANIC COMPOUNDS (VOCS). These include aromatic compounds, such as benzene, toluene, ethylbenzene, and total xylenes (BTEX), as well as methyl tertiary butyl ether (MTBE), that are found in many petroleum products; aliphatic compounds such as hexane; and chlorinated compounds, such as trichloroethylene (TCE) and tetrachloroethylene (PCE), that are commonly used as solvents and cleaners. VOC vapors may be toxic, and under certain conditions may result in vapor intrusion, and potentially lead to explosive or ignitable conditions.

SEMIVOLATILE ORGANIC COMPOUNDS (SVOCS). These include phenols and other components of creosote and coal tar, as well as polycyclic aromatic hydrocarbons (PAHs), that may be naturally occurring but are more commonly found at higher levels in combustion byproducts such as ash. Several PAHs are either known to be or suspected to be carcinogenic.

METHANE. This is generated by decomposing plants and other organic materials. Often found in or near filled wetland areas, methane trapped beneath foundations may lead to explosions.

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POLYCHLORINATED BIPHENYLS (PCBS). Formerly used in electrical equipment and as a plasticizer, PCBs bioaccumulate in aquatic organisms and humans and may cause a variety of neurological and other adverse effects.

PESTICIDES. Substances or a mixture of substances used to destroy or mitigate insects, rodents, fungi, weeds or other plant life. Many pesticides are toxic to humans and animals.

POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS (COMMONLY REFERRED TO AS DIOXINS). These are or were generally formed as byproducts of combustion or manufacturing and industrial processing.

HAZARDOUS WASTES. These are defined by regulations promulgated under the Federal Resource Conservation and Recovery Act and New York State Department of Environmental Conservation, found at 6 NYCRR Part 371, as solid wastes that either meet one of four characteristics (chemically reactive, ignitable, corrosive, or toxic) with respect to defined test methods or are listed in one of following: 1) a generic list of chemicals that are hazardous regardless of the source that produces them; 2) a list of wastes from specific industrial sources; and 3) a list of chemicals that are deemed hazardous wastes if they are discarded or intended to be discarded rather than used as intended. There are slight differences between the state and federal regulations.

Other less commonly encountered hazardous materials include radionuclides (*e.g.*, radiation sources) and biological wastes (*e.g.*, medical waste). When these are managed in accordance with applicable regulatory requirements (*e.g.*, in a hospital or laboratory setting), they would not be expected to be associated with adverse effects. However, when evidence is found that they have been abandoned or are otherwise mismanaged, the appropriate regulatory agencies (*i.e.*, DEP, the New York City Department of Health and Mental Hygiene (DOHMH), New York State Department of Health (NYSDOH), New York State Department of Environmental Conservation (NYSDEC), the United States Environmental Protection Agency (EPA), or the Nuclear Regulatory Commission (NRC)) should be contacted for additional guidance.

120. SITES OF CONCERN

Many sites in urban areas contain soil and/or ground water that are known to be or may be contaminated. However, the presence of hazardous materials on a site may not be obvious. Sites that appear to have no apparent impacts and have no commonly known sources of contamination may have been affected by past uses either on the site or in the surrounding area. Many activities use hazardous materials, and many past waste management practices that were once commonplace are now considered unacceptable.

The presence or likely presence of any hazardous substance or petroleum products on a site under conditions that indicate an existing release, past release, or a material threat of release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property is known as a Recognized Environmental Condition, as defined by the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments (ESA): Phase I ESA Process (ASTM E-1527), currently ASTM E-1527-05. A Recognized Environmental Condition (REC) should be disclosed under CEQR. Examples of RECs include contaminants spilling or leaking into the soil or ground water, dispersed in the soil vapor, indoor or ambient air, or contained in fugitive dust. Hazardous materials may contaminate a site in several ways:

- They may be present in the soil, ground water, soil vapor, or buildings and structures on-site as the residue of past or current activities. Manufacturing processes and commercial activities typically utilize, and thus require storage and handling of, hazardous materials.
- They may have been imported to a site as fill or grading material over the years. It is not uncommon to find elevated levels of hazardous materials in fill of unknown origin, also known as “historic fill,” where the past and current activities do not suggest these types of materials were used. This is especially true for properties that are adjacent to waterways where, historically, large amounts of fill material have been used as part of urban development.

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- They may migrate to the site from off-site areas as a result of soils impacted by an upgradient source through local ground water flow or migrating soil vapor. For example a site may be of concern if hazardous materials migrated to the site from a leaking underground storage tank nearby.
- They may be incorporated in on-site buildings and structures; examples are lead in paints or asbestos in insulation, tiling, caulking, roofing materials, or electrical components.

130. POSSIBLE EXPOSURE

The presence of hazardous materials on a given site is likely to threaten human health or the environment if exposure to those materials occurs. Potential routes of exposure to hazardous materials can include: direct contact, *e.g.*, between contaminated soil and skin (dermal contact); breathing of VOCs or chemicals associated with suspended soil particles (inhalation), swallowing soil or water (ingestion). Public health may also be threatened when soil vapors migrate through the subsurface and/or along preferential pathways (*e.g.*, building foundations, utility conduits, or duct work) and accumulate beneath a concrete slab or inside a basement, resulting in an explosive, oxygen-deficient, or hazardous atmosphere.

Activities that can lead to increased exposure include the following:

- Introducing a new population to an existing building or site containing hazardous materials.
- Conversion of buildings from industrial or commercial to residential uses.
- Investigation activities on a contaminated site.
- Excavation, dewatering, grading, or other construction activities on a contaminated site.
- Construction activities in existing buildings that disturb the building slab and sub-surface soils.
- Construction or maintenance activities on unimproved/landscaped areas that disturb sub-surface soils.
- Creation of fugitive dust from exposed soil containing hazardous materials.
- Demolition of buildings and structures that include hazardous materials.
- Introduction of new activities or processes that use hazardous materials.
- Building on former landfills or filled swampland where methane is present or will be produced.

The circumstances under which potential exposure may occur as a result of a proposed project determine the manner in which hazardous material impacts are assessed for CEQR.

200. DETERMINING WHETHER A HAZARDOUS MATERIALS ASSESSMENT IS APPROPRIATE

The potential for significant impacts related to hazardous materials can occur when: a) elevated levels of hazardous materials exist on a site and the project would increase pathways to human or environmental exposure; b) a project would introduce new activities or processes using hazardous materials and the risk of human or environmental exposure is increased; or c) the project would introduce a population to potential human or environmental exposure from off-site sources. If all these elements can be ruled out, then no further analysis is necessary.

The following circumstances are examples of projects where a hazardous materials assessment is warranted:

- Rezoning (or other discretionary approvals such as a variance) allowing commercial or residential uses in an area currently or previously zoned for manufacturing uses.
- Construction requiring soil disturbance in a manufacturing zone.
- Development within close proximity to a manufacturing zone or existing facilities (including nonconforming uses) listed in the Hazardous Materials Appendix ("the Appendix").

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- Rezoning to a residential or mixed-use district, if the area may have historically stored, used, disposed of, or generated hazardous materials, such as an area in a C8 zoning district.
- Development on a vacant or underutilized site if there is a reason to suspect contamination, illegal dumping, or historic/urban fill.
- Renovation of interior existing space on a site with potential vapor intrusion from on-site or off-site sources; compromised indoor air quality; or the presence of asbestos, PCBs, mercury, or lead-based paint.
- Development in an area with fill material of unknown origin. Fill material historically used in New York City includes dredged material that may contain petroleum, heavy metal, or PCB contamination and ash from the historical burning of garbage. In addition, former wetland areas or areas with fill material containing organic wastes may produce methane.
- Development on or near a government-listed or voluntary clean-up/brownfield site (*e.g.* solid waste landfill site, inactive hazardous waste site, NYSDEC Brownfield Cleanup Program or Local Brownfield Cleanup Program site), current or former power generating/transmitting facilities, municipal incinerators, coal gasification or gas storage sites, or railroad tracks/rights-of-way.
- Development where underground and/or aboveground storage tanks (USTs or ASTs) are (or were) located on or near the site.

A list of facilities, activities or conditions that warrant further assessment regarding the potential for hazardous materials is found in the Appendix. Sites that have been potentially affected by the presence of existing or historical land uses involving hazardous materials, including those not contained in the Appendix, should be examined further to evaluate possible exposure pathways and potential impacts on public health or the environment. As described in greater detail in the following sections, evaluation of a site for hazardous materials concerns should generally include a Phase I Environmental Site Assessment (ESA) in accordance with the most recent ASTM E-1527 Standard, and, if appropriate, a Phase II ESA in accordance with ASTM E-1903, including physical sampling of media (*e.g.*, soil, ground water and soil gas) on the site of concern. If potential hazardous materials impacts are identified, mitigation and/or remediation in accordance with a Remedial Action Plan (RAP) would be required. In cases where the site is listed in the Appendix and sufficient site history is known, the site owner may elect not to complete a Phase I ESA described in Section 320 and proceed directly to a Phase II ESA as described in Section 330. In most cases, however, knowledge of the site history is not sufficient and completion of a Phase I ESA is strongly recommended.

300. ASSESSMENT METHODS

The hazardous materials assessment generally begins with a Phase I ESA, which is a qualitative evaluation of the environmental conditions present at a site, based on a review of available information, site observations, and interviews. As outlined in Section 320 below, the Phase I ESA is conducted in accordance with the standards established by the current ASTM Phase I ESA Standard and includes research and field observations (but typically not subsurface or building testing results) to determine whether the site may contain contamination from either past or present activities on the site or as a result of activities on adjacent or nearby properties. If a potential REC is identified during this assessment, then building and subsurface investigations are usually conducted as part of a Phase II ESA to confirm the presence and extent of the contamination.

Whenever possible, the Phase I and Phase II ESA should reference and take into account proposed project plans to the extent they are known. For example, during the performance of the Phase I ESA, it may be sufficient to know that the existing building is to be demolished and excavation required, whereas, when preparing the Phase II ESA Work Plan, excavation depth(s) and the proposed conceptual foundation design may be necessary to define the appropriate investigation scope. Therefore, project plans (whether conceptual or final) should be referenced in, and attached to, the Phase II ESA Work Plan and any subsequent reports.

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310. STUDY AREA

The first step in any hazardous materials assessment is to establish the study area. The project site and any associated excavation areas (*e.g.*, for utilities, elevator pits, foundations) comprise the focus of the study area, but the area of study should also include any other areas that might have affected or may currently affect the project site. Usually in heavily urbanized settings, other areas include the adjacent properties and, at a minimum, properties within 400 feet of the project site. Regulatory database searches should be performed per the ASTM Phase I ESA Standard.

For the soil, ground water, or soil gas investigations associated with a Phase II ESA (discussed below in Section 330), the study area is typically limited to the project site itself. On a site, this sampling focuses on areas that have higher potential for (a) contamination, based on the results of the Phase I ESA; or (b) enhanced exposure pathways, based on the Phase I ESA and the activities that would be associated with the proposed project. For example, the scope of the Phase II ESA Work Plan for a project involving conversion of an existing building to a new use would likely have limited overlap with a project at the same site involving demolition that is followed by excavation for a new building with a cellar, basement, or multi-level basement.

320. PHASE I ENVIRONMENTAL SITE ASSESSMENT

The current ASTM Phase I ESA Standard should be consulted for the general scope of the qualitative Phase I ESA. For some proposed projects (*e.g.*, area-wide rezonings), portions of the scope, such as site inspections, may not be possible. For other projects, such as zoning text amendments or other generic actions, actual affected sites may be unknown, and the analysis should consider what the potential impacts would be for a variety of different types of sites (see Section 400, below). Generally, Phase I ESAs should be no more than six months old when submitted as part of CEQR documentation. If more than six months old, the Phase I ESA should be updated with current regulatory database and site reconnaissance information. This may not be necessary if an adequate Phase II ESA will be performed to confirm the presence or absence of contamination. In addition to the ASTM Phase I ESA Standard, additional sources of information that are specific to New York City may assist in preparation of Phase I ESAs. These can be found in Section 731, "Sources of Data to Supplement ASTM Standards."

321. Assessment, Conclusions and Reporting

To identify and evaluate potential RECs at a project site, a Phase I ESA should be conducted. The Phase I ESA report typically includes the following kinds of information:

- Site and neighboring properties' history, including required ASTM searches.
- Interviews with past and present owners and occupants.
- Surface and subsurface drainage patterns or infrastructure.
- Site reconnaissance findings.
- Federal, state, and local regulatory agency list review findings.
- Potential impacts from nearby sites, such as landfills, NPL sites, BCP sites, surface impoundments, ASTs, USTs, leaking USTs (LUSTs) of unknown status, *etc.*
- On-site concerns, such as ASTs, USTs, LUSTs of unknown status, dumping of hazardous materials, PCBs, *etc.*
- Previous environmental reports or sampling and analytical data.
- Discussion of the results of the Phase I ESA in the context of the proposed project.
- Recommendations for additional actions, if any.

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Based on the findings of the Phase I ESA, or a recognition that existing or historical uses at the site have included those listed in the Appendix, the applicant should assess the potential for hazardous materials on the project site. In general, hazardous materials may be potential RECs if any of the following have occurred:

- Past or present uses on the site or in the surrounding area used or use hazardous materials.
- The site or surrounding area includes locations listed in federal, state or local regulatory agency records, and known and/or potential RECs have not been rectified.
- Past or present surrounding uses are a concern and the site is downgradient in terms of ground water flow or topographically from those uses. Qualitative assessments of ground water depth and flow direction should not be used exclusive of other available data.
- The proposed project may create the potential for hazardous materials migration (*e.g.*, due to excavation and/or dewatering).
- If records indicate that the site has been filled and the nature and extent of the fill is unknown.

The conclusions of a Phase I ESA should be made by a qualified environmental professional. The credentials of the qualified environmental professional should be included in the Phase I ESA report. As defined by the 2002 Brownfields Amendments to CERCLA, a qualified environmental professional is someone who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to a property, sufficient to meet the objectives and performance factors of the rule. In addition, an environmental professional must have:

- A state or tribal issued certification or license and three years of relevant full-time work experience;
- A baccalaureate degree or higher in science or engineering and five years of relevant full-time work experience; or
- Ten years of relevant full-time work experience.

The conclusions of this assessment can fall into the following categories:

- There is little or no likelihood of contamination, and therefore, there would be no significant adverse impacts resulting from hazardous materials, and no further investigation is warranted. Note that a Phase I ESA cannot entirely eliminate uncertainty regarding the potential for hazardous materials or a REC in connection with a property. Therefore, the preparer and reviewer must make certain that all due diligence measures have been undertaken before concluding that no potential adverse impact could occur.
- Contamination may exist or is known to exist. More work is required to determine nature and extent of the contamination so that the potential for significant adverse impacts can be fully disclosed and mitigation developed, as appropriate. A Phase II ESA (described in Section 330) should be performed to determine the nature and extent of any contamination. At this point, it is strongly recommended that DEP be contacted.

The Phase I ESA should be summarized as part of the CEQR documentation, including a description of the scope of work, research and activities undertaken, findings, and conclusions.

330. PHASE II ENVIRONMENTAL SITE ASSESSMENT

Prior to conducting a Phase II ESA, a Work Plan should be prepared that details the proposed soil, ground water or soil gas scope of work. A Work Plan for the Phase II ESA should include three major elements described in greater detail below: (1) an analytical plan that addresses the types of sampling and rationale for the approach, along with the investigative, sampling, and laboratory analysis methods to be used; (2) a Health and Safety Plan (HASP)

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(see Section 332) for personnel undertaking the work; and (3) a quality assurance and quality control plan for the acquisition, handling, and analysis of samples taken. The Phase II Investigative Work Plan and HASP should be submitted to DEP for review and approval to insure that the investigation conducted satisfies the requirement of the CEQR process. A standard guide for Phase II ESAs has been developed by ASTM (ASTM E 1903) that can be used as a framework for developing the scope of work for the assessment activities. In some cases, depending on the potential contaminants and the surface and subsurface drainage patterns on the site, it is advisable to conduct a physical investigation of the soil, ground water or soil gas on an adjacent property with appropriate access approvals.

Sites should be thoroughly characterized to: (1) document contaminant levels; (2) ensure that all potential exposure pathways to on-site and off-site receptors have been addressed; and (3) ensure public and worker health and safety during remedial activities and construction. The items below present guidance on the type and level of effort required to adequately characterize a site during a Phase II ESA.

- A geophysical survey through a ground penetrating radar (GPR) investigation with confirmatory test pits (if warranted) should be conducted in areas where buried tanks, drums, or other subsurface conditions are suspected to be present based upon a review of the site history, regulatory databases, and/or other documentation/reports, but are not evident at grade. A GPR survey may also be warranted if extensive fill exists at a site with limited historic information.
- In general, evenly spaced test borings spread across the entire site should be advanced to the proposed excavation depth(s) as well as the water table to adequately characterize a site during a Phase II investigation. The test boring locations may be biased towards identified RECs and are usually situated on-site. They may also be located off-site with appropriate authorizations.
- At a minimum, one test boring should be advanced in each identified REC (as per the Phase I ESA findings) and focused on the locations where the greatest contamination is suspected. These areas could include, but are not limited to petroleum or hazardous material storage areas; drywells or leach fields/pools; dry cleaning areas; stained soil or stressed vegetation areas; industrial/manufacturing processing areas; and areas where on-site contamination from off-site sources is suspected.
- To adequately characterize UST areas, a minimum of two test borings should be advanced per tank cluster. Test borings should be advanced within two feet of the tanks, if possible, and to a minimum depth of five feet below the tank invert for the collection of representative soil samples. In the event that any leaking tanks are identified at the site during the Phase II ESA, NYSDEC DER-10 guidance should be followed.
- Test borings should be advanced at least to the proposed excavation depth for future on-site structures or depth of RECs.
- In general, two soil samples should be collected from each test boring/probe, and the samples should be focused on any sections exhibiting evidence of contamination based on field screening. One surface soil sample should be collected from the upper two feet of soil (typically the 0-2 feet bgs interval) and one subsurface soil sample between 2 feet bgs to the maximum proposed excavation depth (based on visual/olfactory evidence of impacts and/or elevated soil screening readings obtained using accepted field instruments). If no evidence or elevated readings are noted during borehole advancement, the subsurface soil sample should be collected from the two foot interval below the proposed maximum excavation depth(s) and/or the ground water interface (whichever is encountered first). If ground water is encountered in a test boring/probe within five feet of surface grade, only one soil sample per boring may be warranted as long as adequate upgradient and downgradient ground water samples are collected.
- Where the water table is less than 30 feet beneath the deepest level of existing or proposed on-site basement or slab-on-grade foundation, ground water samples should be collected for laboratory analysis. Ground water samples should be collected within the areas of concern and to intercept potential migration from off-site sources. Depending on the Phase I ESA findings, as well as known regional ground water or

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soil vapor contamination, collection of ground water samples may be warranted at depths ranging from 30 to 100 feet below the deepest structural elevation of the proposed structure. It is recommended that ground water samples be collected to adequately characterize the site.

- Soil, ground water and soil gas sample collection methods are described in Subsection 331.2.
- Unless contamination is known to be limited to specific compounds, soil and ground water samples should be analyzed for Full List volatile organic compounds (VOCs) with Methyl tert-butyl ether (MTBE) by EPA Method 8260B, semivolatile organic compounds (SVOCs) by EPA Method 8270C, polychlorinated biphenyls (PCBs) by EPA Method 8082, pesticides by EPA method 8081A, and Target Analyte list (TAL) metals by EPA Method 6020 at a NYSDOH-ELAP (Environmental Laboratory Approval Program) certified laboratory. Soil gas, sub-slab soil gas and indoor air samples should be analyzed for VOCs by EPA Method TO-15 at a NYSDOHELAP-certified laboratory. If ELAP certification is not available, certification by other agencies and/or organizations is recommended. Additional analyses may be warranted if the type of contamination suspected cannot be adequately characterized by these analyses. NYSDOH Category B Deliverables are not required for CEQR. However, specific levels of quality control deliverables may be required for some projects using grant money, for legal defense, or if the analysis must comply with requirements of other agencies.
- Where the potential for vapor intrusion from ground water or soil above the water table is suspected based on the identified RECs such as LUSTs, petroleum spills, chlorinated compounds, *etc.*, located at or near the site, the NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York should be used as a guidance tool to design an appropriate vapor intrusion study at the site. The NYSDOH 2006 guidance document provides evaluation methods for existing buildings undergoing change of use and/or renovations, as well as general site investigation protocols applicable to any building scenario. An example is the renovation of a building formerly occupied by a dry-cleaning facility. In some instances it may also be necessary to collect and analyze soil gas, sub-slab soil vapor, indoor air, and/or ambient air samples.

In the process of performing the Phase II ESA described in the following sections, immediate notification(s) to NYSDEC, NYCDEP, and/or USEPA may be required if:

- Discovery of a petroleum spill or "reportable quantity" hazardous substance discharge must be reported in accordance with applicable federal, state and local laws.
- Discovery or evidence of hazardous materials that pose a potential or actual significant threat to public health or the environment that must be reported in accordance with applicable federal, state or local laws.

When possible, the Phase II ESA should be conducted before a determination of significance is made at the EAS stage or, if a positive declaration is being issued, before the DEIS is completed.

331. Phase II ESA Work Plan

The Phase II ESA Work Plan should include an analytical plan, which describes the site investigation appropriate to find and identify the type and extent of contamination that may be present. In general, a single phase of analytical work is conducted, although completing the work in stages may be necessary as a result of access limitations.

The Work Plan should specify the proposed number and locations of test borings on a site map; boring depths for collection of representative soil, ground water, and soil gas samples; well specifications; split-spoon or macro core sampling intervals and how representative samples will be selected for laboratory sampling; organic vapor screening (using, for example, a photo-ionization device or PID) and soil description methods (as conducted by a professional geologist or qualified environmental personnel); potential aquifer permeability testing or determination; well development techniques; handling and disposal of borehole cuttings and well development water; and methods of determining the ground water depth/elevation, *etc.* The Work Plan should include site development plans with (at a minimum) maximum soil excavation depths/elevations for

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basements, footings, sub-surface utilities, elevator pits, *etc.*, as well as any proposed grade-level yard, courtyard, parking, or grass/landscaped areas.

The Work Plan should be tailored to the proposed project. Sampling should typically be performed, at a minimum, to the depth of the project excavation and generally deeper, where the potential for subsurface soils, ground water, and/or soil vapor impacts have been identified. The potential for vapor intrusion should be assumed where on-site/off-site VOC-contaminated ground water is likely located within 30 feet, vertically or horizontally, below an occupied building foundation. When chlorinated VOCs have been identified in the soil vapor, the potential for vapor intrusion may warrant investigation at depths ranging from 30 to 100 feet, vertically or horizontally, below an occupied building foundation.

331.1. Elements of the Work Plan

All Phase II ESA Work Plans consist of the investigation work plan (described above) and sample analysis (described in 331.2). However, not all elements listed below are necessary for all projects.

GEOPHYSICAL SURVEY

If recommended by the Phase I ESA, a geophysical survey may be undertaken to help locate buried metallic objects or material, characterize the subsurface conditions and geology, identify sub-surface utility infrastructure, or determine the presence or extent of a groundwater contaminant plume. Typical geophysical tools and techniques may include magnetometers (to test for buried metal, such as tanks or drums), ground-penetrating radar, ground conductivity surveys, and seismic refraction/reflection surveys. Limits on geophysical techniques can include cost and the presence of interference structures, such as overhead electric wires or excessive subsurface metal (*e.g.*, reinforced concrete) or fill (such as demolition debris) that can produce anomalous readings and difficulty in interpretation of data. The primary goal of the geophysical survey is to guide subsequent fieldwork by aiding in the determination of optimum sampling locations at the site.

SOIL-GAS SURVEY

A soil-gas survey tests the unsaturated zone (soil area above the water table) for the presence of VOCs or methane. Typical volatile compounds include constituents in gasoline, such as, MTBE, BTEX compounds (benzene, toluene, ethylbenzene, and total xylenes), and industrial solvents, such as tetrachloroethylene (PCE) and trichloroethylene (TCE). These VOCs may persist from surface spills or leaking underground storage tanks, or may be diffusing upward into the unsaturated zone from deeper contaminated media, especially ground water. Soil gas sampling may be required in land-filled and/or swampy areas to determine whether methane gas is present. Accepted techniques (see NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York) include the placement of a vapor sampling probe (usually a hollow steel rod with a slotted intake point) into the subsurface, purging the sampling system, and testing the effluent soil gas with field analytical equipment or collecting samples for laboratory analysis. The 2006 NYSDOH guidance document provides guidelines for sampling of soil vapor, sub-slab vapor, crawl space air, indoor air and outdoor air.

SHALLOW TEST PROBES

A large number of shallow soil samples can be collected in a relatively short time using direct push technology (DPT). This type of DPT probing is routinely done during first stage surveys to collect a number of preliminary soil samples to assist in the characterization of the site. This type of probe sampling is easier to maneuver and results in less site disturbance than a typical full sized drilling rig. Upon retrieval, the soil samples should be scanned using an organic vapor analyzer or other suitable field-screening equipment that has been properly calibrated. The field screening results should be noted on a test boring log, along with information regarding sample interval, soil description, relative moisture content, color, and any evidence of contamination (*e.g.*, odor, sheen). As appropriate, a limited number of soil samples can be selected for further analysis at a NYSDOH ELAP-certified labora-

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tory. In certain cases, completion of the shallow soil probe investigation may be sufficient to characterize site concerns. Although this type of soil probe sampling relies heavily on dedicated sampling equipment, this equipment should be decontaminated between sampling locations to avoid cross contamination. Limitations of this type of soil probe sampling include limitations on depth (especially at sites with fill or boulders), limited sample volume, and inability to provide blow counts (standard penetration test).

SUBSURFACE EXCAVATIONS

Test pits and trenching allow for inspection and sampling of subsurface materials, equipment, and structures. Exposing the subsurface to inspection often reveals heterogeneity or other features that may have been missed by probe sampling. In certain situations where the area of concern is defined and relatively small in extent, excavation equipment can quickly assess subsurface conditions with a limited number of test pits. This is especially useful in determining composition of fill material or debris piles.

SURFACE SOIL AND WASTE SAMPLING

Sampling of surface soil or exposed wastes or other surfaces for contaminants is often conducted during first stage analyses. A large number of such samples can be quickly collected with very little disturbance to activities at the site. For example, if PCB transformers were noted in the initial assessment, a wipe sample and surface soil sample in those locations could be taken to determine whether the transformers had leaked PCBs. Areas where suspected wastes are exposed at the surface should also be sampled. Again, depending on the media sampled (liquid, solid, semi-solid, or mixed), the samples can be quickly collected with simple sampling tools, such as dedicated spoons or trowels. Special consideration and care should be exercised in conducting this type of sampling since any contaminants exposed at the surface provide a potential exposure pathway for persons occupying or working at the site.

SOIL AND GROUND WATER PROBE INVESTIGATIONS

During more detailed surveys and subsurface investigations at contaminated sites, DPT can be used to collect both soil and ground water samples from discrete depths by using 4-foot macro-core samplers and/or hydro-punch technology expandable screens. Although DPT ground water collection is possible, temporary small diameter PVC well points are preferred.

SOIL BORINGS AND MONITORING WELLS

Soil boring and monitoring well installations can be implemented at areas of concern identified in initial analyses. This is usually accomplished by mobilizing an environmental drilling rig at the site. Soil samples are generally obtained with a 2-foot split spoon sampler. For both ground water and subsurface soil, sampling depends on rig access to the site and the presence of underground and overhead utilities and right-of way issues. Soil samples may be obtained by other types of rigs or hand auguring if full size rig access is not available; however, this requires the subsurface to be penetrable, may only extend to limited depths, and does not allow for the determination of the ground water flow direction.

TESTING BUILDINGS AND STRUCTURES

It is common for building structures to contain hazardous materials. These materials could have been introduced as components of construction materials or discharged as a result of poor operational practices on the part of an industrial occupant. Appropriate sampling techniques depend on the material of concern and the location of the contamination in or on the building. Wipe samples, bulk samples, air samples, coring samples, or field measurements may be appropriate in different situations. Regulations governing demolition may apply.

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Asbestos is a name applied to a group of natural minerals, with particularly good fire resistant and insulation properties. These minerals include chrysotile, amosite, crocidolite, actinolite, tremolite, and anthophyllite. In addition to insulation/fireproofing products, asbestos is also commonly found in roofing materials, floor tiles, vinyl flooring, gaskets, mastics, caulks, plaster, joint compound, ceiling tiles and a range of other building materials. Materials containing more than one percent asbestos are considered asbestos-containing materials (ACM). ACM are classified as friable or non-friable: friable ACM (*e.g.*, most spray-applied fireproofing and pipe/thermal insulation) more readily release asbestos fibers than non-friable ACM (*e.g.*, vinyl flooring and most roofing materials). Title 15 Chapter 1 of the Rules of the City of New York and New York State Industrial Code Rule 56 set out requirements for sampling and abatement of ACM.

Lead-based paint (LBP) was generally not allowed to be applied inside residential buildings after 1960 in New York City. After 1977, its use inside other buildings was also restricted and its use elsewhere became much less common, but LBP may still be used outdoors. LBP can present a hazard, particularly to children, and especially when it is in a deteriorating condition. Lead dust may be present in some structures and on some paved surfaces in building yards or surrounding streets. New York City's Local Law 1 of 2004 promulgated under the New York City Childhood Lead Poisoning Act of 2003, sets out requirements for testing and abatement of dwellings and child-occupied facilities, and USEPA certifies LBP evaluation and abatement firms.

Visible signs of staining, pooling, or discharge of waste material inside structures should be sampled based on the suspected material. For example, suspected PCB-containing surface stains are usually assessed by collecting wipe samples, which are then analyzed in a laboratory.

331.2. Sample Analysis and Analytical Methods

Samples collected pursuant to the investigation work plan are sent to a NYSDOH-ELAP certified laboratory for analysis. The laboratory analyses of environmental samples should be conducted according to the holding time and QA/QC requirements of the NYSDEC Analytical Services Protocol (ASP) unless superseded by newer guidelines.

Analytical methods for solid matrices are published in US EPA SW-846: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 3rd edition, (see the Appendix). The wastewater and drinking water analytical methods are provided by the US EPA Office of Water: EPA Methods and Guidelines for Analysis of Water (see the Appendix). Environmental samples should typically be analyzed for the Full List volatile organic compounds (VOCs) with Methyl tertbutyl ether (MTBE) by EPA Method 8260B, semivolatile organic compounds (SVOCs) by EPA Method 8270C, polychlorinated biphenyls (PCBs) by EPA Method 8081A, pesticides by EPA method 8082, and Target Analyte list (TAL) metals by EPA Method 6020. Or, for a modified list(s) of constituents from other regulatory entities, by methods appropriate for the project objective and acceptable to DEP. Sample collection and analytical methods for contaminants in air (*i.e.*, the vapor phase) are provided by the US EPA Center for Environmental Research Information: Office of Research and Development. Environmental samples should be collected and analyzed for the contaminants defined in *Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS).*

For buildings and structures, paint samples may be analyzed for the presence of lead utilizing the EPA Method 7420 (Flame Atomic Absorption) or 7421 (Graphite Furnace Atomic Absorption), as appropriate. This can be supplemented by portable X-ray fluorescence to reduce the analytical burden. Wipe samples for PCB-containing surface stains are analyzed using EPA Method 8081. Asbestos samples must be sent to a laboratory accredited by the New York State Department of Health's Environmental Laboratory Approval Program (ELAP) and the National Voluntary Laboratory Accreditation Program (NVLAP), and analyzed by Polarized Light Microscopy (PLM) and Transmission Electron Mi-

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croscopy (TEM), if appropriate, for asbestos type and percentage. If the site history or inspection indicates that other hazardous materials might be present, analyses for these materials should be conducted.

332. Health and Safety Plan

As part of the Phase II ESA Work Plan, surface and subsurface assessments must be conducted in a safe manner and in accordance with a site-specific Health and Safety Plan (HASP), established to protect the health and safety of both on-site personnel and the surrounding community. The HASP is prepared in accordance with the applicable U.S. Occupational Health and Safety Administration (OSHA) requirements under 29 CFR Part 1910.120. The intent of the HASP is to provide appropriate procedures to minimize the potential for injury or exposure to site contaminants during the assessment. The HASP must describe all of the potential hazards at the site and the methods to mitigate such hazards. Special attention must be given to the procedures to monitor for potential exposure and the various levels of protection required for tasks to be completed safely. The HASP may also describe site perimeter and/or community air monitoring that may be needed. The HASP should clearly note that prior to any type of intrusive investigation or sampling, subsurface utilities will be marked out to avoid possible injury to workers and the potential danger of damaging the utility. As a standard requirement, the HASP should include VOCs, SVOCs, Pesticides/PCBs, and Heavy Metals (specifically arsenic, lead and mercury) as potential chemicals of concern. All associated information fact sheets or Material Safety Data Sheets (MSDS) for these potential chemicals of concern should be included in the HASP.

333. Quality Assurance and Quality Control

The third major element of the Work Plan, a laboratory analytical program and proper field and laboratory Quality Assurance/Quality Control (QA/QC) regulatory procedures, must be developed before beginning fieldwork. This program establishes general sampling and QA/QC requirements for all sampling and laboratory analysis activities. Also referred to as a Quality Assurance Project Plan (QAPP), its main goal is to assure sample integrity from the field to the laboratory and that the proper laboratory analytical procedures and protocols are followed. The program should include sampling QA/QC protocols for all compounds sampled. It should describe sampling techniques and methods, including NYSDEC guidelines, to assure sampling integrity; field instrumentation calibration and maintenance procedures; decontamination procedures for all equipment; chain-of-custody procedures; sample preservation requirements; laboratory analytical procedures; laboratory equipment calibration and maintenance procedures; the experience and capabilities of personnel; and any other factors associated with obtaining, delivering, and analyzing samples. The plan should clearly document the procedures regarding decontamination of drilling and subsurface sampling equipment between sampling locations. The USEPA provides guidance in developing a QAPP, and references for these guidance documents are included in the Appendix.

340. CONCLUSIONS AND DOCUMENTATION

The final step of the Phase II ESA is to prepare a report documenting the following:

- Description of the site and surrounding area;
- The methodologies used (including any deviations from the Work Plan);
- Field activities;
- Compilation and tabulation of all analytical data (even if non-detectable concentrations are revealed);
- Description of the site hydrogeology;
- Interpretation of the analytical and site assessment data;
- Comparison to appropriate standards, criteria or guidance values; and

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- Findings and recommendations.

The contents and format of the Phase II ESA Report should conform as closely as possible to the guidelines in ASTM E 1903 Appendix X1.

The results of the Phase II ESA (both in the field and from the laboratory analyses) are interpreted to characterize the extent of hazardous materials and the ranges of soil, ground water, or soil gas contaminant concentrations. The soil and ground water sampling data are quantitatively compared to existing guidelines and standards. Most commonly, soil sampling results are compared to the NYSDEC 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives (SCOs). Comparison with the relevant unrestricted or restricted SCOs should be based on the exposure scenarios associated with the proposed project, and different SCOs may be appropriate at different locations and land uses. Note that soil contamination must be evaluated for protection of ground water in addition to public health criteria, unless excluded by Part 375-6.5 (NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 should no longer be used). Ground water sampling results should be compared to NYSDEC Class GA water quality standards that are listed in NYSDEC's Technical & Operational Guidance Series (TOGS). Note that aquifers in NYC should be viewed as potential drinking water sources. As appropriate, ground water sampling results should also be compared to City or State guidance values for dewatering to city sewers and EPA guidance values for vapor intrusion. Soil vapor and indoor air sample concentrations should be compared to guidelines, where available, in the NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York. When investigations identify soil vapor contaminants outside of NYSDOH's constituent list, EPA guidance values may be used for comparison purposes.

The Phase II ESA Report is provided to DEP or OER, as applicable, for review and approval. If hazardous materials are identified at the site and it appears that remedial measures would likely be required to adequately mitigate the contamination, a Draft Remedial Action Plan (RAP) and site-specific Construction Health and Safety Plan (CHASP) should be submitted along with the Phase II ESA Report.

400. DETERMINING IMPACT SIGNIFICANCE

The potential for significant adverse impacts from hazardous materials depends on the type of materials present, their levels, their location on the site, and whether exposure to the hazardous materials would be associated with the proposed project, either during or following construction. In general, given adequate knowledge of the site and its environs, the following two questions can be used to determine whether a significant adverse impact would occur:

1. Is there a potential for human exposure to hazardous materials? This includes present and future users of the site and surrounding area, as well as construction workers.
2. Is there a potential for environmental exposure to hazardous materials? This includes hazardous materials affecting on-site or surrounding natural resources or exacerbating existing environmental contamination.

If the answer to both of these questions is "no," it is unlikely that a potential for significant impacts exists. If the answer to either is "yes," then a significant adverse impact might occur. Examples of significant adverse impacts from hazardous materials include the following:

- Workers may be exposed during excavation. For example, sites that were formerly solid waste landfills may contain explosive levels of methane; compounds adsorbed to soil may become airborne as dust and ingested through the nose and mouth; or dewatering activities may expose workers to contaminated ground water.
- Future site occupants may be exposed to on-site hazardous materials. For example, children at a residential site may ingest contaminated soil or lead-laden particles from a building's interior.
- Future site occupants may be exposed to materials migrating from off-site. For example, materials leaking from a gasoline underground storage tank on an adjacent property may migrate in the subsurface as a separate-phase liquid, dissolved in ground water, or as a vapor.

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- Occupants of adjacent properties may be exposed. For example, contaminated soil or dust may be transported to adjacent sites during excavation. Surface and subsurface drainage patterns may cause on-site contaminants to migrate off-site during or following construction, impacting adjacent properties or natural resources. Soil gas may migrate to adjacent properties or buildings.
- For projects that would introduce hazardous materials to a site or involve management of hazardous materials, the methods of handling and disposing of those materials (in accordance with all applicable legal requirements of City, State and federal agencies) should be described, but compliance is generally assumed for the purposes of determining whether a significant impact exists under CEQR.

Conditions of contamination that are generally not considered significant adverse impacts include the following:

- No significant impact would occur when hazardous material concentrations in ground water exceed NYSDEC Class GA ground water quality standards listed in TOGS, unless there is a potential route of exposure through drinking water, vapor intrusion into buildings or structures, or ground water recharge to surface waters, or the proposed project involves impacts associated with dewatering.
- In certain circumstances—particularly for asbestos and lead—compliance with applicable regulatory requirements would prevent significant impacts. For example, if the project requires demolition or renovation of a building containing asbestos, compliance with applicable regulatory requirements is necessary whether or not the project is also subject to CEQR.

Decisions regarding the potential for significant adverse impacts must be made on a site-specific, project-specific basis, considering all available information. The lead agency should consult with DEP in determining and assessing the potential for significant adverse impacts. However, if such potential exists, the lead agency must coordinate with DEP or OER, as appropriate, in developing measures to avoid or mitigate the potential impacts. Depending on the adverse impact identified, other agencies (*e.g.*, NYCDOHMH, NYSDEC, NYSDOH, USEPA, US Coast Guard) may also require notification. For generic or programmatic actions, site-specific conclusions may not be possible. In this case, more general conclusions about the type of impacts that may be expected for different types of sites may be appropriate.

500. MITIGATION AND REMEDIATION

Mitigation is the implementation of actions designed to eliminate, contain or control sources of significant adverse impacts and eliminate exposure pathways. Remediation is the implementation of actions designed to remove or treat the sources of significant adverse impacts and eliminate and/or reduce concentrations of hazardous materials. Mitigation and remedial measures are determined based in part on the detailed findings of the Phase II ESA. DEP and OER recommend a "risk-based" approach in determining the proper course of mitigation. The risk-based approach evaluates the exposure pathways associated with the proposed project. Implementation of mitigation and remedial action follows careful development of an appropriate Remedial Action Plan (RAP) and site-specific Construction Health and Safety Plan (CHASP). Both short-term and long-term risks should be assessed. Questions that the City considers when evaluating a proposed remedial approach are:

- Which available mitigation and remedial technologies would accomplish the mitigation and remedial goals for the site?
- What are the short-term risks?
- What are the long-term risks?
- What are the risk-based benefits of the RAP?
- Would implementation create potential new or additional risks to on-site occupants or the surrounding public?

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- Would implementation result in residual hazardous materials remaining in place on site so that an appropriate institutional control (*e.g.*, (E) Designation, declaration of covenants and restrictions for ongoing site management, memorandum of understanding (MOU)) governing ongoing monitoring is required?

In evaluating the short-term risks associated with a remedial technology, both adjacent community and on-site worker risks are assessed. Examples of remedial approaches that may pose a short-term risk to an adjacent community include emissions from an on-site remedial system or fugitive dust emissions and/or odors as a result of excavation activities. In addition, on-site worker health and safety issues should be considered.

Evaluation of long-term risks focuses on evaluating residual risk and evaluating the effectiveness of the remedy over time. Residual risk may occur if hazardous materials are left on-site but are mitigated by reducing or eliminating exposure through measures such as capping, or sub-slab vapor barrier and depressurization systems. These measures should be monitored through a site monitoring plan, which may be ensured through a combination of institutional controls, such as an (E) Designation, declaration of covenants and restrictions for ongoing site management, MOU, land disposition agreement and/or mapping agreement.

Implementation of a mitigation or remedial measure does not absolve the site owner from additional mitigation or remediation in the future should conditions warrant (*e.g.*, site use changes). In addition, NYSDEC or other agencies may require additional investigation, mitigation, and/or remedial measures. Procedures that would document that the selected remedial action was properly implemented should always be incorporated into the chosen remedy or mitigation. For example, where site excavation would be followed by the placement of fill meeting specified requirements, the RAP should set out appropriate testing protocols and timely submission to DEP or OER, as applicable, of laboratory testing data, documenting both proper off-site disposal and compliant incoming fill materials.

510. CONTAINMENT TECHNIQUES

Containment is the process of covering or enclosing hazardous materials to minimize direct contact with or exposure of receptors. For subsurface contamination, capping of the affected area is often used to control the infiltration of surface water or rainwater and reduce contaminant migration. Caps are often employed when contaminated materials are left in place. Capping is sometimes performed together with measures for ground water contaminant control, surface water control, and sub-surface gas collection or control. Various cap designs and capping materials are available--from clean soil or standard paving to multi-layer engineered membranes. The selection of the cap design and materials depends on the nature of the waste to be covered and the intended use of the capped area. Disadvantages of capping include an uncertain design life; the need for long-term inspection and maintenance; and problems that arise should they need to be breached to install or repair utilities. Depending on the materials used, caps can be vulnerable to erosion, cracking or other types of deterioration.

Lateral migration of contaminants can be contained by such techniques as construction of subsurface barriers, such as sheeting, slurry walls, or grout curtains, in which liquid material is injected into the soil where it solidifies to form a barrier. Where the potential for vapor intrusion by contaminated soil vapor is identified, resulting from contaminated ground water or soil above the water table, exposure to impacted indoor air can be mitigated through installation of technologies like sub-slab vapor barriers, and depressurization systems. In situations where exterior installation is not practical, membranes or coatings can be applied to the building's interior slab and subgrade walls. Heating, ventilating, and air conditioning (HVAC) systems can also be adjusted so that there is a "positive pressure" environment within the building that prevents soil vapor from entering indoor spaces. Where below-grade levels of a building are open to outside air or ventilated in accordance with all applicable New York City Department of Building (DOB) Codes (*e.g.*, parking garages beneath residential buildings), additional systems to prevent vapor intrusion may not be warranted. This would be evaluated on a case-by-case basis, pending evaluation of proposed sub-grade uses and ventilation systems.

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520. REMOVAL TECHNOLOGIES

Contaminated surface and subsurface materials can be removed from a site. The types of equipment and construction techniques selected are determined by the physical characteristics of the materials being excavated, the volume of material to be excavated, the depth of the excavation, and the haul distances involved. In general, hazardous wastes and petroleum-contaminated materials require removal, whereas historic fill and other materials with concentrations typical of urban fill material may be reused on-site, provided that doing so is not in violation of any applicable regulatory requirements and that exposure to such materials is mitigated by installation of a cap, or other appropriate mitigation controls are implemented. In accordance with NYSDEC's Rules and Regulations on beneficial use, found at 6 NYCRR Part 360, Section 1.15(b)8, nonhazardous, contaminated soil that has been excavated as part of construction projects may be used as backfill for the same excavation or excavations containing similar contaminants at the same site.

Once removed from the project site, the contaminated materials must be properly disposed of or beneficially reused in accordance with NYSDEC regulations. The transport, treatment, and disposal of solid and hazardous wastes and other materials are regulated by many agencies including the USEPA, NYSDEC, the U.S. Department of Transportation, FDNY, DSNY, and other state regulations if the materials are disposed of in other states outside of New York. In some cases, it is possible to treat hazardous materials on-site or off-site and return the treated material to the site (see below), or to use the treated material elsewhere (*e.g.*, as fill). In all cases, any soil or fill removed from a site must be properly disposed of in accordance with all applicable federal, state, and local regulations. A copy of all relevant documents, including transportation manifests, documentation of the destination of all material removed from the site, disposal/recycling certificates, weigh tickets, and documentation associated with disposal showing requisite approvals for receipt of the material, must be maintained by the engineer/architect of record, associated consultants, and property owner/developer.

Ground water may be extracted to halt the lateral and vertical migration of contaminated ground water for subsequent treatment and/or disposal.

Where contaminated soil vapor is present, passive or active gas control systems (*i.e.*, sub-slab depressurization systems) may be appropriate to prevent exposures. These can include collection and treatment, but more commonly, the emphasis is on control measures that ensure that gases do not form explosive, oxygen deficient conditions, high concentrations of soil vapor contaminants, or enter into structures.

Bulk liquids and sludges are sometimes found in pits, ponds, lagoons, sumps, trenches, or tanks. These liquids and sludges almost always require removal to prevent the contamination of soil and ground water adjacent to the area.

When abandoned storage drums, gas cylinders or similar potentially acutely hazardous items are found at a site, timely removal actions are likely warranted. These activities require specialized knowledge and safety procedures. Appropriate consultation with regulatory agencies may be required.

All contaminated materials treated on site or removed from the site for recycling and/or disposal must be managed in accordance with all applicable federal, state, and local regulations.

530. TREATMENT TECHNOLOGIES

Treatment technologies involve treating hazardous materials to either reduce the concentration of the contaminants of concern or alter the characteristics of the contaminated material. This can be performed on-site (either in-situ or ex-situ), or off-site. All treatment technologies should be implemented in accordance with all applicable federal, state, and local regulations.

INCINERATION is a well-proven method of burning wastes containing organic compounds at a very high temperature. However, incineration is usually too expensive to be a cost effective approach and it also requires removal and transportation of the materials off-site.

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THERMAL TREATMENT TECHNOLOGIES include a number of methods that use heat to separate contaminants thermally from the media in which they are found. These technologies do not destroy the contaminants; consequently, they often require subsequent off-site disposal. An exception is the thermal treatment of petroleum-contaminated wastes that are then incorporated into asphalt and subsequently used for paving roads.

SOIL VAPOR EXTRACTION (SVE) is a method of treating soil in the unsaturated zone contaminated with VOCs. Soil vapor extraction consists of a network of wells with perforated well screens spanning the contaminated portion of the unsaturated zone to remove VOCs.

AIR SPARGING/SVE includes passing air through a column of VOC-contaminated ground water and collecting the contaminant-enriched vapors with a SVE system above the water table. The system includes a series of air injection points below the water table and a series of vapor extraction points above the water table. With favorable site conditions, this type of system can clean up both the ground water and soil at VOC-contaminated sites.

AIR STRIPPING is a process of forcing air through impacted ground water or surface water to remove harmful chemicals. Water is pumped into an air stripper and then sprayed over packing material where a fan blows the evaporated water vapor upward. Air stripping is most effective when dealing with contaminants that evaporate easily, such as fuels or solvents.

SOIL FLUSHING is the application of a liquid flushing agent to soil to physically and/or chemically remove contaminants. This process is not commonly used in New York City, but can be applicable for a low- to medium-concentration of contamination that is distributed over a wide area.

CHEMICAL OXIDATION applies chemicals called oxidants to destroy pollution in soil and ground water. Chemical oxidation can destroy many types of contaminants such as fuels, solvents, and pesticides.

IN-SITU BIODEGRADATION is the process of enhancing microbial action to remediate subsurface contaminants that are adsorbed to soil particles or dissolved in the aqueous phase by adding oxygen and phosphorous, nitrogen, potassium, or other nutrients to the system.

MONITORED NATURAL ATTENUATION (MNA) is a combination of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or ground water. These processes include biodegradation; dispersion; dilution; sorption; volatilization; chemical or biological stabilization, transformation, or destruction of contaminants. This remedial strategy requires continued monitoring to assess progress and to ensure that exposure scenarios do not change as attenuation proceeds. MNA has been gaining acceptance for sites where there is no potential for human or environmental exposure, such as sites with low levels of VOCs in ground water that is not used as a source of drinking water. When MNA is the strategy selected for remediation of VOCs, the potential for soil gas contamination and vapor intrusion should be considered as an exposure pathway during monitoring.

SOLIDIFICATION AND STABILIZATION SOLIDIFICATION refers to treatment processes that are designed to change the physical characteristics of the waste, thereby minimizing free liquids and/or decreasing leachability. Stabilization techniques involve processes that limit solubility.

540. MITIGATION TECHNIQUES FOR CONTAMINATION IN BUILDINGS OR STRUCTURES

Mitigation measures depend on the type(s) of contaminant, the location of the contamination in or on the building or structure, and the potential exposure pathway(s). Generally, hazardous materials contaminating building components can be either contained or removed. Lead and asbestos are the two most common building contaminants, the regulatory frameworks for which were described above, but other possible hazardous conditions may be present. The mitigation for specific problems should be resolved in coordination with DEP for asbestos and/or DOHMH for lead on a case-by-case basis.

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550. MITIGATION THROUGH INSTITUTIONAL CONTROLS

In certain instances, generally when testing is not physically possible during the CEQR process or when CEQR investigations identify the need for the City to ensure that post-CEQR remediation is completed adequately, an institutional control, such as an (E) Designation, MOU (in the case of City-owned property), recorded declaration of covenants and restrictions, land disposition agreement or mapping agreement, is placed on or entered into with respect to the subject property to establish a review and approval framework.

The lead agency should work with DEP during the CEQR process to determine the appropriateness of an institutional control. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility to administer (E) Designations and existing Restrictive Declarations, pursuant to Section 11-15 (Environmental requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York. When an institutional control is necessary on City-owned land, a MOU may be entered into between DEP and the agency controlling the site, where DEP would review and approve any testing and/or remedial plans for that property. DEP and all parties to an MOU should be consulted early in the CEQR process to reach agreement on the form and specifics of an MOU.

551. (E) DESIGNATIONS

The hazardous materials (E) Designation is an institutional control that can be placed as a result of the CEQR review of a zoning map or text amendment or action pursuant to the Zoning Resolution. It provides a mechanism to ensure that testing for and mitigation and/or remediation of hazardous materials, if necessary, are completed prior to, or as part of, future development of an affected site, thereby eliminating the potential for a hazardous materials impact.

Chapter 24 of Title 15 of the Rules of the City of New York and Section 11-15 of the Zoning Resolution of the City of New York set out the procedures for placing (E) Designations, satisfying related requirements, and removing (E) Designations. Detailed requirements on how to investigate, remediate, satisfy, and receive appropriate sign-offs for sites with (E) Designations are included in the Rules. If necessary, the lead agency may consult with DEP during the CEQR process to identify sites requiring an (E) Designation. After a site has been identified or after the (E) has been placed, applicants are advised to provide the CEQR number to OER and, in order to facilitate OER's review of work proposed to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the hazardous materials CEQR review (*e.g.*, EAS/EIS, Phase I ESA, Phase II ESA Work Plan/HASP, Phase II ESA Report(s), RAP/CHASP, lead agency and DEP correspondences, Restrictive Declarations, Notices) to OER. With respect to an applicant-owned or -controlled site, if the lead agency determines that the proposed zoning action warrants a hazardous materials assessment and a Phase I ESA, the Phase I ESA must be completed during CEQR. If the Phase I shows that potential hazardous materials conditions exist, which will need to be addressed during development, the lead agency may assign an (E) Designation to the site, requiring a Phase II ESA and any necessary remediation prior to and/or during redevelopment of the site (see Section 330 above). It is possible that, based on the Phase I and consultation with DEP, the lead agency may determine that the identification and characterization in the EAS/EIS of the actual nature and degree of contamination is appropriate during CEQR. If a Phase II ESA is, therefore, completed during CEQR and remediation is required, the lead agency may assign an (E) Designation if such remediation will involve more than standard construction practices and the proper removal of soil and site preparation in accordance with applicable laws and regulations. Such (E) Designation will require the preparation of a Remediation Action Plan in consultation with OER. Otherwise, remediation proposed to be undertaken in accordance with standard construction practices should be reviewed and approved by DEP, and an (E) Designation may not be warranted.

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution and appear in DOB's online Buildings Information System (BIS).

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With respect to lots with (E) Designations, DOB will not issue building permits or certificates of occupancy in connection with the following actions until it receives an appropriate "Notice" from OER that the environmental requirements have been met:

- Developments;
- Enlargements, extensions or changes of use, involving residential or community facility use; or
- Enlargements or alterations that disturb the soil.

As appropriate, OER will issue the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction.

552. RESTRICTIVE DECLARATIONS

Historically – until the amendments to the (E) Rules, which became effective on June 18, 2012, allowing lead agencies to place (E) Designations on applicant-owned or -controlled sites and in connection with all zoning actions – Restrictive Declarations were used as an institutional control to ensure that the required testing, remediation and/or mitigation occurred prior to or as part of the development of applicant-owned or -controlled sites.

Restrictive Declarations are recorded instruments, binding the property owner and/or long-term lessee, future owners/lessees and other parties-in-interest, to investigation and/or remediation requirements at predetermined stages of the project, as overseen by DEP during the CEQR review process or by OER during post-CEQR review. In particular, Restrictive Declarations require written notice from OER before DOB may issue building permits or certificates of occupancy in connection with the actions described above under (E) Designations.

If an applicant proposes a Restrictive Declaration with requirements to address potential hazardous materials contamination as part of a proposed project, as described in Section 421.1 of Chapter 2, the lead agency may instead elect to incorporate such provisions in an (E) Designation.

600. DEVELOPING ALTERNATIVES

Alternatives to the proposed project would most commonly include the mitigation methods described above and/or specific changes to the proposed project that minimize possible exposure. If increased exposure to hazardous materials may be associated with excavation, an alternative requiring less extensive excavation may be considered. If there is a concern for exposure to surface soil at a residential development, an alternative may be to cap the area or select another use for that portion of the site. Alternative sites for the proposed project may also be considered. In order to consider an alternative site for private developments, the applicant must own or own a right to use the alternative site.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

Regulations regarding hazardous materials address their identification, registration, classification, discharge, handling and storage, generation, treatment, transportation, and disposal. They also provide a means to identify and fund the clean-up of hazardous sites and hazardous releases. Regulations are promulgated by the City, State, and Federal governments. An overview of key applicable regulations is presented below. The primary reference for this section is Parkin, W.P., *et.al.*, 1992, The Complete Guide to Environmental Liability and Enforcement in New York, sponsored by the National District Attorney's Association.

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711. Federal Government

711.1. Resource Conservation Recovery Act (RCRA) and Hazardous and Solid Waste Amendments (HSWA)

RCRA, adopted in 1976 and amended in 1984, creates the basic framework for the Federal regulation of hazardous wastes. It provides controls for the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle to grave" system of hazardous waste management techniques and requirements. USEPA administers RCRA and delegates administration of major components to New York State. RCRA defines hazardous waste either as a listed hazardous waste or a waste exhibiting any of the characteristics of a hazardous waste (40 CFR Part 261). The four characteristics of hazardous waste are: (1) ignitability; (2) corrosivity; (3) reactivity; and (4) toxicity as measured by the Toxicity Characteristic Leaching Procedure (TCLP). The 1984 Hazards and Solid Waste Amendments (HSWA) added Federal regulation of underground storage tanks.

711.2. Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Superfund Amendments and Reauthorization (SARA)

Congress enacted CERCLA (also known as Superfund) and its amendments (40 CFR Part 300) to fund the clean-up of hazardous substance waste sites. CERCLA, which was amended by SARA, has created a national policy and procedures for containing and remediating released hazardous waste substances and for identifying and remediating sites contaminated with hazardous substances. CERCLA's purview excludes crude oil, petroleum products, and natural gas products.

Title III of SARA, the Federal Emergency Planning and Community Right to Know Act, was promulgated to allow public access to information about local use of hazardous chemicals and to require each generator of such materials to develop chemical emergency planning procedures (40 CFR Part 300). A list of Extremely Hazardous Substances (EHS) and their respective reportable quantities was created.

711.3. Transportation of Hazardous Materials

The U.S. Department of Transportation addresses the listing and transportation requirements for hazardous materials under 49 CFR Part 171 through 177, and USEPA regulates hazardous waste transport under 40 CFR Part 262 and 263.

711.4. Toxic Substance Control Act (TSCA)

TSCA empowers EPA to regulate specific toxic substances. Federal regulation of polychlorinated biphenyls (PCBs) and asbestos-containing materials falls under TSCA.

712. New York State

712.1. Environmental Conservation Law

NYSDEC has developed the regulatory framework for hazardous waste management in New York in response to the State's Environmental Conservation Law. The criteria for determining a hazardous waste closely parallel those of RCRA and are set forth in 6 NYCRR Part 371.

The State has also created its own Superfund-like program to help finance the State's share of clean-up costs under the Federal program or to finance clean-ups at State sites that are not under the Federal program. New York State's Superfund program, the Inactive Hazardous Waste Sites Law, was passed in 1979. This program is described in 6 NYCRR Part 375. The law provides for the identification, listing, and remediation of inactive hazardous waste sites in CEQR MANUAL 3J-23 10/01 New York. Under the law, NYSDEC has provided for a comprehensive listing of inactive hazardous waste sites.

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712.2. Petroleum and Hazardous Substances Storage Laws

The storage of petroleum and hazardous substances in New York State is regulated through a series of laws enacted to ensure proper storage and to address petroleum and hazardous substance spills and leaks. In 1984, Federal underground storage tank requirements were adopted as required by Subtitle I of RCRA. The New York State petroleum and hazardous substance storage laws are more comprehensive than the Federal laws and include the Oil Spill Prevention, Control and Compensation Act of 1977; the Petroleum Bulk Storage Act of 1986; and the Hazardous Substance Bulk Storage Act of 1986.

The Hazardous Substances Bulk Storage Act of 1986 specifically addresses the storage of nonpetroleum hazardous substances. Owners of tanks storing listed hazardous substances are required to register all tanks storing listed hazardous substances with a capacity greater than 185 gallons.

713. New York City

713.1. Hazardous Substances Emergency Response Law (Spill Law)

New York City has enacted Local Law 42/1987, the New York City Hazardous Substances Emergency Response Law, also known as the Spill Law. Under this law, the City has declared its policy to respond to emergencies caused by releases or threatened releases of hazardous substances into the environment that may have an adverse effect on the public health, safety, and welfare and to prevent injury to human, plant, and animal life and property. DEP administers this law, which allows the department to order clean-up of hazardous substance spills.

713.2. Community Right-to-Know Law

The New York City Community Right-to-Know Local Law 26/1988 authorizes DEP to gather chemical information from facilities that use, store, or manufacture hazardous substances and to use this information for emergency planning and response purposes. The intent of this law is to protect the health and safety of the community and the environment against accidental release of hazardous materials. In addition, the law gives New York City residents the right to know the identities, quantities, characteristics, and locations of hazardous substances used, stored, and manufactured in their communities.

713.3. Asbestos Legislation

Asbestos-containing materials are regulated at the City, State, and Federal levels of government. NYCDEP, under Title 15 Chapter 1, regulates building surveys, professional certifications, and asbestos abatement procedures. Local Laws 70/1985 and 21/1987, administered by the New York City Department of Sanitation, govern the transport, storage, and disposal of asbestos waste in the City. The City's regulations are more stringent than those of the State and Federal governments. The New York State Industrial Code 56, administered by the New York State Department of Labor, and the EPA-administered National Emissions Standards for Hazardous Air Pollutants (NESHAP) also regulate asbestos activities. Asbestos laboratories are regulated by the NYSDOH under the Environmental Laboratory approval program.

713.4. Industrial Pretreatment Program

This program establishes standards for certain pollutants discharged to the sewer system, requiring pretreatment for effluent that would otherwise not meet the standards.

713.5. Lead Paint

Lead-based paint (LBP) in certain residential and child-occupied facilities is regulated under NYC Local Law 1 of 2004, NYS Public Health Law Title 10 of Article 13, and the Federal "Residential Lead-Based Paint Hazard Reduction Act of 1992." The EPA regulates training and certification of individuals and

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certification of firms under 40 CFR Part 745. In other facilities, lead exposure to workers is regulated by the Federal OSHA regulations 29 CFR 1926.62 and 29 CFR 1910.1025. Disposal of waste with lead paint is regulated by the NYSDEC under Chapter IV Subchapter B - Solid Wastes.

714. Applicable Standards

New York State has promulgated standards and guidance values for ground and surface waters and suggested soil clean-up guidelines.

714.1. Surface and Ground water

The NYSDEC Division of Water has published Water Quality Regulations for Surface Waters and Groundwaters under 6 NYCRR Parts 700-705, last amended August 1999. Under these regulations NYSDEC provides a water classification system for surface and ground water (Part 701). General conditions that apply to all water classifications are that the discharge of sewage, industrial waste, or other wastes shall not cause impairment of the best usages of the receiving waters as specified by the water classification at the location of the discharge and at other locations that may be affected by such discharge.

The Water Quality Regulations establish eight fresh surface water classifications, five saline surface water classifications, and three ground water classifications, and for each, provide a definition of their best usage. Ambient Water Quality Standards and guidance values are categorized according to this water classification system. The standards are derived to provide for the protection of human health, potable water supply, aquatic life, and consumers of aquatic life.

In addition to the Water Quality Regulations under 6 NYCRR Part 700-705, NYSDEC Division of Water has issued Technical and Operational Guidance Series 1.1.1 to provide a compilation of ambient water quality guidance values and ground water effluent limitations for use where there are no standards or regulatory effluent limitations. This document also provides a summary of the water quality standards and limitations under 6 NYCRR Part 700-705.

Standards and guidance values for protection of the best usage as a source of potable water supply protect human health and drinking water sources and are referred to as health (water source) values. For the majority of specified substances, these values generally equal the maximum contaminant level (MCL) for that substance. If no specific MCL exists, the standard or guidance is 5 micrograms per liter (µg/L) or a less stringent value, as determined by the Commissioner of the New York State Department of Health. For those substances that do not have an applicable health (water source) standard, and for which the NYSDEC has determined that a threat to human health may exist if discharged into the waters of the State, a guidance value is derived by applying the procedures utilized by the State or a "general organic guidance" value of 50 µg/L for an individual organic substance may be utilized (Part 702.15), whichever is more stringent.

The three classification categories of ground water established based on their best usage include Class GA fresh ground water, Class GSA saline ground water, and Class GSB saline ground water. The best usage of Class GA ground water is as a source of potable water supply. Thus, the Class GA standards generally correspond to the MCL. The best usages of Class GSA saline ground water are as a source of potable mineral waters, for conversion to fresh potable waters, or as a raw material for the manufacture of sodium chloride or its derivatives or similar products. The best usage of Class GSB saline waters is as a receiving water for the disposal of wastes. The Class GSB is not assigned to any ground water of the State, unless the commissioner of NYSDEC finds that adjacent and tributary ground water and the best usages thereof will not be impaired by such classification. The ground water of the five boroughs are classified as Class GA ground water, except where the criteria for saline ground water are met (Part 703.5).

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Ground water analytical data generated from a site are typically compared with NYSDEC standards and guidance values that apply to a site's ground water classification. This comparison aids in the evaluation of the extent of impairment of the ground water being analyzed. Unless volatilization at the ground water interface would result or a drinking water supply is affected, no significant impact may be considered to result from the ground water contamination.

714.2. Soil

Human exposure to soil contaminants can occur through inhalation, ingestion, or skin contact, as well as indirectly through contaminants leaching or percolating to ground water, if it is used as a source of drinking water. There are no Federal, New York State, or New York City clean-up standards or guidelines applicable to all situations to define "acceptable" levels of contaminants in soil. There are, however, promulgated values applicable to certain situations and guidance values that have been proposed by various government agencies. These standards and guidelines are typically derived from models employing numerous conservative assumptions developed to set clean-up levels at contaminated sites.

In New York, NYSDEC has developed soil cleanup objectives (SCOs), promulgated in 6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives. NYSDEC's Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels (TAGM 4046, January 1994 with updates) also sets up recommended soil cleanup objectives (RSCOs). The goal of the SCOs and RSCOs is to eliminate significant risks to human health and the environment.

The SCOs (and RSCOs especially for evaluating metals) should be used to assess levels of environmental contamination, recognizing each site's particular circumstances regarding current and proposed future exposure scenarios and factors.

714.3. Solid and Hazardous Waste Characteristics

6 NYCRR Part 360 describes how solid waste must be transferred, processed, recovered, stored, reclaimed or disposed. Material at a site is considered solid waste if it exhibits characteristics identified in 6 NYCRR Part 360-1.2.

6 NYCRR Part 371 requires that before transport and disposal of contaminated soil from a site, the generator must determine if it is subject to regulation as a hazardous waste. A solid waste, such as contaminated soil, is considered a hazardous waste if it exhibits one or more of the characteristics identified in 6 NYCRR Part 371.3 or if it is a listed acutely hazardous or toxic waste.

720. APPLICABLE COORDINATION

As noted above, several Federal, State, and City regulations govern hazardous materials. The agencies that administer these regulations at a Federal and State level, such as EPA and NYSDEC, typically are not active in the CEQR process. However, if a significant amount of hazardous waste exists on the site, which is a significant threat to public health and the environment, the appropriate regulatory agencies must be notified by either DEP or the lead agency. For instance, if a petroleum spill of more than 5 gallons is found during a site investigation being performed for a CEQR, NYSDEC must be notified pursuant to Article 17, Section 1743 of the New York State Environmental Conservation Law and Article 12, Section 175 of the New York State Navigation Law. The appropriate Federal and New York City government agencies must also be notified. DEP can provide complete notification requirements. Other than regulatory notification requirements, however, Federal and State agencies typically do not have a review and/or approval role in the CEQR process.

At the City level, coordination with DEP's Bureau of Environmental Planning and Analysis is required where the proposed site is likely to show potential for the presence of hazardous materials (such as a site in or near manufacturing uses or with a history that reveals a potential hazardous materials issue). DEP will provide consistent

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technical guidance and review throughout the research, investigation, and remediation phases of a hazardous waste assessment.

730. LOCATION OF INFORMATION

Throughout this chapter, references to publications, regulations, regulatory agencies, and other sources of information are made. Generally, publications and guidelines can be purchased or obtained free-of-charge from the referenced agencies. Listed below are regulatory agencies and current addresses, along with publications and/or regulations that may be obtained. NYC agencies can be contacted through the web site NYC.Gov or by calling 311. NYSDEC may be contacted at 718-482-4900.

- RCRA/Superfund Hotline (Publications and technical information).
- Government Printing Office, 26 Federal Plaza, New York, NY 10278 (EPA regulations and guidelines available for a fee).
- New York State DEC Regional Office, Region 2 Hunters Point Plaza, 47-40 21st Street Long Island City, NY 11101, Division of Air Resources Division of Solid and Hazardous Materials Division of Fish, Wildlife, and Marine Resources Division of Water Division of Environmental Remediation Division of Lands and Forests.
- DEP-Bureau of Environmental Planning and Analysis, 59-17 Junction Boulevard, 11th Floor Flushing, NY 11373.
- DEP-Bureau of Environmental Compliance, 59-17 Junction Boulevard, 1st Floor Flushing, NY 11373 (Copies of "Spill Law" and Right-to-Know Laws available free of charge).
- United States Geological Survey, P.O. Box 1669, Albany, NY 12201 (Topographic maps). Also available at local map stores, such as the Hagstrom Map Company.
- New York Public Library, 455 Fifth Avenue, New York, NY 10016 (Fire insurance maps and city directories).
- New York City Department of Buildings (Manhattan), 60 Hudson Street, New York, NY 10013 (Building renovation records and certificates of occupancy for past and present uses available for review).
- New York City Department of Buildings (Brooklyn), Municipal Building Brooklyn, NY 11201 (Building renovation records and certificates of occupancy for past and present uses available for review).
- New York City Department of Buildings (Bronx), 1932 Arthur Avenue, Bronx, NY 10457 (Building renovation records and certificates of occupancy for past and present uses available for review).
- New York City Department of Buildings (Queens), 126-06 Queens Boulevard, Kew Gardens, NY 11415 (Building renovation records and certificates of occupancy for past and present uses available for review).
- New York City Department of Buildings (Staten Island), Borough Hall, Staten Island, NY 10301 (Building renovation records and certificates of occupancy for past and present uses available for review).
- New York City Fire Department Bureau of Fire Prevention, 250 Livingston Street, Brooklyn, NY 11201 (Records on fuel tanks, storage of flammable materials).
- National Cartographic Information Center, U.S. Department of the Interior, Geologic Survey, 507 National Center Reston, VA 27092 (Aerial photographs and information on commercial surveying firms).
- Refer to Chapter 9, “Historic Resources,” for more information on historic research sources.

731. Sources of Data to Supplement the ASTM Standard

In addition to the ASTM Standard, the following information, specific to New York City, may assist in preparation of Phase I ESAs.

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- NYC Department of City Planning (DCP), including Zoning Information, (E) Designations, and Restrictive Declarations.
- New York City Department of Buildings, Buildings Information System (BIS) information.
- New York City Department of Finance, Automated City Registration Information System (ACRIS).
- NYC Fire Department, 9 Metro Tech Center, Brooklyn, New York 11201 (List of Registered Underground Storage Tanks).
- Chain-of-Ownership (title search) – although ASTM recommends searches of title records, many of which can be accessed from the ACRIS database, since multi-user buildings and other rental situations are common in New York City, City Directories (*e.g.*, historic telephone records) and other sources that may indicate use rather than ownership should be consulted, where possible. Interviews with building maintenance staff may be helpful.
- Information including base maps, imagery based on aerial photography, tax blocks and lots, roadways, building footprints, waterways, and mass transportation lines are readily available at, for example, http://www.nyc.gov/html/doitt/home.html and http://gis.nyc.gov/doitt/cm/CityMap.htm.
- Companies that specialize in providing fire insurance maps, city directories, aerial photographs, title search information, *etc.* (see, for example, http://www.toxicstargeting.com/ or http://www.edrnet.com).
- DEP Bureau of Environmental Planning and Analysis, 59-17 Junction Blvd., 11th Floor High Rise, Flushing, New York 11373-5108; DEP Bureau of Environmental Compliance, 96-05 Horace Harding Expressway Corona, NY 11368 (Emergency Response Incidents, Spill Law Notices of Violation).
- New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), Environmental Site Database (includes Spill Incidents, Remedial Sites, and Bulk Storage (chemical and petroleum) records).
- New York State Department of Health (NYSDOH), Center for Environmental Health, Bureau of Environmental Exposure Investigation, "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York," October 2006.
- US EPA Center for Environmental Research Information, Office of Research and Development, "Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)," January 1999.

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WATER AND SEWER INFRASTRUCTURE

CHAPTER 13

Infrastructure comprises the physical systems that support populations and include structures such as water mains and sewers, bridges and tunnels, roadways, and electrical substations. Because these are static structures, they have defined capacities that may be affected by growth in a particular area. This chapter addresses how projects may affect the City's water and sewer infrastructure; other types of infrastructure are addressed in other Manual chapters.

The purpose of this chapter is to assess whether projects undergoing review may adversely affect the City's water distribution or sewer system and, if so, assess the effects of such projects to determine whether their impact is significant. Potential mitigation strategies and alternatives are also presented in this chapter for use when significant adverse impacts are identified.

New York City's water and sewer network is fundamental to the operation, health, safety, and quality of life of the City and its surrounding environment, and it must be sized to fit the users and surface conditions in order to function adequately. Ensuring these systems have adequate capacity to accommodate land use or density changes and new development is critical to avoid environmental and health problems such as sewer back-ups, street flooding or pressure reductions. To avoid these problems, areas of the City that lack sufficient water or sewer capacity need infrastructure improvements. In addition, many regulations have been imposed on the City since the system was designed (including multiple Consent Orders by the State regulating the discharge of pollutants to ensure compliance with the Federal Clean Water Act) that pose new challenges for meeting water quality and combined sewer overflow (CSO) standards, especially as the population being served by the sewers increases. Thus, the City has a mandate to provide sufficient service to the community and meet increasingly stringent State and Federal requirements for improved water quality standards.

Generally, only projects that increase density or change drainage conditions on a large site require an infrastructure analysis. In addition to water supply, conveyance and waste water treatment plant (WWTP) assessments, stormwater management is an integral component of an infrastructure analysis due to potential environmental impacts related to how much the built sewer and conveyance system can handle, and related effects such as street flooding, surcharging sewers downstream, sewer back-ups (SBUs), increases in CSOs, and pollutant loadings contained in CSOs or direct stormwater discharges to the City's surrounding waterbodies. Stormwater drainage is also a central element of the natural resources analysis described in Chapter 11, "Natural Resources," since stormwater is a substantial contributor of water into natural systems such as wetlands and adjacent waterbodies. Disruption of water and sewer services during construction should be addressed in Chapter 22, "Construction."

Section 200 of this chapter provides criteria to help determine which projects need an infrastructure analysis. For those projects requiring analysis, section 300 describes how to assess a project's potential for impacts on infrastructure. Section 400 provides guidance on whether the results of the infrastructure analysis identify a significant impact requiring mitigation. Sections 500 and 600 guide the applicant and lead agency in developing mitigation or alternatives, and Section 700 lists applicable regulations and standards.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency throughout the environmental review process. In addition, the New York City Department of Environmental Protection (DEP), the City's expert agency with regard to water and sewer infrastructure, often works with the lead agency during the CEQR process to provide information, technical review, recommendations and approval relating to infrastructure. As needed, it is recommended that the lead agency contact DEP's Bureau of Environmental Planning and Analysis (BEPA)

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as early as possible in the environmental review process. BEPA will serve as DEP's contact for information, questions, and assistance with the technical methodologies and conclusions in this chapter. Section 700 further outlines appropriate coordination with both DEP and other expert agencies.

100. DEFINITIONS

110. WATER SUPPLY

111. New York City Water Supply System

Most of New York City obtains water from three surface water supply systems, operated by DEP, that form a network of reservoirs, aqueducts, and tunnels extending as far as 125 miles north of the City. The watersheds of the three systems cover almost 2,000 square miles, with 19 reservoirs and three controlled lakes, which have a storage capacity of 550 billion gallons. The water flows to the City through aqueducts, reaching most consumers by gravity alone; only some four percent of the City's water must be pumped to its final destination.

Two of the three surface water systems, the Delaware and Catskill systems, collect water from watershed areas in the Catskill Mountains and deliver it to the Hillview Reservoir in Yonkers. From there, it is distributed to the City through three tunnels, City Tunnel No. 1, which goes through the Bronx and Manhattan to Brooklyn, City Tunnel No. 2, which goes through the Bronx, Queens, and Brooklyn (and from there through the Richmond Tunnel to Staten Island), and City Tunnel No. 3 (Stage 1), which goes through the Bronx, Manhattan, and ends in Queens. Stage 2 of City Tunnel No. 3 is under construction in Queens, Brooklyn, and Manhattan.

The third surface water system, the Croton system, collects water from watershed areas in Dutchess, Putnam, and Westchester Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan through the New Croton Aqueduct.

Within the City, a grid of underground distribution mains brings water to consumers. Large mains—up to 96 inches in diameter—feed smaller mains, such as 20, 12 and 8-inch mains, that distribute water to individual locations. These mains also provide water to fire hydrants along many of the City's streets. Water pressure throughout the City water supply system is controlled by pressure regulators.

In addition to the surface water supply system, underground aquifers in Queens can provide drinking water.

120. WASTEWATER AND STORMWATER CONVEYANCE AND TREATMENT

New York City's sewer system consists of a grid of sewers beneath the streets that send wastewater flows to fourteen different WWTPs. The area served by each plant is called a "drainage area." Most of this system is a "combined" sewer system in that it carries both sanitary sewage from buildings and stormwater collected from buildings, catch basins and storm drains. However, some areas of the City, primarily in Queens and Staten Island, operate with separate systems for sanitary sewage and stormwater. In addition, small areas of Staten Island, Brooklyn, and Queens use septic systems to dispose of sanitary sewage.

The City maintains a "drainage plan" for the proper sewer and drainage in the City that describes the location, course size and grade of each sewer and drain for sewerage districts as well as the size and location of stormwater and wastewater conveyance and treatment facilities within these districts.

121. Sanitary and Stormwater Drainage and Management

Sewers beneath the City's streets collect sewage from buildings as well as stormwater from buildings and catch basins in streets. Collection sewers can be ten inches to two feet in diameter on side streets, and larger in diameter under other roadways. They connect to trunk sewers, generally five to seven feet in diameter,

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which bring the sewage to interceptor sewers. These large interceptor sewers (often 11 or 12 feet in diameter) bring the wastewater collected from the various smaller mains to the WWTPs for treatment.

121.1. Combined Sewer Systems

About 50 percent of the City's land area is served by a combined sewer system in which the system collects both "dry-weather" wastewater (primarily sanitary sewage as well as wastewater from industries) and stormwater (see attached map). During dry weather, combined sewers function as sanitary sewers, conveying all flows to the WWTPs for treatment. During wet weather, however, large volumes of rainfall runoff can enter the system from building connections and through catch basins along the City's streets. If this water were conveyed to the treatment plants, it would exceed their design capacity; the plants are designed to handle only twice their average design dry-weather flow. To avoid flooding the plants, "regulators" are built into the combined sewers to act as relief valves. These are chambers set to divert two times the average design dry-weather flow into the interceptor; during storms, if a greater amount of combined flow reaches the regulator, the excess is directed to outfalls into the nearest waterway (*e.g.*, the Hudson River, East River, *etc.*). During such overflow periods, a portion of the sanitary sewage entering, or already in, the combined sewers discharges untreated into the waterway along with stormwater and debris washed from streets. This untreated overflow is known as CSO.

CSO is a concern because it contains oil, gasoline and other pollutants from street traffic, floating debris (also called "floatables," and usually consisting primarily of street litter), various pollutants from industrial facilities (both pollutants discharged into the sewer system and pollutants in the runoff from these facilities), and untreated sanitary sewage.

121.2. Separate Systems

Certain areas of the City are served by separate storm and sanitary sewers. In these areas, sanitary sewage is sent to the wastewater treatment plants and stormwater is sent untreated through separate sewers and outfalls into the nearestwaterway. Areas served by separate sewers include certain areas in Queens and Staten Island (see attached map).

121.3. Stormwater Management

On undeveloped sites with land in its natural condition, rainfall is normally absorbed into the ground through permeable surfaces. In urban settings, however, where permeable surfaces are less common, it typically flows across land ("sheet flows") toward low points such as water bodies or storm sewers. The storm sewers direct this stormwater through underground pipes to an outfall that discharges into a waterway. As described above, in New York City, these can be either combined or separate systems. Generally, stormwater flows in separately sewered and waterfront areas are discharged to the waterway without treatment; stormwater flows in a combined sewered area are treated at the City's WWTPs, except during wet weather periods where resulting combined flows are greater than two times the average design dry-weather flow (resulting in CSOs).

Stormwater is of concern if it exceeds the capacity of the City's sewers or wastewater conveyance systems and transmits new or increased levels of pollutants to the City's water bodies. This is an issue for developments that would increase residential densities and reduce capacity for stormwater in a combined sewer system; industrial facilities with toxic or other harmful materials stored or handled onsite; development sites that would be covered with large areas of impervious surfaces including streets that generate runoff containing various pollutants (*i.e.*, oil, gasoline, floatables, *etc.*); and for project activities or construction that would increase the potential for soil erosion and sedimentation of water bodies citywide. If appropriate stormwater management measures are not implemented, proposed projects that increase runoff to the City's sewer system may potentially worsen existing conditions such as localized street flooding, surcharging sewers downstream, sewer back-ups (SBUs) or CSOs in surrounding waterbodies, all of which are public health and natural resources concerns.

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As described in the NYC Green Infrastructure Plan, *PlaNYC* and the Mayor's *Sustainable Stormwater Management Plan*, a network of stormwater best management practices (BMPs) or source controls, has the potential to significantly reduce pollution through incremental investments made over the next twenty years and beyond. Promising BMPs identified for application in the City include blue and green roofs, subsurface open bottom detention systems that allow for infiltration while slowing the release of stormwater to the sewer system, roadway alterations that allow runoff to soak or infiltrate into the ground, and rain barrels or cisterns that can store water from downspouts during warm weather months. Stormwater capture through green infrastructure and other source controls will reduce CSO volumes and improve water quality while providing substantial sustainability benefits such as reducing energy use and mitigating the urban heat island effect.

122. Collection Facilities

122.1. Regulators

Regulators direct stormwater and wastewater to interceptors and then to combined sewer outfalls once the system reaches its capacity during heavy rainfall or other wet weather events. There are approximately 490 regulators in New York City.

122.2. Interceptors

Interceptors are large sewers that connect the sewer system via regulators to treatment plants and are built to deliver at least two times design dry weather flow to WWTPs.

122.3. Pumping Stations

Pumping stations direct combined and separate flows to downstream locations in the City's sewer infrastructure when gravity cannot direct the flow. There are approximately 90 pumping stations citywide. While most pumping stations are designed to convey sanitary sewage to interceptor sewers, many also convey combined or separate stormwater. Along with regulators and interceptors, pumping stations control the amount of flow that a WWTP receives and how much is discharged through a combined sewer outfall.

123. Connecting to the City's Sewer System

Connecting to the City's sewer system requires certification from DEP as part of the building permit process. This approval is not a discretionary action subject to environmental review. In this process, before a building permit may be issued, house or site connection proposals must be certified for sewer availability by DEP. Once construction is complete, a sewer connection permit also must be obtained from DEP. See Title 15 RCNY Chapter 31 (which can be accessed through http://24.97.137.100/nyc/rcny/entered.htm), N.Y.C. Admin. Code § 24-507–09 and N.Y.C. Construction Code 28-701 for further guidance.

New development sewer certification review ensures that sufficient capacity exists in both the sewer fronting the lot of the proposed new development or alteration as well as in downstream sewers to accommodate additional discharges from new development. If adequate capacity is not available, infrastructure improvements, sewer extensions, or onsite detention/retention systems that offset increased sanitary or stormwater flows may be required before sewer connections can be approved. It is advisable that applicants coordinate with DEP's BEPA as early as possible to determine capacity and potential improvements, as well as certification/connection requirements.

The construction of new sewers and/or other infrastructure improvements may require an amendment to the City's drainage plan. An amended drainage plan (ADP) is a plan for the design and construction of new sewers; it shows general alignments of new pipes and their types and sizes. The development of an ADP is based on zoning designations, topography, current drainage and existing sewer system capacity in the affected area and requires extensive coordination with DEP, who must review and approve the ADP. Certain larger projects often lead to ADPs due to changes in zoning designations and related densities, or variances from existing

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zoning requirements. Due to the length of time involved in the ADP development process and sewer construction, if an ADP would likely be needed, it is recommended that the applicant coordinate with DEP to identify infrastructure improvements as early as possible.

124. Wastewater Treatment Plants

124.1. Sanitary Sewage Treatment

New York City's sewage is treated at fourteen (14) WWTPs, which are listed in Figure 13-1 along with a graphic depicting their respective drainage areas. Together, these plants treat, on average, 1.2 billion gallons of sewage per day.

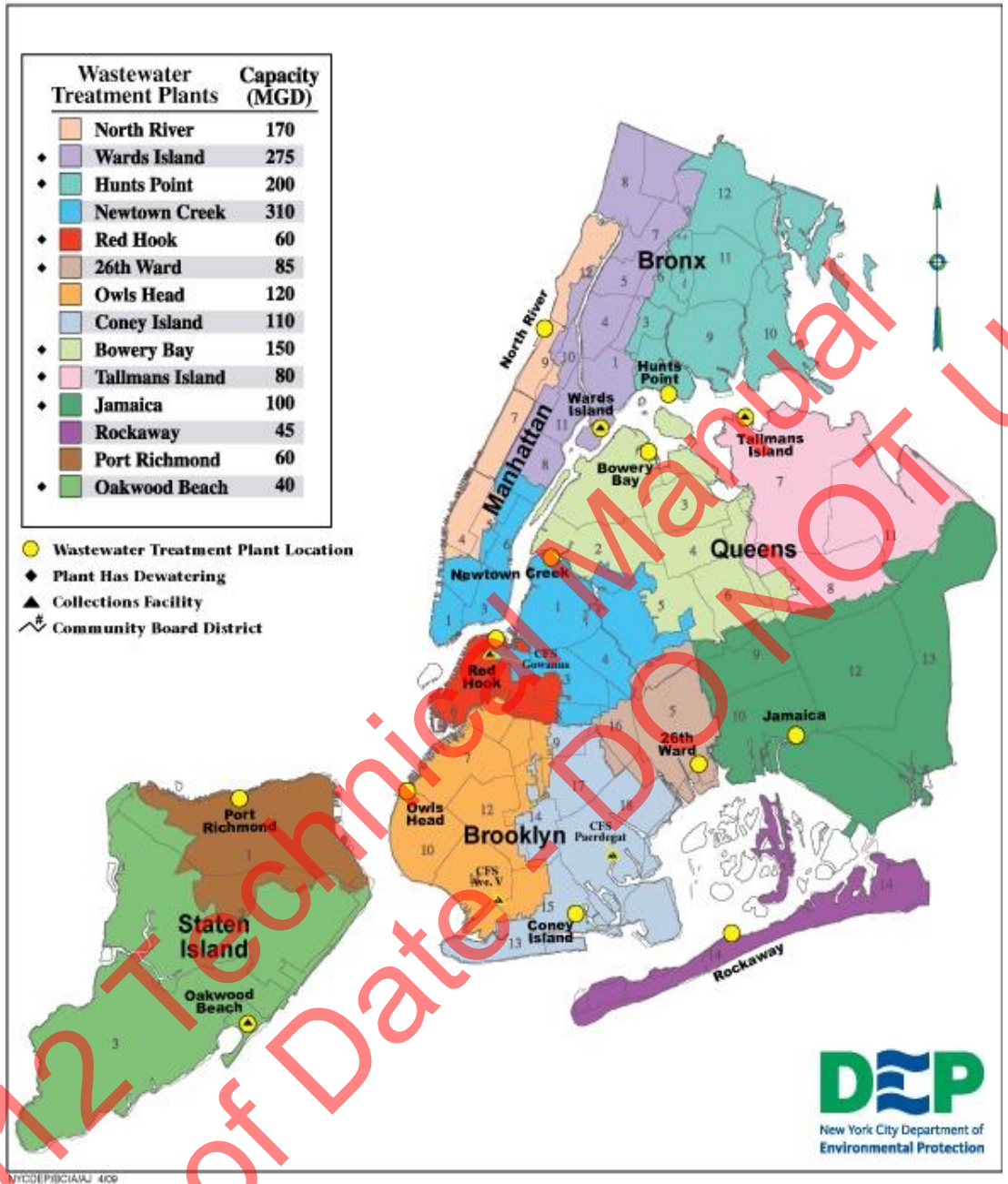
WWTPs treat wastewater through a variety of physical and biological processes that remove solids so the water can be discharged into surface water bodies without adversely affecting water quality. This treated wastewater discharge is called "effluent." The major processes used in the City's WWTPs are:

- Mechanical and physical removal of trash, grit, scum, and sludge (this is "preliminary" or "primary" treatment);
- Biological treatment of remaining sewage ("secondary" treatment);
- Concentration, biological decomposition through anaerobic digestion, with energy recovery, and disposal of sludge; and
- Disinfection of liquid effluent.

Each of the City's WWTPs is regulated through a State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC) to ensure that water quality in the receiving water body is not adversely affected by WWTP effluent. The permits specify the maximum average monthly dry-weather flow in millions of gallons per day (MGD) (based on the quantity of wastewater that the plants can adequately treat), and such effluent parameters as the minimum percent (85 percent) of biological oxygen demand (BOD) that must be removed (BOD, a measure of the amount of oxygen consumed in decomposition of organic matter, is an indicator of the quantity of organic pollution in wastewater); the minimum percent of suspended solid loading that must be removed (also 85 percent); the maximum concentrations of suspended solids, fecal coliform, settleable solids, and other pollutants; and the range of acceptable pH levels. The permits also stipulate monitoring requirements for the regulated parameters, as well as for odor control, and require infiltration/inflow assessments and correction programs if the plants reach a certain percent of their permitted capacity. The permitted capacity of each of the City's wastewater treatment plants is shown in Figure 13-1.

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Figure 13-1
NEW YORK CITY DRAINAGE AREAS AND WASTEWATER TREATMENT PLANTS



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124.2. Industrial Pretreatment

In addition to the parameters described above, the City accepts industrial discharge into the sewer system if it complies, or has been treated to comply, with certain standards. This additional treatment is required to protect health, the environment, the sewers and WWTPs from toxic and hazardous discharges. The City's Industrial Pretreatment Program identifies and monitors industrial users that discharge pollutants of concern into the sewer system and is administered by DEP's Bureau of Wastewater Treatment. The Division of Pollution Control and Monitoring uses permits and directives, which are similar to discharge permits, to notify each industrial user of its discharge requirements. The directives summarize the Industrial Pretreatment Program's legal authority (see Section 710) and monitoring and inspection requirements, and list discharge limits that each of the identified industries must meet.

125. Septic Systems

The southwestern part of Staten Island and parts of Queens use septic systems to dispose of sanitary sewage, until such time as the City's sanitary sewer system can be extended. Septic systems consist of underground tanks that retain sewage for decomposition and surrounding soils that filter the wastewater once it is released from the tank. In the septic tank, the solids in the sewage settle to the bottom, and the liquid undergoes some anaerobic decomposition before being discharged through perforations into the surrounding soils, which are specially prepared, absorbent soils, generally termed "filter fields." Here, the discharge undergoes additional treatment, where it is strained and absorbed by the soils, and microbial organisms in the soil convert it into minerals, gases, and nutrients.

If an applicant proposes to manage sanitary sewage with a septic system, it must be demonstrated that it is not feasible to connect to an existing sanitary or combined sewer or interceptor, either by extending the sewer or constructing a pumping station, ejector or force main. A septic system would not be the appropriate wastewater disposal system for the proposed project if this infeasibility cannot be demonstrated and the applicant must conduct an infrastructure analysis (see Section 200, below). If a septic system is determined to be appropriate, the design, construction, operation and maintenance of the system are subject to approval by DOB and the New York State Department of Health (DOH) and further CEQR analysis is not required. In addition, a community subdivision realty development involving 15 or more dwellings requires a community private sewage disposal system permit from the New York City Department of Health and Mental Hygiene (DOHMH). A septic system that processes more than 1,000 gallons of wastewater per day, or is at an industrial or commercial site, requires a SPDES permit from DEC.

126. Privately Operated Treatment Plants, Pumping Stations and Blackwater Systems

Small, privately owned and operated sewage treatment plants and pumping stations serve only a local area. These facilities operate in much the same way as larger, municipal facilities, but with a smaller capacity and can be located on- or off-site. Privately owned and operated treatment plants may be constructed as "package treatment plants," and, as at municipal plants, the effluent from these plants is discharged to a nearby waterway, subject to the regulations of a SPDES permit. Privately owned and operated treatment plants are used in areas where City sewers and treatment by a municipal WWTP are not available. Privately-operated pumping stations are located in areas where sewage cannot be conveyed via gravity to interceptor sewers or wastewater treatment plants. Blackwater systems include facilities onsite or internal to the building that treat sanitary wastewater for reuse as non-potable water, and must be approved by DOB.

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200. DETERMINING WHETHER AN INFRASTRUCTURE ASSESSMENT IS APPROPRIATE

The following types of projects require a preliminary infrastructure assessment, and, based on the conclusions of the preliminary assessment, may require a detailed infrastructure analysis (see Section 300, Preliminary Assessment Methods, for additional information).

210. WATER SUPPLY

A preliminary infrastructure analysis is needed if the project:

- Would result in an exceptionally large demand for water (*e.g.*, those that are projected to use more than one million gallons per day such as power plants, very large cooling systems, or large developments); or
- Is located in an area that experiences low water pressure (*e.g.* areas at the end of the water supply distribution system such as the Rockaway Peninsula and Coney Island).

If the project does not meet any of these thresholds, no further analysis of water supply is needed.

220. WASTEWATER AND STORMWATER CONVEYANCE AND TREATMENT

While many projects would not require CEQR analysis with regard to wastewater and stormwater conveyance and treatment, certain projects are of a size, location and type where the potential for significant adverse impacts to the City's infrastructure and water quality may exist. Because the City's sewers are sized and designed based on designated zoning for an area, related population density, and surface coverage characteristics, projects that greatly increase density, would be located in an area of concern (described below), or would substantially increase impervious surfaces, merit further analysis for potential impacts to the City's wastewater and stormwater infrastructure. If analyses indicate the project would increase flows of sanitary and stormwater, overburden the wastewater or stormwater infrastructure, or create the potential to result in additional CSO volumes or events, changes to the affected sewer system and/or the preparation of an ADP to address such modifications may be needed. DEP should be consulted early during the conceptual stage to determine whether a project that exceeds the following thresholds would potentially require an ADP.

The sewer connection permitting process and the CEQR process are separate. As discussed in Subsection 123, above, a DEP sewer connection permit is issued based on the availability of the affected sewer system at the time of the building permit process, not on the capacity of the sewer system analyzed during the environmental review, which is conducted much earlier than the building permit process. To determine the potential for significant adverse impacts under CEQR, however, certain project's daily sanitary sewage generation and stormwater runoff, as well as the sensitivity of the project area's existing infrastructure, should be disclosed. This also encourages more efficient review of sewer connections at the time of application. In addition, given the lead time for the design of sewers and other conveyance infrastructure, DEP should be consulted to determine when any such projects are scheduled for the affected area.

During the sewer connection permitting process, if capacity is determined to be inadequate for any development, it is possible that connection to the sewer system may require detention or sewer extensions, or in some more limited instances, may not be approved, regardless of the results of a review under CEQR. By its nature, CEQR review is a conceptual and predictive look into the future and, therefore, applicants should not construe the conclusions made under CEQR as conclusive with regard to the need for sewer drainage analysis, planning, and permits in the future. For this reason, applicants should work with DEP as early as possible to determine whether site plan modifications or sewer extensions/improvements may be required as a condition to granting the sewer connection permit.

The thresholds below relate to a project's potential to result in a significant adverse impact to the environment. A preliminary infrastructure analysis would be needed if the project:

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- Is located in a combined sewer area and would exceed the following incremental development of residential units or commercial, public facility and institution and/or community facility space above the predicted No-Action scenario:
    - 1,000 residential units or 250,000 sq. ft. of commercial, public facility and institution and/or community facility space or more in Manhattan; or,
    - 400 residential units or 150,000 sq. ft. of commercial, public facility and institution and/or community facility space or more in the Bronx, Brooklyn, Staten Island or Queens.
- Is located in a separately sewered area and would exceed the following incremental development (above the predicted No-Action scenario) of residential units or commercial, public facility and institution and/or community space per site. The site's existing zoning designation below indicates the level of development needed on that site to warrant analysis:

Table 13-1

Existing Zoning District	Number of Residential Units or Commercial/Public and Institution/Community Facility Use
R1, R2, or R3	25 residential units or 50,000 sq. ft. of commercial/public and institution/community facility use
R4, R5	50 residential units or 100,000 sq. ft. of commercial/public and institution/community facility use
All remaining zoning designations, including C, M, and Mixed-use districts	100 residential units or 100,000 sq. ft. of commercial/public and institution/community facility use

- Is located in an area that is partially sewered or currently unsewered.

  Unsewered areas are identified in the attached map; DEP should be contacted for assistance in determining partially sewered or other constrained areas of concern. Applicants should identify the appropriate method of storm and sanitary flow drainage and management and consult with DEP during the CEQR review process or earlier. If the applicant demonstrates that it is not feasible to connect the proposed site to an existing sanitary or combined sewer or interceptor, either by extending the sewer or constructing a pumping station, ejector or force main, and that it is feasible to construct, operate and maintain a septic system on the specific proposed site, then no further analysis is needed. If the applicant cannot demonstrate this infeasibility, a septic system would not be the appropriate wastewater disposal system for the proposed project, and the applicant must conduct the infrastructure analysis.

- Involves development on a site five acres or larger where the amount of impervious surface would increase. Examples of projects requiring analysis under this scenario include, but are not necessarily limited to, tow-pounds, parking lots, and warehouse buildings.
- Would involve development on a site one acre or larger where the amount of impervious surface would increase and one of the following would apply:
    - Located within the Jamaica Bay watershed; or
    - Located in certain specific drainage areas including: Bronx River, Coney Island Creek, Flushing Bay and Creek, Gowanus Canal, Hutchinson River, Newtown Creek, and Westchester Creek.
- Would involve construction of a new stormwater outfall that requires federal and/or state permits (see also Chapter 11, "Natural Resources," for additional information).

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230. INDUSTRIAL FACILITIES

Certain industrial facilities would be subject to the City's Industrial Pretreatment Program, which regulates discharge from "Significant Industrial Users" (SIUs) to control the introduction of toxic or other harmful substances into public sewers that are tributary to WWTPs. A facility is a SIU if it meets any of the criteria specified in the Code of Federal Regulations (40 CFR Part 403.3(v)). SIUs that discharge to a WWTP are required to obtain a NYC-DEP permit for Industrial Wastewater Discharge (as described in Title 15 RCNY Chapter 19). It should be noted that all facilities, whether permitted significant industrial users or not, must be in compliance with the City sewer use regulations contained in Title 15 RCNY Chapter 19, which can be accessed through http://24.97.137.100/nyc/rcny/entered.htm.

Federal industrial pretreatment categories are found at the following links:

- http://www.access.gpo.gov/nara/cfr/waisidx_08/40cfrv28_08.html
- http://www.access.gpo.gov/nara/cfr/waisidx_07/40cfrv29_07.html

Generally, if such industrial facilities that discharge to a WWTP comply with the City's Industrial Pretreatment Program, no significant impacts would occur. Facilities that discharge process wastewater directly to a waterbody must obtain a DEC SPDES permit and require an assessment of program compliance. Additionally, in separately-sewered areas of the City, activities that take place at industrial facilities, such as material handling and storage, are often exposed to stormwater runoff. As runoff comes into contact with these activities, it can transport pollutants to a nearby storm sewer system or directly to a river, lake, or coastal water. To minimize the impact of stormwater discharges from industrial facilities, federal regulations, in 40 CFR 122.26(b)(14)(i)-(xi), identify 11 categories of stormwater discharges associated with industrial activity required to be covered under a stormwater permit. This requirement includes development and implementation of a Stormwater Pollution Prevention Plan (SWPPP).

For disclosure purposes, it is often appropriate for a project proposing an industrial facility or activity that would contribute industrial discharges to a WWTP and/or generate contaminated stormwater in a separate storm sewer system to disclose the manner in which it proposes to comply with the City's Industrial Pretreatment Program.

300. PRELIMINARY ASSESSMENT METHODS

If Section 200 indicates that the project requires further analysis, the preliminary infrastructure assessment should be conducted. Based on the results of this preliminary assessment, a detailed assessment may be required (see Section 330). The first step in any analysis is establishing the relevant study area.

310. STUDY AREA

311. Water Supply

The study area for analysis of water supply effects is the project site itself as well as the extent of the system it may affect--this is usually the area supplied by water pressure regulators that serve the project site. In some cases, the affected area is supplied by unregulated connections (or smaller sized connections without pressure regulators) to water trunk mains. There are also several high elevation areas where the affected area is supplied by a water pumping station. Therefore, in order to determine the appropriate study area:

- Identify the primary pressure regulators that would serve the site;
- Identify the primary unregulated connections, if any, that would serve the site; and
- Identify the pumping station, if any, and related gradient zone that would serve the site.

The study area is then defined on a map by connecting these locations around the project site. If necessary, the lead agency may contact DEP's BEPA for this information.

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312. Wastewater and Stormwater Conveyance and Treatment

The analysis of sewage typically focuses on the effects of increased sanitary and stormwater flows on the City's infrastructure serving the site. Therefore, the study area includes the WWTP and the conveyance system comprising that plant's drainage basin and affected sewer system (whether combined or separate). Therefore, in order to determine the appropriate study area:

- Identify the wastewater treatment plant(s) that would serve the site;
- Identify affected components of the downstream collection system, including pumping stations, regulators and interceptors;
- If the area of the proposed project is currently served by a combined sewer system, describe and show on a map the affected combined sewer system, including affected drainage or catchment areas, outfalls and receiving waterbodies;
- If the area of the proposed project is currently served by a separate sewer system, describe and show on a map the affected sanitary sewer system. For the storm sewer system, describe and show on a map the affected drainage or catchment area, outfalls and receiving waterbodies;
- Delineate the drainage area for direct discharges and overland flow to surface water bodies;
- Identify existing or new inlets (*e.g.*, catch basins) and stormwater BMPs that would serve the site; and
- Describe proposed alternative disposal methods, including privately operated sewage treatment plants or private pumping stations that would be included as part of the proposed project, and identify the affected area immediately surrounding the system, or wastewater treatment plants, collections systems and waterbodies receiving effluent from private treatment plants.

Plot the above information on a map to delineate the study area by component. If necessary, the lead agency may contact DEP's BEPA for this information.

320. PRELIMINARY ANALYSIS TECHNIQUES

321. Water Supply

After the study area is determined, the assessment of effects on water supply and water pressure should be performed as follows:

- Describe the existing water distribution system serving the project area, including weaknesses in the local water supply distribution systems, such as sites in high elevations; near pressure boundaries; with a one-way flow of water; far from the nearest pressure regulator; far from the nearest trunk main; or that contain a large number of six inch (or smaller) water mains, based on information obtained from DEP.
- Describe specific elements of the proposed project that would affect the water distribution system such as proposed grade changes that would require water main replacements, street de-mappings that would require water mains to be cut and capped, or street realignments that would require water mains to be relocated.
- Assess existing water use on the project site.
- Using Table 13-2, assess the likely water usage on the project site for the future No-Action Scenario (existing water use on the project site + background growth + No-Action projects, such as anticipated water demand from other recent rezonings or large developments within the same affected water distribution system, to identify impacts on water supply and pressure) and describe the effects on the existing distribution system:

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- Would the existing system have sufficient capacity for the projected growth associated with the No-Action Scenario?
- Is extra capacity is available and how much?
- If over capacity, are measures being taken to ensure the No-Action Scenario can be accommodated?

- Using Table 13-2, predict the proposed project's daily water demand based on the uses expected in the future With-Action Scenario. Water usage for industries depends on the manufacturing processes involved, and should be documented. For less common uses not included in Table 13-2, consult with DEP for appropriate usage rates. Water conservation measures to be implemented as part of the proposed project should also be described. A separate projection in addition to the above may be performed if flows would be lowered through water conservation or other measures, where a mechanism for implementation exists that would allow for commitment to measures that go beyond City rules and regulations.
- Assess the effects of the proposed project's incremental demand above the future No-Action Scenario on the system and determine if there would be sufficient capacity to maintain adequate supply and pressure. This analysis, which considers the pipe sizes and grid of the water system to determine water pressure loss, is usually performed by an engineer. Where the adequacy of the water supply distribution system is in question, a hydrant flow test may be needed in conjunction with an assessment of the impact on water pressure and supply. The lead agency may contact DEP's Bureau of Environmental Planning and Analysis for general assistance. The engineer's assessment to determine the adequacy of the water supply distribution system should be forwarded to DEP for review.

Table 13-2
Water Usage and Sewage Generation Rates for Use in Impact Assessment

Use	Rate (Gallons Per Day)
Residential	100 gpd/person
Retail Stores	
Domestic	0.24 gpd/sf
Air Conditioning	0.17 gpd/sf
Commercial/Office	
Domestic	0.10 gpd/sf
Air Conditioning	0.17 gpd/sf
Hotel	
Domestic	120 gpd/rm/occupant
Air Conditioning	0.17 gpd/sf
Schools (day)	
Domestic	10 gpd/seat
Air Conditioning	0.17 gpd/sf

Note: These rates are for new uses incorporating low-flow fixtures, as required by law.

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321.2. Ground Water Input

Issues related to a project's potential effects on quality of the ground water are discussed in Chapter 11, "Natural Resources."

322. Wastewater and Stormwater Conveyance and Treatment

322.1. City Wastewater Treatment Plants and Collection Facilities

- Describe the existing wastewater and stormwater conveyance systems and the WWTP in the study area (Subsection 312). Figure 13-1 shows each WWTP drainage basin and capacity.
- Using Table 13-2, determine the existing sanitary flows or treated wastewater flows resulting from the area of the proposed project.
- Estimate the expected sanitary flows or treated wastewater flows that the No-Action and With-Action Scenarios would generate, and describe the effect of the flows from the project on the total flows to the plant. The rates listed in Table 13-2 (excluding air conditioning rates) should be used to estimate daily sanitary sewage generation from both the proposed project and developments in the No-Action Scenario. SPDES flow and effluent parameters are used as the basis for assessing impacts on wastewater treatment plants. As part of this assessment, the lead agency should contact DEP's BEPA to obtain projected future flows in the build year, which includes background growth in population and employment as well as new development in that WTTP drainage basin that would serve the project. Add the background future flows obtained from DEP and projected future No-Action Scenario development flows to determine the total No-Action Scenario flows in the drainage basin.
- Consider the effect of the incremental flows from the project on the capacity at the plant.
- Determine the existing capacity for sanitary and combined sewer pumping stations and regulators within each of the affected drainage or catchment areas. Compare the capacity with the projected flows to these facilities for the future No-Action and With-Action Scenarios. As part of this assessment, the lead agency should contact BEPA to obtain information from DEP's sewer maps about affected facilities and existing capacity for each. The assessment of potential impacts on pumping station and regulator capacity would require allocating the above total flows to the plant for existing, No-Action Scenario and With-Action Scenario for each pumping station and regulator drainage area affected.
- Consider the effect of the incremental flows from the project on the capacity of the conveyance elements.
- If a new, privately operated sewage treatment plant is proposed, a description of the treatment plant's sizing and processes should be included, as well as an assessment of potential environmental impacts on the water body to which the plant's effluent would be discharged, including whether the plant would affect its water quality. The methodology for assessing effects on water quality is described below in Section 330, "Detailed Assessment Methods," and in Chapter 11, "Natural Resources." For projects that would affect existing private treatment plants with valid SPDES permits, the analysis typically focuses on whether the plant would have adequate capacity to treat the additional wastewater generated by the project. If a new, privately operated pumping station is proposed, a capacity analysis demonstrating that the receiving collection system has adequate capacity should be provided.

322.2. Sanitary and Stormwater Drainage and Management

- Describe the types of existing surfaces onsite (*i.e.*, pervious or impervious) and the surface areas of each. Identify the appropriate runoff coefficient for each surface type/area, and identify the way the stormwater from each surface currently drains (*i.e.*, combined sewer system, separate sewers, direct discharge, overland flow, *etc.*). Present information in a table format. See Worksheet 1 in the attached matrix for guidance.

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- Describe any changes to the above surfaces and drainage patterns that would result in both the future No-Action Scenario and the future With-Action Scenario. Present information in a table format. See Worksheet 1 in the attached matrix for guidance. Include a discussion of how stormwater would be managed on the site (*i.e.*, retention, detention, *etc.*).

- Determine the volume and peak discharge rates of storm water expected from the site in the future With-Action Scenario for a range of rainfall events (combine this number with sanitary flow rates and volume if located within a combined sewer system area to determine total flows resulting from proposed project). DEP provides a matrix that may be used as a template See Worksheet 2 in the attached matrix for guidance. The matrix enables the applicant to determine the change in flows and volumes to the combined or separate storm sewer system expected with the proposed project and the related increases in flows and volumes at the outfalls serving the drainage area and discharging to specific waterbodies.

  The goal of the matrix is to determine new volumes entering the combined or separate sewer system and compare those to the existing conditions. If the matrix analysis shows either (1) an increase of 2 percent or more over existing conditions for dry and wet weather flows from the proposed site for any rainfall event that would discharge to a drainage area of concern (identified in the following maps of the Jamaica Bay watershed and certain drainage areas); or (2) an increase of 5 percent or more over existing conditions for dry and wet weather flows from the proposed project site for any rainfall event in all other drainage areas, then the matrix should be reviewed by DEP. DEP will work with the lead agency to determine whether further modeling is necessary to evaluate the magnitude of impacts to a receiving waterbody (see Section 330, "Detailed Assessment Methods," below). If the matrix indicates the increase in dry and wet weather flows would not surpass these thresholds, no further analysis is needed. It should be noted that the need for further analysis is highly dependent on the location of the proposed project, as even a 5% increase in dry and wet weather flows may not necessitate detailed review.

  It should be noted that if BMPs, approved by DEP and in compliance with DOB requirements, would be incorporated into the project, further analysis may not be required. Therefore, applicants are encouraged to incorporate BMPs into the project's site planning early on, whenever possible. Note that the DEC SPDES permit for construction activities in separately sewered areas that disturb one acre of ground or more requires development and use of an SWPPP that includes erosion and sedimentation controls and post-construction stormwater BMPs. The SWPPP should be submitted to DEP.

- Characterize unsewered, partially sewered or existing sewer capacity constraints that would be impacted by the proposed project. These applications require a hydraulic analysis (see Section 330). Applicants should identify the appropriate method of storm and sanitary flow drainage and management.

- If a new separate storm outfall is proposed, additional water quality analyses in support of state or federal permits would be necessary. More information on the applicability and requirements of such SPDES permits is available from DEC.

- If sanitary sewers are not fronting the site of the proposed area and it is shown to be infeasible to connect the proposed site to an existing sanitary or combined sewer or interceptor, either by extending the sewer or constructing a pumping station, ejector or force main, applicants should identify the appropriate method of wastewater disposal and treatment. If septic systems are alternatively considered, the proposed setting and design should be assessed to ensure those systems function properly. Percolation tests should be performed to determine the rate at which effluent would percolate through the site's soils, and information on the

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depth of ground water and bedrock must be provided. The bottom of the septic leaching field must be a specified distance from ground water and rock for the system to function properly. The assessment also considers the systems' compliance with ordinances, requirements, and good engineering practice. If a septic system is determined to be appropriate, no further CEQR analysis is needed and all available informationrelated to septic systems, including the results of the percolation tests, is submitted to the DOB and DOH for review.

322.3. Industrial Facilities

Identify the pollutants to or that would discharge from the proposed industrial facilities, and disclose how the facility would comply with the discharge limits set by the City's Industrial Pretreatment Program. The concentrations of various pollutants in the process wastewater, before any treatment, should be determined. Then, effective removal rates of the proposed treatment measures should be evaluated to calculate the expected concentrations in the wastewater. DEP's BEPA can provide more information. Note that, as described above, certain categories of industrial facilities are also required to develop and use a stormwater pollution prevention plan. This plan must identify potential sources of pollution and describe and ensure the implementation of stormwater BMPs or source control measures (SCMs) to reduce those pollutants. More information on the applicability and requirements of such SPDES permits is available from DEC.

330. DETAILED ANALYSIS TECHNIQUES

Based on the preliminary assessments, detailed assessments may be required where increased sanitary or stormwater discharges resulting from the proposed project may impact capacity in the existing sewer system, exacerbate CSO volumes and/or frequencies or contribute greater pollutant loadings in stormwater discharged to receiving waterbodies. The study areas for the detailed assessments are the same as identified above for preliminary assessment methods, unless a larger analysis area is necessary for the modeling programs or analysis techniques used to perform the assessments described below.

- Dependent on the characterization above of unsewered/partially sewered areas or other existing constraints, or if the proposed project meets density thresholds for a separate sewer area in Section 200, conduct a hydraulic analysis to determine whether the affected sewer system has capacity to serve the proposed project. If the hydraulic analysis shows that the sewer system would be inadequate to accommodate the proposed project, an ADP and infrastructure improvements may be necessary. The hydraulic analysis of the affected sanitary and storm sewer systems should be developed by the lead agency in consultation with DEP.
- If the lead agency with DEP's consultation determines that a project's increased combined sewer flows and volumes have the potential to exacerbate CSO volumes or frequency and require modeling, the next step is to develop model-calculated discharge volumes and frequencies for each combined sewer outfall in the affected catchment area(s). The InfoWorks model (or other comparable model subject to DEP review of the modeling protocol) accounts for annual rainfall pattern and conveyance system hydraulic considerations such as storage, travel time, overflows from regulators, *etc.,* and, therefore, can provide a reasonable assessment of the project's impact on the sewer system and the resulting wet-weather discharges. If significantly increased CSO volumes or frequencies are predicted as a result of CSO modeling, ambient water quality modeling may be necessary to assess the impact of wet-weather discharges on the concentrations of dissolved oxygen, enterococcus, fecal coliform, and total coliform bacteria. This latter assessment would depend on the magnitude of pollutant increases and conditions of the receiving water body.
- If ambient water quality modeling is required due to increased volumes of separate storm sewer discharges or CSOs, estimate pollutant types and loadings that could be in the stormwater runoff. Techniques for this assessment range from simple calculations to sophisticated models. A report by the Water Environment Research Foundation (WERF), "Water Quality Models: A Survey and Assessment," provides descriptions of the types of models as well as modeling software, including relevant model features. This reference is useful in defining the capabilities and limitations of available water quality models and in guiding the selection of a model to meet

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the objectives of the environmental assessment. Modeling may also be necessary for immediate mixing areas within receiving waterbodies. More information about water quality modeling is provided in Chapter 11, "Natural Resources."

400. DETERMINING IMPACT SIGNIFICANCE

410. WATER SUPPLY

Significant impacts on water supply may occur if the project would result in:

- Water pressure of less than 30 pounds per square inch in the localized water main network.
- A water demand that would not be met by existing water supply infrastructure and that upgrades to the existing system would be required.

420. WASTEWATER AND STORMWATER CONVEYANCE AND TREATMENT

420.1. Wastewater Treatment Plants and Collection Facilities

Significant impacts on WWTPs, interceptors, regulators and pumping stations may occur if the project would result in:

- Inconsistency with the provisions of a Consent Order or other applicable regulatory program.
- Significantly increased wastewater or combined flows that would affect sanitary or combined sewer pumping stations, regulators or interceptors with limited or no existing capacity.
- Loadings exceed capacity per specific SPDES parameters and limits.
- Privately operated treatment plants that would result in lowered water quality in the receiving water body would have significant adverse impacts on that water body. A project that would increase flows at a privately operated treatment plant to above allowable flows indicated in the SPDES permit would have significant adverse impacts. Privately operated pumping stations that would discharge to inadequately-sized sewers would have an adverse impact on the collection system.

420.2. Sanitary and Stormwater Drainage and Management

The determination of the significance of a project's impact, if any, to the City's infrastructure depends on the project type, any best management practices incorporated into the proposed project, and its location. For instance, a relatively modest increase in sanitary flows may impact separate or combined sewers and conveyance facilities within one drainage or catchment area differently than if the same increase was to occur in another drainage or catchment area. Or, a large increase in stormwater volumes within a drainage or catchment area that discharges to a specific receiving waterbody may not significantly impact water quality to the same extent as if the same volumes were discharged to another receiving waterbody. Consequently, within the context of the location of the project, significant impacts on sanitary and stormwater drainage and management may occur if the project resulted in:

- Appreciable increases in sanitary flows in an area with no existing or proposed combined or sanitary sewers.
- Appreciable increases in stormwater runoff in an area with no existing or proposed combined or separate storm sewers.

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- Appreciable increases in sanitary and/or stormwater flows to a combined or separate sewer system that would exceed capacity in the sewer system or exacerbate current conditions related to street flooding or surcharging sewers downstream.
- Appreciable increases in sanitary and/or stormwater flows to a combined sewer system that would exacerbate current conditions related to CSOs (*i.e.*, frequency or volumes).
- Appreciable increases in combined or separate storm sewer flows that result in increased pollutant loadings or standards that would exacerbate water quality, ecological integrity or public use and enjoyment of receiving waterbodies pursuant to 6 NYCRR Part 800. Under this program, the State Water Pollution Control Board adopts and assigns classifications and standards on the basis of the existing or expected best usage of the State's waters.

500. DEVELOPING MITIGATION

Where a significant impact is identified, potential mitigation strategies must be assessed to reduce or eliminate, to the greatest extent practicable, the effects caused by the proposed project. Mitigation strategies involving modifications to site plan layout, building design and features, site drainage and sewer connections, and infrastructure improvements should be explored to eliminate or reduce significant infrastructure impacts associated with the proposed project. Such mitigation measures are described in additional detail below.

510. WATER SUPPLY

- Identify water conservation measures, such as low-flow fixtures, and develop a concept plan that identifies general types, locations and anticipated demand reductions.
- Identify changes in the water distribution system that would be needed to maintain adequate water pressure and fire protection within the proposed project area.
- For very large water supply demands, the use of suction (surge) tanks may be necessary in order to avoid reduced water pressure in the NYC water supply system.

520. WASTEWATER AND TREATMENT CONVEYANCE AND TREATMENT

520.1. Wastewater Treatment Plants and Collection Facilities

- Identify water conservation measures, such as low-flow fixtures, and develop a concept plan that identifies general types, locations, sizing and anticipated demand reductions.
- Provide a higher level of treatment for new privately operated sewage treatment plants that would not result in significant adverse impacts on water quality, in addition to water conservation measures.

520.2. Sanitary and Stormwater Drainage and Management

- If in combined sewer or separate sewer area, identify water conservation measures, such as low-flow fixtures, and develop a concept plan that identifies general types, locations, sizing and anticipated demand reductions.
- For proposed projects that require construction of sewers or other infrastructure improvements, an ADP should be developed in close consultation with DEP for its review and approval. The schedule and responsible entity for ensuring appropriate implementation should be described in CEQR documentation.
- If located along the waterfront and in a combined sewer area, construct separate storm sewers to divert stormwater flows away from combined sewers. An ADP should be developed in

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close consultation with DEP for its review and approval. The schedule and responsible entity for ensuring appropriate implementation should be described in CEQR documentation.

- If located in a combined sewer area, identify infrastructure improvements such as high level storm sewers. An ADP should be developed in close consultation with DEP for its review and approval. The schedule and responsible entity for ensuring appropriate implementation should be described in CEQR documentation.
- If in either combined sewer or separate sewer areas, identify on-site stormwater best management practices (BMPs) to either treat and retain or detain and release with controlled discharge rates to slow peak runoff rates, and develop a concept plan that identifies general types, locations, sizing and anticipated runoff reductions. Stormwater management systems may be incorporated into the project to mitigate potential significant impacts from stormwater. These systems include techniques, such as subsurface stone beds, storm chambers, and perforated pipes, that allow the stormwater to seep into the ground and be slowly released to the sewer system or blue and green roofs that also store stormwater and gradually release it during off-peak periods. Consult with DEP for types of approvable systems. Note that the NYSDEC SPDES permit for construction activities in separately sewered areas that disturb 1 acre of ground or more require development and use of a stormwater pollution prevention plan. DEP should be forwarded the stormwater pollution prevention plan for review.
- Extend sanitary sewers to convey wastewater flows from sites where septic tanks exist or are proposed but could not appropriately be located or designed.

600. DEVELOPING ALTERNATIVES

Many of the mitigation measures described in Section 500 may also serve as alternatives. Projects that would involve septic systems or construction of privately operated treatment plants resulting in significant adverseimpacts may consider hook-up to the City sewer system as an alternative.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

- Section 301 of the Clean Water Act (33 USC 1311; 40 CFR 133) requires all municipal WWTPs to operate with secondary treatment and authorizes the U.S. Environmental Protection Agency (EPA) to set effluent standards for all municipaldischarges.
- Interstate Environmental Commission water quality standards. This entity, established by New York, New Jersey, and Connecticut through a congressionally approved Tri-State Compact, has established water quality standards for tidal waters in the vicinity of New York.
- Section 402 of the Clean Water Act: National Pollutant Discharge Elimination System (NPDES) Program (33 USC 1342). Under the NPDES program, any point source discharge and storm water discharges associated with industrialactivities and municipal separate storm sewer systems require a permit. The State of New York is authorized to administer the NPDES program under its own State program.
- State Pollutant Discharge Elimination System (SPDES) Program—Water Pollution Control Act (Environmental Conservation Law Article 17; 6 NYCRR Parts 750-757). See also http://www.dec.ny.gov/permits/6054.html. The SPDES program is designed to eliminate the pollution of New York waters and to maintain the highest quality of water possible, consistent with public health and enjoyment of the resource, protection and propagation of fish and wildlife, and industrial development in the State. SPDES permits are required for construction or use of an outlet or discharge pipe ("point

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sources") of wastewater discharging into the surface waters or groundwaters of the state, or construction or operation of disposal systems such as sewage treatment plants.

- Each of the City's 14 wastewater treatment plants is regulated by a SPDES permit. Other activities that require SPDES permits include septic systems designed to process more than 1,000 gallons per day; new treatment plants; stormwater discharges from certain industrial facilities to separate sewer systems; and stormwater discharges from construction activities to separate sewer systems, if more than 1 acre of ground would be disturbed (see below for more information).
- Applications for Long Island Wells (Environmental Conservation Law Article 17; 6 NYCRR Part 602). This regulates ground waterwithdrawals (temporary or permanent) in the County of Kings, Queens, Nassau or Suffolk for any purpose, other than for a public water supply when the total capacity of such well or wells on any one property is in excess of 45 gallons per minute (or 64,800 gallons per day).
- Classification of Waters—Article 6 of the New York State Public Health Law; 6 NYCRR Part 800. Under this program, the State Water Pollution Control Board adopts and assigns classifications and standards on the basis of the existing or expected best usage of the state's waters. All of the state's surface and ground waters are assigned a water quality classification.
- Stormwater SPDES General Permits for Construction Activities. This permit is required for construction activities in separately sewered areas that disturb 1 acre of ground or more. In addition to permit requirements for erosion and sedimentation control measures, certain construction activities require the preparation of a stormwater pollution prevention plan (SWPPP) that includes post-construction stormwater management practices. Other permit requirements include submittal of a Notice of Intent prior to start up of site clearing, grading and grubbing as well as a Notice of Termination upon completion of construction activities.
- Section 307 of the Clean Water Act Federal Standards for Industrial Pretreatment (33 USC 1317). This section of the Clean Water Act establishes standards for certain pollutants discharged to a sewage system, requiring pretreatment for discharge that would otherwise not meet the standards.
- New York City Industrial Pretreatment Program. Like the Federal program (see above), this pro-gram establishes standards for concentrations of pollutants in industrial discharge as set forth in Chapter 19 of Title 15 of the Rules of the City of New York related to the Use of the Public Sewers, issued by DEP, Bureau of Wastewater Treatment and Bureau of Water and Sewer Operations.
- Combined Sewer Overflow Abatement Program and Combined Sewer Overflow Long Term Control Plan. Under this program and plan, implemented by DEP, New York City aims to reduce the amount of pollution reaching the City's waters. This plan includes assessment of CSO problem areas through extensive field investigations, sewer system monitoring, water quality monitoring, and development of landside and water quality mathematical models. Engineering alternatives and conceptual designs of recommended solutions are evaluated and go through cost-benefit analyses. Examples of selected CSO reduction measures include the placement of containment booms at some CSO outfall locations, which capture floatables that are discharged into the receiving water during wet weather; and CSO retention (the use of storage facilities for CSO, from which the overflow can be pumped back to the WWTP for treatment during dry-weather periods of lower flows). In addition, source controls or stormwater best management practices (BMPs) are undergoing extensive evaluations in New York City, including piloting and modeling to identify promising technologies for city-specific applications and potential environmental benefits.
- Title 10 of the New York State Public Health Law, Part 75, Appendix 75 A. This is the State law that governs septic systems.
- New York State Design Standards for Wastewater Treatment, 1988.
- Interim New York City regulations for septic systems, implemented by DOB.

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- Standards for dry wells, as required in New York City Building Code (1968) Reference Standards 16.
- DEP rule as set forth in Chapter 31, Title 15 of the Rules of the City of New York relating to House/Site Connections to the Sewer System.
- DEP rules as set forth in Chapter 23, Title 15 of the Rules of the City of New York relating to the Construction of Private Sewers or Private Drains.
- DEP rules as set forth in Chapter 20 of Title 15 of the Rules of the City of New York relating to the Governing and Restricting the Use and Supply of Water.
- DEP has initiated the City's regulatory process to propose new rules related to construction of private water mains and house and site connections to the sewer system. Upon completion of the regulatory process, the rules will be formalized in Title 15 of the Rules of the City of New York.

720. APPLICABLE COORDINATION

Any projects involving new hook-ups for water supply, wastewater or sewage treatment need to coordinate with DEP, which is the agency responsible for the water mains and sewers, and hook-ups thereto. Industrial projects subject to the City's Industrial Pretreatment Program should coordinate with DEP, Division of Pollution Control and Monitoring regarding that program. Projects involving septic systems will need to consult with DOB. Projects involving privately operated treatment plants should coordinate with both DEP and DEC.

730. LOCATION OF INFORMATION

- New York City Department of Environmental Protection

  59-17 Junction Boulevard
  Flushing, NY 11373
  Bureau of Environmental Planning and Analysis

- New York City Environmental Protection

  59-17 Junction Boulevard
  Corona, NY 11368
  Bureau of Water and Sewer Operations

- New York City Department of Environmental Protection

  59-17 Junction Boulevard
  Corona, NY 11368
  Bureau of Wastewater Treatment

- New York State Department of Environmental Conservation

  47-40 21st Street
  Long Island City, NY 11101

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Solid Waste and Sanitation Services

Chapter 14

A solid waste assessment determines whether a project has the potential to cause a substantial increase in solid waste production that may overburden available waste management capacity or otherwise be inconsistent with the City's Solid Waste Management Plan (SWMP or Plan) or with state policy related to the City's integrated solid waste management system. The City's solid waste system includes waste minimization at the point of generation, collection, treatment, recycling, composting, transfer, processing, energy recovery, and disposal. As discussed below, most projects would not have the potential to generate sufficient waste to warrant a detailed solid waste analysis. By contrast, a project that would directly affect a component of the local integrated solid waste management system may require a detailed analysis to determine if it has the potential to cause a significant impact requiring mitigation.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency during the entire environmental review process. Additionally, the lead agency may determine it is appropriate to consult or coordinate with the city's expert technical agencies for a particular project. Here, the New York City Department of Sanitation (DSNY) should be consulted as early as possible in the environmental review process for information, technical review, and recommendations for mitigation relating to solid waste. Section 700 further outlines appropriate coordination.

100. Definitions

110. COLLECTION, TRANSFER, AND TRANSPORT SYSTEMS

111. Solid Waste Collection/Management

111.1. Publicly Managed Municipal Solid Waste

According to the U.S. Environmental Protection Agency, municipal solid waste (MSW)—otherwise known as trash or garbage—consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, and batteries. Not included are materials that also may be disposed in landfills, but are not generally considered MSW, such as construction and demolition materials, municipal wastewater treatment sludges, and non-hazardous industrial wastes (discussed further below). MSW includes items designated by law for separate collection for recycling. DSNY is the agency responsible for collecting and processing or disposing of MSW (including certain designated recyclable materials discussed below) generated by residences, public schools, some not-for-profit institutions, non-residential facilities that are exempt from real estate taxes, and many city and state agencies. For ease of reference, DSNY uses the term "refuse" to refer to MSW from which designated recyclables have already been separated at the point of origin. MSW is generated by residences, the public sector, and the private sector. DSNY also collects refuse from street litter baskets, street-sweeping operations, and lot cleaning activities and arranges for disposal of refuse collected by certain other City and governmental agencies. Some of the refuse that DSNY collects may include construction and demolition debris generated by the entities served by DSNY.

DSNY does not collect commercial MSW or other commercial wastes, including construction and demolition debris, fill material waste (*i.e.*, a subset of construction and demolition debris that is clean material consisting of earth, dirt, concrete, rock, gravel, stone or sand that does not contain organic

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matter having the tendency to decompose with the formation of malodorous by-products), regulated medical waste, asbestos, hazardous or industrial wastes, or dredge spoils (*i.e.*, sediment-type materials excavated from waterways). The Department of Environmental Protection manages bio-solids (*i.e.*, a solid organic matter recovered from the sewage treatment process). Additional information relating to fill material waste, construction and demolition debris, hazardous waste, and dredge spoils is presented in Chapter 22, "Construction Impacts," Chapter 12, "Hazardous Materials," and Chapter 11, "Natural Resources."

111.2. Commercial MSW and Other Solid Wastes

Commercial establishments (restaurants, retail facilities, offices, industries, *etc.*) in the city contract with private carters for collection and for processing and/or disposal of various kinds of solid waste, notably MSW, construction and demolition debris, non-hazardous industrial wastes, and recyclables. Private carters generally charge a fee on a per-cubic-yard basis.

111.3. Regulated Medical Wastes

Medical facilities separate their waste into two categories: regulated medical waste (which includes potentially hazardous or infectious materials) and ordinary waste. The New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (DEC) regulate the generation, treatment, storage, transfer and disposal of these medical wastes. Regulated medical waste generated in the City must be placed in special sealed containers and disposed of in facilities permitted to process such waste, either by incineration, another form of sterilization, disinfection, or another approved method. Medical facilities are required by law to recycle some of their ordinary waste (that is, non-regulated medical waste). Each medical facility is required to submit a plan to DSNY explaining how it plans to dispose of its waste.

DSNY collects household medical waste (defined as items that are used in the course of home health care, such as intravenous tubing and syringes with needles attached, that is disposed with residential solid waste) if it is placed in puncture resistant containers. Pursuant to Article 28 of the New York State Public Health Law and 10 NYCRR Part 70, NYSDOH regulations require hospitals and nursing homes to accept sharps (defined as needles and other sharp items that may cause punctures or cuts) and other household medical wastes for disposal if they are brought to the facility.

111.4. Designated Recyclable Materials

Under New York City's mandatory Recycling Law (Title 16 of the NYC Administrative Code, Chapter 3) DSNY has established and enforces rules requiring that certain designated recyclable materials be separated from household waste for separate collection, including aluminum foil, glass and metal containers, plastic bottles and jugs, beverage cartons, newspapers and magazines, cardboard and other paper wastes, and other metal items (including bulk metal such as stoves, refrigerators, file cabinets, *etc.*). These recycling rules also require that multi-unit dwellings set aside space for the storage in designated locations and that commercial waste in multi-use buildings be separated from residential waste for separate pick-up. The rules also provide for seasonal collection of leaves and other yard waste in certain districts of the city for composting on certain days designated by DSNY. The Electronic Equipment Recycling and Reuse Act, 27 ECL §2601 *et seq*., enacted in May 2010, establishes a state-wide reuse and recycling program for certain waste electronic equipment. It requires manufacturers of certain kinds of electronic items sold in the state, such as televisions, computers and printers, to take back for reuse or recycling such items of electronic waste (or "e-waste"). The law prohibits disposal of such e-waste within the state by those other than individuals and households as of January 1, 2012, and by individuals and households as of January 1, 2015. The law is intended to promote recycling and protect environmental and public health, in part by reducing the risk of contaminants such as heavy metals found in e-waste from escaping into the environment via air or groundwater pollution pathways from waste disposal facilities such as incinerators and landfills. Lo-

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cal law 97 of 2005 (Title 16 NYC Administrative Code, Chapter 4) also bans the disposal of rechargeable batteries as solid waste and requires them to be taken instead to local retailers that sell such batteries so that they may be recycled pursuant to a program arranged by the battery manufacturer.

Commercial establishments are also subject to mandatory recycling requirements enforced by DSNY. Businesses must source-separate certain types of recyclable materials including paper wastes, cardboard, metal items, and construction wastes. Food and beverage establishments must recycle metal, glass and plastic containers, and aluminum foil in addition to the above items. Private carters may also separate other types of recyclables from the waste after collection.

112. Public and Private Waste Transfer Stations

DSNY delivers most of the refuse it collects to certain public or private solid waste management facilities known as transfer stations, in the city or in adjoining communities, for processing and transportation to out-of-city disposal facilities. Certain transfer stations may accept putrescible solid wastes while others accept only non-putrescible solid wastes. Putrescible solid wastes contain organic matter having the tendency to decompose with the formation of malodorous by-products. Non-putrescible solid wastes do not contain such organic matter. Facilities that accept non-putrescible solid wastes for transfer, sorting out of recyclable items, and disposal of residue are known under state law as "construction and demolition debris processing facilities." A subset of non-putrescible solid waste transfer facilities known as "fill material transfer stations" accepts only construction and demolition wastes consisting of clean fill material, which is typically screened and processed for reuse. Putrescible waste transfer stations require transfer operations to be in fully enclosed buildings subject to stringent dust and odor controls.

DSNY delivers the refuse it collects to waste transfer facilities where it is unloaded, and after sorting and compaction, is transported to landfills or waste-to-energy facilities. A map of such transfer station facilities can be found here. Similarly, commercial MSW and other solid waste that is not carted directly to disposal facilities delivered to transfer stations for transport to disposal facilities. Non-putrescible waste such as construction and demolition debris typically is sorted at transfer stations, which remove clean fill materials, metal, and wood for recycling, and send the residue to landfills for disposal.

113. Landfills, Incinerators and Waste-to-Energy Facilities

New York City has no public or private local disposal facilities such as sanitary landfills, construction and demolition debris landfills, traditional incinerators, or waste-to-energy resource recovery facilities. Consequently, solid wastes that are not recycled, reused or converted to a useful product locally must be exported from the City for disposal. There are, however, several closed, but still regulated, landfills within the City, such as Fresh Kills, Pennsylvania Avenue and Fountain Avenue.

Such landfills generate landfill gas, which is approximately 50% methane, from the on-going decomposition of organic wastes. Some city landfills control such gas through flaring, while the Fresh Kills Landfill has a plant to recover landfill gas and purify the methane for sale as natural gas (biomethane). Modern landfills are required by federal and state law to have double liners, leachate treatment systems and stringent permanent cover design standards to prevent groundwater contamination from the landfill. The Port Authority of New York and New Jersey is authorized to assist in the development of new regional resource recovery facilities.

114. Materials Recovery Facilities

As noted above, DSNY and private carters must collect designated recyclable materials generated within the city and deliver them to materials recovery facilities (MRFs), termed "recyclables handling and recovery facilities" by state regulations. As a result, such recyclable materials are delivered to privately-operated MRFs in the city and adjoining communities for processing and transportation to end product manufacturers. A map of the DSNY's current recycling network can be found here, including the new MRF to be operated in South Brooklyn.

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Paper recyclables collected by DSNY in Manhattan, Staten Island and parts of Brooklyn are not taken to a MRF but are transported directly to the Pratt Industries Paper Plant in Staten Island, which processes them for use in the production of liner board and similar products.

New York State also has a "bottle bill" law that subjects the sale of certain kinds of beverages in bottles and cans to the payment of a deposit that is intended to reduce litter and promote the recovery of natural resources through recycling.

115. Composting Facilities

A private vendor operates leaf and yard waste composting facilities by the former Fresh Kill Landfill in Staten Island and at city park locations in Brooklyn and the Bronx pursuant to a contract with DSNY. Other composting facilities are operated within certain city parks by the Department of Parks and Recreation (DPR). Such facilities accept leaf and yard waste collected from DPR and from the community districts that are served by DSNY's fall leaf and yard waste collection program. The city also runs a small food waste composting facility on Riker's Island using anaerobic digestion technology that processes food waste from the Riker's Island correctional facility.

In addition, businesses that generate yard waste (*e.g.*, gardening services) are required to take such waste to a permitted composting facility, if one exists within New York City or within 10 miles of the borough in which such person generates yard waste.

116. Special Waste Collection Sites

"Special Waste" items are certain designated household waste items that require special handling to avoid mixing with regular refuse and recycling collections, including latex paint, motor oil, automotive batteries, household batteries, motor oil filters, fluorescent light tubes, compact fluorescent bulbs, and mercury thermostats. DSNY accepts Special Waste from New York City households at a drop-off collection facility located in each borough. Special Waste is transported and disposed or recycled pursuant to a contract with a private vendor.

120. COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN

As required by New York State law, the city has adopted a comprehensive SWMP for the long-term management of solid waste generated within its borders. The Plan adopts an integrated approach to waste management, identifies sufficient capacity for handling and disposal of such wastes, and complies with state law regarding providing recycling programs where economically feasible. The SWMP takes into account the objectives of the State's solid waste management policy with respect to the preferred hierarchy of waste management methods: begin with waste reduction, then recycling, composting, resource conservation and energy production, and, lastly, landfill disposal. Solid waste management facilities proposed to be operated by a public entity must be included in the SWMP.

The City's first SWMP was approved in 1992, modified and updated in 1996, and further modified in 2001. The current plan covers the period through 2025 and was adopted in July 2006; it was approved by New York State in October 2006. It may be found here.

The SWMP estimates public- and private-sector waste quantities that must be managed over the planning period, and identifies processing, transfer and disposal capacity that will be necessary for such wastes. The SWMP includes programs designed to prevent, reduce, reuse, recycle and compost solid waste, and includes initiatives intended to reduce truck traffic and air emissions associated with the export of DSNY and commercial waste and recyclables to processors and disposal facilities such as landfills and resource recovery facilities. No new landfill or resource recovery facility capacity is planned within the City. Both the new SWMP and PlaNYC support the concept of new "waste conversion" technologies such as anaerobic digestion and non-incineration gasification that can derive energy from non-recyclable wastes in an environmentally acceptable manner, reducing the impacts, energy use and greenhouse gas emissions from long distance transport and landfilling of such waste. The follow-

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ing describes the three principal programs in the SWMP: 1) recycling; 2) export of refuse for disposal; and 3) commercial waste.

RECYCLING PROGRAM

DSNY's curbside recycling program and plans set forth in the SWMP include:

- A contract to develop a central MRF to process city-wide DSNY collections of source-separated metal, glass and plastic (MGP) recyclables and paper to be shipped by barge to the South Brooklyn Marine Terminal. MGP from Queens and northern Brooklyn would continue to be transferred to barges at a facility located in Long Island City, and Bronx-origin MGP would continue to be transferred at a facility in the Bronx before being barged to the new central MRF.
- Development of a Manhattan recyclables facility on the Gansevoort Peninsula where DSNY-collected MGP from Manhattan would be transferred to barges for delivery to the Sims Metal Brooklyn MRF for processing, while paper recyclables from Manhattan would be transferred to barges and delivered to Staten Island for recycling. Until this facility is operational, MGP from southern Manhattan would continue to be tipped Jersey City, NJ, while MGP from northern Manhattan would continue to be tipped at a Bronx facility.
- A contract for acceptance of Recyclable Paper curbside from Staten Island, Manhattan and a portion of Brooklyn by a paper recycling mill in Staten Island, and short-term contracts with other paper recycling vendors to receive DSNY deliveries of paper recyclables collected from the Bronx, Queens, and other portions of Brooklyn.
- A yard waste composting facility at Spring Creek Park in Brooklyn, in addition to the composting facilities at Soundview Park in the Bronx and at the Fresh Kills Landfill in Staten Island.
- Establishment of a Composting/New Technologies Taskforce to explore and test facilities utilizing new and emerging waste conversion technologies such as anaerobic digestion or thermal technologies that can process organic and other wastes into useful products such as compost, biogas, electricity and/or other products and thereby minimize the need for landfilling.
- Various other initiatives, including expanded outreach efforts to increase recycling rates, and periodic household hazardous waste collection events in each Borough.

REFUSE DISPOSAL PROGRAM

Refuse collected by DSNY for disposal utilizes public and private transfer facilities, rail or barge transport, and long-term contracts for transport and disposal. The SWMP includes the following:

- A contract for containerization and rail export of DSNY-managed refuse to a Virginia landfill.
- A contract for export of DSNY-managed MSW from Staten Island in sealed containers by rail.
- A contract for transfer of DSNY-managed refuse from Brooklyn for containerized rail transport to a landfill in Virginia.
- A planned contract for transfer of DSNY-managed refuse from Queens for rail transport to a landfill in Virginia.
- A planned contract to continue the disposal of a portion of DSNY-managed refuse from the west side of Manhattan at a facility in Newark, New Jersey.
- Plans to construct four DSNY waterfront marine transfer stations ("MTSs") that would place refuse in sealed shipping containers for barge export to disposal facilities.

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- Planned contracts with vendors to transport and dispose of barged waste from the MTS facilities at remote landfills.
- Pending implementation of planned long-term contracts and MTS construction and commissioning, refuse would continue to be managed under short-term contracts with transfer station vendors in the city and region.

COMMERCIAL WASTE

With respect to commercial waste, the SWMP provides the capacity for barge export of certain amounts of commercial refuse from the four converted DSNY MTSs, provides for barge export of construction and demolition waste from the existing DSNY MTS at West 59th Street in Manhattan, and requires rail export of commercial refuse from the three private transfer stations that also contract to take DSNY refuse. The Plan also includes more stringent restrictions on the siting and operation of commercial solid waste transfer stations.

200. DETERMINING WHETHER A SOLID WASTE AND SANITATION SERVICES ASSESSMENT IS APPROPRIATE

A solid waste assessment determines whether a proposed project would cause a substantial increase in solid waste production that would overburden available waste management capacity or otherwise be inconsistent with the SWMP or with state policy related to the City's integrated solid waste management system. Few projects have the potential to generate substantial amounts of solid waste (50 tons per week or more) and, therefore, would not result in a significant adverse impact. However, it is recommended that the solid waste and service demand (if relevant) generated by a project be disclosed, based on an estimate using Table 14-1. It is possible that an unusually large project or a project involving a use with unusual waste generation characteristics may increase a component of the City's waste stream beyond the projections for that component in the SWMP and, therefore, further analysis should be conducted.

Wastes with special characteristics, such as regulated medical wastes, are subject to specific handling and disposal regulations. Compliance with applicable requirements generally eliminates possible significant adverse impacts.

PRELIMINARY CAPACITY ANALYSIS

The capacity of the City's solid waste management system generally consists of carting capacity and transfer/disposal capacity. The SWMP estimates that approximately 50,000 tons per day (tpd) of public and private sector solid wastes (exclusive of dredge spoils and biosolids) are generated in the City. As of 2009, there is authorized processing capacity within the City of approximately 20,697 tpd for putrescible solid waste, 23,970 tpd for mixed construction and demolition debris, and 784,312 cubic yards of storage capacity for fill material, as well as additional waste transfer processing and disposal capacity outside the city, but within the metropolitan region. Sufficient capacity is required to meet demand on peak days, since the waste flow quantity fluctuates by day of the week, season and economic cycle. While there is currently excess non-putrescible waste transfer capacity in the City, there is not sufficient capacity at the permitted putrescible transfer stations to handle peak days for the combined DSNY-managed and commercial carter-managed putrescible waste streams. There is, however, sufficient capacity within the region, together with in-city capacity, to accommodate the transfer of all city-origin refuse.

DSNY has over 2000 waste collection trucks in its fleet. The capacity of DSNY's collection truck fleet and that of the more than 100 private carters licensed to serve New York City is sufficiently flexible to accommodate increased demand for waste and recyclables collection generated by most proposed projects as needed.

In view of the foregoing, if a project's generation of solid waste in the With-Action condition would not exceed 50 tons per week, it may be assumed that there would be sufficient public or private carting and transfer station capacity in the metropolitan area to absorb the increment, and further analysis generally would not be required. However, it is recommended that the solid waste and service demand (if relevant) to be generated by a project be disclosed, using the citywide average rates for waste generation (Table 14-

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1) to make this determination. As noted in Section 311 below, any waste management features to be included in the project should also be disclosed.

If a project would result in the development of more than either 500 residential units or 100,000 square feet of commercial space, the proposed location and method of storage of refuse and recyclables prior to collection should be disclosed. In addition, if the use of compactors, dumpsters and/or "roll on/roll off" refuse containers are proposed to avoid large piles of bags with refuse on the sidewalk or building perimeter awaiting collection, they should also be discussed. If refuse set out for collection would consist of large piles of bags with refuse and/or recyclables, the applicant should also discuss the expected location, square footage, volume and duration of such piles, and their effects upon traffic, pedestrians, public health, and community character.

SYSTEMWIDE IMPACT AND CONSISTENCY WITH SOLID WASTE MANAGEMENT PLAN

Regardless of the amount of solid waste generated by a proposed project, a more detailed discussion is warranted if the project involves the construction, operation, or closing of any type of regulated solid waste management facility, DSNY district garage, or borough repair shop, or if it would involve a regulatory change to public or private waste collection, processing, recycling, or disposal activity. Such a project should be analyzed for its quantitative impact to the solid waste management system, as well as for its consistency with the goals and elements of the SWMP.

As noted above, the City's SWMP develops goals for the management of the components of the waste generated in the city and identifies procedures and facilities that may be required to meet those goals. The Plan includes timetables for the phased implementations of its recommendations. Examples of projects that may directly affect the City's current and planned integrated system of solid waste management include, but are not limited to:

- Projects that would close or preclude planned development of one or more major facilities identified in the SWMP to process waste generated within the City (*e.g.*, closure of a city marine transfer station or a permitted transfer station that is on long-term contract with the City to process waste from one or more community districts served by DSNY).
- Projects that would result in the generation of solid waste in quantities that may exceed the available solid waste management capacity in the City or region (*e.g.*, a multi-year harbor deepening project requiring land disposal of hundreds of thousands of cubic yards of dredge spoils).
- Regulatory changes affecting the generation or management of the city's waste.
- Projects causing the dislocation of a DSNY district garage facility or a borough repair shop.

It should be noted that if the project involves a new solid waste management facility, such as an incinerator or autoclave, impact analyses of other technical areas (air, traffic, noise, *etc.*) may also be appropriate. Other chapters of the Manual provide guidance for determining the appropriate level of review for each of these areas.

300. ASSESSMENT METHODS

310. ANALYSIS TECHNIQUES

An assessment of potential solid waste impacts for projects that would generate solid waste consists of describing the waste management features of the project and quantifying the incremental quantities of waste that the project would generate. The assessment of medical facilities is somewhat different, as described below.

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311. Projects that Would Generate Solid Waste

The amount of waste that a project would generate should first be determined. For most projects, the city-wide average rates for waste generation used in the SWMP may be used to make this determination. These rates are provided in Table 14-1.

Projects with additional waste management features, however, may generate less solid waste than indicated in the table. Features that minimize waste, beyond those required by law, should be identified. Examples include the following:

- Installation of such equipment as air-dryers in public lavatories.
- Provisions for on-site composting.
- Provisions for material storage to allow use of bulk-packaged supplies (this would minimize the use of packaging).
- Installation of kitchen garbage disposal units and compactors.
- Use of double-sided photocopying.
- Use of electronic mail (rather than communication on paper).
- Developing provisions for the return of packaging to the manufacturer/supplier.
- Installation of bottleless water coolers or other alternatives to plastic bottled water.

Project features that enhance recycling (*i.e.*, those that facilitate the separation, storage, collection, processing, or marketing of recyclables) beyond that required by law should be identified. These may include, for example, on-site measures to process yard waste and/or food waste into compost and/or biogas. Project features to facilitate waste collection, such as provisions for containerized collection or special waste chutes to central collection areas with waste compactors (as at Roosevelt Island) should also be identified. At the same time, any aspects of the project that may make recycling difficult, impede waste collection, or result in the generation of high levels of solid waste, such as the construction of a tunnel, shaft, or very large building foundation generating hundreds of truckloads of fill material, should be identified and discussed.

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Table 14-1
Solid Waste Generation Rates

Use	Rate (pounds per week)
Residential	
Individual	17
Household	41
Institutional	
Public Elementary School	3 per pupil
Public Intermediate School	4 per pupil
Public High School	2 per pupil
Private School (K-8)	1 per pupil
Private School (6-12)	4 per pupil
College	1 per pupil
Hospital	51 per bed
Government Office	0.03 per square foot
Correctional Facility	13 per inmate
Commercial	
Office Buildings	13 per employee
Single Offices	9 per employee
Wholesale	66 per employee
General Retail	79 per employee
Restaurants	251 per employee
Fast Food	200 per employee
Food Stores	284 per employee
Hotels	75 per employee
Industrial	
Apparel and Textile Manufacturing	125 per employee
Printing/Publishing	240 per employee

Source: New York City Department of Sanitation

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312. Detailed Solid Waste Generation Analysis

If the proposed project would lead to substantial new development (*e.g.*, Hunters Point South or Atlantic Yards) resulting in at least 50 tons (100,000 pounds) of solid waste generated per week, it may be appropriate to assess whether additional trucks or other sanitation services would be required. Although the additional trucks or services would not necessarily in and of themselves constitute solid waste or service impacts, the information may be appropriate for use in other technical analyses, such as traffic, air quality, and noise. The typical DSNY collection truck for residential refuse (25 cubic yards) carries approximately 12.5 tons of waste material (8 tons for containerized collections). Recycling trucks carry about 11.5 tons of paper or approximately 10.0 tons of metal, glass and plastic containers. DSNY diesel collection trucks are required by Local Law 39 of 2005 [24 Admin. Code 163.4] to be equipped with Best Available Retrofit Technology (BART) such as diesel particulate filters or to meet 2007 U.S. EPA model year standards to minimize vehicular emissions to the air. Commercial carters typically carry between 12 and 15 tons of waste material per truck. Private carter diesel trucks and non-road diesel equipment used in the fulfillment of solid waste and recycling contracts with the City of New York and used primarily within New York City are also subject to a mandate to phase in use of BART to limit emissions, pursuant to Local Law 40 of 2005. Contact DSNY for information on collection truck routes and capacities, street sweepers and other equipment.

313. Regulated Medical Waste

The assessment considers how regulated medical wastes would be handled and disposed to ensure that these procedures would comply with the appropriate regulations. With a large waste generator, it may be appropriate to estimate additional truck trips, as discussed above. The number of truck trips associated with the new facility may be obtained from the carrier.

320. CONSISTENCY WITH THE CITY'S SOLID WASTE MANAGEMENT PLAN

For a project identified in Section 200 as warranting a more detailed analysis, either because of the large quantity of waste that it would generate or its potential impact upon the city's solid waste management system, the analysis should include a consideration of the project's consistency with the City's SWMP. The lead agency should review the summary of the SWMP described above, and if more detail is needed, consult the SWMP itself. The review should consider whether the proposed project would materially conflict with the following:

- Adherence to the hierarchy of preferred solid waste management, which places waste prevention first, followed by reuse, recycling, or composting, deriving energy from non-recyclable waste in an environmentally acceptable way, and disposal by landfilling.
- Implementation of the New York City Recycling Law (Local Law 19 of 1989), as amended.
- Any element of the SWMP, including a significant delay in achieving one or more milestones identified in the SWMP.

400. DETERMINING IMPACT SIGNIFICANCE

Because of the large size of the City's public and private refuse and recyclables collection fleets, the capacity of the local and regional transfer stations and related access to MRFs and disposal facilities, and the fact that solid waste often moves in interstate commerce, any given project's waste generation would not likely be significant relative to the total city-wide and region-wide system. Significant impacts may occur, however, for projects that generate large quantities of solid waste over a multiyear period, such as a river or harbor dredging project, that exceed local and regional disposal or processing capacity.

The closure or dislocation of a substantial, active element of the City's current integrated solid waste management system without identifying substitute capacity within the region may also significantly impact the city's solid waste system. In weighing such effects, a project resulting in closure of a transfer station facility under long-term contract with the City would be more significant than closure of a facility under a short-term city contract.

A regulatory action that materially conflicts with the adopted SWMP or a law that bans solid waste transfer stations could likewise significantly and adversely impact the city's solid waste system. A proposed modification to the city's SWMP should be evaluated for substantial conflict with state policy on solid waste management and for the project's potential to overburden the capacity of the city's integrated solid waste management system within the next five years, including but not limited to disposal capacity reasonably available to the city via truck, barge or rail. Minor modifications to the SWMP that do not overburden or reduce existing system capacity--for example adjustments to the SWMP implementation schedule, designating additional recyclables that have a market, special collections of household hazardous waste for separate disposal to protect the environment, or changes in waste transport or disposal technology to reduce greenhouse gas emissions--would generally not be considered significantly adverse to the city's system of solid waste management. In addition, a project that causes substantial excavation into a closed, regulated city landfill may be considered a significant impact to that solid waste facility.

500. DEVELOPING MITIGATION

For significant impacts due to the quantity of waste generated, mitigation measures may include minimizing waste at the point of generation, increasing the amount of waste that may be recycled or beneficially reused, or increasing the capacity of the local waste management infrastructure that would be overburdened by the project. For significant impacts resulting from the project's conflict with the current solid waste management system or with the SWMP, mitigation measures may include steps to minimize the specific conflict. For example, if the project would cause the closure of a major DSNY transfer station facility, mitigation may involve proposing alternative capacity or technology to accommodate such waste.

600. DEVELOPING ALTERNATIVES

Many of the mitigation measures described in Section 500 may also serve as alternatives. If a proposed project, such as a rezoning and redevelopment plan, would cause an impact due to the closure of a facility relied upon for the current

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or proposed integrated solid waste management system or a DSNY district garage, an alternative that would result in a lesser impact should be considered. This may include modification to proposed zoning amendments, or a modified project design that incorporates the waste management facility or DSNY Garage use on-site or elsewhere.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

SOLID WASTE MANAGEMENT PLANNING

- New York State Solid Waste Management Act of 1988, codified at Article 27, Title 1 of the New York State Environmental Conservation Law (ECL). This law provides for the preparation of New York City's Solid Waste Management Plan. Also see the regulations at Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 360, Subpart 15, Comprehensive Solid Waste Management Planning.
- City of New York Comprehensive Solid Waste Management Plan (2006)

SOLID WASTE MANAGEMENT FACILITIES

- Solid waste management facilities in New York State are governed by Title 7 of Article 27 of the ECL and 6 NYCRR Part 360.
- ECL Section 27-0706 is the statute that required the Fresh Kills Landfill to close and bars the issuance of a permit by the NYS DEC for the proposed Brooklyn Navy Yard Waste-to-Energy Facility. Also see the Fresh Kills Order on Consent between the NYSDEC and DSNY, Modification No. 7, dated April 27, 2000, providing for the landfill's closure.
- Stipulation and Order in the *Matter of The City of New York v. The New York State Department of Environmental Conservation* filed April 20, 1992 in the Supreme Court of New York, Albany County, Index No. 7218/91 (stipulated that NYSDEC and DSNY shall act as co-lead agencies and conduct a coordinated SEQRA review for all new facilities proposed in transfer station permit applications for which both NYSDEC and DSNY issue such transfer station permits).
- New York City Local Law 40 of 1990, codified at Section 16-130 *et seq.* of the Administrative Code of the City of New York, governs transfer stations within New York City. DSNY has promulgated three sets of regulations pursuant to authority granted in this statute. They are codified at 16 Rules of the City of New York (RCNY), Chapter 4. Subchapter A governs Non-Putrescible Solid Waste Transfer Stations; Subchapter B governs Putrescible Solid Waste Transfer Stations; and Subchapter C governs the Siting, Hours of Operation, Engineering Reports, and Transportation Plans for Solid Waste Transfer Stations.
- Local Law 39 of 1989 amends Sections 24-102, 24-104 (18) and 24-117 of the Administrative Code of the City of New York in connection with the operation of private incinerators.
- New York City Zoning Resolution. The Zoning Resolution also regulates the siting and operation of waste management facilities in New York City.

RECYCLING

- New York City Recycling Law, Local Law 19 of 1989, codified at Section 16-301 *et seq.* of the Administrative Code of the City of New York. Also see rules promulgated by DSNY at 16 RCNY §§ 1-08 - 1-10. This law and the rules require households and generators of private carter-collected waste to source separate designated materials in specified manners. The law and rules also require recycling by City agencies and other institutions.

REGULATED MEDICAL WASTE

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- Under ECL § 27-1501 *et seq.* and 6 NYCRR Part 360-10, the NYSDEC regulates the storage, transfer, and disposal of regulated medical waste. Among other things, ECL § 27-1504 provides for a mandatory regulated medical waste tracking program.
- The NYSDEC regulates Regulated Medical Waste Treatment Facilities off the site of the facility producing the waste under 6 NYCRR Part 360-17.
- Regulated Medical Waste is defined as any solid waste generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals including cultures of infectious agents, human pathological wastes, liquid waste human blood and blood products, sharps including hypodermic needles, contaminated animal carcasses, wastes from surgery or autopsy, laboratory wastes from research, dialysis wastes, and biological wastes from humans or animals isolated to protect others. See 6 NYCRR Part 360-17.2(h) for the complete definition and exemptions and exclusions.
- NYSDOH regulates the generation, treatment, and disposal of regulated medical waste under Article 13, Title XIII of the Public Health Law (PHL § 1389-aa *et seq.*)
- Section 16-120.1 of the Administrative Code of the City of New York. While local regulation of regulated medical waste transportation is largely preempted by State law, this section requires generators of regulated medical waste to file a solid waste removal plan with DSNY. Generators of 50 pounds or more per month of regulated medical waste must file annual updates. See also 16 RCNY, Chapter 11.
- Items that may cause punctures or cuts that are used in the course of home health care, such as intravenous tubing and syringes with needles attached, and are disposed with residential solid waste, must be placed in puncture resistant containers prior to disposal. See 16 RCNY § 1-04.

720. APPLICABLE COORDINATION

Coordination with DSNY for solid waste assessment concerns is recommended.

730. LOCATION OF INFORMATION

The city's SWMP contains relevant data on existing conditions, existing and proposed solid waste management systems, and residential and commercial waste generation projections. Other information on current DSNY operations may be obtained by contacting the Department's Bureau of Legal Affairs.

New York City Department of Sanitation
125 Worth Street
New York, NY 10013
http://www.nyc.gov/sanitation

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ENERGY

CHAPTER 15

SEQR regulations 6 NYCRR 617.9(b)(5), and consequently CEQR, require that EISs include a discussion of the effects of the proposed project on the use and conservation of energy, if applicable and significant. In most cases, a project does not need a detailed energy assessment, but its operational energy consumption is often calculated. However, regardless of whether an assessment is needed, every project proponent is encouraged to examine the benefit of energy efficiency measures and the feasibility of co-generation, tri-generation, or on-site renewable generation.

100. DEFINITIONS

Analysis of energy focuses on a project's consumption of energy and, where relevant, potential effects on the transmission of energy that may result from the project. The assessment is of the energy sources typically used in a project's operation (HVAC, lighting, *etc.*) and includes electricity, fossil fuels (oil, coal, gas, *etc.*), nuclear power, hydroelectric power, and occasionally, miscellaneous fuels like wood, solid waste, or other combustible materials.

200. DETERMINING WHETHER AN ENERGY ASSESSMENT IS APPROPRIATE

All new structures requiring heating and cooling are subject to the New York City Energy Conservation Code, which reflects state and city energy policy. Electricity used in New York City is generated both within and outside the city and is delivered to most New York City users by Con Edison, with a small number of users in the Rockaways receiving power from the Long Island Power Authority. Projected generation and transmission requirements are forecasted by both the New York State Independent System Operator (NYISO) and Con Edison, ensuring that the City's power supply and transmission systems have the capacity to meet expected future demand. The incremental demand caused by most projects results in incremental supply, and consequently, an individual project's energy consumption often would not create a significant impact on energy supply. Consequently, a detailed assessment of energy impacts would be limited to projects that may significantly affect the transmission or generation of energy. For energy intensive facilities that may significantly affect the transmission or generation of energy, consideration of clean on-site generation alternatives is recommended.

Although significant adverse energy impacts are not anticipated for the great majority of projects analyzed under CEQR, it is recommended that the projected amount of energy consumption during long-term operation be disclosed in the environmental assessment.

210. RELATIONSHIP TO THE GREENHOUSE GAS EMISSIONS (GHG) ASSESSMENT

The calculation of operational energy consumption is the first step in a GHG assessment (see Chapter 18, "Greenhouse Gas Emissions"). A project subject to the GHG assessment should estimate its operational energy consumption using energy modeling or estimates from the project's architect or engineer. The methods for estimating this energy consumption are presented below in Section 310.

300. ASSESSMENT METHODS

Disclosing energy consumed by a proposed project begins with an analysis of operational energy, or the amount of energy that would be consumed annually after the project is operational. Usually, this encompasses the energy for the operation of the building: heating, cooling, lighting, pumps, fans, domestic hot water, plug loads, and elevators.

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In order to most accurately present the effect on energy supply that would result from the project, its net increase in energy consumption should be calculated. Often, this is the same as the amount of energy that would be consumed by the project. However, in some instances, a project would result in removal of sources of energy consumption and, therefore, the loss of that source's energy consumption should be subtracted from the projected annual energy use to determine the net increase. Similarly, a project that results in the removal of sources of energy generation should take that removal into account as well.

The measure of energy used in the analysis is British Thermal Units (BTUs) per year. One BTU is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit. This unit of measure may be used to compare consumption of energy from different sources (*e.g.*, gasoline, hydroelectric power, *etc.*), taking into consideration how efficiently those sources are converted to energy. Its use avoids the confusion inherent in comparing different measures of output (*e.g.*, horsepower, kilowatt hours, *etc.*) and consumption (*e.g.*, tons per day, cubic feet per minute, *etc.*). Several standard reference documents provide tables that list the factors for converting various energy measures to BTUs. The U.S. Energy Information Administration has also developed an energy conversion calculator, available here.

310. OPERATIONAL ENERGY CONSUMPTION

Operational energy use is calculated in BTUs for each project element. The energy requirements of the different uses that would result from a project are sometimes available through energy modeling or from the project architect or engineer. If feasible, based upon knowledge of a project's site design and the project proponent's control over the site, this energy consumption should be estimated, either using estimates from project engineers or an energy modeling tool in order to most accurately reflect a project's energy consumption. Energy consumption may be modeled through programs such as Trace, HAP, DOE-2, and eQuest to determine a building's energy use, to which calculated energy requirements of other systems, such as domestic hot water, are added to obtain the final values. The specific energy modeling program to use depends on the level of detail known to the project proponent at the time of modeling. For instance, the eQuest Schematic Design Wizard model is designed to support the earliest design phase when information is limited. Most often, energy modeling is only appropriate for those projects requiring a GHG assessment in Chapter 18, Greenhouse Gas Emissions."

Projects subject to this GHG assessment in Chapter 18, "Greenhouse Gas Emissions," should estimate energy consumption using energy modeling, information from a project architect or engineer, or energy use information compiled for comparable buildings. If sufficient information regarding the project is not available to model its probable operational energy consumption or provide specific project energy consumption estimates, the lead agency, within its discretion, may determine it is most appropriate to use the standard reference table below to estimate energy usage. The standard reference table will often be used to estimate energy consumption on those sites not controlled by the applicant, as is often the case in a rezoning action.

For example, if the project would rezone an area where projected development would occur on sites not controlled by the applicant, the lead agency likely could not calculate lot-by-lot building operation consumption through energy modeling or engineer estimates. However, for any projected development on a site within the rezoned area that is controlled by the applicant, whether a private applicant or the City, the annual projected energy consumption should be estimated using the tools above. For those sites either with insufficient information to model their energy usage or that are under the control of an entity other than the applicant, it is appropriate for the lead agency to estimate the project's energy consumption using Table 15-1, below. This table represents the average energy consumption in New York City for each building type below.

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Table 15-1
Average Annual Whole-Building Energy Use in New York City

Building Type	Source energy (Thousand Btu (MBtu)/sq ft)
Commercial	216.3
Industrial	554.3
Institutional	250.7
Large Residential (>4 family)	126.7
Small Residential (1-4 family)	94

Source energy accounts for energy consumed on site in addition to energy consumed during the generation and transmission of energy supplied to the site. This table was developed by the Mayor's Office of Long Term Planning and Sustainability and lists New York City-specific energy- and carbon-intensity values for various building types. Building energy intensity (measured by thousand Btu per square foot (MBtu/sq. ft)) is calculated from data compiled for calendar year 2008 for the Inventory of New York City Greenhouse Gas Emissions: September 2009. These values have been normalized for weather using the National Oceanographic and Atmospheric Administration (NOAA) Typical Meteorological Year (TMY) data, which are derived from 1976-2005 historical weather data.

Data sources: City of New York, *Inventory of New York City Greenhouse Gas Emissions* (2009); New York City Department of Finance; U.S. Department of Energy National Renewable Energy Laboratory.

For certain projects, such as energy-intensive facilities like data centers or web hosting facilities, a project-specific analysis may be more appropriate. Such figures are not available for manufacturing uses because energy demands vary widely for those uses and depend on building requirements and the manufacturing activity proposed. Such information is obtained from the manufacturer.

If more than one building would be constructed as a result of the proposed project, each building should be separately assessed, if practicable. A lead agency may also calculate a project average. For some projects, such as a rezoning, the lead agency, within its discretion, may determine it is more appropriate to estimate the project's total projected energy consumption and not present a lot-by-lot calculation of energy use.

Once the net energy consumption has been determined, it may be appropriate to consult with the appropriate energy supplier and request confirmation that there would be no problem in providing the additional load and making service connections.

400. REGULATIONS AND COORDINATION

410. REGULATIONS AND STANDARDS

The New York City Energy Conservation Code, which became effective in December 2009, sets minimum energy standards for the design and construction of all new buildings and substantial renovation of existing buildings within New York City. There is also a State Energy Plan, published every three years, available from the New York State Energy Research and Development Authority (NYSERDA).

420. COORDINATION

Consultation with energy suppliers is typically appropriate to determine if a proposed project would require extension or upgrading of energy transmission facilities. NYSERDA provides information about loans and incentives to assist businesses with initial costs associated with installing energy-efficient equipment. Questions regarding energy policy in the City should be directed to the Mayor's Office of Environmental Coordination.

430. LOCATION OF INFORMATION

- New York City Economic Development Corporation

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Energy Division
110 William Street
New York, NY 10038
(212) 312- 3762

- NYS Energy Research & Development Authority

  17 Columbia Circle
  Albany, NY 12203-6399
  (866) NYSERDA (Toll-Free)
  (518) 862-1090

- NYS Energy Research & Development Authority – New York City Office

  485 Seventh Avenue – Suite 1006
  New York, NY 10018
  (212) 971-5342

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TRANSPORTATION

CHAPTER 16

Our modes of travel — private car, taxi cab, subway/rail, bus, ferry, bicycle, or by foot — form the basis of New York City's extensive and interrelated transportation infrastructure and system. A positive effect on one mode of travel may negatively impact another, while a negative effect on travel modes may negatively impact several aspects of the transportation system. The objective of the transportation analyses is to determine whether a proposed project may have a potential significant impact on traffic operations and mobility, public transportation facilities and services, pedestrian elements and flow, safety of all roadway users (pedestrians, bicyclists and vehicles), on- and off-street parking, or goods movement.

As with each technical area assessed under CEQR, it is important for applicants to work closely with the lead agency during the entire environmental review process. As appropriate, the New York City Department of Transportation (DOT), the Metropolitan Transportation Authority (MTA), its affiliates and subsidiary agencies, should also work with the lead agency during the CEQR process to provide information, technical review, recommendations and approvals relating to transportation and any required mitigation. It is recommended that the lead agency consult with expert agencies as early as possible in the environmental review process. The level and extent of consultation may vary based upon the in-house technical expertise of the lead agency. Section 700 further outlines appropriate coordination with these agencies.

This chapter describes each technical area to be addressed in a transportation assessment, and outlines the general elements needed for any transportation assessment. This chapter also discusses each specific technical area separately, beginning in Section 340, "Detailed Traffic Analysis," should a detailed analysis be needed. A proposed project and any recommended improvement or mitigation measures, if any, should, to the extent practicable, be guided by the policies of *Sustainable Streets: Strategic Plan for the New York City Department of Transportation 2008 and Beyond,* which seeks to promote efficient means of travel with emphasis on "alternative modes" like transit, pedestrians or bicycles. The specific DOT guidelines applicable to mitigation measures are discussed in greater detail in Section 510.

100. DEFINITIONS

The transportation analyses should address the following major technical areas:

TRAFFIC FLOW AND OPERATING CONDITIONS, including the traffic volume expected to be generated in the future with the proposed project in place and the impact of the project-generated volume on traffic levels of service. The purpose of this assessment is to evaluate the traffic operating conditions and ability of roadway elements to adequately process the expected traffic flow under the future With-Action condition.

RAIL AND SUBWAY FACILITIES AND SERVICES, including the capacity of subway lines (known as "line haul" capacity), station platforms, stairwells, corridors, and passageways, station agent booths/control areas, turnstiles, and other critical station elements to accommodate projected volumes of passengers in the future with the proposed project in place.

BUS SERVICE, including the ability of existing routes and their frequency of service to accommodate the expected level of bus demand without overloading existing services. MTA has three agencies that operate bus service in New York City: MTA Bus Company (MTABC), MTA Long Island Bus (LIB) and New York City Transit (NYCT). In addition to these entities, privately operated fixed-route service should be included in these analyses to the extent known.

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PEDESTRIAN FACILITIES, which include three elements – sidewalks, crosswalks and intersection corners (corner reservoirs). The purpose of the assessment is to evaluate the capacity of these elements to safely and conveniently process or store the volume and activities of pedestrians expected to be generated by the proposed project.

PEDESTRIAN, BICYCLE AND VEHICULAR SAFETY ASSESSMENTS principally focus on the effect of the proposed project's generated demand at existing high-crash locations or at locations that may become unsafe due to the proposed project.

PARKING CONDITIONS, which include occupancy levels of parking lots and garages (public and accessory) as well as curbside parking utilization. The purpose of the on- and off-street parking assessment is to determine what effect the proposed project may have on parking resources in the study area.

GOODS DELIVERY, which includes the capacity of proposed loading areas to accommodate the expected volume of deliveries and the ability to do so without interfering with vehicular, pedestrian and bicycle traffic or compromising safety.

CONSTRUCTION PHASE IMPACTS, which include projected impacts on transportation (traffic, pedestrian, parking, *etc.*) during a proposed project's construction phase. Guidance for conducting the transportation analyses for construction activities is presented in Chapter 22, "Construction Impacts."

To analyze each of these technical areas, specific technical methodologies, databases, and procedures have been developed and are referenced in this chapter. It is also important to note the interrelationship between the traffic analysis, and air quality and noise studies, which should be kept in mind during the course of the data collection and analysis stages. Both the air quality and noise analyses may call for extensive traffic information; therefore, traffic information should be collected and formatted in a way that can be easily used for the other analyses. It may also be necessary to assess transportation impacts on residential streets as part of the neighborhood character studies.

200. DETERMINING WHETHER A TRANSPORTATION ASSESSMENT IS APPROPRIATE

While interrelationships between the key technical areas of the transportation system — traffic, transit, pedestrians, and parking — should be taken into account in any assessment, the individual technical areas are separately assessed to determine whether a project has the potential to adversely and significantly affect a specific area of the transportation system. Consequently, each area is discussed separately.

It is possible that detailed transportation analyses may not be needed for projects that would create low- or low- to moderate-density development in particular sections of the City. Before undertaking any transportation analysis, reference should be made to Table 16-1 to determine whether numerical analysis is needed.

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Table 16-1
Minimum Development Densities Potentially Requiring Transportation Analysis

Development Type	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Residential (number of new dwelling units)	240	200	200	200	100
Office (number of additional 1,000 gsf)	115	100	100	75	40
Retail (number of additional 1,000 gsf)	30	20	20	10	10
Restaurant (number of additional 1,000 gsf)	20	20	15	15	10
Community Facility (number of additional 1,000 gsf)	25	25	25	15	15
Off-Street Parking Facility (number of new spaces)	85	85	80	60	60

With the following zone definitions:
Zone 1: Manhattan, 110th Street and south; Downtown Brooklyn.
Zone 2: Manhattan north of 110th Street, including Roosevelt Island; Long Island City; Downtown Flushing; Fort Greene; Park Slope; Portions of Brooklyn Heights; Greenpoint-Williamsburg; Jamaica; all areas within 0.25 miles of subway stations (excluding Staten Island, Broad Channel and the Rockaways, Queens); South Bronx (south of 165th Street).
Zone 3: St. George (Staten Island); all other areas located within 0.5 miles of subway stations (except in Staten Island, Broad Channel and the Rockaways, Queens).
Zone 4: All areas in Staten Island located within 0.5 miles of subway stations; all other areas located within one-mile of subway stations (except in Staten Island, Broad Channel and the Rockaways, Queens).
Zone 5: All other areas.
The attached map shows the zone boundaries.

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The development thresholds cited in Table 16-1 were determined by applying typical travel demand factors (*i.e.*, daily person trips, temporal distribution, modal split, vehicle occupancy, *etc.*) for the land uses cited in the table for each of the zones, up to a development density at which vehicle, transit, and pedestrian trip generation would not likely cause significant adverse impacts, based on a review of prior Environmental Assessment Statements (EASs) and Environmental Impact Statements (EISs) conducted under the CEQR process. The development densities cited in Table 16-1 generally result in fewer than 50 peak hour vehicle trips (with "trips" referring to trip ends), 200 peak hour subway/rail or bus transit riders and 200 peak hour pedestrian trips, where significant adverse impacts are generally considered unlikely. Should the proposed project involve a mix of land uses, it is appropriate to conduct a preliminary trip generation assessment (see Levels 1 and 2 Screening Assessment in Section 300) for each land use or use a weighted average to determine whether the total site generated trips exceed the threshold for analysis. If the proposed project would result in development densities less than the levels shown in Table 16-1, further numerical analysis would not be needed for any technical area, except in unusual circumstances. Conversely, if a proposed project surpasses these levels, a preliminary trip generation analysis, described below in Section 300, is needed.

300. ASSESSMENT METHODS

If Section 200 indicates that an analysis is warranted, a preliminary trip generation assessment and Travel Demand Factors (TDF) memorandum should be prepared following the two-tier screening process described below to determine whether a quantified analysis of any technical areas of the transportation system is necessary:

LEVEL 1 (PROJECT TRIP GENERATION) SCREENING ASSESSMENT determines the number of person trips by mode as well as vehicle trips for all analysis peak hours. Except in unusual circumstances, a further quantified analysis would typically not be needed for a technical area if the proposed development would result in fewer than:

- 50 peak hour vehicle trip ends;
- 200 peak hour subway/rail or bus transit riders; or
- 200 peak hour pedestrian trips.

If the threshold for traffic is not surpassed, it is likely that a parking assessment is also not needed. The methodologies available for use in determining trip generation involve either: (a) utilizing approved available trip generation rates for the type of land use proposed and available modal split characteristics for the site of the proposed

project; or (b) obtaining these data from new surveys at a comparable facility in the same (or comparable) part of the City. The methodologies are presented below in Section 310.

LEVEL 2 (PROJECT GENERATED TRIP ASSIGNMENT) SCREENING ASSESSMENT assigns the trips to specific intersections, bus routes, subway lines, or parking spaces. If the results of this level of analysis conclude that the proposed development would generally result in intersections with 50 or more vehicle trips, pedestrian elements with 200 or more pedestrian trips, 50 or more bus trips in a single direction on a single route, or 200 or more passengers at a subway station or on a subway line during any analysis peak hour, further detailed analysis may be needed for a particular technical area. Guidance for conducting detailed assessments is located in Section 330.

310. LEVEL 1 (PROJECT TRIP GENERATION) PRELIMINARY SCREENING ASSESSMENT

A TDF memorandum should be submitted to the lead agency and DOT for review and approval, identifying the land use types (dwelling units for residential uses; square feet for commercial, retail and other land uses; seats for movie theaters; beds for hospital facilities; *etc.*), trip generation rates, modal splits, vehicle occupancy rates, temporal distribution, *etc.* The memorandum summarizes and presents generated person and vehicle trips for all peak hours. In addition, the memorandum cites all sources used in developing the TDF memorandum. Each element of the Level 1 preliminary screening assessment is described below.

311. Trip Generation

Trip generation analyses provide the estimated number of person trips expected to be generated by the proposed project over the course of the entire day, as well as during the peak analysis hours. The classification of a proposed project's daily trip ends by hour of the day is also referred to as its temporal distribution. There are several options available for obtaining the trip generation information:

- Use of existing information (*i.e.*, recently approved EISs and EASs), where the sources cited in the travel demand factors are based on a survey of a similar land use with comparable travel characteristics and are considered appropriate to be used in the trip generation analysis;
- In absence of existing information, the preferable option is to conduct original trip generation and modal spilt surveys of the same land use in a comparable setting of the City; and
- If a comparable survey site cannot be identified within the City, the rates in most recent edition of the Institute of Transportation Engineers (ITE) *Trip Generation* (the "ITE Trip Generation Report") may be used. However, care must be exercised in using the ITE *Trip Generation Report* since most of its trip generation rates are based primarily on surveys conducted in suburban settings and need to be adjusted for New York City conditions.

Additional guidance for calculating trip generation rates follows in Subsections 311.1 through 311.3.

311.1. Use of Previously Researched/ Approved Trip Generation Rates

There has been considerable trip generation analysis work done in the City to date as part of prior environmental reviews and studies and rates for certain specific land use types in specific parts of the City have been defined and approved for use on these projects. Table 16-2 presents a list of previously researched and approved trip generation rates that may be used provided that the proposed project being analyzed matches the building(s) or land uses surveyed.

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Table 16-2
Examples of Previously Approved and Researched Trip Generation Rates (Weekday and Saturday)

		Weekday Peak Hour Percentage				
Land Use	**Weekday Daily Person Trips**	**AM**	**Midday**	**PM**	**Saturday Daily Person Trips**	**Saturday Peak Hour Percentage**
Office (multi-tenant type building)	18.0 per 1,000 sf	12	15	14	3.9 per 1000 sf	17
Residential (3 or more floors)	8.075 per DU	10	5	11	9.6 per DU	8
Residential (2 floors or less)	12.6 per DU	10	5	11	13.7 per DU	8
Hotel	9.4 per room	8	14	13	9.4 per room	9
Home Improvement Store	72 per 1,000 sf	7	7	8	96.4 per 1,000 sf	10
Supermarket	175 per 1,000 sf	5	6	10	231 per 1,000 sf	9
Museum	27 per 1,000 sf	1	16	13	20.6 per 1,000 sf	17
Passive Park Space	44 per acre	3	5	6	62 per acre	6
Active Park Space	139 per acre	3	5	6	196 per acre	6
Local Retail	205 per 1,000 sf	3	19	10	240 per 1,000 sf	10
Destination Retail	78.2 per 1,000 sf	3	9	9	92.5 per 1,000 sf	11
Academic University	26.6 per 1,000 sf	16	NA	26	13.5 per 1,000 sf	16
Cineplex	3.26 per seat	1	3	8	6.25 per seat	5
Health Club	44.7 per 1,000 sf	4	9	5	26.1 per 1,000 sf	9
Television Studio	10 per 1,000 sf	12	15	11	NA	NA
	Daily Vehicle Trips				**Saturday Daily Vehicle Trips**	
Truck						
Local Retail	0.35 per 1,000 sf	8	11	2	0.04 per 1,000 sf	11
Office	0.32 per 1,000 sf	10	11	2	0.01 per 1,000 sf	11
Residential	0.06 per DU	12	9	2	0.02 per DU	9

NOTES: NA = Not Available; DU = Dwelling Unit
These trip generation rates are for all boroughs.
The truck trip generation rates are based on the use of a 50-50 directional split.

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Trip generation rates should be based on information for generally similar facilities. There may also be a condition to the specific proposed project being analyzed that makes its trip generation expectations significantly different from those listed in Table 16-2. For example, the trip generation rate cited for midtown office space may not be appropriate for back-office space outside Manhattan, or even within Manhattan, since back-office space generally does not generate the same number of visitor and business trips that general office space does.

Should the survey for the source cited be considered "stale" by the lead agency, in consultation with DOT, it is recommended that an original survey be conducted for the same land use in a comparable setting of the City. In addition, all findings from this survey should be provided to the lead agency and DOT.

It is also appropriate to determine the number of truck and van deliveries generated by a proposed project separately from the trip generation/modal split analyses. In order to obtain accurate truck trip generation rates for a proposed project, it is recommended that original surveys of a similar existing facility be conducted. Truck trip generation rates cited in the 1969 Wilbur Smith and Associates' Motor Trucks in the Metropolis and the Federal Highway Administration's 1981 Curbside Pick-up and Delivery Operations and Arterial Traffic Impacts have been used previously in EASs/EISs, but are not recommended for use due to the staleness of the information. For projects that generate predominantly heavy vehicles, such as trucks and/or buses, the PCE factors should be applied to determine the number of new vehicle trips (see Table 16-3). Examples of these types of projects include a warehouse, waste transfer facility, freight or bus terminal, *etc.*

311.2. Conduct of Original Surveys

As indicated previously, if usable trip generation rates are not listed in Table 16-2 and are not available from other surveys, or the available trip generation rates are considered "stale," conducting original surveys in comparable settings is the recommended course of action. Although conducting such a survey may seem rather straightforward, it often calls for considerable judgment. In general, it is not easy, or necessary, to find a survey target that is perfectly comparable to the proposed project in its study area. Due to the many variables of a survey, the lead agency should submit the scope and format to DOT prior to conducting the survey. Factors to consider in selection of a survey site and proper use of survey data include:

- Is the facility to be surveyed comparable to the proposed facility?
- Is the site of the facility to be surveyed comparable in its transit service availability and its modal split characteristics to the site of the proposed project?
- Is the size of the site to be surveyed comparable to that of the proposed project, and does any difference in size play a role in trip making to and from the site?
- Are the hours and operation of the survey site similar to those of the proposed project?
- Is the on-site parking area of the site to be surveyed comparable to that of the proposed project?

For example, if a project would facilitate creation of a hospital on Queens Boulevard, it may be possible to find another hospital along the same corridor that is equivalently sited with regard to bus and subway service. However, if there is not a similarly sited hospital along the same corridor, the survey could be conducted at a hospital located in another neighborhood that may be assumed to have similar modal split characteristics to those of the proposed project.

In determining whether that hospital is appropriate to survey, a number of other factors should be considered. For example, is the hospital to be surveyed of a comparable size to that of the proposed project? Does the hospital to be surveyed have functions and health care facilities generally comparable to the one being proposed? If one is a teaching hospital while the other is not, the former may generate more or fewer trips during key periods of the day.

It may also be necessary or advisable to survey more than one facility deemed potentially comparable to the proposed project in order to make a reasoned judgment as to where the proposed project would fit within the available range of data.

In conducting a trip generation survey, there are several important considerations to keep in mind:

- The survey should be conducted for two typical midweek days throughout the normal business hours and, if applicable, include a weekend day for the type of facility being surveyed. If the data from the survey are not consistent, then a third midweek day survey may need to be conducted to confirm the appropriate trip generation.

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- All entry and exit points should be covered--not just the main entrance/exit location--so that all trips are recorded.
- All person and vehicle trips should be recorded separately at their respective entries and exits in 15-minute intervals throughout the survey period, since they are eventually translated into arriving and departing person and/or vehicle trips.
- Vehicle occupancy should be recorded for each entry and exit vehicle.
- Weather conditions should be noted along with any other occurrences that may affect the volume of trip-making on the survey day, since adjustments may be needed afterward.

The survey methodology, data, significant findings and assumptions should be summarized in a memorandum for submission to the lead agency and DOT. Often, this body of information serves as supporting documentation for the analyses and may subsequently be used by others.

311.3. Use of the ITE Trip Generation publication

If a comparable survey site cannot be identified within the City, the rates in the ITE *Trip Generation Report* may be used. The ITE Trip Generation Report contains auto trip generation rates for a wide range of land uses, but most of these rates reflect nationwide averages based on surveys conducted in suburban settings, often with little or no available public transportation. Therefore, these rates may not be appropriate for the urban character of New York City. However, the rates may be useful for interpolating rates or factors that are not available (such as deriving Saturday rates when only Sunday and weekday rates are available, or certain temporal distributions), provided the rates are adjusted for New York City conditions. In using the ITE trip rates, which are usually presented as vehicle trips rather than as person trips, the data should be adjusted for local modal split characteristics in the proposed project's study area. Therefore, it is recommended that the lead agency consult with DOT before using the ITE *Trip Generation Report*.

311.4. Linked and Pass-By Trips

The determination of a proposed project's generation of person trips may need to recognize that a percentage of its trip generation may be considered either "linked trips" or “pass-by trips” for certain types of development, particularly retail or commercial. Person linked trips are trips that have multiple destinations, either within the proposed development site or between the development site and existing adjacent sites. Pass-by trips are trips that are already present on the adjacent network, have direct access to the site and enter the site only as an intermediate stop on the way to their final destination. If it can be clearly demonstrated that there would be a proportion of true ‘pass-by’ trips that are already on the network, then these trips may be deducted from the total site-generated vehicle trip ends for the development.

For example, a proposed retail component in a mall would be expected to generate vehicle trips to it on the basis of its expected trip generation rate, yet a portion of these trips may not be newly generated because some of the vehicle trips to the mall’s retail component may be trips that are already made from another component in the mall and may now include an additional “link” to it. This phenomenon may be reflected in the analyses by either a higher "walk" modal split percentage for the proposed project or by dividing the project's overall trip generation into "linked" and "non-linked" components and assigning them separately to the study area network. Up to 25% of “linked and/or pass-by” trip credit for retail developments is allowed, unless valid information based on an original survey support a higher linked and/or pass-by trip credit. Care must be exercised in determining whether the linked trip credit should be applied to the total person trips or to a specific mode of travel.

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312. Modal Split

Modal split analyses provide information on the travel modes likely to be used by persons going to and from the proposed project, including autos, taxis and livery services, subways, buses, ferries, commuter rail, bicycles, and walking. These modes are considered in terms of percentages—*i.e.*, what percent of the total number of people traveling to and from the site would travel by that particular mode. The modal split percentages are then applied to the hourly trip generation estimates to determine the number of persons traveling to and from the site by each mode for each of the analysis peak hours. It is important to remember that pedestrian trips refer not only to walk trips (people who walk all the way from/to their starting point to/from the project site), but also to the pedestrian component associated with walking between the site and other modes of travel, such as the subway station, bus stop, or parking facility (unless on-site parking is provided). Thus, the number of pedestrian trips to be included in the pedestrian analysis should include the combined assignments of all pedestrian trips (which include pure walk trips as well as the pedestrian component of all other modes).

A subsequent step applies to both traffic and transit. For traffic, an average vehicle occupancy factor is applied to the number of persons using autos or taxis/livery services to determine the number of vehicles that the proposed project would generate for each peak hour. For transit, bus trip generation also considers subway-to-bus transfers for sites substantially distant from the nearest subway station.

For many combinations of land use types and geographic locations within the City, there are previously researched modal splits available for use. For other combinations, there are sources of information that may be investigated. Similar to the previous discussion on trip generation, there is a significant body of data available from previous EASs/EISs, as well as other databases including the U.S. Census (the annual American Community Survey (ACS)) and the New York Metropolitan Transportation Council (NYMTC) Household Interview Survey (HIS). Census data, described below, provides substantial data on mode choice for journey-to-work/reverse journey-to-work trips in different parts of the City and is useful for analysis of both residential and office uses. The HIS provides a snapshot of typical household travel patterns for all purposes (work and discretionary travel). However, care should be exercised prior to using this information since the data set includes the travel patterns of the suburban counties surrounding New York City; it is recommended that the lead agency consult with DOT prior to using this data. Sometimes, an original survey is needed. It is emphasized that the City has undergone a noticeable mode shift resulting in a higher transit ridership, walk, and bicycle trips. Therefore, it is recommended that a trip generation survey with an emphasis on modal split be conducted to verify the modal split used in previous EASs/EISs. In no case should modal split data more than ten years old be used.

312.1. Use of U.S. Census Bureau's American Community Survey

Another important source of modal split information is the U.S. Census Bureau's American Community Survey, which contains data on journey-to-work trips by mode for each census tract in the City. Therefore, journey to work modal split percentages can readily be obtained for residential projects for any study area. It is also possible to obtain reverse journey-to-work information for a particular census tract, which provides information on how people travel to a workplace. These data are used to determine modal split characteristics for residential and/or office spaces proposed in a given area. Updated census data may be obtained from the New York City Department of City Planning (DCP). U.S. Census transportation data by New York City census tract is available on the DCP website. These data are also available on the U.S. Census website.

312.2. Use of Previously Accepted Modal Splits

Because there has been a considerable amount of survey and analysis work done on previous studies, researched modal splits are available for use for various combinations of proposed projects in certain parts of the City. If the survey for the source cited is considered "stale" by the lead agency, in consultation with DOT, it is recommended that an original survey be conducted.

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In certain cases, previously accepted modal splits may need to be adjusted if there is a special aspect of the proposed project that calls for its modal split to be significantly different. For example, journey-to-work modal splits for high-rise residential buildings in Midtown Manhattan may be obtained from the U.S. Census Bureau's American Community Survey. If a project proposes a similar type of building to be the residence of foreign consuls or diplomats, it may be appropriate to modify the modal split to reflect a heavier reliance upon vehicular travel because a significantly higher use of autos, taxis, livery and limousines services is expected in lieu of mass transit for this population.

In other cases, recent initiatives by the City, including Select Bus Service (SBS); expansions to the bicycle route network; and improvements to public transportation, pedestrian and bicycle facilities, are expected to change modal splits in affected areas and should be reflected in the travel demand factors.

312.3. Conduct of Original Surveys

In the absence of previously accepted modal splits, it is recommended that original surveys of modal splits for the same type of land use as the proposed project be conducted in the same or comparable setting. When a proposed project is similar to land uses that currently exist in the study area, this is relatively straightforward task. If not, a similar study area with similar travel characteristics and mass transit availability should be identified in preparing an appropriate modal split survey. This is generally the case when the proposed project includes a land use that is either unique (*e.g.*, an amusement park), unique to the proposed project's study area (*e.g.*, a hotel in the downtown section of St. George, Staten Island), or the survey source cited for the modal split for the land use is considered "stale." If this is the case, the guidance regarding the conduct of trip generation surveys in Subsection 301.2 is also appropriate here.

In conducting modal split surveys, it is important to determine the mode of travel both to and from the site being surveyed. For several land use types, there may be a tendency for people to travel there by one mode and leave by another. For example, a proposed restaurant, concert hall, or entertainment facility in midtown Manhattan may cater to a primarily transit and walk-in population when patrons arrive at 6:00 p.m. or 7:00 p.m., but may be significantly more taxi-oriented for their departures later at night.

The same facility may also have different modal split and vehicle occupancy characteristics by time of day. For the same midtown eatery/entertainment facility cited above, the heavy walk-in trade during the daytime may be replaced by a significantly higher auto-oriented clientele at nighttime. Daytime arrivals by taxi may be mostly single individual arrivals, while nighttime arrivals may be more multi-person groups.

Consequently, it is important that surveys consider the nature of the facility being surveyed, as well as how its activity patterns, clientele, surrounding area and transit services change by time of day for the analysis hours being studied.

Many of the same guidelines cited in Subsection 342 for the selection of traffic count days are also appropriate for trip generation and modal split surveys. Days and hours of operation typical for that facility should be chosen for survey. Consultation with the lead agency and DOT is recommended prior to conducting the survey.

Other factors to consider when preparing for, and conducting, modal split surveys include:

- Survey staff should be properly positioned. For example, if people traveling to a particular building by subway typically approach the building from its west side, positioning survey staff on the east side of the entrance to the building may result in missing several or many subway trips.

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- All entry and exit points should be surveyed. Although a building's rear door may look inconspicuous, it may in fact be used by a substantial number of people who get off the subway on that side of the building or people who park in a garage on that street.
- Weather conditions should be noted since they may play a significant role in the decision of how to travel to work, particularly on days with inclement weather.
- Survey staff should be directed not to approach people selectively, *i.e.*, to avoid a tendency to approach people based on their age, race, or sex, since this may bias the findings of the survey. One acceptable strategy is to approach every second or third person in order to not statistically bias the survey.

It is recommended that trip generation and modal split surveys be conducted concurrently. This helps to provide an understanding of whether the particular modal split characteristics surveyed represent a particularly busy day or light day at the site. It is possible that for major trip generators, choice of travel mode may be influenced by the patrons' expectations of travel to the site and to the area.

Studies have found that some people would use bicycles to travel to work if bicycle facilities were available at their place of work instead of using other modes, such as driving. Such facilities may include: bicycle storage areas (racks, bicycle lockers, storage room), locker rooms, and showers. Use of bicycles depends on the distance that a person must travel. As part of PlaNYC, DOT promotes bicycle use by designing and installing new bicycle lanes and racks throughout the City. In addition, DCP has approved a zoning text amendment, Article II, Chapter 5, Section 25-80, requiring on-site bicycle parking facilities.

312.4. Use of the NYMTC Best Practices Model

For projects that would cause major changes in regional and citywide travel patterns (*i.e.*, Congestion Pricing), it may be appropriate to use NYMTC's *Best Practices Model* (BPM) to determine shifts in travel patterns and mode choice arising from the proposed project. It is recommended that the lead agency consult with DOT if the BPM is proposed to be used for analysis of mode shift or traffic diversions.

312.5. Determination of the Trips by Travel Mode

Once the modal split characteristics of a proposed project have been determined on a percentage basis, the number of trips by mode is determined by multiplying the number of person trips to be generated in each analysis hour by the modal split percentage. This yields the number of persons traveling by each mode (*i.e.,* auto, taxi, bus, subway, walk and bicycle and, for certain projects in unique settings, by rail or ferry). To determine the number of vehicles—*i.e.*, autos and taxis—generated in the analysis hours, an average vehicle occupancy factor is applied. This factor differs for different land uses and in different parts of the City. As one example, average auto and taxi occupancies of 1.65 and 1.40, respectively, have most often been used for office and residential projects in Midtown Manhattan.

At the conclusion of this analysis element, it is advantageous to summarize in a table the number of person trips by mode (*i.e.*, auto, taxi, subway, bus, walk, bicycle, and others) and vehicular trips by characteristic (*i.e.*, auto, taxi and truck) for each of the analysis peak hours, both to document the number of trips generated and to facilitate the subsequent trip assignment task. For projects requiring an air or noise analysis, further categories of vehicles would likely be needed.

313. Determining Whether Further Analysis is Necessary

This subsection, based on the above trip generation and modal split assessments, determines whether further study of any of the following technical areas of the transportation system is necessary:

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313.1. *Traffic*

If the proposed project would generate fewer than 50 peak hour vehicle trip ends, the need for further traffic analysis would be unlikely. A trip end is defined as a vehicle (*i.e.*, auto, taxi, truck, *etc.*) traveling to or from a site. Should the vehicle travel to and from the site within the same peak hour (*i.e.*, auto pick-up/drop-off, taxi-trip, *etc.*), two trip ends (one in, one out) are included. However, it should be emphasized that proposed projects affecting congested intersections have at times been found to create significant adverse traffic impacts when their trip generation is fewer than 50 trip ends in the peak hour, and therefore, the lead agency may require further analysis of such intersections of concern.

For proposed projects that generate a significant number of trucks and/or buses, which are considered to be "equivalent" to more than one car, such vehicle trips should be converted to Passenger Car Equivalents (PCEs) to determine if the 50 peak hour vehicle trip end threshold is exceeded. Table 16-3 lists the suggested PCE factors.

Table 16-3
Passenger Car Equivalents (PCEs)

Vehicle Type	PCE Factor
Personal Auto	1.0
Trucks/Buses with 2 Axles and Waste Collection Vehicles	1.5
Trucks/Buses with 3 Axles	2.0
Trucks with 4 or more Axles	2.5

* PCE factor for waste transfer trailers should be determined based on number of axles.

It should be noted that an auto trip to a parking garage or lot is considered one trip end, whereas a drop-off by auto is two trip ends (one in, one out). Similarly, most taxi trips are two trip ends. However, in the Manhattan CBD (south of 60th Street) a 50 percent taxi overlap (inbound full taxis are assumed to be available for outbound demand) is a standard practice, whereas all other taxi movements are empty taxis. Further, in the vicinity of inter-modal facilities (such as the Grand Central Terminal, the Port Authority Bus Terminal, Penn Station, the South Street Ferry Terminal, *etc.*) up to a 75 percent taxi overlap would be applicable. For Manhattan north of 60th Street and other CBDs, a 25 taxi overlap is acceptable. In all other areas of the City, the taxi overlap assumption is not permitted.

If the combination of projected trip generation (50 or more vehicle trip ends per peak hour) and location of the proposed project indicates the potential for a significant traffic impact, a Level 2 Screening Assessment, described in Section 320, should be conducted before undertaking a quantitative traffic analysis.

313.2. *Transit*

According to general thresholds used by MTA agencies, if the proposed project is projected to result in fewer than 200 peak hour subway/rail or bus transit riders, further transit analyses are not typically required as the proposed project is considered unlikely to create a significant transit impact. For generic projects that affect more than one neighborhood, the 200-rider threshold would generally be applied on a per-neighborhood basis. If a generic project would result in an increase of fewer than 200 riders per neighborhood, but the combined ridership impact on a single subway or bus route is 200 or more riders, an assessment is still required.

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For example, consider that a generic project affecting the neighborhoods of Prospect Heights and Park Slope in Brooklyn would result in an increase of 199 transit riders in each neighborhood. Based on the location of the project, it is expected that all of the transit riders from both neighborhoods would use the 7th Avenue Station of the B/Q Lines. In this example, although on a per-neighborhood level the programmatic project would fall below the threshold, the cumulative impact on a single subway station would be 200 or more riders, and further transit analysis would be required.

It is also possible that higher transit trip projections would not be expected to impact transit services, especially for stations, bus or subway routes that are not heavily patronized today. Should the projected transit ridership be deemed clearly unlikely to produce significant impacts, this finding should be documented and further analyses would not be needed. If the proposed project might have a significant impact, a Level 2 Screening Assessment should be conducted before undertaking a detailed transit analysis.

313.3. Pedestrian

For pedestrian elements, pedestrian trips include not only "walk" trips, but also trips of other modes that usually have a pedestrian component. For example, subway trips have a walk component from subway stations, bus trips from bus stops, and vehicle trips from parking facilities (except where on-site parking is provided). If the proposed project would result in fewer than 200 pedestrian trips during the analysis peak hours, a further detailed analysis would be unnecessary. However, under all circumstances, if the project proposes to remove or reduce capacity of a pedestrian element (for example, reducing the width of a sidewalk), then further analysis is necessary. Should the proposed project result in 200 or more pedestrian trips during the analysis peak hours, a Level 2 Screening Assessment should be conducted before undertaking a detailed pedestrian analysis.

The above thresholds for pedestrian elements assessment do not apply for new or expanded schools, for which detailed pedestrian analyses are typically required. These analyses should concentrate on safety and operations of pedestrian elements (*i.e.*, intersections with high number of pedestrian accidents, uncontrolled pedestrian crossing(s), narrow sidewalks, non ADA-compliant pedestrian ramps, *etc.*) along principal access routes to/from the school. For example, the route between a new high school and the nearest subway station(s) should be assessed. This analysis should be coordinated with the traffic analysis.

313.4. Parking

An on- and off-street parking analyses may likely be needed if the proposed project exceeds the development densities identified in Table 16-1 and a quantified traffic analysis is necessary based on the Levels 1 and 2 Screening Analyses.

320. LEVEL 2 (PROJECT GENERATED TRIP ASSIGNMENT) SCREENING ASSESSMENT

When a proposed project exceeds 50 peak hour vehicle trip ends or 200 peak hour pedestrian or transit trips as determined by the Level 1 Screening Assessment, a Level 2 Project Generated Trip Assignment Screening Assessment should be prepared to determine whether a detailed assessment of any technical areas is warranted. Project generated vehicle and pedestrian trips should be assigned to the traffic network for all peak hours in which the proposed project exceeds the Level 1 Assessment. Project-generated transit trips should be assigned to specific stations and lines and specific entrances within each station. Bus trips should be assigned to specific bus routes (by direction) and bus stops.

321. Trip Assignment

This element of the assessment entails the routing, or "assignment," of vehicular and/or pedestrian trips by each travel mode to specific roadways; subway/rail lines and stations; bus routes; sidewalks, crosswalks and intersection corners; and bicycle and parking facilities en route from their origin to their destination. To estimate which

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roadways, transit services, pedestrian elements, or parking facilities are likely to be used and the extent to which each of these facilities/services would receive project-generated trips, origin-and-destination (O&D) studies should be used. Prevailing vehicular, transit, and pedestrian traffic volume patterns in the area should be reviewed and may be used as a guide in developing the origin-destination patterns. If the proposed project would generate truck trips, the trucks should then be assigned to designated truck routes.

321.1. Trip Origins and Destinations

The first step in the trip assignment process is to determine the extent to which trips to the project site would be made from various parts of the metropolitan region. The best source of this information, if available, is origin and destination (O&D) data, or information about the location where a trip began and the location where it would end. Such data may be readily available for certain parts of the City that have been previously studied or surveyed. An example of this is Midtown Manhattan office space, for which there exists a body of information on what percentage of Midtown's employees typically come from Manhattan, the other boroughs, New Jersey, Long Island, *etc.* This information has been derived from the U.S. Census (*i.e.*, reverse journey-to-work data) or other O&D surveys. The U.S. Census also contains information on where residents of individual census tracts work, which gives the same information for journey-to-work trips. Yet, it is also important to note that the O&Ds—or regional distribution—of transit trips may be very different from that for traffic activities. For example, a project located in Midtown Manhattan may draw 30 percent of its total trips, or even 30 percent of its transit trips, from the borough of Manhattan, but only 1 or 2 percent of its auto trips from that same borough because Manhattan residents are unlikely to drive to work in the same borough.

Another potentially useful source of general information about regional O&D patterns and trends is the NYMTC Household Interview Survey (HIS). Additionally, O&D data may be extracted from NYMTC's BPM for any appropriate analysis year, via such procedures as Subarea Extraction and/or Select Link Analysis for affected roadways. However, it is recommended that the lead agency consult with DOT before this approach is taken to ensure that any use of the BPM is appropriate.

It is also possible to survey O&D patterns of a comparable site, similar to the types of surveys outlined regarding trip generation and modal split. Such surveys would ask travelers where their trip originated from (*i.e.*, for surveys conducted at a work site for a commercial project) or where their trip was destined to (*i.e.*, for surveys conducted at a residential building for people en route to their work places). The survey would also ask the trip purpose because there may be important differences identified between work trips and recreational, educational, or other trips.

Many of the same survey guidelines discussed previously are followed, such as finding and surveying a similar type of facility in the same study area as the site of the proposed project. In this case, the O&D data to be obtained and applied to a proposed residential building in Flushing should be obtained via surveys of a residential building in Flushing, and not in Astoria, because the choice of traffic routes are different. On the other hand, a more unique type of proposed project, such as an amphitheater in the Coney Island area of Brooklyn, may not have a comparable survey location in the same area. In this case, information could be drawn from either similar types of facilities elsewhere in the City or different types of recreational/entertainment facilities in Brooklyn or Queens to make a reasonable and reasoned judgment for the specific proposed project being analyzed.

For certain projects, the sponsors or developers of the project may have conducted market studies that indicate the likely distribution of its users. Such studies may be used as a surrogate for new O&D studies. Once such O&D or market analysis data have been obtained, these may be used as the basis for the more specific traffic assignments that follow, which are presented below.

As part of many larger regional transportation studies, travel models have been developed that simulate the routes expected to be used by projected future projects. These studies may use one of sev-

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eral models that are currently in use nationally. The objective of these models is to define the travel characteristics of individual links in the regional roadway network to simulate how people decide to use specific routes and, thus, to predict how future trips would likely be made. They are generally beyond the means or required scope of the type of analyses covered in this Manual, unless the proposed project's sponsor/analyst team independently chooses to develop such a model. The analyst should contact DOT, NYSDOT, DCP or NYMTC to identify whether any recent studies have such modeled O&D information available for public use.

321.2. Assignments

Once the trip origins and destinations have been established, the assignment of both vehicular trips to specific streets and through specific intersections, transit trips to specific subway/rail, commuter and/or bus lines, and walk trips to particular pedestrian elements is conducted. This assignment is generally accomplished using the judgment of an experienced traffic professional.

The standard method for assigning trips is described in the following sections. In some cases, it may be appropriate to supplement professional judgment with the use of a micro-simulation model (Section 321.1.5) that captures the routing of traffic under complex, congested conditions.

321.1.1. STANDARD METHOD FOR TRAFFIC ASSIGNMENTS, USING PROFESSIONAL JUDGMENT

First, the major routes available to approach or depart the study area from each of the major trip origins or destinations are identified. For example, if the proposed project is a shopping center in downtown Flushing and available O&D sources indicate that 30 percent of the traffic would likely come from Long Island, the westbound Long Island Expressway and Grand Central Parkway would be identified as the major routes available to these travelers.

Next, the traffic assignment process identifies the "target" for which motorists would aim to park their cars. If this is an on-site parking garage, the most direct routes to it would be identified for each arriving vehicular component. In some cases, there may be a single desirable route to the site, while for other cases there may be two or more reasonably equivalent alternatives. The site-generated traffic would be assigned to each of these likely routes (percentage-wise) to the extent deemed appropriate.

A proposed project may have multiple parking facilities available to it, both on-site and off-site. In this case, the assessment considers how specific arrival routes could link up with the different parking sites via a reasoned judgment as to where motorists coming from different directions are likely to park. If a site has multiple parking facilities available to it, more cars cannot be assigned to any of them than its capacity can accommodate. If the proposed project were a corporate headquarters office space, for example, there may be assigned parking spaces, or employees may be expected to "learn," for example, that after 8:30 a.m. the closest garage always fills up and that those arriving at 8:45 a.m. or 9:00 a.m. do not touch the site but, in fact, go directly elsewhere to park. Also, note that parking lots and garages that are occupied at 98 percent of their capacity in the existing or future No-Action conditions should be considered to be “at capacity,” and therefore would be unable to attract new vehicles to the parking facility.

There are a multitude of factors that, with the motorists' point of view in mind, should be carefully considered. This traffic assignment step is the major determinant in selecting study intersections, where a proposed project could have significant impacts. Again, factors for consideration include, but are not limited to, the following:

- Where are trips to the site of the proposed project expected to originate? To where would return trips go?
- What are the major roadways expected to be used by these motorists from their individual trip origins (and to their respective destinations)?

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- Which streets are most likely to be used by motorists in getting to the project site? How do they link to the facilities at which project-generated trips would park?
- Would traffic destined for the project site be accommodated at the site's primary parking facility, or would it be necessary for project-generated trips to circulate through the study area in search of hard-to-find parking? How may such a travel pattern be "modeled" in the traffic assignment?

The definition of vehicular traffic assignments may also account for pass-by trips and diverted-linked trips in addition to a site's primary trips. The incorporation of an adjustment factor in the analyses to account for these phenomena is generally most applicable for major retail projects. Primary trips are trips made for the specific purpose of visiting the trip generator. Pass-by trips, on the other hand, are made as intermediate stops on the way from an origin to a primary trip destination. They are attracted to the site from traffic passing the site on an adjacent street that contains direct access to the generator. Diverted-linked trips are trips attracted from streets near the site but that re-quire some diversion from one street to another to gain access to the site. The ITE Trip Generation publication presents an excellent elaboration on accounting for these trips, including a range of pass-by and diverted-linked trip percentages surveyed at shopping centers and other land uses across the country. The estimates of the percentages to be used should reflect the extent of retail activity already in the vicinity of the site and volumes on adjacent and nearby roadways.

In addition to auto trip assignments, taxi and truck trips are also assigned to the street network. It is important to note that project-generated taxi and truck trips may have a very different assignment than auto trips, especially in Manhattan where most taxi trips are local. It is also important to note that all taxi trips assigned "in" to the site should also be assigned away or "out" of the site, regardless of whether they are occupied or unoccupied. DOT has recently compiled new data on the taxi O&D patterns in the Manhattan CBD. It may be helpful to consult with DOT to obtain this data.

Project-generated truck trips are routed on designated truck routes, as per DOT truck route regulations. These regulations require trucks to use designated routes for the majority of their trips until they must move onto a street not designated as a truck route to reach their final destination. NYSDOT regulations also preclude trucks and commercial traffic from using certain regional highways—generally those designated as "Parkways" or "Drives."

At the conclusion of these trip assignment steps for autos, taxis, and trucks, the assessment has a percentage assignment of the project's trip generation by each mode by roadways in the study area network. At this point, these percentage assignments are reviewed to determine whether they reasonably represent expected traffic patterns to the site, and whether there are any locations that should be included in the assessment because they would likely receive a significant amount of project-generated trips.

The last step in the trip assignment process is to multiply the project's expected total vehicle trip generation by the percentages assigned to each link and intersection in the network to determine the number of vehicular trips likely to use the area's street network. These volumes would be added to the future No-Action traffic volumes to prepare balanced future With-Action traffic volume maps for each analysis hour.

321.1.2. STANDARD METHOD FOR TRANSIT ASSIGNMENTS, USING PROFESSIONAL JUDGMENT

To assign transit trips, the subway lines that are available in each borough to serve these travelers should be reviewed to assign rail trips to the most logical routes. In cases where more than one subway line is available in a given area, appropriate percentages may be assigned to each of the lines. Once rail trips have been assigned to particular lines and stations, the passenger arrivals and departures are then routed through the station to the exit or exits most likely to be used to access the proposed project site. This routing typically covers the various platforms, stairwells, passageways or cor-

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ridors, turnstile banks, and token booth/control areas extending between the subway car and the street level. The congestion on a given stairwell or through a given bank of turnstiles is less likely to affect a subway rider's movement through the station than a traffic "choke" point would affect motorists' decisions on routes to their destination. Therefore, the most direct paths are generally used for transit trips.

In assigning rail trips as part of the platform and line-haul analyses, such trips are generally not allocated evenly to all cars or all sections of the platform while awaiting the arrival of incoming trains, but only to those platform zones and subway cars that may reasonably be expected to be used. These platform and per-car assignments reflect the entry points to the station that would be used by project-generated trips, the location of stairwells on the platforms, and possibly even the destination of riders at the end of their trip.

A similar approach is used for bus trips. The assessment considers the particular routes stopping near the project site and assign bus riders to these routes in accordance with their general destinations. It is usually possible to review the general service areas of the various bus routes serving a project site (which are themselves often a very limited number) and make a general percentage assignment of bus travelers to the various routes. In addition, the bus assignment should also consider subway transfers when sites are located some distance from the nearest subway station. Bus assignments should be reviewed to ensure that the proposed number of buses could physically be operated in the study area.

321.1.3. STANDARD METHOD FOR PEDESTRIAN ASSIGNMENTS, USING PROFESSIONAL JUDGMENT

The trip assignment for pedestrians basically picks up where the traffic and transit assignments leave off. For the weekday AM and PM peak hour (and weekday or Saturday midday peak hour for certain land uses) arrivals and departures of persons to the project site by auto, taxi, and transit, pedestrian trips from parking facilities, subway or rail stations, and bus stops are traced to the main entrances of the site, and through the sidewalk, crosswalk, and corner reservoir areas that are evaluated as part of the impact analyses. There may be additional all-walk trips that need to be assigned through the area as well. The most logical walking paths should be used.

For midday peak hour trips, it is more likely that pedestrian trips focus on local eateries, shopping facilities, and other retail establishments. For this set of analyses, connectivity to parking lots and garages and to subway stations and bus stops are far less pronounced. Therefore, a broader-brushed assignment of these off-peak pedestrian patterns may be made as part of the midday assessment.

321.1.4. STANDARD METHOD FOR PARKING ASSIGNMENTS USING PROFESSIONAL JUDGMENT

The traffic assignments also determine the number of peak hour trips that are attracted to and depart from each of the parking facilities within the study area. An hourly parking utilization analysis should be conducted for these facilities based on observations, available data, and interviews with the parking operator to ensure that these peak hour trips to each parking facility would not exceed 98 percent of the number of spaces identified as available at that time of the day.

321.1.5. ALTERNATE METHOD: USE OF MICRO-SIMULATION MODELS

For larger proposed projects that would be located in a CBD-type area or in sensitive areas (*i.e.*, schools, parks, hospitals, *etc.*), a micro-simulation model may prove useful to assign traffic to the network if the project is expected to cause the re-routing of traffic across a broad study area. Before undertaking a micro-simulation analysis, the lead agency should consult with DOT to determine whether this analysis technique is appropriate for the project. Generally, any simulation models used for CEQR analysis should follow these guidelines:

- The underlying O&D trip table should be consistent with a generally accepted model (NYMTC BPM or an existing DOT-approved micro-simulation such as the Lower Manhattan model).

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- The operating conditions (lane widths, curb conditions, *etc.*) shown in the model should match the real physical operating environment.
- The model should produce Measures of Effectiveness (MOEs) that are consistent with the MOEs described elsewhere in this chapter (*e.g.* LOS and average vehicle delay).
- The process should follow recent Federal Highway Administration (FHWA) guidance for the calibration and validation of simulation model. This ensures that model outputs do not under- or over-estimate intersection volumes.

322. Determining Whether a Detailed Analysis is Necessary

Based upon the results of the screening analyses, the lead agency determines whether a detailed traffic, transit, pedestrian or parking analysis is required. Based upon the vehicle trip assignment, intersections with fewer than 50 vehicle trips during the analysis peak hour may likely be screened out, and no further analysis would be needed for those intersections. However, it should be emphasized that proposed projects affecting congested intersections and/or lane groups have at times been found to create significant traffic impacts when the assigned trips are fewer than 50 vehicles in the peak hour. Therefore, the lead agency, in close consultation with DOT, may identify congested intersections (generating fewer than 50 vehicle trips in the peak hour) to be included in the analysis based on safety and/or operational concerns. This determination should occur at the time the TDF memo is being finalized by the lead agency. If a detailed traffic analysis is warranted, a detailed parking analysis may likely be warranted.

If, based upon the screening analysis, a proposed project would result in 50 or more bus passengers being assigned to a single bus line (in one direction), or if it would result in an increase in passengers at a single subway station or on a single subway line of 200 or more, a more detailed bus or subway analysis would be warranted.

Based upon the Level 2 Screening Assessment, projected pedestrian volume increases of less than 200 pedestrians per hour at any sidewalk, crosswalk or intersection corner would not typically be considered a significant impact and would not require a detailed analysis because that level of increase would not generally be perceptible. However, detailed analysis is necessary if the project results in pedestrian volume increases of 200 or more pedestrians per hour at any sidewalk, crosswalk, or intersection corner, or proposes to remove or reduce capacity of a pedestrian element (for example, reducing the width of a sidewalk).

330. DETAILED ANALYSIS METHODS

The following provides background information on technical areas that require a detailed analysis, guidance regarding the extent of the analysis, approaches to conducting the analyses, and specific methodologies available for use. The detailed analysis utilizes elements and methodologies that are necessary to identify the traffic, transit, pedestrian, and parking study areas, to determine the project's peak analysis hours and the required existing or new data collection for the peak analysis hours, to prepare and summarize the data into acceptable formats that reflect existing, future No-Action and With-Action conditions, and to represent the primary components of the levels of service analysis.

In some cases, surveys and analyses may overlap in two or more of these technical areas so coordination and understanding of the nature and extent of surveys to be conducted and technical assumptions to be made may be necessary between the various analyses. A discussion of factors to be considered in determining significant impacts, the approach to identifying and evaluating appropriate improvement/mitigation measures, and approaches to developing and evaluating alternatives that reduce or avoid impacts follows. It is important that facilities being analyzed, the assessment methodologies, and technical assumptions be outlined and documented as much as possible and get concurrence from the lead and other involved agencies. For some aspects of the analyses, it is possible to be fairly specific about the methodologies to be used, such as the selected capacity analysis methodology.

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The discussions on the various components of the transportation analyses are categorized by component and located, respectively, on pages 16-18 to 16-32 for traffic, pages 16-32 to 16-42 for transit, pages 16-42 to 16-47 for pedestrian, pages 16-47 to 16-48 for vehicular and pedestrian safety, and pages 16-48 to 16-50 for on- and off-street parking.

331. STUDY AREA DEFINITION

The information requested above is critical for proceeding to the next step--determining the Study Area and selection of analysis locations, including, but not limited to, streets, intersections, highway ramps, pedestrian and bicycle facilities, truck loading/unloading and parking facilities. The identification of locations and facilities to be studied and the extent of the coverage—*e.g.*, one block, one-half mile, one mile, *etc.*, from the site—is a function of the proposed project, its geographical setting, its size and its scale. It could very well range from one block to an entire neighborhood or sub-area of the City. Defining the study area calls for considerable judgment. For certain projects, there may be a need to define a primary study area and a secondary study area, with the primary area being the focus of intense analysis and the secondary area being the focus of a more targeted and less intense analysis. Specific guidance for determining the study area and analysis locations for each transportation element is discussed below in that area's assessment section.

332. DETERMINATION OF PEAK PERIODS

After the study areas are determined, the next step is the determination of peak periods, which depend on the type of project. Generally, the same peak period is used for all transportation analyses. Each peak period is typically two to four hours. However, the actual analysis is performed for a shorter time period within the peak period, such as a peak hour or peak 15 minutes, depending on the technical area (traffic, parking, rail transit, bus transit, and pedestrian). The "Analysis of Existing Conditions" section of each technical area describes the procedure for determining the analysis time period (peak hour or peak 15 minutes) within the peak periods.

For example, for residential land uses, the weekday AM and PM peak periods should suffice. For some projects, an analysis of midday traffic conditions should also be included if impacts during the midday period could be significant. For most types of retail, weekday midday, weekday PM and Saturday and/or Sunday midday peak periods should be considered. The typical weekday peak periods are 7:00 a.m. to 10:00 a.m., 11:00 a.m. to 2:00 p.m., and 4:00 p.m. to 7:00 p.m. The weekend peak period is dependent upon the proposed project's site-generated trips and adjacent roadway traffic volumes.

The standard weekday peak hours in Zone 1, as defined in Table 16-1, are 8:00 a.m. to 9:00 a.m., 12:00 p.m. to 1:00 p.m., and 5:00 p.m. to 6:00 p.m.

Other types of proposed projects (shopping centers, parks, arenas, *etc.*) are more likely to require traffic analyses at other times of the day and/or on weekends. A proposed sports arena or concert hall may also require a pre-and post-event analysis for a weeknight event, a Friday night or Saturday night event, and a weekend afternoon event. A solid waste facility may generate traffic during other off-peak periods—*e.g.*, earlier in the morning and afternoon than conventional peak commuter hours.

The setting of the proposed project also plays a role in determining the peak periods. For projects located near stadiums, peak periods on game days may need to be considered. A movie theater located in the Manhattan CBD may require a "conventional" weekday or Friday late afternoon/early evening analysis as well as a Friday night or Saturday night analysis, since even a moderate level of movie-going activity on a Friday at 5:30 p.m. to 6:30 p.m. may overlap with background commuter travel peaks, and, when compared to the future No-Action and future With-Action conditions, would create a significant adverse impact necessitating mitigation.

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340. DETAILED TRAFFIC ANALYSIS

For proposed projects requiring the preparation of a traffic analysis, the study areas to be analyzed, assessment methodologies, and technical assumptions are outlined and documented as much as possible. Typically, such documentation outlines at least the following:

- Study areas to be analyzed for potential traffic impacts. The study area(s) is based on the Level 2 (Project Generated Vehicle Trip Assignment) Screening Assessment.
- Availability and appropriateness of existing data, and the expected need (if any) to collect new data via field surveys and counts. Existing traffic data should not be more than three years old assuming no operational, geometric or land use changes have occurred since the time data was collected (See Section 730 for the sources of existing data).
- The technical analysis methodologies to be used and key technical assumptions such as trip generation rates, modal splits, average vehicle occupancies—including a preliminary projection of the number of trips to be made by travel mode during the proposed project's peak travel hours—and a first-cut trip assignment that helps to identify (preliminarily) potential significant impact locations.
- The data assembly effort and the subsequent analyses should reflect the need for close coordination of traffic, air quality, and noise analyses.

The text and tabular sections that follow provide the technical guidelines for conducting a traffic analysis.

341. Traffic Study Area

Definition of an appropriate traffic study area is probably the single most critical decision to be made, and the one in which hard guidelines are most difficult to formulate. In this work element, it is important to cover key potential impact locations with the under-standing that the study area should be appropriately sized to include potential impact locations. The traffic impact analysis should consider several primary factors in defining the study area:

- How many new vehicle trips would be generated or diverted by the proposed project in its peak hours? Since the magnitude of the projected trip generation is one guide to be considered in defining the extensiveness of the study area, this information is derived from the Travel Demand Factors memorandum prepared as part of the Level 1 Screening Assessment.
- What are the most logical traffic routes for access to and from the site (*i.e.*, its "traffic assignment")? These are traced on a map and used to identify potential analysis locations along them. This information is derived from the Level 2 Screening Assessment.
- What are the existing and/or potential problem locations (*i.e.*, congestions, excessive delays, high vehicular and/or pedestrian accident history, complex intersections, *etc.*) along these routes or next to these routes that could be affected by traffic generated by the proposed project? It is useful to review information available from previous reports and databases regarding problem locations, and it is very important to drive or walk the area during peak travel hours to make an informed determination.

The traffic study area may be either contiguous or a set of non-contiguous intersections combined into a study "area." The traffic study area could extend from a minimum of one to two blocks from the site to as much as one-half mile or more from the site. It is defined by the logical direct routes along which traffic proceeds to and from the site, and typically includes major arterials and streets along the most direct routes to the project site as well as significant alternate routes. Multi-legged intersections and other problem locations along these routes should generally be incorporated into the traffic study area. Consequently, the study area need not have a particular shape--it could be rectangular, a long and narrow area extending along a major route to the project site, *etc.*

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Although it is difficult to outline the number of analysis locations encompassed within the study area for a detailed traffic analysis, in most cases it would range from a low of six to eight intersections or analysis locations to a high of about 30 or more such locations. The six to eight analysis location guideline reflects analyses at the four corners of a typical square block site plus additional analysis location(s) along approach route(s) to the site. The 30 or more analysis location guideline reflects the potential to cover two or three avenues or streets on each side of the site, as well. It should be noted that each project is different, and the appropriate number of intersections to be selected for study should be based on the Level 2 Screening Assessment trip assignments. A small-scale project that would generate a modest volume of peak hour trips in a congestion-free area could require even fewer than the six to eight analysis location guideline. Similarly, a major development project in a congested section of the City could require significantly more than 30 analysis locations; "mega-projects" could encompass traffic study areas with 100 or more intersections. However, in the event that the study area appears to be very large and encompass significantly more than 30 analysis locations, care should be exercised that some of the intermediate locations within the area—but not on a direct route to the site—are not included unnecessarily. It is advisable to use a knowledgeable traffic expert to ensure that the traffic study area is appropriately defined.

The completion of the Travel Demand Factors memorandum (Level 1 Screening Assessment) and the Project Generated Trip Assignment (Level 2 Screening Assessment) provides a sound basis for defining the traffic study area. It is also possible to "screen out" several analysis locations at this stage of the work effort, provided that the preliminary trip generation estimates and the preliminary traffic assignments are close to their final versions. Generally, intersections with fewer than 50 vehicle trips in a peak hour may be screened out. However, the analysis should include those intersections identified as problematic (in terms of operation and/or safety) or congested, even though the assigned trips are less than the established threshold. It is also possible that once the preliminary trip assignments have been completed, the initially defined traffic study area may need to be enlarged to encompass other intersections. This is typically the case when several intersections at the outer edges of the study area are likely to be significantly impacted. However, the study area should only be expanded in consultation with lead agency and DOT.

In addition to the above operation-based guidelines, the traffic study area should also consider intersections or locations that may be problematic from the safety viewpoint. High-crash locations, if any, should be identified in consultation with DOT and the traffic study area should include these intersections. A high crash location is one where there were 48 or more total crashes (reportable and non-reportable) or five or more pedestrian/bicycles injury crashes in any consecutive 12 months of the most recent 3-year period for which data is available (for details see Section 370, “Assessment of Vehicular and Pedestrian Safety Impacts”).

342. ANALYSIS OF EXISTING CONDITIONS

Once the study areas have been defined, the analysis of existing conditions becomes the building block upon which all impact analyses are based. The objective of the existing condition analysis is to determine existing volumes, traffic patterns, and levels of service (LOS) as a description of the setting within which the proposed project would occur. It is important that existing conditions be defined precisely since this is a reflection of activity levels that actually occur today and serve as the baseline for future condition analyses that require at least some projection.

The guidelines provided below require coordination with the assessments of other transportation components if the surveys to be conducted would overlap two or more of these technical areas. This way, if different individuals are responsible for traffic, transit, and pedestrian analyses, they should each be involved in understanding the nature and extent of surveys to be conducted and technical assumptions to be made so that there are no internal conflicts within the different analyses.

The analysis of existing traffic conditions entails three key steps: (a) the assembly and/or collection of traffic, pedestrian and bicycle volume, and speed-and-delay data, physical inventory, official signal timing, *etc.* needed for the analyses; (b) the determination of volume-to-capacity ratios, average vehicle delays, and level

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of service at the traffic analysis locations within the study area; and (c) consideration of the traffic accident history in the study area.

342.1. Determination of the Peak Hour for Analysis Purposes

The first step in the analysis of existing conditions is the determination of the peak travel hours to be analyzed. For most proposed projects, the peak analysis hours are the same as the peak travel hours already occurring on study area streets, *i.e.*, the specific one hour within the morning home-to-work and the late afternoon/early evening return trip rush hour.

The traffic analysis considers the peak activity hours for the proposed project, the peak hours for background traffic already existing in the study area, and which combinations of the two may generate significant impacts. It might be the busiest hours of the proposed project superimposed on light, moderate, or heavy traffic hours that already exist. It might be more moderate activity hours of the proposed project superimposed on the heaviest existing traffic hours. Or, it might be both. To determine prevailing peak hours in the study area, the source of existing traffic volumes may either be available through 24-hour Automatic Traffic Recorder (ATR) machine counts or new counts obtained from installed ATR machines.

One means of quantitatively making this determination is to prepare a table showing existing hour-by-hour traffic volumes at a set of representative intersections within the area or at a cordon line around the area, side by side with hour-by-hour projections of the expected trip generation of the project. A comparison of the two sets of volumes would indicate: a) which travel hours are likely to be the busiest in the future; and b) at which hours would the influence, or impact, of the proposed project's trip-making levels likely be the greatest. From this comparison, potential significant impact hours—and thus the peak traffic hours to be analyzed—may be identified. Should there be multiple projects in the study area, it is recommended that common peak analysis hours be used. The lead agency and DOT should be consulted if there are multiple projects in the study area.

In some cases, the peak condition to analyze is obvious because the peak hour of the project's trip generation would coincide with the existing peak hour. In other cases, the two peak hours may be very close, and it may be proper to use the existing peak hour and later, during the impact analysis stage, to superimpose the peak trip generation of the proposed project onto the peak existing condition. In yet other cases where the two peaks are not coincidental (or nearly coincidental), a screening analysis is needed to determine which of the two peaks (the existing peak or the proposed project's peak) would reflect the worst impact condition, or whether both hours require detailed study.

342.2. Assembly and Collection of Traffic Volumes, Street Network Characteristics, and Speed and Delay Data

USE OF AVAILABLE DATA

Once the peak analysis hours have been determined, the next step in the existing traffic condition analysis is to define the volume of traffic operating within the study area, and to create traffic volume maps to be used in analyzing roadway and intersection capacities and levels of service. In starting this task, it may be helpful to review DOT traffic volume data, particularly available ATR machine counts in the area (perhaps the count data used to determine the peak analysis hours), as well as intersection turning counts and vehicle classification counts (*i.e.*, a breakdown of the total volume by auto, taxi, truck, bus, *etc.*).

A second source of data that may be reviewed very early in the analysis effort are completed CEQR documents—EISs, EASs, or other traffic impact studies conducted for projects in the study area that are available for public review through the Mayor's Office of Environmental Coordination (MOEC).

The most important criteria to be used in considering whether available traffic volume data may be used concerns the age of the volume data and the nature of changes, if any, in the street network, adjacent land uses, or traffic patterns, as discussed below:

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- In most parts of the City, volume data that are more than three years old are generally inappropriate for use in traffic studies. It is only in unusual cases where such data might be usable, such as data for a section of the City that has undergone very little change in land use and/or activity levels since the data were collected. Consultation with the lead agency and DOT is recommended prior to using any such data. The key factor is whether available data are reasonably representative of existing conditions. It is also important that the data were collected at an appropriate time of year, for a typical mid-week day, and within a full peak hour (as opposed to spot counts). The older the data are, the more necessary it should be that they comply fully with the parameters that follow below under "New Data Collection." Volume data available for a previous year may need to be adjusted to reflect conditions in the "existing" year of the study.
- Available data less than three years old are generally appropriate for analysis purposes if there have not been substantive changes in adjacent or nearby land uses or in traffic patterns and operations, that would affect traffic volumes within the study area. For example, if a major development project has been built within a few blocks of the site of the proposed project and generates a significant amount of traffic during the peak travel hours, new traffic counts are likely needed. If a nearby street has been converted from two-way operation to one-way operation or has been closed, or if a new highway ramp has been built that affects traffic volumes or patterns in the study area, new traffic counts are also likely needed. In addition, conditions in the study area at the time the available traffic counts were conducted need to be researched. If the available traffic volumes were collected at a time when traffic patterns were atypical—for example, at a time when a nearby bridge or viaduct was closed or partially closed for reconstruction—either new traffic counts are likely needed or the data collected needs to be adjusted to reflect typical conditions (it may be helpful to consult with DOT regarding the adjustment of such volume data). These examples are not intended to be all-inclusive, but should indicate that if conditions at the time of analysis are materially different from those at the time available volume data were collected, new counts are likely needed. Furthermore, new traffic counts are likely needed if new truck routes, Select Bus Service and bicycle lanes, *etc.* have been added or removed from the network since the collection of this data.
- To determine whether data older than three years are acceptable for use, the evaluation should consider whether the land use or traffic activity picture of the study area has changed over the time period in question. It is much more likely that older data will not be acceptable simply because conditions influencing traffic patterns or volumes are more likely to have occurred over this longer time frame. Therefore, such older data may be considered in only a limited number of sections of the City. And, even if accepted, it may be necessary to adjust these data for growth that occurred over this period.

NEW DATA COLLECTION

If the decision is made to collect new traffic volume data, several guidelines are presented below to help ensure that appropriate, representative traffic data are collected. The traffic data collection task is one of the most important steps in the traffic analysis process because it is of paramount importance that existing conditions be accurately portrayed. It usually takes a week or more to define the scope of the traffic count program, organize it properly (including setting up the field data sheets), and plan for any potential contingencies. This is one step of the overall impact analysis process in which major errors that are not caught in time may cause nearly all subsequent work to be redone. Field survey crews should be adequately trained prior to conducting the counts, and monitored during the counting effort to ensure a high quality data collection effort.

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- Traffic counts should reflect typical conditions at the locations being analyzed. Traffic counts taken during periods of the year within which traffic volumes or patterns are unusually low or high do not provide representative traffic data. Time periods in which traffic counts should not be taken include the weekend before Thanksgiving through mid-January and the last week of June through mid-September (coinciding with Department of Education (DOE) summer vacation). For instance, a proposed office project should not have its traffic counts conducted during the summer months when many people tend to take vacation time from work and when traffic volumes are typically lower than during the remainder of the year. Exceptions to this guideline may be considered if the peak trip generation of a proposed project coincides with one of these periods. For example, a proposed water park, marina, or amusement park should have its traffic counts taken during the summer months when traffic patterns are likely to be representative of future background conditions, or a development in a recreational area such as Coney Island or the Rockaway's should be analyzed under summer conditions. It should be noted that this seasonal analysis precludes the need for a typical period analysis.

  Although it is possible to adjust field-collected traffic counts for seasonal variation, it is noted here that such adjustments are not necessary if the traffic counts have in fact been collected on typical days within a typical period of the year for that land use. It usually is preferable to rely on typical day counts rather than on seasonally-adjusted counts.

- Weekday traffic counts should generally not be taken on a Monday or Friday, since there is a tendency for volumes to be different on those days than on more typical weekdays, *i.e.*, Tuesdays, Wednesdays, or Thursdays. Traffic counts should neither be taken on any holiday where traffic may historically be lower or higher than on typical days, nor on the day before or day after that holiday because people tend to take an extra day off or leave work early on those days. National holidays such as Memorial Day, Labor Day, Independence Day, *etc.*, are included on this list, as are others that are significantly observed in New York, such as Martin Luther King, Jr. Day and Rosh Hashanah (Jewish New Year). Some judgment should be exercised for holidays that are not considered major. Traffic counts also should not be conducted during periods when extensive construction work or bad weather significantly alters traffic patterns, unless reasonable adjustments to the count data may be made.

  Traffic counts should not be collected during special events, such as street fairs that impact vehicle, pedestrian and bicycle traffic in the study area. It may be helpful to consult with DOT to confirm any scheduled upcoming street closures due to special events.

- Manual traffic counts should also not be conducted on days when inclement weather influences people's driving patterns. For example, traffic counts on snow days or on days for which snow has been predicted (even if it does not materialize) should be avoided. Rainy day counts should also be avoided, but if the counts are already under way once it has begun raining, the volumes collected may be generally considered acceptable since the weather has probably not influenced a significant number of people to drive or not to drive. However, if the counts are collected for air quality analysis, care should be exercised as speed data collected under wet roadway surface conditions may not be useful since drivers exercise caution and tend to drive at lower speeds.

- Weekday traffic counts should be conducted over a sufficient number of days to be considered representative of a typical day. Historically, weekday traffic counts have generally been taken over three mid-week days to ensure that a representative day is reflected in the traffic volume analyses, and so that any abnormality in a given day's worth of counts may be identified and adjusted (or discarded). For example, three mid-week days of counts may be taken in one of two ways: a) three days of manual counts that are subsequently averaged to

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reflect a typical day; or b) one day of manual counts collected concurrently with a nine-day 24-hour Automatic Traffic Recorder (ATR) machine count (to collect two weekends of data where necessary), from which adjustments to the one-day manual count may be made. In the latter example, it is advisable to collect validation manual counts at one or more control intersections (but no more than 20 percent of the intersections in the study area) on a second day. ATRs should be placed at sufficient number of locations covering all major street approaches as well as representative minor street approaches. Generally, ATRs should be placed on approach leg(s) of an intersection rather than the departure leg(s).

Before adjusting one day of manual counts to reflect several days of ATR counts, the entire body of data collected should be reviewed to make sure that there was no "event" going on at the time the counts were taken that would significantly alter the accuracy of the counts. Such events could include the malfunctioning of the ATR machine for a period of time, vandalism to the ATR machine, a street opening for utility repairs that would narrow the number of lanes available and therefore limit the volume of traffic that passed through the area, *etc.* This need not be a lengthy review providing that the proper agencies and/or news services have been contacted to determine that nothing unusual was planned for the count day or occurred on that day. It should be noted that ATR counts taken during constrained or congested traffic conditions or on wide roadways carrying more than three lanes may give inaccurate and misleading results and should be field verified and/or calibrated.

- Weekend traffic counts should be conducted for more than a single day to be considered reasonably representative of a typical weekend day. However, one weekend day of manual counts could be sufficient if the ATR data collection is conducted over a nine-consecutive day period including two full weekends. For those types of proposed projects with activities that extend at generally equal levels over several hours, and for which a particular peak hour is not easily discernible, the manual count period should extend over all hours that could potentially comprise the peak hour for the study area and/or the proposed project.
- Manual traffic counts taken at study area locations for the purposes of determining the volume of through and turning traffic should be conducted over the course of the full peak period, from which the peak hour is derived. Manual counts should not be counted for a shorter period of time and then factored upward to reflect the peak hour worth of data. The counts should generally be taken over a minimum of two full hours per peak period, overlapping the projected peak hour plus at least 30 minutes on each side of the peak (*i.e.*, 7:30 a.m. to 9:30 a.m. for a projected 8:00 a.m. to 9:00 a.m. peak hour), to ensure capturing any peaking that could occur at the beginning or end of the peak hour. The additional 30 minutes of data on either side of the peak allow confirmation that the peak hour has been covered.
- Manual traffic counts taken at study area locations for the purpose of identifying the mix of vehicles (autos, taxis, buses, trucks, bicycle *etc.*)—also referred to as "vehicle classification counts"—may be taken for less than the two hours discussed above because vehicle mixes at a given location are usually not subject to wide fluctuations over the peak hour. Usually, vehicle classification counts should be conducted for each movement per approach for a minimum of one hour in 15-minute intervals.
- If an air quality or noise analysis is required, more detailed vehicle classification counts would be necessary. See Chapter 17, “Air Quality,” and Chapter 19, “Noise,” for more details on the required classifications. The New York City Department of Environmental Protection (DEP) should also be consulted. It should be noted that the peak hours of noise analysis may not coincide with the peak hours of traffic.
- Vehicle occupancy needs to be determined for transit-related projects (for example, Select Bus Service) which may include person-delay by approach to demonstrate project benefits

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(see Subsection 331.3 for person-delay). For some locations this information may already be available (such as for Midtown Manhattan from the NYMTC Hub-Bound report).

- All traffic data collected for the preparation of a CEQR traffic analysis should be provided, in tabulated form, to the lead agency and DOT. Volumes collected by Automatic Traffic Recorder (ATR) devices should be delivered per the certified NYSDOT format, with station numbers and GPS coordinates to identify the count location.

PREPARATION OF PEAK HOUR TRAFFIC VOLUME MAPS

Once all of the traffic volume data have been assembled and/or collected, the next step is to prepare traffic volume maps for each of the peak hours for which the proposed project is evaluated. As described previously, the preliminary choice of peak periods (from which the peak hours are derived) is generally made at the very outset of the project when study areas are defined.

Once the data collection effort is complete, the analysis returns to the initial identification of the peak hours to be analyzed, reviews the data collected, and then determines the precise peaks to be analyzed. For traffic, these peak hours are usually identified to the nearest 15 minutes, *i.e.*, 7:15 a.m. to 8:15 a.m. rather than simply 7:00 a.m. to 8:00 a.m. Then, all of the peak hour volumes are plotted on a map of the study area, including all through and turning volumes at each location counted to present a total picture of traffic volumes throughout the study area. These traffic volume maps may then be "balanced" so that volumes at adjacent intersections are consistent with one another. For example, if the northbound through volume on Sixth Avenue at 43rd Street in Manhattan is 2,000 vph and there are 200 vehicles turning onto Sixth Avenue from westbound 43rd Street, the northbound volume on Sixth Avenue at 44th Street should be exactly 2,200 vph, provided that there are no parking garage entrances or other places for vehicles to leave the street network between 43rd and 44th Streets. Midblock activities such as driveways, parking garages/lots, *etc.*, should be identified and factored into the traffic volume maps. These activities are known as “sinks” and “sources.”

These balanced traffic volume maps are key inputs for determining volume-to-capacity (v/c) ratios, average vehicle delays, and levels of service (LOS) for the study intersections.

STREET GEOMETRY AND PHYSICAL INVENTORY

As part of the overall data assembly/data collection effort, information on the street network is needed. This provides a description of what the area's traffic network "looks like" and how it is sized to accommodate traffic flow. It also becomes an additional set of inputs to the determination of street capacity and traffic level of service. Data to be collected varies depending on the capacity analysis methodology used, but generally includes the following:

- The lane widths, number of travel lanes, designated truck routes and direction of each street in the study area and along the major routes into the study area. For added clarity, the direction of streets should be presented graphically, while street width information may be presented in either graphic, tabular, or text format, whichever is clearer. It is preferable that this information be presented graphically and should be legible and neatly prepared.
- The location of traffic control devices, such as traffic signals, stop signs, yield signs, turn prohibitions, *etc.*, should be illustrated graphically. For signalized intersections, signal cycle length, phasing, and timing are needed to conduct capacity analyses. Official signal timing data should be obtained from DOT and field-checked; consultation with DOT is advisable should there be discrepancies between the two sets of timings.
- Restricted lanes, such as part time bus lanes or bicycle lanes.
- General on-street parking regulations as well as parking maneuvers in the area and on the blocks leading to and away from the intersections being analyzed (more detailed parking inventories are needed for the parking analyses and are outlined later). The presence of bus

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stops and fire hydrants is accounted for in the traffic and parking capacity analyses. It is preferable that this information is presented graphically, although it is also acceptable in tabular format or in text within the analysis documentation.

- General pavement or alignment conditions along the major roadways in the area that affect traffic flow, *e.g.*, poor pavement conditions, difficult vertical or horizontal geometries that affect traffic flow, or other like conditions should be noted.

TRAVEL TIME AND DELAY RUNS

Travel time and delay runs are generally collected for use in the mobile source air quality analyses, and should be collected concurrently with the traffic count program. In particular, the running time of the traffic, stopped delay at intersections, vehicle classifications, roadway geometrics, and signal timing data is required (see Chapter 17, "Air Quality"). These data are collected concurrently to correlate travel time to traffic volumes and calculated vehicle delays for air quality analysis purposes. If there is no need for travel time data for air quality purposes, there is likely no need to collect these data at all. If air quality analyses require this information, it is important to coordinate traffic and air quality analysis locations and their data needs (including the length of the corridor along which travel time data are needed for the air quality analysis) so that the data collection process may be conducted more efficiently.

Travel time and delay runs are generally best collected via the "floating car technique," in which the survey car seeks to travel at the speed of a typical car in the traffic stream, passing as many cars as pass the test vehicle. A driver and data recorder are dispatched in a car and travel a route (or routes) through each of the air quality analysis sites, recording travel time and delay information for each approach to each site.

For the purposes of the fieldwork, it is advisable to create a form noting the points along the route so that the elapsed time may be recorded as well as the location, extent, and type of delays. By comparing the elapsed time it takes to go from point to point to the distance between the two points, actual travel speeds may be quantified. As noted above, the travel time and delay runs should progress at the same time as the traffic counts, *i.e.*, over the same time period and number of days. A total of at least six to nine runs per link for each analysis hour are generally necessary to replicate typical conditions. At times, it may be necessary to dispatch more than one team to complete the required number of runs at the required number of air quality analysis sites.

In addition to the floating-car technique, other proven and generally accepted technologies, such as those based on the use of electronic toll collection readers and GPS, may also be considered. It is advisable to consult with the lead agency, DOT and DEP before employing such techniques.

342.3. Analysis of Roadway Capacity and Level of Service

After the preparation of balanced traffic volume maps, the determination of the capacity and levels of service (LOS) of the study area's roadways and intersections is the next critical step in the overall traffic analyses. The key to evaluating urban area traffic conditions is the analysis of its intersections, since the capacity of an urban street is typically controlled by the capacity at its intersections with other streets. At times, the linkages between a highway and the study area street network may also play a critical role in the analysis. In general, the capacity of an intersection—*i.e.*, the maximum number of vehicles that can pass through it—depends on several factors and may be evaluated by one of several available methodologies. Use of one of these methodologies produces the capacity for each lane group and is compared with the volume of that lane group and its operating conditions. The resulted Measures of Effectiveness (MOEs) are expressed in terms of volume-to-capacity (v/c) ratio, average control delay and LOS.

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In addition to the above performance measures, for certain projects, calculations of person-delay should be performed when determining more efficient use of street space among competing users (such as autos, buses, bicycles, or pedestrians). Projects that require calculation of person-delay are:

- The proposed project, or its mitigations, increase surface transit capacity, *e.g.* a Bus Rapid Transit (BRT) project, by dedicating one or more traffic lanes on a roadway for the exclusive use of buses for some part of the day; or
- The proposed project, or its mitigations, decrease surface transit capacity through the complete or partial removal of an existing bus lane.

For example, if a Select Bus Service (SBS) is proposed on Second Avenue, and one of the available travel lanes is converted to "Bus Only" lane, then person-delay should be calculated to demonstrate the project benefits in addition to the vehicle-based delay that may show adverse effects on vehicular traffic operation.

The lead agency should consult DOT to review the person-delay calculations. This review ensures that surface transit operations would be enhanced, or not impacted, by the proposed project or its improvement/mitigation measures.

HIGHWAY CAPACITY MANUAL METHODOLOGY

The Highway Capacity Manual (HCM), developed by the Transportation Research Board (TRB), contains procedures for analyzing signalized and unsignalized intersections and is considered an appropriate analysis tool for use in New York City. The HCM is continually being updated and it is recommended the lead agency contact DOT to ascertain the most appropriate approved version of the HCS for use.

SIGNALIZED INTERSECTIONS

According to the HCM, the capacities of signalized intersections are based on three sets of inputs: 1) geometric conditions, including the number of lanes, the length of storage bays for turns, the type of area the analysis locations are situated in (*e.g.*, central business district and others), the existence of parking or bus stop activity at the curb, *etc.*; 2) traffic conditions, including volumes by movement, vehicle classification, parking maneuvers, the nature of vehicular platooning in arrivals at the intersection, pedestrian conflicts, *etc.*; and, 3) signalization conditions, including signal cycle length, timing and phasing, and the existence of signal actuation capabilities by either vehicles or pedestrians.

Based on all of these and other inputs, the HCM model then calculates the ratio of the volume on the street to the street's capacity (v/c ratios), average vehicle delays, and level of service (LOS), where LOS is defined in terms of the average control delay per vehicle for lane groups, intersection approaches and the intersection as a whole. According to the HCM, the conditions that the driver is likely to encounter at each LOS for signalized intersections are as follows (the definitions of LOS are included in the Appendix):

- LOS A describes traffic operations with very low delay. This occurs when signal progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
- LOS B describes operations with low but increased delay. This generally occurs with good progression and/or short cycle lengths. Again, most vehicles do not stop at the intersection.
- LOS C describes operations with moderate delay. These higher delays may result from fair progression and/or longer cycle lengths. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- LOS D describes operations with heavy delay. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progres-

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sion, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines substantially.

- LOS E describes very heavy delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios near capacity.
- LOS F typically describes ever increasing delays as queues begin to form. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, *i.e.*, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with cycle failures. Poor progression and long cycle lengths may also be contributing to such delays.

The procedures to be used in conducting the capacity analyses are contained and fully described in the HCM and its Highway Capacity Software (HCS). It should be noted that the HCM provides for two alternative means of obtaining selected inputs to the capacity analyses--detailed field information and default values. The detailed field verified information of inputs, such as lane width, peak hour factor, arrival type, number of parking maneuvers, number of conflicting pedestrians and bicycles, *etc.*, are used for operational level analyses. The use of "default" values specified in the HCM are permitted only for planning level analysis for which the actual field surveys cannot be obtained. It should also be noted that any changes to the HCS estimated adjustment factors may not be acceptable unless supported by verifiable and quantifiable surveys/field observations.

UNSIGNALIZED INTERSECTIONS

Capacity analyses for unsignalized intersections are based on the use of "gaps" in a major traffic stream by vehicles crossing through or turning into that stream. At unsignalized intersections, "Stop" or "Yield" signs are used to assign the right-of-way to one street while controlling movements from the other street(s). This forces drivers on the controlled street (usually the "minor" street approach to the intersection) to use judgment when selecting gaps in the major street flow through which they may enter and turn into the intersection, or cross entirely through the intersection. The minor street traffic also has to yield to pedestrians in that approach.

The capacity analysis method used for unsignalized intersections under the HCM generally assumes that major street traffic is not affected by minor street flows. Left turns from the major street are assumed to be affected by the opposing or oncoming major street flow. Minor street traffic is obviously affected by all conflicting vehicular and pedestrian movements.

In analyzing the ability of traffic to use gaps in the major street traffic flows, the HCM recognizes that certain movements are more able to use these gaps than others. Right turns from the minor street are most able to use available gaps, since they need to be concerned only with gaps in one direction of major street traffic and/or conflicting pedestrians. Left turns from the major street are the next movement most able to use available gaps, followed by through movements and then left turns from the minor streets (which must recognize and negotiate their way through gaps in two directions of major street flows, for a two-way street). This is important to understand because it reflects the frequent capacity shortages for vehicles seeking to make left turns from a minor street onto a major street.

The key input data required to analyze unsignalized intersections include geometric factors and volumes. Geometric factors include the number and use of lanes, channelization, percent grades, curb radii and approach angles, sight distances, and pedestrian flows. The capacity computations result in a determination of volume-to-capacity ratio and delays and LOS. The LOS table containing all of the definitions is included in the Appendix.

Any highway or highway ramp/local street merge or weave conditions should also utilize HCM procedures. All methodologies, data needs, and procedural steps are detailed in full in the HCM. The in-

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tersections of highway ramps with adjacent service roads and streets, however, would follow the procedures outlined above for signalized and unsignalized intersections.

OTHER ANALYSIS METHODOLOGIES

Other software (*i.e.*, TRAFFIX) or simulation models (*i.e.*, CORSIM) may be employed for use in the particular study area only if they may be proven appropriate and are compatible with air quality models. However, it should be emphasized that the concurrence of the lead agency, in consultation with DOT, regarding the use of such models is required before they are employed. The lead agency must certify that any alternative analysis method (including micro-simulation) meets the following criteria:

- Provides the same performance measures as the HCM outputs described above (*i.e.*, levels of service, delays, *etc.*); and
- Demonstrates consistency with the traffic engineering principles and theories of traffic flow as described the HCM.

342.4. Overview of Level of Service Determinations

The definitions of the various levels of service and the criteria for determining whether given lane groups of a study intersection operate at LOS A, B, C, D, E or F are described in the previous section. According to generally accepted practice in New York City, LOS A, B, and C reflect clearly acceptable conditions; LOS up to mid-D reflects the existence of delays within a generally tolerable range; and LOS above mid-D, E and F indicate levels of congestion.

Once the capacity analyses have been completed, and v/c ratios, delays and LOS have been preliminarily defined for each lane group, approach and overall intersection, these findings should be reviewed and compared to conditions observed in the field, as well as to information that is also available from other sources such as travel speed and delay runs. Please note that the existing condition v/c ratio of a lane group should not exceed a value of 1.05. It is often possible that the computed v/c ratios, delays or LOS do not accurately reflect field conditions.

It is possible that congestion occurring at an upstream intersection does not allow traffic to proceed to the next intersection in a normal manner. To illustrate, if there is construction activity that narrows southbound Fifth Avenue at 45th Street to only two lanes as opposed to its normal five or six lanes, only a small volume of traffic can pass through the 45th Street intersection, which then accelerates as it passes through a full-width Fifth Avenue at 43rd Street. Without observing this in the field and understanding this traffic issue, an erroneously low volume could be used at 43rd Street that would lead to a determination that the intersection is operating at a clearly acceptable level of service, when under normal conditions at 45th Street, the intersection at 43rd Street would not operate that well.

It is also possible that the occurrence of double-parking activities or truck loading/unloading activities may create LOS conditions that are worse than those projected via the capacity analysis methodology employed. There are many such potential field conditions that should be understood and considered during the development of traffic volume maps, conduct of capacity analyses, and determination of an intersection's typical LOS. All available information should be weighed before finally determining level of service and defining which intersections operate in a problematic manner. The lead agency should consult with DOT with regard to LOS calibration if the v/c ratio for a lane-group is greater than 1.05 under the existing condition.

343. Future No-Action Condition

The future No-Action condition accounts for general background traffic growth within or through the study area, plus trip making expected to be generated by anticipated projects that are also likely to be in place by

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the proposed project's build year. Background growth rates and the methodologies used in accounting for trips from expected development projects are presented below.

343.1. Annual Background Growth Rates

The development of the annual background growth rates follows the general trends in traffic and growth prevalent through various sections of the City over a number of years. It reflects the general long-term trend rather than quick deviations from the general trend. Several sources of information are generally used to develop this projection, including bridge and tunnel volume counts that are collected and monitored by DOT, as well as general development trends throughout the City. Such information, and land use and population data, is available from DCP.

For transportation analyses purposes, the following compounded annual background growth rates are recommended:

Table 16-4
Annual Background Growth Rates

Section of the City	1 to 5 years	Year 6 and beyond
Manhattan	0.25%	0.125%
Bronx	0.25%	0.125%
Downtown Brooklyn	0.25%	0.125%
Other Brooklyn	0.50%	0.250%
Long Island City	0.25%	0.125%
Other Queens	0.50%	0.250%
St. George (Staten Island)	0.50%	0.250%
Other Staten Island	1.00%	0.500%

It is recommended to use these factors when determining a suitable growth rate. For example, if a development is proposed in St. George, Staten Island with a base year of 2010 and a build year of 2020, a compounded annual background growth rate of 0.5 percent is applied until 2015 and a 0.25 percent compounded annual growth rate is used thereafter.

Since traffic growth is influenced by land use trends, market conditions, modal split changes, auto ownership rates, and other factors, these rates may change over time. Further, it should be noted that the above growth rates reflect peak travel hour expectations rather than daily figures. In some areas, daily traffic growth may in fact be significantly greater or less than the rates above, while peak hour growth is constrained by the presence of traffic capacity bottlenecks during the peak periods. It should also be noted that these are recommended rates; other rates may be researched, calculated, and used if there are data to substantiate them (documentation of the assumptions and/or data used to make these calculations are required). For example, the use of a micro-simulation model based on a future-year subarea trip table from the NYMTC Best Practice Model (BPM) would be acceptable because the model itself contains accepted assumptions about population and employment growth that are consistent with regional efforts to comply with the Clean Air Act.

The use of other rates may be appropriate for proposed No-Action projects with peak travel hours at non-peak times, such as a concert hall or amusement park that is to be active on weekends and/or during summer months.

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For projects with horizon years beyond a 10-year period, the lead agency, in consultation with DOT and DCP, should determine the applicability of the annual background growth rate percentages described above.

343.2. *No-Action Development Project Trip Making*

In addition to the compounded annual background growth rate that is applied evenly throughout the study area (*i.e.*, at all intersections for the traffic analysis), the analysis also accounts for trips to and from major development projects that are not assumed to be part of an area's general annual growth. Here, too, the determination of whether a proposed No-Action project should be considered part of the general background or superimposed on top of the general background growth calls for considerable judgment. At a minimum, it is advisable to consult with DCP or MOEC for a full No-Action project listing.

Another means of determining whether or not proposed No-Action development projects would be appropriately considered as part of the background is to calculate the total amount of peak hour trip making expected from all of the projects and then calculate the percentage increase in traffic this constitutes within the study area. If the calculated percentage is less than the recommended growth rates enumerated in Table 16-4, it may generally be assumed that each of the developments fall within the background growth rate and do not need to be superimposed on it.

There are several ways to determine the amount of trip making associated with a No-Action project. The best way is to use the trip projections cited in that project's traffic impact analysis, if such an analysis exists. If such trip projections are not available, the methodologies for trip generation, modal split and trip assignment described earlier in the *e.g.* may be used. This second means of determining No-Action trip making entails additional work beyond just using available projections.

If it is necessary to conduct independent trip making estimates of No-Action projects, the same procedures cited for the future With-Action analysis may be used. However, if there are numerous No-Action development projects, the future With-Action trip generation methodologies are followed but it is possible to use a condensed method of assigning the traffic trips to the street network. However, consultation with DOT regarding use of the condensed methodology is recommended. The analysis may determine the total volume of new vehicle trips expected, compare that volume with the existing volume at a representative "cordon line" around the study area, determine the percentage increase from the new trips, and then apply that percentage to all intersections and roadway links to be analyzed. This process could also be used for assigning parking trips.

343.3. *Preparation of Future No-Action Volumes and Levels of Service*

Balanced traffic volume maps and traffic level of service analyses are prepared to reflect No-Action conditions, adhering to the same methodologies outlined in the existing condition analysis. Text and tables provide a full description of future No-Action conditions and include text and tabular comparisons of how conditions are expected to change from the existing condition to the future No-Action condition.

This assessment accounts for any programmed street or highway changes that could affect traffic flow or levels of service, such as any mitigation measures that are incorporated in the approvals for a development project considered in the No-Action condition. As another example, if DOT plans to program the widening of a particular street in the study area by the proposed project's build year, changes to intersection capacity and the resulting levels of service would be included as part of the No-Action analysis. Other examples may include street direction changes, signal timing, bicycle lanes, pedestrian improvements, street closures, and possibly even major changes outside of the study area (such as a permanent viaduct closure) that would affect travel within the study area. These should be confirmed with DOT.

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344. FUTURE WITH-ACTION CONDITION

The objective of the analysis is to determine projected future With-Action conditions with the proposed project in place and fully operational. These future With-Action conditions are then compared with the future No-Action conditions to determine whether or not the proposed project would have a significant impact on the study area's traffic facilities, therefore requiring mitigation.

The assessment of projected future With-Action conditions consists of a series of analytical steps derived directly from the Level 1 (Travel Demand Factors) and the Level 2 (Project Generated Vehicle Trip Assignment) Screening Assessments—trip generation, modal split, and trip assignments, discussed in detail in Subsections 311 through 321 of this chapter.

Once these steps have been completed, a capacity and level of service (LOS) analysis, described below, is conducted. This analysis evaluates conditions within the study area with project-generated trips superimposed on the future No-Action traffic volumes, as a representation of the projected future With-Action traffic volumes. After the LOS analysis is complete, a determination of significant impacts—based on a comparison of future With-Action conditions with future No-Action conditions and with thresholds of acceptability—may be made.

344.1. Preparation of Future With-Action Volumes and Levels of Service

Balanced traffic volume maps are prepared for future With-Action conditions, using the same methodologies outlined previously. It is important that these traffic volume maps be balanced, and that there are no unexplainable increases or decreases in traffic volume from one block to the next.

Capacity and level of service (LOS) analyses are then completed as part of the assessment of future With-Action traffic conditions. The methodologies to be used are the same as described previously, with certain special considerations.

Within the traffic analyses, the traffic assignment process may, for example, result in significant increases in the percentage of turns at specific intersections, and may be appropriate to re-compute relevant capacity analysis input factors. Should there be a shortage of parking spaces in the area, some project-generated traffic may need to be assumed to re-circulate through the area in search of available parking.

Also, as part of the proposed project, changes may be proposed for specific streets that produce changes in their capacities, which would also be checked. For example, should a street closure or street direction change be a part of the proposed project, the future With-Action traffic should be diverted accordingly.

The future With-Action analyses culminate with the preparation of balanced traffic volume maps and a full set of capacity and LOS analyses (including v/c ratios and average control delays per vehicle for each lane group, intersection approach and overall intersection) for traffic conditions. The future With-Action analysis also includes occupancy findings for parking facilities. Findings are presented in a clear tabular format that facilitates the subsequent comparison of No-Action and With-Action conditions as part of the determination of significant impacts. The LOS comparison tables (for all scenarios and peak analysis hours) should be included in the traffic and parking section of the report, not in an appendix.

350. DETAILED TRANSIT ANALYSIS

For proposed projects requiring the preparation of a transit analysis, the study areas to be analyzed, assessment methodologies, and technical assumptions are outlined and documented as much as possible. Typically, such documentation outlines at least the following:

- Study areas to be analyzed for potential transit impacts. The study area(s) is based on the Level 2 Screening Assessment.

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- Availability and appropriateness of existing data, and the expected need (if any) to collect new data via field surveys and counts. Existing transit data should not be more than two years old assuming that there has been no major change to the bus route/station/subway line.
- The technical analysis methodologies to be used and key technical assumptions, including a preliminary projection of the number of trips to be made by transit during the proposed project's peak travel hours and a first-cut trip assignment that helps to identify (preliminarily) potential significant impact locations.

The text and tabular sections that follow provide the technical guidelines for conducting a transit analysis.

351. Subway/Rail and Bus Transit Study Areas

351.1. Subway/Rail Transit Study Area

For the analysis of subway and rail facilities, the study area relates more to specific lines and stations proximate to the site than to a physical area or intersections. For the subway system, the closest station to the proposed project site would be studied for each line serving the site, provided that station is within 0.5 mile of the project site or more than 200 peak hour bus transfers would be generated by the project at any particular station. Should a proposed project site be served equally well by two different stations along the same line, both stations may need to be studied. The extent to which subway riders would travel to the site should be determined, by direction, to identify which of the two stations could potentially be significantly affected. For example, if a project is sited in the vicinity of 42nd Street and Ninth Avenue in Manhattan, it would be served (within 0.5 mile) by 42nd Street – Port Authority Bus Terminal station of the A/C/E lines, Times Square-42nd Street station of the 1/2/3/7 and N/Q/R/S lines, and 42nd Street–Bryant Park station of the B/D/F/M lines, all three stations would be included in the rail transit study area and should be analyzed. Alternatively, if a project built in eastern Queens on Hillside Avenue would result in more than 200 people transferring from buses to the 179th Street F station, that station should be included in the transit analysis, even though the station is farther than 0.5 mile from the project.

The subway station analysis should encompass all station circulation and fare control elements, whether in the free-zone or paid-zone, that would have an increase in ridership resulting from the project, such as all affected stairs, escalators, elevators, fare arrays, platforms and passageways. A platform analysis is usually conducted for projects such as the design of a new stations or a large station renovation, and is often not conducted for existing stations. However, there are instances where an analysis of an existing station is appropriate, and the lead agency, in consultation with NYCT, should determine the appropriateness of a platform analysis. Elevators should be analyzed only if they provide primary access to the subway (for example, the 181 Street–St. Nicholas Avenue station (1 line)). The study area could also include an assessment of the line-haul capacities of the specific subway lines serving those stations, since the subway cars may exceed NYCT loading guidelines. For generic projects that affect several neighborhoods, it may be necessary to analyze the cumulative impacts of the project at key locations within the line-haul analyses or at major passenger transfer locations.

Commuter rail lines, such as the Long Island Rail Road or Metro-North Commuter Railroad, could also be the subjects of such analyses, depending on a proposed project's modal split and origin/destination characteristics. For example, should the proposed project site be located within 0.5 mile of the LIRR station in Flushing, the key station elements and line-haul capacity may need to be addressed.

351.2. Bus Transit Study Area

The definition of the appropriate study area for bus services follows the same principles outlined above. First, a review of available bus route maps and field observations of the project site is con-

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ducted to identify the primary bus routes and stops serving the site. Based on this information and the likely entrance and exit points for the proposed project's buildings, a simple pedestrian routing analysis would indicate which bus routes and stops should be the focus of new trips. Bus routes within 0.5 mile of the project site may need to be addressed and the maximum load point along each potentially affected bus route should be identified.

352. ANALYSIS OF EXISTING CONDITIONS

Once the study areas have been defined, the analysis of existing conditions becomes the building block used to project future No-Action and With-Action conditions. The objective of the existing condition analysis is to determine existing transit ridership/pedestrian volumes and levels of service to provide a baseline from which future conditions may be projected. The definition of existing conditions is important because it is a reflection of activity levels that actually occur today as opposed to future conditions, which require at least some projection. The guidelines provided for the existing condition analyses are discussed separately below for rail transit and bus transit.

352.1. Existing Rail Transit Conditions

The existing rail transit conditions analysis identifies the rail and subway lines serving the project site, the frequency of service provided, and ridership and levels of service that exist at the current time. For sites that are well served by transit, lines and stations within a convenient walking distance are included. For other project sites not as well served by transit, it is advisable to identify the closest rail facility, providing that a significant number of people would use transit to reach the site and then access the site from the station via bus or available taxi services.

The analysis of existing rail transit conditions entails the assembly and/or collection of ridership data and pedestrian flows through the stations to be analyzed, the determination of the capacity and levels of service of the station elements that need to be analyzed, and an evaluation of the overall line-haul capacity of the routes serving the site.

352.1.1. DETERMINATION OF THE PEAK HOUR FOR ANALYSIS PURPOSES

The first step in the analysis of existing conditions is the determination of the peak travel hours to be analyzed. Guidance for determining the peak travel hours is located in Subsection 332.

352.1.2. ASSEMBLY AND COLLECTION OF PASSENGER AND PEDESTRIAN VOLUMES WITHIN STATIONS

Available data may be used if there have not been major changes in nearby land uses or transit services that have significantly affected transit usage since the data were collected. However, most of the data needed to conduct the rail transit analyses generally need to be newly collected. It is also generally appropriate to observe pedestrian movement patterns through the station and along critical platforms simultaneously with the counts. NYCT can supply recent turnstile registrations (entries only) as well as existing, and, where appropriate, No-Action line-haul volumes. Required actual counts may include any or all of the following, depending on whether these elements are part of the transit study area:

- Up and down stairway, escalator, and elevator pedestrian counts.
- The volume of pedestrians in each direction along key corridors or passageways within the station or connecting the station with other stations or on-street uses, if these elements have been identified as potentially significant impact locations within the study area.
- Passenger volume entering and exiting through turnstiles.
- The nature of queuing and walk movements on station platforms when platform congestion is a current problem or is identified as a potential problem in the future.

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- The number of persons waiting at station agent booths and MetroCard vending machines only if station agent booth and vending machine lines are an existing or anticipated problem. Issues to be analyzed here could include, among others, the amount of remaining physical space available for pedestrians and potentially excessive waiting times.

Each of these counts and observations should be conducted over the course of the full peak hour in 15-minute increments.

Transit station counts and surveys should not be taken on days when activity levels are unusually low, and they should generally be taken on a Tuesday, Wednesday, or Thursday for conventional weekday peak hour analyses. With the availability of daily turnstile registration data, however, it is not necessary to conduct station counts for more than one day, assuming subway service and ridership is normal on the day the counts were taken. To determine whether the day surveyed represents a typical day for that station, obtain a full week of registration counts and adjust the survey data, if necessary.

Except for a few cases, it is generally not necessary to balance pedestrian flows among the various elements within stations. Exceptions may include areas (such as those where consistently high movements between the various stairwells and passageways are best depicted via a pedestrian flow map) where a substantial amount of activity occurs at elements in close proximity to each other and where it would be helpful to understand the relationship between flows. Passenger trip assignments to entrances and exits should be provided where there are multiple entrances/exits to a station.

352.1.3 ANALYSIS OF STATION ELEMENT LEVEL OF SERVICE

The analysis of conditions within subway stations is based on a comparison of the capacities of circulation and fare control elements against the volume of passengers expected to use them. This ratio of passenger volume and element capacity (v/c ratio) equates to a LOS rating for each station element.

Since different station circulation elements have distinctive use patterns, there are different analytical methodologies for each type of element. Methodologies for analyzing each type of station element are described below.

ANALYSIS OF STAIRS AND PASSAGEWAYS

The v/c ratio and LOS rating of a stair or passageway is based on its peak 15-minute passenger volume divided by the capacity. For CEQR analyses, "capacity" is based on the width of the stair or passageway, the maximum volume for that width based on NYCT capacity guidelines and adjustments for passenger flow surging and counterflow.

The first step in calculating existing and projected v/c ratios is to measure the width of the stair or passageway, count passenger volume, and observe degree of surging. The counts should be in 15-minute intervals, by direction, during the peak hours (usually morning and evening peak hours). It is also critical to note if passenger flow is surged or not. Typically exit flow out of stations or transfer flows between subway lines are "surged," *i.e.*, passengers are concentrated in dense groups after debarking from trains. However, de-training surges may be metered by other circulation elements or multiple surged flows may merge "downstream." Thus exit or transfer flows may be more uniform than surged if they are remote from the actual train platform(s). Typically, entry flows into the subway are uniform over a 15-minute interval.

The numerator in the v/c calculation is always an unaltered 15-minute passenger flow volume. The "capacity" denominator is derived from four factors: the NYCT guideline, the effective width of the stair or passageway, and surging and counterflow factors, if applicable. Each of these factors are discussed individually, followed by the calculation itself and finally, the v/c ratio ratings.

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NYCT GUIDELINE CAPACITY

The NYCT guideline capacity for stairs is 10 passengers per foot per minute (pfm). The guideline capacity for passageways is 15 pfm. These rates represent conditions that are moderately crowded but not congested. These guideline capacities are then adjusted to reflect surging and counterflow (discussed below).

EFFECTIVE WIDTH

The effective width of a stair or passageway is its actual width adjusted for friction along its sides (which reflects the avoidance of sidewalls by pedestrians) and for center handrails (if present). For a stairway, this means the tread width, in feet, at its narrowest point, less 1 foot (6"of buffer for each side of the stair) and less 3" for each intermediate handrail, if present. For example, a 10-foot wide stair with one center handrail would have an effective width of 8'-9" (10'-0" minus 6" minus 6" minus 3"). For a passageway, this means the width of the passageway, at its narrowest point, less two feet (12" of buffer on each side of the passageway). Passageways usually do not have intermediate handrails.

SURGING FACTOR

When passenger flow is surged, the calculated capacity of the stair or passageway is reduced by up to 25 percent to reflect that the passenger volume counted in a 15-minute interval was actually concentrated in less time. Circulation elements that are immediately off the platform have a strong surging pattern that requires a full 25 percent reduction in capacity. In the CEQR v/c calculation, this means multiplying the "capacity" denominator by a surging factor of 0.75. Circulation elements that are fed by multiple train lines or are far from the platform are typically less surged and require a smaller surging factor. It should be noted that some elements require no surging factor at all. Table 16-5 below shows the surging factor that should be used for elements at different locations in the station. Note that surging factor is applied only to the exiting pedestrian volume.

Table 16-5
Surging Factors

Location of Circulation Element	Number of Tracks Served	
	One or two tracks	Three or more tracks
Platform Level	0.75	N.A.
One floor above or below the platform	0.8	0.9
Two or more floors above of below the platform	0.9	0.95

FRICTION (COUNTERFLOW) FACTOR

Opposing passenger flows using the same stair or passageway creates some friction that reduces overall flow. If there is flow in both directions on the stair or passageway, the capacity should then be reduced by 10 percent (multiply the capacity by a friction factor of .90). If the flow is only in one direction, or almost all in one direction (95 percent or more in one direction), then no counterflow factor is required.

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VOLUME / CAPACITY RATIO CALCULATION FOR STAIRS

Equation 16-1

The formula to calculate the v/c ratio for stairs is:

$$\frac{\text{Vin}}{150 \times \text{We} \times \text{Sf} \times \text{Ff}} + \frac{\text{Vx}}{150 \times \text{We} \times \text{Sf} \times \text{Ff}}$$

Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

The 150 in the denominator is based on the NYCT guideline capacity for stairs of 10 pfm for 15 minutes (10 x 15). The "per foot" 15-minute guideline capacity is then adjusted for the width of the stair, surging and counterflow. The resultant denominator is the maximum desirable 15-minute passenger volume for a specific width stair considering surging and counterflow. The 15-minute volume is then divided by the adjusted denominator to calculate a ratio of volume to capacity. Typically there is a 15-minute volume for each scenario of analysis - base year, future No-Action, future With-Action.)

Note that only the "capacity" denominator is adjusted and that the "volume" numerator, whether observed for existing conditions or calculated for future conditions, should always remain unaltered. Unaltered volumes are helpful in post-environmental review planning and design efforts.

VOLUME / CAPACITY RATIO CALCULATION FOR PASSAGEWAYS

Equation 16-2

The formula to calculate the v/c ratio for passageways is:

$$\frac{\text{Vin}}{225 \times \text{We} \times \text{Ff}} + \frac{\text{Vx}}{225 \times \text{We} \times \text{Sf} \times \text{Ff}}$$

Where
Vin = Peak 15-minute entering passenger volume
Vx =Peak 15-minute exiting passenger volume
We = Effective width of the passageway
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

The 225 in the denominator is based on the NYCT guideline capacity for passageways of 15 pfm for 15 minutes (15 x 15). The rest of the calculation is then the same as with stairs.

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CEQR V/C LOS RATINGS

Volume/Capacity ratios are assigned LOS ratings. For stairs and passageways, the relationship of v/c ratio to LOS ratings is as follows:

- 0.00 to 0.45 v/c ratio = LOS A Free flow
- 0.45 to 0.70 v/c ratio = LOS B Fluid flow
- 0.70 to 1.00 v/c ratio = LOS C Fluid, somewhat restricted
- 1.00 to 1.33 v/c ratio = LOS D Crowded, walking speed restricted
- 1.33 to 1.67 v/c ratio = LOS E Congested, some shuffling and queuing
- Above 1.67 v/c ratio = LOS F Severely congested, queued

Example Analysis:
A stair with treads 9'-6" wide with a center handrail has a peak 15-minute volume of 930 passengers, 650 entering and 280 exiting. The stair directly serves the platform.

Effective width = 8'- 3" (deduct six inches from each side and three inches for the intermediate
handrail)
Surging factor = 0.75 for exiting passengers
Counterflow factor = 0.90 (70% of flow is in one direction)

v/c ratio = (650 / (150 x 8.25 x 0.90)) + (280 / (150 x 8.25 x 0.75 x 0.90)) = 0.92 LOS C

ANALYSIS OF ESCALATORS AND TURNSTILES

Passenger flow on escalators and through turnstile arrays is different from flow on stairs or passageways. Passengers routinely use escalators and turnstiles at a rate closer to maximum through-put. In contrast, maximum passenger "through-put" on a stair or in a passageway throughout a 15-minute interval is uncomfortable and undesirable.

The numerator in the v/c calculation is the unaltered 15-minute passenger flow volume. The "capacity" denominator includes only two factors: the NYCT guideline capacity for a 15-minute interval and a surging factor of up to 25 percent. Like stairs and passageways, the surging factor is variable based on the extent of actual surging. Escalators and turnstiles immediately off of the platform with heavy detraining traffic require a 25 percent surging factor. Circulation elements that are farther from the platform are served by multiple train lines, or are predominantly entry flow, require a smaller surging factor or none at all. Consult the Surging Factor table, Table 16-5, for the appropriate factor to apply.

ANALYSIS OF ESCALATORS

NYCT uses three widths of escalators (as measured across the tread)--24", 32" and 40". Escalator width at hip height is usually about 8" wider. NYCT escalators are operated at one of two speeds--90 treads per minute (tpm) and 100 tpm. Table 16-6 indicates the guideline capacities by minute and by 15-minute interval for different escalator widths and speeds. These capacities are based on observed through-put rates of escalators under peak period conditions.

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Table 16-6
Escalator Capacity (15 minute)

	24" Tread	32" Tread	40" Tread
90 tpm	480	750	945
100 tpm	600	825	1050

VOLUME / CAPACITY RATIO CALCULATION FOR ESCALATORS

Equation 16-3

The formula to calculate the v/c ratio for escalators is:

$$\frac{V}{GCap \times Sf}$$

Where:
V = Peak 15-minute passenger volume
GCap = Guideline Capacity for the escalator
Sf = Surging factor (if applicable)

No counterflow friction factor is used, since escalators operate in one direction only.

The same LOS ratings and v/c ratios used for stairs and passageways is used for escalators.

ANALYSIS OF TURNSTILES

NYCT operates regular (low) turnstiles, High Entry/Exit Turnstiles (HEETs) and high exit turnstiles (HXTs) in the subway. Low turnstiles and HEETs are bi-directional and serve both entry and exit moves. Because entry requires a MetroCard swipe (and exiting does not), there are different through-put rates by direction. Therefore, turnstile analysis involves calculation of separate v/c ratios by direction, which are then combined into a single v/c ratio for the turnstile array. Surging and counterflow factors are applied as appropriate.

Table 16-7 indicates the NYCT guideline capacity for turnstiles by minute and by 15-minute interval for different turnstiles and directions. These capacities are based on observed through-put rates under crush conditions.

Table 16-7
Fare Array Capacities (15 minute)

	Turnstile	High Entry/Exit Turnstile	High Exit Turnstile
Entries	420	255	n/a
Exits	645	540	555

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VOLUME / CAPACITY RATIO CALCULATION FOR TURNSTILES

The formula to calculate the volume to capacity ratio for turnstiles is:

Equation 16-4

$$\frac{\text{Vin}}{\text{Cin} \times \text{Ff}} + \frac{\text{Vx}}{\text{Cx} \times \text{Sf} \times \text{Ff}}$$

where

Vin = Peak 15-minute entering passenger volume
Cin = Total 15-minute capacity of all turnstiles for entering passengers
Vx = Peak 15-minute exiting passenger
Cx = Total 15-minute capacity of all turnstiles for exiting passengers
Sf = Surging factor (if applicable)
Ff = Friction factor

The application of surging and friction factors is as described for stair and passageway analyses. Surging for entry flow (within a 15-minute interval) is unusual, but may occur especially at intermodal transfers locations.

The same v/c ratio LOS ratings used for stairs and passageways are applied to turnstile ratios.

ANALYSIS OF PLATFORMS

Platforms need to accommodate both passengers who are standing waiting for trains as well as passengers who are walking along the platform. As stated above, a platform analysis is usually conducted for projects such as the design of a new stations or a large station renovation, and is often not conducted for existing stations. However, there are instances where an analysis of an existing station is appropriate, and the lead agency, in consultation with NYCT, should determine the appropriateness of a platform analysis. Platforms in the New York City subway are typically between 520 and 600 feet long. Different sections of the same platform have very different concentrations of walking and/or waiting passengers. Therefore, platforms should be divided into separate zones for individual analyses.

The delineation of zones to be analyzed for a given project involves observations of platform layouts and how pedestrians exit the trains, walk along them to the stairwells, or wait for the next train. Consideration of the entire platform as a single zone would not be correct, since a platform may have sections that are very actively used and others that are seldom used or used with no apparent congestion problem. Therefore, the definition of zones that are too large could understate potential problems. On the other hand, the definition of zones that are too small—*i.e.*, generally less than one subway car length—could depict conditions that are worse than actually exist. Confirm with NYCT Operations Planning the delineation of platform zones.

There are two different methods to analyze platform conditions within any zone, depending upon the degree of segregation of waiting and walking passengers:

- If passengers walking through the zone use random paths and filter through waiting passengers, then the total number of waiting passengers within the zone should not exceed a density of 10 square feet per waiting passengers.
- If passengers walking through the zone generally maintain distinct paths and waiting passengers are relatively undisturbed within a discreet "waiting" sub-zone, then the acceptable density of waiting passengers within the sub-zone is 6 square feet per waiting passenger.

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Note that a projected increase in the number of walking passengers may require the pathway area to increase, causing a decrease in the sub-zone area assigned to waiting passengers. The accumulation of waiting passengers per zone would be based on train headways within the peak 15-minute interval.

A third acceptable methodology for analysis of platform zones is Time-Space Analysis. This technique involves allocation of both space and time (within a 15-minute interval) to account for the momentary use of space by walkers.

The platform analysis should incorporate the appropriate methodology based on observed conditions within the station under study. Confirm with NYCT Operations Planning if questions arise.

ANALYSIS OF ELEVATORS

An analysis of elevator service is only required when elevators will be used as general access into and out of the station, platform, or mezzanine, such as at the Clark Street station (2, 3 lines) or the 191st Street (1 line). It is not necessary to analyze elevators designed primarily for ADA use.

352.1.4. ANALYSIS OF LINE-HAUL CAPACITY AND LEVEL OF SERVICE

An analysis of line-haul capacity addresses the ability of trains to accommodate passenger loads. The analysis determines whether there is sufficient capacity per car per train to handle existing and projected future transit loads. This analysis should be done at the maximum load point of the line, or at the location where the addition of project-generated passengers to No-Action passenger volumes would be greatest.

Line-haul capacity analyses are based on per-car practical capacity guidelines used by NYCT. The guideline capacities of subway cars are identified in Table 16-8:

Table 16-8
Line-Haul Capacity Guidelines

Car Class[1]	Maximum Peak-Period Loading Guideline Capacity (per car)[2]	Maximum Off-Peak Loading Guideline Capacity (per car)[3]
R 62 (51 feet A Division)	110	54
R 142 (51 feet A Division)	110	48
R32 / R42 (60 feet B Division)	145	63
R143 (60 feet B Division)	145	54
R160 (60 feet B Division)	145	53
R44 / R46 / R68 (75 feet B Division)	175	88

Notes:

[1] Since cars switch between various lines, consult with NYCT Operations Planning to determine the appropriate car length for the analysis.

[2] This guideline is the maximum used to schedule subway service during weekday peak periods and is based on full occupancy of all seats and approximately 3 square feet per standing passenger.

[3] This guideline is used to schedule subway service during off-peak periods and is based on an average of 125% of the seated load on each car type. During some large-scale special events, it is expected that ridership may temporarily exceed off-peak loading guidelines (but not the maximum loading guidelines).

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The line-haul capacity of a given subway line is determined by multiplying the number of peak hour trains by the number of cars per train and times the guideline capacity per car. The volume of riders passing a given point may then be compared with the line haul capacity of the subway line. It should be noted that during some large-scale special events, such as during peak entrance and exit periods for a sporting event, it is expected that ridership may temporarily exceed off-peak loading guidelines (but not the maximum loading guidelines). Another means of evaluating a line's conditions is to utilize the same information differently—that is, divide the volume of riders passing a given point by the number of train cars serving that point, and determine the average passenger load per car. The resulting per-car passenger load may then be compared with guideline capacity standards to determine the acceptability of conditions.

352.2. Existing Bus Transit Conditions

The analysis of existing bus transit conditions presents bus load level and loading conditions on the routes serving the site of the proposed project to determine whether or not there is capacity available to accommodate additional project-generated trips.

For the routes and stops identified as the bus transit study area, these analyses entail the assembly and/or collection of bus ridership data at the bus stops most closely serving the project site and at the route's "maximum load point," and an analysis of bus loading levels versus their physical capacities.

352.2.1. ASSEMBLY AND COLLECTION OF BUS RIDERSHIP DATA

Data may be obtained from the relevant operator regarding the number of persons per bus at the maximum load point on each route. In some cases, on-off data (ride checks) for all stops along a route may also be available. In addition, field counts may help determine the average and maximum number of riders per bus as the bus arrives at and leaves the bus stop closest to the project site. These counts should be conducted on a typical day, as described earlier for the other traffic and transit analyses. These counts may be taken either by: a) getting on the bus and conducting a quick count of the number of riders; or b) estimating the number of persons on the bus by a visual estimate from off the bus looking through its windows (often called a "windshield count" or “point check”). The windshield estimate method should not be used if the bus windows are tinted, which would preclude the surveyor from getting an accurate reading of the passenger count. The field count effort would also note the bus route number (at multiple-route bus stops) and the number of persons waiting at the bus stop and boarding and alighting from each bus.

352.2.2. ANALYSIS OF BUS LOAD LEVELS

MTABC, NYCT and LIB currently operate three types of buses:

- 40-foot standard buses (including both low-floor and high-floor models) operating on both local and limited-stop routes.
- 60-foot articulated buses operating on both local and limited-stop routes.
- 45-foot over-the-road coaches operating on express routes.

NYCT has adopted schedule guideline capacities for each of these bus types:

- 40-foot standard buses: total guideline capacity of 54.
    - The standard buses are scheduled based upon the capacity of the newer low-floor models. Even though the high-floor models have greater capacity than the newer low-floor models, the capacity of the low-floor model is used as the guideline because the buses are used interchangeably.
- 60-foot articulated buses: total guideline capacity of 85.

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- 45-foot over-the-road coaches: total guideline capacity of 55.

Although MTABC has not adopted official guideline capacities, in practice they use those adopted by NYCT. LIB uses only 40-foot standard buses on routes that operate in NYC and has the same capacity guidelines for these buses (54 people per bus).

Typically, the number of persons per bus at the maximum load point is quantified and then compared with MTA bus operating agencies' guidelines so as to identify the extent to which bus capacity is utilized under existing conditions. On/off activity could also be quantified and presented for general informational purposes.

353. Future No-Action Condition

The future No-Action conditions account for general background growth within the study area, plus tripmaking expected to be generated by major proposed projects that are likely to be in place by the proposed project's build year. In general, the procedures and approach used are similar to those reviewed previously for traffic analyses.

353.1. Background Growth Rates

For rail and bus transit analysis purposes, NYCT and/or MTA Bus should be consulted for modeled projections that may be available on a per line, or possibly per station, basis. The compounded annual growth rates in Table 16-4 are recommended to calculate the background growth rate accounting for short-term and long-term patterns. For additional information regarding the assessment of the future No-Action condition, see Subsection 343.

353.2. No-Action Development Project Trip-making

In addition to the compounded background growth rate that is applied evenly throughout the study area, the analysis also accounts for trips to and from major development projects that are not assumed to be part of an area's general growth. The determination of whether a No-Action project is considered part of the general background or superimposed on top of the general background growth call for considerable judgment, with the following guideline suggested:

- A No-Action project that generates fewer than 100 peak hour transit trips should be considered as part of the general background. Two such projects, situated on the same block and generating 200 new riders at the same station, should generally not be considered as part of the background.

There are several ways to determine the amount of trip-making associated with a No-Action project. The best way is to use the trip projections cited in that project's transit analysis, if such exists. An alternative is to use the same methodologies described in Subsection 354, "Analysis of Future With-Action Conditions."

353.3. Preparation of Future No-Action Volumes and Levels of Service Analysis

Transit level of service analyses should be prepared following the same methodologies outlined for the existing conditions analyses. Documentation of the analyses would provide for a full description of future No-Action conditions and include text and tabular comparisons of how conditions are expected to change from existing conditions to the future No-Action scenario.

This assessment should also account for any programmed transit changes that could affect passenger flows or levels of service. For example, if the NYCT has programmed the closure of a stairwell at a particular subway station, the effects of such measures would be accounted for in the No-Action analysis. In certain cases, a major transit initiative—such as the construction of a new terminal/station or an intermodal transfer facility—could affect subway, bus, and pedestrian trips. For the analysis of bus conditions, it should be assumed that service changes would be made such that future

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No-Action conditions would not exceed capacity on any given route. Please consult with MTA for direction and guidance on changes to subway and station configuration.

354. ANALYSIS OF FUTURE WITH-ACTION CONDITION

The objective of the future With-Action condition analysis is to determine projected future conditions with the proposed project in place and fully operational. The future With-Action condition is then compared with the future No-Action scenario to determine whether or not the proposed project would likely have significant adverse impacts on the study area's transit facilities and requires mitigation.

The assessment of projected future With-Action conditions consists of a series of analytical steps—trip generation, modal split, and trip assignment, discussed in detail in Subsections 311 through 321 of this chapter. A capacity and level of service analysis, defined as the evaluation of conditions within the study area with project-generated trips superimposed on the future No-Action condition, as a representation of the projected future With-Action condition, is conducted.

Once these steps have been completed, a determination of significant impacts—based on a comparison of With-Action conditions with No-Action conditions and using the impact thresholds—may be made. Generally, the transit analyses are performed in coordination with those of traffic and pedestrians.

360. DETAILED PEDESTRIAN ANALYSIS

The first step in preparing for and conducting the pedestrian impact analysis is to determine the specific locations of the pedestrian elements and facilities to be studied. The pedestrian analysis considers three pedestrian elements: crosswalks, intersection corners where pedestrians wait for a pedestrian signal to allow them to cross the street, and sidewalks and other walkways.

361. PEDESTRIAN STUDY AREA

The first step in determining the study area is to identify the routes between the site entrances/exits and the beginning/end of pedestrian components, including subway stations, bus stops, parking facilities and generators of "walk" trips. For example, the pedestrian analysis for a proposed office building in Midtown Manhattan would consider, in addition to nearby pedestrian elements (*i.e.*, sidewalks, crosswalks and intersection corners) that would be used by walk trips, the major elements en route to/from the site from/to the subway stations, bus stops and parking lots reasonably expected to be used. If the combined assignments of all pedestrian trips (which include pure walk trips as well as the pedestrian component of all other modes) to any of these elements is 200 or more, then these elements should be part of the pedestrian study area.

When identifying the study area for a new or expanded school site, special consideration should be given to pedestrian elements posing safety concerns (*i.e.*, uncontrolled crossings, intersections with high number of vehicular and pedestrian accidents, *etc.*) along walking routes to/from the school. Any uncontrolled crossing, where, under the With-Action condition an increment of 20 or more students are assigned during the highest crossing hour (a threshold recommended by the Federal Highway Administration's (FHWA) 2009 edition of the Manual on Uniform Traffic Control Devices (MUTCD) for the School Crossing signal warrant,) should be included in the detailed safety and operational analyses including the signal warrant analysis (please refer to Section 370 for further details).

362. DETERMINATION OF PEAK PERIODS

After the study area is determined, the next step is the determination of peak periods, which depend on the type of project. Guidance for determining the peak travel hours is located in Subsection 332.

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363. ANALYSIS OF EXISTING CONDITIONS

Once the study areas have been defined, the analysis of existing conditions becomes the building block that is used to project future No-Action and With-Action conditions. The analysis of existing pedestrian conditions determines whether key pedestrian routes and related elements (sidewalks, crosswalks and corner reservoir areas) expected to be traversed by pedestrians under the proposed project are currently operating at acceptable LOS, and provides an overview of general pedestrian conditions within the study area.

363.1. Assembly and Collection of Pedestrian Counts

Prior to collecting any new data, DCP and DOT should be contacted regarding the availability of any pedestrian studies as well as recently completed environmental assessments within the project study area that could be the source of available pedestrian count data and LOS analyses. However, the available data should not be more than three years old and care must be taken to ensure that the pedestrian travel patterns have not changed due to significant developments and/or modification to the existing pedestrian elements in the project study area.

New pedestrian counts should be taken for one "typical" mid-week day during representative peak periods (i.e. morning, midday, evening, and/or other appropriate peak periods). Counts should be taken over the course of the full peak period and recorded in 15-minute intervals, since analyses to be conducted utilize a 15-minute analysis period for their evaluations. Counts taken during weekend peak periods or special times (such as game days or other events) should also be taken for one day. However, crosswalk counts at all study intersections should be collected for one additional mid-week day and one additional weekend day during representative peak periods to validate the data if counts for all three pedestrian elements (i.e., crosswalk, sidewalk and corner) are collected. If a proposed action requires one pedestrian element, such as a sidewalk, to be analyzed, then counts for one additional mid-week day and one additional weekend day (if warranted) should be performed to confirm all the counts.

The pedestrian counts to be conducted depend on the pedestrian elements identified as constituting the pedestrian study area. They should include crosswalks, corner reservoirs at intersections where pedestrians queue up while waiting to cross the street and those moving between the adjoining sidewalks but not crossing the street, sidewalks, and other important routes if such are applicable (*e.g.* bridges, mid-block arcades or plazas). Two-directional counts are needed to conduct the subsequent LOS analyses.

363.2. Preparation of Existing Pedestrian Volumes and Levels of Service Analysis

The methodologies presented in the HCM are the basic analytical tools used to analyze pedestrian conditions and the HCM should be referred to for detailed information on analytical procedures. For midblock sidewalk locations or other walkways, the most important parameters in the analyses are the volume of pedestrians passing a given point during the peak 15 minutes of each peak period and effective walkway width (the portion of a walkway that can be used effectively by pedestrians). A schematic of existing conditions should be prepared detailing total walkway width, walkway obstructions (*i.e.*, poles, signs, trees, hydrants, subway entrances, parking meters, newsstands, street vendors, telephone booths, *etc.*) and effective walkway width. Care must be taken in estimating the effective walkway width by taking into account shy distances of building faces and curbs, preemptive width of obstructions, and effective length of occasional obstructions. Refer to the HCM for details.

The primary performance measure for sidewalks and walkways is pedestrian unit flow rate, expressed as pedestrians per minute per foot of width (pmf), which is an indicator of the quality of pedestrian movement and comfort. It must be determined whether the pedestrian flow along a sidewalk or walkway location is best described as "non-platoon" or "platoon." Non-platoon flow occurs when pedestrian volume within the peak 15-minute period is relatively uniform. Platoon flow occurs when pedestrian volumes vary significantly within the peak 15-minute period, such as where nearby

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bus stops, subway stations and/or crosswalks account for much of the pedestrian volume. Sidewalk and walkway LOS for average unit flow rates are defined in Table 16-9 for non-platoon and platoon conditions:

Table 16-9
Sidewalk/Walkway LOS for Non-Platoon and Platoon Conditions

	Non-Platoon Flow	Platoon Flow
LOS A	≤ 5 pmf	≤ 0.5 pmf
LOS B	> 5 to 7 pmf	> 0.5 to 3 pmf
LOS C	> 7 to 10 pmf	> 3 to 6 pmf
LOS D	> 10 to 15 pmf	> 6 to 11 pmf
LOS E	> 15 to 23 pmf	> 11 to 18 pmf
LOS F	> 23 pmf	> 18 pmf

Street corners and crosswalks are also analyzed via the HCM procedures, the most important analysis parameters of which are intersecting sidewalk pedestrian volumes, crosswalk pedestrian volumes, average pedestrian speed, effective street corner/crosswalk areas, volume of conflicting vehicles that turn into the crosswalk and pedestrian signal timings. The primary performance measure for corners and crosswalks is pedestrian space, expressed as square feet per pedestrian (ft^2/p). Corner and crosswalk LOS for pedestrian space are defined in Table 16-10:

Table 16-10
Corner/Crosswalk LOS Pedestrian Space

LOS A	> 60 ft^2/p
LOS B	> 40 - 60 ft^2/p
LOS C	>24 - 40 ft^2/p
LOS D	> 15 - 24 ft^2/p
LOS E	> 8 - 15 ft^2/p
LOS F	≤ 8 ft^2/p

When reporting pedestrian volumes and conducting LOS analyses for intersection corners and crosswalks, a peak 15-minute period for each pedestrian element should be used rather than a common peak 15-minute period. For example, during an AM peak hour of 8:00 a.m. to 9:00 a.m., the peak 15-minute period for a crosswalk may be 8:30 a.m. to 8:45 a.m., but for an adjacent corner, it may be 8:45 a.m. to 9:00 a.m. Therefore, the analysis for these two elements would be based on their respective peak 15-minute volumes.

Average pedestrian walking speed, which is used in determining crosswalk time-space, depends on the proportion of elderly and school children in the walking population. An average walking speed of 3.5 feet per second (fps) should be used if the elderly and school children proportion is less than 20 percent of the walking population; otherwise, a walking speed of 3.0 fps should be used. If the study intersection has a school crosswalk or is located within the Senior Pedestrian Focus Areas (SPFA), a walking speed of 3.0 fps should be used in the intersection corner and crosswalk analyses. To determine whether the study intersection(s) are within the designated SPFA, examine the maps provided here.

In addition to the operational analyses discussed above, high crash locations should be identified in consultation with DOT and the study area should include those intersections in the safety assess-

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ment. A high crash location is one where there were 48 or more total crashes (reportable and non-reportable) or five or more pedestrian/bicycle injury accidents in any consecutive 12 months of the most recent 3-year period for which data is available. In addition, if the proposed project is a school site, it requires the analysis of existing pedestrian safety at intersections expected to be used as main walking routes to and from schools, even if these intersections are not categorized as high-accident locations. See Section 370 for additional information.

364. Future No-Action Condition

The future No-Action conditions account for general background growth within the study area, plus tripmaking expected to be generated by major proposed projects that are likely to be in place by the proposed project's build year. The compounded annual growth rates in Table 16-4 are recommended to calculate the background growth rate accounting for short term and long term patterns in CEQR documents. For additional information regarding the assessment of the future No-Action condition, see Subsection 343.

364.1. Preparation of Future No-Action Volumes and Levels of Service Analysis

Pedestrian flow maps and pedestrian level of service analyses should be prepared following the same methodologies outlined for the existing conditions analyses. Documentation of the analyses would provide for a full description of future No-Action conditions and include text and tabular comparisons of how conditions are expected to change from existing conditions to the future No-Action scenario.

This assessment should also account for any programmed pedestrian network changes that could affect pedestrian flows or levels of service.

365. Analysis of Future With-Action Condition

The objective of the future With-Action condition analysis is to determine projected future condition with the proposed project in place and fully operational. The future With-Action condition is then compared with the future No-Action scenario to determine whether or not the proposed project would likely have significant adverse impacts on the study area's pedestrian facilities requiring mitigation.

The assessment of projected future With-Action condition consists of a series of analytical steps—trip generation, modal split, and trip assignment, discussed in detail in Subsections 311 through 321 of this chapter. Once these steps have been completed, a capacity and level of service analysis, defined as the evaluation of conditions within the study area with project-generated trips superimposed on the future No-Action condition, as a representation of the projected future With-Action condition, is conducted. Then, a determination of significant impacts—based on a comparison of With-Action condition with No-Action condition and using the impact thresholds—may be made.

Generally, the pedestrian analyses are performed in coordination with those of traffic and transit.

370. ASSESSMENT OF VEHICULAR AND PEDESTRIAN SAFETY ISSUES

The key issue to be resolved in safety analyses is the extent to which vehicular and pedestrian exposure to crashes may reasonably be expected to increase with the proposed project in place. While many proposed projects do not require a detailed analysis of safety impacts, they may need to be addressed for some projects, such as those that would significantly redesign or reconfigure one or more streets as part of the proposed project; or those located near sensitive land uses, such as hospitals, schools, parks, nursing homes, elderly housing, or study intersections located in SPFAs (maps of SPFAs can be found here) that could be affected by increased traffic and pedestrian volumes generated by the proposed project.

Increased pedestrian crossings at documented high-accident locations may result in increasingly unsafe conditions. Generating measurable pedestrian crossings at non-controlled locations, midblock or intersection, especially for sites generating young pedestrians, such as schools, parks or other similar facilities, may also lead to unsafe conditions. One example would be a new school where a principal access path transverses a high crash location,

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defined as a location with 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclists injury crashes in any consecutive 12 months of the most recent 3-year period for which data is available.

"Reportable crashes" are defined as all crashes involving death or injury that must be "reported" to the NYS Department of Motor Vehicles (DMV) by the police agencies, as well as those crashes resulting in death, injury or property damage in excess of $1,000 must be reported to the DMV by the involved party.

"Non-reportable" crashes contain less detail than reportable crashes, and are entered and retained in the computerized accident file by DMV. Property Damage Only (PDO) crashes reported by police agencies, but not by the involved motorists, are filed by the DMV as "non-reportable." PDO crashes filed by a motorist are considered "non-reportable" if the property damage reported is either less than $1,000 or not provided.

In addition, the absence of controlled pedestrian crosswalks at key access points leading to/from a proposed project, crossing locations with difficult sight lines, *etc.*, may all serve as indicators of current or future problems that could create the potential for significant impacts.

The assessment of safety impacts should indicate the nature of the impact, the volumes affected by or affecting such impacts (including the types of vehicles, including trucks; and the age group of pedestrians, such as children or the elderly), accident types and severity, and other contributing factors. Increased pedestrian crossings at already-documented high-crash locations would result in increasingly unsafe conditions. In addition, increased pedestrian crossings at non-controlled locations (midblock or intersection), may also lead to unsafe conditions, especially for projects generating young pedestrians, such as schools, parks and other similar locations. The analysis of the proposed project should also consider potential safety effects on bicycle activity. For example, does the proposed project affect heavily-used bicycle routes or paths? A quantitative analysis should be conducted indicating the number of bicycle accidents at the location, and may be combined with the evaluation of pedestrian safety. The types of measures to improve traffic and pedestrian safety should be identified and coordinated with DOT (Section 540 for mitigation of pedestrian impacts).

Summary accident data for the most recent three-year period is available from DOT. In addition, the following reference material may be helpful in addressing these issues: a) accident records at New York Police Department; and b) New York State Department of Transportation (NYSDOT) CLASS data.

380. DETAILED PARKING ANALYSIS

The first step in preparing for and conducting the parking analysis is to determine the specific locations of the parking facilities to be studied.

381. Study Area

An appropriately sized parking study area encompasses those facilities—*i.e.*, parking lots and garages and on-street curb spaces—in which vehicular traffic destined for the site of the proposed project would likely park. The extent of the area corresponds to the maximum distance that someone driving to the site would be willing to walk. This walking distance is a function of several parameters, including the following:

- How much accessory and/or public parking would be provided on-site as part of the proposed project? Would it be sufficient or would project-generated vehicles need to park off-site? If on-site parking would be sufficient, there would be no need to define a parking study area unless the proposed project would eliminate a significant amount of available public parking.
- What is the nature of the site's surrounding area? Is the site centrally located within the surrounding street network or, for example, is it a waterfront site from which drivers cannot proceed in all four directions to find parking? Is the area somewhat desolate in peak project hours, thereby making drivers anxious about walking greater distances from their parked cars to the site? Is there an abundance of available parking in the area that affords the driver the opportunity to walk short distances and not require an analysis of parking sites more distant from the project site?

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In general, a 0.25 mile walk is considered the maximum distance from primary off-site parking facilities to the project site, although it could be longer or shorter depending on the factors noted above. Amusement parks, arenas, beaches, and recreational facilities are examples of land uses with parking demands that often extend beyond 0.25 mile of the project site. Should the parking spaces available within this distance of the site, along with whatever amount of parking is provided on-site, prove insufficient to accommodate the peak parking demand, consideration should be given to extending the study area to a maximum of 0.5 mile of the site. However, it should be noted that this is the extent to which drivers would generally go to find available parking, and it does not necessarily indicate that this extended parking study area supply is acceptable. It merely constitutes a piece of information to be disclosed to decision-makers and the public at large.

382. Existing Parking Condition

The objective of the existing parking condition analysis is to document the extent to which public parking is available and utilized in the study area. The analysis consists of an inventory of on- and off-street (*i.e.*, parking lot and garage) spaces, and a summary tabulation indicating the number of parking spaces available for potential future parkers in the area.

382.1. On-Street Parking Analyses

Typically, a parking analysis provides both a qualitative overview of parking in the area and quantified summaries of the nature and extent of parking that occurs. Qualitatively, it should include a general overview of the type of parking regulations that exist in the area. For example, is it generally an "alternate-side-of-the-street" type parking area with metered parking available along key retail streets (with those key streets specified by name)? Is it an area where curb parking is generally prohibited to allow maximum street frontage for commercial vehicle deliveries or for additional traffic capacity, as is the case in much of Midtown Manhattan?

Quantitatively, the analysis should include a tabulation of the number of legal on-street parking spaces that exist within the parking study area by the critical times of day for parking. For a conventional office or residential project, the critical times are 7 a.m. to 9 a.m. when people arrive at work or leave their homes to go to work; at midday (usually between 12:00 and 2:00 p.m.) when parking in a business area is frequently at peak occupancy; and at any other times when parking regulations change significantly (such as in areas where alternate-side-of-the-street parking regulations exist—typically from 8:00 a.m. to 11:00 a.m. or from 11:00 a.m. to 2:00 p.m.—and where curb occupancies change just before and just after the hours that the restrictions are in place). The number of spaces may be obtained by tabulating the length of curb space at which it is legal to park (*i.e.*, excluding fire hydrants, driveways, restricted parking areas, *etc.*) and dividing by an average parking space length of 20 feet, or by counting the number of cars actually parked at the curb plus those that could fit within available gaps.

The analysis should include a tabulation of how many legal on-street parking spaces exist at the likely periods of lowest supply and highest demand, such as 8:00 a.m., 11:00 a.m. and 3:00 p.m., since the peak times for parking activity and parking facility utilization often differ from the peak times for potential traffic impacts, as well as how many of those spaces are occupied and how many are vacant. For proposed projects that have significant trip making activities at other times, those other peak times are also assessed. For example, this could include weekend or weeknight hours for a concert hall, sports arena, convention center, movie theater, *etc.*

It is also advisable to include a more detailed map indicating the key parking regulations on the block faces of the project site and within a more convenient walking distance than the full parking study area. This is needed for two reasons: 1) to provide a better picture of actual conditions at the site; and 2) should a future parking shortfall be identified and additional on-street parking prohibitions be needed as mitigation for traffic impacts, it facilitates the determination of the spaces to be taken.

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382.2. Off-Street Parking Analyses

The location of all public parking lots and garages within the study area should be inventoried and mapped. The licensed capacity of each (which must be posted at its entrance) is noted. Then, one or two mid-week days surveys of the occupancy levels of each parking lot and garage are undertaken to determine the extent to which each is occupied at a representative morning peak hour, such as 8:00 a.m. to 9:00 a.m., and at a time of typical maximum occupancy, such as 12:00 p.m. to 1:00 p.m., or 1:00 p.m. to 2:00p.m.

For specific types of projects that generate a significant amount of in and out parking activity, an hour-by-hour parking occupancy survey may be needed. Examples of this include shopping centers, multiplex movie theaters, and major mixed-use development projects. For several of these uses, weekend and/or weeknight surveys may also be appropriate. For example, a proposed museum may be expected to generate traffic and parking activity weekdays from 10:00 a.m. to 8:00 p.m. and on weekends from 10:00 a.m. to 6:00 p.m. For this proposal, parking occupancy surveys might be performed at 10:00 a.m., when museum employees would come to work and look for nearby parking; at 12:00 p.m. or 2:00 p.m., when visitor activity would build to an assumed maximum; an evening hour, such as 7:00 p.m., when there would be a significant amount of patronage and demand for parking in the area from other uses; and at a representative weekend peak hour, when visitor traffic is expected to be greatest and/or when parking facilities in the area are most fully utilized. Reasonable judgment is needed.

The tabulation of off-street parking should include the name and location of each facility, its posted capacity, number of spaces utilized, and the percentage utilization for the representative critical hours identified. A summary statement of the overall extent to which such parking is available in the study area is included. For example, it could be that only 65 percent of a study area's off-street parking supply is occupied at peak hours, but that the three facilities closest to the proposed project site are fully utilized because development density is greatest there. These important findings should be highlighted.

Occupancy surveys may be taken in one of several ways. The most appropriate procedure is to physically count the number of vehicles parked at the lot or garage. General practice has been to interview the lot manager or an attendant and ask to what extent the facility fills up by time of day, or to make a visual judgment of the utilization of a parking facility. As this information cannot be validated, other methods should be pursued that result in first-hand counts.

383. FUTURE NO-ACTION PARKING CONDITION

The objective of this assessment is to identify the future on- and off-street parking conditions without the proposed project. The projection of future No-Action on- and off-street parking needs includes applying an annual background growth rate (see Table 16-4) to the existing on- and off-street parking demand and assigning the No-Action projects' parking demand to these facilities. The projected parking demand is then compared to study area's parking supply by considering any changes to the street network, on-street parking regulations, closure or reduction of existing off-street parking facilities, and/or addition of any new parking facilities within the study area. The parking garage/lot assessment should be shown as an hourly parking utilization/accumulation, while on-street utilization may be focused to the analysis peak periods. Should any analysis peak hour indicate that the garage/lot parking utilization is at or exceeds 98 percent of its capacity, then the parking facility is considered "at capacity" for that hour and no vehicles should be assigned to the garage/lot. All hourly shortfalls should be identified in the parking utilization table.

384. FUTURE WITH-ACTION CONDITION

The objective of this assessment is to identify the future on- and off-street parking conditions with the proposed project in place, which requires estimating the action's daily and hourly parking demand and the study area's future parking supply (which may include on- and off-site parking facilities as well as on-street curb

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spaces), and assigning the project-related vehicles to these facilities. Should any analysis peak hour indicate that the garage/lot parking utilization is at or exceeds 98% of its capacity, then the parking facility is considered "at capacity" for that hour and no vehicles should be assigned to the garage/lot. This information should be presented in an hourly parking utilization table that compares the future No-Action and With-Action conditions and identifies excess capacity and/or parking shortfalls.

400. DETERMINING IMPACT SIGNIFICANCE

The comparison of expected conditions in the future with and without the proposed project in place determines whether any impacts, or changes in future conditions, are to be expected. Nationally, there are no hard federal or industry-wide standards in use that define impact significance. Each municipality, county, or state agency responsible for traffic, transit, pedestrian, parking operations and/or site plan approvals has either developed its own local set of standards, or responds to development proposals more qualitatively based on their sense of whether the proposal's trip generation is likely to be significant.

The proposed project's context, location, hours of operation, and the types of travel modes it would generate play a key role in determining whether or not a project's impacts are deemed significant. For example, if two distinct proposed projects would generate the same number of trips or result in the same levels of service, but one project would generate its trips during the conventional peak travel hours and the other would generate its traffic during non-peak hours, one project's impacts may be significant while the others may not be considered as such. In another example, if two proposed projects would generate the same volume of traffic, but one would be situated in a commercial area and the other on a quiet residential street, it is possible that only one of these projects would have significant impacts.

Correspondingly, the determination of significant impacts must respond to several important questions:

- Would generated vehicle trips likely cause a noticeable change in volumes on study area streets?
- Would generated vehicle trips likely cause additional traffic delays considered to be unacceptable?
- Would generated vehicle trips likely exacerbate or create unsafe conditions?
- Would generated vehicle trips likely worsen pedestrian crossing conditions on the affected streets?
- Would generated vehicle trips likely create significant delays for surface transit trips?
- Would generated pedestrian trips likely cause noticeable delays and congestion to vehicular traffic?
- Would the location and use of truck loading docks or other goods delivery areas create significant problems for vehicles, pedestrians, and bicycles?
- Would the volume of project-generated subway trips likely cause congestion, delays, or unsafe conditions on station stairwells, platforms or corridors, or through its turnstiles?
- Would the volume of project-generated bus passengers cause overcrowding on buses? Would it necessitate adding more bus service?
- Could the volume of pedestrian trips generated by the proposed project be accommodated on study area sidewalks and safely within its crosswalks and corners at key intersections?

The sections that follow present recommended guidelines for determining impact significance for each transportation element.

410. DETERMINATION OF SIGNIFICANT TRAFFIC IMPACTS

Different municipalities and agencies around the country use different definitions of a significant traffic impact. There is no industry wide standard for the definition of a significant traffic impact. In general, however, there is agreement that deterioration in levels of service (LOS) within the clearly acceptable range (LOS A through LOS C) is not considered significant. Deterioration to marginally acceptable LOS D (mid-LOS D or better) is also not consi-

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dered significant. If the LOS under the With-Action condition deteriorates to worse than mid-LOS D, then the determination of whether the impact is considered significant is based on a sliding scale that varies with the No-Action LOS. This impact determination is premised on the assumption that deterioration in LOS under the With-Action condition becomes less tolerable when there is a poor LOS in the No-Action condition. The following should be applied in determining whether or not the traffic impacts of a proposed project being evaluated are significant.

411. Signalized Intersections

Determination of significant impacts for signalized intersections is summarized as follows:

- If a lane group under the With-Action condition is within LOS A, B or C, or marginally acceptable LOS D (average control delay less than or equal to 45.0 seconds/veh), the impact is not considered significant. The level of service changes, however, could affect neighborhood character should they occur on residential streets, and, therefore, should be disclosed (see Chapter 21, "Neighborhood Character," for further guidance). However, if a lane group under the No-Action condition is within LOS A, B or C, then a deterioration under the With-Action condition to worse than mid-LOS D (delay greater than 45.0 seconds/veh) should be considered a significant impact.
- For a lane group with LOS D under the No-Action condition, an increase in projected average control delay of 5.0 or more seconds should be considered significant if the With-Action delay exceeds mid-LOS D (delay greater than 45.0 seconds/veh).
- For a lane group with LOS E under the No-Action condition, an increase in projected delay of 4.0 or more seconds should be considered significant.
- For a lane group with LOS F under the No-Action condition, an increase in projected delay of 3.0 or more seconds should be considered significant.

412. UNSIGNALIZED INTERSECTIONS

For unsignalized intersections the same criteria as for signalized intersections would apply. For the minor street to trigger a significant impact, 90 PCEs must be identified in the future With-Action conditions in any peak hour.

413. Highways and Ramp Sections

Highway or ramp sections being analyzed—including main line capacity sections, weaving areas, and ramp junctions—should not deteriorate more than one-half of a level of service between the No-Action and With-Action conditions when the No-Action condition is within LOS D, E, or F.

420. DETERMINATION OF SIGNIFICANT SUBWAY/RAIL TRANSIT IMPACTS

The determination of significant impacts differs for stairways, passageways/corridors, turnstiles, and platform conditions. For all circulation elements, however, it is important to highlight incremental changes in passenger volumes as well as v/c changes. NYCT is the agency in New York responsible for implementing or overseeing the implementation of rail transit mitigation measures, should they be needed. There may be cases where alternative assessments may be warranted to cover either unique conditions or alternative with project analysis methodologies.

421. Stairways and Passageways

NYCT has defined significant stairway impacts in terms of the width increment threshold (WIT) needed to bring the stair or passageway back to its No-Action v/c ratio or to bring it to a v/c ratio of 1.00, whichever is greater. Please note that the WIT is used to determine significant impact, and is not the actual widening that would be required to mitigate a significant impact (see Section 520 for stairway/passageway mitigation).

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To determine the WIT, use the following formula if both the No-Action v/c and the With-Action v/c ratios are greater than 1.00:

Equation 16-5

$$WIT = \frac{We \times Vp}{Vna}$$

Where: WIT = width increment threshold
We = effective width in inches in the No-Action
Vp = 15-minute project-induced change in passenger volume
Vna = No-Action passenger volume

In instances where the No-Action v/c ratio is less than one but the With-Action v/c ratio is greater than one, then the WIT should be calculated to bring the v/c back to 1.00, rather than the to the No-Action v/c. Use the following formula to calculate the WIT in cases where the No-Action v/c is less than 1.00:

Equation 16-6

$$WIT = \frac{Vb\ up}{150 \times Sfup \times Ff} + \frac{Vb\ down}{150 \times Sfdown \times Ff} - We$$

Where: WIT = width increment threshold
We = effective width in the No-Action
Vb up = total With-Action volume in the up direction
Vb down = total With-Action volume in the down direction
150 = guideline capacity of stairway (use 250 for passageways)
Ff = friction factor
Sf = surge factor (Sf = 1 in the non-surged direction)

Stairways and passageways that are substantially degraded in v/c, or which result in the formation of extensive queues are classified as significantly impacted. Significant impacts are typically considered to occur once the following WIT are reached or exceeded:

Table 16-11

With-Action v/c	WIT for Significant Impact (inches)	
	Stairway	Passageway
1.00-1.09	8	13
1.1-1.19	7	11.5
1.20-1.29	6	10
1.3-1.39	5	8.5
1.4-1.49	4	6
1.5-1.59	3	4.5
1.6 and up	2	3

422. Turnstiles, Escalators, Elevators and High-Wheel Exits

Proposed projects that cause a turnstile, escalator or high-wheel exit gate to increase from v/c below 1.00 to v/c of 1.00 or greater are considered to create a significant impact. Where a facility is already at a v/c of 1.00 or greater, a 0.01 change in v/c ratio is also considered significant.

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423. Platforms

NYCT guidelines define the objective of maintaining LOS C/D occupancy conditions along platforms. For platforms (and for station mezzanine or concourse levels) there are two concerns: capacity for passenger movement and waiting; and passenger safety. However, platform widths and configurations are also the most difficult of the station elements to modify or enlarge.

A future With-Action increment that causes a platform zone to exceed a v/c ratio of 1.33 is considered a significant impact. A full description of what deterioration between or within given levels of service mean to passengers and train operation should also be included.

424. Line-Haul Capacity

In the area of line-haul capacity, there are constraints on what service improvements are potentially available to NYCT. The comparison of future With-Action load levels per car with future No-Action levels would indicate whether, and to what extent, ridership per car would increase.

Any increases in average per car load levels that remain within guideline capacity limits are generally not considered significant impacts. However, projected increases from a No-Action condition within guideline capacity to a With-Action condition that exceeds guideline capacity may be considered a significant impact if the proposed project is generating five more transit riders per car. This is based on a general assumption that at guideline capacity, the addition of even five more riders per car is perceptible.

430. DETERMINATION OF SIGNIFICANT BUS TRANSIT IMPACTS

The With-Action evaluations provide an analysis of projected load levels per bus at each affected route's maximum load point to determine whether this future load level would be within a typical bus's total capacity or above total capacity. As previously noted, LIB, MTABC, and NYCT buses are scheduled to operate at a maximum load of 54 (standard) or 85 (articulated) or 55 (over-the-road) passengers per bus—their maximum seated-plus-standee load—at the bus's maximum load point. According to current MTA bus operating agencies' guidelines, increases in bus load levels to above their maximum capacity at any load point is defined as a significant impact since it necessitates adding more bus service along that route.

440. DETERMINATION OF SIGNIFICANT PEDESTRIAN IMPACTS

The guidance described below is based on the general comfort and convenience levels of pedestrians and should be used in determining the significance of pedestrian impacts. As defined previously, pedestrian LOS D refers to restricted flow conditions for sidewalks and crosswalks (a level where pedestrians do not have freedom to select their walking speeds and to bypass other pedestrians) and to "no touch" zones (standing without touching is possible) for corner reservoir areas. LOS E refers to severely restricted conditions for sidewalks and crosswalks (space is not sufficient for passing slower pedestrians) and to "touch" zones (standing in physical contact with others is unavoidable) for corner reservoir areas, and LOS F refers to conditions where movement is extremely difficult if not impossible. LOS D through F, therefore, have undesirable implications regarding comfort and convenience of pedestrian flow. In addition, severely restricted flow conditions may have potential safety implications.

When evaluating pedestrian impacts, the location of the area being assessed is an important consideration. For example, Central Business District (CBD) areas, such as Midtown and Lower Manhattan, Downtown Brooklyn, Long Island City, Downtown Flushing, Downtown Jamaica, and other areas having CBD type characteristics, have a substantially higher level of pedestrian activity than anywhere else. Pedestrians there have, to some extent, become acclimated to, and tolerant of, restricted level of service conditions that might not be considered acceptable elsewhere. Therefore, acceptable LOS for CBD areas is generally taken to be mid-LOS D or better, while acceptable LOS elsewhere in the City (non-CBD areas) is generally taken to be the upper limit of LOS C or better. The following sections offer guidance in determining impact significance for pedestrian elements.

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441. Corners and Crosswalks

Determination of significant impacts for corners and crosswalks depends on whether the area type is considered a CBD or non-CBD. It is recommended that DOT be consulted prior to conducting corner or crosswalk level of service analyses to determine area types to be used in determining potential significant impacts.

441.1. Corners and Crosswalks in Non-CBD Areas

For corners and crosswalks in non-CBD areas, average pedestrian space under the With-Action condition deteriorating within acceptable LOS (LOS C or better) should generally not be considered a significant impact. If the pedestrian space under the With-Action condition deteriorates to LOS D or worse, then the determination of whether the impact is considered significant is based on a sliding scale that varies with the No-Action pedestrian space. This impact determination is premised on the assumption that the reduction in pedestrian space under the With-Action condition becomes less tolerable when there is less pedestrian space to begin with under the No-Action condition. Determination of significant impacts for corners and crosswalks within a non-CBD area is summarized as follows:

- If the average pedestrian space under the No-Action condition is greater than 26.6 ft^2/p, then a decrease in pedestrian space under the With-Action condition to 24.0 ft^2/p or less (LOS D or worse) should be considered a significant impact. If the pedestrian space under the With-Action condition is greater than 24.0 ft^2/p (LOS C or better), the impact should not be considered significant.
- If the average pedestrian space under the No-Action condition is between 5.1 and 26.6 ft^2/p, a decrease in pedestrian space under the With-Action condition should be considered significant according to the sliding scale formula below or using Table 16-12:

Equation 16-7

$$Y \geq \frac{X}{9.0} - 0.31$$

where,
Y = decrease in pedestrian space in ft^2/p to be considered a potential significant impact
X = No-Action pedestrian space in ft^2/p

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TABLE 16-12
SIGNIFICANT IMPACT GUIDANCE FOR CORNERS AND CROSSWALKS NON-CBD LOCATION

No-Action Condition Ped Space (sf/ped)	With-Action Condition Ped Space Reduction to be Considered Significant Impact (sf/ped)
>26.6	With-Action Condition ≤ 24.0
25.8 to 26.6	Reduction ≥ 2.6
24.9 to 25.7	Reduction ≥ 2.5
24.0 to 24.8	Reduction ≥ 2.4
23.1 to 23.9	Reduction ≥ 2.3
22.2 to 23.0	Reduction ≥ 2.2
21.3 to 22.1	Reduction ≥ 2.1
20.4 to 21.2	Reduction ≥ 2.0
19.5 to 20.3	Reduction ≥ 1.9
18.6 to 19.4	Reduction ≥ 1.8
17.7 to 18.5	Reduction ≥ 1.7
16.8 to 17.6	Reduction ≥ 1.6
15.9 to 16.7	Reduction ≥ 1.5
15.0 to 15.8	Reduction ≥ 1.4
14.1 to 14.9	Reduction ≥ 1.3
13.2 to 14.0	Reduction ≥ 1.2
12.3 to 13.1	Reduction ≥ 1.1
11.4 to 12.2	Reduction ≥ 1.0
10.5 to 11.3	Reduction ≥ 0.9
9.6 to 10.4	Reduction ≥ 0.8
8.7 to 9.5	Reduction ≥ 0.7
7.8 to 8.6	Reduction ≥ 0.6
6.9 to 7.7	Reduction ≥ 0.5
6.0 to 6.8	Reduction ≥ 0.4
5.1 to 5.9	Reduction ≥ 0.3
< 5.1	Reduction ≥ 0.2

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- If the decrease in pedestrian space is less than the value calculated from the formula or Table 16-12, the impact is not considered significant.
- If the average pedestrian space under the No-Action condition is less than 5.1 ft^2/p, then a decrease in pedestrian space greater than or equal to 0.2 ft^2/p should be considered significant.

For example, if a crosswalk under the No-Action condition in a non-CBD area has an average pedestrian space of 19.8 ft^2/p, then a reduction in pedestrian space equal to or greater than 1.9 ft^2/p (Y = 19.8/9.0 – 0.31 = 1.9) should be considered a significant impact.

441.2. Corners and Crosswalk in CBD Areas

The procedure for corners and crosswalks in CBD areas is similar to that for non-CBD areas, except that With-Action condition average pedestrian space that is considered to be acceptable ranges from LOS A to mid-LOS D (as opposed to LOS A through LOS C for non-CBD areas). If the pedestrian space under the With-Action condition deteriorates to worse than mid-LOS D, then the determination of whether the impact is considered significant is based on the same sliding scale as for non-CBD areas. Determination of significant impacts for corners and crosswalks in a CBD area is summarized as follows:

- If the average pedestrian space under the No-Action condition is greater than 21.5 ft^2/p, then a decrease in pedestrian space under the With-Action condition to less than 19.5 ft^2/p worse than mid-LOS D) should be considered a significant impact. If the pedestrian space under the With-Action condition is greater than or equal to 19.5 ft^2/p (mid-LOS D or better), the impact should not be considered significant.

TABLE 16-13
SIGNIFICANT IMPACT GUIDANCE FOR CORNERS AND CROSSWALKS
CBD LOCATION

No-Action Condition Ped Space (sf/ped)	With-Action Condition Ped Space Reduction to be Considered a Significant Impact (sf/ped)
> 21.5	With-Action Condition < 19.5
21.3 to 21.5	Reduction ≥ 2.1
20.4 to 21.2	Reduction ≥ 2.0
19.5 to 20.3	Reduction ≥ 1.9
18.6 to 19.4	Reduction ≥ 1.8
17.7 to 18.5	Reduction ≥ 1.7
16.8 to 17.6	Reduction ≥ 1.6
15.9 to 16.7	Reduction ≥ 1.5
15.0 to 15.8	Reduction ≥ 1.4
14.1 to 14.9	Reduction ≥ 1.3
13.2 to 14.0	Reduction ≥ 1.2
12.3 to 13.1	Reduction ≥ 1.1
11.4 to 12.2	Reduction ≥ 1.0
10.5 to 11.3	Reduction ≥ 0.9
9.6 to 10.4	Reduction ≥ 0.8
8.7 to 9.5	Reduction ≥ 0.7
7.8 to 8.6	Reduction ≥ 0.6
6.9 to 7.7	Reduction ≥ 0.5
6.0 to 6.8	Reduction ≥ 0.4
5.1 to 5.9	Reduction ≥ 0.3
< 5.1	Reduction ≥ 0.2

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- If the average pedestrian space under the No-Action condition is between 5.1 and 21.5 ft^2/p, a decrease in pedestrian space under the With-Action condition should be considered significant according to the sliding scale formula in Equation 16-7 or using Table 16-13. If the decrease in pedestrian space is less than the value calculated from the formula, or Table 16-13, the impact should not be considered significant.
- If the average pedestrian space under the No-Action condition is less than 5.1 ft^2/p, then a decrease in pedestrian space greater than or equal to 0.2 ft^2/ped should be considered significant.

For example, if a crosswalk under the No-Action condition in a CBD has an average pedestrian space of 12.8 ft^2/p, then a reduction in pedestrian space equal to or greater than 1.1 ft^2/p (Y = 12.8/9.0 – 0.31 = 1.1) should be considered a significant impact.

442. Sidewalks

Determination of significant impacts for sidewalks/walkways depends on the pedestrian flow type –non-platoon or platoon– and the area type –non-CBD or CBD. It is recommended that the lead agency consult with DOT prior to conducting sidewalk levels of service analyses to determine pedestrian flow types and area types to be used in determining potential significant impacts.

442.1. Sidewalks with Non-Platoon Flow in Non-CBD Areas

For sidewalks exhibiting non-platoon flow in non-CBD areas, With-Action condition pedestrian flow rates deteriorating within acceptable LOS (LOS C or better) should generally not be considered a significant impact. If the pedestrian flow rate under the With-Action condition deteriorates to LOS D or worse, then the determination of whether the impact is considered significant is based on a sliding scale that varies with the No-Action average pedestrian flow rates. This impact determination is premised on the assumption that the increase in pedestrian flow rate under the With-Action condition becomes less tolerable when there are large pedestrian volumes to begin with under the No-Action condition. Determination of significant impacts for sidewalks with non-platoon flow in a non-CBD area is summarized as follows:

- If the average pedestrian flow rate under the No-Action condition is less than 7.5 pmf and the average flow rate under the With-Action condition is greater than 10.0 pmf (LOS D or worse), then it should be considered a significant impact. If the average flow rate under the With-Action condition is less than or equal to 10.0 pmf (LOS C or better), the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is between 7.5 and 23.0 pmf, an increase in average flow rate under the With-Action condition should be considered significant using Table 16-14 or the sliding scale formula below:

Equation 16-8

$$Y \geq 3.53 - \frac{X}{8.0}$$

where,
Y = increase in average pedestrian flow rate in pmf to be considered a potential significant impact
X = No-Action pedestrian flow rate in pmf

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TABLE 16-14
SIGNIFICANT IMPACT GUIDANCE FOR SIDEWALKS
NON-PLATOONED FLOW
NON-CBD LOCATION

No-Action Condition Ped Flow (ped/min/ft)	With-Action Condition Ped Flow Increment to be Considered a Significant Impact (ped/min/ft)
< 7.5	With-Action Condition > 10.0
7.5 to 7.8	Increment ≥ 2.6
7.9 to 8.6	Increment ≥ 2.5
8.7 to 9.4	Increment ≥ 2.4
9.5 to 10.2	Increment ≥ 2.3
10.3 to 11.0	Increment ≥ 2.2
11.1 to 11.8	Increment ≥ 2.1
11.9 to 12.6	Increment ≥ 2.0
12.7 to 13.4	Increment ≥ 1.9
13.5 to 14.2	Increment ≥ 1.8
14.3 to 15.0	Increment ≥ 1.7
15.1 to 15.8	Increment ≥ 1.6
15.9 to 16.6	Increment ≥ 1.5
16.7 to 17.4	Increment ≥ 1.4
17.5 to 18.2	Increment ≥ 1.3
18.3 to 19.0	Increment ≥ 1.2
19.1 to 19.8	Increment ≥ 1.1
19.9 to 20.6	Increment ≥ 1.0
20.7 to 21.4	Increment ≥ 0.9
21.5 to 22.2	Increment ≥ 0.8
22.3 to 23.0	Increment ≥ 0.7
> 23.0	Increment ≥ 0.6

- If the increase in average pedestrian flow rate is less than value calculated from the formula or Table 16-14, the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is greater than 23.0 pmf, then an increase in pedestrian flow rate greater than or equal to 0.6 pmf should be considered significant.

For example, if a sidewalk under the No-Action condition has a pedestrian flow rate of 12.8 pmf, then an increase in pedestrian flow rate greater than or equal to 1.9 pmf (Y = 3.53 – 12.8/8.0 = 1.9) should be considered a significant impact.

442.2. Sidewalks with Non-Platoon Flow in CBD Areas

The procedure for sidewalks exhibiting non-platoon flow in CBD areas is similar to that for non-CBD areas, except that With-Action condition average pedestrian flow rate that is considered to be ac-

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ceptable ranges from LOS A to mid-LOS D (as opposed to LOS A through LOS C non-CBD areas). If the average pedestrian flow rate under the With-Action condition deteriorates to worse than mid-LOS D, then the determination of whether the impact is considered significant is based on the same sliding scale as for non-CBD areas. Determination of significant impacts for sidewalks with non-platoon flow in a CBD is summarized as follows:

- If the average pedestrian flow rate under the No-Action condition is less than 10.4 pmf and the average flow rate under the With-Action condition is greater than 12.5 pmf (worse than mid-LOS D), then it is considered a significant impact. If the average flow rate under the With-Action condition is less than or equal to 12.5 pmf (mid-LOS D or better), the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is between 10.4 and 23.0 pmf, an increase in average flow rate under the With-Action condition should be considered significant according to the formula in Equation 16-8 or using Table 16-15. If the increase in average pedestrian flow rate is less than the value calculated from the formula or Table 16-15, the impact should not be considered significant.

TABLE 16-15
SIGNIFICANT IMPACT GUIDANCE FOR SIDEWALKS
NON-PLATOONED FLOW
CBD LOCATION

No-Action Condition Ped Flow (ped/min/ft)	With-Action Condition Ped Flow Increment to be Considered Significant Impact (ped/min/ft)
< 10.4	With-Action Condition > 12.5
10.4 to 11.0	Increment ≥ 2.2
11.1 to 11.8	Increment ≥ 2.1
11.9 to 12.6	Increment ≥ 2.0
12.7 to 13.4	Increment ≥ 1.9
13.5 to 14.2	Increment ≥ 1.8
14.3 to 15.0	Increment ≥ 1.7
15.1 to 15.8	Increment ≥ 1.6
15.9 to 16.6	Increment ≥ 1.5
16.7 to 17.4	Increment ≥ 1.4
17.5 to 18.2	Increment ≥ 1.3
18.3 to 19.0	Increment ≥ 1.2
19.1 to 19.8	Increment ≥ 1.1
19.9 to 20.6	Increment ≥ 1.0
20.7 to 21.4	Increment ≥ 0.9
21.5 to 22.2	Increment ≥ 0.8
22.3 to 23.0	Increment ≥ 0.7
> 23.0	Increment ≥ 0.6

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- If the average pedestrian flow rate under the No-Action condition is greater than 23.0 pmf, then an increase in pedestrian flow rate greater than or equal to 0.6 pmf should be considered significant.

442.3. Sidewalks with Platoon Flow in Non-CBD Areas

For sidewalks exhibiting platoon flow in non-CBD areas, With-Action condition pedestrian flow rates deteriorating within acceptable LOS (LOS C or better) should generally not be considered a significant impact. If the pedestrian flow rate under the With-Action condition deteriorates to LOS D or worse, then the determination of whether the impact is considered significant is based on a sliding scale that varies with the No-Action average pedestrian flow rates. This impact determination is premised on the assumption that the increase in pedestrian flow rate under the With-Action condition becomes less tolerable when there are large pedestrian volumes to begin with under the No-Action condition. Determination of significant impacts for sidewalks with platoon flow in a non-CBD area is summarized as follows:

- If the average pedestrian flow rate under the No-Action condition is less than 3.5 pmf and the average flow rate under the With-Action condition is greater than 6.0 pmf (LOS D or worse), then it is considered a significant impact. If the average flow rate under the With-Action condition is less than or equal to 6.0 pmf (LOS C or better), the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is between 3.5 and 19.0 pmf, an increase in average flow rate under the With-Action condition should be considered significant using Table 16-16 or the sliding scale formula below:

Equation 16-9

$$Y \geq 3.03 - \frac{X}{8.0}$$

where,
Y = increase in average pedestrian flow rate in pmf to be considered a potential significant impact
X = No-Action pedestrian flow rate in pmf.

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TABLE 16-16
SIGNIFICANT IMPACT GUIDANCE FOR SIDEWALKS
PLATOONED FLOW
NON-CBD LOCATION

No-Action Condition Ped Flow (ped/min/ft)	With-Action Condition Ped Flow Increment to be Considered Significant Impact (ped/min/ft)
< 3.5	With-Action Condition > 6.0
3.5 to 3.8	Increment ≥ 2.6
3.9 to 4.6	Increment ≥ 2.5
4.7 to 5.4	Increment ≥ 2.4
5.5 to 6.2	Increment ≥ 2.3
6.3 to 7.0	Increment ≥ 2.2
7.1 to 7.8	Increment ≥ 2.1
7.9 to 8.6	Increment ≥ 2.0
8.7 to 9.4	Increment ≥ 1.9
9.5 to 10.2	Increment ≥ 1.8
10.3 to 11.0	Increment ≥ 1.7
11.1 to 11.8	Increment ≥ 1.6
11.9 to 12.6	Increment ≥ 1.5
12.7 to 13.4	Increment ≥ 1.4
13.5 to 14.2	Increment ≥ 1.3
14.3 to 15.0	Increment ≥ 1.2
15.1 to 15.8	Increment ≥ 1.1
15.9 to 16.6	Increment ≥ 1.0
16.7 to 17.4	Increment ≥ 0.9
17.5 to 18.2	Increment ≥ 0.8
18.3 to 19.0	Increment ≥ 0.7
> 19.0	Increment ≥ 0.6

- If the increase in average pedestrian flow rate is less than the value calculated from the formula or Table 16-16, the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is greater than 19.0 pmf, then an increase in pedestrian flow rate greater than or equal to 0.6 pmf should be considered significant.

For example, if a sidewalk under the No-Action condition has a pedestrian flow rate of 8.8 pmf, then an increase in pedestrian flow rate greater than or equal to 1.9 pmf (Y = 3.03 – 8.8/8.0 = 1.9) should be considered a significant impact.

442.4. Sidewalks with Platoon Flow in CBD Areas

The procedure for sidewalks exhibiting platoon flow in CBD areas is similar to that for non-CBD areas, except that With-Action condition average pedestrian flow rate that is considered to be acceptable

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ranges from LOS A to mid-LOS D (as opposed to LOS A through LOS C non-CBD areas). If the average pedestrian flow rate under the With-Action condition deteriorates to worse than mid-LOS D, then the determination of whether the impact is considered significant is based on the same sliding scale as for non-CBD areas. Determination of significant impacts for sidewalks with platoon flow in a CBD is summarized as follows:

- If the average pedestrian flow rate under the No-Action condition is less than 6.4 pmf and the average flow rate under the With-Action condition is greater than 8.5 pmf (worse than mid-LOS D), then it is considered a significant impact. If the average flow rate under the With-Action condition is less than or equal to 8.5 pmf (mid-LOS D or better), the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is between 6.4 and 19.0 pmf, an increase in average flow rate under the With-Action condition should be considered significant according to the formula in Equation 16-9 or using Table 16-17. If the increase in average pedestrian flow rate is less than the value calculated from the formula or Table 16-17, the impact should not be considered significant.
- If the average pedestrian flow rate under the No-Action condition is greater than 19.0 pmf, then an increase in pedestrian flow rate greater than or equal to 0.6 pmf should be considered significant.

TABLE 16-17
SIGNIFICANT IMPACT GUIDANCE FOR SIDEWALKS PLATOONED FLOW CBD LOCATION

No-Action Condition Ped Flow (ped/min/ft)	With-Action Condition Ped Flow Increment to be Considered a Significant Impact (ped/min/ft)
< 6.4	With-Action Condition > 8.5
6.4 to 7.0	Increment ≥ 2.2
7.1 to 7.8	Increment ≥ 2.1
7.9 to 8.6	Increment ≥ 2.0
8.7 to 9.4	Increment ≥ 1.9
9.5 to 10.2	Increment ≥ 1.8
10.3 to 11.0	Increment ≥ 1.7
11.1 to 11.8	Increment ≥ 1.6
11.9 to 12.6	Increment ≥ 1.5
12.7 to 13.4	Increment ≥ 1.4
13.5 to 14.2	Increment ≥ 1.3
14.3 to 15.0	Increment ≥ 1.2
15.1 to 15.8	Increment ≥ 1.1
15.9 to 16.6	Increment ≥ 1.0
16.7 to 17.4	Increment ≥ 0.9
17.5 to 18.2	Increment ≥ 0.8
18.3 to 19.0	Increment ≥ 0.7
> 19.0	Increment ≥ 0.6

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450. DETERMINATION OF SIGNIFICANT PARKING SHORTFALLS

Should the proposed project generate the need for more parking than it provides, this shortfall of spaces may be considered significant. The availability of off-street and on-street parking spaces within a convenient walking distance (about 0.25 mile) is considered in making this determination. For example, should the number of available parking spaces within this distance from the project site be ample to accommodate the project's parking shortfall, the shortfall would not be significant. If the available parking supply is not sufficient to accommodate the proposed project's shortfall, the determination whether a parking shortfall is considered significant should take into account the following:

- For proposed projects located in Parking Zones 1 and 2, as shown in Map 16-2, "Parking Zones," the inability of the proposed project or the surrounding area to accommodate a project's future parking demands is considered a parking shortfall, but is generally not considered significant due to the magnitude of available alternative modes of transportation.

  NOTE: To view detailed maps of parking zones 1 and 2 for areas outside of Manhattan (which is all considered Parking Zones 1 and 2), see the maps for the South Bronx, Flushing, Jamaica, Long Island City/Astoria, Downtown Brooklyn, and Greenpoint/Williamsburg.

- For proposed projects located in residential or commercial areas not designated as Parking Zones 1 and 2, as shown in Map 16-2, a project's parking shortfall that exceeds more than half the available on-street and off-street parking spaces within 0.25 mile of the site can be considered significant. The lead agency should consider additional factors to determine whether such shortfall is significant, including: the availability and extent of transit in the area; the proximity of the project to such transit; any features of the project that are considered trip reduction or travel demand management measures (TDM) as set forth in Subsection 515; and travel modes of customers of area commercial businesses; and patterns of automobile usage by area residents. The sufficiency of parking within 0.5 mile (rather than 0.25 mile) of the project site to accommodate the projected shortfall may also be considered.

500. DEVELOPING MITIGATION

The identification of significant impacts leads to the need to identify and evaluate suitable mitigation measures that mitigate the impact or return projected future conditions to an acceptable level that is not considered a significant impact, following the same impact criteria as defined by the guidelines in Section 400. Identification of feasible and practical mitigation/improvement measures should be guided by DOT's 2009 *Street Design Manual,* the detailed guide to the City's transportation policies.

In general, the mitigation analysis begins by identifying those measures that would be effective in mitigating the impact at the least cost and then proceeds to measures of increasingly higher cost only if the lower cost measures are deemed insufficient. In doing so, care should be exercised that the implementation of a given measure should not mitigate impacts in one area—either geographic or technical—that would create new significant impacts or aggravate already projected significant impacts elsewhere.

For example, for a significantly impacted stairwell from a subway station, stairwell widening could be an appropriate mitigation, but such widening should not narrow the adjacent street-level sidewalk to the point where it does not have sufficient capacity to process pedestrians passing along it and consequently creates a significant adverse pedestrian impact. Consideration should be given to widening the sidewalk or relocating the stairwell into a project building, if conditions permit. Creation of a bus "lay-by"—where the sidewalk width is reduced to provide an exclusive berth for buses to pick-up and drop-off passengers—should also not result in a longer pedestrian path, reduced sidewalk width or corner reservoir area by an amount that creates significant impacts. One commonly recommended traffic mitigation measure is to re-time existing traffic signals to provide increased green time—and thus increased capacity—to the intersection approach that is significantly impacted. Not only should the traffic analysis make sure that other intersection approaches that would lose green time could afford to do so, and that existing signal progression along an impor-

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tant arterial not be unduly impacted, but also that pedestrians crossing the street still have sufficient green time for them at cross-walks losing pedestrian walk time. The same concern is apparent with respect to parking, where the prohibition of curbside parking along an intersection approach that requires an additional travel lane could reduce the supply of parking spaces by an amount large enough to trigger a parking shortfall. Also, traffic mitigation analyses need to consider potential implications on air quality, noise, and, possibly, neighborhood character analyses.

Consequently, it is important that the each transportation element and facility be considered as a comprehensive system, wherein changes in one could impact activity patterns and/or levels of service in another. It is possible that recommendation of a major new transit service—such as institution of ferry service at a new waterfront site—that is generally viewed as a major overall access benefit, may also have secondary impacts that need to be evaluated as to their significance. For example, the lead agency should examine whether pedestrian flows to and from the ferry landing would cause impacts, whether intersection capacity would be affected if buses are rerouted to connect with the ferry, or whether there be sufficient parking for ferry users. This does not mean that these broader, more effective or desirable mitigation measures should not be considered, but rather that a comprehensive look and evaluation is needed.

LOS analysis should be conducted and documented for those transit and pedestrian elements that undergo mitigation and/or for those elements that may be impacted as a result of mitigation measures of another element as described above. This analysis is referred to as the "Action-with-Mitigation" condition and is then compared to the No-Action condition. The impact is considered fully mitigated if there is no significant impact following the same impact criteria as described above. A significant adverse impact that has no feasible mitigation or cannot be fully mitigated must be identified as an unmitigated impact.

As an example, suppose a sidewalk with platooned flow in a CBD has an average pedestrian flow rate of 15.8 pmf under the No-Action condition, and under the With-Action condition the average flow rate is increased to 17.9 pmf. This is considered a significant impact because the increment is 2.1 pmf, and from Equation 16-9 or Table 16-17, any increment greater than or equal to 1.1 pmf is considered a significant impact. To be considered fully mitigated, the increment under the Action-with-Mitigation condition relative to the No-Action condition would have to be less than 1.1 pmf. This means the average pedestrian flow rate under the Action-with-Mitigation condition would have to be brought down to less than 16.9 pmf.

Once the mitigation analyses have been completed, it is necessary to review the required mitigation measures with DOT for its approval as the agency responsible for their implementation. Similarly, for transit mitigation, NYCT-Operations Planning should be contacted. For EISs, it is recommended to contact the implementing agency prior to the draft EIS stage because the approval of mitigation must be finalized before the issuance of the Final EIS. Below are the specific mitigation measures that could be implemented.

510. TRAFFIC MITIGATION

When considering traffic mitigation, the impact is considered fully mitigated when the resulting LOS degradation under the Action-with-Mitigation condition compared to the No-Action condition is no longer deemed significant following the impact criteria as described in Section 420. For example, if a No-Action condition lane group has an average control delay of 57.0 seconds/vehicle (LOS E) and the average delay in the With-Action condition increases to 65.0 seconds (LOS E), it is considered a significant impact as the increment in delay (8.0 seconds) is greater than the impact threshold of 4.0 or more seconds identified for LOS E. For this impact to be mitigated, the average delay would have to be brought down to less than 61.0 seconds so that the delay increment between the With-Action and No-Action conditions is less than 4.0 seconds. For future No-Action LOS A, B, or C, mitigation to mid-LOS D is required. For example, if a No-Action condition lane group has an average control delay of 34.0 seconds/vehicle (LOS C) and the average delay in the With-Action condition increases to 50.0 seconds (LOS D), it is considered a significant impact. For this impact to be mitigated, the average delay would have to be brought down to 45.0 seconds (mid-LOS D).

The range of traffic mitigation measures can be viewed as encompassing five categories: a) low-cost, readily implementable measures; b) moderate-cost, fairly readily implementable measures; c) higher capital cost measures; d) enforcement measures; and e) trip reduction or travel demand management (TDM) measures. Some discus-

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sion of the benefits and issues associated with each of these types of measures is presented below. If the lead agency, in consultation with DOT, determines such measures are impracticable for a particular project or in a particular location, other mitigation measures may then be considered. In addition, when geometric changes to city streets are proposed to mitigate significant transportation impacts, the proposed changes must conform to the guidance in DOT's 2009 *Street Design Manual*, which sets the City's policy for designing existing and new streets. Mitigation measures often require implementation by, or approval from, agencies (such as DOT, MTA and the New York City Transit Authority (NYCTA)). Since many of the City's highways are under NYSDOT jurisdiction, coordination and approval from that agency, in addition to NYCDOT, is required. Such approval should be agreed to in writing by the implementing agency before such mitigation is included in the FEIS. Table 16-18 below describes typical traffic mitigation measures, the approvals required before including such mitigation in the FEIS, and the policies that guide the design of certain measures:

Table 16-18

Type of measure	Approval required	Must follow
511. Low-cost, readily implementable measures		
Signal phasing and timing modifications	DOT Signals Division	
Parking regulation modifications	DOT Borough Engineering	
Lane restriping and pavement marking changes	DOT Highway Design and Construction	*Street Design Manual*
Street direction and other signage-oriented changes	DOT Traffic Planning Division, Highway Design and Construction, Borough Engineering	
512. Moderate-cost, fairly readily implementable measures		
Intersection channelization improvements	DOT Highway Design and Construction	*Street Design Manual*
Traffic signal installation	DOT Signals Division	Intersection Control Analysis
513. Higher-Cost Mitigation Measures		
Geometric improvements	DOT Highway Design and Construction	*Street Design Manual*
Street widening	DOT Highway Design and Construction	*Street Design Manual*
Construction of new streets	DOT Highway Design and Construction	*Street Design Manual*
Construction of new highway ramps.	DOT Highway Design and Construction, NYS DOT (for State-owned highways)	*Street Design Manual*
514. Enforcement Measures		
Traffic enforcement agents	NYPD	
515. Trip Reduction or Travel Demand Management Measures		
Carpooling and vanpooling		
Staggered work hours and flextime programs		
Improved bus service	MTA New York City Transit DOT Highway Design and Construction (if geometric changes are proposed)	*Street Design Manual* (if geometric changes are proposed)
New transit services	MTA New York City Transit	
Telecommuting		
Bicycle facilities	DOT Office of Bicycle and Pedestrian Programs	

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Mitigation analysis would typically start with the identification of low-cost, readily implementable measures and proceed to the higher cost measures. It is recommended that TDM or similar measures that would promote efficient means of travel, reduce auto dependency and encourage transit, pedestrian and bicycle modes be considered to the extent practicable concurrently with the low-cost measures.

511. Low-Cost, Readily Implementable Measures

These mitigation measures typically include signal phasing and timing modifications, parking regulation modifications, lane restriping and pavement marking changes, turn prohibitions, street direction changes, and other traffic-signage-oriented changes. DOT approval is required for the acceptance and implementation of these measures.

SIGNAL PHASING AND TIMING MODIFICATIONS

The goal of signal timing modifications, which is often the first traffic mitigation measure considered, is to shift green time from intersection approaches that have clearly sufficient capacity to those that need additional green time to accommodate their traffic demand. Signal phasing modifications are considered when a specific movement at an intersection requires exclusive time for its movement to be completed. For example, northbound left turns at an intersection may often proceed together with all other north- and southbound traffic. Provision of a separate signal phase for left turns would generally allow them to move conflict-free and, thus, at a better level of service. Care should always be exercised that provision of such an exclusive phase would not significantly impact other traffic movements at the intersection. Should a left-turn phase be proposed, a left-turn warrant analysis is required for DOT review and approval. See the Appendix for the left-turn warrant analysis.

Signal phasing modifications need not only be the provision of a separate phase for a particular left turn volume. It could also be an advance phase for an entire approach to an intersection or a combination of different movements that do not conflict. Phasing and timing modifications may also be helpful in mitigating pedestrian crossing problems at particular intersections. Application to DOT must be made for signal phasing and/or timing modifications. In addition, should the proposed signal timing changes exceed four seconds of green time reallocation, a signal progression analysis may be required. The lead agency should consult DOT to determine whether such analysis is needed.

Evaluation of signal timing measures also considers their implication on pedestrian crossings and waiting areas as well as on the overall signal progression along a corridor or through a CBD area. It should be emphasized that time needed for pedestrians to safely cross the street must be maintained if a reallocation of green time is proposed. An average walking speed of 3.5 feet/second (fps) should be used if the elderly and school children proportion is less than 20 percent of the population, otherwise a walking speed of 3.0 fps should be used. If the study intersection has a school crosswalk or is located in a Senior Pedestrian Focus Area, a walking speed of 3.0 fps should be used. The minimum time required for pedestrians should be estimated using the following guidelines:

Equation 16-10

$$\text{Minimum Pedestrian Time} = \text{WI} + \text{PCT}$$

where,
WI (Walk Interval) = minimum of 7.0 seconds,
PCT (Pedestrian Clearance Time) = PCI + BI = crosswalk length/average walking speed,
PCI (Pedestrian Change Interval aka Flashing Don't Walk) should not be less than 6.0 seconds, and
BI (Buffer Interval aka Don't Walk) is the same as the amber plus all-red time and should not be less than 5.0 seconds.

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PARKING REGULATION MODIFICATIONS

The goal of this measure is to restrict, remove, or relocate parking (including bus stops) by modifying curbside regulations along streets where additional travel lanes are needed for traffic capacity reasons, or to reduce conflicts between cars involved in parking maneuvers and through traffic. In adding capacity by removing on-street parking, the analysis also evaluates impact on bus service and whether there is sufficient parking space within the study area to accommodate those parked cars that have been displaced. It should be noted that relocation of bus stops would require NYCT/MTA Bus review and approval of such mitigation measures.

LANE RESTRIPING AND PAVEMENT MARKING CHANGES

The objective of these measures is to make more efficient use of a street's width, either in providing an exclusive turning lane, restriping the lane markings to give greater width to those movements that need them, *etc.* For example, an intersection approach characterized by a very heavy right-turn movement and moderate through and left-turn movements may currently provide a 10-foot wide right-turn lane and two 12-foot wide lanes for the other movements. Restriping the approach to provide a 12-foot wide right-turn lane and two 11-foot wide lanes for the other movements may provide right-turning vehicles with the capacity they need. It should be emphasized that any proposed lane widths modifications should follow the DOT guidelines. One other objective would be to improve pedestrian safety by widening crosswalks at critical intersections.

STREET DIRECTION AND OTHER SIGNAGE-ORIENTED CHANGES

At times, it may be advisable, or necessary, to convert a two-way street to one-way operation or vice versa, or convert a pair of two-way streets into a pair of one-way streets. This tends to provide greater traffic capacity since it removes conflicts typically inherent in two-way traffic operation, particularly from left turns vs. oncoming traffic movements at high volume intersections. It should be noted that the one-way operation could also result in undesirable safety impacts due to higher vehicle speeds. Any street direction changes require re-analysis of all potentially affected intersections in the study area (and outside the area, if appropriate) for traffic and safety impacts, pursuant to the methodologies described in earlier in this chapter.

Other traffic mitigation measures include the prohibition of left- or right-turns, or signage that requires all vehicles in a given lane to turn left or right or to only proceed through the intersection. Since it generally takes more time and capacity for vehicles to make turns than to proceed straight through an intersection, these measures often offer substantial capacity benefits. Again, the traffic analysis would need to assess carefully the diversions of traffic and their impacts to other streets and intersections.

Any parking regulation modification, lane striping, pavement marking, street direction, and other signage-related changes require the preparation of scaled schematic drawings depicting existing and proposed conditions for DOT's review and approval. In addition, the schematic drawing should include the number of lost parking spaces.

512. Moderate-Cost, Fairly Readily Implementable Measures

These measures typically involve a level of capital costs somewhat higher than those defined above, yet which are generally considered moderate overall, such as intersection channelization improvements, traffic signal installation, and others.

- Intersection channelization improvements. Channelization improvements are intended to provide traffic movements with greater clarity or ease of movement. They may include minor widening of the approach to an intersection to provide an increased curb radius for right-turning vehicles, a median separating the two directions of traffic flow on a two-way street, or islands for pedestrian refuge

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or to delineate space for turn movements through an intersection. In addition, any proposed channelization would require the preparation of scaled schematic drawing depicting existing and proposed changes for DOT's review and approval.

- Traffic signal installation. At times, it may be necessary to propose the installation of a traffic signal where an unsignalized intersection does not possess sufficient capacity to process cross-street traffic volumes or where it would mitigate vehicular or pedestrian safety impacts. Recommendation of this mitigation measure also requires the completion of a signal warrant analysis—this is a set of volume and safety evaluations needed to determine whether a signal is warranted.

DOT requires the preparation of traffic signal warrant analyses if a new signal is proposed at the draft EAS or EIS stage (see the Appendix for "Intersection Control Analysis"). The analysis should include projected future volumes, the appropriate modal split, and future volume flow maps. There are City, State, and Federal government guidelines on the conduct of signal warrant analyses. The DOT guidelines should be utilized in conducting a warrant analysis to determine the likelihood that a signal is warranted. DOT would approve the new signal once the warrants have been satisfied.

513. Higher-Cost Mitigation Measures

In general, this category of mitigation measures includes street widening, construction of new streets, construction of new ramps to or from an existing highway, implementation of a sophisticated computerized traffic control system, and other measures that are typically physically oriented and not readily implementable. These measures would require review and approval from by DOT.

GEOMETRIC IMPROVEMENTS

A variety of methods are available to change the physical configuration of the street so as to improve safety and rationalize traffic movements to improve flow. These include curb extensions, medians, traffic calming treatments, and other elements described in DOT publications such as the *Street Design Manual*.

STREET WIDENING

When implementation of capacity improvements such as signal phasing and timing changes, curb parking prohibitions, bus stop relocations, and others are not sufficient to provide the required capacity within the existing street width, it may be possible to widen the street, to provide wider travel lanes or additional travel lanes. However, wider streets may result in detrimental effects related to safety and the quality of the walking environment and should be avoided in existing built-up areas. The effect on pedestrian, bicycle, and surface transit movements in the area would be jointly analyzed with this mitigation measure.

CONSTRUCTION OF NEW STREETS

At times, it may be advantageous to either reopen a closed, or demapped, street or construct a new street leading to a development site. This access improvement could thus potentially provide a new access route to the site and alleviate projected congestion on existing routes. It is a relatively uncommon measure that is occasionally available to large projects in settings where existing street access is rather limited.

CONSTRUCTION OF NEW HIGHWAY RAMPS

The objective of this measure is to provide an additional means of access from the primary regional route(s) leading to a project site. When access to the site is via an existing highway ramp that leads to an already congested local street en route to the site, construction of a new ramp could relocate traffic to another street better able to accommodate it. Since many of the City's highways are under NYSDOT jurisdiction, coordination and approval from that agency, in addition to DOT, is required.

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514. Enforcement Measures

These measures generally involve costs that accrue to the City over a period of time, rather than as one-time construction costs, and include the deployment of traffic enforcement agents (TEAs), or certain types of physical improvements that are variable by time of day.

TRAFFIC ENFORCEMENT AGENTS

TEAs are often deployed by the New York City Police Department (NYPD) at critical locations where it is important to minimize spillback through an intersection, and thus avoid potential gridlock. At times, by virtue of their being stationed at busy intersections, the TEAs also manually override the traffic signal timing patterns to improve traffic operation for intersection approaches experiencing congestion. The recommendation of deploying TEAs at a significant impact location may be appropriate where: a) an intersection is unsignalized and a TEA could ensure that minor street traffic gets the enough gaps needed to pass into or through the intersection; or b) an intersection requires several different timings to function optimally at different times of the day (*e.g.*, during peak exit periods from a sporting event).

In addition, TEAs may be deployed by NYPD to ensure that on-street parking regulations are obeyed and that the required number of moving travel lanes—and thus capacity—is maintained during critical time periods. Within the traffic analyses, it may be insufficient to assume that the mere replacement of an existing curb parking regulation with a more restrictive one would automatically ensure that the curb lane is fully free of parked cars at times when its capacity is needed for moving traffic. At critical locations, the deployment of TEAs would assist in ensuring that the lane's capacity would be available.

It should be noted that the use of enforcement agents as mitigation is not a preferred measure due to their recurring annual cost. Historically, enforcement agents have been considered only for city-sponsored projects as a matter of city policy. However, for construction-related impacts that are temporary in nature, enforcement agents may be an appropriate measure. In addition, if a private applicant recommends the use of TEAs, then the lead agency/applicant must secure approval from NYPD.

515. Trip Reduction or Travel Demand Management Measures

Trip reduction or TDM measures seek to reduce either the volume of vehicular trips generated by a project, divert them to higher-occupancy vehicles than single-occupant autos, or divert them to hours that are not as critical as the hours for which significant impacts were identified. These measures include carpooling or vanpooling, staggered work hours or flextime programs, new transit services or transit subsidies, telecommuting, and a range of other measures.

CARPOOLING AND VANPOOLING

The objective here is to promote the formation of carpools or vanpools that would draw people out of their single-occupant vehicles or otherwise increase the average occupancies of all vehicle traffic generated by the site.

STAGGERED WORK HOURS AND FLEXTIME PROGRAMS

The objective of these measures is to stagger the times at which people drive to and leave their workplace so as to reduce the volume of vehicular traffic on the road during the affected area's peak commuting hours. With staggered work hours, employees work somewhat different shifts; under flextime, employees are free to arrive at work at any time within a given range (say, 7:30 a.m. to 9:30 a.m.) and leave within a given range (say, 4:00 p.m. to 6:00 p.m.).

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IMPROVED BUS SERVICE

This measure may include the provision or expansion of dedicated bus lanes to improve the operation of major bus routes in the study area by introducing the elements of Select Bus Service (*i.e.*, high-speed boarding, limited-stop service, off-board fare collection, *etc.*). Because most bus service is provided by MTA and its member agencies, coordination and approval from NYCT/MTA Bus is required.

NEW TRANSIT SERVICES

This measure may include provision of a company shuttle bus linking the workplace with the nearest mass transit stop, initiating shuttle bus or jitney service for noontime trips to local retail areas, or the extension or enhancement of existing bus routes to the site, with the objective of promoting transit usage to the maximum extent possible. Because most bus service is provided by MTA and its member agencies, coordination and approval from NYCT/MTA is required.

TELECOMMUTING

With telecommuting, employees may work a specified number of days per week or per month either at a telecommuting center where they may complete their assignments on a centralized set of computers or work stations, or at employer-provided installations in their home. The objective is to reduce the volume of trips being made.

BICYCLE FACILITIES

The objective of this measure is to promote the use of bicycles as a mode of travel to work by providing bicycle facilities such as secure indoor bicycle storage areas, locker rooms, and showers, when not already required by zoning. Studies have shown that up to 3.9 percent of those who would normally use an automobile or taxi to travel to work would use a bicycle if bicycle facilities were available. If it is anticipated that a portion of projected users of the site would use bicycles instead of automobiles, then the number of projected automobile person trips could be reduced by up to 3.9 percent for sites such as offices and industrial workplaces.

For example, if a proposed project's person trips have 12 percent auto share based on a previously researched or approved modal split, and the proposed development would provide bicycle facilities, in this case the person auto share could be reduced to approximately 11.5 percent (12.0% * (100% - 3.9%) = 11.5%).

MANAGED DELIVERIES

This measure would commit the project owner/operator/tenant to reducing or eliminating deliveries during peak periods. It would require scheduling deliveries and ensuring that staff is available on the receiving end during off-peak hours (*i.e.* evening and overnight).

Although the measures described above may be implemented individually, their implementation may also be sought as a collective menu of trip reduction options—referred to as TDM.

It should be noted, however, that embracing TDM as mitigation means that the project developer, sponsor, and/or tenant need to make a binding commitment to measures that may to some degree affect the way their business is conducted (*e.g.*, altering work schedules, commitment to vanpools, *etc.*). For any proposed TDM measures not described in the above list, the lead agency should consult with DOT as early as possible regarding use of this strategy as mitigation. Additionally, any commitments to mitigation and TDM measures should be memorialized in the Statement of Findings.

516. Traffic Monitoring Plan

A Traffic Monitoring Plan (TMP) is recommended for medium- to large-scale developments that have identified unmitigatible impacts as well as projects that propose capital improvements such as widening of roadway, curb extension (neck-down/bulb-out), raised median, signal installation, *etc.* The TMP would help DOT

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verify the need and effectiveness of the proposed mitigation measures identified in the EIS or similar measures through use of traffic data collection and analyses when the proposed project is built and occupied. The TMP should include both locations for which mitigations are identified and locations that are determined to be unmitigatible in the EIS. The monitoring commitments should be acknowledged either in the FEIS and/or in the DOT sign-off letter. A detailed TMP scope of work should be submitted for DOT review and approval prior to commencing any data collection and analysis. The lead agency, in consultation with DOT, should determine whether a TMP is required and, if so, what technical areas (*i.e.*, traffic, parking, pedestrian, *etc.*) and locations should be included in the TMP.

520. RAIL TRANSIT MITIGATION

There is a range of rail transit measures available to mitigate certain types of significant impacts that may be projected for a proposed project. These measures are primarily related to the station elements that are analyzed and could be affected by a proposed project. Significant line-haul impacts, on the other hand, may be extremely difficult to mitigate.

521. Stairways

Stairway widening are the most common form of mitigation for projected significant impacts, providing that NYCT deems it practicable, *i.e.*, that it is worthwhile to disrupt service on an existing stairway to widen it and that a given platform affected by such mitigation is wide enough to accommodate the stairway widening.

It may also be possible to mitigate stairway impacts by adding vertical capacity in the vicinity of the impacted stairway, rather than widening the stairway itself. As stated earlier, NYCT approval is needed. Stairway widening or new stairways must conform to the NYCT Station Planning and Design Guidelines.

Where the calculated WIT triggers a significant impact and potential mitigation, actual stair widening are planned with NYCT guidance. Typically, stair widths are considered in terms of one 30" pedestrian lane. Thus, a stair that is 100 inches wide and has a WIT of 6 inches should be widened to 120 inches to create four 30-inch pedestrian lanes. New stairs are also ideally built in 30-inch increments.

522. Station Passageways

The consideration of appropriate mitigation measures for station passageways and corridors is very similar to that for the station stairways. Here, too, widening of a congested passageway or the construction of a new passageway to divert some passenger activity away from the existing one may be considered. Both of these types of measures are extremely costly. They are likely to be considered only for severe impacts. Where physical constraints permit, passageways should be constructed or widened to create a passageways based on 36" pedestrian lanes.

There is a close physical and analytical relationship between stairways connecting station platforms with passageways over or under the platforms. For cases where both stairways and passageways would be characterized by significant impacts, the provision of widened stairways might increase the pedestrian flow rate into the passageway, thereby exacerbating congestion there. Mitigation analyses for all these elements need to be conducted simultaneously.

523. Turnstiles, High-Wheel Exits, Escalators, and Elevators

The most logical and readily available measure to mitigate projected turnstile or high-wheel exit shortages is to add more turnstiles or high-wheel exits, providing there is sufficient space within the station, to accommodate them. A measure to mitigate projected escalator or elevator shortages is to add appropriate vertical processor capacity, preferably an escalator or elevator. As mentioned above, transit station mitigation should consider the entire station as a system and make sure that improvements in one area do not affect operations in another.

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524. Station Agent Booths and Control Areas

Mitigation of excessive queuing and/or delays at booths and MetroCard vending machines may entail the provision of additional machines, where space permits. As mentioned above for turnstiles, the analysis of mitigation measures may need to consider potential effects on other elements of the station as well.

525. Platforms

Mitigation of platform impacts is a difficult exercise since the lengths and widths of existing platforms are generally fixed. There are relatively minor measures that may be considered, including the relocation of trash receptacles and other platform furniture that reduce platform width at critical locations. It is also possible that the opening of new stairways could alleviate problem conditions at the congested location. NYCT may also consider widening side platforms where congestion is severe.

526. Line-Haul Capacity

Generally, the generation of significant line-haul impacts can only be mitigated by operating additional trains over a given subway line, which may not be operationally or fiscally practicable. It is generally accepted that the determination of significant line-haul capacity impacts is made for disclosure purposes rather than to provide mitigation; these impacts usually remain unmitigated.

530. BUS TRANSIT MITIGATION

Significant bus impacts generally may be mitigated by increasing the frequency of service on existing bus lines. This must be approved and implemented by the operator and is subject to operational and fiscal constraints. In addition, the mitigation measures below should be considered if impacts are identified. As some of these measures are more applicable outside of the urban core, it is important to consult with NYCT/MTABC/LIB to determine the appropriate mitigation measure. For developments served by an existing bus the following should be considered:

If the main building entrance is near to the street, the following options are available for consideration:

- Inclusion of a pedestrian entrance on the side of the building facing the bus route;
- Inclusion of curb-side bus stop that would allow buses to pull out of traffic and discharge and pick-up passengers; and/or
- Inclusion of space for a bus-shelter for passengers.

If the main building entrance is not near to the street, two options are available for consideration:

- Routing the bus through the project site, with:
  - Inclusion of a bus turnaround area;
  - Inclusion of a bus stop; and/or
  - Inclusion of a bus shelter.
- Stopping the bus on the street adjacent to the Project Site with:
  - The same mitigation measures listed above; and optionally,
  - The inclusion of a lit, sheltered pedestrian walkway between the building's entrance and the bus stop.

If the development is not served by an existing bus route, MTABC/NYCT/LIB should be consulted about possibly extending a bus route to serve the site with the above-mentioned mitigation measures being considered along with the following modifications:

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- Space provided at a bus stop adequate for bus operational needs.
- Access for bus drivers to the rest-rooms at terminals.

If a significantly large number of bus passengers are expected to be generated, a covered, secure location for fare-vending machines could be considered for inclusion in the project's site-plan.

The developer should also consult with NYCT about locating a designated space for Access-A-Ride vehicles adjacent to the accessible entrances of the development to the extent practicable.

This listing of possible mitigation measures is not meant to be exhaustive, and other appropriate mitigation measures with respect to transit impacts should be considered. NYCT/MTABC/LIB should be consulted. As some of these mitigation measures have the potential to impact available sidewalk space, close coordination with the pedestrian analysis is integral.

540. PEDESTRIAN MITIGATION

Identification of feasible and practical mitigation measures should be consistent, to the extent practicable, with DOT's 2009 *Street Design Manual*, the detailed guide to the City's transportation policies. Available measures to mitigate significant pedestrian impacts may include:

- Providing additional green signal time or new signal phases, such as a leading pedestrian interval, for pedestrians crossing at signalized intersections. Signal timing changes should still leave vehicular traffic with sufficient green time without causing a significant traffic impact.
- Widening intersection crosswalks to provide additional pedestrian crossing capacity. Care must be taken so that turning vehicles have time to react to pedestrians in all areas of the crosswalk. Crosswalk widening typically should not extend past the building line of the adjacent sidewalk to maintain visibility.
- Relocating street furniture, newsstands, or other obstacles that reduce pedestrian capacity at sidewalks or corner reservoirs.
- New traffic signal or other intersection control measures for uncontrolled pedestrian crossings.
- Providing curb extensions, neck-downs or lane reductions to reduce pedestrian crossing distance.
- Widening the sidewalk or other pedestrian path.
- Providing a pedestrian refuge island where analysis indicates that pedestrians would not have enough time to cross the street.
- Creating mid-block crossings and cut-throughs (*i.e.*, arcades, plazas, *etc.*) on long blocks.
- Providing direct connections from adjacent transit stations to major proposed projects that reduce the need for transit patrons to traverse overtaxed pedestrian street elements.
- Constructing a pedestrian bridge to separate pedestrian and vehicular flows.
- Simplifying intersection operations by aligning/normalizing the intersecting streets close to a ninety degree angle, where practicable. It may include modifying/closing the existing channelization (slip roadways) and/or little used street approaches.
- Creating a part-time or full-time pedestrian mall by closing streets to vehicular traffic.
- Creating high visibility crosswalks to alert motorists of the pedestrian crossing and improve pedestrian safety

Again, the relationship between traffic, transit, and pedestrian needs must be fully considered in developing and evaluating alternative mitigation measures.

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550. PARKING MITIGATION

The range of measures that could generally be considered to alleviate projected parking shortfalls or mitigate significant parking impacts includes the following:

- Provision of additional parking spaces as part of the proposed project, including such provision off-site but within a convenient walking distance from the site.
- Modification of existing on-street parking regulations in an appropriate manner—for example, where a less restrictive parking regulation would not affect the capacity of the street to process adjacent vehicular traffic demands.
- Paid commercial parking or ParkSmart (a DOT initiative to increase metered parking rates during peak periods) may also be effective measures. DOT has found that these measures improve the availability of parking by encouraging drivers to park no longer than necessary in locations where high turnover is desired.
- Implementation of new transit services (*e.g.*, bus routes or bus route extensions) or trip reduction initiatives that would change the projected modal split or reduce the number of vehicles traveling to (and parking at) the project site. The addition of bicycle facilities such as indoor secure storage areas, locker rooms and showers would encourage the use of bicycles to travel to the workplace.

In general, where a parking shortfall or significant impact has been identified, a proposed project must strive to provide the amount of parking it needs as part of the proposed project rather than relying on available off-site parking supplies.

600. DEVELOPING ALTERNATIVES

610. DEVELOPMENT OF ALTERNATIVES

The alternatives analysis section of the EIS is intended to depict and analyze alternatives to the proposed project that are likely to eliminate or reduce significant impacts expected to be generated by the proposed project. Since traffic, transit, pedestrian and parking impacts are often among those determined to be significant, there are attributes of a proposed project that, if changed, may result in a reduction of expected impacts. Guidance regarding the development of such alternatives follows.

611. Reductions in Size

The first and most logical alternative is a scaling down of the size of the proposed project, *e.g.*, reducing the amount of proposed square footage to reduce its overall trip generation. This approach would generally lead to a proportional reduction in the amount of trips generated, but not necessarily in the magnitude of the impacts that would occur. For example, if a significant impact is projected under the proposed project that requires a widening of the crosswalk, this proposed mitigation measure may not be warranted under the alternative that would reduce the size of the proposed development. Similarly, an unmitigated impact in the proposed project may now be mitigated under the lesser density alternative.

612. Different Uses

A second type of alternative involves replacement of a high trip-generating land use component of the proposed project with a lesser trip generator. Care would be needed to make sure that the times in which trips are reduced are those times at which significant impacts are expected. For example, potential replacement of office space with retail space may reduce the volume of trips generated by auto in the AM when retail activity is light, but not at midday when retail uses are very active. Should the preceding With-Action analyses determine that there would be a significant traffic or pedestrian impact in only the midday peak hour, this replacement alternative would not be beneficial.

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Consideration of this category of alternative must also recognize that different types of land uses may tend to have different modal splits as well, and that a land use that has a lower overall trip generation rate may not necessarily generate fewer trips by all modes. For example, framing an alternative that responds to a significant traffic impact under the proposed project with a less-intensive overall trip generator that has a higher auto-plus-taxi use percentage may not result in a removal of the impact. The alternatives analysis would consider the type of impact found significant and consider alternatives that reduce that impact during the specific significant impact hour.

613. Changes in Access and Circulation

Another type of alternative revolves around physical site changes that do not necessarily reduce the overall volume of trips generated or the number of trips generated during a specific impact hour, but that affect access and circulation patterns and effectively move traffic to locations or routes that would not be significantly impacted. There are several examples of this.

Relocation of a project's proposed parking facility or the facility's entrance may positively affect traffic patterns and divert traffic away from significant impact locations. Provision of parking—or additional parking—may reduce the undesirable circulation of vehicles on-street in search of hard-to-find parking spaces. This is especially true for proposed projects that either do not include parking as part of their project, or where the amount of parking is appreciably short of the demand. For major projects that include large parking garages (*e.g.*, 500 or more parking spaces), it may be advantageous to split the parking into two sites rather than one, to disperse traffic and pedestrians to different routes rather than having all of it concentrated at a single entrance and exit location and a single primary access route.

Relocation of a project's main entrance may also alter access patterns for both vehicular, transit, and pedestrian access. A proposed project that generates a substantial volume of vehicular drop-offs, such as a hotel in Midtown Manhattan, for example, could potentially shift its main entrance to a location on the site that reduces significant traffic impacts at critical locations or that minimizes conflicts between vehicles engaged in picking up or dropping off passengers and other vehicles driving past the site. Such "front door" relocation may also make pedestrian access from nearby subway stations more convenient, alter pedestrian patterns or increase utilization of a particular subway station or station entrance over another one, and reduce congestion at key crosswalks or corner reservoir spaces in the affected area.

Relocation of a project's loading docks, or their reconfiguration, could also have similar benefits in moving the goods delivery function to a location that does not significantly impact traffic or pedestrian flow. Reconfiguration of a proposed loading dock from a back-in operation to one in which the trucks may pull directly into the delivery area would also relieve pressure on traffic and pedestrian movements. It should also be noted that DOT has indicated a strong preference for front-in and front-out truck operations.

Ideally, these options should be considered both in the early planning for a project as well as during the analysis of impacts of the project and while it is possible that they may constitute an Alternative, it is more logical to include this in the future With-Action analysis.

614. Other Alternatives

There may be other alternatives that are tailored to a specific proposed project at a specific site that could be developed. In general, to be effective, they should either (1) reduce the overall level of trip making, shift trip making to noncritical hours or to noncritical modes, or (2) alter the physical design of a project to relocate trips away from identified significant impact locations. However, all alternatives must be approved by the lead agency.

620. EVALUATION OF ALTERNATIVES

In evaluating the impacts of the alternatives relative to the impacts previously determined for the proposed project, it may not be necessary to conduct a full analysis of the traffic and parking systems conducted as part of

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the With-Action analyses. However, regardless of the technical approach taken, conclusions made from the analyses of alternatives must have a degree of confidence reasonably comparable to that for the analysis of the proposed project.

For alternatives that reduce the size but not the land use mix of the proposed project, it may be possible to scale down the proposed project's trip generation projection and then pro-rate the findings of the traffic and parking analyses accordingly. Yet, while the scaling down of volumes may be appropriate, the pro-rated evaluation of vehicle delay time and other level of service analyses may not. Therefore, those locations determined to have significant impacts under the proposed project should be reanalyzed and those findings (*i.e.*, the magnitude of impacts and any subsequent changes to the mitigation measures), along with the overall trip reduction that would occur under the alternative, should be reported.

For alternatives that alter the mix of land uses within the proposed project or replace a more intensive trip generator with another less intensive trip generator, it would generally be necessary to first quantify the magnitude of changes in the projected trip generation by travel mode for the peak analysis hours, and then determine the likelihood that new impacts could be created from those determined for the proposed project. Afterwards, the technical analysis approach could follow the guidelines provided immediately above.

For alternatives that contain physical design changes that alter access and circulation patterns, the analysis would evaluate the likely access routes expected under the alternative, and where these changes would positively and adversely affect traffic conditions. If this review indicates that traffic increases would occur along routes and at locations that likely would not be significantly impacted, this evaluation is documented. If it encompasses locations that have not been analyzed earlier in the EIS, and it is readily apparent those conditions are not currently problematic nor are they likely to be problematic, that evaluation would suffice but is reported. If this evaluation cannot be made with a reasonable degree of certainty, other available sources of data would be sought to make a preliminary evaluation. If this preliminary evaluation indicates that problematic levels of service currently exist, or that significant impacts may occur in the future with background growth and the project-generated trips factored in, these findings would be documented based on the data at hand.

In general, the evaluation of alternatives documents the following:

- Would the alternative result in increased or decreased trip making by travel mode during the peak analysis hours? This finding is typically quantified.
- Would the alternative result in the reduction or elimination of significant impacts, and by what amount? It is preferable to determine whether all significant impacts would be avoided or reduced under the alternative, but for very large-scale proposed projects a representative set of significant impact locations may suffice as long as the technical analysis may present its conclusions in a comparably confident manner to that of the proposed project. An assessment of the implications of the analyses on this representative set of locations is presented for the overall study area.
- Would any new significant impacts be expected to occur under an alternative? This would be especially germane for alternatives that alter travel patterns within the study area.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are no specific regulations governing the conduct of transportation analyses. Therefore, the procedures and methodologies that are described in this Manual are intended to provide assistance in the structuring and conduct of EIS and EAS transportation impact analyses.

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711. NEW YORK CITY LOCAL LAW 24 (CRIA)

Effective September 2005, Local Law 24 amended the administrative code of the City of New York in relation to creation of a review process in the event of the closure of a publicly mapped street. The Community Reassessment Impact Amelioration (CRIA) statement is required if a street is closed for more than 180 consecutive days for which a permit from DOT is needed. As a result, a CRIA (or EAS/EIS in lieu of CRIA) must be issued to the Council Member and Community Board prior to the 210th day of the closure. In addition, one public forum must be held prior to the issuance of the CRIA/EAS/EIS where the applicant/project sponsor assists DOT in conducting the forum. DOT makes entities applying for permits to close streets for more that 180 days the responsible party for producing the CRIA and assisting and helping to lead the public forum. The CRIA or EAS would:

- State the objectives of the closure and why the closure is necessary to attain objectives;
- Identify alternatives, including the least expensive one, the cost of the alternative and explanation if no alternative is available;
- Assess impacts of the closure on access, traffic, parking, pedestrian safety, businesses, residences, community facilities, emergency services, public transportation including para-transit and school buses, *etc.*; and
- Provide recommendations/solutions to mitigate adverse on the above referenced and increase access to the area.

720. APPLICABLE COORDINATION

Lead agencies should be aware that it is necessary to seek approvals for mitigation measures from agencies that would be responsible for implementing those measures. In these instances, the lead agency should confer with the appropriate agencies, namely NYCT for rail, subway, and bus mitigation/improvement measures and DOT for traffic, parking, and goods delivery analyses and pedestrian mitigation/improvement measures. DOT is also responsible for the designation of bus stops in the City. It is also advisable to confer with DCP regarding its policy guidelines, and NYC Parks and Recreation approval would be required for mitigation measures involving park-edge sidewalks and pedestrian/bicycle greenway systems. It is also important to note that coordination with the analytical needs of other environmental categories (*e.g.*, air quality, noise, neighborhood character) may be needed; other chapters of this Manual should be referred to regarding those needs.

730. REQUIRED DOCUMENTS FOR REVIEW

To ensure a timely review, the lead agency should submit the following documents to DOT (for traffic, pedestrians and parking) or MTA (for transit):

- EAS forms (if applicable);
- Traffic, Transit, Pedestrian and Parking sections/studies;
- Electronic and hard copies of back-up material (*i.e.*, ATR, TMC, physical inventory, official signal timing, pedestrian and bicycle counts, queue observations, three-year accident history, etc);
- Back-up material for travel demand factors (TDF) including source information and surveys, if conducted;
- Electronic files and hard copies of the Levels of Service analyses (or similar DOT/MTA-approved software) for all peak hours and scenarios;
- Documentation identifying any modification(s) to the HCS (or other software) default factors as well as all quantifiable and verifiable field information to support the change(s);
- Parking analysis, including field survey, parking utilization and related text, figure(s) and table(s);
- Traffic signal warrant analysis if a new signal or left-turn signal is proposed;

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- Signal coordination and progression analysis if timing reallocation in excess of four seconds is proposed; and
- Scaled schematic of existing and proposed conditions if geometric improvements are recommended.

740. LOCATION OF INFORMATION

Much, but certainly not all, of the information needed to conduct the traffic and parking analyses may be available within the technical libraries and files maintained by city and State agencies. For the transit analysis, NYCT has most information needed. Although it is likely that a significant amount of data will need to be collected via field surveys and traffic counts, contact should be made with MOEC, DOT, NYCT, MTA Bus, DCP, and other agencies that may possess information that would be helpful and could save time and resources. In some cases, use of a specific set of available data may be preferable to conducting new counts or new surveys. This may be true, for example, where a recent similar study has been completed in the same or neighboring area, and it is important for the data and findings of that study and the analysis of the proposed project to be consistent.

An initial listing of the location of primary sources of available traffic and parking data is presented below, and followed with an indication of those technical areas in which original research or surveys are often required. This list may be revised or augmented from time to time.

741. Sources of Available Traffic Data

- EISs and EASs that contain original volume or survey data that are recent enough to be valid for the area surveyed. It is strongly preferred that traffic count data not be more than three years old at the time the draft EIS is certified as complete. It may be possible to use somewhat older data, but only for areas that have undergone very little change and for which the data still validly represent conditions in the area.
    - Sources: MOEC, 253 Broadway, 14th Floor, Manhattan, NY 10038; DCP, Environmental Assessment and Review Division, 22 Reade Street, Manhattan, NY 10007 (http://www.nyc.gov/planning); DEP, Office of Environmental Planning, 59-17 Junction Boulevard, Elmhurst, Queens, NY 11373 (http://www.nyc.gov/dep); and DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041 (http://www.nyc.gov/dot).
- Traffic studies with original volume or survey data that satisfy the guidelines above.
    - Sources: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041 (http://www.nyc.gov/calldot) or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, Manhattan, NY 10007 (http://www.nyc.gov/planning).
- DOT 24-hour automatic traffic recorder (ATR) counts or other intersection counts, with the same time frames noted above.
    - Sources: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041 or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, New York, NY 10007.
- Bridge and tunnel volume information, including screenline volumes, peak hour volumes and growth trends, which may help in developing trend line projections and understanding seasonal fluctuations in traffic volumes.
    - Source: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041.
- DOT Truck Regulations, which define the designated truck routes to be used for traffic analyses.
    - Source: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041.

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- DOT signal operations information, which provides signal phasing and timing information needed to conduct the traffic analyses.
    - Source: DOT, Signals Division, 34-02 Queens Boulevard, Long Island City, Queens, NY 11101
- DOT parking regulations inventory, which provides a computer listing of all approved parking regulation signs throughout the City, for use in the traffic analyses should field surveys indicate that signs have been vandalized or stolen.
    - Source: DOT, 28-11 Queens Plaza North, Long Island City, Queens, NY 11101 (http://www.nyc.gov/calldot).
- Institute of Transportation Engineers (ITE) Trip Generation publication (latest edition), which provides a comprehensive summary of trip generation rates for determining the volume of trips that a proposed project would generate. These rates are based on nationwide, rather than local, surveys which may not be appropriate for New York City conditions in many cases.
    - Sources: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041 (http://www.nyc.dot.gov); ITE Headquarters, 1099 14 Street, NW, Suite 300, Washington, DC 20005 (http://www.ite.org); or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, NY 10007 (http://www.nyc.gov/planning).
- Trip generation and temporal distribution data published in Urban Space for Pedestrians by Pushkarev & Zupan (1975).
    - Sources: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041 or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, NY 10007.
- The following publications provide bicycle data and research:
    - DOT, 2010 NYC Cycling Map (Regular Updates);
    - DOT, New York City Bicycle Master Plan (1997);
    - DOHMH, DOT, DPR NYPD, Bicyclist Fatalities and Serious Injuries in New York City (1996 – 2005);
    - DOT, Street Design Manual (2009);
    - DCP, Greenway Plan for New York City (1993);
    - DCP, New York Bicycle Lane and Trail Inventory (Regular Updates);
- *DOT Street Design Manual* (2009). The New York City Street Design Manual provides policies and design guidelines to city agencies, design professionals, private developers and community groups for the improvement of streets and sidewalks throughout the five boroughs. It is intended to serve as a comprehensive resource for promoting higher quality street designs and more efficient project implementation.
    - Sources: DOT, Traffic Planning Division, 55 Water Street, Manhattan, NY 10041
- Additional information may be downloaded here.
- DOT Library contains DOT Policies and reports, Traffic Rules and laws, Street Furniture and Street Lighting Rules, community presentations and plans, Transportation and Traffic Data, DOT Research Papers and Presentations and Specifications and Drawings. This information may be obtained here.

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- *DOT Sustainable Streets* (2008) (Regular Updates) is the strategic plan for DOT that focuses on safety, mobility, world class streets, infrastructure, greening, global leadership and customer service. Additional details may be found here.
- It is also possible that additional surveys or original research are needed to provide either the most up-to-date representation of conditions where available data are too old to be used or where the data required simply are not available. Moreover, recently collected original survey data are typically preferred, providing they are obtained in a proper manner and reflect the specific nature and geographical setting of the proposed project.

742. Sources of Available Rail Transit Data

- EISs and EASs that contain appropriate ridership or capacity utilization information. The key guideline rests with how representative the counts or data are of existing conditions. Historically, this has included data not more than three years old at the time the draft EIS was completed, but it could include somewhat older data for areas that have undergone very little change and for which the data still represent conditions there.
    - Sources: MOEC, 253 Broadway, Manhattan, NY 10038; DCP, Environmental Assessment and Review Division, 22 Reade Street, Manhattan, NY 10007; NYC Department of Environmental Protection (DEP), Office of Environmental Planning, 59-17 Junction Boulevard, Elmhurst, Queens, NY 11373 (http://www.nyc.gov/dep); and DOT, 55 Water Street, Manhattan, NY 10041.
- Transit studies with volumes or analyses that are relatively recent.
    - Source: MTA, 347 Madison Avenue, New York, NY 10017 (http://www.mta.info).
- New York City subway system turnstile registration counts, which detail the volume of riders entering each subway station by turnstile bank.
    - Source: NYCT Operations Planning, 2 Broadway, 17th Floor, New York, NY 10004
- Biannual survey of system riders indicating the number of subway riders entering the central business district by line.
    - Source: MTA, 347 Madison Avenue, New York, NY 10017

743. Sources of Available Bus Transit Data

- EISs that contain bus ridership information for the specific study area and bus routes affected, provided the data are reasonably recent and bus service has not changed appreciably.
    - Sources: MOEC, DCP, or DOT, as cited above.
- Bus studies that are recent enough to be valid.
- MTABC Operations Planning, 2 Broadway, 21st Floor, New York, NY 10004 (www.mta.info/busco).
- NYCT Operations Planning, 2 Broadway, 17th Floor, New York, NY 10004 (http://www.mta.info/nyct/index.html).
- NYCT/MTABC/LIB Bus Guide, bus maps, and websites for bus routes, hours of operation, and frequency of service.
    - Source: NYCT/MTABC/LIB, as cited above.
- Bus ridership, or load levels, for the maximum load points on each route. This information is helpful in identifying the bus stop at which bus occupancy levels are highest, thereby also defining the amount of bus capacity remaining for additional riders.

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- Source: LIB/MTABC, NYCT as cited above. Also, franchise bus operators who provide public bus service within the City.

744. Sources of Pedestrian Data

- EISs that contain pedestrian volume information and/or pedestrian level of service findings for a particular study area, providing such information is reasonably recent.
  - Source: MOEC, DCP, or DOT, as cited above.
- Pedestrian volume is generally one of the more difficult technical areas in which to obtain readily usable data, and new pedestrian counts are almost always needed for detailed analyses.

745. Sources of Available Parking Data

- EISs or EASs that contain parking inventory or occupancy information that is reasonably representative of current conditions.
  - Sources: MOEC, DCP, DEP, or DOT, as cited above.
- Parking studies that contain such data.
  - Sources: DOT, Traffic Planning, 55 Water Street, Manhattan, NY 10013; or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, NY 10007, as cited above.
- DOT parking regulations inventory.
  - Source: DOT, 28-11 Queens Plaza North, Long Island City, Queens, NY 11101 (http://www.nyc.gov/calldot).
- ITE Parking Generation publication, which provides the maximum parking supply needed to serve a proposed land use. As discussed earlier for trip generation data, it should be noted that data contained in the Parking Generation Manual is based on nationwide sources of survey data that may not be fully appropriate in New York City.
  - Sources: DOT, Traffic Planning, 55 Water Street, Manhattan, NY 10041; or ITE Headquarters, 1099 14 Street, NW, Suite 300, Washington, DC 20005 (http://www.ite.org).
- Parking capacities and licensing information.
  - Sources: New York City Department of Consumer Affairs, 80 Lafayette Street, Manhattan, NY 10013 (www.nyc.gov/consumers); or DCP, Transportation Division, 2 Lafayette Street, Manhattan, NY 10007 or Environmental Assessment and Review Division, 22 Reade Street, NY 10007 (http://www.nyc.gov/planning).

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AIR QUALITY

CHAPTER 17

Ambient air quality, or the quality of the surrounding air, may be affected by air pollutants produced by motor vehicles, referred to as "mobile sources"; by fixed facilities, usually referenced as "stationary sources"; or by a combination of both. Under CEQR, an air quality assessment determines both a proposed project's effects on ambient air quality as well as the effects of ambient air quality on the project. Proposed projects may have an effect on air quality during operation and/or construction. This chapter provides background information on air quality, discusses whether an assessment is appropriate, and describes the methods used to assess potential impacts from a proposed project and determine their significance.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide technical review, recommendations and approval relating to air quality. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), the lead agency, in coordination with DEP, determines whether an institutional control, such as an (E) Designation, may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering post-CEQR (E) Designations and existing Restrictive Declarations recorded on privately-owned parcels, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

100. DEFINITIONS

110. SOURCES OF POLLUTANTS

111. Mobile Source

Vehicular traffic, whether on a road or in a parking garage, may affect air quality. Other moving sources, such as planes, helicopters, boats, trains, *etc.*, may also affect air quality. All of these sources of pollution are termed "mobile sources."

In general, mobile source analyses consider projects that add new vehicles to the roads, change traffic patterns by diverting vehicles, include parking lots or garages, or add new uses near sources of pollutants, such as when a park is proposed adjacent to a highway.

112. Stationary Sources

Sources of pollutants that are fixed in location, rather than mobile, are termed "stationary sources." Stationary sources that may cause air quality impacts include exhaust from boiler stack(s) used for the heating, hot water, ventilation, and air conditioning systems of a building; the process exhaust points of a manufacturing or industrial operation; the stack emissions from a nearby power generating station; or the emissions from incinerators or medical or chemical laboratory vents.

A proposed project may have significant stationary source air quality impacts if it creates new stationary sources that affect the air quality in the surrounding community, such as a large new boiler that exhausts pollutants into the air. Conversely, stationary source impacts may also result when a proposed project introduces new uses that would be affected by emissions from existing fixed facilities, such as locating a new residential building beside an existing power generating station. Proposed buildings may also cause stationary source

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impacts by changing the building geometry or topography of an area so that existing fixed facilities begin to adversely affect other existing structures in the area.

Odors may also result from stationary sources. Significant odor impacts may occur when a new, odor-producing facility is created by a project, or when a project adds sensitive uses close to an odor-producing facility.

113. Construction Activities

Potential air quality impacts from construction activities may include dust emissions generated by the construction of a new facility (or, likewise, the demolition of an existing structure that contains asbestos—see Chapter 12, "Hazardous Materials," for further discussion on this issue); dust emissions related to sandblasting; emissions from construction equipment (typically an issue of concern for very large, multiphase projects); or emissions from construction-generated traffic or diversion of traffic because of construction activity. Because such impacts are frequently temporary, even though the duration of construction activities may last years, construction impacts on air quality are examined separately in Chapter 22, "Construction."

120. POLLUTANTS OF CONCERN

National and state regulations identify a number of air pollutants that are of concern nationwide and statewide. These include seven key pollutants of general concern, and numerous other pollutants of concern primarily due to industrial activities. Some pollutants, such as lead, may be present in the soil or groundwater as well. A discussion of the potential impacts associated with soil and groundwater contamination is included in Chapter 12, "Hazardous Materials."

121. National and State Ambient Air Quality Standards

As required by the Clean Air Act (CAA), National Ambient Air Quality Standards (NAAQS) have been established for the following air pollutants of concern: carbon monoxide, nitrogen dioxide, ozone, respirable particulate matter, sulfur dioxide, and lead. Particulate matter is regulated in two size categories: (i) particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$); and (ii) particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). Table 17-1 shows the primary and secondary standards for these pollutants. According to EPA, the primary standards are intended to protect the public health and represent levels at which there are no identified significant effects on human health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. For carbon monoxide, nitrogen dioxide, ozone, and respirable particulates, the primary and secondary standards are the same.

121.1. Other National Standards

EPA also publishes the National Emission Standards for Hazardous Air Pollutants (NESHAP), which limits the emission rates of certain highly toxic compounds, in most cases for specifically selected processes or operations. NESHAP includes emission limitations for arsenic, asbestos, benzene, beryllium, mercury, radionuclides, and vinyl chloride. See 40 CFR 61. In addition, the U.S. Occupational Safety and Health Administration's (OSHA) and National Institute for Occupational Safety and Health (NIOSH) Short-Term Exposure Levels (STELs) may be used as a guideline for emissions typically present for short periods of time, such as emissions resulting from chemical spills. In addition, EPA has promulgated regulations that govern emissions of 187 listed Hazardous Air Pollutants (HAPs) from major facilities and area sources. Major sources are defined as sources that emit either 10 tons per year of any of the listed pollutants or 25 tons per year of a mixture of listed air pollutants.

Under the CAA, New York State requires the implementation of Reasonably Available Control Technology (RACT) at facilities in the New York City metropolitan area that have the potential to emit volatile organic compounds (VOC) of 25 tons or more per year.

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121.2. State Standards

NEW YORK STATE AMBIENT AIR QUALITY STANDARDS

NAAQS have been adopted as the ambient air quality standards for the State of New York. In addition to NAAQS, there are New York State Ambient Air Quality Standards (NYAAQS) for total suspended particulate matter (TSP), settleable particles, non-methane hydrocarbons (NMHC), and ozone, which correspond to federal standards that have since been revoked or replaced; and for beryllium, fluoride, and hydrogen sulfide (H_2S), which are generally associated with industrial projects.

NONCRITERIA POLLUTANTS

The New York State Department of Environmental Conservation (DEC) also publishes maximum allowable guideline concentrations for certain pollutants, known as "noncriteria pollutants," for which the EPA has no established standards. DEC's guidelines are published in the DAR-1 AGC/SGC Tables. DAR-1 presents Annual and Short-Term Guideline Concentrations (AGCs and SGCs, respectively) for contaminants that range in toxicity from high to low. The AGCs and SGCs are annual and 1-hour guideline concentrations, respectively, for potentially toxic or carcinogenic air contaminants. AGCs and SGCs are guideline concentrations for noncriteria pollutants that are considered acceptable concentrations below which there should be no adverse effects on the general public's health. AGCs and SGCs within the DAR-1 are updated periodically, therefore, the latest available DEC DAR-1 AGC/SGC Tables must be used when employing AGCs and SGCs for analyses.

Table 17-1
National and New York State Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	PPM	Micrograms Per Cubic Meter	PPM	Micrograms Per Cubic Meter
Carbon Monoxide (CO)				
Maximum 8-Hour Concentration[1]	9	10,000	None	
Maximum 1-Hour Concentration[1]	35	40,000		
Lead (Pb)				
Rolling 3-month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
Annual Arithmetic Average	0.053	100	0.053	100
Maximum 1-Hour Concentration[2]	0.100		None	
Ozone (Photochemical Oxidants—O_3)				
8-Hour Maximum[3]	0.075		0.075	
Inhalable Particulates (PM_{10})				
Maximum 24-Hour Concentration[4]		150		150
Fine Particulate Matter ($PM_{2.5}$)				
Average of 3 Consecutive Annual Means		15		15
24-Hour Concentration[5]		35		35
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean	0.03	80		
Maximum 24-Hour Concentration	0.14	365		
Maximum 1-Hour Concentration[6]	0.075		None	

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Note:
[1] Not to be exceeded more than once a year. A violation of standards occurs if these are exceeded more than once.
[2] 3-year average of the 98th percentile of the daily maximum 1-hour average.
[3] 3-Year average of the annual fourth-highest daily maximum 8-hr average concentration.
[4] Not to be exceeded more than once per year on average over 3 years.
[5] 98th Percentile 24 hour concentration averaged over three years.
[6] 99th percentile of the daily maximum 1-hour average averaged over three years. The EPA will revoke the 3- and 24-hour standards in the future.

Source: 40 CFR 50. "National Primary and Secondary Ambient Air Quality Standards."

ODORS

DEC enforces regulations that generally state that no facility should emit measurable amounts of airborne pollutants that result in the detection of bad odors by the general public. These regulations prohibit "emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which . . . unreasonably interfere with the comfortable enjoyment of life or property. Notwithstanding the existence of specific air quality standards or emission limits, this prohibition applies, but is not limited, to any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emission, either alone or in combination with others." 6 NYCRR 211.2.

122. Regulated Pollutants

The air pollutants for which national or state air quality standards exist, and the potential projects for which they would be of concern, are described below. Some pollutants described above, such as lead, may also be present in the soil or groundwater. A discussion of the potential impacts associated with soil and groundwater contamination is included in Chapter 12, "Hazardous Materials."

122.1. Carbon Monoxide

Carbon monoxide (CO) is produced from the incomplete combustion of gasoline and other fossil fuels. In New York City, about 80 percent of CO emissions are from motor vehicles. Because this gas disperses quickly, CO concentrations may vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near congested intersections and along heavily traveled and congested roadways. Consequently, it is important to evaluate concentrations of CO on a localized, or "microscale," basis. For proposed projects that would generate (or divert) a significant number of motor vehicles, it is appropriate to examine the potential incremental impact on CO levels from this traffic.

122.2. Hydrocarbons, Nitrogen Oxides, and Ozone (Photochemical Oxidants)

Hydrocarbons and nitrogen oxides (NO_x) are of concern because of their role as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow and occur as the pollutants are transported downwind, elevated ozone levels are often found many miles from the sources of the precursor pollutants. The effects of nitrogen oxides emissions from mobile sources are, therefore, generally examined on a regional basis. The regional mobile source emissions of these pollutants are related to the number of vehicle miles traveled throughout the New York metropolitan area. Actions that would significantly increase the number of vehicle miles traveled throughout New York City would require an analysis of emissions of NO_x from mobile sources. As discussed in detail in Section 123, nitrogen dioxide (NO_2) (one component of NO_x) is also a regulated pollutant.

122.3. Lead

Lead emissions are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles produced since 1975, and all vehicles produced after 1980, are designed to use unleaded fuel. In 1996, EPA banned the use of leaded gasoline in on-road vehicles, concluding a 25-year effort to phase out lead in gasoline. As newer vehicles replaced older

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ones, motor vehicle-related lead emissions have ceased to be a concern. As a result of Clean Air Act regulations, ambient lead emissions in urban areas have decreased by 97 percent nationwide since the 1970s.

Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are below the national standard of 0.15 micrograms per cubic meter (three-month average). If a proposed project would produce significant new sources of lead (*e.g.*, lead smelters), resulting ambient lead levels in the surrounding community should be examined. If a project would include new structures that may be affected by existing stationary lead emitters (*e.g.*, a new residential building proposed to be located near or in a manufacturing zone), it may be appropriate to perform an assessment of ambient lead levels on these structures.

122.4. *Respirable Particulate Matter (PM_{10} and $PM_{2.5}$)*

Particulate matter (PM) is emitted into the atmosphere from a variety of sources: industrial facilities, power plants, construction activity, concrete batching plants, waste transfer stations, *etc.* The primary concern is with respirable particulates that are less than 10 micrometers (μm) in diameter (referred to as PM_{10}), and less than 2.5 μm in diameter (referred to as $PM_{2.5}$). $PM_{2.5}$ is extremely persistent in the atmosphere and has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles.

Gasoline-powered vehicles do not produce any significant quantities of particulate emissions; but diesel-powered vehicles, especially heavy trucks and buses, do emit respirable particulates, most of which is $PM_{2.5}$. Consequently, levels of respirable particulates may be locally elevated near roadways with high volumes of heavy diesel-powered vehicles. Vehicular traffic may also contribute to particulate matter emissions through brake and tire wear and by disturbing dust on roadways.

Parking garages or lots that would accommodate large numbers of diesel-powered vehicles may also elevate PM_{10} and $PM_{2.5}$ levels in the surrounding area. Stationary sources that burn large volumes of fuel oil may also elevate PM_{10} and $PM_{2.5}$ in the surrounding area.

122.5. *Sulfur Dioxide*

Sulfur dioxide (SO_2) emissions are associated primarily with the combustion of oil and coal, both sulfur-containing fuels. Due to federal rules on the sulfur content in fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. However, assessment of ambient SO_2 levels may be appropriate for projects that result in the development of new stationary sources or new uses near an existing stationary source.

122.6. *Noncriteria Pollutants*

Noncriteria pollutants include hundreds of toxic pollutants, ranging from high-toxicity contaminants that are known or potential human carcinogens (cancer-causing); moderate-toxicity contaminants, including animal carcinogens, mutagens (causing mutations), and other substances posing a health risk to humans; and low-toxicity contaminants, which are of primary concern as irritants and have not been confirmed as carcinogens, mutagens, or teratogens (causing malformations). Noncriteria pollutants are generally released during industrial processes and may be of concern for projects that would result in new air emissions of such compounds (*e.g.*, hospital waste incinerators) or new development within manufacturing zones. Examples include a project that would result in the development of a residential building near a manufacturing area that has several low-level sources (one- to two-story industrial facilities with multiple exhaust stacks) that emit airborne toxic compounds; or new industrial sources, such as a solid waste facility, that could emit such compounds in potentially significant quantities.

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122.7. Odors

In addition to the noncriteria pollutants described above, certain other pollutants are also of concern because of their odor, rather than their toxicity. These are of concern primarily because of the discomfort they may cause, rather than the harm they do to the body. As an example, uncontrolled emissions of ammonia or sulfide compounds may result in detectable malodorous off-site pollutant levels, depending on the processes in which they are being used or from which they are a byproduct. Other compounds that cause odors include amines, diamines, mercapatans, and skatoles. Activities that have the potential for releasing malodorous emissions in significant quantities include light and heavy industrial facilities and waste management facilities, including solid waste management facilities, water pollution control plants (*i.e.*, sewage treatment plants), and landfills.

New York State has a one hour ambient air quality standard for hydrogen sulfide of 10 parts per billion (ppb). While hydrogen sulfide has a malodorous smell (similar to rotten eggs), the 1-hour New York ambient air standard is nuisance-based and is applicable at all off-site locations when analyzed under CEQR. In addition, the DEP uses a 1 ppb increase in hydrogen sulfide concentration from wastewater related processes as a screening value for potential significant odor impact. The 1 ppb guidance level is recommended when considering hydrogen sulfide as an indicator for assessing malodorous compounds from a facility on sensitive receptors (*e.g.*, residences, playgrounds). Since DEP has, in some cases, performed more detailed studies on the sources of malodorous pollutants of concern related to wastewater processes, it should be consulted before undertaking detailed odor impact assessments.

123. Compliance with Standards

EPA designates areas that do not meet one or more of the NAAQS as nonattainment areas (NAA). The CAA, as amended in 1990, requires that each state with a NAA to submit a State Implementation Plan (SIP) that delineates the control strategies to achieve compliance with the NAAQS. New York City complies with the NAAQS for SO_2, NO_2, CO and lead, but is designated as NAA for 8-hour ozone and $PM_{2.5}$.

Historical monitoring data for New York City indicate that the ozone 8-hour standard is exceeded. To be in compliance, the 3-year average of the annual fourth highest maximum 8-hour average concentration should not exceed the ozone 8-hour standard. In August 2007, the state submitted the final proposed revision of the SIP for ozone, documenting how the area will attain the 8-hour ozone standard by 2013. Separately, the state has requested that the NY-NJ-CT metropolitan area (NYMA), of which New York City is part, be reclassified from "moderate" to "serious" nonattainment. In March 2008, EPA revised the 8-hour ozone NAAQS to 0.075 ppm.

Air quality monitoring in Manhattan indicates that the annual average concentration of respirable particulates is above the NAAQS. EPA designated New York County (Manhattan) as a nonattainment area for respirable particulate matter (PM_{10}). The other four New York City boroughs are designated as in attainment for the PM_{10} standards. New York City has been designated as a $PM_{2.5}$ non-attainment area under the CAA due to exceeding both the 24-hour and annual average standard. New York State has submitted a draft SIP to EPA designed to meet the annual average standard by April 8, 2010. By April 2012, New York will be required to submit a SIP demonstrating attainment with the 24-hour standard by 2014 (EPA may grant attainment date extensions for up to five additional years). Monitoring data for the other three national criteria pollutants demonstrate that New York City is in compliance with the corresponding NAAQS for these pollutants.

On February 9, 2010, USEPA revised the Clean Air Act's primary NAAQS for NO_2 by supplementing the existing annual primary standard of 53 parts per billion (ppb) with a new 1-hour primary standard at 100 parts per billion (ppb) based on the 3-year average of the 98th percentile of the daily maximum 1-hour average concentrations, and establishing a new monitoring program. 75 Fed. Reg. 6475 (Feb. 9, 2010). The final rule became effective on April 12, 2010. The USEPA intends to promulgate initial NO_2 designations of attainment, nonattainment, and unclassifiable areas, using the 3 most recent years of quality-assured air quality data from the

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current monitoring network. The USEPA will designate as ''nonattainment'' any areas with NO_2 monitors recording violations of the revised NO_2 NAAQS, and intends to designate all other areas of the country as ''unclassifiable'' to indicate that there is insufficient data to determine whether or not they are attaining the revised NO_2 NAAQS. The current monitoring network focuses upon concentrations for general population exposure at neighborhood and larger scales to support the current annual NO_2 standard, and therefore, does not include monitors near major roadways that could measure the localized concentrations, which are estimated to be responsible for the majority of 1-hour peak NO_2 exposures. 75 Fed. Reg. 6479 (Feb. 9, 2010). States must site required NO_2 near-roadway monitors and have them operational by January 1, 2013, which means that sufficient air quality data from the new network will not be available to determine compliance with the revised NAAQS until after 2015.

Until the NO_2 designations are made, USEPA states that "[m]ajor new and modified sources applying for NSR/PSD permits will initially be required to demonstrate that their proposed emissions increases of NO_x will not cause or contribute to a violation of either the annual or 1-hour NO_2 NAAQS and the annual PSD increment." 75 Fed. Reg. 6525 (Feb. 9, 2010) (referring to 40 C.F.R. 51.166(k)). USEPA may provide additional guidance in the future, as necessary, to assist states and emissions sources to comply with the CAA requirements for implementing new or revised NO_2 NAAQS. At this time and for the purposes of CEQR, it is premature to conduct a quantitative assessment of the effects of a project's potential NO_2 emissions on the new 1-hour NO_2 primary standard. Data and technical gaps need to be addressed and neither the EPA nor DEC has promulgated guidance for such an assessment. Currently, the baseline NO_2 data provided by the current monitoring network and the variability of the NO_x to NO_2 conversion factor for purposes of the one-hour standard do not provide for a meaningful ability to predict exceedances of the hourly standard. Under special circumstances, the lead agency may determine that a qualitative or quantitative discussion/analysis of a project's NO_2 emissions in terms of the new 1-hour standard may be appropriate. EPA's clarification memoranda on modeling could be found at http://www.epa.gov/ttn/scram/guidance_clarificationmemos.htm. MOEC will issue further guidance as appropriate.

On June 22, 2010, EPA promulgated a new 1-hour NAAQS for SO_2. The final rule became effective on August 23, 2010. States are required to submit their initial area designation recommendations for SO_2 to EPA no later than June 2011. EPA will designate areas as ''attainment,'' ''nonattainment'' or ''unclassifiable'' for the new 1-hour NAAQS by June 2012. The EPA plans to approve plans needed to provide for attainment and maintenance of the new 1-hour NAAQS by approximately August 2017 in all areas of the state, including any area initially designated "nonattainment," and also including any area designated ''unclassifiable'' that has SO_2 sources with the potential to cause or contribute to a violation of the NAAQS.

The limited monitoring data available for non-criteria compounds show that annual monitored arsenic, cadmium, and nickel concentrations are greater than the current AGCs for these substances in New York City. In addition, based on data reported from other urban areas, it is expected that the annual formaldehyde concentrations are greater than the current AGC.

It is recommended that the lead agency check with DEP for the latest background levels and compliance status prior to commencing detailed analyses.

124. Conformity

Conformity, a process mandated by the CAA, requires that air pollution emissions from federal actions not contribute to state air quality violations. Conformity is defined in Section 176(c) of the CAA as conformity to the State Implementation Plan's (SIP) purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards, and ensuring that such activities will not: (1) cause or contribute to any new violation of any standard in any area; (2) increase the frequency or severity of any existing violation of any standard in any area; or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

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EPA has promulgated criteria and procedures for determining conformity of all proposed projects that a federal agency is supporting, licensing, permitting, or approving. The purpose of these rules is to determine whether or not the proposed project would interfere with the clean air goals stipulated in the SIP. The criteria and procedures developed for this purpose are called “general conformity'' rules. Currently, the general conformity requirements apply only in areas that are designated "nonattainment" or "maintenance" for CO, lead, nitrogen oxides (NO_x), ozone, PM_{10}, $PM_{2.5}$ and SO_2. A "maintenance" area has been redesignated to "attainment" from "nonattainment" and must maintain the NAAQS for 20 years by following two sequential 10-year plans.

In addition to general conformity, CAA has special “transportation conformity” rules, which support the development of transportation plans, programs, and projects that enable areas to meet and maintain national air quality standards for ozone, particulate matter, and CO, which impact human health and the environment. Transportation conformity is a CAA requirement that calls for EPA, the U.S. Department of Transportation (DOT), and various regional, state and local government agencies to integrate the air quality and transportation planning development process. New York State has also adopted transportation conformity regulations, which are coordinated by the DEC Division of Air Resources.

130. AIR QUALITY ANALYSES

131. Microscale Analyses

Air quality pollutants, except total hydrocarbons (discussed below), may be of concern on a localized, or microscale, level, where elevated concentrations may occur at particular locations. In addition, PM_{10} and $PM_{2.5}$ may also be characterized for a neighborhood area. Therefore, these pollutants are assessed on a microscale level, which considers pollutant concentrations at particular sites.

For these microscale analyses, air quality impacts are assessed by considering the mobile or stationary pollutant source, the type and amount of pollutants being emitted, the dispersion--the way these pollutants mix with the ambient air and become dispersed before reaching the analysis locations, given meteorological conditions (such as wind speed, wind direction, atmospheric stability, and temperature), the distance between the source and the receptor, roadway and building geometry, and other factors. Often, mathematical models are used to estimate emission levels, and mathematical or physical models, such as wind tunnels, are used to evaluate dispersion. Calculating the emissions and their dispersion provides a particular source's contribution of a pollutant level to the ambient air at a given location (called a "receptor"). If appropriate, the calculated value is added to the general background concentrations of that pollutant to obtain the total concentration of the pollutant at the receptor being assessed.

For dispersion modeling purposes, mobile and stationary sources of air pollutants may be considered either line sources, area sources, or point sources, as follows:

LINE SOURCES

Sources of pollutant emissions that can be simulated as a continuous or segmented group of lines in a mathematical model are considered to be "line" sources. Typical examples include vehicles traveling along a roadway that is curved, elevated, at-grade, or below grade with an opening above (otherwise known as a "cut-section"); traffic traversing an unpaved or dusty roadway; or industrial operations, such as conveyor belt operations.

AREA SOURCES

Emissions that can be simulated over a small region are "area" sources. Typical area sources include the following: vehicles traveling in a parking lot or multilevel parking facility; multiple exhaust stacks around the rooftop of a building or several buildings; construction equipment and other activities at a

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construction site; an outdoor storage area of fine particulate material; or an industrial process that is distributed over large sections of a manufacturing plant.

POINT SOURCES

"Point" sources discharge pollutants from a relatively small, restricted area. Examples of sources typically modeled as point sources are boiler exhaust stacks; power generating station stacks; exhaust vents for release of medical laboratory chemicals; effluent from incinerators; exhaust vents for a parking garage; and vents for pollutant discharges from a spray booth.

The models should generally conform to the EPA's *Guideline on Air Quality Models*, which is periodically updated.

132. Mesoscale Analyses

Nitrogen oxides and hydrocarbons are precursors to ozone formation in the presence of sunlight and, consequently, are concerns on a regional, or mesoscale, level. This ozone formation occurs relatively slowly and takes place downwind from the site of the actual pollutant emission and, therefore, is not related to localized changes. Consequently, the effects of these two classes of pollutants are examined on an area-wide, or mesoscale, basis. The area for examination is typically large, such as an entire borough, or the entire City of New York, or even the tri-state metropolitan area. Such an analysis is rarely performed, however, because few projects have the potential to affect ozone over such large regions. CO, PM, and $PM_{2.5}$ are also analyzed on a regional basis for projects that have the potential to significantly affect background levels of these pollutants.

200. DETERMINING WHETHER AN AIR QUALITY ASSESSMENT IS APPROPRIATE

The following guidance for determining whether air quality analyses are needed was developed by examining historical air quality data in New York City and using prototypical air quality modeling. Table 17-2 may be used to identify the air pollutants that might be of concern for different types of projects.

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Table 17-2
Potential Pollutants of Concern for Typical Kinds of Projects or Uses Surrounding Those Projects

Type of Project/Use	Potential Issue of Concern	CO	PM	SO_2	NO_x	O_3	Pb	NC
Office, Retail, Mixed-Use, or Residential Building	Induced Traffic	☐						
	Induced Trucks or Buses	☐	☐					
	Boilers		☐	☐	☐			
	Near Elevated Highway/Bridge	☐	☐					
	Near Large Stacks (*e.g.*, Con Edison)		☐	☐	☐			
Manufacturing or Industrial	Induced Traffic	☐						
	Induced Trucks	☐	☐					
	Boilers		☐	☐	☐			
	Process	☐	☐	☐	☐	☐	☐	☐
Hospital, Medical Center, and Laboratories	Induced Traffic	☐						
	Boilers		☐	☐	☐			
	Incinerators	☐	☐	☐	☐	☐	☐	☐
	Process	☐	☐	☐	☐	☐	☐	☐
Parking Lots/Garages	Induced Traffic	☐						
Bus or Truck Depots, Garages, Parking Lots, or Franchises	Induced Bus or Truck Traffic	☐	☐					
New or Modified Roadway	Induced Traffic	☐	☐					
Cogeneration/Power Plant	Process	☐	☐	☐	☐	☐		☐
Demapping Built Streets	Traffic Diversion	☐	☐					
Transfer Stations	Induced Traffic	☐	☐					
	Process	☐	☐	☐	☐			☐
Asphalt/Concrete Plants	Induced Traffic	☐	☐					
	Process		☐	☐	☐			☐

Key:
CO - Carbon monoxide
PM - Particulate matter (*e.g.*, PM_{10} and $PM_{2.5}$)
SO_2 - Sulfur dioxide
NO_x - Nitrogen dioxide and/or nitrogen oxides
O_3 - Ozone (*i.e.*, volatile organic compounds or nitrogen oxides that lead to ozone formation)
Pb - Lead
NC - Non-criteria or malodorous pollutants

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210. MOBILE SOURCES

Projects—whether site-specific or generic—may result in significant mobile source air quality impacts when they increase or cause a redistribution of traffic, create any other mobile sources of pollutants (such as diesel trains, helicopters, *etc.*), or add new uses near mobile sources (roadways, garages, parking lots, *etc.*). The following project types may result in significant adverse air quality impacts from mobile sources and therefore require further analyses, which may include microscale analyses of mobile sources. It is recommended that the traffic assessment, located in Chapter 16, "Transportation," be completed before reviewing the following checklist:

- Projects that would result in placement of operable windows (*i.e.*, windows that may be opened and close by the tenant), balconies, air intakes, or intake vents generally within 200 feet of an atypical (*e.g.*, not at-grade) source of vehicular pollutants, such as a highway or bridge with a total of more than two lanes.
- Projects that would result in the creation of a fully or partially covered roadway, would exacerbate traffic conditions on such a roadway, or would add new uses near such a roadway.
- Projects that would generate peak hour auto traffic or divert existing peak hour traffic, resulting in the following:
    - 160 or more auto trips in areas of concern in downtown Brooklyn or Long Island City, Queens (see Figures 17-1 and 17-2);
    - 140 or more auto trips in Manhattan between 30th and 61st Streets; or
    - 170 or more auto trips in all other areas of the City.
- Projects that would generate peak hour heavy-duty diesel vehicle traffic or its equivalent in vehicular emissions (the attached worksheet and guidance regarding vehicle class may be used to calculate equivalency), resulting in the following:
    - 12 or more heavy duty diesel vehicles (HDDV) for paved roads with average daily traffic fewer than 5,000 vehicles;
    - 19 or more HDDV for collector roads;
    - 23 or more HDDV for principal and minor arterials; or
    - 23 or more HDDV for expressways and limited access roads.
- Projects that would result in new sensitive uses (particularly schools, hospitals, parks, and residences) adjacent to large existing parking facilities or parking garage exhaust vents.
- Projects that would result in parking facilities or applications to the City Planning Commission requesting the grant of a special permit or authorization for parking facilities should consult the lead agency regarding whether an air quality analysis of parking facilities is necessary.
- Projects that would result in a sizable number of other mobile sources of pollution, such as a heliport, new railroad terminal, or trucking.
- In addition, projects that would substantially increase the vehicle miles traveled in a large area (a borough, the City, or larger) may require mesoscale analyses.

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Figure 17-1

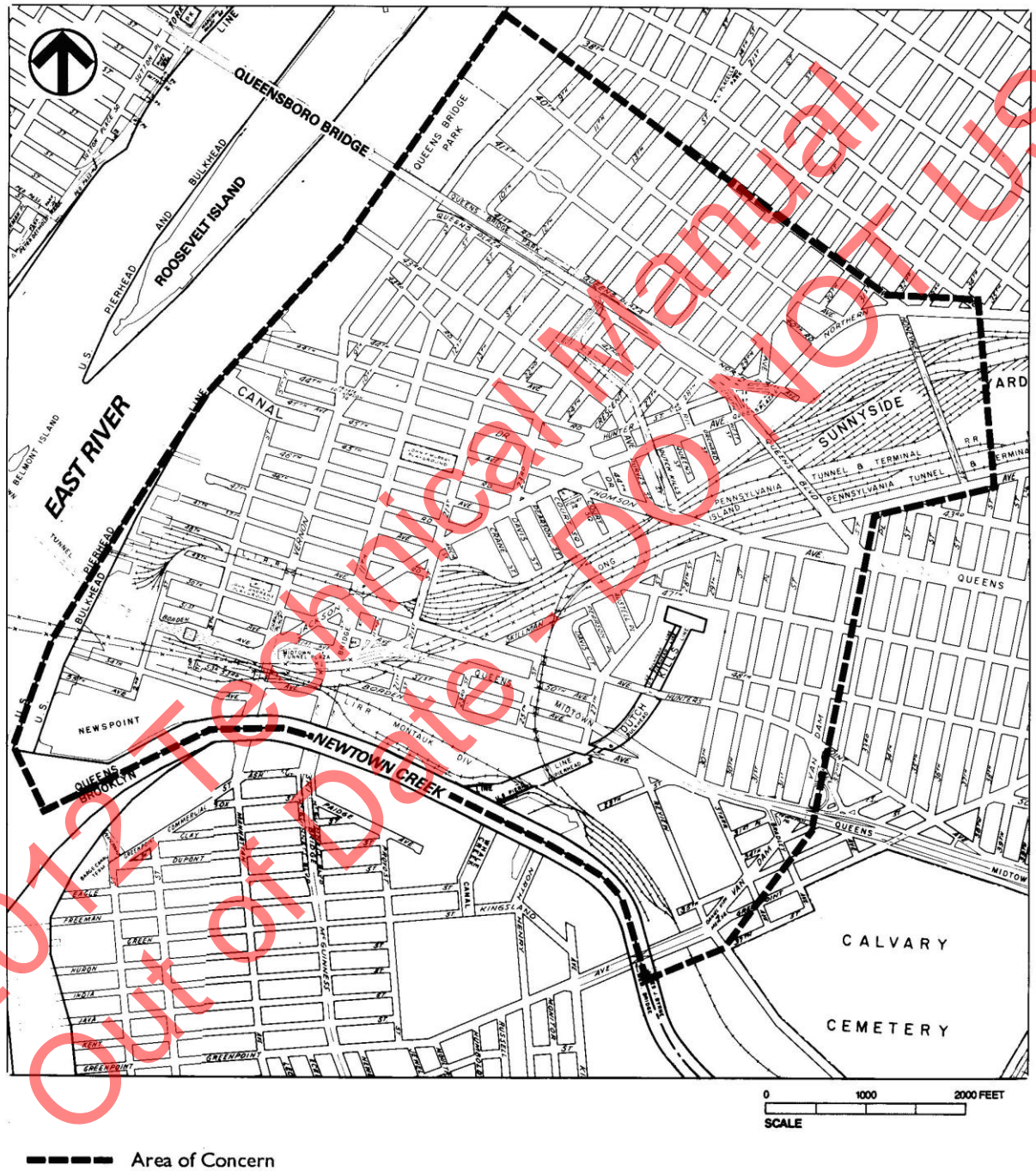
Area of Concern in Downtown Brooklyn



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Figure 17-2

Area of Concern in Long Island City



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220. STATIONARY SOURCES

Projects may result in stationary source air quality impacts when they would (1) create new stationary sources of pollutants—such as emission stacks for industrial plants, hospitals, other large institutional uses, or even a building's boilers—that may affect surrounding uses; (2) introduce certain new uses near existing (or planned future) emissions stacks that may affect the use; or (3) introduce structures near such stacks so that the structures may change the dispersion of emissions from the stacks so that surrounding uses are affected.

The following projects may result in potential significant adverse impacts related to stationary sources, and therefore require stationary source analyses:

- Projects that would use fossil fuels (fuel oil or natural gas) for heating/hot water, ventilation, and air conditioning systems (note that single-building projects may be able to perform a screening analysis rather than detailed stationary source analyses; see Subsection 322.1, below).
- Projects that would create large emission sources, including but not limited to the following: solid waste or medical waste incinerators, cogeneration facilities, asphalt and concrete plants, or power generating plants.
- Projects that would result in new uses (particularly schools, hospitals, parks, and residences) located near a large emission source.
- Projects that would include medical, chemical, or research labs.
- Projects that would result in new uses being located near medical, chemical, or research labs.
- Projects that would include operation of manufacturing or processing facilities.
- Projects that would result in new uses (such as residences, schools, hospitals, parks, *etc.*) within 400 feet of manufacturing or processing facilities.
- Projects that would result in new uses within 400 feet of a stack associated with commercial, institutional, or residential developments, and the height of the new structures would be similar to or greater than the height of the emission stack.
- Projects that would result in potentially significant odors. This includes, but is not limited to, solid waste management facilities, water pollution control plants (*i.e.*, sewage treatment plants), and incinerators.
- Projects that would result in new uses near an odor-producing facility.
- Projects that would create "non-point" sources, such as unpaved surfaces and storage piles that could result in what is known as fugitive dust.
- Projects that would result in new uses near non-point sources.

Stationary sources may also be an issue for generic or programmatic actions that would change or create a stationary source (as described above) or that would expose new populations to such a stationary source.

230. CONFORMITY

All projects that require federal support, federal licensing, federal permitting, or federal approval are subject to the conformity requirements. Examples of projects that are subject to “general conformity” would be an airport expansion, a veteran's hospital expansion, or new federal court facilities. Highway and transit projects are examples of projects that must comply with “transportation conformity” requirements.

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300. ASSESSMENT METHODS

310. STUDY AREAS AND RECEPTOR LOCATIONS

The first step in performing air quality analyses is to determine the appropriate study area. The study area encompasses the region or locations where there is the potential for a significant air quality impact resulting directly or indirectly from the project. Thus, the extent of the study area depends on the project proposed and the pollutants of concern.

For microscale, or localized, analyses, air quality predictions are made for specific locations, such as intersections, and at those locations, for specific geographic points. These prediction locations are called "receptor locations," or simply "receptors." Receptor locations are included in the air quality analyses when air quality impacts are expected and where people would have continuous access when the project is implemented. For mobile source analyses, the study area often consists of intersections where congestion is expected, and receptors are sited at numerous locations at these intersections. Sidewalks and other ground-level locations alongside roadways and highways are often receptor locations. However, median strips, bikeways or crosswalks in roadways are not appropriate receptor locations because the public would not be in those locations for more than a few minutes. Sometimes, particularly for stationary source analyses, elevated receptors may be located high up on the faces of buildings, either existing or proposed, if there is or would be a balcony or other means of outdoor access, an operable window, or an air intake vent at that location. By contrast, an elevated location would not be a receptor if there was no balcony or other means of outside access. Different study areas and receptor locations are appropriate depending on whether mobile or stationary sources are being examined, as described in the following sections. Consideration of potential cumulative impacts from other nearby substantial sources of pollution (*e.g.*, a heat input of 2.8 million BTU/hour or higher) may also be required in some cases.

For mesoscale analyses, which are rarely performed for CEQR, the study area is that area that would be affected by the large-scale change in pollutant sources. For example, if a project would result in a large increase in the number of vehicle miles traveled in the City, the study area may include the entire City. This delineation may be difficult because the analysis must consider the origins and destinations of those vehicle trips to assess whether a larger area should be studied. Care needs to be taken in developing the proper study area because too large an area would make the relative effects of one project seem insignificant (for example, if the project would greatly increase the number of vehicle miles traveled in the City, but the analysis considered the tri-state metropolitan area, the project's effect might be inappropriately considered insignificant).

311. Mobile Sources

311.1. Roadways

LOCATIONS FOR STUDY

The study area for mobile sources is directly related to the project's traffic study area (explained in Chapter 16, "Transportation"). This usually includes those intersections where traffic congestion is expected, since this is where air quality impacts are likely to occur. The choice of which intersections to include in the mobile source air quality analysis is based on the estimates of incremental vehicular traffic associated with the project, following the guidance provided in Chapter 16, "Transportation." The study area should include at least the following locations:

- Based on peak hour traffic assignments, intersections in the traffic study area to which the project would add the following incremental traffic:

  <u>CO</u>

  - 160 or more auto trips in areas of concern in downtown Brooklyn or Long Island City, Queens;

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- 140 or more auto trips in Manhattan between 30th and 61st Streets; or
- 170 or more auto trips in the rest of the City.

$\underline{PM_{2.5}}$

- 12 or more HDDV for paved roads with average daily traffic fewer than 5,000 vehicles;
- 19 or more HDDV for collector roads;
- 23 or more HDDV for principal and minor arterials; or
- 23 or more HDDV for expressways and limited access roads.

- Locations within and adjacent to a fully or partially covered roadway when covered roadways are a concern (*e.g.*, when the project would create, exacerbate traffic conditions on, or add new uses near a fully or partially covered roadway).
- Locations adjacent to an atypical (*e.g.*, not at-grade) source of pollutants (if either the receptors or the source are created by the project), such as a multilane highway or bridge.

For some projects, following the criteria for determining the study area listed above may result in either too many or too few intersections being analyzed. After determining the general study area, the following procedure may be used to choose intersections for further study:

- Choose three or four intersections where the projected incremental traffic increase is greater than the thresholds suggested above for a preliminary analysis. These should be the intersections with the worst conditions. For example, an intersection should be selected if it would process the largest traffic volumes or result in the greatest traffic impacts with the project and/or would be severely congested without the project (and would be affected by project-generated or diverted vehicular traffic).
- Perform a mobile source analysis for these intersections (following the procedures set forth later in this chapter). This initial analysis provides an indication of the magnitude of the project's impacts.
- If any significant impacts are predicted, review the study area to consider whether additional intersections with less severe traffic conditions should be added.
- This procedure may need to be repeated several times until enough receptor locations have been chosen to accurately characterize the project's mobile source air quality impacts.

When collecting traffic data to be used for air quality analyses, it may be prudent to collect data at the same time from additional intersections that may be of concern to ensure data collection under similar conditions. Should those intersections be added to the air quality study area later, returning to collect these data on a different day can lead to data inconsistencies that are difficult to resolve. Traffic data are collected for all roadway segments ("links") within 1,000 feet of the intersection of concern.

For generic or programmatic actions, the study area depends on the nature of the project proposed and the amount of information that exists about its implementation. The air quality analyses may follow the same procedure used for the traffic analyses in these cases. Typically, depending on the size of the proposed project, certain areas are chosen as representative of all the types of areas that may be affected, and within those areas, intersections are selected as representative critical analysis locations. The air quality assessment is then performed in the same way as for any other intersections.

RECEPTOR LOCATIONS

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After the intersections are selected for study, receptor locations are chosen. Numerous receptors are sited at each intersection studied in order to accurately characterize the intersection's ambient air quality. As described above, receptors are generally located where people are likely to have continuous access and where the maximum total pollutant concentrations with the project or incremental pollutant concentrations resulting from the project are likely to occur. This usually means that receptors are located near those approaches of the intersection where traffic is likely to be the greatest or the most congested (*e.g.*, where vehicles are delayed waiting at traffic signals). Examples of reasonable receptor sites are:

- Sidewalks near roadways;
- Edges of rights-of-way for roadways without sidewalks, if publicly accessible;
- Property lines of all residences, hospitals, schools, playgrounds, and the entrances and air intakes to all other buildings;
- Portions of a parking lot to which the public has pedestrian access;
- Parks proximate to roadways; and
- All air intakes or operable windows adjacent to elevated emission sources such as elevated highways or bridges for vehicular traffic.

Places where the public would not have continuous access are not considered to be receptor locations. Some locations, such as tollbooths, are not considered accessible to the public even though people may work there all day. The air quality at these locations is regulated by U.S. Occupational Safety and Health Administration (OSHA) workplace standards. In addition, EPA guidelines list other unreasonable receptor sites, including:

- Median strips of roadways;
- Locations within the rights-of-way on limited access highways;
- Locations within intersections or on crosswalks at intersections; and
- Tunnel approaches.

Multiple receptors are used to determine the location of both the highest total pollutant concentration and the highest increment caused by the project. Therefore, a series of receptors at different locations are assessed. When analyzing pollutant levels near an intersection, at least one receptor at each corner of the intersection and one or two receptors adjacent to each queue (line of vehicles waiting at a traffic signal) on an approach link (the segment of roadway between two intersections, approaching the intersection being analyzed) to the primary intersection under analysis should be analyzed. Depending on the analysis results at these receptors, additional receptor locations may be appropriate. For example, if significant impacts are predicted at the receptors farthest from the intersection, additional receptors are added still farther away, until no impact is predicted. Receptors should be placed at mid-sidewalk, generally 6 to 7.5 feet from the curbline of the sidewalk (for wider sidewalks, no more than 7.5 feet from the curb), and set back from the corner of the intersection. If the above methodology results in receptors in the mixing zone (for the CAL3QHC version 2.0 model, discussed below), the mixing zone should be narrowed so that receptors are one foot from the edge of the mixing zone.

311.2. Parking Facilities

The locations where the worst potential air quality impacts might result from parking facilities' emissions (and, therefore, the locations where receptors should be placed in an air quality analysis of these facilities) vary depending on whether the facility would be open and at-grade (a parking lot),

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multilevel and open-sided (therefore, naturally ventilated), or totally enclosed (parking garage). As discussed later in Subsection 321.2, potential cumulative impacts analyses from both on-street and off-street sources of emissions may be required. Each type of parking facility is discussed below.

PARKING LOTS AND OPEN-SIDED GARAGES

The greatest potential pollutant concentrations from at-grade, unenclosed parking lots or multilevel, open-sided parking facilities would be immediately adjacent to such facilities, with the additional potential for cumulative impacts from pollutant emissions from the facility and from nearby on-street sources. Therefore, receptor locations are placed on sidewalks adjacent to, and across the street from, the garage.

ENCLOSED GARAGES

In the case of parking garages that are to be totally enclosed and mechanically ventilated, potential impacts from the exhaust vent(s) are assessed. The greatest impacts from the exhaust vent(s) might occur at a nearby building if the vent(s) are exhausted above the rooftop of the garage, or at pedestrian height if the vent(s) are near ground level. It should be noted that, even though exhaust results from cars within a garage, the exhaust vents are assessed in the same way as that of stationary sources because the emissions emanate from a fixed location (see the discussion of analysis techniques, below). Receptor locations are placed at elevated locations on nearby buildings when rooftop exhaust vents are being assessed, and at ground-level locations both adjacent to and across the street from the vent(s) when pedestrian-level vents are being examined.

312. Stationary Sources

312.1. Study Area

Study areas for the analysis of stationary source impacts depend on the magnitude of the pollutant emission rates from the new source(s), the relative harmfulness of the compounds emitted, the characteristics of the systems that would discharge such pollutants (*e.g.*, stack heights, stack exhaust velocities), and the surrounding topography relative to these sources (*e.g.*, tall residential buildings near shorter stacks). Similar to mobile sources, the study area consists of particular locations chosen for study; however, receptors for stationary source analyses are not usually located at intersections.

When the proposed project would result in a new stationary source, the following general guidelines may apply:

- If a project would result in a single building that would use fossil fuels (fuel oil or natural gas) for heating/hot water, ventilation, and air conditioning systems, first perform the screening analysis presented in Subsection 322.1 to determine whether further analyses are required. If required, the study area should generally include nearby buildings with heights similar to or greater than the stack.
    - For projects that would result in more than one building that would use fossil fuels for heating/hot water, ventilation, and air conditioning, the study area would generally extend to at least 400 feet from the boundaries of a project site.
    - If a project would include operation of manufacturing or processing facilities, or medical, chemical, or research labs, the area within at least a 400-foot radius from the emission source should be included in the analysis.
    - If a project would create large emission sources, including but not limited to solid waste or medical waste incinerators, cogeneration facilities, asphalt and concrete plants, or power generating plants, the study area should extend to at least a 1,000-foot radius of the new source(s).

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- If the proposed project would result in major sources, the preparation of a cumulative air impact assessment may be required. A cumulative assessment would consider the combined effect of a proposed project's emissions in conjunction with other existing or planned projects, which have the potential for combined air impacts at receptor sites.
- If an project would result in potentially significant odors, including, but not limited to, solid waste management facilities, water pollution control plants (*i.e.*, sewage treatment plants), and incinerators, the study area should extend to at least a 1,000-foot radius.

- When the proposed project would result in new receptors near stationary sources, the analysis considers the effects of those sources on the site of the project.
- For projects that would create "non-point" sources, such as fugitive dust, the effects on the nearest locations to which the public has general access are typically considered.

Generally, a preliminary analysis is performed for the locations chosen using the above criteria. If significant impacts are predicted at all or most of the chosen locations, it may be appropriate to expand the study area to determine whether potential significant impacts may also occur at more distant locations. Alternatively, a preliminary screening analysis may be performed for several locations at various distances from the stationary source. The results of this screening analysis determine the radius where the maximum impacts from the source will be calculated in a more detailed analysis. When more detailed modeling analyses are required, it may be appropriate to submit a detailed modeling protocol to the lead agency for review and approval before undertaking such extensive studies. The lead agency may consult with DEP for its advice on the detailed modeling protocol.

For generic actions the first step would be to consider the potential ranges of stationary sources that may be a concern. Then, worst-case scenarios assuming prototypical stationary sources may be addressed.

312.2. Receptor Locations

Similar to the procedure for mobile sources, numerous receptors are analyzed at each of the locations to be studied in the stationary sources assessment. The receptors are located where people are likely to have continuous access and where the maximum total pollutant concentrations or incremental pollutant concentrations resulting from the project are likely to occur. When the project would result in a new stationary source, off-site receptor locations are usually modeled. In addition, on-site receptors may be appropriate. For analyses of the effects of heating/hot water, ventilation, and air conditioning systems or other stacks, receptors are placed at elevated locations on nearby buildings (at operable windows or air intake vents).

When development related to the project may be affected by existing (or planned) stationary sources, receptors are typically located on the project site. For projects that would result in development that may affect the dispersion of pollutants from an existing emissions source (*e.g.*, power generating station), receptors are placed both on-site and off-site at locations where pollutant levels may increase significantly because of the changes in dispersion of the emissions from the source.

Examples of reasonable receptor sites include the following:

- Pedestrian-height receptors on sidewalks.
- Exterior uses, such as parks and playgrounds, and entrances and air intakes to sensitive interior uses, such as residences, hospitals, nursing homes, schools, and community facilities.

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- Buildings with operable windows, usually just residential buildings. Receptors may be at elevated locations, such as at operable windows anywhere on the building. When receptors are placed on a structure with operable windows, such as a tall residential building, multiple receptors should be placed along the building facades (from roof level down the side of the building) closest to the source(s) under analysis.
- Air intake vent locations of buildings.
- Balconies on buildings and other accessible areas at elevated locations on buildings, such as rooftop decks, *etc.*

If there are substantial differences between the local grade levels of the source(s) and the receptors, the differences in terrain should be accounted for in the mathematical modeling. When performing either mathematical modeling or physical modeling, such as wind tunnel studies, some initial test runs should be performed with the first set of selected receptor sites. Based on these initial test runs, it is possible to determine the specific locations or general regions where additional receptors should be added in the complete analysis to ensure that the locations where the maximum total pollutant levels and incremental changes in concentration from the project are included.

320. MODELS AND ANALYSIS TECHNIQUES

For CEQR analyses, air quality is usually assessed at the microscale level, using mathematical models that predict the pollutant concentrations for given locations. Field monitoring of air quality is seldom used. Models used for the air quality assessment generally should conform to the U.S. EPA's Guideline on Air Quality Models or should be approved by the lead agency as appropriate on a case-by-case basis. Because models are periodically revised and updated, the lead agency or analyst should verify that the most recent edition of the appropriate model(s) is used before performing the analysis. Note that certain large stationary sources may require review through the U.S. Environmental Protection Agency's (EPA) New Source Review procedures (see Section 710 of this chapter). The techniques described in this Manual do not replace those assessments, which have their own guidelines. The EPA's Guideline on Air Quality Models may be found here.

The models take into consideration various factors that may affect air quality—the pollutants being emitted from the mobile sources (usually, vehicle tailpipes) or stationary sources (usually, stacks), and the way these pollutants are dispersed, given meteorological conditions and roadway and building geometry. A project's effects on air quality are determined by comparing predictions made for the future No-Action and the future With-Action conditions. For mobile sources, the predictions for the analysis year are made using mathematical models rather than actual monitoring. The existing condition does not serve as a baseline for determining if a proposed project would have a significant impact, but is typically included in the analysis for informational purposes. Predictions of pollutant concentrations are made separately for each of the analysis years chosen. For analyses of the effects of existing stationary sources, information on the existing pollutants being emitted from the source in question is obtained, and the analysis assumes that the future emissions are the same, unless available information indicates otherwise. The following general procedures are used for microscale analyses of both mobile and stationary sources. These are described in detail in the sections that follow (Subsections 321 through 324).

- Determine which pollutants should be assessed. This depends on the nature of the proposed project.
- Choose a preliminary study area and receptor locations (see Section 310).
- Determine the emissions of pollutants from the sources of concern.
- Estimate the dispersion of those pollutants into the air, using a model.
- Add the appropriate background pollutant concentrations to the predicted pollutant concentrations at the receptor locations resulting from the source to determine the total concentrations for the pollutants of concern at each receptor site.

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- Compare the predicted concentrations for each pollutant of concern with the appropriate standards and criteria (see Section 400).

Sections 321 and 322 describe the methodology for predicting microscale mobile and stationary source pollutant concentrations for existing, future No-Action, and the future With-Action conditions, respectively. They describe the various models appropriate for mobile and stationary source analyses, as well as how those models are applied. Input parameters to the models, methodological assumptions, and limitations of the models are also discussed. Mesoscale analyses are discussed separately in Subsection 323.

321. Microscale Mobile Source Modeling

CO is the primary pollutant of concern for most microscale mobile source analyses, including the assessments of roadways and automobile parking lots and garages. Particulate matter may also be of concern for parking lots and garages used primarily by heavy-duty diesel-powered trucks and buses and for projects generating bus or truck traffic with the potential to affect nearby sensitive receptors for a prolonged period of time.

The basic tool for analyzing pollutant concentrations from mobile sources is the air pollutant dispersion models. These models estimate CO and PM concentrations under given conditions of traffic, meteorology, and roadway configuration. First, traffic data for the analysis years are input into the model. Then, emissions from vehicle exhaust systems (and other on-road sources of emissions for particulate matter) and their distribution over the roadway are estimated for that year, using a separate mathematical model. However, for areas with complex topography, or projects that propose, or would affect, a fully or partially covered roadway, it may be more appropriate to use physical rather than mathematical models to assess the potential for significant impacts. Then, the way these emissions are dispersed because of meteorological conditions, roadway geometry, and other factors is considered.

321.1. Roadways

Mobile source analyses related to roadways are performed for projects that change traffic patterns, add traffic to an area's roadways, or reconfigure roadways, or for projects that could be affected by pollutants from roadways. Typically, they assess at-grade intersections or street corridors with adjoining sidewalks. Sometimes, analyses are needed for major sources of CO or particulate matter, such as multilane highways or bridges or partially or fully covered roadways.

TRAFFIC DATA REQUIREMENTS

Vehicle classifications are the relative mix of autos, taxis, trucks, *etc.* For air quality modeling, vehicles are divided into the following classifications: autos, sport-utility vehicles (SUVs), taxis, light-duty trucks (those with four wheels, including vans and ambulances), heavy-duty gasoline-powered trucks and buses (heavy duty trucks have six or more wheels), and heavy-duty diesel-powered trucks and buses. Documentation on the procedures used to distinguish among the different vehicle types and weight categories when field surveys are performed is provided in the Appendix.

Before any mobile source impact analysis may be performed, input data are required on the vehicular traffic conditions on the roadways near the receptor sites under analysis. Data are generally collected, and analyses performed, for roadway "links." A link is the section of roadway between two traffic signals. The links leading to a particular intersection are also called "approaches." At a minimum, the following information is required for each signalized street segment approach included in the mobile source modeling of at-grade roadways for each time period analyzed:

- Hourly traffic volume.
- The effective width of the roadway.
- Average speed of traffic.

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- Stopped delay at the intersection.
- Number of moving lanes.
- Signal cycle length.
- Red time length per cycle.

In addition, the following information derived from the Highway Capacity Manual (see Chapter 16, "Transportation") is also needed:

- Saturation flow rate (a measure of each lane's vehicular capacity per hour of green time).
- Arrival type—the way traffic arrives at a light (*e.g.*, in a constant stream or in platoons), which depends on how lights at the adjacent intersections are timed (and, particularly, the extent of signal timing progression for those lights).
- Signal type—pretimed, actuated (a signal that changes in response to the presence of a vehicle), or semi-actuated.

These data are collected for 1,000 feet from the intersection to be analyzed. Traffic data should also be gathered for all links within 1,000 feet of the intersection. Those links should be modeled in their entirety. It is generally not necessary to collect traffic data and model links that begin beyond 1,000 feet of the intersection. Chapter 16, "Transportation," provides more information on many of these traffic parameters, including procedures for collecting travel speed and delay data for subsequent use in air quality analyses. Because other parameters are needed for air quality analyses, coordination with the traffic task is required to ensure that the appropriate data are collected in the field.

ESTIMATES OF MOBILE SOURCE EMISSIONS

Emissions models predict the distribution of pollutants emitted from vehicles' exhaust systems over the roadway (for both idling and moving vehicles). The primary pollutant of concern from mobile sources on roadways from autos is CO, while particulate matter may be more of a concern from diesel trucks and buses. Emissions models used to analyze CO and particulate matter from mobile sources are a series of mathematical models developed by EPA and periodically updated to account for the most recent test data on new vehicles under production (and any revised standards for emissions from new vehicles, also called "tailpipe" standards). EPA's MOVES2010 program is the most recent version of the mobile emissions factor model for CO and PM emissions estimates. Projects undergoing CEQR review should use MOBILE6.2 until MOVES2010 is officially released for project-level analysis. For those projects that have begun to model mobile emissions based upon MOBILE6.2, MOBILE6.2 could be used until the end EPA's two-year phase-in period. At that time, the emissions should be re-run with MOVES2010.

MOVES2010 estimates emissions for both on-road and non-road sources covering carbon monoxide, particulate matter, as well as greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). The model allows for multiple scale analysis from fine-scale analysis to national inventory estimation, and encompasses the tools, algorithms, data, and guidance necessary for analyses associated with regulatory development, compliance with statutory requirements, and estimations and projections of national/regional inventory. DEP should be consulted for information regarding new releases and updates to mobile emissions models. In addition, EPA continues to issue policy and technical guidance on running the MOVES2010, available here.

The various factors to be considered when using mobile emissions models are described below. These general guidelines are intended to provide conservative estimates and may be revised at times when specific data about a project or location are available.

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AMBIENT TEMPERATURE

Estimates of CO emissions should be computed with a mobile model at 50ºF in Manhattan and 43ºF for the rest of the City (these are for winter conditions), unless a project would generate a significantly larger number of vehicle trips during the summer period, when a higher ambient temperature for CO emissions calculations might be prudent. These recommended temperatures are revised at times to reflect the most recent recorded data from CO monitoring, and DEP should be contacted to make sure the most recent temperature guidance for CO modeling is understood. The MOVES2010 emissions model does not require temperature as an input variable. If a summer CO analysis is required, the appropriate ambient temperature would be determined by examining meteorological data for the period of concern following this procedure:

- A summer temperature may be determined by following the general recommended procedures in EPA's Guideline for Modeling Carbon Monoxide from Roadway Intersections, (EPA-454/R-92-005). As a first step, three years of the most recent hourly CO monitoring data at DEC's nearest CO street-level monitor needs to be obtained and used to compute running 8-hour average CO levels for each of the three complete years. Then the highest and second highest non-overlapping periods for the entire year should be calculated, and compared to the values reported by the DEC. This step confirms that the data and calculations are accurate.
- The next step parses out the 8-hour CO concentrations for the summer period of interest for each year. Based on the guidance in Section 4.7.1 of the EPA document referenced above, the temperature corresponding to each of the ten highest non-overlapping 8-hour CO monitoring values for the last three years for the period of interest should be obtained. Temperatures for these time periods are based on the corresponding values recorded at the nearest representative meteorological surface station for these 10 time period sets. The ten average temperatures are then averaged for use with emissions modeling.

VEHICLE OPERATING CONDITIONS

The latest version of the emissions model, MOVES2010, calculates separate CO emissions for start-up and running modes. The number of engine start-ups per day, engine start-ups distribution by hour, and engine start-up "soak time" distribution are inputs that affect exhaust start-up emissions. Soak time is the length of time between the engine being turned off and it being started up again, and engine start emissions are affected by soak time. NYSDEC's soak time distribution should be used for each of the five NYC boroughs. There are three sets of soak distributions for all five boroughs: baseline, cold start, and hot start. The model's default soak distribution should be applied to the baseline traffic. The cold starts are defined as a soak time longer than 12 hours. Hot starts are defined as a soak time between 9 and 10 minutes. For vehicles generated by the project, the appropriate soak distribution file should be modified according to DEP guidelines. For particulate matter, MOVES 2010 does not use thermal states as input variables. The following assumptions are generally appropriate when determining thermal states:

- All project-generated taxis and heavy-duty gas trucks are assumed to be operating in a baseline mode. In order to provide conservative projections of project increments in CO analyses, large trucks may be considered to be gas trucks, while in particulate matter analyses the same large trucks may be simulated as heavy-duty diesel vehicles.
- All arriving project-generated autos are, in general, assumed to be operating in a hot-stabilized mode (unless the arriving induced trips are from the immediate community, such as a local supermarket, where this assumption may not be valid). The MOVES 2010 model calculates emissions for twenty-eight different vehicle classes, which includes sport utility

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vehicles (SUVs). The model accounts for the increased occurrence of SUVs in the vehicle mix, in the light-duty gasoline truck category.

- All departing project-generated autos and SUVs are assumed to be operating in a cold mode.
- In most instances, thermal states in the future without the project are assumed to be the same as those in the existing condition. However, for large future No-Action projects located in the study area, it may be appropriate to consider that project's vehicles separately. Vehicles generated by such projects are modeled individually as hot stabilized or cold start autos/SUVs, taxis, or trucks based on that project's traffic assignment. In addition, the amount of time a vehicle is parked affects its operating condition. For certain types of retail projects, it may be reasonable to estimate that a fraction of auto departures would be hot-starts. Typically, length-of-stay field survey data from similar types of projects may be necessary to support such an assumption.

As discussed above, although the primary pollutant of concern from autos on roadways is CO, particulate matter may be more of a concern from diesel trucks or buses. EPA's MOVES2010 model may be used to estimate particulate emissions from gasoline-fueled and diesel-fueled motor vehicles. MOVES2010 calculates particle emission factors in grams per mile (g/mi) from on-road automobiles, trucks, and motorcycles. The particulate matter emission factors include exhaust particulate, exhaust particulate components, brake wear, tire wear, and re-entrained road dust, all of which are required for $PM_{2.5}$ and PM_{10} inventories and analyses. The program contains default values for most data required for the calculation of all the emission factors, but it also allows for user-supplied data in many cases.

Fugitive road dust emissions should be accounted for according to the guidelines and formulas contained in Chapter 13 of EPA's Compilation of Air Pollutant Emission Factors (AP-42). One of the key inputs to the fugitive dust formula is the silt loading factor. Based on data collected in New York City, it is recommended that for paved roadways in New York City, a silt factor of 0.015 g/m^2 for expressways and limited access roadways, 0.10 g/m^2 for principal and minor arterials, and 0.16 g/m^2 for collector type roadways, and 0.4 g/m^2 for paved roads with fewer than 5,000 average daily traffic volumes (ADT).

Based on the latest AP-42 guidance, an unpaved road silt content of 8.5 percent is generally assumed for unpaved areas. Fugitive dust levels are inversely affected by frequency of precipitation. A conservative assumption of "dry" conditions is used for short term calculations. Based on national precipitation measurement data contained in AP-42, 130 days of precipitation are assumed for annual calculations in the NY metro area, which is the number of days in the year with more than 0.01 inches of rain.

Where borough-specific vehicle weight estimates are unavailable, a standard fleet average vehicle weight of 6,000 pounds is recommended for estimating existing particulate emissions from on-street traffic for typical New York City roadways. If a roadway has less than 500 vehicles per day, a different average vehicle weight may be applicable. Vehicle classifications for on-street traffic are generally obtained from collected traffic data. Estimates of increased particulate matter from project generated traffic may be added to the estimated No-Action base volumes to recalculate the vehicle mix for the build scenario modeling.

DISPERSION MODELING

The necessary traffic data for each roadway segment and the emission outputs from the recommended mobile emissions model (both discussed above) are analyzed together using a dispersion model. Mobile source dispersion models estimate the way CO and particulate matter concentrations

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resulting from given traffic conditions are dispersed because of meteorological conditions, roadway geometry, and other factors, and predict resultant pollutant concentrations at given receptor sites.

For most locations adjacent to at-grade signalized roadways, the CAL3QHC version 2.0 dispersion model, as described in User's Guide to CAL3QHC2.0, Research Triangle Park, North Carolina, is usually most appropriate. The CAL3QHC version 2.0 model is a microcomputer-based modeling methodology developed by EPA to predict the concentration of CO and particulate matter from motor vehicles traveling near or through roadway intersections. Based on the assumption that vehicles at an intersection are either in motion or idling, the program is designed to predict air pollution levels by combining the emissions from both moving and idling vehicles.

The CAL3QHC version 2.0 model requires a coordinate system corresponding to the roadway geometries under study as part of the input to the program. For each street approach to a signalized intersection, a "free flow" link simulates the emissions from vehicles over the blocks that are not delayed by traffic signals. A second "queue" link length is calculated by the algorithms within the program, using input parameters supplied to the model for each approach of a signalized intersection. Emission factors for idling vehicles from the mobile model are input into the CAL3QHC version 2.0 model to estimate emission rates from these queued links. As recommended in the User's Manual for CAL3QHC, in overcapacity situations, where the predicted hourly traffic volume-to-capacity ratio (V/C) is greater than 1, the "model predicted queue length" could be larger than the physical roadway configuration. The user could either revise the traffic assumption for the link, or limit the length of the queue by running the analysis in the following manner: (1) input the queue link as a free flow link; (2) specify X1, Y1, X2, Y2 coordinates that determine the physical limits of the queue (*i.e.*, the physically largest queue length); and (3) input the emission source as the equivalent VPH (from the output run on the queue link) with an emission rate of EF=100. This provides the appropriate emission source for the queue link with the manually determined queue length. In certain cases, the links for left- or right-turn movements may be separated from the through movements of an approach if the signal phasing differs or if such movements have high volume-to-capacity (v/c) ratios.

For a more refined analysis, the CAL3QHC model has been updated with an extended module that allows for the incorporation of actual meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters. This refined version of the model, known as CAL3QHCR, should only be employed if maximum predicted CO concentrations are greater than the applicable ambient air quality standards, if significant air quality impacts are predicted with the CAL3QHC modeling, or if particulate matter modeling from mobile sources is necessary. Refined modeling with CAL3QHCR should also be performed before identifying mitigation measures for eliminating predicted air quality impacts.

In the first approach with CAL3QHCR, called Tier I, a full year of hourly meteorological data is entered into CAL3QHCR in place of the one hour of "worst-case" meteorological data that are commonly entered into CAL3QHC. One hour of vehicular emissions, traffic volume, and signalization data are also entered as is done when using CAL3QHC. This is a screening level model that is most suitable for short-term time averaging periods where peak hour traffic conditions are suitable. However, use of Tier I modeling (*i.e.*, assuming peak hour traffic and project increment conditions for every hour of the year) may result in overly conservative projections of pollutant levels or project impacts for analyses that are dependent upon non-peak hour conditions or for long-term pollutant time averaging periods (*e.g.*, annual averages).

The CAL3QHCR model also offers a second approach, called Tier II, for which the same meteorological data used in the Tier I approach are entered into the model. The vehicular emissions, traffic volume, and signalization (ETS) data, however, are more detailed and reflect traffic conditions for each hour of a week. CAL3QHCR reads the ETS data as up to 7 sets of hourly ETS data (in the form of diurnal

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patterns) and processes the data into a week of hourly ETS data. The weekly ETS data are synchronized to the day of the week of the meteorological data year (weekday or weekend). The weekly traffic conditions are assumed to be the same for each week throughout the modeled period. The Tier II modeling approach is not typically employed for projects evaluating peak hour conditions or short term pollutant time averaging periods. Before undertaking a Tier II analysis, consultation with DEP is recommended.

Since the refined CAL3QHCR model uses meteorological data in the computation of pollutant levels at selected receptor locations, the coordinate system in the modeling must be developed with consideration of true north and the corresponding directions of the compass. A critical component of the hourly meteorological data used in these computations is wind direction. When the meteorological data are initially compiled, all hourly wind directions are referenced to true north. Therefore, like coordinate systems developed for stationary source mathematical modeling, mobile source modeling must simulate sources and receptor locations using a coordinate system that is consistent with the meteorological data set.

Generally, the following assumptions are employed for the various input parameters to the CAL3QHC version 2.0 model for assessments of CO concentrations:

- Surface roughness of 3.21 meters in Manhattan south of 96th Street, downtown Brooklyn, and Long Island City; for other areas, the CAL3QHC User's Guide may be used to determine surface roughness, based on the area's building geometry.
- Wind speed of 1 meter/second.
- Settling and deposition velocities of 0.
- Source height of 0 (for at-grade roadways).
- Mixing height set at 1,000 meters.
- Neutral atmospheric stability (unless along an undeveloped shoreline area where a stable atmospheric stability may be appropriate, based on Aeur's land use classification technique—see Subsection 322.2.
- Time averaging period of 60 minutes.
- Wind angle search over 360° with default wind angle search routine.
- Receptor height of 1.8 meters (approximately 6 feet).
- Clearance interval time as determined by the traffic model used (*e.g.*, the Highway Capacity Manual). Two seconds per approach is the default value.
- Saturation flow rate as determined by the traffic model used (*e.g.*, the Highway Capacity Manual).
- Add 6 meters to the effective width of the roadway for free flow links.

For the refined analyses with CAL3QHCR, the meteorological data set should consist of the latest available five consecutive years of meteorological data in order to ensure that an adequate number of hours are simulated to determine compliance with applicable standards and guideline concentrations. It is recommended that surface data collected at the nearest representative airport (either LaGuardia, JFK International, or Newark Liberty Airport) and upper air data collected at Brookhaven, NY be used for this 5-year meteorological data set. DEP may be contacted to determine the latest 5-year meteorological data set.

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In some instances, irregular applications of a dispersion model may be required to simulate unique roadway configurations (*i.e.*, estimating potential pollutant levels at receptors on a new residential structure adjacent to an elevated highway or a raised entrance/exit to a bridge crossing). For these situations, CAL3QHC version 2.0 may be used to simulate these line sources by treating these roadways as unsignalized, free flow links (if travel speeds warrant such an assumption). The CAL3QHC may be used to assess unsignalized intersections; however, air quality is not typically a concern at these intersections, so this type of analysis is seldom needed. For areas with complex topography or fully or partially covered roadways, physical models, such as wind tunnel modeling, may be appropriate. It is prudent to check with DEP to determine the appropriateness of using other models before the model is used.

TIME AVERAGING PERIODS

Predictions of pollutant concentrations are made for the same time periods as the National Ambient Air Quality Standards (for example, the NAAQS for CO are for 1-hour and 8-hour concentrations; the PM_{10} standards are for an annual geometric mean and a 24-hour average concentration). These standards are for the average concentration during each of those time periods. Annual standards pertain to the average pollutant concentrations either predicted or measured in a calendar year, while 24-hour standards pertain to pollutant concentrations occurring in a calendar day.

As discussed in the Chapter 16, "Transportation," peak hour periods are commonly used to evaluate the potential impacts of traffic generated by a project. Peak 1-hour traffic data gathered as part of the traffic analysis are typically used as the basis for predicting the maximum pollutant levels near a roadway. In the CAL3QHC modeling of CO, these peak 1-hour traffic data are also typically used to develop the maximum predicted 8-hour CO levels. To derive the 8-hour CO level, the maximum 1-hour concentration calculated from local sources for the peak hour is multiplied by a "persistence" factor, based on historical air quality monitoring data in New York City. The persistence factor takes into account the fact that over a period of 8 hours (as distinct from a single hour), vehicle volumes fluctuate downward from the peak hour, traffic speeds may vary, and wind directions and speeds change to some degree relative to the conservative assumptions used for the single highest hour. The following persistence factors are recommended: 0.77 for Midtown Manhattan; 0.79 for Lower Manhattan; 0.81 for downtown Brooklyn; and 0.70 for the rest of the City. Given that these factors are subject to change over time, DEP should be contacted to confirm the latest guidance for these parameters.

BACKGROUND CONCENTRATIONS

Mobile source modeling of CO concentrations at sidewalk locations accounts solely for emissions from vehicles on the nearby streets, but not for overall pollutant levels. Therefore, background pollutant concentrations must be added to modeling results to obtain total pollutant concentrations at a prediction site. Background pollutant concentrations are usually derived from recorded pollutant concentrations throughout New York City at elevated monitors maintained by the DEC that are not unduly influenced by local sources of pollutants. These monitors are indicative of pollutant levels associated with pollutants throughout the nearby region.

One of the primary applications of mobile source modeling is to evaluate maximum predicted 8-hour CO concentrations at places of public access. Therefore, background CO levels for the 8-hour averaging period is required for each of the analysis years (the existing and build year(s), as appropriate). Existing and future year background concentrations are based on CO measurements at the nearest DEC monitoring stations. The maximum second-highest 8-hour measurement is used, based upon the most recent five-year period for which complete monitoring data is available. For PM_{10} modeling of on-street sources, background levels are generally considered to be the same for existing and future year conditions. DEP will provide the most up-to-date monitored pollutant background levels for the

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various regions within New York City. Note that $PM_{2.5}$ background concentrations are generally not required because impacts are assessed on an incremental basis.

FUTURE NO-ACTION CONDITION

The future No-Action condition accounts for general background traffic growth in the study area, new trips and other changes expected because of other proposed developments, and changes in emissions because of vehicle turnover, *etc*. Traffic that would be generated by development on "soft" sites may also need to be considered.

FUTURE WITH-ACTION CONDITION

The future With-Action condition adds any changes resulting from the project to the future No-Action conditions. The differences between these two conditions and the potential for significant impacts are then assessed.

321.2. Parking Facilities

Analyses of parking facilities are similar to those for roadways (Subsection 321.1, above), but the assumptions used in estimating emissions (or, the inputs to the emission model) differ, as does the dispersion model.

PARKING LOTS

CO is the primary pollutant of concern for unenclosed, at-grade parking lots used by automobiles; PM is the primary pollutant of concern for parking lots used by heavy-duty diesel vehicles. The modeling procedures for both types of parking lots are explained below.

For automobile/SUV parking lots, the following techniques are appropriate:

ESTIMATES OF MOBILE SOURCE EMISSIONS. Emissions estimates for CO are calculated at an ambient temperature of 43°F (except for Manhattan, which uses 50°F) with a mobile emissions model (such as the EPA's MOBILE6.2 or MOVES2010 model, discussed in Subsection 321.1, above). Information required for the mobile emissions model includes the following: the dimensions (*i.e.*, length and width) of the parking lot; idle emission factors for cold autos/SUVs or idle emission factors for other vehicles; emission factors at 5 miles per hour for both cold and hot autos/SUVs or other vehicles; and hour-by-hour vehicular entrances to and exits from ("ins and outs") the parking lot (typically, the eight hours with the highest volumes). Peak 1-hour averaging periods' emission rates are typically calculated for the build year, assuming that autos idle for 1 minute before starting to travel to the parking lot exit(s). The traveling distance within the lot by vehicles entering and exiting the lot is usually conservatively estimated by calculating this mean travel distance as two-thirds of the maximum travel distance from the entrance/exit of the lot to the farthest parking space. The 1-hour and (in most cases) 8-hour averaging periods with the largest total number of departing autos yield the highest CO emission rates for these respective time averaging periods.

DISPERSION ESTIMATES. Potential cumulative concentrations from on-street sources and emissions from the parking lot at a receptor location adjacent to the lot may be calculated by adding the CO levels calculated from the parking facility at this location to the contribution of on-street sources. It is advisable to analyze receptor locations on the near and far sidewalks adjacent to the parking lot to ensure that maximum cumulative effects from on-street and parking lot emissions are disclosed. Appropriate background concentrations also must be added. Contribution of on-street source emissions at this receptor location may be calculated through microscale modeling for the same wind directions that cause the parking lot emissions to affect this location. Or, alternatively, they may be calculated to include parking lot emissions as line sources, as mentioned below. Air quality impacts from parking facilities may be followed to estimate potential CO concentrations

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from parking lots with the EPA's SCREEN3 model (described in Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, EPA-450/4-88-010. A sample air quality analysis of potential CO impacts from an automobile multilevel, naturally ventilated parking facility is included in the Appendix.

As discussed in Subsection 321.2, emissions from parking facilities may also be modeled as line sources in CAL3QHC or CAL3QHCR for assessing cumulative emissions adjacent to on-street sources. This would include simulating the parking lot as multiple line sources adjacent to the on-street source in a dispersion model, such as CAL3QHC or CAL3QHCR. The EPA's Guideline on Air Quality Models provides more information.

For parking lots used by large numbers of diesel trucks or buses, where $PM_{2.5}$ and PM_{10} are the primary pollutants of concern, a procedure analogous to that used for automobile parking lots (see above) may be used to determine PM concentrations near the lot:

- Idle emissions of $PM_{2.5}$ and PM_{10} from heavy-duty diesel vehicles are insignificant when compared with PM emission rates for accelerating heavy-duty diesel trucks. Therefore, only PM emission rates from trucks traveling within the lot are typically estimated, usually from factors listed in EPA's Compilation of Air Pollutant Emission Factors (AP-42), MOBILE6.2 or MOVES2010 emission model for this kind of analysis. Estimates of particulate emissions from heavy vehicles operating on paved and unpaved surfaces may also be included in such analyses if they overlap with the parking areas.
- Analyses are performed to determine the maximum potential PM_{10} and $PM_{2.5}$ 24-hour concentrations adjacent to the lot, based on the hourly average (over a 24-hour period) for the diesel vehicles entering and exiting the parking lot.
- Twenty-four-hour PM_{10} background values are then added to the localized contribution.

MULTILEVEL, NATURALLY VENTILATED PARKING FACILITIES

Multilevel parking facilities with at least three sides partially open are, for air quality analyses, considered in a similar manner to that of at-grade parking lots. As with at-grade lots, CO is the primary pollutant of concern for facilities used by automobiles, and PM is of concern when diesel trucks or buses use the facility. The CO impact analyses for these facilities are almost identical to those performed for parking lots, except that CO emissions from arriving and departing vehicles are distributed over the various levels and ramps of the parking facility. It is usually appropriate to adjust the calculation of CO impacts at a ground-level receptor from the above-grade levels of the facility following calculations presented in EPA's Workbook of Atmospheric Dispersion Estimates (AP-26). A PM_{10} analysis for a multilevel, naturally ventilated facility used by diesel trucks or buses may be similarly modified. A sample air quality analysis of potential CO impacts from a multilevel, naturally ventilated automobile parking facility is in the Appendix.

Emissions from multilevel parking facilities may also be modeled as line sources in CAL3QHC or CAL3QHCR (for source heights less than 30 feet) for assessing cumulative emissions adjacent to on-street sources.

PARKING GARAGES

These include any parking facilities – whether multi- or single-level, below- or above-grade – that would be enclosed and include a ventilation system. Similar to at-grade lots and multi-level, naturally ventilated facilities, CO is the primary pollutant of concern for automobile parking garages, and PM is of concern when heavy-duty diesel trucks or buses use the garage. In either case, pollutants would be present within the garage and would be exhausted by the garage's vent(s) for the mechanical ventilation system. Thus, pollutant levels could be elevated near the vents outside of the garage. The vents

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are considered stationary sources, similar to stacks. The analysis of pollutant concentrations within and outside parking garages is described below.

For automobile garages, the following procedures are generally appropriate:

- For CO concentrations within the garage, it is recommended that CO emissions within the facility be conservatively estimated at an ambient temperature of 43°F (50°F for Manhattan). Total CO emissions rates (for 1- and 8-hour averaging periods) within the garage are calculated following the same procedures for the multilevel, naturally ventilated garage, and all of the emissions from the different levels are summed together.
- The appropriate background concentrations are then added to the predicted concentrations.
- These total emission rates are then divided by the minimum ventilation rate required by the New York City Building Code (*i.e.*, 1 cubic foot per minute of fresh air per gross square foot of garage area), to determine the maximum 1- and 8-hour CO levels within the garage.
- For concentrations near the garage vents, the CO concentrations predicted within the garage are then used in the calculations. The garage vent(s) are converted into "virtual point sources" using equations listed in EPA's AP-26, and the concentrations within the garage are used to estimate the initial dispersion at the garage vent(s). These equations may be used to estimate CO impacts at nearby elevated receptors (*e.g.*, tall residential buildings nearby) if the effluent is exhausted at an elevated height, or at pedestrian-level height (for lower exhaust stacks).
- Potential cumulative CO impacts on the near and far sidewalks adjacent to the garage vent(s) may be calculated by adding the impact from the garage exhaust to on-street sources following a methodology similar to that employed for naturally ventilated parking facilities. A sample air quality analysis of potential CO impacts from an automobile parking garage is in the Appendix.

For garages that would be used by heavy-duty diesel trucks or buses, the following procedures may be used:

- Estimates of PM emissions are calculated following procedures similar to those for parking lots.
- These total PM emissions should be divided by the minimum ventilation rate required by the New York City Building Code to determine maximum PM levels within the facility.
- Off-site PM concentrations may be calculated by following the same methodology employed for CO exhaust from automobile garages. If there would be numerous exhaust points, such as exhaust vents all along the rooftop of the structure, off-site PM impacts may be calculated treating these emissions as an "area source" (see discussion on area source analyses in Subsection 322.2, below).

TIME AVERAGING PERIODS

The anticipated hourly vehicular entrances and exits to the facility are usually reviewed to determine the hour that would yield the largest amount of pollutants emitted from the parking facility. Peak 1-hour concentrations adjacent to the facility (and peak 1-hour concentrations within the facility if it is an enclosed garage), are then determined for this hour. The hourly vehicular entrances to, and exits from, the garage are also used to determine the period that would generate the largest amount of pollutants over a multi-hour period. Off-site concentrations calculated with the average hourly pollutant emission rate over this multi-hour interval are also multiplied by a persistence factor when determining multi-hour pollutant incremental impacts from parking facilities.

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FUTURE NO-ACTION CONDITION

Similar to the assessment of roadways, analyses of parking facilities considers conditions in the future without the project. This assessment considers any new developments expected by the project's build year (see discussion above), but does not include the proposed parking facility.

FUTURE WITH-ACTION CONDITION

The future With-Action condition assesses the proposed parking facility, and compares the results of that analysis with conditions expected in the future No-Action condition to determine the potential for significant impacts.

321.3. Conformity Analyses

Air quality modeling analyses are used in the conformity determination (both general and transportation) to show that the federal action neither contributes to any new violations of standards nor increases the frequency or severity of any existing violations.

The analyses are to be based on the latest planning assumptions developed by the municipal planning organization (MPO). Any revisions to these estimates are to be approved by the MPO or other authorized agency. The New York Metropolitan Transportation Council (NYMTC) is the MPO for the New York Region. The analyses are to be based on the latest and most accurate emission estimation techniques available. For motor vehicle emissions, the most current EPA emissions models are to be used. For stationary and area source emissions, the latest emissions factors specified by EPA in the Compilation of Air Pollutant Emissions Factors (AP-42) should be used unless more accurate emission data are available. The air quality modeling analyses are to be based on the applicable models, databases, and other requirements specified in the most recent version of the Guideline on Air Quality Models (Revised).

The analyses are to be based on the total of emissions from the project and reflect the emission scenarios that are expected: (1) during the attainment year mandated by the CAA (or during the furthest year for which emissions are projected in the maintenance plan); (2) during the year for which the total emissions from the project are expected to be the greatest; and (3) during any year with a specific emissions budget. Also, the federal agency is to identify any measures for mitigating air quality impacts, describe the enforcement process for these measures, and obtain written commitments for these mitigation measures.

322. Stationary Source Modeling

Stationary source modeling is typically required to evaluate the potential impacts of emissions from the following:

- Boilers for heating/hot water, ventilation, and air conditioning systems (HVAC) in new buildings or building expansions.
- Ventilation exhaust systems for new manufacturing or industrial facilities, or medical, chemical, or research laboratories.
- Large emissions sources, such as power generating stations, that may affect surrounding uses or be affected by new structures nearby.
- Existing (or future planned) manufacturing and industrial facilities that may affect nearby sensitive uses.
- Industrial facilities that may potentially discharge malodorous pollutants into the nearby neighborhood.

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For assessing potential stationary source impacts related to boilers for heating and hot water, ventilation, and air conditioning systems for a single building, a preliminary screening analysis may be performed. Many such projects do not require any further analysis. This screening analysis methodology is presented in Subsection 322.1.

All other projects with potential stationary source air quality impacts require detailed analyses, described in Subsection 322.2.

In general, for projects that would result in, or facilitate, either new significant fossil fuel burning sources or new facilities that may be adversely affected by airborne emissions from nearby existing (or planned) major fossil fuel burning sources, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are the primary pollutants of concern. If such sources under study would exclusively burn natural gas, NO_2 is the primary pollutant of concern. Projects that would result in the development of new significant industrial sources or new uses that may be adversely affected by airborne emissions from existing (or planned) industrial sources require an assessment of both criteria and non-criteria pollutant emissions. The existing or potential new stationary source(s) under review should be examined on a case-by-case basis to appropriately determine the pollutants of concern. This is also applicable for proposed industrial facilities that may potentially discharge malodorous pollutants or for existing facilities that discharge malodorous pollutants that may affect new development resulting from a project.

322.1. Screening Analyses

SCREEN FOR HEAT AND HOT WATER SYSTEM

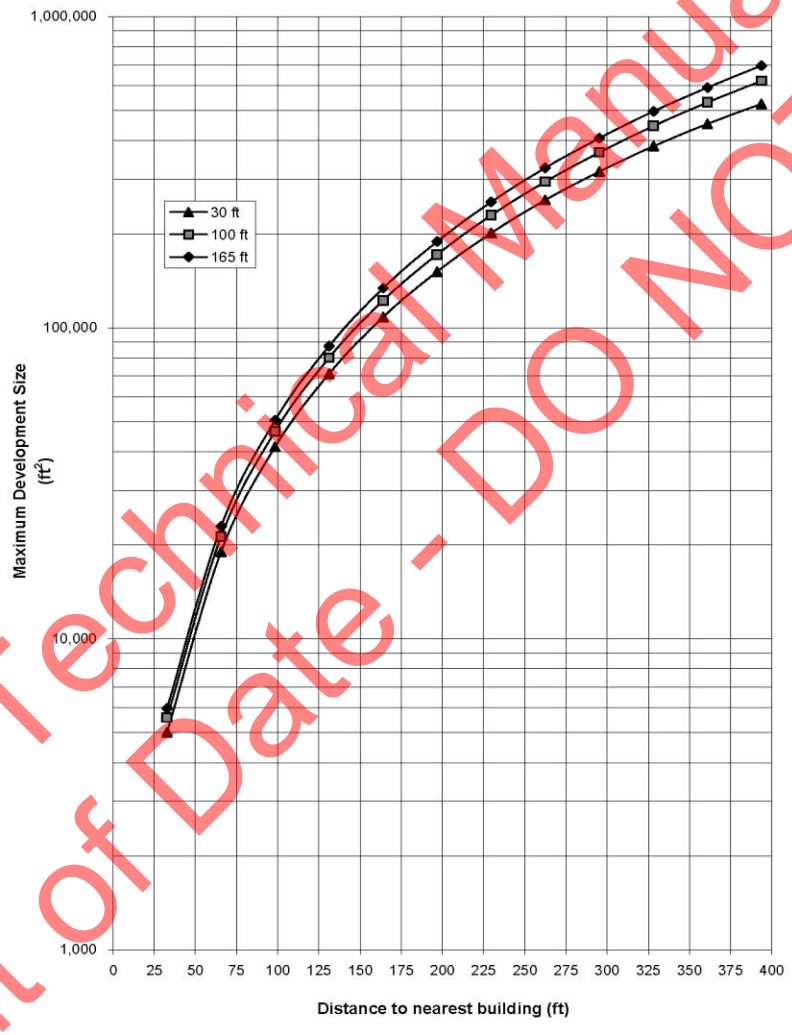
Impacts from boiler emissions are a function of fuel type, stack height, minimum distance from the source to the nearest receptor (building), and floor area (square footage) of development resulting from the project. Floor area is considered an indicator of fuel usage rate. The preliminary screening analysis for heat and hot water systems uses Figure 17-3, which indicates the size of proposed development and distance to the nearest building of a height similar to or greater than the stack height of the proposed building(s). The figure was specifically developed through detailed mathematical modeling to predict the threshold of development size below which a project would not likely have a significant impact. The step-by-step methodology outlined below is only appropriate for single buildings or sources. For other situations, refer to the discussion below on area sources. The figure is also only appropriate for sources at least 30 feet from the nearest building of similar or greater height.

- Determine the maximum size of development that would use the boiler stack.
- Using a Borough President's map, Sanborn atlas, or Graphical Information System (GIS) tools, determine the minimum distance (in feet) between the building(s) resulting from or facilitated by the proposed project and the nearest building of similar or greater height. If the distance is less than 30 feet, a more detailed analysis is required. If the distance is greater than 400 feet, assume 400 feet.
- Determine the stack height for the building resulting from the proposed project, in feet above the local ground level. If unknown, assume 3 feet above the roof height of the building.
- Then, from the heights of 30, 100, and 165 feet, select the number closest to, but NOT higher than, the proposed stack height.
- Based on steps 1 through 4 above, select the appropriate figure and curve (by stack height) for the proposed project. Locate a point on the appropriate chart by plotting the size of the development against the distance in feet to the nearest building of height similar to or greater than the stack of the proposed project.

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- If the plotted point is on or above the curve corresponding to the height recorded in step 5, there is the potential for a significant air quality impact from the project's boiler(s), and detailed analyses may need to be conducted. More refined screening analyses (which account for the type of fuel consumed and development type) are available for use in the Appendix. If the plotted point is below the applicable curve, a potential significant impact due to boiler stack emissions is unlikely and no further analysis is needed.

Figure 17-3:
Stationary Source Screen



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In some cases, it may be possible to pass this screening analysis by restricting the type of fuel that could be used to supply heat and hot water. As illustrated in the air quality stationary source screen-

ing analysis figures in the appendices, No. 4 and No. 6 oils have greater emissions than No. 2 oil or natural gas. Limiting the fuel used by the proposed project to No. 2 oil or natural gas may eliminate the potential for significant adverse impacts and the need for further analyses. Based on the fuel type to be used (natural gas, No. 2, or No. 4 oil), and the type of development (residential or commercial), the screening figures in the Appendix may be used following steps 1 through 6 above. The project, however, would have to include the restriction on the boiler fuel type (and indicate the mechanism that would ensure the use of a specific fuel type) if this option is selected.

Alternatively, if a proposed project fails the screening analysis, but the maximum short term emissions and annual emissions have been estimated, figures for screening known emissions from boilers are included in the technical appendices.

INDUSTRIAL SOURCE SCREEN

This subsection describes the screening analysis that may be performed to determine the potential for significant impacts from industrial sources. This screen provides the maximum unitary 1-hour, 8-hour, 24-hour and annual average values for the distances from 30 feet to 400 feet and a conservative stack and receptor height of 20 feet (see Table 17-3). This look up table is based on a generic emission rate of 1 gram per second of a pollutant from a point source and was developed using the AERMOD model (see Subsection 322.2). To determine the potential impact from industrial emissions on a proposed project, the estimated emissions from the industrial source of concern should first be converted into grams/second. This converted emission rate should then be multiplied by the value in the table corresponding to the minimum distance between the industrial source and the new use of concern. Values are provided for 1-hour and annual averages to enable the comparison of pollutant levels to SGCs (1-hour averaging period) or AGCs (annual averaging period).

Table 17-3
Industrial Source Screen

20 Foot Source Height

Distance from Source	1-Hour Averaging Period (µ/m3)	8-Hour Averaging Period (µ/m3)	24-Hour Averaging Period (µ/m3)	Annual Averaging Period (µ/m3)
30 ft	126,370	64,035	38,289	6,160
65 ft	27,787	15,197	8,841	1,368
100 ft	12,051	7,037	4,011	598
130 ft	7,345	4,469	2,511	367
165 ft	4,702	2,967	1,643	236
200 ft	3,335	2,153	1,174	167
230 ft	2,657	1,720	924	131
265 ft	2,175	1,377	727	103
300 ft	1,891	1,142	594	84
330 ft	1,703	991	509	73
365 ft	1,528	857	434	62
400 ft	1,388	755	377	54

If these screening methods indicate that further analysis is necessary, then a detailed stationary source analysis is required as described in the following subsection.

322.2. Detailed Analyses

ESTIMATES OF STATIONARY SOURCE EMISSIONS

The method for estimating the pollutant emissions from a stationary source depends on whether the source currently exists or whether it is planned.

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For existing large fossil-fuel burning sources, emission rates may be obtained as follows:

- Almost all existing large fossil-fuel burning sources have certificate-to-operate permits from either DEP or DEC that define the amount and type of fuel to burned and/or pollutants that may be emitted through the exhaust stacks. "Major" sources (those large sources that require Prevention of Significant Deterioration permits) and large institutional use boilers (*e.g.*, large boilers for hospitals or universities) have permits issued by DEC, while all other facilities likely have permits filed with DEP. Even if an existing source discharges less than the prescribed limits in a permit, the limits specified in the permits are considered as the basis for estimating the maximum emissions from this source.
- In cases where only the fuel consumption rates (or refuse burning rates) are supplied, emission factors for the criteria pollutants of concern—which may usually be obtained from EPA's Compilation of Air Pollutant Emission Factors (AP-42)—are multiplied by the consumption rates to yield estimates for pollutant emission rates. Sulfur dioxide emission factors reported in AP-42 for oil-burning boilers are directly proportional to the percentage of sulfur in the oil. New York City limits the sulfur content of distillate No. 2 oil to 0.2 percent (by weight) sulfur, and to 0.3 percent sulfur for residual (No. 4 and No. 6) oil. Therefore, these percent sulfur limits should be used to estimate sulfur dioxide emission factors for boilers burning the respective fuel oil types.

For existing manufacturing uses, the following steps may be performed:

- Conduct field observations of manufacturing uses within the study area to identify the existing manufacturing uses with exhaust stacks, vents, or other emission sources that may have the potential to adversely affect the uses introduced by the project. Documenting field observations with field photographs, notes, and on maps is recommended. Please note that exhaust stacks may not be visible from street level. Regardless of whether it is observed, when an exhaust stack is suspected to exist (due to the type of manufacturing process), the facility should be included in the list for step 2 below.
- Prepare a list of facilities observed in the field with their corresponding addresses. Then, send a formal request to DEP for a copy of any air contaminant permits for these facilities. DEP assesses a charge for each address in a search request, unless a waiver of the fees (which is normally done for projects sponsored by governmental agencies) is first approved by DEP's counsel. Requests for copies of the DEP air contaminant permits should be addressed to the New York City Department of Environmental Protection, Bureau of Environmental Compliance, 59-17 Junction Boulevard, Flushing, NY 11373, and requests for fee waivers for DEP searches should be addressed to DEP Bureau of Legal & Legislative Affairs at the same address. The permits may be used to ascertain the pollutants being emitted from the facility in question. The analysis considers the maximum emissions allowable under the permit, even if actual operating conditions are different. With respect to the accuracy of the technical information provided in an air permit, DEP relies upon verification of the information by an applicant's professional engineer or registered architect. DEP does not certify as accurate any information gathered through the permitting or certification process. Therefore, DEP accepts no responsibility for the use of the data or consequences of the use of the data by any party. This information should be independently verified before relying on it for analyses in compliance with any local, state or federal law, rule or regulation.
- EPA or DEC permits are generally available from the respective agencies websites. If additional information is required, contact the regional office. EPA: http://oaspub.epa.gov/enviro/ef_home2.air; DEC: http://www.dec.ny.gov/index.html.

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- When no permits are available from DEC or DEP for a given location, but emissions are expected on that location, a conservative emissions analysis based on the likely manufacturing process may be appropriate. This may entail examining material safety data sheets (MSDS) at the facility in order to obtain a list of the pollutants potentially involved in the particular manufacturing process. Contact DEP for assistance with this analysis.

For new sources associated with a proposed project (and for future sources that may affect or be affected by a project), estimates of pollutant emission rates depend on the type of sources and the pollutants emitted from such sources. Generally, the following procedure may be used:

- For new fuel burning sources, estimates of fuel consumption rates may be based on either "rule of thumb" fuel consumption rates estimated by mechanical engineers designing the facility or default emission factor values for residential and commercial facilities. Energy consumption surveys conducted by the Department of Energy and available on its website (http://www.eia.doe.gov/) may be used to develop fuel consumption rates. DEP should be contacted to determine the appropriateness of using this method.
- For buildings with interruptible natural gas service (systems that use natural gas for most of the year, but use fuel oil during the coldest days to receive more economical rates from the power utility), analyses of short-term effects are typically performed for fuel oil, while analyses of annual emissions are performed for natural gas. More information on this is provided under “Time Averaging Periods” below.

Estimates of malodorous pollutant emission rates are evaluated on a case-by-case basis. Odor thresholds of specific pollutants (*i.e.*, pollutant levels in ambient air that result in a malodorous smell that is recognized by the general populace) may vary by several orders of magnitude, depending on the pollutants. For odor concerns from facilities that are related to wastewater treatment, DEP should be consulted. Similarly, for facilities that handle solid waste, DEP or the Department of Sanitation (DSNY) should be contacted. To evaluate the potential for malodorous emissions, the following general procedures may be used:

- Perform an evaluation of the processes at the facility in question to determine the potentially malodorous substances emitted and their respective emission rates.
- For those substances, perform a literature search for odor thresholds and other characteristics.
- Of all the chemical compounds emitted, the one that results in the greatest potential for malodorous emissions is usually defined as the "indicator" compound. An identified malodorous pollutant that has the largest potential emission rate of all potential malodorous pollutants discharged from a facility may not be the appropriate indicator compound for evaluating potential odor impacts because other malodorous compounds emitted from the facility may have tremendously smaller odor threshold concentrations. Therefore, the “indicator” compound has the correct combination of the following elements: (1) the lowest odor threshold (the minimum concentration at which the odor is detectable), and/or (2) the highest emission rate. Published test data on malodorous emission rates for specific operations with corresponding odor control mechanisms (if any) may provide information for preparing estimates of malodorous pollutant emission rates. Alternatively, in lieu of an indicator compound, a mix of malodorous pollutants may be addressed by the use of dilution thresholds. Consultation with DEP is suggested before undertaking such analyses.

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TIME AVERAGING PERIODS

SO_2, NO_2, and PM, the principal pollutants of concern for fuel-burning stationary sources, are examined for oil or interruptible gas burning facilities, while NO_2 is the only pollutant analyzed in any refined study of a natural gas burning source. Peak daily emission rates are typically employed in the modeling to calculate the maximum 3- and 24-hour pollutant concentrations. Peak hourly emission rates are typically calculated by determining the total amount of pollutants emitted in the peak day and dividing by 24 hours. However, in instances when oil-burning equipment is used irregularly (*e.g.*, only 8 hours per day at a manufacturing facility), actual peak hourly emission rates are used to evaluate the maximum potential 3-hour SO_2 concentrations. The average hourly annual emission rates (*e.g.*, the anticipated or permitted total amount of a pollutant emitted in a year divided by 8,760 hours—the approximate number of hours in a year) are used in the modeling to determine the annual average pollutant concentrations at selected locations. Some simple stationary source models, such as EPA's SCREEN3, or in the future AERSCREEN, only simulate maximum 1-hour impacts. Persistence factors of 0.9 and 0.4 are recommended for adjusting 1-hour impacts of these simple models to 3- and 24-hour time averaging periods, respectively.

In an analysis of potential noncriteria pollutant impacts from new sources on the surrounding community or from existing sources on a proposed facility, comparisons are ultimately required between the maximum predicted pollutant levels and the corresponding AGCs and SGCs listed in DEC's DAR -1. Since SGCs and AGCs are intended for time-averaging periods of 1 hour and 1 year, respectively, suitable noncriteria emission rates for these scenarios are needed. Maximum 1-hour concentrations for noncriteria pollutant sources are usually calculated with the maximum hourly pollutant emission rates from these sources through modeling (described in the following subsection). Maximum hourly pollutant emission rates are estimated either through the permitted values for existing sources or specifically developed for new sources. Annual average pollutant emission rates are used to determine maximum annual impacts, which are then compared to the AGCs. Annual average hourly emission rates are estimated by dividing either the total annual amount of emissions permissible, as listed in a permit, or the annual pollutant amount estimated for a proposed facility by 8,760 hours. In addition, certain pollutants—specifically, air toxics that could be released during chemical spills—have shorter averaging periods. These are discussed under "Puff Modeling," below.

DISPERSION MODELING

Potential pollutant concentrations from stationary sources may be predicted through the use of either dispersion or fluid (*i.e.*, physical or wind tunnel) modeling. In most instances where a refined stationary source impact analysis is required, mathematical dispersion modeling is the most suitable choice for performing these evaluations. A discussion on the conditions that may warrant fluid (*i.e.*, physical, or wind tunnel) modeling over mathematical modeling is included under "Suitability of Fluid Modeling Versus Mathematical Modeling." A detailed discussion on the procedures and input parameters for typical mathematical dispersion modeling scenarios is provided below.

EMISSION RATES FOR POLLUTANTS OF CONCERN. Before modeling is performed, determine the pollutants of concern and the respective emission rates following the procedures discussed above. For sources emitting pollutants through an exhaust stack, pollutant emission rates and stack exhaust parameters for multiple potential operating loads (*e.g.*, operation of large fossil fuel burning facility at 100 percent capacity, 75 percent capacity, and annual average conditions) should be prepared for input into the dispersion modeling. The analysis of all three conditions is appropriate in a prediction of worst-case impacts for the following reasons. Although the 100 percent capacity load usually results in the greatest amount of pollutants discharged by such an operation, it may not result in the worst-case analysis because the exit velocity of the pollutants through the stack is also at its greatest in this condition, resulting in a plume rise that ejects to a height greater than nearby receptor locations. On the other hand, if a nearby receptor location is of near or equal height to the exhaust stack(s) under

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analysis, maximum pollutant concentrations at the receptor from the local source may occur with a lower load and, therefore, a lower exit velocity. In addition, pollutant emission rates and stack exhaust velocities under annual average operating conditions are normally much lower than the 100 percent load conditions. Since maximum annual pollutant levels are sometimes required for comparison to either applicable criteria pollutant standards or non-criteria pollutant AGCs, estimations of pollutant levels on an annual average basis at receptor locations should be determined by modeling annual average operating conditions of the source(s).

AERMOD MODEL. For most projects, EPA's AERMOD is the most suitable mathematical dispersion model for performing a refined air quality impact analysis. AERMOD, described in User's Guide for the AMS/EPA Regulatory Model – AERMOD (EPA-454/B-03-001), calculates pollutant concentrations from one or more sources using hourly meteorological data. AERMOD was designed as a replacement to the EPA Industrial Source Complex (ISC3) model and is approved for use by EPA. AERMOD is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of terrain interactions. AERMOD may also account for building-induced turbulence, or "wake" effects, caused by nearby structures on the dispersion of pollutants from nearby stacks that do not meet Good Engineering Practice (GEP) heights.

The following information is required to execute AERMOD:

- When modeling potential pollutant concentrations emitted from stacks (*i.e.*, point sources) with AERMOD, the following information is needed: the appropriate pollutant emission rates, stack exhaust parameters (*i.e.*, stack exhaust velocity, inner stack diameter, stack exhaust temperature, stack height), and representative meteorological data.
- Computations with AERMOD are usually made assuming stack tip downwash, urban dispersion parameters, and use of routines for elimination of calm winds and handling of missing meteorological data.
- The AERMOD computer program should be run both with and without building downwash (*i.e.*, wake effects option) if the exhaust from the stack(s) could be affected by either the building on which the stack is located or a nearby structure. EPA's Building Profile Input Program for PRIME (BPIPPRM) should be used to determine the projected building dimensions for the AERMOD modeling with the building downwash algorithm enabled. BPIPPRM includes an algorithm for calculating downwash values for input into the PRIME algorithm contained in AERMOD. The input structure of BPIPPRM is the same as that of BPIP. For more information, see the BPIP User's Guide.
- In cases where the sources and receptors are in a relatively undeveloped, coastal area of New York City (*i.e.*, less than 50 percent of the land area within a 1.9-mile radius from the source is developed into non-park uses), the rural dispersion option should be selected in the AERMOD modeling of such facilities. Auer's technique may also be used to classify whether the region should be simulated as urban or rural (Auer, A.H. "Correlation of Land Use and Cover with Meteorological Anomalies," Journal of Applied Meteorology, Vol. 17. 1978).
- The meteorological data set used with AERMOD should consist of the latest available five consecutive years of meteorological data in order to ensure that an adequate number of hours are simulated to determine compliance with applicable standards and guideline concentrations. It is recommended that surface data collected at the nearest representative airport and upper air data concurrently collected at Brookhaven, NY be used for this 5-year me-

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teorological data set. Depending on the location of the proposed project, the use of surface data from LaGuardia, J.F.K. International or Newark Liberty International Airport may be acceptable for modeling. The meteorological data set includes wind speeds, wind directions, ambient temperatures, and mixing height data for every hour of a year. DEP Bureau of Environmental Planning and Analysis (BEPA) may be contacted to confirm the latest recommended meteorological data set before performing any analyses. AERMOD uses the AERMET preprocessor, described in the User's Guide for the AERMOD Meteorological Processor (AERMET), (EPA-454/B-03-002), November 2004 and Addendum, December 2006, for meteorological information. AERMET requires surface and upper air data and determination of appropriate surface characteristics. When applying the AERMET meteorological processor, appropriate surface characteristics must be determined for surface roughness length {zo}, albedo {r}, and Bowen ratio {Bo}. The recommended methods for determining these surface characteristics are described in the EPA AERMOD Implementation Guide, January 2008. Recommended data to use for these parameters are provided in the AERSURFACE User's Guide, (EPA-454/B-08-001), January 2008. AERSURFACE, developed by EPA, may also be used as an aid in determining the surface characteristics.

- If terrain elevation varies significantly within the study area, the variations should be accounted for. AERMAP is the terrain pre-processor and is used to characterize and generate receptor grids and terrain elevations.
- Ideally, estimates of stack exhaust parameters (*i.e.*, stack exhaust velocity at various loads, inner stack diameter, exhaust temperature, and stack height) for new significant stationary sources will be available. If this information is unavailable for a new source, the following assumptions may be used as conservative estimates in a stationary source analysis:
    - Exhaust velocity at all loads: 0.001 meter/sec
    - Inner stack diameter: 0 meters (no plume rise)
    - Stack exhaust temperature: 293 °K
    - Stack height: 3 feet above rooftop level
- Since dispersion modeling uses meteorological data in the computation of pollutant levels at selected receptor locations, the coordinate system in the modeling must be developed with consideration of true north and the corresponding directions of the compass. A critical component of the hourly meteorological data used in these computations is wind direction. When the meteorological data are initially compiled, all hourly wind directions are referenced to true north. Therefore, contrary to coordinate systems developed for mobile sources mathematical modeling, stationary source modeling must simulate sources and receptor locations using a coordinate system that is consistent with the meteorological data set.

Additionally, it may not be reasonable to assume the stack(s) to be at the edge of the building roof. The Building Code of the City of New York regulates the placement of chimneys and vents and of buildings relative to nearby chimneys and vents. Additionally, the Zoning Resolution and NYC Air Pollution Control Code both contain performance standards for emissions from manufacturing uses. These regulations should be considered when determining the reasonable worst-case location(s) for modeling, when the exact locations of the proposed stack(s) are not available. See Subsection 713.

CAVITY REGIONS

Under certain meteorological conditions, the exhaust from a stack on top of, or proximate to, a structure may be entrapped for short periods in the cavity regions adjacent to the structure. For these

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cases, additional analysis may be appropriate when using a screening approach to determine impacts from stationary sources of emissions. Since AERMOD has the capability to determine impacts in the cavity region, cavity region may be included as part of the AERMOD modeling effort.

The predicted concentrations in a cavity zone are inversely proportional to the surface area of the building (perpendicular to the wind direction) and to the wind speed required to entrap most of the exhaust plume. It should be assumed in this type of analysis that all of the exhaust would be entrapped in the cavity zone.

Maximum predicted pollutant short-term averaging periods (*e.g.*, 1-, 3-, and 24-hour) are calculated for at least two of the perpendicular cross-sectional areas of the structure producing the cavity effect. Maximum potential cavity concentrations may be calculated using the SCREEN3 or AERSCREEN model.

Meteorological persistence factors of 0.9 and 0.4 are used to calculate the maximum 3- and 24-hour cavity pollutant concentrations, respectively, from 1-hour concentrations yielded from the SCREEN3 or AERSCREEN modeling.

VOLUME AND AREA SOURCES

A volume or area source analysis is used if a proposed project would result in development of a facility that would emit pollutants through a series of stacks along the rooftop edges of a structure or over an area on top of, or adjacent to, the facility. Pollutant emission rates through the multiple stacks or over the area may be estimated following the procedures discussed above, and concentrations at selected receptor sites should be determined following the procedures outlined in the AERMOD User's Manual. Conservative estimates of concentrations can be calculated using the recommended algorithms for these applications, assuming a wind speed of 1 meter per second, neutral atmospheric stability, and (if needed) meteorological persistence factors of 0.9 and 0.4 for 3- and 24-hour time averaging periods, respectively. For a more refined analysis, the AERMOD may be run for these area or volume source analyses using five years of meteorological data.

CUMULATIVE ANALYSIS

For proposed sources that would be located near existing or other proposed source(s), and where the contributions from these source(s) cannot be properly accounted for in the background concentrations, a cumulative analysis may be necessary. Detailed dispersion modeling should be conducted using the agreed upon list of sources, the same modeling parameters accepted by DEC for permitting purposes, and those described in this chapter. The following steps should be completed:

- An initial (primary) study area for analysis should be defined by delineating a 1,000-foot distance from the boundaries of the property line for the proposed facility.
- Ground level and elevated sensitive receptors outside the property line of the proposed project that may be affected by the proposed source should be identified. Maximum predicted concentrations at the receptors that may be affected by more than one source should be identified. This should be done in accordance with the guidelines described in Subsection 312.2.
- All facilities or sources within the 1,000-foot study area that may not be properly accounted for in the background concentrations and have a heat input of 2.8 million BTU/hour or greater should be identified along with their stack parameters and emissions calculations.
- A search should be conducted beyond the 1,000-foot initial study area to identify any existing sources that have the potential to significantly add to pollutant loadings at the identified sensitive receptors. Stack parameters and emissions calculations of these facilities should be presented along with similar data for the proposed facility. It is the responsibility of the appli-

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cant to verify these parameters or to present the rationale behind modeling assumptions to be used if verification data cannot be obtained. Similarly, all large sources that may be constructed before the proposed project should be identified if such sources would have the potential to add to pollutant loadings at receptor locations. Proposals that have active permit applications should be included.

- A preliminary background source inventory should be submitted to DEP for review, including all identified sources within and beyond the primary 1,000-foot study area. A screening analysis may be conducted to determine which of the background sources beyond the 1,000-foot study area may be eliminated from further consideration. The screening analysis is recommended to determine the final list of sources to be included in the detailed cumulative dispersion modeling. Consensus should be reached with DEP regarding the source inventory prior to the commencement of a detailed dispersion analysis.
- The collection of permit data for such sources generally follows the procedure outlined in Subsection 322.2.
- In general, those include: (a) use of the latest five years of meteorological data; (b) examination of criteria pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and inhalable particulate matter (PM_{10} and $PM_{2.5}$); (c) large source loads; (d) long- and short-term analyses; (e) use of AERMOD to determine the highest short-term concentration and the highest average annual concentration; and (f) use of appropriate ambient concentrations (backgrounds). Combined emissions of the existing and planned sources identified above and background concentrations should be examined at all sensitive receptors to determine if there are any projected NAAQS exceedances.
- Downwash and cavity analysis, where necessary, should be included in the studies.
- All the backup data necessary to verify the results of the analysis should be submitted (as described in Section 430).

SUITABILITY OF FLUID (PHYSICAL) MODELING VERSUS MATHEMATICAL MODELING

For most projects, screening (for single residential buildings) or full-scale mathematical modeling is appropriate for evaluating air quality impacts from stationary sources. The mathematical expressions and formulations that constitute the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all mathematical models contain simplifications and approximations of actual conditions and interactions, and because a worst-case scenario is of most interest, these models are conservative and tend to overpredict pollutant concentrations, particularly under adverse meteorological conditions. Typically, these models are too conservative to account accurately for such conditions as complex topography and, therefore, may predict pollutant concentrations that are too high. Such conservative results are usually adequate in the analyses of small sources, such as residential or commercial boilers. When larger sources are being considered, physical modeling may yield more accurate results and is preferred because the dispersion created by either existing or proposed structures on air movement in the area under analysis predominates over the dispersion effects of regional atmospheric factors, such as thermal gradients.

Physical modeling, also called fluid or wind tunnel modeling, involves constructing a scaled model of the proposed buildings and any nearby existing and proposed buildings and surrounding terrain that is then subjected to wind tunnel studies in which a tracer gas is emitted from the source. Measurements are taken at different locations (receptors) on the physical model to determine the dispersion of the gas. Recommended procedures for fluid modeling are outlined in EPA's Guideline for Fluid Modeling of Atmospheric Diffusion (EPA-600/8-81-009), April 1981, and Guideline for Use of Fluid

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Modeling to Determine Good Engineering Practice Stack Height (EPA-450/4-81-003), July 1981. It is recommended that DEP be contacted for assistance before performing any fluid modeling studies.

BACKGROUND CONCENTRATIONS

The monitored background levels of the principal pollutants of concern for stationary source air quality modeling — SO_2, NO_2, and PM_{10} — have remained relatively steady for some time. Summaries of the background levels for these pollutants at various DEC monitoring locations throughout New York City may be obtained from DEP. Background pollutant concentrations for lead and non-criteria pollutants (for which there is only a limited amount of data available) should be obtained from DEC reports on ambient air monitoring. These DEC reports may be examined at the offices of DEP. New York State ambient air monitoring data may also be found at DEC's website. To determine annual average background levels, the highest annual averages measured over the latest available 5-year period should be used for NO_2, SO_2 and CO, while the latest available 3-year period should be used for PM_{10}. To determine worst-case short-term background levels, the highest second highest maximum yearly concentrations measured over the period should be used.

CHEMICAL SPILLS

Some projects may result in the development of facilities that house operations with the potential to accidentally emit air toxics as the result of chemical spills. As an example, medical, chemical, or school laboratories with fume hoods are required to have a ventilation system that discharges pollutants released under the hoods or in the laboratories to exhaust points above the rooftop. Since chemicals may be accidentally spilled in these facilities, the dispersion of hazardous pollutants from these discharge points and potential impacts on the surrounding community are examined. The appropriate department responsible for establishing and enforcing safety procedures for the storage and use of all hazardous materials at the institution should be contacted for a complete list of chemicals to be used in the proposed laboratories. In addition, the project's mechanical engineers should be contacted to obtain specific mechanical information for the laboratory fume hood exhaust system. The techniques described below may be applied to chemical spills or to any other short-term releases of pollutants.

EVAPORATION RATES. Evaporation rates for volatile hazardous chemicals that are expected to be used in the labs may be estimated using a model developed by the Shell Development Company to assess air quality impacts from chemical spills. The Shell model calculates evaporation rates based on physical properties of the material, temperature, and rate of air flow over the spill surface. The evaporation rates for such scenarios are usually calculated assuming room temperature conditions (~70°F) and an air flow rate of 0.5 meters/second. A "worst-case" chemical spill is usually determined by reviewing the chemicals that are expected to be frequently used under the hoods, the amount, the container sizes for such chemicals, and the evaporation rates (from Shell model) and relative toxicities of these chemicals (see Fleisher, M.T., An Evaporation/Air Dispersion Model for Chemical Spills on Land, Shell Development Company, December 1980). Samples of how to perform such calculations are also provided in the appendices (Guidelines for Calculating Evaporation Rate for Chemical Spills).

RECIRCULATION. Analysis of chemical spills or other sources of hazardous pollutants also considers the effects of recirculation of the pollutants from the vent back through nearby windows or air intake vents. This may occur anytime exhaust vents are situated near operable windows or intake vents. The potential for recirculation of fume hood emissions or other sources of hazardous pollutants back into the nearest window or fresh air intake vent may be assessed using the method described by D.J. Wilson in A Design Procedure for Estimating Air Intake Contamination from Nearby Exhaust Vents (ASHRAE TRANS 89, Part 2A, 1983, pp. 136-152). This empirical procedure, which has been verified by both wind tunnel and full-scale testing, is a refinement of the ASHRAE

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handbook procedure and takes into account such factors as plume momentum, stack tip downwash, and cavity recirculation effects. Additional information on performing such calculations is provided in the appendices (Guidelines for Recirculation for Chemical Spills).

PUFF MODELING. Maximum pollutant concentrations at elevated receptors downwind of fume exhausts or other short-term, instantaneous releases of pollutants may be estimated using the latest EPA AERMOD or CALPUFF model. The EPA CALPUFF model version 5.8 is the most recent release of this model. CALPUFF is a multi-layer, multi-species non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation and removal. These models are appropriate because these types of emissions are typically present only for short periods of time. For example, most chemical spills are completely evaporated in considerably less than an hour. Under these conditions, maximum predicted pollutant concentrations from the recirculation calculations and the modeling at places of public access should be compared to the Short-Term Exposure Levels (STELs) or ceiling levels recommended by the U.S. Occupational Safety and Health Administration (OSHA) for these chemicals. STELs are usually 15-minute time-weighted average exposures that should not be exceeded at any time during an employee's work day. Ceiling levels are the exposure limits that should never be exceeded in an employee's work day. Stable atmospheric conditions and a 1 meter per second wind speed are usually assumed as input to the recommended model.

FUTURE NO-ACTION CONDITION

The assessment of stationary sources for the future without the project takes into consideration expected changes by the project's build year. For existing stationary sources, existing emissions are usually assumed to continue in the future, unless there is reason to expect otherwise. As noted above, when emissions are determined through a facility's operating permit(s), maximum allowable concentrations are assumed. For assessments of the effects of future pollutant emissions on sensitive uses near an existing manufacturing district, it may be appropriate to consider expected future trends in that district, when no known new development is proposed.

FUTURE WITH-ACTION CONDITION

This assessment considers conditions with the project in place, and compares them with conditions in the future No-Action scenario to determine the potential for significant impacts.

324. Mesoscale Analyses

As described earlier, nitrogen oxides and hydrocarbons are examined on a regional level. These pollutants are of concern because they are precursors to ozone (both may react in sunlight to form photochemical oxidants). The area for examination would typically be large, such as an entire borough, or the entire City of New York, or even the tri-state metropolitan area. Such an analysis is rarely performed because few projects have the potential to affect ozone precursors over such large regions.

Projects that may affect nitrogen oxides or hydrocarbons in such a large region would be those that greatly increase the total number of vehicle miles traveled in the region (for example, a major roadway improvement or construction of new bridges) or change regulations that affect numerous stationary sources (such as changes in the type of fuel burned throughout the city). Most often, these analyses are performed for large transportation projects.

In a mesoscale analysis, the project's contributions to the total emissions over the area are considered. In the example of a major roadway improvement that would greatly increase the total number of vehicle miles traveled, the analysis would consider whether the total amount of carbon monoxide, nitrogen oxides, and hydrocarbons emitted in the region would increase (because of the increased vehicle miles) or decrease (because the new roadway would alleviate existing congestion).

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400. DETERMINING IMPACT SIGNIFICANCE

To determine whether a project may have a significant impact on ambient air quality or be impacted by ambient air quality levels, the analysis techniques described above are used to predict future concentrations in the chosen study area for the receptor locations if the project is not implemented (the No-Action condition). Then, concentrations predicted for the future with the project (the With-Action condition) are compared to the No-Action condition levels using the impact criteria described below.

410. IMPACT CRITERIA

411.1. Comparison with Standards

The predicted pollutant concentrations for the pollutants of concern associated with a proposed project are compared with either the NAAQS for criteria air pollutants or ambient guideline concentrations for non-criteria pollutants. In general, if a project would cause the standards for any pollutant to be exceeded, it may likely constitute a significant adverse impact. In addition, for CO from mobile sources, the de minimis criteria (described below in Subsection 412) are also used to determine significant impacts.

To evaluate the potential air quality impacts for criteria pollutants and non-criteria pollutants from stationary sources, predictions for these pollutant concentrations must correspond to the appropriate NAAQS time averaging periods. These standards are for the average concentration during each of those time periods. Annual standards pertain to the average pollutant concentrations either predicted or measured in a calendar year, while 24-hour standards pertain to pollutant concentrations occurring in a calendar day. For short-term standards (*i.e.*, 1-, 3-, 8-, and 24-hour averaging periods), two exceedances of the corresponding short-term standard in one calendar year (at the same location) constitute a violation of the standard. Recommended SGCs and AGCs for non-criteria pollutants correspond to time-averaging periods of 1-hour and annual averages, respectively.

411.2. Conformity

For projects subject to conformity requirements, potential air quality impacts should be evaluated to ensure that the project is consistent with the SIP and (1) would not contribute to any new violation of the NAAQS, (2) would not increase the frequency or severity of existing violations, and (3) would not delay attainment or required emission reductions. For projects subject to general conformity, *de minimis* thresholds listed for such projects under federal regulations should be referenced.

412. De Minimis Criteria

For CO from mobile sources, the City's *de minimis* criteria are used to determine the significance of the incremental increase in CO concentrations that would result from a proposed project. These set the minimum change in 8-hour average CO concentration that constitutes a significant environmental impact. According to these criteria, significant impacts are defined as follows:

- An increase of 0.5 parts per million (ppm) or more in the maximum 8-hour average CO concentration at a location where the predicted No-Action 8-hour concentration is equal to 8 ppm or between 8 ppm and 9 ppm; or
- An increase of more than half the difference between baseline (*i.e.*, No-Action) concentrations and the 8-hour standard, when No-Action concentrations are below 8 ppm.

413. $PM_{2.5}$ Interim Guidance Criteria

DEC has published a policy providing interim guidance for project-specific assessment of fine particulate matter impacts under SEQRA and details when mitigation of such impacts may be necessary. This policy seeks to

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address impacts from $PM_{2.5}$ emissions until such time as DEC adopts a SIP covering $PM_{2.5}$, and applies only to facilities applying for permits or major permit modifications that emit 15 tons of PM_{10} or more annually. The policy states that such a project would have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations at a receptor by more than 0.3 µg/m3 averaged annually or more than 5 µg/m3 on a 24-hour basis. Projects that result in $PM_{2.5}$ concentrations at a receptor exceeding either the annual or 24-hour threshold would be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

Based on DEC's policy, DEP developed the interim guidance criteria below for determination of potential significant adverse $PM_{2.5}$ impacts are established for projects subject to CEQR. They are as follows:

- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 5 µg/m3 at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (*i.e.*, a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 2 µg/m3 but no greater than 5 µg/m3 would be considered a significant adverse impact on air quality depending on magnitude, frequency, duration, location, and size of the area of the predicted concentrations. The lead agency must consult with the DEP to determine the significance of results between 2 µg/m3 and 5 µg/m3;
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.1 µg/m3 at ground level on a neighborhood scale (*i.e.*, the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.3 µg/m3 at a discrete or ground-level receptor location.

414. Odors

A significant odor impact would occur if a project results in maximum predicted 1-hour average malodorous pollutant levels above the applicable odor threshold at places of public access, or if it results in the development of a structure that would be subject to such malodorous pollutant levels from nearby sources of these pollutants. Peaking factors may be employed to convert predicted 1-hour concentrations to shorter-term durations. If a dilution-to-thresholds approach is employed, a significant odor impact would occur if the dilution-to-thresholds indicated that malodorous impacts would be detected by a substantial portion of the population exposed at the nearest sensitive receptor. This determination depends on the odor thresholds for the substances of concern and the emission rates for those substances (see discussion above in Subsection 322.2). While odors may still be detected for time periods from a few seconds to several minutes, it would be unrealistic to define this as a significant impact unless the odor persisted, on average, for at least an hour. Generally, there are no other specific standards for odors as there are for other regulated pollutants.

420. TYPES OF POTENTIAL IMPACTS

For both mobile and stationary sources, significant impacts, as defined by the criteria above, may occur either (1) on surrounding uses as a result of the proposed project; or (2) on the proposed project due to the surrounding existing uses. Both scenarios must be considered under CEQR because either may result in significant adverse air quality impacts.

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421. Mobile Sources

A project may result in significant mobile source air quality impacts when the incremental increases in CO concentrations, relative to those in the No-Action scenario, exceed the *de minimis* criteria or when a project results in the creation or exacerbation of a predicted violation of the NAAQS for the pollutants of concern. For example, if a project adds vehicles to a particular intersection and thereby changes the 8-hour CO concentration at that intersection from 6 ppm in the No-Action condition to 7 ppm in the With-Action condition, no significant impact occurs because the increase caused by the project (1 ppm) is not equal to more than half the difference between the baseline and the 8-hour standard of 9 ppm. The project would have to increase the concentration by more than 1.5 ppm at that location to have a significant adverse impact. If the project raised the 8-hour CO concentrations at an intersection from 8 ppm to 9 ppm, a significant impact would occur because this increase would be greater than the de minimis criterion of 0.5 ppm or greater when the No-Action concentration is 8 ppm or between 8 ppm and 9 ppm. Note that any violation of the NAAQS constitutes a significant adverse impact, regardless of the *de minimis* criterion. For example, if a project causes an increase in the 8-hour CO concentration from 8.9 to 9.2 ppm, a significant adverse impact occurs.

Similar to the CO *de minimis* criteria, a project results in significant mobile source air quality impacts when the incremental increase in $PM_{2.5}$ concentrations exceeds the interim guidance criteria. However, annual incremental concentrations of $PM_{2.5}$ from mobile sources at intersection locations are only assessed on a neighborhood, rather than local, scale.

422. Stationary Sources

Sulfur dioxide, nitrogen dioxide, and respirable particulate matter are the principal pollutants associated with a project that may result in a significant stationary source impact, although significant impacts for lead and other toxic contaminants may also occur. A proposed project has a significant adverse stationary source air quality impact if it results in either the creation or exacerbation of a violation of the NAAQS for criteria pollutants or an exceedance of the guidance values for non-criteria pollutants.

When a proposed project causes the NAAQS to be exceeded at sensitive receptors, such as air intake vents, balconies, or operable windows, the potential for a significant adverse impact at such locations should be disclosed. Further analysis may be performed to determine the expected range of indoor concentrations. The indoor values may be lower, depending on the magnitude of the predicted concentration, the time of year, the outside temperature, and the manner in which the ventilation system operates (*e.g.*, whether it mixed with other air intake locations). In this case, judgment is required to determine whether it is reasonable to assume the indoor concentration is the same as, or lower than, the outdoor concentration. If the predicted range of indoor values is lower than those outside, the potential for significant impacts resulting from exceeding standards outside is still disclosed.

Projects that cause the NAAQS or guidance values to be exceeded at locations to which the public would not have ongoing access, such as at elevated locations on a residential building that are not near operable windows, balconies, or air intake vents, do not result in significant adverse impacts. These locations are not considered ambient air and, therefore, are not valid receptors.

423. Odors

Most often, odor impacts result from stationary sources. Like other air quality impacts, these may occur because the proposed project would either cause odors or add a sensitive use in an area subject to odors.

430. PRESENTATION OF RESULTS

As described above in Section 300, a typical air quality analysis considers a large number of receptors. Generally, the environmental assessment may limit its report on the analysis results to those receptors where the maximum predicted pollutant concentrations and maximum incremental impacts from the project are calculated. The re-

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sults for all other receptors may be reported in an appendix or be made available on request. Typically, when summarizing the results for CO analyses, values presented are rounded off to the nearest tenth of a part per million (ppm). For example, an 8-hour CO level at a receptor site would typically be reported as 6.5 ppm, not 6.464 ppm or 7 ppm. In many cases, only the 8-hour average CO values are reported because the maximum predicted 1-hour CO concentrations are well below the applicable NAAQS. Comparisons to the *de minimis* criteria of 0.5 ppm are made to the nearest hundredth of a ppm (*i.e.*, an increment of 0.49 ppm in the 8-hour CO average would not be a significant *de minimis* impact, but 0.51 ppm would be a significant adverse impact if the 0.5 ppm criterion was applicable in this instance).

All the backup data that are necessary for DEP or the reviewing agency to verify the results of any analysis should be submitted. These data should be submitted on electronic media such as CD-ROMs and should include a "read me" file with information describing the content and names of the files presented. The backup data should include:

- Scaled maps with coordinates and receptor locations.
- Emissions calculations and, if applicable, a list of equipment, emission factors and their sources, formulas, and assumptions or manufacturers' specifications, *etc.* used to develop the total emissions presented. A detailed sample calculation should be provided for each pollutant. Any assumptions made or any regulation or reduction applied to emissions should be stated and appropriately substantiated.
- For stationary source analyses, buildings and dimensions of buildings that may create downwash, the stack locations, *etc.*
- For mobile source analyses, supplemental traffic data should be included (*e.g.*, speeds, vehicle classifications).
- Tables or spreadsheets detailing any additional calculations (*e.g.*, parking, chemical spills, AP-42 emission factors).
- For a detailed cumulative impact analysis, the documentation should clearly reference how the emissions and stack parameters were obtained for the included sources.
- Input and output files for all the models used in the analyses should be submitted.

500. DEVELOPING MITIGATION

When a significant air quality impact (as defined above) is likely to result from a project, potential mitigation measures to eliminate such adverse impacts must be investigated.

510. MOBILE SOURCES

Measures that would mitigate the full increment of CO resulting from the project should be identified. If potential concentrations exceed the 8-hour CO standard of 9 ppm, further measures that allow the city to attain compliance should be identified. As discussed above, refined dispersion modeling with CAL3QHCR should be performed before identifying traffic mitigation measures for eliminating predicted impacts.

511. Roadways

Significant mobile source impacts due to pollutant concentrations would usually occur at a sidewalk adjacent to an intersection that encounters a significant amount of congested vehicular traffic. In many instances, the mitigation measures recommended to eliminate a predicted significant traffic impact at an intersection would also eliminate any predicted significant air quality impacts at this location. Potential mitigation measures for eliminating adverse traffic impacts are presented in Chapter 16, "Transportation."

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At the same time, traffic mitigation measures – such as those that would increase the number of moving lanes at an approach to an intersection, increase red time at an intersection, or divert traffic to other intersections – may result in increasing pollutant levels near the affected intersections. Consequently, all mitigation measures that avoid or minimize the project's impacts in other technical areas should be assessed for their potential air quality impacts.

512. Parking Facilities

Significant air quality impacts from parking facilities may usually be mitigated using the same range of options available to mitigate traffic impacts and significant air quality impacts related to roadways. If the vent(s) for an enclosed mechanically ventilated parking facility may result in significant air quality impacts, restrictions on the placement of such vent(s) may be incorporated into the project to mitigate the impacts.

520. STATIONARY SOURCES

There are several options available to mitigate the significant adverse impacts caused by stationary sources for the criteria pollutants of concern. One typical example of a significant stationary source impact would be the result of the emissions from a large stack on a nearby, taller building. Examples of potential mitigation measures available for alleviating this adverse impact include the following:

- Restricting the fuel type burned and exhausted from this stack;
- Modifications to the design of the proposed project that eliminate receptor locations that may experience impacts (building setbacks, sealed windows, *etc.*);
- Restricting the processing capacity at the facility;
- Restricting the operating parameters and physical dimensions of the stack or vent (*i.e.*, increasing the source height or increasing the exhaust velocity, which may lessen the impact on the project);
- Control equipment to limit emissions from the facility; and
- Moving the location of the stack or vent to ensure that there would be no significant impacts from the facility on the proposed project.

These measures may be difficult to implement if the stack that would cause the impact is not part of the project and is owned by a party not involved in the project. As noted in Chapter 1, "Procedures and Documentation," commitments to mitigation measures must be obtained before those measures may be considered adequate to mitigate a project's significant impacts.

Stationary source impacts ensuing from a project that facilitates the development of an industrial facility that would emit significant amounts of air toxics or malodorous pollutants may be mitigated by such means as:

- Restricting the processing capacity at the facility;
- Requiring commitments on odor control mechanisms for the facility that ensure elimination of potential impacts; or
- Restrictions similar to those discussed for the new boiler stack impact example.

530. GENERIC ACTIONS

For generic actions, site-specific mitigation measures are often inappropriate because the intersections or stationary sources assessed are often only prototypes. In these cases, mitigation would typically involve changes to the proposed project that would avoid the resulting significant impact.

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540. (E) DESIGNATIONS

The (E) Designation is an institutional control that is implemented through CEQR review of a zoning map or text amendment or action pursuant to the Zoning Resolution. It provides a mechanism to ensure that measures aimed at avoiding a significant adverse impact and, if necessary, remediation are completed as part of future development, thereby eliminating the potential for an air quality impact.

If necessary, the lead agency may consult with DEP during the CEQR process to identify sites requiring an (E). The Mayor's Office of Environmental Remediation (OER) is responsible for administering post-CEQR determinations for assigned (E) Designations and existing Restrictive Declarations, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York (Rules). If property owners have applied for an action that will result in placement of an (E) Designation, they are advised to provide the CEQR number to OER and, in order to facilitate OER's review of the proposed work to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the CEQR Air Quality analysis (*e.g.*, EAS/EIS, Technical Memoranda, CEQR determination, modeling results, lead agency and DEP correspondences, Restrictive Declarations, Notices) to OER. The Rules and Section 11-15 of the Zoning Resolution set out the procedures for placing, satisfying and removing (E) Designations. OER should review and approve all documents needed to satisfy the requirement of the Air Quality (E) Designation (*e.g.*, boilers/HVAC specifications, fuel usage, stack location).

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution, and appear in the Department of Buildings' (DOB) online Buildings Information System (BIS).

With respect to (E) designated lots, DOB will not issue building permits or certificates of occupancy in connection with the following actions until it receives an appropriate "Notice" from OER that the (E) requirements have been met:

- Developments;
- Enlargements, extensions or changes of use; or
- Alterations that involve ventilation or exhaust systems, including, but not limited to, stack relocation or vent replacement.

As appropriate, OER issues the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction.

600. DEVELOPING ALTERNATIVES

Alternatives that incorporate the potential mitigation options discussed above may also reduce or avoid significant impacts associated with a project. In addition to these mitigation measures, there are alternative options available that may also reduce or eliminate significant air quality impacts in these respective areas.

610. MOBILE SOURCES

Mobile source air quality impacts are usually directly related to the size and type of development and, consequently, the amount of traffic generated by development of such a project. Therefore, alternatives that would diminish the magnitude of the project-generated traffic should also, in general, lessen the mobile source impacts associated with such projects.

In instances where the project-generated traffic would create significant parking facility impacts due to locations of the egress points at the site affected by the project, these impacts may be reduced by developing alternatives with relocated or multiple access/egress points.

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620. STATIONARY SOURCES

In the cases where significant stationary source impacts would result from the structure introduced through the project, alternatives that modify the dimensions of the structure (*e.g.*, lower the maximum height of the structure; restrict the locations of operable windows and/or air intakes if it is impacted by a nearby emission source, such as a power generating station) may eliminate adverse impacts.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND ADMINISTRATIVE RECORD

711. Federal Regulations

711.1. Clean Air Act

The CAA, which was first enacted in 1955 and subsequently amended in 1963 and 1967, changed significantly with the passage of the 1970 amendments. That year, Congress passed amendments that significantly broadened the federal role in air pollution control. In addition to establishing NAAQS for six criteria pollutants (sulfur dioxide, particulates, carbon monoxide, photochemical oxidants, nitrogen dioxide, and hydrocarbons), the 1970 amendments also established the new source performance standard (NSPS) program and the national emission standards for hazardous air pollutants (NESHAP). These programs gave EPA the authority to regulate emissions from new stationary sources as well as the ability to regulate hazardous air pollutants not covered by NAAQS. EPA added a NAAQS for lead in 1978 and rescinded the hydrocarbon NAAQS in 1983. In the 1977 amendments, two new programs were added: a nonattainment program was adopted for areas in violation of specific NAAQS and a prevention of significant deterioration (PSD) program was established for areas meeting NAAQS.

For CEQR, the most significant aspect of the CAA and its amendments has been the SIP program begun in 1970. Under this program, each state must demonstrate in a SIP the manner in which it will attain compliance with the NAAQS. Once a SIP has been approved by EPA it becomes federally enforceable and subject to citizen suits.

EPA has developed many air quality regulations, which are contained in the Code of Federal Regulations (CFR). The most pertinent air quality regulations in the CFR are as follows:

- 40 CFR 50: National Primary and Secondary Ambient Air Quality Standards.
- 40 CFR 51: Preparation of Implementation Plans.
- 40 CFR 52: Approval and Promulgation of Implementation Plans (which includes Prevention of Significant Deterioration).
- 40 CFR 53: Ambient Air Monitoring Methods.
- 40 CFR 60: Standards of Performance for New Stationary Sources.
- 40 CFR 61: National Emission Standards for Hazardous Air Pollutants.
- 40 CFR 93: Determining Conformity of Federal Actions to State or Federal Implementation Plans.

In addition, as part of the 1990 Clean Air Act Amendments (CAAA), EPA has also established a list of 189 air toxics (HAPs) to be regulated (this list is found in Title III of the CAAA). This list is regulatory in nature: it is used to determine the levels of controls and permits required for different projects rather than to assess a project's impacts.

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Other relevant CAAA issues include provisions for attainment and maintenance of NAAQS (Title I); provisions relating to mobile sources—these promulgated emission reductions are accounted for in the latest mobile source emission models (Title II); and provisions relating to stratospheric ozone protection (Title VI). The last title, relating to ozone protection, contains regulations governing various chlorofluorocarbons (commonly referred to as "CFCs"), including prohibitions against the use of certain CFCs and controls for the recycling and disposal of others.

711.2. OSHA and NIOSH Standards

The U.S. Occupational Safety and Health Administration (OSHA) regulates air pollutants in the workplace. The National Institute for Occupational Safety and Health (NIOSH) is the Federal agency responsible for conducting research and making recommendations for the prevention of work-related disease and injury. OSHA and NIOSH have promulgated standards for many air contaminants in the workplace. These standards are identified in 29 CFR 1910.1000, as amended. NIOSH's Pocket Guide to Chemical Hazards, July 1996, also identifies recommended standards. Permissible Exposure Limits include Short Term Exposure Limits (the employee's 15-minute time-weighted average exposure that shall not be exceeded), 8-hour Time Weighted Average limits (the employee's average airborne exposure in any 8-hour work shift of a 40-hour work week that shall not be exceeded), and ceiling levels (the employee's exposure that shall not be exceeded during any part of the work day).

712. New York State Regulations

DEC provides applicable New York State air quality regulations under the New York Codes, Rules and Regulations, Title 6, Chapter III-Air Resources, Subchapter A-Prevention and Control of Air Contamination and Air Pollution:

- Part 200: General Provisions.
- Part 201: Permits and Certifications.
- Part 203: Indirect Sources of Air Contamination.
- Part 211: General Prohibitions.
- Part 212: General Process Emission Sources.
- Part 218: Emissions Standards for Motor Vehicles and Motor Vehicle Engines.
- Part 219: Incinerators.
- Part 222: New Incinerators for New York City.
- Part 228: Surface Coating Processes.
- Part 231: New Source Review for New and Modified Facilities.
- Part 232: Perchloroethylene Dry Cleaning Facilities.
- Part 234: Graphic Arts.
- Part 240: Transportation Conformity Rule.
- Part 257: Air Quality Standards.

713. New York City Regulations

- New York City Air Pollution Control Code, Section 1402.2-9.11, "Preventing Particulate Matter from Becoming Airborne; Spraying of Asbestos Prohibited; Spraying of Insulating Material and Demolition Regulated." These regulations govern fugitive dust.

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- Building Code of the City of New York (Local Law No. 76 of 1968 and amendments), Title 27 of the Administrative Code of the City of New York Chapter 1, Subchapter 15, governs chimneys and gas vents.
- Local Law No. 77 of 2003 and amendments, Title 15 of the Administrative Code of the City of New York, Chapter 14, Rules Concerning the use of Ultra-Low Sulfur Fuel and Emissions Control Technology in Nonroad Vehicles Used in City Construction.
- New York City Zoning Resolution, Article IV (Manufacturing Districts), Chapter 2, Section 42-20, provides performance standards in manufacturing districts that address smoke, dust, and other particulate matter, and odorous matter.

720. APPLICABLE COORDINATION

Consistency with the New York State Implementation Plan for air quality (SIP) is of critical importance to New York City. If the State is found to be inconsistent with this plan by the EPA, federal transportation funding for the City may be suspended. DEP is the designated City agency for coordinating with EPA for SIP consistency. Therefore, under certain circumstances, the lead agency needs to coordinate detailed air quality analyses with DEP.

Coordination between the lead agency and DEP is strongly recommended and DEP should be notified if the air quality analysis for projects subject to CEQR indicates any of the following results: a potential violation of the ambient air quality standards for CO and PM predicted from mobile sources at any location in the project's build year(s); an exceedance of any of the criteria ambient air quality standards due to stationary sources at any location; or an exceedance of any of the $PM_{2.5}$ interim guidance criteria thresholds.

The data used for any refined air quality impact studies for a proposed project should be examined for consistency with recent air quality studies performed in the same region affected by the proposed project. In addition, the air quality analysis requires coordination with the traffic and transportation analyses, both for data collection and for certain analysis techniques.

730. LOCATION OF INFORMATION

At DEP, BEPA is the main source that compiles readily available data that is commonly required to perform detailed mobile and stationary source air quality analyses. DEP may also provide sample air quality analyses for various types of applications.

Requests for copies of the Bureau of Environmental Compliance (BEC) air contaminant permits should be addressed to:

DEP's Bureau of Environmental Compliance
59-17 Junction Boulevard
Elmhurst NY 11373

Requests for fee waivers for BEC searches should be addressed to DEP Bureau of Legal and Legislative Affairs at the same address as BEC.

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GREENHOUSE GAS EMISSIONS

CHAPTER 18

Increased greenhouse gas (GHG) emissions are changing the global climate, which is predicted to lead to wide-ranging effects on the environment, including rising sea levels, increases in temperature, and changes in precipitation levels. Although this is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level. In New York City, increased temperatures may lead to an increase in summertime electricity demand due to greater usage of air conditioning, which in turn may result in more frequent power outages. Increases in precipitation levels may lead to more street and sewer flooding, while extended droughts and increased water demand may strain the City's water supply system. Rising sea levels may lead to increased risks of coastal flooding, as well as damage to infrastructure not designed to withstand saltwater exposure.

Through PlaNYC 2011 Update, the City advances sustainability initiatives and goals for both greatly reducing greenhouse gas emissions and increasing the city's resilience to the effects of climate change. In addition, the City is engaged in several initiatives related to assessing potential local impacts of global climate change and developing strategies to make existing and proposed infrastructure and development more resilient to the effects of climate change. These include:

- In 2008, the City launched the Climate Change Adaptation Task Force to develop strategies to secure the City's critical infrastructure against potential threats from rising seas, higher temperatures, and changing precipitation patterns projected to result from climate change. The Task Force is composed of 40 City, state, and federal agencies, public authorities, and private companies that operate, regulate, or maintain critical infrastructure in New York City. The Task Force identified more than 100 types of infrastructure that climate change could impact. The Task Force will use this initial assessment to develop coordinated strategies to increase the resilience of the region's infrastructure. The focus of the Task Force will be expanded to include public health and safety services in its assessment.

- The current 100-year floodplain, defined as the area with a one percent chance of flooding in any given year, is based on historical data. The City has established an interagency group to work with the Federal Emergency Management Agency (FEMA) to revise the Flood Insurance Rate Maps for the City, which set the flood elevations that are the triggers for the City building code's flood protection requirements. The City is working with FEMA to reflect current shorelines and elevations, employing technological changes that allow for more accurate map-making. Subsequent development within the flood zone will reflect any changes to the floodplain elevations.

- The City convened the New York City Panel on Climate Change (NPCC) to develop climate change projections for New York City. The *Climate Risk Information* report released by the NPCC was prepared as part of PlaNYC to advise the Mayor and the New York City Climate Change Adaptation Task Force on issues related to potential impacts on infrastructure due to climate change (*i.e.*, temperature, precipitation, rising sea levels, and extreme events). The NPCC developed projections using the Intergovernmental Panel on Climate Change (IPCC)-based methods to generate model-based probabilities for temperature, precipitation, sea level rise, and extreme events including coastal flooding (including the 1-in-100 year flood) in the 2020s, 2050s, and 2080s. These projections were developed using 16 global climate model (GCM) simulations and three GHG emission scenarios developed by the IPCC. This and other work produced by the NPCC will be used to guide the City's policymaking

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process. The NPCC will continue to regularly assess climate change projections and establish process to update its climate projections regularly.

- At the request of the City, the Urban Green Council (New York Chapter of the U.S. Green Building Council) convened a Green Codes Task Force, consisting of over 150 building and design professionals, to strengthen the City's energy and building codes and address the impacts of climate change. On February 1, 2010, the Task Force released a report of 111 code improvement recommendations to the City, 11 of which focus on climate change.

- The City plans to create a climate risk assessment tool that quantifies its exposure and vulnerability to climate risks today and over time to prioritize investments, develop cost-benefit estimates for impacts and actions, and track progress. In addition, the City is examining how to update local laws and zoning regulations that can allow buildings to be built to better withstand flooding, temperature extremes, and other conditions.

- To best prepare the City for extreme climate events, the City has developed a number of plans, including the Natural Hazard Mitigation Plan, Coastal Storm Plan, Heat Emergency Plan, Debris Management Plan, Power Disruption Plan, Winter Weather Emergency Plan, and Flash Flood Emergency Plan. To continue to prepare for and respond to climate-related emergencies as effectively as possible, the City plans to integrate climate change projections into its emergency management and preparedness plans and procedures and include climate change as a hazard assessed under the Natural Hazard Mitigation Plan, which will be updated in 2014.

- The New York City Department of Environmental Protection (DEP) is in the process of evaluating and implementing adaptive strategies for its infrastructure. In May 2008, DEP issued its Climate Change Assessment and Action Plan to establish near-, medium-, and long-term actions that it will undertake to address this critical issue. DEP is currently assessing potential impacts of climate change on the City's drinking water systems and is proposing to undertake a long-term planning and conceptual engineering effort for the drainage and wastewater management systems in the City.

As detailed above, the City is preparing for the likely consequences of climate change citywide. Federal, state, and local standards are evolving to address and account for these changing environmental conditions and, as noted above, it is anticipated that the City's infrastructure design criteria, building codes, and other laws and regulations will be updated to incorporate measures related to a building's resilience to climate change.

Currently, standards and a framework for analysis of the effects of climate change on a proposed project are not included in CEQR; as this area of analysis develops, the Mayor's Office of Environmental Coordination ("MOEC") should be consulted about the scope of climate change analyses in CEQR reviews. At the same time, where appropriate, the potential for a proposed project to result in a significant adverse impact to the environment as a result of the anticipated effects of climate change may be qualitatively discussed in environmental review. For example, if a proposed project that includes storage of hazardous materials is located in a floodplain, the possibility of flooding and, to the extent warranted, methods to prevent adverse effects on the surrounding area in such an event, such as raising or flood proofing storage areas, should be discussed. Such a discussion should focus on early integration of climate change considerations into the project and may include proposals to increase climate resilience and adaptive management strategies to allow for uncertainties in environmental conditions resulting from climate change.

The City has determined that consideration of GHG emissions is appropriate under CEQR for at least certain projects for several reasons: (1) greenhouse gas emission levels may be directly affected by a project's effect on energy use; (2) the U.S. Supreme Court has upheld the determination that carbon dioxide, one of the main greenhouse gases, is an air pollutant, subject to regulation as defined by the Clean Air Act; and (3) Local Law 22 of 2008 codified PlaNYC's citywide GHG emissions reduction goal of 30 percent below 2005 levels by 2030 (the "GHG reduction goal"). The guidance for determining the appropriateness of a GHG emissions assessment for a project and conducting analysis of a project's GHG emissions is presented in this chapter. It is expected that this guidance will be revised as regulatory standards evolve and analytic tools are developed and refined over time.

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Although the contribution of a proposed project's GHG emissions to global GHG emissions is likely to be considered insignificant when measured against the scale and magnitude of global climate change, certain projects' contribution of GHG emissions still should be analyzed to determine their consistency with the City's citywide GHG reduction goal, which is currently the most appropriate standard by which to analyze a project under CEQR. This goal was developed as part of PlaNYC for the purpose of planning for an increase in population of almost one million residents while achieving significant greenhouse gas reductions, and was codified by the New York City Climate Protection Act (Local Law 22 of 2008). See §24-803 of the Administrative Code of the City of New York. Seeking to expand its codified goal of reducing GHG emissions by more than 30% by 2030, the City is undertaking a study to determine potential strategies to reduce its GHG emissions by more than 80% by 2050.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency throughout the review process. As appropriate, the lead agency should consult with MOEC about the GHG emissions assessment described below. It is recommended that MOEC be contacted as early as possible in the environmental review process. Section 700 further outlines appropriate coordination.

100. DEFINITIONS

110. SOURCES OF GREENHOUSE GAS EMISSIONS

OPERATIONS EMISSIONS

a. Direct Emissions—emissions from on-site boilers used for heat and hot water, on-site electricity generation, including co-generation/tri-generation, electricity generation (from power plants), industrial processes, and fugitive emissions.

b. Indirect Emissions—emissions from purchased electricity and/or steam generated off-site and consumed on-site during a project's operation.

c. Indirect Emissions from Solid Waste Generation—emissions resulting from a project's generation, transportation, treatment, and disposal of solid waste (this should be estimated for certain projects affecting the City's solid waste management system, discussed below).

MOBILE SOURCE EMISSIONS

a. Direct Mobile Source Emissions—fleet vehicles owned (or leased) and operated by the applicant and associated with the project.

b. Indirect Mobile Source Emissions—emissions from vehicle trips to or from the project site during its operation that are not owned or operated by the applicant.

CONSTRUCTION EMISSIONS

a. Direct emissions resulting from the operation of construction vehicles and equipment.

b. Emissions resulting from the manufacture or transport of construction materials (generally, steel and concrete) used for the project.

120. GREENHOUSE GAS EMISSIONS

There are six internationally-recognized greenhouse gases regulated under the Kyoto Protocol (an international agreement adopted in 1997 that is linked to the United Nations Framework Convention on Climate Change): carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Evaluation of the emissions of each of these GHGs may potentially be included in the scope of an EIS.

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All calculations of emissions should be presented in units of metric tons of carbon dioxide equivalent (CO_2e), a common measure that allows gases with different global warming potentials (the potential to trap heat in the atmosphere) to be added together and compared. According to standard GHG accounting protocols, projects should calculate emissions of all six gases, where applicable. In order to convert all six gases into units of metric tons of CO_2e, a list of global warming potentials of the six primary greenhouse gases is presented below.

Table 18-1
Global Warming Potential for Primary Greenhouse Gases

Greenhouse Gas	Common sources	Global Warming Potential
CO_2 - Carbon Dioxide	Fossil fuel combustion, forest clearing, cement production	1
CH_4 - Methane	Landfills, production and distribution of natural gas and petroleum, anaerobic digestion, rice cultivation, fossil fuel combustion	21
N_2O - Nitrous Oxide	Fossil fuel combustion, fertilizers, nylon production, manure	310
HFCs - Hydrofluorocarbons	Refrigeration gases, aluminum smelting, semiconductor manufacturing	140-11,700*
PFCs - Perfluorocarbons	Aluminum production, semiconductor manufacturing	6,500-9,200*
SF_6 - Sulfur Hexafluoride	Electrical transmissions and distribution systems, circuit breakers, magnesium production	23,900

Note: Since the Second Assessment Report (SAR) was published in 1995, the IPCC has published updated GWP values in its Third Assessment Report (TAR) and Fourth Assessment Report (AR4) that reflect new information on atmospheric lifetimes of greenhouse gases and an improved calculation of the radiative forcing of CO_2. However, GWP values from the SAR are still used by international convention to maintain consistency in GHG reporting, including by the United States when reporting under the United Nations Framework Convention on Climate Change.
* The GWPs of HFCs and PFCs vary depending on the specific compound emitted. A full list of these GWPs is available in Table ES-1 of the U.S. Environmental Protection Agency's *Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008*, available at: http://epa.gov/climatechange/emissions/usinventoryreport.html.

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200. DETERMINING WHETHER A GHG EMISSIONS ASSESSMENT IS APPROPRIATE

Currently, the GHG consistency assessment focuses on those projects that have the greatest potential to produce GHG emissions that may result in inconsistencies with the GHG reduction goal to a degree considered significant and, correspondingly, have the greatest potential to reduce those emissions through the adoption of project measures and conditions. Over time, as data improve and as GHG emissions standards and regulations evolve, MOEC will reevaluate and, as appropriate, revise the guidance to potentially expand the applicability of the guidance or refine methodologies. The assessment is currently limited to the projects with the characteristics described below.

Generally, a GHG emissions assessment is typically conducted only for larger projects undergoing an EIS, since these projects have a greater potential to be inconsistent with the City's GHG reduction goal to a degree considered significant. However, the nature or type of certain projects may warrant consideration of the project's GHG emissions and, consequently, an analysis of consistency with city policy to reduce GHG emissions, even where preparation of an EIS is not required. This should be determined by the lead agency on a case-by-case basis. In making such determination, the lead agency should consider the following:

- For city capital projects subject to environmental review, it is often appropriate to examine the project's consistency with Executive Order 109 of 2007, which mandates formulation of a GHG reduction plan to reduce city building and operational emissions by 30 percent below Fiscal Year 2006 levels by 2017; or
- A project that proposes either of the following may warrant assessment:
    - Power generation (not including emergency backup power, renewable power, or small-scale cogeneration); or
    - Regulations and other actions that fundamentally change the City's solid waste management system by changing solid waste transport mode, distances, or disposal technologies.
- A project conducting an EIS that would also result in development of 350,000 square feet or greater.

Currently, the GHG consistency assessment focuses on those projects with the above characteristics. However, the need for a GHG emissions assessment is highly dependent on the nature of the project and its potential impacts and the lead agency should evaluate, on a case-by-case basis, whether an assessment of consistency with the City's GHG reduction goals should be conducted for other projects undergoing an EIS. For example, if a project would result in the construction of a building that is particularly energy-intense, such as a data processing center or health care facility, a GHG emissions assessment may be warranted, even if the project would be smaller than 350,000 square feet.

300. GHG EMISSIONS ASSESSMENT

310. ASSESSMENT APPROACH

GHG emissions are a consequence of global growth and the technologies employed in the global economy. At the local level, the City's GHG emissions are a function of its growth, its technologies, and its distribution of economic activity. New York City growth and development may contribute to lower per capita GHG emissions over the business-as-usual case by redirecting economic activity to, and capturing development within, higher-density urban areas that may otherwise locate in lower-density, suburban and rural areas, and by doing so in a more energy-efficient and transit-oriented fashion. In general, New York City residents consume less energy per capita for transportation purposes than other U.S. citizens because they use mass transit and non-motorized transportation (*e.g.*, walking) at far higher rates, and New York City's buildings require less energy per capita than those in comparable climates because they are configured more vertically, house more people and businesses per square foot, and have shared walls and heating and cooling systems. As a result, the average New York City resident is responsible for the emission of 5.9 metric tons of CO_2e per year, compared to a U.S. average of 19.0 metric tons per capita (excluding agriculture and non-local processes). Despite this, the sheer size of the City means that it produces nearly one-sixth of one percent of the world's total greenhouse gas emissions. Therefore, even though other regions that are less efficient today may present proportionally greater opportunities for GHG emissions reductions, reducing New York City's GHG emissions would make an appreciable contribution toward global goals, and the City has committed to doing so with its GHG reduction goal.

To illustrate, a highly-dense, transit-oriented project within New York City may not initially appear consistent with the GHG reduction goal due to the large number of total GHG emissions attributed to the development. However, the density of the project and its location in a transit-rich, rather than auto-dependent, area of the City, facilitates a lower automobile mode share and ensures that the GHG emissions per person would be lower than that of

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a development for the same number of people on a site not well-served by transit. Dense, mixed-use, transit-oriented development should be encouraged as an important aspect of achieving the GHG reduction goal; however, a project's location alone does not make it consistent (or inconsistent) with the GHG reduction goal. By the same token, a project in a more auto-dependent area of the City may be able to offset a higher mode share of vehicles by constructing an energy efficient building and using lower-GHG intense fuels for building operation. For these reasons, the focus of a GHG emissions assessment in the CEQR Technical Manual is not to ascribe environmental significance to a specified level of GHG emissions, but instead to consider GHG emission sources and practicable means to reduce their output in the context of the project's location, consistent with the City's GHG reduction goal. It should be noted that, in the future, federal, state, or city regulations may mandate both specific GHG emissions reduction targets and the means by which to achieve them. If this occurs, it is possible that compliance with such regulations may constitute consistency with the GHG reduction goal.

The local laws, policies, and building codes that are anticipated to be enacted in furtherance of the City's GHG reduction goal will apply to projects irrespective of whether they are subject to environmental review, and the City's GHG emissions reductions largely will be achieved through such measures. Because the overall GHG reduction goal will be achieved through a variety of measures and the relative potential for each measure to contribute toward achievement of the goal will vary, a GHG emissions assessment cannot measure consistency with the City's GHG reduction goal based on a quantitative measure linked to the project's contribution toward achieving the overall 30 percent reduction. Instead, the lead agency should generally assess whether the nature, setting, and features of the proposed project are consistent with the goals and benchmarks outlined to achieve the City's GHG reduction goal. Of particular relevance to projects undergoing this consistency assessment are PlaNYC's goals to reduce citywide GHG emissions, including constructing new resource- and energy-efficient buildings and improving the energy efficiency of existing buildings; providing clean, renewable power through replacement of inefficient power plants with state-of-the-art technology and expanding the use of clean distributed power generation; encouraging transit-oriented development; and encouraging sustainable transportation by improving public transit, improving the efficiency of private vehicles, and decreasing the carbon intensity of fuels.

320. ASSESSMENT

Typically, impact significance for technical areas analyzed pursuant to CEQR is determined by the potential for localized impacts. For instance, under a traditional air quality analysis conducted pursuant to CEQR, the National Ambient Air Quality Standards ("NAAQS"), developed with localized health-based standards in mind, establish numeric thresholds that assist an agency in determining impact significance. However, because GHG emissions impact the global climate, a project's associated GHG emissions cannot be assessed for a potential discernable localized impact. The global nature of GHG emissions and the current absence of similarly established numeric standards for these emissions support the emerging consensus that a numerical threshold for determining significance should not be established for the purposes of environmental review. Therefore, the fact that a proposed project generates GHG emissions does not, in and of itself, suggest the possibility of a significant adverse impact. Consequently, developing a study area, measuring the relative increment of a project's GHG emissions as compared to a No-Action scenario, and then comparing that increment to a quantitative threshold is not appropriate; rather, the lead agency should assess the project's consistency with the GHG reduction goal by calculating the total GHG emissions associated with a project and examining the project's contribution in relation to qualitative goals for reducing GHG emissions.

There are three types of projects in which the assessment outlined below applies: (1) those where the project site is under the control of the applicant, whether private or the City; (2) those where the proposed project would result in construction on sites that are not under the control of the applicant (such as a rezoning of multiple sites); and (3) those where the project would result in development both on sites controlled by the applicant and sites not controlled by the applicant. If a project would not fit within one of these frameworks, the lead agency should consult with MOEC to determine the appropriate level and type of analysis.

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For any project where development would result on sites controlled by the applicant (project category (1) or (3) above), the applicant should conduct the analysis below to determine whether its project is consistent with GHG reduction goal.

If project category (2) or (3) applies, a GHG emissions assessment of emissions associated with sites not controlled by the applicant is unlikely to be meaningful because promotion of the GHG reduction goal through improved efficiency of site-specific building systems and similar measures cannot be achieved within the scope of the project. Therefore, the guidance below does not apply. Instead, in quantifying (calculated using Table 18-3 below), disclosing, and discussing the GHG emissions resulting from this type of project, the lead agency should qualitatively discuss the benefits or drawbacks of the project in relation to the achievement of the City's GHG reduction goal through encouragement of mixed-use, sustainable transportation-oriented development and/or GHG emissions avoided in the City as a result of the project.

321. Conducting an Assessment

A project's GHG emissions may generally be assessed in two steps: estimate the emissions for the sources discussed below and examine the project in terms of the qualitative goals for reducing GHG emissions. After the project's GHG emissions have been examined in terms of such goals, the project's consistency with the City's GHG reduction goal may be assessed.

It is recommended that the project's emissions be estimated with respect to the following main emissions sources: operations emissions (direct and indirect); mobile source emissions (direct and indirect); and, when applicable, construction emissions and emissions from solid waste management (both defined in Section 100, above). Then, the source of GHG emissions should be examined in terms of goals for reducing GHG emissions using qualitative considerations. Guidance on estimating the project's GHG emissions and comparing them to qualitative goals for GHG emissions reduction for each emission source is below.

OPERATIONS EMISSIONS

Step 1: Estimate Project Energy Usage

To quantify the GHG emissions for the operation of a building, including direct and indirect emissions from stationary sources, the lead agency should reasonably estimate energy usage from the proposed stationary sources included in the project design. If a proposed project would result in the construction of a building, a lead agency should calculate each building's emissions for heating, cooling, power, and lighting. The energy use estimated for the project in Chapter 15, "Energy," should be used to calculate a project's estimated energy consumption. To convert this energy consumption to annual GHG emissions, the following conversion factors may be used:

Table 18-2
CO_2e Conversion Factors

Energy source	kg CO_2e/MMBtu
Electricity	35.902
Natural gas	53.196
Distillate oil	73.567
Residual oil	79.217
Steam	64.306

Source: New York City Office of Long-Term Planning and Sustainability

For projects, such as a rezoning, where the whole building energy use was estimated using Table 15-1 in Chapter 15, "Energy," the specific fuel type to be used is likely unknown. Therefore, the Table 18-3,

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which provides the carbon intensity (GHG emissions per gross square foot of floor area, based on all energy sources used) for different building types in New York City, should be used to calculate the project's overall annual GHG emissions.

Table 18-3
Carbon Intensity of New York City Buildings

Building Type	kg CO_2e/sq ft
Commercial	9.43
Industrial	23.18
Institutional	11.42
Large Residential (>4 family)	6.59
Small Residential (1-4 family)	4.52

Note: This calculation includes the total annual GHG emissions from all energy sources for each building sector in 2008, as reported in the City's *Inventory of New York City Greenhouse Gas Emissions: September 2009*, divided by the total gross square feet of building area for each building sector in 2008.

Along with total operational GHG emissions, the carbon intensity, or the GHG emissions per square foot should be disclosed.

For certain projects subject to a GHG assessment, such as constructing a power plant, the lead agency should quantify emissions using a protocol developed for quantifying GHG emissions for these types of projects, such as the World Resources Institute/World Business Council for Sustainable Development's (WRI/WBCSD) Greenhouse Gas Protocol. The lead agency should consult with MOEC before using any such protocol. For the purposes of this section, the following guidance focuses on the "typical" project resulting in one or more buildings.

Step 2: Assessing a Project in Terms of Qualitative Goals to Reduce GHG Emissions

To evaluate a project's consistency with the GHG reduction goal and to analyze the effect a project may have with regard to GHG emissions, the lead agency should assess a project in terms of the goals for GHG emissions reduction by examining measures that may reduce this carbon intensity. See Section 330, "Assessment of Consistency," below for further guidance in completing this assessment.

MOBILE SOURCE EMISSIONS

Step 1: Estimate mobile source emissions

A project's mobile source emissions may be estimated using the following steps:

- Obtain the "trip generation" numbers for the number of car, truck, and other trips estimated in Chapter 16, "Transportation."
- Calculate the Vehicle Miles Traveled (VMT) for each vehicle mode (trucks, cars, and other trips) using reasonable assumptions about distances traveled, based on existing community patterns. For certain projects, such as distribution centers, more refined data may be known about the VMTs for each vehicle mode that indicates a greater likelihood of longer regional trips to and from the proposed site and, therefore, should be used instead of the recommended VMTs per vehicle mode listed below.
    - To calculate the VMT for trucks, it is recommended that 38 miles per one-way truck trip be assigned. This assumption of truck VMTs is based on academic research on

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local truck trips within New York City and is corroborated by using the Best Practices Model (BMP) developed by the New York Metropolitan Transportation Council (NYMTC) for weekday truck commercial trips for the region. While the BPM shows a slightly lower number for truck mileage in the City, it is appropriate at this time to use the more conservative 38 miles per one-way trip. As data on trucks in New York City improve, the number will be refined as necessary.

- To calculate the VMT for cars and taxis, please consult the following tables. If more specific data regarding the VMT assignment are known about a project, those data should be used.

Table 18-4
Average One-Way Trip Distance for Personal Vehicles (Miles)

	VMT		
Manhattan	***Residential***	***Office***	***Retail***
Weekday	5	5	3
Weekend	3	5	3
Other NYC	***Residential***	***Office***	***Retail***
Weekday	8	8	4
Weekend	4	8	4

Sources: *NYMTC/NJTPA Regional Travel–Household Interview Survey General Final Report (Feb. 2000)* and the *NYMTC Best Practices Model General Final Report (Jan. 2005).*

Table 18-5
Average One-Way Taxi Trip Lengths (Miles)

		Destination		
		Manhattan	***Other NYC***	***Unknown Destination***
Origin	***Manhattan***	2	9	2.32
	Other NYC	11	6	7.88
	Unknown Origin	2.32	7.88	N/A

Source: 2009 annual Taxi GPS data from the New York City Taxi and Limousine Commission.

- Assign the VMTs to arterials, local roads, or interstates/expressways using the following percentages. If more specific data regarding the VMT assignment is known about a project, those data should be used.

Table 18-6
Percentages of Daily Vehicle-Mile-Travel (VMT) by Facility Type

Facility	Manhattan	Other NYC
Freeways	30%	39%
Arterials	48%	41%
Locals	22%	20%

Source: NYMTC's Transportation Conformity Determination Draft Report-March 2010
Note: The above percentages may need to be adjusted based on the location of the proposed project and its distribution and assignments.

- Using the attached mobile GHG emissions calculator, enter the project's projected build year and VMT per arterial, local road, or interstate/expressway to obtain the total estimated mobile source GHG emissions attributable to the project.

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Step 2: Assessing a Project in Terms of Qualitative Goals to Reduce GHG Emissions

Mobile source GHG emissions constitute approximately 22 percent of the City's total GHG emissions. Therefore, a proposed project's induced mobile GHG emissions should be calculated using the above methodology. Currently, a qualitative analysis that assesses the proposed project's mobile source GHG emissions in terms of goals for reducing mobile source GHG emissions, such as reducing the motor vehicle portion of the project's predicted modal split by pursuing transit-oriented development and encouraging alternative modes of transportation, provides the qualitative information for the decision maker to determine a project's consistency with the GHG reduction goal. As noted above, both direct and indirect mobile sources should be considered.

To conduct the qualitative assessment, the following should be considered:

- Does the proposed project take advantage of opportunities for transit-oriented development?
    - Describe anticipated modal splits and potential for a greater share for non-automobile modes, including any such potential created by features of the project.
    - Describe nearby transit facilities or services and/or bicycle facilities nearby or included in the project.
    - What are the types of transit near the project? What is the distance (in miles and walking minutes) of the project from the transit service?
    - What types of trips associated with the project may be served by this transit?
    - What is the quality and type of bicycle facilities connecting the project site to other origins and destinations? How would bicycles using these facilities access the project?
    - Would there be transit services or amenities incorporated into the project (ferry landing, shuttle services, bus shelter)?
- Would the project facilitate the co-location of uses complementary to one another or to other uses within walking distance of the project? For instance, does the project introduce residences within walking distance of a local retail street, or introduce retail that would serve nearby residents?
- If there would be on-site transportation, what type would it be?

CONSTRUCTION EMISSIONS

Step 1: When to quantify construction emissions

For projects subject to a GHG assessment, the lead agency should discuss construction, extraction or production of materials or fuels qualitatively by considering the types of construction materials and equipment proposed for use on the project and the opportunities for alternative approaches (*e.g.*, different forms of concrete production) that may serve to reduce GHG emissions associated with construction. For those projects where the construction phase or the extraction or production of materials or fuels is likely to be a significant part of total project emissions, the lead agency, in its discretion, may quantify the emissions resulting from construction activity and construction materials.

Step 2: Assessing a Project in Terms of Qualitative Goals to Reduce GHG Emissions

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There are construction measures that may help achieve relatively low GHG emissions and may be considered a "best practices" benchmark, thereby achieving the goals of environmental disclosure as well as identifying avenues by which a project's contribution of GHG emissions may be minimized. For instance, fly ash (a byproduct of coal-fired power generation) or slag (a byproduct of iron production) may be used in concrete as inexpensive replacements for Portland cement—the production of which results in substantial GHG emissions. Depending on the fly ash or slag content, an applicant's commitment to use this type of concrete may reduce the associated GHG emissions. By utilizing a different form of concrete production, a project may use 30 to 40 percent less cement while maintaining the same strength. The Building for Environmental and Economic Sustainability (BEES) software at http://www.bfrl.nist.gov/oae/software/bees/ and the Buildings Energy Data Book published by the U.S. Department of Energy at http://buildingsdatabook.eren.doe.gov may be helpful when comparing several design and construction choices.

EMISSIONS FROM SOLID WASTE MANAGEMENT

Step 1: When to quantify emissions from solid waste management

For those projects that may fundamentally change the City's solid waste management system, the GHG emissions from solid waste generation, transportation, treatment, and disposal should be presented. For guidance on conducting a solid waste GHG emissions assessment, the lead agency should contact MOEC. Several tools are available to measure these emissions. Pursuant to guidance provided by New York State Department of Environmental Conservation (DEC) in its *Guide for Assessing Energy Use and Greenhouse Gas Emissions in an Environmental Impact Statement* for DEC staff reviewing an EIS pursuant to the State Environmental Quality Review Act, applicants should refer to one or more of the following three tools:

- The U.S. EPA's Waste Reduction Model (WARM) web-based calculator and Excel spreadsheet (http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html);
- The Northeast Recycling Council (NERC) Environmental Benefits Calculator (available at http://www.nerc.org/documents/environmental_benefits_calculator.html); or
- The Municipal Solid Waste Decision Support Tool (MSW-DST) developed by the U.S. EPA's Office of Research and Development and Research Triangle Institute (available at https://mswdst.rti.org/resources.htm).

These models enable applicants to derive the GHG emissions implications of different levels of solid waste generation and differing solid waste management practices.

Step 2: Comparing Project to a baseline

If it is appropriate for a project to quantify the GHG emissions from solid waste management, the baseline to be used for such an assessment is often the existing condition of the solid waste management facilities, waste transportation modes, and associated disposal facilities. Because this assessment is not common, guidance regarding the analysis of GHG emissions from solid waste generation is not specifically detailed below. Therefore, the lead agency should consult with MOEC for further guidance in quantifying and assessing GHG emissions from the management of solid waste.

330. ASSESSMENT OF CONSISTENCY WITH THE GHG REDUCTION GOAL

This assessment considers the following question:

Is the project consistent with the goal of reducing GHG emissions, specifically the attainment of the City's established GHG reduction goal of reducing citywide GHG emissions by 30 percent below 2005 levels by 2030?

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To determine the consistency with the City's overall GHG reduction goal, an applicant should assess consistency with the following goals, as relevant to the project:

- Pursue transit-oriented development;
- Generate clean, renewable power through replacement of inefficient power plants with state-of-the-art technology and expanding the use of clean distributed generation;
- Construct new resource- and energy-efficient buildings (including the use of sustainable construction materials and practices) and improve the efficiency of existing buildings; and
- Encourage sustainable transportation through improving public transit, improving the efficiency of private vehicles, and decreasing the carbon intensity of fuels.

For example, for a proposed project a number of the following characteristics would be considered consistent with the GHG reduction goal: the applicant demonstrates that (or commits to) each building would be built to Energy Star® levels; even though the development is not considered "transit-oriented development," it reduces the auto share or auto trips in a neighborhood by providing services previously unavailable to the area; the development uses co-generation, tri-generation, or other forms of renewable energy; the fuels used in the building operation produce low-GHG emissions, alternative modes of transportation are accessible and encouraged; the development commits to using fly-ash concrete to the greatest extent practicable; and low-GHG emission construction equipment and vehicles would be used for the duration of the construction. It should be noted that project may differ and specific measures that make a project consistent with the GHG reduction goal may vary. The applicant should contact MOEC if it needs further guidance on reducing its GHG emissions.

331. Assessment

In order to assess consistency with the reduction goal, the lead agency should examine how a project would reduce its carbon intensity based upon its density, fuel choices, geographic setting, avoided GHG emissions, building efficiency, *etc.* In making this determination, the lead agency should examine the analysis for operations emissions, mobile source emissions, and construction emissions, and weigh it against the considerations below.

GOAL: BUILD EFFICIENT BUILDINGS

In general, for a project to support this goal, an applicant should examine measures to reduce a building's carbon intensity insofar as feasible given the use for which the building is intended. This examination should be conducted qualitatively by considering whether a project would:

- Commit to pursuing an EPA Energy Star® rating; or
- Incorporate any of these sustainability and efficiency measures for "Building Design and Operation Measures and Site Selection and Design Measures" that would reduce the project's carbon intensity.

GOAL: USE CLEAN POWER

In general, for a project to support this goal, consider whether a project would:

- Incorporate elements that would reduce purchased electricity from non-renewable sources.
- Generate on-site power from low-carbon, renewable sources.
- Incorporate a co-generation or tri-generation system.
- Replace inefficient and more GHG-intense power generation systems or heating, cooling, and hot water systems with more efficient and less GHG-intense systems.

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- Use fuel from renewable sources or less-GHG intense fuels, such as natural gas.
- Incorporate any of the following sustainability and efficiency measures for "On-Site GHG Sources" that would reduce the project's carbon intensity.

GOALS: TRANSIT-ORIENTED DEVELOPMENT AND SUSTAINABLE TRANSPORTATION

In general, for a project to support this goal, consider whether the project would:

- Be considered "transit-oriented development," *i.e.*, is it accessible to public transit and designed to take advantage of this access.
- Incorporate measures to encourage the use of public transportation or alternative modes of transportation, such as walking or bicycling.
- Facilitate avoided GHG emissions. For instance, a shopping center being built in an area that is underserved by retail, but not highly transit-accessible may promote GHG reduction by encouraging residents to shop nearby instead of driving longer distances to suburban locations.
- Require on-site low-emission vehicles to be used.
- Incorporate any of the following sustainability and efficiency measures for "Transportation" to reduce the project's mobile GHG emissions.

GOAL: REDUCE CONSTRUCTION OPERATION EMISSIONS

In general, for a project to support this goal, consider whether the project would:

- Use low-emission construction vehicles and equipment.
- Incorporate any of the following measures to reduce the project's construction GHG emissions.
    - Diesel particulate filters;
    - Diesel oxidation catalysts;
    - Alternate low-carbon fuels; or
    - Other technologies that reduce construction operation GHG emissions.

GOAL: USE BUILDING MATERIALS WITH LOW CARBON INTENSITY

In general, for a project to support this goal, consider whether the project would:

- Replace traditional concrete/steel/materials with less carbon-intensive materials, while still maintaining appropriate building strength and compliance with applicable building and fire codes.
- Utilize a design that would result in the use of less carbon-intensive concrete and steel.

LEED® CERTIFICATION OR ENERGY STAR®

A commitment by the applicant to seek LEED® Silver certification or an EPA Energy Star® rating for the project does not automatically make a project "consistent" with the GHG reduction goal; however, it is a vehicle for helping to ensure consistency. In the event that the applicant commits to seek LEED® Silver certification, the lead agency should examine what types of credits or points an applicant plans to achieve in order to obtain LEED® Silver certification. In general, consistency with the GHG reduction goal is most likely to be achieved where the applicant commits to achieve a substantial proportion of its points in the following general areas of sustainability: energy efficiency, transit-oriented development and alternative transportation, and renewable energy.

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400. DETERMINING IMPACT SIGNIFICANCE

A proposed project may or may not be consistent with the City's GHG emission reduction goal and this potential inconsistency may be a significant impact. The above goals for reducing GHG emissions should be considered together to determine consistency with the GHG reduction goal. Consistency with the GHG reduction goal should not be measured by a project's consistency or inconsistency in any one category.

A projects' consistency or inconsistency with the City's GHG reduction goal should be stated clearly in the analysis. If a project is initially found inconsistent with the GHG reduction goal, reasonable alternatives or efficiency measures should be considered so that the project achieves consistency.

500. MITIGATION

If a project's inconsistency with the GHG reduction goal is considered significant, the lead agency should use suggested mitigation measures as guidance for minimizing the inconsistency to the greatest extent practicable. A list of potential mitigation measures is located here.

600. ALTERNATIVES

Sometimes, a proposed project's inconsistency with the GHG reduction goal may be avoided through an alternative to the project. Such changes may include alternative uses, technologies, sites, scale, or designs. The development of such alternatives should take into account the objectives and capabilities of the project sponsor, consistent with the guidance in Chapter 23, "Alternatives."

700. APPLICABLE COORDINATION

The lead agency should contact MOEC with any questions regarding applicability of the analysis, methodologies, or the consistency assessment. If appropriate, MOEC will direct the lead agency to one of the City's expert agencies.

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NOISE

CHAPTER 19

Noise, in its simplest definition, is unwanted sound. While high noise levels may cause hearing loss, the levels associated with environmental noise assessments are often below this hazardous range. However, noise levels that are not considered hazardous should not be overlooked, since they can cause stress-related illnesses, disrupt sleep, and interrupt activities requiring concentration. In New York City, with its high concentration of population and commercial activities, such problems may be common.

This chapter discusses the topic of noise as it relates to regulations and guidelines that govern activities in New York City. It defines technical terms, discusses the appropriateness of a noise analysis, and provides information related to detailed noise analyses, study area definitions, technical subareas, models, and analysis techniques used. Also discussed are methods used by agencies for projects within and outside New York City as well as accepted industry practices for environmental noise assessments applicable to New York City projects. Relative to noise, the goal of CEQR is to determine both (1) a proposed project's potential effects on sensitive noise receptors, including the effects on the level of noise inside residential, commercial, and institutional facilities (if applicable) and (2) the effects of ambient noise levels on new sensitive uses introduced by the proposed project. If significant adverse impacts are identified, CEQR requires such impacts to be mitigated or avoided to the greatest extent practicable.

As mentioned throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. In addition, the New York City Department of Environmental Protection (DEP) often works with the lead agency during the CEQR process to provide technical review, recommendations and approvals relating to noise. When the review identifies the need for long-term measures to be incorporated after CEQR (prior to or during development), the lead agency, in coordination with DEP, determines whether an institutional control, such as an (E) Designation, may be placed on the affected site. The Mayor's Office of Environmental Remediation (OER) has the authority and responsibility for administering post-CEQR (E) Designations and existing Restrictive Declarations, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York.

100. DEFINITIONS

In addition to defining technical terms used in a noise assessment, this section provides background information to better understand such an assessment.

110. SOURCES OF NOISE

For CEQR purposes, the three principal types of noise sources that affect the New York City environment are mobile, stationary, and construction sources.

111. MOBILE SOURCE NOISE

Mobile sources are those noise sources that move in relation to a noise-sensitive receptor—principally automobiles, buses, trucks, aircraft, and trains. Each has its own distinctive noise character, and, consequently, an associated set of noise assessment descriptors. The details of these signatures and descriptors are discussed in following sections.

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112. STATIONARY SOURCE NOISE

Stationary sources of noise do not move in relation to a noise-sensitive receptor. Typical stationary noise sources of concern for CEQR include machinery or mechanical equipment associated with industrial and manufacturing operations; or building heating, ventilating, and air-conditioning systems. In addition, noise produced by crowds of people within a defined location, such as children in playgrounds or spectators attending concerts or sporting events and noise produced by concerts or by announcements using amplification systems, are considered stationary sources.

113. CONSTRUCTION NOISE

Construction noise sources comprise both mobile (*e.g.*, trucks, bulldozers, *etc.*) and stationary (*e.g.*, compressors, pile drivers, power tools, *etc.*) sources. Construction noise is examined separately in Chapter 22, "Construction Impacts," because it is temporary, even though the duration of construction activities may last years. The duration of each phase of construction is a factor that should be considered when assessing noise from construction activities. See Chapter 22, "Construction Impacts," for more guidance.

120. BACKGROUND DISCUSSION

This section provides the reader with a background of the terminology used in noise assessment discussions, the basic physical characteristics of noise, the types and appropriate use of noise descriptors, and what are considered receptors (noise-sensitive locations) in the conduct of noise analyses.

121. CHARACTERISTICS OF NOISE

The first step in understanding the impact of sound, its perception, and control is an understanding of the source, path, and receptor. The source is the equipment or process directly responsible for the sound generation. The path is the medium of sound propagation, such as air, water, or solid materials. The receptor is the final destination of concern for the sound in question. For CEQR purposes, the receptor is usually persons being affected; the ear of an affected person is the final destination of the noise source of concern. Each link of this chain plays a role in producing a resultant sound pressure level at the receptor.

122. SOUND LEVELS: PROPAGATION VELOCITY, WAVELENGTHS AND FREQUENCIES, AND DIFFRACTION

Sound pressure is the parameter that is normally measured in noise assessments. People's ears respond to "acoustic" pressures that represent the range from the threshold of hearing to the threshold of pain. This vast range is represented as a logarithmic scale.

A basic measure of sound is the sound pressure level (SPL), which is expressed in decibels (denoted dB). When the SPL = 0 dB, the acoustic pressure is the same as the threshold of hearing, or the SPL at which people with healthy hearing can just begin to hear a sound.

Sound is emitted as a wave of varying length and frequency. A higher frequency sound is perceived as a higher pitch—for example, the sound of the flute. A lower frequency is heard as a lower pitch—for example, the sound of the bass drum. The frequency is expressed in cycles per second or Hertz (Hz): one Hz is one cycle per second. Just as the ear cannot hear sound pressure levels below a certain range, it cannot hear some frequencies above a certain range. The normal range of hearing is 20 Hz to 20,000 Hz or 20 kiloHertz (kHz).

The velocity of sound, which is constant in air, is governed by the relationship 'velocity equals wave length times frequency.' Therefore, since sound travels at a constant velocity in air, the longer the wavelength, the shorter the frequency, and vice versa. The wavelength determines how the sound interacts with the physical environment. Since sound is a wave phenomenon, it is also subject to "diffraction," such as "bending" around corners. This is why a person continues to hear some sound from a source on the other side of a wall that is higher than the individual in question.

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In general, hearing is such that a change of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving of sound level. In a large open area with no obstructive or reflective surfaces, SPL drops from a point source of noise at a rate of 6 dB with each doubling of distance from the source. For "line" sources (such as vehicles on a street), the SPL drops off at a rate of 3 dB(A) with each doubling of the distance from the source. Over distances greater than 1,000 feet, this may not hold true, as atmospheric conditions cause changes in sound path and absorption. The drop-off rate also varies with both terrain conditions and the presence of obstructions. In the urban canyon environment present in New York City, drop-off rates along city streets generally range from 2 to 4 dB per doubling of distance from the source because of sound reflections from buildings. The drop-off rate should be verified by field measurements whenever ideal open situations do not exist and a drop-off rate is required in the analysis.

123. NOISE DESCRIPTORS

Many descriptors are commonly used in environmental noise assessments. The choice of specific descriptors is related to the nature of the noise "signature" (SPL, frequency, and duration) of the source and the potential effect it may have on the surrounding environment.

123.1. Sound Weighting

Sound is often measured and described in terms of its overall energy, taking all frequencies into account. However, the hearing process is not the same at all frequencies. Over the normal hearing range, humans are most sensitive to sounds with frequencies between 200 Hz and 10 kHz. Therefore, noise measurements are often adjusted or weighted as a function of frequency to account for human perception and sensitivities. The most common weighting networks used are the A- and C-weighting networks.

These weight scales were developed to allow sound level meters to simulate the frequency sensitivity of the ear. They use filter networks that approximate hearing. The A-weighted network is the most commonly used and sound levels measured using this weighting are noted as dB(A). The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does. A listing of common noise sources with their associated typical dB(A) values is shown in Table 19-1. Note that the table presents a representative range of noise levels, where 0 dB(A) corresponds to the threshold of hearing and 120 dBA corresponds to an air raid siren at 50 feet.

Table 19-1
Noise Levels of Common Sources

Sound Source	SPL (dB(A))
Air Raid Siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Platform by Passing Subway Train	100
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60-70
Typical Suburban Area	50-60
Quiet Suburban Area at Night	40-50
Typical Rural Area at Night	30-40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of Hearing	0

Notes: A change in 3 dB(A) is a just noticeable change in SPL. A change in 10 dB(A) is perceived as a doubling or halving in SPL.

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Sources: Cowan, James P. Handbook of Environmental Acoustics. Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

The C-weighted network provides essentially the unweighted microphone sensitivity over the frequency range of maximum human sensitivity. C-weighted measurements, denoted as dB(C), are used in some ordinances and standards, usually when dealing with stationary mechanical noise sources; however, dB(A) are normally used for environmental assessments. Since C-weighting does not attenuate frequency levels below 1,000 Hz the way A-weighting does, inspection of dB(A) versus dB(C) readings may give a quick estimate of the low frequency contribution of the sound source in question.

The most common descriptors used in environmental noise assessments are (1) time-equivalent level (L_{eq}); (2) day-night level (L_{dn}); (3) percentile level (L_x); (4) sound exposure level (SEL); and (5) maximum instantaneous level (SPL). Each is typically based upon A-weighted measurements and described briefly below.

- L_{eq} is the continuous equivalent sound level, defined as the single SPL that, if constant over the stated measurement period, would contain the same sound energy as the actual monitored sound that is fluctuating in level over the measurement period. L_{eq} is widely recognized as the descriptor of choice for most environmental noise assessments. In addition to its simplicity, it is easy to combine with other readings or predictions to derive a total noise level. L_{eq} is an energy-average quantity that must be contrasted with an average or median sound level. L_{eq} must be qualified in terms of a time period to have meaning. The normal representation for the time period is placing it in parentheses in terms of hours (*e.g.*, $L_{eq(1)}$ refers to a 1-hour measurement and $L_{eq(24)}$ refers to a 24-hour measurement).

- L_{dn} is the day-night equivalent sound level, defined as a 24-hour continuous L_{eq} with a 10 dB adjustment added to all hourly noise levels recorded between the hours of 10 PM and 7 AM. This 10 dB addition accounts for the extra sensitivity people have to noise during typical sleeping hours. Aircraft noise around airports is usually mapped out in terms of L_{dn} contours, which are constant lines of L_{dn} mapped similarly to elevations on topographical maps.

- L_x is the percentile level, where x is any number from 0 to 100. Here x is percentage of the measurement time that the stated sound level has been exceeded. For example, L_{10} = 80 dB(A) means that SPL measurements exceeded 80 dB(A) 10 percent of the time during the measurement period. As with L_{eq}, the measurement time period must be specified and is denoted in parentheses (*i.e.*, $L_{10(1)}$ corresponds to the SPL exceeded 10 percent of the time during a one-hour period).

  The most commonly used L_x values are L_1, L_{10}, L_{50}, and L_{90}. L_1, the SPL exceeded 1 percent of the time, is usually regarded as the average maximum noise level when readings are an hour or less in duration. L_{10} is usually regarded as an indication of traffic noise exposure with a steady flow of evenly-spaced vehicles. L_{50} provides an indication of the median sound level. L_{90} is usually regarded as the residual level, or the background noise level without the source in question or discrete events.

- SEL is the sound exposure level, defined as a single number rating indicating the total energy of a discrete noise-generating event (*e.g.*, an aircraft flyover) compressed into a 1-second time duration. This level is handy as a consistent rating method that may be combined with other SEL and L_{eq} readings to provide a complete noise scenario for measurements and predictions. However, care must be taken in the use of these values since they may be misleading because their numeric value is higher than any sound level which existed during the measurement period.

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- The maximum instantaneous SPL is the highest single reading over the measurement period. It is useful to note this level because if it is very high, it elevates the L_{eq}, perhaps making it appear spurious. In instances where uses may be particularly sensitive to single event noise events, the lead agency should also consider analyzing potential noise impacts on a single event basis, particularly if the single event would be entirely new to the receptor, or where the receptor would experience a significant increase in the number of these single events.

Recommended descriptors for characterizing various types of noise are provided below. The discussion includes a notation of major agencies that use different descriptors for noise analysis purposes. It should be noted that the Noise Exposure Guidelines recommended by DEP (see Section 420, below) are expressed in terms of L_{10} for vehicular noise, daily L_{dn} for rail sources, and yearly L_{dn} for aircraft. The New York City Noise Control Code specifies maximum allowable sound pressure levels for designated octave bands emanating from a commercial or business enterprise as measured within a receiving property (see Section 711, below). In addition, the New York City Zoning Resolution uses maximum instantaneous octave band sound pressure levels as its noise descriptor for industrial noise sources (see Section 712, below). Detailed analyses in these areas, if required, should include these descriptors for those assessments.

123.2. Descriptors for Mobile Sources

Each type of mobile source noise generator produces a distinct noise. The use of different descriptors for each is appropriate, as described below.

VEHICULAR TRAFFIC

Because vehicular traffic on local streets is not steady—vehicles often move by in groups or platoons—its noise signature is characterized by fluctuating levels. If the traffic stream is characterized by sporadic heavy vehicles such as trucks, the noise levels could contain "spikes" associated with these events. For that reason it is generally best to use the descriptors of $L_{eq(1)}$ or $L_{10(1)}$ in a noise assessment. $L_{eq(1)}$ captures an hour's total noise energy at the location, and $L_{10(1)}$ represents the level exceeded 10 percent of the time. The $L_{10(1)}$ descriptor may be considered an average of the peak noise levels at a given location. If the noise fluctuates very little, then L_{eq} approximates L_{50}, or the median level. If the noise fluctuates broadly, then the L_{eq} is about equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} could exceed L_{90}, or the background level, by 10 or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance depend on the character of the noise. In community noise measurements, L_{eq} generally lies between L_{10} and L_{50}, but is often closer to L_{10} where fluctuating traffic noise is the dominant noise source.

AIRCRAFT

Aircraft noise consists of a series of single events over time. Depending on the location of and ambient noise levels at the receptor, these single events may be easily distinguishable from background noise levels. This is particularly true, for example, where the receptor is close to an airport and in the flight path. The Federal Aviation Administration (FAA) currently averages daily L_{dn} levels to use the yearly L_{dn} as its preferred noise descriptor. The distance from the flight path where various L_{dn} levels occur is measured (or calculated) and then mapped. These L_{dn} "noise contours" constitute the basic form of reference for assessing impacts associated with aircraft noise. Many airports are monitored to derive annual L_{dn} contours, and the FAA has its own computer program to calculate L_{dn} contours. The Noise Exposure Guidelines (see Section 420 below) also use the annual L_{dn} descriptor, patterned after FAA specifications for descriptor use. Therefore, when it is necessary to conduct a detailed noise analysis involving aircraft noise, the annual L_{dn} descriptor should be used in the analyses. Measured annual L_{dn} values are available from the Port Authority of New York and New Jersey (PA-

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NYNJ) for its facilities in the form of noise contour maps, or may be calculated using the federally-approved INM computer model and flight data from the Port Authority.

Based on flight data, it is also possible to establish $L_{eq(1)}$ noise levels for existing and future conditions. Since annual L_{dn} values tend to average out high hourly values, it is recommended that the $L_{eq(1)}$ descriptor be used in this noise analysis (see Section 332, below).

TRAINS

Similar to aircraft noise, train noise comprises a series of single events over time. Depending on the location of the receptor and ambient noise levels, these single events may be easily distinguishable from background noise levels. This is particularly true, for example, at noise receptors close to elevated rail lines. The Federal Transit Administration (FTA - formerly UMTA), depending on the adjacent land use, uses the $L_{eq(1)}$ or L_{dn} as its principal noise descriptors for mass transit noise. The Noise Exposure Guidelines (see Section 420 below) for noise assessment require the use of the daily L_{dn} for impact assessment. Because of these standards, it is recommended that the L_{dn} be used in the analysis of train noise. However, because the L_{dn} descriptor tends to average out high hourly values over 24 hours, it is recommended that the $L_{eq(1)}$ descriptors be used for purposes of impact analysis.

123.3. Descriptors for Stationary Sources

Stationary source noise is usually associated with mechanical equipment used for manufacturing purposes or building mechanical systems. Other stationary sources worth noting are crowd noise, as related to playgrounds or spectator events, and noise from amplification systems. In many cases, the nature of this noise is fairly uniform. The recommended descriptor for this type of noise source is the $L_{eq(1)}$ descriptor. However, for purposes of developing noise attenuation measures for mechanical equipment, the analysis should generally be performed using the octave band components of the sound. The analysis should include the 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 Hz octave band center frequencies.

124. RECEPTORS

Receptors are generally the subject of most noise impact analyses. A noise-sensitive location (known as a "receptor") is usually defined as an area where human activity may be adversely affected when noise levels exceed predefined thresholds of acceptability or when noise levels increase by an amount exceeding a predefined threshold of change. These receptors either currently exist or would be introduced by the project. These locations may be indoors or outdoors. Indoor receptors include, but are not limited to, residences, hotels, motels, health care facilities, nursing homes, schools, houses of worship, court houses, public meeting facilities, museums, libraries, and theaters. Outdoor receptors include, but are not limited to, parks, outdoor theaters, golf courses, zoos, campgrounds, and beaches.

Land use and zoning maps are usually helpful in initially targeting receptors that should be analyzed; however, field inspection of the area in question is the most appropriate way to identify all receptors that may be affected by the proposed project. In some cases additional receptor sites may need to be identified after the initial analysis has been performed to ensure that the extent of the area where significant impacts may occur has been defined.

130. NOISE CHARACTERISTICS OF TYPICAL NOISE SOURCES

131. MOBILE SOURCES

131.1. Vehicular Traffic

Vehicular traffic includes automobiles, buses, and trucks. The noise generated by these vehicles comes from the operation of its engine and the sound of its tires passing over the roadbed. Buses and trucks are similar in their respective noise generating characteristics, while cars are different.

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Automobiles generally produce noise levels that are independent of vehicle speed, but vary with engine speed. With changing gears, the noise levels tend to increase in a sawtooth kind of pattern as vehicular speed increases. The interaction of the road surface with the tires generates noise that increases with vehicle speed. At vehicular speeds below 30 miles per hour, the typical automobile noise spectrum is dominated by engine noise. At speeds higher than 30 miles per hour, the automobile noise signature is composed of a combination of lower frequency engine noise and higher frequency tire noise. The engine and tire noise for vehicular speeds above 30 miles per hour are comparable in noise level.

Noise generated by buses and heavy trucks is also composed of engine and tire noise, but tire noise tends to dominate the noise signature at vehicular speeds above 30 miles per hour in trucks and buses. Cargo load normally does not significantly affect noise levels because increased load usually results in decreased vehicular speed and the effects cancel each other out. Because individual trucks and buses are noisier than individual automobiles, the concept of Passenger Car Equivalents is used (see Subsection 332.1).

131.2. Aircraft Operations

The principal noise sources from conventional aircraft (airplanes and helicopters) using New York City airspace are the propulsion system and aerodynamic noise. There are generally three types of engines in use on contemporary airplanes —turbojet, turbofan, and propeller. For turbojets and turbofans, the dominant noise source is the exhaust, generating the characteristic low frequency roar of the jet engine. Propeller aircraft have combinations of engine exhaust noise and propeller noise, with the propeller component usually dominating. This produces the typical whining sound of propeller-driven aircraft.

Aerodynamic noise is generated by airflow around the fuselage, cavities, control surfaces, and landing gear of the aircraft. Aerodynamic noise is usually only dominant during cruise conditions (frequencies above 600 Hz). Conditions during takeoff and landing normally cause propulsion system noise to dominate the aerodynamic component.

Helicopter noise is generated by the engine and main rotor system. The engine noise is similar to that discussed for airplanes, but on a smaller scale. Rotor noise is characterized by slaps or cracks caused by the sharp variations in pressure encountered by the rotating rotor blades as they pass through the aerodynamic wake produced by each adjacent blade. As for propeller noise, the frequency of the rotor noise is proportional to the tip speed and the number of blades in the rotor system.

131.3. Rail Operations

In general, the principal noise sources of rail systems are the interaction between wheels and rails, the propulsion system of the railcars, brakes, and auxiliary equipment (ventilation and horns). The dominant cause of railcar noise over most of the typical speed range is interaction between the wheels and rails. In general, noise increases with train speed and train length.

Noise levels are dependent upon the rail guideway configuration (*i.e.*, whether the track is at-grade, welded rail, joined track, embedded track on grade, or aerial structure with slab track) and whether there are any noise barriers or berms in place.

When railcars travel on tight curves, the dominant noise emitted may be a high pitched squeal or screech. This is usually caused by metal wheels sliding on the rail and scraping metal on metal when the train negotiates a curve.

Other concerns relating to rail operations that may need to be addressed include noise from train crossovers and switches, as well as noise from train warning horns. In some limited situations, noise from new or increased rail yard operations may also have to be examined.

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132. STATIONARY SOURCES

The principal stationary noise sources encountered in the City are mechanical equipment associated with industrial and manufacturing operations and building ventilating systems. Other stationary sources worth noting are crowd noise related to playgrounds or spectator events, and noise from amplification systems. The basic characteristics of these sources are described below.

Mechanical equipment generally includes machinery used for industrial purposes, such as motors, compressors, boilers, pumps, transformers, condensers, generators, cooling towers, and ventilating equipment. Such machinery commonly generates noise mechanically (through gears, bearings, belts, fans, or other rotating components), aerodynamically (through air or fluid flow), and magnetically (through magnetostriction or periodic forces between rotors and stators).

Assuming proper maintenance, mechanical machinery noise is usually characterized by discrete mid- to high-frequency tones. These tones are usually caused by friction, vibration of components, and aerodynamic flow generation. Even when large machinery is properly maintained, noise levels may exceed 100 dB(A) within 10 feet of the equipment. Badly maintained machinery may increase mechanical noise levels by as much as 20 dB(A); this represents a quadrupling of the perceived loudness.

Common mechanical stationary noise sources in the City are ventilating systems. These usually have fans that generate tones at high operating speeds. These tones may propagate through ducts in a building and produce noise in rooms far away from the original source. Air conditioning units may generate noise that could affect adjacent buildings. If not isolated from the building structure by properly tuned springs or resilient materials, ventilating systems and other machinery may generate vibrations that may be sensed throughout a building and possibly a neighborhood.

Aerodynamic noise usually becomes an issue when the air (or other fluid) flows through ducts in a restrictive, unsmooth path, and turbulence is generated. Boilers and steam turbines have liquids and steam flowing through them at high speeds, generating a hissing noise or roaring noise that may exceed 100 dB(A) within 10 feet.

While people are not usually thought of as stationary noise sources, children in playgrounds or spectators at outdoor sporting events or concerts may cause annoyance in communities. Instantaneous crowd noise levels at outdoor events may exceed 90 dB(A). In addition, measurements taken at 10 school playground sites in 1987 concluded that maximum $L_{eq(1)}$ levels at school playground boundaries in the New York City area are 75 dB(A). The equations for calculating playground noise may be obtained from DEP.

Potential noise impacts due to amplification systems at outdoor concert or performance facilities, ballparks, amusement facilities, *etc.*, may be avoided if the system is properly designed and operated (see Section 333).

200. DETERMINING WHETHER A NOISE ANALYSIS IS APPROPRIATE

In many instances, it is possible to determine that a project would not have the potential for a significant noise impact simply from its proposed physical characteristics and, therefore, no further analysis is necessary. Recommended guidelines for the screening assessment and the rationale behind these guidelines are presented below for mobile and stationary sources.

The initial impact screening considers whether the project would: (1) generate any mobile or stationary sources of noise; and/or (2) be located in an area with existing high ambient noise levels. If the proposed project is located in areas with high ambient noise levels, which typically include those near highly-trafficked thoroughfares, airports, rail, or other loud activities, further noise analysis may be warranted to determine the attenuation measures for the proposed project.

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210. MOBILE SOURCES

211. VEHICULAR TRAFFIC NOISE

An initial noise assessment may be appropriate if a proposed project would:

- Generate or reroute vehicular traffic; or
- Be located near a heavily trafficked thoroughfare.

212. AIRCRAFT NOISE

An initial noise impact screening analysis, described in Subsection 311.2, is appropriate if the proposed project would:

- Introduce a new receptor and would be located within one mile of an existing flight path; or
- Cause aircraft to fly through existing or new flight paths over or within one mile (horizontal distance parallel to the ground) of a receptor.

213. TRAIN NOISE

Based on previous studies, unless existing ambient noise levels are very low and there are no structures that provide shielding, it is unusual for rail activity to have a significant impact at distances beyond 1,500 feet in New York City. Therefore, a detailed analysis, as described in Subsection 332.3, may be appropriate if the proposed project would:

- Be located within 1,500 feet of existing rail activity and have a direct line of sight to that rail facility; or
- Add rail activity to existing or new rail lines within 1,500 feet of, and have a direct line of site to, a receptor.

220. STATIONARY SOURCES

Based upon previous studies, unless existing ambient noise levels are very low and/or stationary source levels are very high, and there are no structures that provide shielding, it is unusual for stationary sources to have significant impacts at distances beyond 1,500 feet in New York City. Examples of substantial stationary source noise generators include unenclosed cooling or ventilation equipment (other than single-room units), truck loading docks, loudspeaker systems, stationary diesel engines (typically more than 100 horsepower), car washes, or other similar types of uses. The distance between a receptor and a substantial stationary source may be measured from a Sanborn map or similar real estate or insurance atlas. Therefore, a detailed analysis, as described in Subsection 333, may be appropriate if the proposed project would:

- Cause a substantial stationary source (*i.e.* unenclosed mechanical equipment for manufacturing or building ventilation purposes, playground) to be operating within 1,500 feet of a receptor, with a direct line of sight to that receptor; or
- Introduce a receptor in an area with high ambient noise levels resulting from stationary sources, such as unenclosed manufacturing activities or other loud uses.

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300. ASSESSMENT METHODS

If the proposed project does not screen out in the initial noise impact screening analysis below, a more detailed noise analysis, which begins with establishing the study area in Section 320, may be appropriate.

310. NOISE IMPACT SCREENING

For most sources of noise (except train noise), the initial impact screening noise analysis identifies whether the potential exists for the project to generate a significant noise impact at a receptor or be significantly affected by high ambient noise levels. If the basic analysis does not identify the potential for significant impacts, no further noise analysis is necessary and it may be stated that the proposed project would not result in a significant noise impact.

311. MOBILE SOURCES

311.1. Vehicular Noise

In coordination with the traffic studies (see Chapter 16 of the Manual), traffic volumes should be estimated for the expected hour or hours with the greatest noise level change at sensitive receptors likely to be most affected by the proposed project. For some projects, the worst-case hour or hours may occur during non-typical time periods (*i.e.*, during the nighttime for projects which produce significant traffic volumes or truck traffic when baseline traffic levels and/or ambient noise levels are low.) The method for assigning noise passenger car equivalent (Noise PCE) values to vehicle type is discussed in Subsection 332.1, below. If existing Noise PCE values are increased by 100 percent or more due to a proposed project (which is equivalent to an increase of 3 dB(A) or more), a detailed analysis is generally performed. Conversely, if existing Noise PCE values are not increased by 100 percent or more, it is likely that the proposed project would not cause a significant adverse vehicular noise impact, and therefore, no further vehicular noise analysis is needed.

311.2. Aircraft Noise

Yearly L_{dn} contours should be obtained or calculated for the build year(s) of the proposed project. Calculation of the yearly L_{dn} contours is seldom necessary, since these contours are updated periodically by the Port Authority of New York and New Jersey (PANYNJ) for the three major metropolitan airports, which may be contacted for the latest contours. If calculations are necessary, they may be performed using the FAA hand-calculation methodology or the Federal INM V7.0a computer model. Starting with the release of INM Version 7.0, INM capabilities replace the HNM for the evaluation of helicopter noise impacts. Helicopter noise may be calculated using the FAA INM V7.0a computer model or other acceptable modeling based on actual noise measurements of helicopter flyovers. If the proposed project would cause a receptor to be located within an L_{dn} 65 contour or greater, or if the proposed project would introduce a receptor within this area for an existing flight path, a detailed analysis may be appropriate. If the proposed project would either not be located within an L_{dn} 65 contour or greater or not introduce a receptor within this area of an existing flight path, it is likely that the proposed project would not result in a significant adverse aircraft noise impact, and therefore, no further aircraft noise analysis is needed.

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312. STATIONARY SOURCES

A more refined screen to determine whether a detailed noise analysis is necessary analyzes whether noise from a stationary source would produce potentially significant levels at nearby receptor sites. Figure 19-1 shows noise levels in sound power levels versus distance. If the sound power level exceeds at a given distance shown in Figure 19-1, then a detailed analysis is necessary.

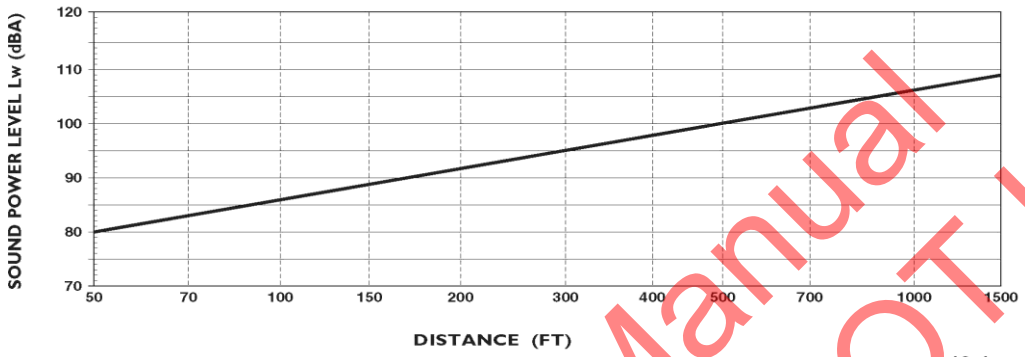


Figure 19-1
Curve for Estimating Lw vs. Distance in Screening Noise Analysis

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320. ESTABLISHING STUDY AREAS AND IDENTIFYING RECEPTORS

Guidelines for determining the appropriate study area size and noise receptor locations are described below. Selection of a study area depends on the noise source. Both the effect of noise generated on surrounding receptors as a result of the proposed project and the effect of noise from surrounding sources on the proposed project need to be considered. It should be noted that receptor sites should generally include all locations where significant impacts may occur. Therefore, if significant impacts are identified during the analysis, additional receptor sites, sometimes farther from the noise source than the distance suggested in these guidelines, may have to be added to the analysis. For rezoning purposes, please consult with the Department of City Planning (DCP) prior to selection of sensitive receptors (see Subsection 124), which are identified based on land use in the study area as a result of the proposed project.

321. MOBILE SOURCES OF NOISE

321.1. Vehicular Traffic Sources

The study area for potential noise impacts from vehicular sources includes the locations of receptors along traffic routes to and from the site along which project vehicular trips are assigned, and the proposed site itself, if a receptor would be located there. Of particular importance are routes where traffic levels without the proposed project would be light and made up of lighter vehicles, and where the proposed project would result in a significant number of new trips. Typically, the selection of sensitive noise receptors for analysis goes hand in hand with the traffic and transportation trip generation and assignment process. Once the vehicular trips have been assigned to the roadway network, the potential locations where significant noise impacts could occur may be identified. Typically, this is done by driving the routes to and from the site to identify noise receptors along those routes.

Of particular importance in selecting these receptor locations is the consideration of the existing vehicular mix and the vehicular mix that would be generated by the proposed project. Under noise analysis procedures, vehicles are converted to Noise PCEs, which in turn are used to compute the noise levels for future conditions (See Subsection 332.1). If a significant increase in the number of

Noise PCEs is expected (*i.e.*, more than a doubling of Noise PCEs) along any given route that proposed project-related vehicles would use going to and coming from the site within a given hour, then representative receptors should be selected along that route for analysis. The project itself should also be considered as a receptor if it would include a noise sensitive use. Usually at this stage, these judgments are made without firm data in hand. It is therefore prudent to be conservative in this judgment regarding the analysis locations (*i.e.*, analyze any receptor that may conceivably be affected as a noise analysis location). The actual selection of the potential noise receptor sites may be narrowed if more data are available since potential noise increases along these routes may be calculated.

321.2. Aircraft Sources

Three types of projects require study areas for aircraft-related noise sources: a proposed project that would include a new or expanded aircraft facility, renewal of a lease for an existing facility, or a receptor that would be affected by a proposed project that is near a flight path of an existing aircraft facility and that is typically within the annual 65 dB(A) L_{dn} contour of the existing aircraft facility. The study area for a new/expanded aircraft facility or a lease renewal (which is more commonly undertaken by a city agency) are essentially the same. In this case, selection of the study area and the sensitive receptors within it should be based on preliminary calculations and mapping of noise contours. Representative locations are then selected from within these areas for detailed noise impact analysis. Every receptor need not be selected for this purpose. For example, if there were a number of residential buildings within this area, then one or more representative receptor sites may be selected within the 60-65 dB(A) L_{dn} contours, one or more representative receptor sites between the 65 to 70 dB(A) L_{dn} contours, and so on. The same exercise may be repeated for other types of receptors within the critical contours.

For airport expansions that would include increase of aircraft at the facility, the study area should include receptors within the revised 65 L_{dn} contour prepared for the expansion, assuming the proposed expansion was fully operational. Representative receptors are then selected from within this study area for aircraft sources for detailed noise impact analysis.

If a proposed project is located near a flight path of an existing aircraft facility and is within an existing 65 dB(A) L_{dn} contour, then the proposed project would introduce a receptor and the study area is the site of the proposed project itself.

321.3. Rail Facility Sources

Two types of projects generally require study areas for rail-related noise sources: a proposed project that introduces a receptor located within approximately 1,500 feet of an existing rail facility and generally having a direct line of sight to the rail facility; or a proposed project that would include a new rail facility or that would add trains to an existing facility. Similar to aircraft facilities, representative locations should be selected from within the areas most likely to be impacted by the proposed project for projects that would provide new rail facilities or would add trains to an existing rail facility. Not every receptor need be selected for this purpose. However, sufficient data should be collected to define the entire area that may be significantly impacted by the noise level changes.

If a proposed project is within 1,500 feet of, and has a direct line of sight to, an existing rail facility, and the proposed project would be a receptor, the study area should encompass the proposed project site.

322. STATIONARY SOURCES

The study area for stationary sources is based on proximity of a receptor to the site of the proposed project, or the proximity of the proposed project to a major stationary noise source in the area. When the project would result in a new sensitive receptor within 1,500 feet of a stationary noise source, with a direct line of sight to that source, the receptor and source should be considered for analysis. Generally, when the proposed

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project would result in any significant stationary noise sources, receptors within a 1,500-foot radius of the proposed project that would be within a direct line of sight of the proposed project should be considered for analysis. Receptors closest to a proposed project containing a significant stationary source noise generator are the first candidates for inclusion in the analysis. If there is more than one such receptor within this distance from the site, the analysis may be phased to analyze the closest receptor first —if no significant impact is found at the closest site, then it is reasonable to conclude that receptors farther from the site would also not be affected by the proposed project. Otherwise, it is necessary to extend the analysis to the farthest receptor where no significant impact is found. A similar relationship between the proposed project and existing and future No-Action stationary sources should be described, as appropriate. Although these sources may not have to be analyzed separately (because they are included in ambient noise levels) they should be generally identified. It is possible that one or more may be close enough to the site of the proposed project and loud enough to require consideration of noise mitigation at the project site.

330. MODELS AND ANALYSIS TECHNIQUES

The basic analysis techniques used for noise impact analysis follow the same basic procedures as for other impact analysis areas —existing conditions are first characterized, then No-Action conditions are projected and analyzed, and finally, the With-Action condition is projected and analyzed. Impact assessments are then made by comparing the No-Action and With-Action conditions. The following discussion outlines this procedure for mobile sources and stationary sources of noise.

331. NOISE MEASUREMENT PROCEDURES

The first procedure for each noise source is to characterize existing conditions at selected receptor locations within the noise study areas. As a first step within this process, existing noise levels at receptors are established through a noise measurement program. This noise measurement program described below follows a method consistent for all sensitive receptors.

331.1. Noise Measurement Instrumentation

The most common instruments used for environmental noise assessment are sound level meters and spectrum analyzers. The American National Standards Institute (ANSI) has published standards on types of meters and methods of sound measurement. ANSI defines three types of meters—Type 0, having the most stringent tolerances, targeted for laboratory use; Type 1, called a precision meter; and Type 2, a general-purpose meter, having the least stringent tolerances acceptable for SPL monitoring. Sound level meters without at least Type 2 tolerances are not appropriate for SPL monitoring. Many sound level meters available for use today can measure and store in their memory the various statistical and average sound level parameters described earlier. These parameters may be read directly from the sound level meter or downloaded to a computer. Many of these devices may be programmed to carry out these measurements for a user-defined period at regular intervals, making long term monitoring even more convenient. Instrumentation used for the measurements must meet appropriate ANSI standards.

Most sound level meters have three time response characteristics —slow, fast, and impulsive. Slow, corresponding to a one second time constant, is usually recommended for environmental noise assessments, such as those performed for CEQR. Fast, corresponding to a one-eighth second time constant, is usually recommended to monitor discrete events to get a better indication of peak levels. Impulsive, corresponding to 1/30 second, is used for assessing human loudness response to impulsive sounds.

331.2. Noise Measurement Procedures

ANSI also provides guidelines for SPL measurement practices to provide reliable data. Basic measurement procedures are defined by these standards and accepted industry practices.

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These guidelines account for microphone placement, calibration of instruments, and precautions pertaining to meteorological conditions, principally wind speed. The following are general guidelines for reference.

CALIBRATION. To be sure that the meter is working properly, measuring instrument calibration should be checked before and after each series of readings. Typical sound level calibrators are small hand-held devices with adapters to fit the measuring microphone of the meter being used. With a properly operating meter and calibrator, the meter should not vary by more than 0.5 dB. Any variation beyond 0.5 dB that cannot be accounted for is an indication that the device should be returned to the manufacturer for adjustment and calibration. In no case should a meter be adjusted manually in the field unless a new microphone is being fitted. Calibrators and sound meters should be factory-calibrated at least once a year.

MICROPHONE PLACEMENT. To avoid distortion, the measuring microphone is placed a minimum of 3 to 4 feet away from any reflecting surfaces, including the ground, walls, and the body of the person performing the measurements. Failure to do so may introduce errors as high as 6 dB from reflected sound. Whenever feasible, the meter should be mounted on a tripod to permit the monitoring personnel to stand away from the instrument. Complete records of the measurement, including specifics of the measurement location(s), a map of the monitoring location(s), time of measurement(s), meteorological conditions during the measurement(s), identification of significant sound sources, model and serial numbers of all equipment used, and calibration results should be made. The electronic log files from the sound level meter should also be provided. This allows for accurate duplication of the measurements, if necessary, due to questions, changes in conditions, or inconsistencies.

ACCOUNTING FOR WIND. When measurements are performed outdoors or in areas where airflow may be sensed, the movement of air may skew the monitoring results because wind may introduce errors of as much as 20 dB over actual noise levels. Therefore, a windscreen designed to fit the specific instrument should be used. These windscreens are typically open cell foam spheres and are designed to block wind noise without attenuating the signal being measured. Even with a windscreen in place, wind speeds above 12 miles per hour may cause erroneous readings. Therefore, wind speed should be monitored and readings should not be taken when wind speeds exceed 12 miles per hour.

ACCOUNTING FOR TEMPERATURE. According to ANSI Standard S1.13-2005, the acceptable temperature range for measurements is 14 degrees Fahrenheit to 122 degrees Fahrenheit. In addition, the temperature shall not be outside the ranges recommended for operation by the sound level meter manufacturer or individual instruments in the measurement system.

ACCOUNTING FOR RAIN. During periods of inclement weather (*i.e.*, rain, snow, *etc.*), measurements should not be taken. Measurement should also be performed when the ground is dry, and not when the ground is wet or snow covered.

NOISE MEASUREMENT PERIODS AND NOISE PEAK HOUR SELECTION. Noise measurements should be made in accordance with the expected times that the proposed activity at the site would be greatest, or when surrounding receptors may otherwise be most likely to experience significant impacts because of the proposed project. While this generally occurs for most projects during the peak typical weekday traffic hours (*i.e.*, the AM, midday, and/or PM peak periods), this may not be appropriate for some projects and it may be necessary to gather data during weekend, late night hours, or for all 24 hours. For example, noise generated by traffic leaving a large multiplex movie theater may result in significant noise impacts during late night hours; maximum project impacts from truck traffic generated by solid waste transfer stations may occur either during late night or early morning hours; and noise from power generation facilities may be most likely to cause significant impacts during late night or early morning hours when background levels are low. Traffic

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data collection should be coordinated with the noise studies to ensure that, where necessary for analysis purposes, traffic data is available for late night, weekend, and/or all 24 hours. Traffic data collection should be conducted in accordance with the methods described in Chapter 16, "Transportation." Vehicular trip assignments and their hourly distribution should be defined before the hours for noise analysis are determined. Care must be exercised in selecting the noise measurement period and, as detailed information about a project is developed, it may be necessary to supplement initial noise measurements by including additional time periods.

OTHER ACTIVITIES DURING THE CONDUCT OF THE NOISE MEASUREMENTS. While each of the noise measurements is being taken, events that contribute to the monitored values should be noted. At locations where traffic on the adjacent street is a significant noise source, a traffic counting and classification program should be conducted that records the following: total vehicles; total number of buses (*i.e.*, vehicles having two or three axles and designed to carry more than nine passengers); total number of heavy trucks (*i.e.*, cargo vehicles with three or more axles with a gross vehicle weight of more than 26,400 pounds); total number of medium trucks (*i.e.*, cargo vehicles with two axles and six tires with a gross vehicle weight of between 9,900 and 26,400 pounds); and total number of passenger vehicles or light trucks (*i.e.*, vehicles having two axles and four tires with a gross vehicle weight of less than 9,900 pounds).

At locations where rail noise is a significant noise source, the number of trains passing by during the measurement period should be recorded, and if possible, the number of cars on the train should be noted.

If noise from a rail facility or aircraft becomes audible during the measurement program, measurements should be suspended until that sound is no longer audible. Where these noise sources are of concern, they are calculated rather than being measured because of the extreme variability in measured data from these sources. Measured noise levels for aircraft noise are unreliable because they are highly sensitive to environmental factors, such as atmospheric and terrain conditions.

In general, measurements should also be suspended when unusual events occur during the measurement period. Typically this includes noise from sirens of emergency vehicles, construction activities, *etc.* However, it may include noise from other non-dominant sources (*e.g.*, rail noise when vehicular traffic is the dominant noise source).

DURATION OF NOISE MEASUREMENTS. The duration of noise measurements should be sufficient to ensure that the measurements are reflective of ambient conditions. For example, at locations where traffic is the dominant noise source, measurements made for shorter time periods are generally sufficient since noise is relatively insensitive to minor fluctuations in changes in Noise PCEs. For example, it takes a doubling of Noise PCEs to equal a 3 dB(A) change (*i.e.*, just perceptible) in sound levels. For that reason, it is generally not necessary to conduct noise measurements for more than a 20-minute period during any hour at any given location, provided that a traffic count and vehicle classification is conducted simultaneously with the noise measurement at the measurement site. Typically, one-hour measurements are recommended for rail facilities. Shorter measurements (*e.g.* 20-minute) may be allowed for certain rail facilities, such as subways, provided the measurements include typical rail operation events. Because of rail scheduling, the duration of measurements at these locations should be determined on a site-specific basis. It is important to ensure that the duration of the measurement period is sufficiently long to include typical events and conditions. When doubt may arise about whether the measurement duration is sufficiently long to be representative of conditions, 20-minute measurements may be compared to one-hour values to see if there are discrepancies in the values.

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If the proposed project is expected to generate traffic or stationary source noise over a 24-hour period, it may be necessary to take 24-hour noise measurements at one or more receptor locations.

MONITORING RESULTS. At the completion of the measurement, the following noise levels should be recorded from the noise meter: L_{max}, L_{min}, L_1, L_{10}, L_{50}, L_{90}, $L_{eq(1)}$. Recording of these descriptors may assist in determining if any anomalous conditions occurred during the measurement, if the measurement is called into question during the detailed analysis. If monitoring results are to be used in the placement of noise (E) Designations, 1/3 octave bands should also be recorded.

332. MOBILE SOURCES ANALYSES

332.1. Vehicular Noise

For most projects reviewed under CEQR, a desk-top analysis may be employed using a logarithmic equation (described below). However, the FHWA Traffic Noise Model (TNM) should be used for the following situations:

- Analyzing conditions that result in new or significant changes in roadway or street geometry;
- Roadways that currently carry no or very low traffic volumes are involved;
- Ambient noise is the result of multiple sources including traffic; or
- A detailed analysis of changes due to the traffic component of the total ambient noise levels is necessary.

The TNM model takes into account various factors that influence vehicular noise, including traffic volumes, vehicle mix, source/receptor geometry, shielding (including barriers and terrain), ground attenuation, *etc.* While calculated values using the TNM model may be used directly, it is preferable to verify the accuracy of the model for the particular condition being analyzed. Based upon these measurements, adjustment factors may be developed to account for site-specific differences between measured and model-predicted values.

One particularly useful application of the TNM model is for situations where traffic is one of the components of the total ambient noise. In such situations, the TNM model may be used to compute the traffic component of the noise, and may then be subtracted from the measured ambient noise levels to determine the non-traffic components of the total ambient noise levels.

Computerized models, such as CadnaA and SoundPLAN, either have developed or are in the process of developing algorithms that incorporate the TNM model for vehicular noise calculations. Upon verification by FHWA that these algorithms produce results comparable to the TNM model, they may be utilized for CEQR analyses.

While the TNM model often yields accurate prediction results for first level screening purposes as well as for assessing project impacts, it is more convenient and easier to use the logarithmic equation described below.

EXISTING CONDITIONS. Analysis of existing noise conditions uses monitored noise levels and observations made during the monitoring period to assess noise levels and their sources. Most often, it may be assumed that substantially all measured noise at a measurement site is associated with the vehicular traffic passing the site. This is a proper assumption as long as vehicular noise levels are at least 10 dBA above levels associated with all other noise sources. The results of the noise monitoring program are reported as existing conditions in the environmental assessment.

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If noise levels cannot be measured at a receptor location, measured data from a site in the area may sometimes be adjusted assuming a 3 dB(A) attenuation per doubling of distance to estimate existing noise levels at the receptor location.

FUTURE NO-ACTION CONDITION. To arrive at the No-Action noise condition, the results of the No-Action traffic analysis (see Chapter 16, "Transportation") are used to compute total Noise PCEs passing each receptor site. From the existing and No-Action traffic data, existing and No-Action Noise PCEs are calculated in the following manner (see Subsection 331.2 under "Other Activities During the Conduct of the Noise Measurements" for definitions of vehicle types):

- Each Automobile or Light Truck: 1 Noise PCE
- Each Medium Truck: 13 Noise PCEs
- Each Bus: 18 Noise PCEs
- Each Heavy Truck: 47 Noise PCEs

Note: These values were obtained using the TNM model, assuming a speed of 25 mph and a distance of 30 feet from the roadway. For speeds below 25 mph, the TNM model should be run to develop project-specific screening values. For projects with traffic moving at higher speeds and/or receptors at more than 30 feet from the roadway, either the default values shown above or project-specific values obtained using the TNM model may be used for purposes of screening.

After the Noise PCEs are calculated and tabulated at each receptor site, the No-Action noise levels are calculated using the following equation:

Equation 19-1

FNA NL =10 log (NA PCE/E PCE) + E NL

where:

FNA NL = Future No-Action Noise Level

NA PCE = No-Action Noise PCEs

E PCE = Existing Noise PCEs

E NL = Existing Noise Level

The calculation is conducted using the $L_{eq(1)}$noise measurement results. $L_{10(1)}$ values are calculated by adding the difference between the $L_{10(1)}$ and $L_{eq(1)}$ descriptors found to exist in the measurement program to the calculated No-Action $L_{eq(1)}$ noise level. The results of the No-Action noise level calculation are then reported in the environmental assessment.

FUTURE WITH-ACTION CONDITION. The identical analysis procedure is used to determine the With-Action condition, with calculated total Noise PCEs derived from the With-Action traffic analysis. To determine potential significant impacts, the With-Action condition noise levels are compared with the No-Action noise levels, applicable standards and impact thresholds at each receptor (see Sections 410 and 710, below).

332.2. Aircraft Noise

EXISTING CONDITIONS. While FAA L_{dn} contours are of general interest and should be reported because they show annual average values over a 24-hour period and tend to average out high hourly values, they are of limited use for an impact assessment because it is generally necessary to calculate $L_{eq(1)}$ values to determine project impacts. $L_{eq(1)}$ values, as well as L_{dn} values, may be calculated using the Federal INM V7.0a computer model or other acceptable models based on actual noise measurement.

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Computerized models, such as CadnaA FLG and SoundPLAN, either have developed or are in the process of developing algorithms that incorporate aircraft noise calculations. Upon verification that these algorithms produce results comparable to the INM V7.0a model, they may be utilized for CEQR analyses.

NO-ACTION CONDITION. The same analysis methods used to estimate existing aircraft noise levels are to be used in the No-Action scenario using the No-Action aircraft mix.

WITH-ACTION CONDITION. The same analysis methods used to estimate existing aircraft noise levels are to be used in the With-Action scenario using the With-Action aircraft mix. To determine potential significant impacts, the With-Action condition noise levels are compared with the No-Action noise levels, applicable standards and impact thresholds at each of the receptors (see Sections 410 and 710, below).

332.3. Train Noise

EXISTING CONDITIONS. Noise from train operations is calculated using the detailed noise analysis methodology contained in the Federal Transit Administration (FTA) guidance manual, Transit Noise and Vibration Assessment (May 2006). Using this methodology, Leq(1) values may be calculated as a function of a number of factors, including the distance between the track and receptor; shielding at the receptor; number of trains; average number of cars per train; train speed; track conditions; whether the track is on grade or on structure; *etc.* Calculated values using the FTA methodology may either be used directly or, based upon measurements, adjustment factors may be developed to account for site-specific differences between measured and model-predicted values.

Computerized models, such as CadnaA and SoundPLAN, either have developed or are in the process of developing algorithms that incorporate the FTA and/or FRA algorithms for rail transit noise calculations. Upon verification that these algorithms produce comparable results to the FTA algorithm, they may be utilized for CEQR analyses.

NO-ACTION CONDITION. The same analysis methods used to estimate existing train noise levels are used in the No-Action scenario using the No-Action train mix.

WITH-ACTION CONDITION. The same analysis methods used to estimate existing train noise levels are used in the With-Action scenario using the With-Action train mix. To determine potential significant impacts, the With-Action condition noise levels are compared to the No-Action noise levels, applicable standards and impact thresholds at each of the receptors (see Sections 410 and 710, below).

333. STATIONARY SOURCES

EXISTING CONDITIONS. Noise levels of existing stationary sources should be measured at the noise-sensitive receptors closest to the source. If the stationary source in question would be part of the proposed project and does not currently exist, noise measurements should be performed at the property line of the site closest to the proposed stationary source(s) and at the closest noise-sensitive receptors to ensure that spatial coverage and receptor "type" coverage is adequate. For example, if there is a park nearby and residential units nearby, both need to be monitored for existing conditions.

NO ACTION CONDITION. In cases where new stationary sources are to be introduced into the study area in the future without the project, the noise contribution from these facilities is predicted at the noise-sensitive receptors and/or the project site and added to existing noise levels to obtain the No-Action condition. The calculations are based on operational information from the entity responsible for the new stationary noise sources.

WITH-ACTION CONDITION. If the project under consideration involves locating a potential noise sensitive receptor near an existing stationary noise source, then measurements made at the site location of

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the existing stationary source are generally used for the impact evaluation. Where the proposed project involves a new stationary source, the analysis should focus on determining maximum $L_{eq(1)}$ values at receptor locations (including the property line) with the stationary source operating. The first step in this calculation is acquiring project-specific noise emission data from the manufacturer, or, lacking that, estimating the emission levels from a review of the literature. Often the data is provided in terms of sound power level. This noise descriptor, expressed in decibels, is a measure of the total acoustic power of a source. It may be used to predict the sound level at a given distance using the formula:

Equation 19-2

$L_p = L_w - 20*\log(d) - A_e$

where:

L_p is the sound pressure level

L_w is the sound power level

d is the distance from the source to the receiver in feet

A_e is excess attenuation caused by environmental and terrain features

While noise emission data from the manufacturer of the stationary equipment is always the best source, when this is not available information may be available from industry groups such as EPRI (3412 Hillview Avenue, Palo Alto, California 94304 USA), in publications such as Electric Power Plant Environmental Noise Guide published by the Edison Electric Institute, or in industry-sponsored computer models. Other alternatives include locating an operating facility with similar equipment and performing measurements at that facility, preferably at similar distances and under similar conditions to those anticipated for the proposed project.

Once data are acquired, the next step is predicting the sound levels at the noise sensitive receptors. Where a single or several discrete sources exist, and where the distances are moderate and have an unobstructed line of sight, this may be accomplished using basic noise fundamentals for calculation (*i.e.*, the addition of sound levels, frequency adjustments to get A-weighted values, *etc.*). For example, if sound power data is available, the equation given above may then be used. If sound level data are available, the following equation may be used to estimate sound levels at a receptor:

Equation 19-3

$L_{p1} = L_{p2} - 20*\log(d_1/d_2)$

where:

L_{p1} is sound pressure level at the receptor

L_{p2} is sound pressure level at the reference location

d_1 is the distance from the source to the receptor

d_2 is the distance at which the source sound level data is known

Any attenuation by structures around the source or noise control measures (such as silencers, acoustic barriers, *etc.*) that are to be used must be considered in calculating sound levels at the receptors.

Where there are many individual sources associated with the project, and when there is varying landscape (parks, buildings, trees) between the source and receptors, calculations become even more complicated. In addition, data provided by manufacturers and/or the literature are often presented in octave bands. While it is useful to perform the calculations in octave bands, particularly when designing noise control features, the calculated octave band values should be converted to equivalent A-weighted values for impact evaluation purposes. Both ANSI and ISO have documents which describe techniques and considerations for carrying out these calculations. Following these procedures often involves programming a computer spreadsheet to automate the details (*i.e.*, sound power level to sound pressure level conversion as a function of frequency and distance; application of attenua-

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tion of buildings, barriers, terrain, noise control as a function of frequency; summation of contributions of the various sources; and conversion to A-weighted sound levels).

Computer models are also available that are based upon the various standards and allow the calculations to be carried out. These models also often include databases of source sound levels for use in the model. Programs such as CadnaA developed by DataKustik, NOISECALC developed by the New York State Department of Public Service, SPM9613 developed by Power Acoustics Inc, SoundPLAN developed by Braunstein + Berndt GmbH, Electric Utility Environmental Noise Program developed by the Empire State Electric Energy Research Corporation, and Predictor 7810 developed by Brüel & Kjær are examples of such programs. These programs are not specifically endorsed, and other programs may be available to perform similar functions.

In all cases, rather than using theoretical modeling techniques, it is preferable to use actual facility data. Therefore, if a facility comparable to the proposed project can be measured, and its levels can be adjusted to account for differences in conditions between its site and the proposed project site, that is generally a preferred modeling approach.

As previously mentioned, noise generated by children in playgrounds or people using parks is considered stationary source noise. For locations adjacent to playgrounds or parks, absent data for comparable facilities, based upon noise measurements made at ten school playground sites in 1987, it may be assumed that $L_{eq(1)}$ noise levels at the boundary would be 75 dB(A), 15 feet from the boundary would be 73 dB(A), 30 feet from the boundary would be 70 dB(A), and the noise level would decrease by 4.5 dB(A) per doubling of distance beyond 30 feet. In some situations, these values may overestimate playground noise levels. It is prudent to consult with DEP to see if updated information is available prior to using these screening values.

To determine potential significant impacts, the With-Action condition noise levels are compared with the No-Action noise levels, applicable standards and impact thresholds at each of the receptor locations or within contours developed to indicate noise levels within varying distances from a source (see Sections 410 and 710, below).

334. Combined Effects of Mobile and Stationary Noise Sources

Each mobile and stationary source analysis yields a maximum $L_{eq(1)}$ noise level. These values are logarithmically added to yield a total maximum-possible $L_{eq(1)}$ level. To determine the potential for significant impacts caused by the proposed project, the totals in the With-Action condition are compared to the No-Action total noise levels at the respective receptor locations, the applicable standards, and the impact thresholds.

335. USE OF PROPRIETARY MODELS

Proprietary models may be used for analysis purposes only if they have been deemed appropriate by the reviewing agency or agencies, and full disclosure of the model, the model's operation, and all data are made available to the reviewing agency or agencies. Information on proprietary models may not be able to be treated as confidential. Consequently, the use of proprietary models should be discussed with the reviewing agency or agencies.

400. DETERMINING IMPACT SIGNIFICANCE

The following section provides guidelines and recommendations for the determination of impact significance. Depending on the project, using either one, or both, of the following approaches to determine impact significance may be appropriate. The first approach describes the use of absolute noise level limits (absolute noise impact criteria). The second approach describes the use of an incremental change from No-Action conditions (relative impact criteria). For either approach, two considerations must be made:

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- Are the existing and future receptors experiencing noise levels above absolute limits? (Absolute limits, in this case, relate to published standards (see Section 710, below))
- Would the proposed project become a sensitive receptor in the area?

410. IMPACT THRESHOLDS AT RECEPTORS

The selection of incremental values and absolute noise levels should be responsive to the nuisance levels of noise and critical time periods when nuisance levels are most acute. During daytime hours (between 7 AM and 10 PM), nuisance levels for noise are generally considered to be more than 45 dB(A) indoors and 70 to 75 dB(A) outdoors. Indoor activities are subject to task interference above this level, and 70 to 75 dB(A) is the level at which speech interference occurs outdoors. Typical construction techniques used in the past (including typical single-glazed windows) provide a minimum of approximately 20 dB(A) of noise attenuation from outdoor to indoor areas.

In view of these factors and for the purposes of determining a significant impact during daytime hours, it is reasonable to consider 65 dB(A) $L_{eq(1)}$ as an absolute noise level that should not be significantly exceeded. For example, if the No-Action noise level is 60 dB(A) $L_{eq(1)}$ or less, a 5 dB(A) $L_{eq(1)}$ or greater increase would be considered significant. If the No-Action noise level is 61 dB(A) $L_{eq(1)}$, the maximum incremental increase would be 4 dB(A), since an increase higher than this would result in a noise level higher than the 65 dB(A) $L_{eq(1)}$ threshold and is considered significant. Similarly, if the No-Action noise level is 62 dB(A) $L_{eq(1)}$ or more, a 3 dB(A) $L_{eq(1)}$ or greater change is considered significant.

Nighttime (between 10 PM and 7 AM) is a particularly critical time period relative to potential nuisance values for noise level increases. Therefore, irrespective of the total nighttime noise levels, an increase of 3 dB(A) $L_{eq(1)}$ is typically considered a significant impact during nighttime hours.

420. IMPACT THRESHOLDS FOR PROPOSED PROJECTS THAT INTRODUCE SENSITIVE RECEPTORS

Impact thresholds for proposed projects that introduce sensitive receptors are more straightforward. Typically, potential significant impacts on the newly created receptor relate to absolute noise limits. The Noise Exposure Guidelines shown in Table 19-2 are followed by lead agencies for this purpose. If a proposed project is within an area where the project noise levels exceed the marginally acceptable limit shown in the Noise Exposure Guidelines (as measured at the proposed building line, or if that is not known, at the property line), a significant impact would occur. Then, the project would be subject to mitigation measures necessary to bring its interior noise levels down to a level of 25 dB(A) or more below the maximum marginally acceptable levels (by receptor type) for external exposure shown in Table 19-2. If the proposed project includes a publicly accessible outdoor area requiring serenity and quiet (such as a park for passive recreation), the feasibility and applicability of implementing mitigation measures to bring exterior noise levels to below 55 dB(A) $L_{10(1)}$ should be explored on a case by case basis in consultation with the lead agency and the New York City Department of Parks and Recreation (or controlling entity if it would not be a city park).

The manner in which these typical significant impact thresholds are applied to mobile and stationary sources is discussed below.

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Table 19-2
Noise Exposure Guidelines For Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	$L_{dn} \leq 60$ dBA		$60 < L_{dn} \leq 65$ dBA		(I) $65 < L_{dn} \leq 70$ dBA, (II) $70 \leq L_{dn}$		$L_{dn} \leq 75$ dBA
2. Hospital, nursing home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA		$65 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
3. Residence, residential hotel, or motel	(7 AM to 10 PM)	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	(10 PM to 7 AM)	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:

(i) In addition, any new activity shall not increase the ambient noise level by 3 dB(A) or more.

[1] Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.

[2] Tracts of land where serenity and quiet are extraordinarily important and serve as important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.

[3] One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

[4] External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Sources: New York City Department of Environmental Protection (adopted policy 1983).

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421. MOBILE SOURCES

421.1. Vehicular Noise

The impact assessments for vehicular noise compare the proposed project $L_{eq(1)}$ noise levels at receptors potentially affected by the project to those calculated for the No-Action condition. If the No-Action levels are less than 60 dB(A) $L_{eq(1)}$ and the analysis period is not at nighttime, an increase of 5 dB(A) $L_{eq(1)}$ or more in the future with the project would be considered a significant impact. In order for the 5 dB(A) threshold to be valid, the resultant With-Action condition noise level would have to be equal to or less than 65 dB(A). If the No-Action noise level is equal to or greater than 62 dB(A) $L_{eq(1)}$, or if the analysis period is a nighttime analysis period, the incremental significant impact threshold would be 3 dB(A) $L_{eq(1)}$. If the No-Action noise level is 61dB(A) $L_{eq(1)}$, the maximum incremental increase would be 4 dB(A), since an increase higher than this would result in a noise level higher than the 65 dB(A) $L_{eq(1)}$ threshold and be considered significant.

If the proposed project would introduce a sensitive receptor, With-Action noise levels in dB(A) $L_{10(1)}$ would be compared to the values contained in the Noise Exposure Guidelines. If these noise levels would exceed the marginally acceptable levels, a significant impact would occur unless the building design as proposed provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. These values are shown in Table 19-3. The applicant should demonstrate that sufficient attenuation is provided in the form of composite building attenuation calculations based upon the Outdoor Indoor Transmission Class (OITC) values of individual major window/wall/ventilation components, unless a federal funding source, as defined in Subsection 723 of this chapter, requires usage of a different single number rating, such as the Sound Transmission Class (STC) rating, to calculate the noise levels and attenuation values.

Table 19-3
Required Attenuation Values To Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise level with proposed project	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Attenuation[A]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)$[B] dB(A)

Note: [A] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.

[B] Required attenuation values increase by 1 dB(A) increments for L_{10} values greater than 80 dBA.

Source: New York City Department of Environmental Protection

421.2. Aircraft Noise

If the proposed project would create an aircraft facility (heliport or airport), cause a change in flight paths or flight frequency at an aircraft facility, or be subject to aircraft noise, the impact criteria discussed in Sections 410 and 420 apply. If these levels in dB(A) $L_{dn(y)}$ exceed the marginally acceptable level, a significant impact would occur, unless the building design as proposed provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. In the case of significantly impacted buildings, design measures should be implemented that achieve the levels of composite building attenuation provided in Table 19-3. The applicant should demonstrate that sufficient attenuation is provided in the form of composite building attenuation calculations based upon the OITC values of individual major window/wall/ventilation components, unless a federal funding source, as defined in Subsection 723 of this chapter, requires usage of a different single number rating, such as the STC rating, to calculate the noise levels and attenuation values.

421.3. Train Noise

If the proposed project would create a rail facility, cause a change in frequency of trains along the rail facility, or be subject to rail noise, the impact criteria discussed in Sections 410 and 420 apply. If these levels in dB(A) $L_{dn(1)}$ exceed the marginally acceptable level, a significant impact would occur, unless the building design as proposed provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. In the case of significantly impacted buildings, design measures should be implemented that achieve the levels of composite building attenuation provided in Table 19-3. The applicant should demonstrate that sufficient attenuation is provided in the form of composite building attenuation calculations based upon the OITC values of individual major window/wall/ventilation components, unless a federal funding source, as defined in Subsection 723 of this chapter, requires usage of a different single number rating, such as the STC rating, to calculate the noise levels and attenuation values.

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422. STATIONARY SOURCES

If a proposed project would be subject to stationary source noise levels greater than the impact criteria discussed in Section 410, a significant impact would occur, unless the building design as proposed provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. In the case of significantly impacted buildings, design measures should be implemented that achieve the levels of composite building attenuation provided in Table 19-3. The applicant should demonstrate that sufficient attenuation is provided in the form of composite building attenuation calculations based upon the OITC values of individual major window/wall/ventilation components, unless a federal funding source, as defined in Subsection 723 of this chapter, requires usage of a different single number rating, such as the STC rating, to calculate the noise levels and attenuation values.

500. DEVELOPING MITIGATION

The following section provides guidelines and recommendations for developing mitigation of a significant noise impact. General types of possible mitigation measures that may be used to alleviate significant noise impacts for the different source types are discussed.

510. MOBILE SOURCES

511. VEHICULAR NOISE

The first mitigation option to be considered is to reroute the traffic that would cause the significant impact. This is generally possible only for facilities that generate traffic under the control of the applicant (for example, a city vehicle storage facility would fit this requirement, but a commercial office building would not). Where this mitigation appears appropriate, it is necessary to be sure that the rerouted traffic would not simply relocate the significant noise impact or introduce a significant traffic or air quality impact in another location.

If rerouting is not feasible, the most common mitigation measure used for vehicular noise impacts is to provide adequate window/wall attenuation at the affected receptor to conform with the Noise Exposure Guidelines acceptable interior noise levels of 45 dB(A) $L_{10(1)}$. When maximum hourly exterior levels are greater than 70 dB(A), alternate means of ventilation should be incorporated into buildings so that windows do not need to be opened at any time of the year. If windows were open, the effect of the window-wall attenuation would be reduced. An alternate means of ventilation would allow for a closed window condition, ensuring that acceptable interior noise levels are achieved. For existing receptors where the maximum exterior noise level is less than 75 dB(A), standard double-glazed and/or laminated windows are available that would provide adequate noise attenuation. However, as the maximum exterior noise level increases, the project may be required to incorporate special designs into the windows and possibly the exterior walls of buildings to conform to Noise Exposure Guidelines.

At locations adjacent to highways and limited access roadways, barrier walls (and sometimes berms) may be used for vehicular traffic noise impact mitigation; however, to be effective in providing attenuation, the barrier wall must interrupt the line of sight between the noise source (the flow of traffic) and the receptor. Buildings taller than the barriers receive no acoustical benefit from their presence. Barriers could also detract from the aesthetics of neighborhoods and, therefore, may be impractical for most uses in the New York City area. There are a number of methodologies for calculating the noise attenuation attributable to noise barriers, including the use of the TNM model algorithms.

512. AIRCRAFT NOISE

The first mitigation option investigated should be to change the flight path. If this mitigation is appropriate, it is necessary to ensure that the mitigation does not merely relocate the significant impact to another area. In addition, facility use restrictions (*e.g.*, capacity limitations, lower takeoff angles, curfews, using only certain

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types of aircraft, *etc.*) should be investigated. These measures would require commitment from the appropriate agency.

If flight operations adjustment is not feasible, the only possible mitigation measure for aircraft significant noise impacts is treatment of all exterior walls and roofs of buildings to ensure that interior noise levels would be less than 45 dB(A) $L_{10(1)}$. If exterior noise levels are less than 75 dB(A), double-glazed or laminated windows (with alternate means of ventilation for levels above 70 dB(A)) should be provided to achieve adequate attenuation and ensure interior noise levels of 45 dB(A). However, if noise levels are equal to or greater than 75 dB(A), special designs may have to be incorporated into windows, walls, roofs, and doors.

513. TRAIN NOISE

Mitigation measures available for significant noise impacts are the exterior building attenuation measures discussed above (Subsection 512) for significant vehicular noise impacts, barrier wall (or berm) construction, treating the vehicles, wheel truing and rail grinding, rail lubrication on sharp curves, and providing operational restrictions. Barrier wall attenuation has a practical limit of 10 to 15 dB(A), so it would provide complete impact mitigation only when exterior $L_{eq(1)}$ levels (for existing uses) at receptors are less than 75 dB(A). It must also be kept in mind that barriers are only effective when the line-of-sight is broken between the source and receiver. Therefore, buildings with windows higher than the barrier may not receive much benefit from the barriers and exterior wall attenuation, and window attenuation and an alternate means of ventilation would have to be designed into the facades of buildings facing the rail activity.

520. STATIONARY SOURCES

The most common mitigation measures available for stationary sources include exterior building attenuation (as discussed for mobile sources in Subsection 511 above), barrier erection (as discussed above), and noise control design on the source in question. Caution should be exercised when erecting barriers in New York City given the limitations mentioned above. In many cases, treating the noise source (*i.e.*, providing baffles, silencers, mufflers, sound insulation, placing it within an enclosed structure, *etc.*) may be the least expensive option. Moving the source in question so that receptors would not be significantly affected is also a potential mitigation measure.

530. (E) DESIGNATIONS

The (E) Designation is an institutional control that is implemented through CEQR review of a zoning map or text amendment or action pursuant to the Zoning Resolution. It provides a mechanism to ensure that measures aimed at avoiding a significant adverse impact are part of future development, thereby eliminating the potential for a noise impact.

If necessary, the lead agency may consult with DEP during the CEQR process to identify sites requiring an (E). The Mayor's Office of Environmental Remediation (OER) is responsible for administering post-CEQR determinations for projects with assigned (E) Designations and existing Restrictive Declarations, pursuant to Section 11-15 (Environmental Requirements) of the Zoning Resolution of the City of New York and Chapter 24 of Title 15 of the Rules of the City of New York (Rules). If property owners have applied for an action that will result in placement of an (E) Designation, they are advised to provide the CEQR number to OER and, in order to facilitate OER's review of the proposed work to address the requirements of the (E) Designation, it may be necessary for property owners to provide historical technical documentation related to the CEQR Noise analysis (*e.g.*, EAS/EIS, Technical Memoranda, CEQR determination, modeling results, lead agency and DEP correspondence, Restrictive Declarations, Notices) to OER. The Rules and Section 11-15 of the Zoning Resolution set out the procedures for placing, satisfying and removing (E) Designations. OER reviews and approves all documents needed to satisfy the requirement of a noise (E) Designation.

(E) Designations are listed in a table, "CEQR Environmental Requirements," appended to the Zoning Resolution, and appear in the Department of Buildings' (DOB) online Buildings Information System (BIS).

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With respect to (E) designated lots, DOB will not issue building permits or certificates of occupancy in connection with the following actions until it receives an appropriate "Notice" from OER that the (E) requirements have been met:

- Developments;
- Enlargements, extensions or changes of use; or
- Alterations that involve window or exterior wall relocation or replacement.

As appropriate, OER issues the applicable notices to DOB including a Notice of No Objection, Notice to Proceed or Notice of Satisfaction.

600. DEVELOPING ALTERNATIVES

In developing project alternatives to reduce or avoid significant noise impacts, the simplest and most common way of analyzing the situation is to calculate the conditions that would just avoid an impact and tailor the project alternative to that new scenario. For instance, if a significant vehicular traffic noise impact were identified at a receptor, the project-generated $L_{10(1)}$ worst-hour increase would be at least 3 dB(A). If one calculated the project-generated traffic volume that would cause a less than 3 dB(A) increase in worst-hour $L_{10(1)}$ values, that traffic volume would define the alternative project volume. A change in plan that dispersed traffic differently or reduced the size and thus the trip generation from the project may address this issue. Similar analysis techniques to this may be used for analyzing alternatives from any relative impact criterion.

When dealing with absolute impact criteria, alternative project arrangements may be set by moving, scaling down, or shielding the original project to the point where significant impacts are avoided. For instance, if a manufacturing facility generated a significant impact at a residence, the noise-generating part of the facility may be moved to the distance at which the noise levels at the property line would be low enough not to cause a significant impact. Another possible alternative would be to scale down operations until noise levels reached would not cause a significant impact. Yet another alternative to the project may include a building or barrier between the noise-generating facility and the property line to shield the noise to the point where a significant impact would be avoided. These options may each have to be evaluated in terms of their feasibility and potential impacts on other environmental assessment categories.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

Regulations applicable to New York City environmental noise assessments are found in the Noise Exposure Guidelines. These regulations, which apply to all private or city-sponsored projects subject to CEQR in New York City, are described below. When a project to be undertaken in New York City also includes some level of State or federal involvement, additional State or federal regulations may also apply.

In 1983 DEP adopted City Environmental Protection Order-City Environmental Quality Review (CEPO-CEQR) noise guidelines for environmental impact review. Four categories of acceptability have been established, based on noise level limits and land use, for vehicular traffic, rail, and aircraft noise sources. These acceptability categories include: "generally acceptable," "marginally acceptable," "marginally unacceptable," and "clearly unacceptable." These categories and associated noise limits apply to exterior noise levels only. The levels are shown in Table 19-3. The exterior limitations are based on an acceptable interior noise level of 45 dB(A) ($L_{10(I)}$ or L_{dn}, depending on the source). Only mobile sources are included in the standards. Each of the three noise source classifications is analyzed separately and in terms of different descriptors. Mitigation requirements have been developed according to the noise category. Both absolute and relative impact criteria are presented.

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711. NEW YORK CITY NOISE CONTROL CODE

In addition to the Noise Exposure Guidelines, the New York City Noise Control Code governs noise emissions in New York City, and the New York City Zoning Resolution includes noise performance standards for any manufacturing activity in manufacturing districts. These have not traditionally been used for purposes of CEQR environmental assessments. However, it is appropriate to discuss the proposed project's method for compliance with the Noise Control Code. Below is a description of the Noise Code.

The New York City Noise Control Code, as amended in 2005, defines "unreasonable and prohibited noise standards and decibel levels" for the City of New York. The amended Noise Control Code specifically addresses noise from circulation devices and commercial and business enterprises (see Subsection 711.1, below).

711.1. Circulation Devices §24-227

The New York City Noise Control Code stipulates the following noise limits that apply to "circulation devices," which include HVAC equipment, when measured inside a receiving property dwelling unit:

- A circulation device shall not create a sound level in excess of 42 dB(A);
- The cumulative sound from all circulation devices on a building shall not create a sound level in excess of 45 dB(A).

As per §24-227(a), the measurement shall be taken in a receiving property dwelling unit with the window or terrace door open at a point three feet from the open portion of the window or terrace door.

Note: If the cumulative sound from all circulation devices on a building exceed 50 dB(A), when measured inside a receiving property dwelling unit, the commissioner may order the owner or person in control of such devices to achieve a 5 dB(A) reduction in such cumulative sound level within not more than 12 months after the issuance of such order (see §24-227(c)).

Table 19-4
New York City Noise Control Code §24-232

Octave Band Frequency (Hz)	Maximum Sound Pressure Levels (dB) as Measured Within a Receiving Property as Specified Below	
	Residential receiving property for mixed-use building and residential buildings (as measured within any room of the residential portion of the building with windows open, if possible)	*Commercial receiving property (as measured within any room containing offices within the building with windows open, if possible)*
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37

Source: Section §24-232 of the Administrative Code of the City of New York, as amended December 2005.

711.2. Allowable Decibel Levels-Octave Band Measurement §24-232

The New York City Noise Control Code specifies maximum allowable sound pressure levels for designated octave bands emanating from a commercial or business enterprise as measured within a receiving property. These values are shown in Table 19-4.

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712. New York City Zoning Resolution

RESOLUTION PERFORMANCE STANDARDS FOR MANUFACTURING DISTRICTS

The New York City Zoning Resolution Performance Standards for Manufacturing Districts uses maximum instantaneous octave band sound pressure levels as its noise descriptor for industrial noise sources. These values are shown in Table 19-5.

Table 19-5
City of New York Noise Performance Standards for Manufacturing Districts

Octave Band, in cycles per second (Hz)	M1 District (dB)	M2 District (dB)	M3 District (dB)
20 to 75	79	79	80
75 to 150	74	75	75
150 to 300	66	68	70
300 to 600	59	62	64
600 to 1200	53	56	58
1200 to 2400	47	51	53
2400 to 4800	41	47	49
Above 4800	39	44	46

Source: City of New York Performance Standards for Manufacturing Districts Section 42-213

More information regarding the Performance Standards may be found in Section 42-20 of the Zoning Resolution of the City of New York, Chapter 2, "Use Regulations."

SPECIAL MIXED USE DISTRICTS

Section 123-32 of the New York City Zoning Resolution requires that all new dwelling units in a Special Mixed Use District are required to provide a minimum window wall attenuation of 35 dB(A) to maintain an interior noise level of 45 dB(A).

720. APPLICABLE COORDINATION

Lead agencies may need to coordinate with other agencies when developing an environmental noise assessment for a proposed project in New York City. The need for coordination depends on either the mitigation required to reduce or eliminate the significant impact or the funding sources for the project. This is discussed below in terms of city, state, and federal agencies.

721. CITY COORDINATION

The lead agency may need to coordinate with other agencies when developing mitigation measures for significantly impacted facilities under the control of those agencies. Examples of this coordination may include coordination with the Board of Education or the New York City Housing Authority for the installation of double-glazed windows and alternate means of ventilation at a school or residential building experiencing significant noise impacts from a proposed project. For technical assistance in conducting noise analyses, the lead agency may wish to coordinate with DEP.

722. STATE COORDINATION

If any part of the proposed project would involve a State-funded highway, coordination concerning analysis methodologies and significant impact thresholds with the New York State Department of Transportation (NYSDOT) is necessary. In general, NYSDOT follows the guidelines of the Federal Highway Administration (FHWA). Otherwise, no coordination with State agencies on noise issues is necessary.

723. FEDERAL COORDINATION

If any part of the proposed project would be financially assisted by the U.S. Department of Housing and Urban Development (HUD), analysis methodologies, significant impact thresholds, and reporting of noise information should be in accordance with HUD noise regulations or in a form acceptable to HUD officials. If any part

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of the proposed project would involve a federally-funded highway, coordination with FHWA (usually through the State) for the same items is necessary. Any part of the proposed project dealing with new aircraft or flight patterns should be coordinated with FAA. New rail projects funded by the Federal Transit Administration (FTA) should be coordinated with that agency for analysis methodologies and significant impact thresholds.

730. LOCATION OF INFORMATION

If some level of environmental noise assessment is required for a proposed project, it is useful to obtain any recent data or information concerning existing noise levels in the area of the proposed project, or information concerning other development proposed in the area that could affect future noise levels. Environmental Impact Statements (EISs) for such other proposals may be available through MOEC. Other than the identification of future planned projects, however, previous EISs seldom contribute other useful data for analysis purposes. Information regarding removing (E) Designations may be obtained from OER.

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PUBLIC HEALTH

CHAPTER 20

Public health is the organized effort of society to protect and improve the health and well-being of the population through monitoring; assessment and surveillance; health promotion; prevention of disease, injury, disorder, disability and premature death; and reducing inequalities in health status. The goal of CEQR with respect to public health is to determine whether adverse impacts on public health may occur as a result of a proposed project, and if so, to identify measures to mitigate such effects.

Scientific understanding of the links between human health and the environment is an evolving and expanding field of research. Some well established associations include the influence of poor air quality on human health and human exposure to hazardous materials, noise, and contaminants in soil and water. These topics are discussed in other chapters of this Manual, and should be considered in conjunction with any public health assessment.

As with each technical area assessed under CEQR, it is important for an applicant to work closely with the lead agency throughout the environmental review process. In addition, a lead agency should consult, as appropriate, with the City's expert technical agencies early in the process to ensure that the proposed methodologies are appropriate for assessing a particular project. For this technical area, the expert technical agency is the New York City Department of Health and Mental Hygiene (DOHMH).

100. DEFINITIONS

The following terms are helpful when considering potential public health impacts.

ENVIRONMENTAL HAZARDS. Chemical agents, physical agents, biochemical stressors, and biologic toxins that may be found in air, water, soil, food, or other environmental media.

ENVIRONMENTAL MEDIA. Environmental media that, as a result of a proposed project, may serve to transport contaminants, sound or radiation from the source(s) to possible points of human exposure. Affected media may include groundwater, surface and subsurface soils, sediment, surface water, air, soil gas, food chain, sludge/leachate/waste materials.

EPIDEMIOLOGY. The study of the distribution and determinants of health or disease in a population and the application of such study to control health problems.

EPIDEMIOLOGIST. A masters- or doctoral-level public health professional trained in epidemiologic analysis.

EXPOSURE. Contact by swallowing, breathing, hearing, radiation energy absorption, or dermal contact. Exposure may be short-term, of intermediate duration, or long-term.

EXPOSURE PATHWAY. The route a substance takes from its source (where it began) to its end point, and how people may come into contact with it. An exposure pathway has five parts: a source of contamination; an environmental media and transport mechanism; a point of exposure; a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed).

EXPOSURE ASSESSMENT. A process that estimates the amount of a contaminant, sound or radiation that enters or comes into contact with people. An exposure assessment also describes how often and for how long an exposure occurred, and the nature and size of a population exposed.

HEALTH OUTCOME. A disease or health problem, such as asthma or gastroenteric illness (see Table 20-1).

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LITERATURE REVIEW. A comprehensive examination of peer-reviewed, published, scientific literature on a subject that includes a critical examination of the scientific validity of study findings by assessing the quality of the study methods and generalizability of study findings.

MORBIDITY RATE. The relative frequency, or incidence, of a non-fatal disease or other health conditions.

MORTALITY RATE. The relative frequency, or incidence, of deaths generally or attributable to particular causes.

POTENTIALLY EXPOSED POPULATION. Populations to consider include residents, those engaged in recreational activities, workers, transients, potential "sensitive or vulnerable" populations.

PUBLIC HEALTH ASSESSMENT. An analysis and statement of the public health implications posed by activities, a facility, release, or contaminated site under consideration. The public health assessment is an evaluation of relevant environmental data and health outcome data associated with a proposed project where environmental exposures may occur.

SENSITIVE OR VULNERABLE POPULATION. A population vulnerable to the potential for health impacts by virtue of their financial circumstance, health, age, functional or developmental status, ability to communicate effectively, presence of chronic disease or disability, or other personal characteristics.

200. DETERMINING WHETHER AN ASSESSMENT IS APPROPRIATE

For most proposed projects, a public health analysis is not necessary. Where no significant unmitigated adverse impact is found in other CEQR analysis areas, such as air quality, water quality, hazardous materials, or noise, no public health analysis is warranted. If, however, an unmitigated significant adverse impact is identified in other CEQR analysis areas, such as air quality, water quality, hazardous materials, or noise, the lead agency may determine that a public health assessment is warranted for that specific technical area. For example, if an unmitigated impact on the quality of the city's drinking water was identified, a public health analysis of water quality would be appropriate.

In unusual circumstances, a project may have potential public health consequences that may not be related to the issues already addressed in other technical analysis areas in CEQR reviews. The lead agency, therefore, may determine that a public health assessment is warranted. Examples of these unusual public health analyses have included the potential public health impact of pesticide application for the control of West Nile Virus infected mosquitoes and the potential for gastrointestinal illness associated with the installation of devices that aerosolized water in public areas.

300. THE PUBLIC HEALTH ASSESSMENT PROCESS

If a public health assessment is determined to be appropriate under Section 200 above, the assessment process involves evaluating whether and how exposure to environmental contaminants may occur and the extent of that exposure; characterizing the relationship between exposures and health risks; and applying that relationship to the population exposed. This assessment should be conducted in consultation with an environmental epidemiologist, a professional exposure or risk assessor, or similarly trained person. The public health assessment is a step-wise process consisting of:

STEP ONE: Identifying the extent of potential environmental exposures to the public as a result of a proposed project. This may already have been determined in analyses conducted of other CEQR technical areas such as water quality, air quality, hazardous materials, *etc.*, where an unmitigated significant adverse impact was identified. (Section 310).

STEP TWO: If necessary, identifying potential health impacts as a result of identified exposure pathways (See Section 320 and Table 20-1).

STEP THREE: If necessary, determining the potential significance of the impact (Section 400).

STEP FOUR: Recommending steps to reduce and prevent exposures (Section 500).

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Examples of how this public health analytic framework has been utilized in the past include the following scenarios:

- Estimating the number of asthma hospitalizations in a neighborhood that may occur from an increase in $PM_{2.5}$ that is identified as an unmitigated significant impact in Chapter 17, "Air Quality."
- Estimating the number of poisonings and asthma hospitalizations that may result from the spraying of a pesticide for a mosquito control program.
- Estimating the total bacterial dose that may result from proximity to a project that involved spraying river and estuary water.

310. STEP ONE: IDENTIFYING POTENTIAL ENVIRONMENTAL HAZARD EXPOSURES

If an analysis is required and contaminants/substances of concern are identified, a public health analysis should first consider:

- The levels (or "concentrations") of hazardous substances and contaminants likely to result from the proposed project; and
- Whether people may be exposed to contamination and how people may be exposed (for example, through "exposure pathways" such as breathing air, drinking or contacting water, contacting or eating soil, or eating food).

Depending on the proposed project, some of this information may already be available as a result of CEQR technical analyses that identified an unmitigated significant impact.

Exposure pathways are used to evaluate the specific ways in which people may come into contact with environmental contamination or hazards. An exposure pathway evaluation, therefore, determines if project-related contaminants have been, are, or may be in contact with local populations. In other words, it answers the key question: Could people be exposed to project-related hazards? Past, current, and future exposure conditions need to be considered because the elements of an exposure pathway typically change with time.

Potentially exposed populations may include:

- Residential populations - those living in the area that may be impacted by the proposed project.
- Recreational populations - people who may reasonably be anticipated to recreate near, or on, a site of a proposed project.
- Worker populations - On- and off-site workers who may be impacted by the proposed project.
- Transient population – populations that may visit the area of the proposed project.
- Vulnerable populations - *e.g.*, children, elderly, those with pre-existing health conditions.

When characterizing potentially exposed populations, it is important to determine:

- Who is exposed?
- What activities are occurring?
- Where are activities occurring?
- When has exposure occurred (past current, future)? For how long?
- How are people exposed?

If the exposure assessment does not find potential environmental hazard exposures to the public as a result of a proposed project, then no further analysis is necessary.

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320. STEP TWO: IDENTIFYING POTENTIAL IMPACTS OF EXPOSURES

If a public health assessment for a particular topic has been determined in Section 200 to be appropriate, and potential hazardous exposures to the public were identified in Section 310, then additional analysis is warranted. Further analysis of potential health impacts is appropriate when exposures are known, qualitatively or quantitatively estimable, and may potentially occur for periods of time, over geographic areas, or to a population large enough that one may not reasonably rule out the possibility of significant impact. The next step in the process considers whether hazardous substances might harm people, whether working or living nearby might affect their health, or whether the proposed project may result in other dangers, such as physical hazards. Health impacts may involve short-term, or acute, effects, including burns, injuries, poisonings, and exacerbations of asthma and other respiratory or cardiovascular diseases. Health impacts may also involve long-term or chronic impacts, including increased incidence of heart disease, respiratory illness, cancers, diabetes, and obesity.

Depending on the known information, the potential for impacts may be quantitatively or qualitatively discussed, as appropriate. For instance, where concentration-response functions or attributable risks are available in peer-reviewed literature, regulations and/or guidelines, the potential for public health impacts should be quantified. However, when quantitative relationships between exposures and health outcomes are not well-established, but where peer-reviewed literature indicates effects may occur, a qualitative assessment is appropriate for determining the likely direction and significance of impact.

321. Environmental Media-Specific Guidance

If further assessment is appropriate and potential health exposures are identified for a particular environmental media, then that specific area should be further examined to determine potential public health impacts. The following sections describe examples of hazards, exposures, potential health effects and measurable outcomes that may be utilized when conducting a public health assessment for specific environmental media. Because the field of environmental health is constantly evolving as new research becomes available, consultants with expertise in environmental epidemiology and toxicology may be critically important when more detailed health assessments are warranted. Health impacts may be directly discerned in some cases, but others may require more complex modeling.

AIR QUALITY

Fine particles and ozone are both found in New York City's airshed at levels that, as of 2009, exceed federal Clean Air Act standards. Road and non-road vehicle emissions and stationary combustion sources contribute to these pollutants. Stationary sources may emit volatile organic compounds (VOCs) (*e.g.* drycleaners and perchloroethylene), metals, or other chemicals.

When significant adverse air quality impacts are identified pursuant to the methodologies of Chapter 17, "Air Quality," and may not be fully mitigated, the increments in the concentrations of air pollutants should be evaluated for their potential impact on an affected area's health.

Route of exposure: Inhalation

Health effects: Two air pollutants, fine particles ($PM_{2.5}$) and ozone, are of particular concern since these air pollutants exacerbate asthma symptoms and are known to contribute to emergency department visits, hospitalizations for respiratory and cardiovascular conditions, and to overall mortality. Of these two, ambient levels of $PM_{2.5}$ tend to be localized and analyzable and are more likely to be influenced by proposed projects. Health effects may also occur from exposure to pollutants from combustion and process emissions such as VOCs.

Analysis: For a public health assessment of air quality impacts, analyses frequently include epidemiologic modeling or the impacts of exposures on affected populations. Data that contribute to such analyses may include the increment in a pollutant's concentration, a concentration-response function, age, underlying illness bur-

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dens in affected populations, and the number of people affected. Much of this information may have been collected as a result of the analysis in Chapter 17, "Air Quality."

WATER QUALITY (POTABLE, NON-POTABLE, AND RECREATIONAL)

When significant adverse water quality impacts are identified pursuant to the methodologies of Chapter 11, "Natural Resources," or Chapter 13, "Water and Sewer Infrastructure," and may not be fully mitigated, the project's impact on water quality should be evaluated for its potential impact on the health of the potentially affected population.

Route of exposure: Exposure may be by direct ingestion, contamination of cooking water and/or food supply, or secondary exposure from hand-to-mouth contact with affected surfaces.

Health effects: Water contaminated with infectious organisms may cause mild or serious infectious diseases. Chemical contamination of water may result in increased risk for acute and chronic conditions including neurologic effects, kidney or other organ system effects, and cancers.

Analysis: The potential effects of a project's unmitigated impact on water contamination may be analyzed in terms of potential impacts on beach closings and frequency of potential contact with waters. The potential increase in the risks of, or anticipated numbers of occurrences of, water- and food-borne illnesses should be examined and, if feasible, quantified.

SOIL AND DUST CONTAMINANTS

Soil contaminants may include environmental contaminants such as lead or other metals, asbestos, volatile organic compounds, other hazardous materials, or, in some cases, infectious agents. Soil contaminants are a concern particularly with projects having unmitigated significant impacts where the public would have access to previously restricted areas that have unknown quality of fill materials, where disturbance of topsoil is possible during construction or operational project phases, or where ongoing soil erosion is likely. Soil vapor intrusion is a concern in areas where VOCs may have been used as solvents or where compounds have spilled or leaked into soil or groundwater. These compounds may subsequently become a source of soil gas that may enter nearby buildings.

When significant adverse hazardous materials impacts are identified pursuant to the methodologies of Chapter 12, "Hazardous Materials," and may not be fully mitigated, that hazardous materials impact should be evaluated for its potential impact on the health of the potentially affected population.

Routes of exposure: Ingestion, inhalation, dermal contact

Health effects: Dust exposure may exacerbate asthma, cause gastroenteric illnesses, and elevate risks for health effects from toxic exposures, such as lead poisoning. Unmitigated significant soil gas exposures may increase risks of fires and explosions, and may increase risks of a variety of chronic illnesses associated with VOCs.

Analyses: The potential health impacts may be evaluated in terms of expected airborne concentrations of soil or soil vapors, potential for vapor buildup in interior spaces, or levels and quantities of anticipated dust deposition and their attendant health and safety risks. Many of these data may have been collected as a result of the analysis in Chapter 12, "Hazardous Materials."

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NOISE

Noise, or unwanted sound, is a leading cause of public complaints in New York City. When significant adverse noise impacts are identified pursuant to the methodologies of Chapter 19, "Noise," and may not be fully mitigated, that noise impact should be evaluated for its potential impact on the health of the potentially affected population.

Route of exposure: Soundwave absorption.

Health effects: Noise in and around homes may disturb quality-of-life by disrupting sleep or interfering with conversations, Chronic noise exposure may raise blood pressure and has been suggested to contribute to myocardial infarctions, as well as to interfere with language development in children. Prolonged exposure to levels above 85 a-weighted decibels (dB(A) will eventually harm hearing. Episodic and unpredictable exposure to short-term impact noise at high decibel levels may also affect health.

Analyses: Noise modeling results and allowable city noise levels based on proposed use (residential, open space, *etc.*) data can be used for quantitative analyses for unmitigated significant noise impacts. Much of this information may have been collected as a result of the analysis in Chapter 19, "Noise."

PESTS (RODENTS, INSECT VECTORS, AND ANIMAL-BORNE DISEASE)

Projects that modify the built and natural environment may result in increased wild animal – human interaction, or conditions conducive to insect and animal breeding, and subsequently an increase in animal bites, or vector-borne disease. Examples of vectors include mosquitoes, rats, ticks and fleas.

Routes of exposure: Inhalation of allergens; insect and animal bites.

Health effects: Contact with animals may lead to infectious diseases, rabies exposures, injuries, and other health problems. The increased presence of indoor pests may contribute, in sensitive persons, to asthma symptoms and exacerbations. Inappropriate pest control may increase exposures to pesticides and their health effects.

Analyses: The need for inclusion of a pest analysis in this chapter occurs only when it cannot be determined that standard practices/protocols would adequately address a potential problem. Projects should be evaluated for their potential to shift or increase pest or wild animal populations in or around a project area, for the potential impact of pesticide-based mitigation, and for the potential to increase the risks of animal bites and vector-borne diseases. Analyses may also include an evaluation of potential impacts on rodent complaints, seasonal mosquito pool counts, and on animal populations.

NON-EXPOSURE FACTORS

When conducting a public health assessment, there are certain non-exposure factors that may influence the likelihood and magnitude of a public health impact. For instance, if an air quality analysis conducted pursuant to Chapter 17, "Air Quality," determines that a proposed project may have the potential to result in an unmitigated significant adverse impact with respect to $PM_{2.5}$ and the increase in $PM_{2.5}$ exposure would occur in an area with a relatively healthy population, the potential for this exposure to be considered a significant adverse public health impact may be lower than if the same increase in $PM_{2.5}$ were to occur in an area where the population exhibits more signs of vulnerability. The following questions help to identify the factors that may influence the potential for public health impacts based upon the vulnerability of the area's population:

- Based on existing health data for the affected community, what are the leading causes of morbidity and/or mortality? Does the proposed project have the potential to contribute to an existing health burden? Does the existing health status of the population in the affected area make it vulnerable to the potential exposure(s)? Health issues of particular concern include:

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  - Asthma
  - Cardiovascular disease and its consequences
  - Immuno-compromised conditions (diabetes, HIV/AIDS, *etc.*)
  - Adult and infant mortality.

- Does the affected population have characteristics that may place it at greater risk of exposure to urban health stressors or environmental hazards? Depending on the exposure, vulnerability may be evaluated in terms of a population's relative age, institutional status, or other vulnerability.
- Are the characteristics of the population in the affected area such that there are many people potentially affected by the project? Population characteristics to consider include:
  - Population size. In calculating the total burden of a health outcome that is associated with exposure to a contaminant, the total number of cases is estimated as a function of the background rate of this particular health outcome in the population and the size of the population. A condition that has a high background rate in a relatively small population may produce the same number of cases as a larger population with a smaller background rate.
  - Population density (residential, occupational) in proximity to sources of exposure.

400. Step Three: Determining Impact Significance

When a more detailed analysis is undertaken, it is important to gather as much project and site-specific data as possible. If these data are unavailable reasonable, but conservative, assumptions should be made. Literature reviews may be helpful in identifying concentration response functions and dose-response relationships. Data describing baseline conditions about neighborhoods (*e.g.* socio-economic factors such as education levels, median income, traffic volume and flow, *etc.*), its populations (census, other demographic data), and its health status and disease burdens (*e.g.*, self-reported health status, asthma and myocardial infarction hospitalization rates, mortality and birth rates, pedestrian injury rates, *etc.*) are important to consider when determining the significance of a public health impact.

Impacts may either be considered adverse (*i.e.*, increasing the frequency or severity of illness) or positive (*i.e.*, decreasing its incidence). In general, CEQR is predominantly concerned with disclosure of significant adverse impacts. However, in the event that a proposed project has the potential for both adverse effects and those that are positive, it is appropriate for the lead agency to disclose such information.

500. Developing Mitigation

A hierarchy of mitigations should be considered that prioritizes engineering or process controls that minimizes the presence of hazards first, reduces the potential for exposure second, and mitigates the effect of exposure only as a last resort.

600. Developing Alternatives

Alternatives that incorporate the potential mitigation discussed above may also reduce or avoid significant impacts associated with a project. In addition, depending on the impact, there may be alternatives available that could also reduce or eliminate significant public health impacts in these respective areas.

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700. REGULATIONS AND COORDINATION

710. APPLICABLE COORDINATION

Coordination between the lead agency and DOHMH should be initiated when significant unmitigated impacts are found that may influence public health in ways described in this chapter. DOHMH should be notified if the public health analysis for CEQR projects determines there may be elevations in rates of illness, injury or mortality. DOHMH may also be consulted if questions arise with respect to appropriate methodology for public health analyses, or appropriate mitigation of potential public health impacts.

720. REGULATIONS, STANDARDS, AND GUIDELINES

City, state and federal standards and guidelines may be helpful when considering potential public health impacts. Examples of some standards/guidelines include:

- New York City Noise Control Code §24-232
- USEPA - National Ambient Air Quality Standards (NAAQS) promulgated under the Clean Air Act
- US EPA – Drinking Water Standards and Health Advisories promulgated under the Safe Drinking Water Act
- Agency for Toxic Substances and Disease Registry (ATSDR) - Minimal Risk Levels (MRL)
- US EPA – Reference Concentration Levels in Air
- NYSDEC Air Annual Guidance Criteria/ Short-term Guidance Criteria – (AGC/SGC)
- NYS DEC Soil Cleanup Objectives (currently 6NYCRR Part 375)
- NYS DOH – Soil Vapor Intrusion Guidelines
- Information may also be readily obtained from the websites of the following agencies: USEPA, ATSDR, NYSDEC, NYSDOH, DOHMH.
- In addition to the regulations and guidelines listed above, other laws and regulations pertaining specifically to public health may be relevant for assessment purposes. These may include, but not be limited to, the following:
    - New York State Public Health Law Section 570 *et seq*. and 10 NYCRR Part 58 (regulating clinical laboratories) and 42 CFR Part 72 (covering the handling of pathogenic organisms).
    - New York City Health Code

730. DATA AND RESOURCES

DOHMH publishes data describing neighborhood-specific demographic and socioeconomic characteristics, as well as mortality, morbidity, birth rates and outcomes, communicable, noninfectious and chronic disease burdens, environmentally related illnesses such as respiratory and cardiovascular disease burdens and their consequences, insect-borne disease, water-related infectious diseases, domestic and wild animal-related illnesses, pest burdens and pesticide use. The following resources are available here:

- Epi-Query
- Vital statistics publications
- Community Health Profiles
- NYC Health Disparities Reports
- Environmental Public Health Tracking Portal

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731. Literature and Reference Sources

Peer-reviewed literature and toxicological references can be found at:

- Medline (PubMed) http://www.ncbi.nlm.nih.gov/pubmed/
- Toxnet (Toxicology Data Network) http://toxnet.nlm.nih.gov/

732. Epidemiologists

Epidemiologists study the frequency and distribution of health and diseases within human populations and environments. Specifically, they measure or estimate the incidence of disease occurrence and relate it to different characteristics of populations and environments; plan and develop methodology relating to risk assessments; analyze experimental data and interpret published literature; and interpret and evaluate environmental epidemiological data/studies. An Epidemiologist should have a masters or doctoral degree in epidemiology. A background or experience in Environmental Health (one area of specialization in Public Health) is also helpful.

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NEIGHBORHOOD CHARACTER

CHAPTER 21

In a neighborhood character assessment under CEQR, one considers how elements of the environment combine to create the context and feeling of a neighborhood and how a project may affect that context and feeling. Thus, to determine a project's effects on neighborhood character, a neighborhood's contributing elements are considered together.

New York City's neighborhoods are organic and dynamic places, often identified as much by a long-established character as they are by their changes. Such changes are often brought on by factors independent of the proposed project, such as increases and decreases in population, local, regional and global economic forces, and shifts in demographic patterns. Neighborhood character impacts are rare and it would be under unusual circumstances that, in the absence of an impact in any of the relevant technical areas, a combination of moderate effects to the neighborhood would result in an impact to neighborhood character.

Moreover, a significant impact identified in one of the technical areas that contribute to a neighborhood's character is not automatically equivalent to a significant impact on neighborhood character. Rather, it serves as an indication that neighborhood character should be examined. The examination focuses on whether a defining feature of the neighborhood's character may be significantly affected. For example, a significant traffic impact may occur if a project adds vehicles to an intersection, increasing the delay to unacceptable levels. This significant impact would not constitute an impact on neighborhood character, however, if a neighborhood's traffic conditions are not considered one of its defining features (*i.e.*, if the traffic conditions are comparable to those of many other neighborhoods and areas in the city). Conversely, a significant impact on neighborhood character may result due to an increase in traffic or a change in the type of traffic (*i.e.*, an increase in truck deliveries) on a neighborhood's roadways if that neighborhood is defined by particularly quiet residential streets, even if that increase did not constitute a significant traffic impact.

As indicated throughout the Manual, it is important for an applicant to work closely with the lead agency during the entire environmental review process. Because the neighborhood character assessment requires considerable coordination among the different technical areas that make up neighborhood character—land use, urban design and visual resources, historic resources, socioeconomics, transportation, and noise—the lead agency should consult, as appropriate, with the city's expert agencies for that specific technical area.

100. DEFINITION

Neighborhood character is an amalgam of various elements that give neighborhoods their distinct "personality." These elements may include a neighborhood's land use, urban design, visual resources, historic resources, socioeconomics, traffic, and/or noise. These technical areas are often considered in a CEQR assessment and are defined and described individually in other chapters of the Technical Manual.

200. DETERMINING WHETHER A NEIGHBORHOOD CHARACTER ASSESSMENT IS APPROPRIATE

An assessment of neighborhood character is generally needed when a proposed project has the potential to result in significant adverse impacts in any technical area presented below, or when the project may have moderate effects on several of the elements that define a neighborhood's character.

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210. SIGNIFICANT IMPACTS IN OTHER TECHNICAL AREAS

To determine whether a Neighborhood Character assessment is appropriate, answer the following question:

Would the project have the potential to result in any significant adverse impacts in the following areas?

A. Land Use, Zoning, and Public Policy;
B. Socioeconomic Conditions;
C. Open Space;
D. Historic and Cultural Resources;
E. Urban Design and Visual Resources;
F. Shadows;
G. Transportation; or
H. Noise.

If 'Yes,' a preliminary assessment of neighborhood character may be appropriate. For guidance on conducting a preliminary neighborhood character assessment, proceed to Section 310, below. If the answer is 'No,' a preliminary assessment of neighborhood character probably is not required. However, depending on the project, a combination of moderate changes in several of these technical areas may potentially have a significant effect on neighborhood character. See Section 220, below, for further information.

220. COMBINATION OF MODERATE EFFECTS

Even if a project does not have the potential to result in a significant adverse impact in any specific technical area(s), additional analysis may be required based on the potential for a combination of moderate effects in more than one area. A "moderate" effect is generally defined as an effect considered reasonably close to the significant adverse impact threshold for a particular technical analysis area.

When considered together, there are elements that may have the potential to significantly affect neighborhood character. These may consist of a combination of urban design, historic resources, shadows, open space, and noise effects. Moderate effects on several these elements may affect defining features of a neighborhood and, in turn, a pedestrian's overall experience. Additionally, a combination of moderate effects on the land use, socioeconomics and transportation conditions of a neighborhood may also result in changes in the prevailing businesses and economics of an area, which in turn may affect defining features of the neighborhood and the overall experience of pedestrians, workers, residents, and visitors. If it is determined that two or more categories may have potential 'moderate effects' on the environment, the following question should be answered:

Would the proposed project *result in a combination of moderate effects to several elements that cumulatively may affect neighborhood character?*

If a project would result in only slight effects in several analysis categories, then no further analysis is needed. If the answer to the above question is "Yes," then proceed to the preliminary analysis in Section 320, below.

300. ASSESSMENT METHODS

310. STUDY AREA

The study area for a preliminary analysis of neighborhood character is typically consistent with the study areas in the relevant technical areas assessed under CEQR that contribute to the defining elements of the neighborhood.

Unless the project covers a substantial physical area or is a generic action, the study area should generally include at least the project site and the area within 400 feet of the project site boundaries. The extent of the study area may be modified, as appropriate, either to include any additional areas that may be affected by the project or to exclude areas that would clearly not be affected by the project.

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Larger study areas may be appropriate in certain circumstances, such as when projects are large in scale, located just outside a well-defined neighborhood that they may affect, or may result in truck routes or other project-related traffic some distance from the proposed site. For example, if a project would facilitate a new commercial building on the outskirts of a well-defined neighborhood, such as Brooklyn Heights, a larger study area may be appropriate. Even if that neighborhood is outside of the quarter-mile radius generally considered an appropriate study area for a new commercial building, it may be appropriate to include a portion of the Brooklyn Heights neighborhood in the study area if the new building may affect its character.

Smaller study areas may be appropriate if the neighborhood that may be affected is itself smaller than the typical study area. An example may be a mid-rise (15- to 20-story) building proposed for midblock in a residential part of the Upper West Side of Manhattan and the midblock portion of the block has a strongly defined low-rise (four- to five-story) residential character that is very different from the ends of the block, where mid-rise buildings with ground floor retail front wide avenues. The proposed building may not affect the character of the ends of the block, but may affect the mid-block portion. Therefore, it may be appropriate for the study area to focus on the midblocks. Considering a study area that is too large would dilute the intensity of the effects.

For generic actions that would affect relatively small areas, the affected areas would serve as the study area. When large areas would be affected, the analysis considers neighborhoods typical of those that would be affected.

320. PRELIMINARY ASSESSMENT

A preliminary assessment determines whether changes expected in other technical areas may affect a contributing element of neighborhood character. The assessment should answer the following two questions:

1. *What are the defining features of the neighborhood?*
2. *Does the project have the potential to affect the defining features of the neighborhood, either through the potential for a significant adverse impact or a combination of moderate effects in relevant technical areas?*

DEFINING FEATURES

Because a neighborhood's character is the result of the combination of various contributing elements, the salient features of the neighborhood should be identified. The discussion should focus on the major characteristics of the neighborhood and how they relate to the area's overall character, and should not merely repeat information about each of the contributing technical areas (*e.g.*, land use, socioeconomics, *etc.*) found elsewhere in the environmental assessment. For instance, the analysis may consider whether a particular housing type, such as rent-stabilized housing, serves to define the socioeconomic character of an area. The displacement of a large amount of this type of housing from the area may potentially affect neighborhood character. This information should be available from the socioeconomic conditions analysis (see Chapter 5, "Socioeconomic Conditions," for guidance). The discussion should address all of the various components of neighborhood character, even if changes to only one of these elements have triggered the need for an analysis. Some of these elements are critical to the character, while others may only contribute to it.

For example, the Financial District area of Manhattan is characterized and defined by its tall buildings and narrow, winding streets. The skyscrapers front uniformly onto the street, creating a wall. During much of the day, these streets are crowded with pedestrians. In this neighborhood, the height and form of the buildings, the width of the streets, the block form, and the pedestrian activity are the defining characteristics. Other elements, such as socioeconomic conditions, traffic, and noise, contribute to the character, but are not key features of the Financial District area.

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In another area, however, such as suburban Staten Island, the width of the streets and the buildings' positions relative to the street may not be important, but the size and form of its single-family, detached homes, the landscaping, and the quiet and traffic-free streets may be.

For purposes of the preliminary assessment, a description of the neighborhood's general defining features is usually appropriate, and depending on the project, a site visit may also be recommended. If a detailed assessment is necessary, that assessment may go into greater depth as needed to make an impact determination.

POTENTIAL TO AFFECT DEFINING FEATURES OF A NEIGHBORHOOD

After the defining features of a neighborhood are identified, the potential for the project to affect the defining features of the neighborhood, either through the potential for a significant adverse impact or a combination of moderate effects in relevant technical areas, should be examined. For example, a project may affect a defining neighborhood feature if a significant adverse shadow impact was identified on sunlight sensitive features of an historic building or park and that resource was determined to be central to a neighborhood's character. An example where a combination of moderate effects may affect defining features may occur with a proposal for a large office complex in an area characterized by quiet residential streets with limited pedestrian and vehicular traffic. In this instance the project may result in an increase in traffic and pedestrian activity on local streets to the extent that the character of the area may be significantly altered.

If the project has the potential to affect defining features of a neighborhood, a detailed assessment of neighborhood character may be appropriate. If there is no potential for the project to affect such features, further analysis is likely not required.

330. DETAILED ASSESSMENT

After a preliminary assessment has been performed and it has been established that a project would affect a contributing element of neighborhood character, the detailed assessment is used to examine potential effects of the project by gathering information through field visits, photographs, and interviews, as needed. Using this information as a baseline, the future No-Action and future With-Action conditions are then projected and compared. The steps involved in a detailed assessment of neighborhood character are described in this section.

331.1. Gather Information

FIELD VISIT

Generally, the first step in a detailed analysis is to conduct a field visit to observe the neighborhood. Field visits typically are made during active periods rather than at odd hours. Observations are made of such features as major uses, scale and types of buildings, activity patterns and intensities, and the relationship between traffic, noise, and the character of the streets. Any unusual features or combination of features are identified.

PHOTOGRAPHS

Photographs are an effective way to illustrate a neighborhood's characteristics.

OTHER AVAILABLE INFORMATION

Data gathered for other technical areas of the environmental assessment (such as land use, urban design and visual resources, community facilities, socioeconomics, etc.) are useful in identifying a neighborhood's characteristics.

INTERVIEWS

Interviewing neighborhood residents and workers to learn about the neighborhood may also be useful in some cases, but is not generally necessary.

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331.2. Describe the Existing Character

Both graphics and text may be used to describe the character of the neighborhood affected by the project. This assessment should be organized to identify those elements that have a major determining role in the character of the neighborhood. For examples of how to determine the existing character see Section 320, above.

Generic actions may be assessed similarly. Neighborhoods may be described by the regularity of street grid, building form, site planning and configuration, parking, and streetscape, as well as by predominant land use(s): low-rise, residential, medium-density residential, commercial, industrial, or undeveloped.

332. Future No-Action Condition

Using the information gathered for other technical areas about changes expected in the future, predict how the character of the neighborhood would change in the future without the proposed project (the No-Action condition). This analysis focuses on the key elements that contribute to neighborhood character and if, and how, they may change without the proposed project.

333. Future With-Action Condition

To determine how the proposed project may affect neighborhood character compared to the No-Action condition, the assessment should describe the proposed project in terms of how it would affect the key elements that define the study area's character (the With-Action condition). For example, if one of the most important aspects of a neighborhood's character is that a street ends in a cul-de-sac so that the area is very quiet and has very little traffic, note whether the project would change that condition (by continuing the street through, for example). In the example of Manhattan's Financial District, where the height and form of the buildings, narrowness of the streets, and pedestrian activity are the defining characteristics, a tower-on-a-plaza design for an office building may change neighborhood character in its vicinity, even if it represented a one-for-one replacement of floor area. Also, in this case an increase in traffic alone, although it may be a significant traffic impact that requires mitigation, may not affect neighborhood character.

Generic actions may be assessed in much the same way with somewhat less detail than an assessment of site-specific projects. In some cases, when less detail about the project is available, the assessment considers the circumstances or issues that may affect neighborhood character in the study area.

400. DETERMINING IMPACT SIGNIFICANCE

An understanding of the key elements that define neighborhood character, and their relationships to one another, forms the basis for determining impact significance. Usually, a significant change to one of the determining elements of neighborhood character would result in a significant impact on neighborhood character. In general, the more uniform and consistent the existing neighborhood context, the more sensitive it is to change. A neighborhood that has a more varied context is typically able to tolerate greater changes without experiencing significant impacts.

A significant impact identified in one of the technical areas that may contribute to neighborhood character is not automatically equivalent to a significant impact on neighborhood character. Rather, it serves as an indication that neighborhood character should be examined. If that examination determines that one of the defining features of the neighborhood's character would be significantly affected, then a significant impact may occur. For example, a significant traffic impact may occur if a project adds vehicles to an intersection, increasing the delay there. This traffic impact does not result in an impact on neighborhood character if traffic is not an important determining characteristic of that neighborhood. Alternatively, a significant impact on neighborhood character may occur because of an increase in traffic on area roadways, even if that increase did not constitute a significant traffic impact.

Significant impacts on neighborhood character may also occur if the proposed project would not have a significant impact on any one defining feature of the area. In such cases, the project may have moderate impacts on a number of

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defining features that, cumulatively, result in a significant impact on the neighborhood character. For example, a commercial strip in a suburban section of Staten Island may be different in land use and in urban design from the area's detached houses with lawns and landscaping, but not significantly; it may add some traffic to local residential streets, but not a significant amount; and it may increase area noise levels, but not significantly. Altogether, however, the commercial strip may have a significant impact on the neighborhood's character by changing it from a small-scale, quiet residential area to a busier commercial one.

As with other technical areas, significant impacts on neighborhood character may be either beneficial or adverse. Because a neighborhood's character is perceived and contextual, this judgment may be more subjective than in other technical areas. For example, a new and modern apartment building in an older neighborhood may be perceived as an improvement by some, but as out of context and adverse by others. The lead agency should consider comments made during public review in making such a determination as to which significant impacts are adverse and require mitigation.

500. DEVELOPING MITIGATION

Often, mitigation proposed for significant impacts in the technical areas that contribute to neighborhood character may also mitigate neighborhood character impacts. For example, if a significant traffic impact is predicted and increases in traffic also significantly affect neighborhood character, measures that mitigate the significant traffic impact may also reduce traffic to levels that are consistent with the neighborhood. Mitigation of urban design impacts often also effectively mitigate related impacts on neighborhood character.

In other situations, however, mitigation measures may alleviate significant adverse impacts in other technical areas, but significant impacts on neighborhood character may remain. In the example of significant traffic impacts, above, mitigation measures may reduce the delay at area intersections to acceptable levels, but not the overall effect that increased traffic may have on the character of the area. The number of vehicles may still be sufficiently large to change the character of the streets. Another example is a project that may result in both significant adverse socioeconomic impacts related to secondary residential displacement and a related significant impact on neighborhood character because of the change in the area's population profile. The socioeconomic impacts may be mitigated by finding affordable housing for displaced residents, but if the residents move out of the neighborhood, the significant impact on the neighborhood's character still occurs.

If mitigation measures presented for the project's other significant adverse impacts, if any, would not mitigate neighborhood character impacts, other mitigation measures are to be identified where feasible. For example, if a signal timing change addresses a traffic impact, but not a related neighborhood character impact, the solution may be deliberate rerouting of project-related traffic to a more suitable street. This solution may be considered even if the diversion causes a new traffic impact (which may be mitigated), but does not affect neighborhood character.

600. DEVELOPING ALTERNATIVES

Alternatives proposed to avoid impacts in other technical areas of the environmental assessment may also avoid neighborhood character impacts. Similar to mitigation, alternatives proposed in response to impacts in the technical areas of the assessment may not necessarily avoid neighborhood character impacts.

Mitigation measures developed specifically to avoid neighborhood character impacts may be incorporated into alternative proposals.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

There are no special statutes, regulations, or standards that control the study of neighborhood character in particular. Regulations and standards for each of the technical areas that may contribute to neighborhood character are discussed in Section 700 of the appropriate Manual chapters.

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720. APPLICABLE COORDINATION

The neighborhood character assessment requires considerable coordination among the different technical areas that make up neighborhood character—land use, urban design and visual resources, historic resources, socioeconomics, transportation, and noise. The lead agency should ensure that the analysts addressing individual technical areas are aware of the issue of neighborhood character and that the analyst for neighborhood character coordinates with these other disciplines.

730. LOCATION OF INFORMATION

Information related to the elements of neighborhood character is found in the other technical areas of the environmental assessment (see Section 700 of the appropriate technical chapters of this Manual).

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CONSTRUCTION

CHAPTER 22

Construction activities, although temporary in nature, can sometimes result in significant adverse impacts. A project's construction activities may affect a number of technical areas analyzed for the operational period, such as air quality, noise, and traffic; therefore, a construction assessment relies to a significant extent on the methodologies and resulting information gathered in the analysis of these technical analyses areas. The following guidance provides the framework for conducting a construction assessment.

100. DEFINITIONS

CONSTRUCTION DURATION is often broken down into short-term (less than two years) and long-term (two or more years). Where the duration of construction is expected to be short-term, any impacts resulting from such short-term construction generally do not require detailed assessment. However, there are instances where a potential impact may be of short duration, but nonetheless significant, because it raises specific issues of concern. In addition, there are technical areas, such as air quality, where the duration of construction alone is not a sufficient indicator of the need for a detailed assessment, and other factors should be considered. In such instances, a targeted assessment of the relevant technical area may be appropriate. The factors to consider in determining whether a construction impact assessment is warranted for a particular technical area, such as transportation or air quality, are discussed in more detail below.

CONSTRUCTION EQUIPMENT is defined as machinery used, at a specified site, for the fabrication, erection, modification, demolition, or removal of any structure or facility, including all related activities such as land clearing, site preparation, excavation, cleanup, and landscaping.

200. DETERMINING WHETHER A CONSTRUCTION IMPACT ASSESSMENT IS APPROPRIATE

Construction impacts may be analyzed for any project that involves construction or could induce construction. For construction activities not related to in-ground disturbance, short-term construction generally does not warrant a detailed construction analysis. For example, the use of a property for construction staging activities is likely to only warrant analysis if this activity continues for a period of several years. However, consideration of several factors, including the location and setting of the project in relation to other uses and the intensity of construction activities, may indicate that a project's construction activities, even if short-term, warrant analysis in one or more technical areas described below. For instance, further analysis may be warranted in certain areas if a project's construction period would be short, but construction activities that otherwise would take place over a longer period have been compressed into this shorter timeframe.

The following should be used by the lead agency to determine whether further analysis of a project's construction activities is needed for any technical area.

TRANSPORTATION

Construction activities may affect several elements of the City's transportation system, including traffic, transit, pedestrians, and parking. A transportation analysis of construction activities is predicated upon the duration, intensity, complexity and/or location of construction activity.

Analysis of construction activities on transportation is often not required, as many projects do not generate enough construction traffic to warrant such analysis. However, due to the location, extent, and intensity of construction, this is not always the case. Therefore, the lead agency should consider a number of factors before determining whether a preliminary assessment of the effect of construction on transportation is needed. These factors include:

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- Whether the project's construction would be located in a Central Business District (CBD) or along an arterial or major thoroughfare.
    - If 'yes', the duration and the nature of the construction activity (which could include, if known, the number of construction-related auto and truck trips (in PCEs), on-site vs. on-street staging area, hours of construction, etc.) should be considered to determine whether a preliminary assessment would be needed.
- Whether the project's construction activities, regardless of where it will be located either in a CBD or along an arterial or major thoroughfare, would require closing, narrowing, or otherwise impeding moving lanes, roadways, key pedestrian facilities (*e.g.,* sidewalks, crosswalks, corners/corner reservoirs), parking lanes and/or parking spaces in on-site or nearby parking lots and garages, bicycle routes and facilities, bus lanes or routes, or access points to transit.
    - If so, would the closure be located in an area with high pedestrian activity or near sensitive land uses such as a school, hospital, or park?
        - If 'yes', the proximity of the closure to the sensitive area(s), the extent of the rerouting of pedestrians, bicycles or vehicular traffic, and the duration of the closure activity should be considered to determine whether a preliminary assessment would be needed.
- Whether the project would involve construction on multiple development sites in the same geographic area, such that there is the potential for several construction timelines to overlap, and last for more than two years overall. If yes, then a preliminary assessment of the effect of construction on transportation may be needed.

AIR QUALITY OR NOISE

Generally, if a transportation analysis is not needed with regard to construction activities, an air quality or noise assessment of construction vehicles is likely not warranted. With regard to the air quality and noise effects of other construction activities, the following should be considered by the lead agency in determining whether a preliminary analysis is needed. Often, this involves considerations of construction equipment and activities.

An assessment of air quality and noise for construction activities is likely not warranted if the project's construction activities:

- Are considered short-term;
- Are not located near sensitive receptors;
- Do not involve construction of multiple buildings where there is a potential for on-site receptors on buildings to be completed before the final build-out; and
- The pieces of diesel equipment that would operate in a single location at peak construction are limited in number.

If a project either does meet one or more of the criteria above or one of the above criteria is unknown at the time of review, a preliminary air quality or noise assessment is not automatically required. Instead, various factors should be considered, such as the types of construction equipment (gas, diesel, electric), the nature and extent of any commitment to use the Best Available Technology (BAT) for construction equipment, the physical relationship of the project site to nearby sensitive receptors, the type of construction activity, and the duration of any heavy construction activity.

To illustrate the above, construction noise, generated by pile driving, truck traffic, blasting, demolition, *etc.*, is generally analyzed only when it affects a sensitive receptor over a long period of time. Based upon experience, unless ambient noise levels are very low and/or construction source levels are very

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high, and there are no structures that provide shielding, it is unusual for construction sources to have significant impacts at distances beyond 1,500 feet in New York City. Therefore, further analysis should be performed if the proposed project would cause construction equipment to be operating within 1,500 feet of a receptor for a period of time exceeding two years. In some circumstances, however, even a shorter term construction phase may affect highly sensitive locations (such as schools, hospitals, *etc.*), warranting further quantitative analysis.

OTHER TECHNICAL AREAS

HISTORIC AND CULTURAL RESOURCES

Construction impacts may occur on historic and cultural resources if in-ground disturbances or vibrations associated with project construction could undermine the foundation or structural integrity of nearby resources.

A construction assessment is not needed for historic and cultural resources unless the project involves construction activities within 400 feet of a historic resource. Note that both impacts on archaeological resources from construction and demolition of an architectural resource as a result of the project are assessed as part of the historic and cultural resources analysis described in Chapter 9, "Historic and Cultural Resources."

HAZARDOUS MATERIALS

A construction assessment is not needed for hazardous materials unless the construction activities would disturb a site, or be located adjacent to a site containing hazardous materials. The conclusions from Chapter 12, "Hazardous Materials," regarding the presence or absence of hazardous materials on the site(s) may be used in making this determination.

For any potential construction sites and areas along the routes of proposed utilities that have been found to have a potential to contain hazardous materials, the possible effects on construction workers and the surrounding community during construction should be assessed. This is typically part of the hazardous materials analysis and is described in Chapter 12, "Hazardous Materials." Any impacts from in-ground disturbance that are identified in Chapter 12 should be identified in this chapter as well. The mitigation or other measures to avoid the impact, such as an (E) Designation or Restrictive Declaration, should be disclosed here as well. If the impact identified in Chapter 12 is fully mitigated, no further analysis of the effect from construction activities on hazardous materials is needed. If an unmitigated significant impact is identified in Chapter 12, the unmitigated impact should be disclosed in this chapter as well.

NATURAL RESOURCES

Natural resources may be affected during construction, particularly during such activities as excavation; grading; site clearance or other vegetation removal; cutting; filling; installation of piles, bulkheads, or other waterfront structures; dredging; dewatering; or soil compaction from construction vehicles and equipment.

A construction assessment is not needed for natural resources unless the construction activities would disturb a site or be located adjacent to a site containing natural resources. The conclusions from Chapter 11, "Natural Resources," regarding the presence or absence of natural resources on the site(s) may be used in making this determination. If there is a potential for the construction activities to disturb a natural resource, a preliminary natural resources assessment, using the guidance below and in Chapter 11, "Natural Resources," should be conducted to determine whether, and the extent to which, the project's construction activities would disturb natural resources.

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OPEN SPACE, SOCIOECONOMIC CONDITIONS, COMMUNITY FACILITIES, LAND USE AND PUBLIC POLICY, NEIGHBORHOOD CHARACTER AND INFRASTRUCTURE

A preliminary construction assessment is generally not needed for these technical areas unless the following are true:

- The construction activities are considered "long-term" (more than 2 years);
- Short-term construction activities would not directly affect a technical area, such as impeding the operation of a community facility (*e.g.*, result in the closing of a community health clinic for a period of a month(s)).

If further assessment is warranted for one or more these technical areas, a preliminary analysis may be conducted for those areas only.

300. ASSESSMENT METHODS

310. PRELIMINARY ASSESSMENT

In addition to the information gathered in Section 200, the following information should be considered in the preliminary assessments for the transportation, air quality, or noise effects of construction activities. For those areas with specific direct effects only, such as an effect of construction on historic resources, this information may not be required.

- The construction stages and activities, including numbers and types of equipment, and the anticipated duration of each stage or activity;
- The number of daily construction vehicles (construction worker vehicles and construction trucks) and deliveries and their temporal distribution for each stage and activity, presented in Passenger Car Equivalents (PCEs); and
- The number of daily construction workers and their temporal distribution for each stage and activity.

The range of construction impact issues that may be assessed in a preliminary assessment and the circumstances where a detailed assessment may be warranted for a specific technical area are described below. The assessment should be targeted only to those issues where potential impacts may result from the project's construction activities. Based on the results of the preliminary assessment, the lead agency should consider construction duration, the project's geographic surroundings, related pedestrian and vehicular activities, the distance between the general public and emissions sources, construction intensity, and the thresholds that trigger further analysis in the appropriate technical area to determine whether a detailed analysis is needed.

TRANSPORTATION

The volume of vehicular traffic (including trucks) expected to be generated during peak construction hours should be estimated in order to determine whether a detailed quantitative analysis is warranted. The assessment of construction-related traffic should consider vehicles generated by construction employees driving to and from the site, as well as trucks and other vehicles associated with project construction. Calculating the background information necessary for this assessment can be performed as follows:

- Estimate the construction employee and construction-related vehicle trips (presented as PCEs) that would be generated during construction peak periods. This should include an estimate of the number of autos bringing construction workers to the site during the peak travel periods and the volume of trucks or other construction vehicles expected to access the site during those periods. This information is usually developed by, or in close coordination with, the project's engineers. Typically, construction peak hours take place earlier than the AM and PM traffic peak hours. For some projects, however, a portion of the employee- and

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construction-related vehicle trips will occur at the same time as peak commuting or traffic conditions in the area. For example, where the peak hour for the study area under current conditions is 8:00 a.m. to 9:00 a.m., the analysis may note that approximately 10 to 15 trucks and 50 autos are expected to bring construction workers to the site during the 7:00 a.m. to 8:00 a.m. peak arrival hour for construction-related activity, while 3 to 5 trucks and 15 autos are expected to do likewise during the 8 to 9 AM peak travel hour for the study area.

- Using the data gathered for the traffic analysis, assess whether the AM or PM peak hours for construction of the project will overlap with peak operational hours for the project.

If applicable, the preliminary assessment should also comment on the extent to which sidewalk, travel lane(s) or street closures would impact traffic and pedestrian flows, and it should assess whether capacity losses and/or full street closures would affect traffic patterns, create traffic diversions, cause backups or otherwise cause a significant deterioration in local or regional traffic flow. For multi-phase projects, potential construction impacts should be addressed for each phase. Note that the term "closure" is used broadly and includes the complete closure of a street or sidewalk for 24 hours a day, as well as the taking of one curb lane 24 hours a day to accommodate construction vehicles or field offices or the closure of a lane or lanes during parts of the day. Any impacts on parking supply caused by the taking of lanes or the removal of parking spaces in on-site or nearby parking lots and garages should also be disclosed, especially for active retail or residential areas where such losses may affect retail activity and residents.

No detailed traffic analysis for construction activities is needed if the construction peak would generate fewer than 50 vehicle trips (presented in PCEs). If the project involves multiple development sites over varying construction timelines, a preliminary assessment must take into account whether the PCEs associated with operational trips from completed portions of the project and construction trips associated with construction activities could overlap and exceed the 50 PCE threshold. If not, further analysis is not required.

If the project would exceed the 50 PCE threshold, the conclusion may be drawn that the project would have no significant impacts with regard to traffic and, therefore, no detailed traffic analysis for construction activities is needed if the following factors are all present:

- The construction peak would generate fewer vehicle trips (presented as PCEs) than the operational project peak and the construction peak lane geometry, signal timing, and parking regulations are consistent with those of the operational peak hours;
- The construction would occur during off-peak hours or during hours comparable to the operational peak hours;
- The project has been determined not to produce the potential for significant adverse traffic impacts during the operational period; and
- The preliminary assessment indicates that changes to the capacity of the roadway network related to construction activities are not likely to cause a significant deterioration in local or regional traffic flow.

Correspondingly, if construction would generate a number of vehicular trips similar to or greater than the proposed project and if the operational analysis indicates significant impacts, a more detailed construction traffic assessment may be necessary. In cases where the project's operational analyses do not identify significant traffic impacts but the project's construction-related activities could affect the capacity of the roadway network in an area and result in the potential for a significant impact, a detailed traffic analysis may be warranted.

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AIR QUALITY

Construction impacts on air quality may occur because of particulate matter emitted by construction activities or sandblasting, exhaust and emissions from construction equipment, and increased truck traffic to and from the construction site on local roadways or because of temporary road closings. Specifically for mobile sources, these noticeable effects on air quality are typically results of lane closures, traffic diversions, disruptions of area traffic flow or goods delivery, as mentioned above under traffic. For stationary sources, they are typically correlated with large diesel equipment, on-site batching plants, and fugitive dust emissions, and often focus on emissions of $PM_{2.5}$. The determination whether it is sufficient to conduct a qualitative analysis of these emissions or whether a quantitative analysis is required cannot be made based solely on the duration of the construction period, and should take into account such factors as the location of the project site in relation to existing residential uses or other sensitive receptors, the intensity of the construction activity, and the extent to which the project incorporates commitments to appropriate emission control measures. The mobile and stationary source analyses follows the same guidance detailed in Chapter 17, "Air Quality."

If the operational analysis indicates that the project would not result in significant mobile source impacts, and the vehicular trip generation from construction would be less than that of the proposed project, then a more detailed assessment is usually not necessary. In this case, the analysis may be qualitative, describing how the determination of no significant impact was reached. However, if the construction peak would generate significantly more vehicles than the project peak or if significant air quality impacts are expected under the With-Action condition, more detailed analyses may be necessary.

NOISE

For mobile sources, effects on noise are typically results of lane closures, traffic diversions, disruptions of area traffic flow or goods delivery, as mentioned above under transportation. For stationary sources, construction noise, generated by pile driving, truck traffic, blasting, demolition, *etc.*, is generally analyzed in detail only when it affects a sensitive receptor over a long period of time. The determination whether it is sufficient to conduct a qualitative analysis or whether a quantitative analysis is required cannot be made based solely on the duration of the construction period, and should take into account such factors as the location of the project site in relation to existing residential uses or other sensitive receptors, the intensity of the construction activity, and the extent to which the project incorporates commitments to appropriate noise control measures. The mobile and stationary noise source analyses follows the same guidance detailed in Chapter 19, "Noise."

OTHER TECHNICAL AREAS:

LAND USE AND NEIGHBORHOOD CHARACTER

A construction impact analysis of land use and neighborhood character is typically needed if construction would require continuous use of property for an extended duration, thereby having the potential to affect the nature of the land use and character of the neighborhood. A land use and neighborhood character assessment for construction impacts looks at the construction activities that would occur on the site (or portions of the site) and their duration. The analysis determines whether the type and duration of the activities would affect neighborhood land use patterns or neighborhood character. For example, a single property might be used for staging for several years, resulting in a "land use" that would be industrial in nature. Depending on the nature of existing land uses in the surrounding area, this use of a single piece of property for an extended duration and its compatibility with neighboring properties may be assessed to determine whether it would have a significant adverse impact on the surrounding area. Guidance for a preliminary assessment of the effects to land use, zoning, and public policy and neighborhood character, and consequently, whether a detailed analysis is warranted, may be found in Chapter 4, "Land Use, Zoning, and Public Policy," and Chapter 21, "Neighborhood Character."

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SOCIOECONOMIC CONDITIONS

If the proposed project would entail construction of a long duration that could affect the access to and therefore viability of a number of businesses, and the failure of those businesses has the potential to affect neighborhood character, a preliminary assessment for construction impacts on socioeconomic conditions should be conducted. This assessment focuses on construction conditions affecting access to existing businesses, the potential consequences concerning their continued viability, and the potential effects of their loss on the character of the area. Guidance for a preliminary assessment of the effects socioeconomic conditions, and consequently, whether a detailed analysis is warranted, may be found in Chapter 5, "Socioeconomic Conditions."

COMMUNITY FACILITIES AND SERVICES

A construction impact assessment should be conducted for any community facility that would be directly affected by construction (*e.g.*, if construction would disrupt services provided at the facility or close the facility temporarily, *etc.*). In some cases, depending on the community facility and nature of its services, even a limited disruption could trigger the need for more detailed analysis. The assessment of construction impacts on community facilities examines the service disruption to those facilities that may occur during construction. Guidance for an analysis of direct effects to community facilities may be found in Chapter 6, "Community Facilities."

OPEN SPACE

A construction impacts analysis for open space should be conducted if an open space resource would be used for an extended period of time for construction-related activities, such as construction staging, or if access to the open space would be impeded for an extended period during construction activities. The analysis usually documents the amount of open space proposed for use as staging, the length of time that the open space would be used, and the current condition of the open space and current utilization by the community. In addition, the Department of Parks and Recreation should be consulted to coordinate replacement of any street trees lost as a result of the project. Guidance for an analysis of effects to open space, and consequently, whether detailed analysis is warranted, may be found in Chapter 7, "Open Space."

HISTORIC AND CULTURAL RESOURCES

The assessment of construction impacts on historic and cultural resources considers the possibility of physical damage to any architectural or archaeological resources identified in the project's historic and cultural resources assessment, identified in Chapter 9, "Historic and Cultural Resources." Impacts on archaeological resources from construction are assessed as part of the overall evaluation of the project's effect on archaeological resources (see Chapter 9, "Historic and Cultural Resources").

If a project's construction activities are located within 400 feet of a historic or cultural resource, potential hazards should be assessed, such as whether certain character-defining elements of a structure, including but not limited to rooftops or stained glass windows, could be impacted by falling objects from an adjacent construction site.

There are also regulatory mechanisms that address many of the concerns regarding vibrations associated with construction. If the project is located within 90 feet of a New York City Landmark, a National Register-listed property, or within a New York City Historic District, the potential for physical disturbance should be disclosed and the project is required to comply with DOB Technical Policy and Procedure Notice (TPPN) #10/88. TPPN #10/88 supplements the standard building protections afforded by Building Code C26-112.4 by requiring a monitoring program to reduce the likelihood of construction damage to adjacent New York City Landmarks and Na-

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tional Register-listed properties (within 90 feet) and to detect at an early stage the beginnings of damage so that construction procedures may be changed.

If the project is not located within 90 feet of a historic or cultural resource that is NYC-landmark eligible, eligible for the State and National Register of Historic Places, or is within an eligible New York City Historic District, no special protections apply. Therefore, the potential for physical disturbance and adverse impacts to those historic and cultural resources should be disclosed.

NATURAL RESOURCES

If a project or construction staging area is located near a sensitive natural resource (such as wetlands, *etc.*, as defined in Chapter 11, "Natural Resources"), construction activities may result in the disruption of these areas. Projects located on the waterfront or on sites which discharge to a separate sewer system may also have construction impacts on water quality from construction work in or near the water. If large land areas are expected to have surface soils exposed to precipitation, an analysis of runoff may be warranted. To address potential impacts associated with runoff of sediments, the analysis documents the activities that might generate sediments (these may include demolition, excavation, grading, erosion, unpaved and exposed soil areas, *etc.*).

The analysis of construction's effects on natural resources would also consider the loss or additional destruction of natural resources on the project site or in the staging area. An assessment could also include an inventory of existing street trees within the construction impact zone if the project would potentially result in the loss of those trees. The potential for construction activities near the root zone of a tree to compact the soil and destroy the roots and/ or kill the tree over a period of time that may extend beyond the duration of the construction project should be examined as well. The assessment of such issues is described in Chapter 11, "Natural Resources." Usually the assessment is more qualitative in nature, since these potential impacts may be mitigated to a great extent.

HAZARDOUS MATERIALS

Because soils are disturbed during construction and utility placement, any project proposed for a site that has been found to have the potential to contain hazardous materials should also consider the possible construction impacts that may result from that contamination and identify measures to avoid impacts This is typically part of the hazardous materials analysis, and is described in Chapter 12, "Hazardous Materials."

INFRASTRUCTURE

If construction would cause a disruption to infrastructure, the analysis is usually qualitative. Measures to minimize disruption are generally documented. For example, in an instance where important infrastructure lines run beneath an area of project construction or where significant new infrastructure would be developed with the project, necessitating the rerouting of infrastructure lines, the construction impacts section would disclose these service disruptions and their durations. The discussion would then describe the measures taken to minimize these disruptions in service. These measures may include construction of a bypass connection before services would be interrupted. Close coordination with the appropriate agency is recommended to ensure that any disruption is temporary. Another example for a large project would be the extensive number of construction-related heavy trucks and their effect on pavement conditions. If such disruptions were expected, a more detailed analysis may be warranted.

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320. STUDY AREA

If detailed quantitative analysis is needed, study areas for construction impacts analyses are established. Baseline data for the construction impact analyses are typically the same as those used in conducting impact analyses for the With-Action condition; however, the study areas for construction impact analyses may vary, since a great deal depends on the route that construction vehicles will take. Generally, the areas that could be affected by construction are the uses immediately bordering the site, truck routes to and from the site, routes which construction vehicles and employees would take to access the site, vehicular detour routes with major traffic diversion, bicycle detour routes, historic and cultural properties adjacent to the site or historic districts containing the site, and facilities with substantially relocated pedestrian volumes.

To illustrate, the analysis of mobile air quality impacts includes intersections where the greatest increase in construction-related truck traffic is expected, and the analysis is performed using the techniques described in Subsection 321 of Chapter 17, "Air Quality."

For noise, the study area for construction sources is based on the proximity of a noise-sensitive receptor to the construction site and the route of construction traffic traveling to and from the site. Generally, receptors within a 1,500-foot radius of the proposed project (for stationary construction sources) and along feeder streets to the proposed project (for mobile construction sources) should be considered if a detailed construction assessment is necessary. The method for selecting the study areas for stationary and mobile sources in Chapter 19, "Noise," should be used.

330. DETAILED ANALYSIS TECHNIQUES

Detailed construction impact analyses are typically based on the guidance used for the operational analyses for the various technical areas. The primary difference in assessing construction impacts is that the nature of the impacts associated with construction are often unique to construction disruption, such as fugitive dust, traffic diversion, and pedestrian crosswalk and bicycle lane relocation. When more detailed analyses are called for, the methodology for analysis is the same as that used in conducting impact analyses for the With-Action condition.

The construction analysis (especially as it relates to the air quality, noise, and transportation technical areas) typically considers the anticipated construction activities and phasing of the project, and identifies where construction staging would occur, if applicable. For multiphase projects, the equipment and activities associated with each major phase on each portion of the site and the duration of each phase are documented and used for the analyses. This information serves as the basis for describing and analyzing construction impacts. For analysis of multi-phased construction, the assessment is often broken into two or three major phases, during which different portions of the site would be used in varying ways and with varying intensities. For example, during the first phase, construction might be initiated on the northern portion of the site while the center portion of the site is used for construction staging; during the second phase, construction might be completed on the northern end and initiated on the center of the site, while the southern portion of the site is used for staging.

For projects requiring detailed construction analyses, there may be instances where the lead agency, in its discretion, determines it is appropriate to cumulatively assess the construction impacts of the project, in conjunction with those of known No-Action developments that are in close proximity to construction activities under the project. In order to accurately assess cumulative construction impacts, the adjacent projects to be considered should be limited to those with known information regarding construction activities and impacts—often, these projects have been subject to a separate environmental assessment. For information regarding projects in the study area undergoing environmental review, please contact the Mayor's Office of Environmental Coordination.

The following technical approaches and analysis methodologies may be useful in preparing a detailed construction impact analysis where the potential exists for significant impacts.

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TRANSPORTATION

If, based upon the results of the preliminary assessment for transportation, a detailed traffic, transit or pedestrian analysis is warranted, the analysis is usually conducted for the hours most likely to have significant adverse impacts. The determination of construction phase impacts entails an abbreviated version of the impact assessment framework described in Chapter 16, "Transportation," and addresses the likely significance of any such impacts on the study area street network. It focuses on depicting the potential magnitude and duration of impacts for the key locations likely to be impacted, rather than for all potential impact locations analyzed within the operational period analyses. This could include a quantitative evaluation of expected levels of service at intersections in the study area that would be affected by construction traffic, or a quantitative determination that peak hour trips are likely to be small enough not to have significant impacts on levels of service, v/c ratios, or average vehicle delays. The impact assessment also indicates the routes that heavy construction vehicles would use to approach and depart the site and whether or not any residential streets would be used.

For projects involving temporary roadway or lane closures requiring detailed analysis, the traffic diversions that would occur during the construction phasing, until the new roadway system is functioning, should be assessed. This analysis follows the methodology described in Chapter 16, "Transportation."

AIR QUALITY

The air quality analyses for construction may examine mobile sources from construction traffic and stationary sources from activities on-site.

If, based upon the screening analyses conducted in the preliminary assessment, detailed quantitative analysis is warranted, the mobile or stationary source analysis follows the same guidance detailed in Chapter 17, "Air Quality."

The analysis usually quantifies the length of time the dust-causing activities are expected to last, and describes the measures that are undertaken to minimize the emissions (*i.e.*, watering down of excavation sites, *etc.*). If the project sponsor has committed to implementation of these measures they may be incorporated into the project description and analyzed as a project component, thereby reducing the potential for project impacts.

The effects of particulate matter emissions from the construction site and earthmoving equipment should be considered. If the project would involve an on-site concrete batching plant, this plant would be assessed as a new stationary source, using the methodologies described for stationary sources describe above and appropriate models, such as AERMOD, and emission factors such as from AP-42. Fugitive dust emissions from construction material handling are estimated to analyze construction impacts on air quality. In addition to the estimates of emissions from the physical movement or from the tires of such equipment that entrain particulates into the air, exhaust emission factors (from combustion) for such equipment should be included in this analysis. The most recent AP-42 factors, NEVES Report or EPA NONROAD model should be used for nonroad mobile source emissions (please refer to EPA website http://www.epa.gov/nonroad/ for the latest model version). Estimated activities, cycles of equipment operations, duration of operations, equipment types, emission factors, and load factors should be used to estimate emissions. Emission control measures, such as watering of material storage piles or truck tires that are taken into consideration in the analysis should be documented.

NOISE

Construction source noise is associated with a variety of mobile and stationary sources, each having unique noise characteristics and operating for different time periods. The only noise descriptor that can be used reliably with these noise sources is the L_{eq}. Hourly L_{eq} values should be used because construction operations vary with the time of day.

If the preliminary assessment indicates the need to conduct a mobile source noise analysis (associated with heavy truck trips passing sensitive receptors over a long period of time) or a stationary source

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noise analysis (associated with construction equipment and activities), then detailed analysis is required. This analysis looks at the specific activities, types of equipment, and duration of activities planned for specific locations and the combined effects of the noise on nearby sensitive receptors. For example, if pile driving would be occurring on one section of the site while building erection would be occurring on another area of a site, the construction noise analysis would logarithmically add the noise from each of these sources to estimate noise levels at nearby sensitive receptors.

Table 22-1 shows the maximum allowable noise emission levels for specific pieces of construction equipment based upon the New York City Noise Control Code (Local Law 113) and per Chapter 28, "Citywide Construction Noise Mitigation" of the Department of Environmental Protection (DEP) Notice of Adoption of Rules for Citywide Construction Noise Mitigation. The values from Local Law 113 of 2005 represent the maximum allowable noise emission levels for specific pieces of construction equipment at construction sites in New York City, and the values from Chapter 28 are what DEP uses to identify equipment that may be the cause for a noise complaint. Construction equipment with maximum noise emission levels less than those shown in Table 22-1 is available. Guidance on quieter available construction equipment and quieter construction procedures is provided in DEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation, as well as from the equipment manufacturers. Noise levels from construction may also be reduced through the use of perimeter noise barriers, temporary portable barriers, shrouds, shields, enclosures, *etc.* These path controls should be investigated where feasible. Absent information about specific equipment noise characteristics, the maximum values shown in Table 22-1 should be assumed, and these values may be adjusted for distance assuming a 6 dB(A) attenuation per doubling of distance. At distances of less than 25 feet, specific equipment noise data should be used for distance attenuation.

Where detailed construction noise analysis is necessary, construction noise analysis modeling methodologies have been developed by a variety of federal agencies including the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and Environmental Protection Agency (EPA). The Roadway Construction Noise Model (RCNM) is the FHWA model for detailed construction noise analysis, and the maximum noise emission levels and the equipment usage factors in Table 22-1 are based on the RCNM construction equipment library. The CadnaA or SoundPLAN model can also be used for detailed construction noise analysis. If these models are used, absent project specific information, construction equipment noise emissions levels and usage factors from the RCNM could be utilized for analysis. In general these models, which should be applied to each phase of construction (*i.e.*, clearing, foundation, erection, finishing, landscaping, *etc.*) separately, account for the noise emission of each particular piece of equipment, the number of pieces of equipment on the site, a usage factor which accounts for the fraction of time the equipment is being used, topography and ground level effects, source-receptor distance, and shielding in calculating a maximum $L_{eq(1)}$ at the closest noise-sensitive receptor to the proposed project. To determine potential significant impacts caused by the construction activity, these levels are compared to the No-Action noise levels and to applicable standards.

Table 22-1
Noise Emission Reference Levels (A-weighted decibels with RMS "slow" time constant)

Equipment Description	Usage Factor (%)	L_{max} @ 50 Feet
All Other Equipment > 5 HP	50	85
Auger Drill Rig	20	85
Backhoe	40	80
Bar Bender	20	80
Blasting	N/A	94
Boring Jack Power Unit	50	80
Chain Saw	20	85

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Clam Shovel (dropping)	20	93
Compactor (ground)	20	80
Compressor (air, less than or equal to 350 cfm)	40	53
Compressor (air, greater than 350 cfm)	40	58
Concrete Batch Plant	15	83
Concrete Mixer Truck	40	85
Concrete Pump Truck	20	82
Concrete Saw	20	90
Crane	16	85
Dozer	40	85
Drill Rig Truck	20	84
Drum Mixer	50	80
Dump Truck	40	84
Dumpster/Rubbish Removal	20	78
Excavator	40	85
Flat Bed Truck	40	84
Front End Loader	40	80
Generator	50	82
Generator (< 25 KVA, VMS signs)	50	70
Gradall	40	85
Grader	40	85
Grapple (on Backhoe)	40	85
Horizontal Boring Hydr. Jack	25	80
Hydra Break Ram	10	90
Impact Pile Driver	20	95
Jackhammer	20	73
Man Lift	20	85
Mounted Impact Hammer (Hoe Ram)	20	90
Pavement Scarafier	20	85
Paver	50	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pumps	50	77
Refrigerator Unit	100	82
Rivet Buster / Chipping Gun	20	85
Rock Drill	20	85
Roller	20	85
Sand Blasting	20	85
Scraper	40	85
Shears (on Backhoe)	40	85
Slurry Plant	100	78
Slurry Trenching Machine	50	82
Soil Mix Drill Rig	50	80
Tractor	40	84
Vacuum Excavator (Vac-truck)	40	85
Vacuum Street Sweeper	10	80
Ventilation Fan	100	85
Vibrating Hopper	50	85
Vibratory Concrete Mixer	20	80
Vibratory Pile Driver	20	95
Warning Horn	5	85
Water Jet Deleading	20	85
Welder / Torch	40	73

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Notes: As per Local Law 113 §24-228(a)(1) *Construction, Exhausts, and other Devices*, "Sound, other than impulsive sound, attributable to the source or sources, that exceeds 85 dBA as measured 50 or more feet from the source or sources at a point outside the property line where the source or sources are located or as measured 50 or more feet from the source or sources on a public right-of-way" is prohibited.
[A] Indicates the value is from Local Law 113; other values are from Chapter §28-109, Appendix.
[B] Impact Device
Sources: Local Law 113 and the New York City Department of Environmental Protection Notice of Adoption of Rules for Citywide Construction Noise Mitigation: Chapter §28-109, Appendix.

Construction noise is regulated by the New York City Noise Control Code and by EPA noise emission standards for construction equipment. These local and federal requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emissions standards; that, except for special circumstances, construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction material be handled and transported so as not to create unnecessary noise. A statement of adherence to these requirements is often included.

OTHER TECHNICAL AREAS

For the following technical areas--"Land use, Zoning, and Public Policy, "Neighborhood Character," "Socioeconomic Conditions," "Community Facilities," "Open Space," "Historic and Cultural Resources," "Natural Resources," "Hazardous Materials," and "Sewer and Water Infrastructure"—the guidance in the respective chapters for each technical should be followed in conducting the preliminary assessment, determining whether a detailed analysis is warranted, and if so, conducting the detailed analysis.

400. DETERMINING IMPACT SIGNIFICANCE

In general, the determination of the significance of construction impacts is based on the same criteria as described for each relevant technical area of this Manual. For example, if a detailed air quality analysis is conducted for a project's construction activities, the criteria for a significant impact in Chapter 17, "Air Quality," should be used.

500. DEVELOPING MITIGATION

Significant construction impacts may often be mitigated in the same ways as other impacts in the particular technical area of concern. Such mitigation measures are described in the different technical chapters of this Manual and, depending on the impact, may also include such measures as alternative scheduling of construction phases.

Measures that are appropriate specifically for construction impacts are described below:

LAND USE, ZONING, AND PUBLIC POLICY AND NEIGHBORHOOD CHARACTER

Impacts associated with the use of land for construction staging or for activities associated with construction may be mitigated by fencing, plantings, or similar buffers, or the use of an alternative site not in a sensitive area.

SOCIOECONOMIC CONDITIONS

Potential measures for socioeconomic impacts include different phasing of construction to avoid extended periods when existing businesses may have a loss of access, adjusting closures of travel lanes and sidewalks areas to improve access to businesses, and similar measures.

OPEN SPACE

If construction staging that requires the use of an open space or a loss of access to an open space is determined to be a significant adverse impact, mitigation may involve expansion and improvement of another nearby open space or the creation of an open space of similar characteristics at a nearby location, or to mitigate a loss of access, alternative access may be provided. Mitigation may also include the restoration of any open space impacted by a construction project.

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HISTORIC AND CULTURAL RESOURCES

Mitigation for the avoidance of blasting impacts may include establishment of criteria for maximum peak particle velocity; movement criteria, and criteria for ground water. Generally, mitigation should be developed in consultation with the Landmarks Preservation Commission.

NATURAL RESOURCES

Mitigation for impacts from runoff and sedimentation may include planting, fencing or the protection of exposed soil areas, and the implementation of best management practices (BMPs) (*e.g.*, filter fences and sediment ponds) or similar measures, to minimize erosion because of precipitation. Where the loss of natural resources is inevitable, replacement plans should be developed as mitigation. Mitigation may also include the implementation of protection measures such as tree guards to reduce the likelihood of accidental tree losses and the replacement of removed street trees.

INFRASTRUCTURE

If impacts from the disruption of infrastructure service during construction are anticipated, mitigation should be developed in close coordination with the appropriate agency.

TRANSPORTATION

Mitigation of traffic impacts related to construction activities may involve temporary changes in signal phasing/timing, closure of travel and/or parking lane(s), modification of lane configuration, changes in traffic and curbside parking regulations, deployment of traffic enforcement agents (TEAs), *etc.* Examples would be prohibition of turns onto a street with reduced capacity due to street narrowing or a temporary bus lane to expedite surface transit. For projects that would create significant impacts on traffic, pedestrians or bicyclists during construction, OCMC may request installation of closed-circuit cameras (CCTV) for incident mitigation along the roadways affected by the construction activities.

Mitigation for construction impacts affecting access to a bus stop or subway access point should be coordinated with New York City Transit (NYCT) and DOT. Access may need to be maintained to certain locations through temporary walkways, or temporary signage may be required directing transit users to other access points. If construction requires the closure of a sidewalk, a temporary walkway may be constructed alongside the site which would require providing pedestrian fencing as well appropriate signage to maintain pedestrian safety. In addition flaggers should be provided to minimize the conflicts between pedestrians and construction-related vehicles. At mid-block construction sites where pedestrians are diverted to the opposite side of the street (provided there is enough capacity), a temporary traffic signal may be required to facilitate the crossing.

AIR QUALITY

Mitigation for impacts from particulate matters includes control measures and construction practices that exceed the requirements of the New York City Air Pollution Control Code and, in the case with City projects, Local Law 77. For City projects, this may include paving areas and pathways where exposed soil would result in fugitive emissions from traveling vehicles and wind erosion. Limiting the use of diesel equipment to cleaner tiers (EPA's Tier II, III, or IV) and/or substituting diesel equipment with electric-power equipment should also be considered. For private developments, the mitigation may include some or all the measures in Local Law 77, in addition to the measures detailed for City projects.

NOISE

Mitigation for construction noise impacts may include noise barriers, use of low noise emission equipment, locating stationary equipment as far as feasible away from receptors, enclosing areas, limiting the duration of activities, specifying quiet equipment, scheduling of activities to minimize impacts (either time of day or seasonal considerations), and locating noisy equipment near natural or existing barriers that would shield sensitive receptors.

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600. DEVELOPING ALTERNATIVES

In general, alternatives to address impacts during construction are focused on alternative scheduling of construction phases that can serve to alleviate impacts, particularly those related to traffic. In addition, alternatives may sometimes focus on the design of the proposed project. For example, if a wetland impact may be expected due to excavation for footing of a proposed project, the alternative would either be a differently designed project to avoid the wetland area, or locating the proposed project at a different location.

700. REGULATIONS AND COORDINATION

710. REGULATIONS AND STANDARDS

The following list is not exhaustive and applicants are responsible for determining any local, State, and Federal regulations that apply.

NEW YORK CITY AIR POLLUTION CONTROL CODE

All projects, whether or not subject to the requirements of CEQR, are required to comply with the New York City Air Pollution Control Code, which regulates fugitive dust under Section 1402.2-9.11, "Preventing Particulate Matter from Becoming Air-Borne; Spraying of Asbestos Prohibited; Spraying of Insulating Material and Demolition Regulated." Local Law 77 of 2003 requires that any diesel-powered nonroad equipment, fifty horsepower or greater, that is owned by, operated by or on behalf of, or leased by a City Agency be powered by Ultra Low Sulfur Diesel (ULSD) and utilize Best Available Technology (BAT). Documentation of these measures and commitment to adherence to these requirements are often reflected in the environmental assessment.

NEW YORK CITY ASBESTOS CONTROL PROGRAM

The regulations of the New York City Asbestos Control Program include specific procedures that must be adhered to for the control of asbestos during construction. In instances where demolition of an existing building could result in emissions of asbestos, the qualitative analysis should document a commitment to the adherence of these measures and requirements during construction.

LOCAL LAW 24 OF 2005

Local Law 24 of 2005 requires the issuance of a community reassessment, impact amelioration (CRIA) statement or Environmental Assessment Statement (EAS)/Environmental Impact Statement (EIS) in lieu of CRIA if a publicly mapped street is closed for more than 180 consecutive calendar days to vehicular traffic. The CRIA Statement or equivalent EAS/EIS must be delivered to both the community board and the city council member in whose district the street is located on or before the 210th day of the street closure. In addition, at least one public forum must be held prior to the issuance of either the CRIA, EAS, or EIS if the project is one for which DOT has issued a permit. Further information is available from:

New York City Department of Transportation
Division of Traffic Planning
55 Water Street
New York, NY 10041

REQUIRED PERMITS FROM DOT'S OFFICE OF CONSTRUCTION MITIGATION AND COORDINATION

Before receiving construction permits from DOT (such as street opening, sidewalk construction, construction activity or canopy permits), the traffic, bicycle detour, and pedestrian access plans must be approved by OCMC, located at 55 Water Street in Manhattan. For areas south of Canal/Rutgers

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Street, plans must be approved by the Lower Manhattan Borough Commissioner's Office instead of OCMC. For bicycle detour plans located anywhere in the City, the DOT's Office of Alternative Modes must also review the plan. Should any bus stops or bus routes need to be relocated or subway station access be affected, such impacts must be identified and reviewed with NYCT and DOT.

Pedestrian access plans should identify the extent to which any sidewalks and/or crosswalks would be closed or narrowed to allow for construction-related activity and describe how pedestrian access to adjacent land uses and uses through the area/intersections would be maintained. In addition, any construction activities that necessitate the closure of an existing bicycle lane(s) would require the preparation of a bicycle detour plan showing the detour bicycle lane with pavement marking and signage. The plan should show how the proposed temporary bicycle lane would be reconnected to other existing bicycle lane(s) in the area.

NEW YORK CITY NOISE CONTROL CODE

The New York City Noise Control Code, as amended in 2005, defines "unreasonable and prohibited noise standards and decibel levels" for the City of New York. The New York City Noise Control Code, Section 24-219, contains rules that prescribe "noise mitigation strategies, methods, procedures and technology that shall be used at construction sites" when certain construction devices or activities occur. Specifically, the Code requires:

- The development and implementation of a site-specific construction noise mitigation plan, where appropriate;
- Construction activities to occur between 7 AM to 6 PM Monday through Friday (construction work to occur outside the permitted days/hours requires prior authorization); and
- Certain pieces of construction equipment (see Subchapter 5 of the New York City Noise Control Code, "Prohibited Noise Specific Noise Sources–Sound Level Standard") to satisfy maximum allowable noise emission requirements.
- In addition, Title 15, Chapter 28 of the New York City Administrative Code prescribes citywide construction noise mitigation rules, found here, which prescribe the methods, procedures and technology to be used at construction sites to achieve noise mitigation whenever any one or more of certain construction devices or activities set forth in the rules are employed or performed.

NEW YORK CITY PROCEDURE FOR THE AVOIDANCE OF DAMAGE TO HISTORIC STRUCTURES

Regulations for the protection of historic structures are found in "Technical Policy and Procedure Notice #10/88, Procedures for the Avoidance of Damage to Historic Structures Resulting from Adjacent Construction when subject to Controlled Inspection by Section 27-724 and for Any Existing Structure Designated by the Commissioner," issued by the New York City Department of Buildings. Additional standards and guidance are available from:

New York City Landmarks Preservation Commission
Environmental Review Division
1 Centre St., 9N
New York, NY 10007

720. APPLICABLE COORDINATION

Depending on the potential impact, the agencies responsible for implementing required mitigation measures should be coordinated with as soon as practicable. The agencies that may be contacted are specified within the different technical chapters of this Manual.

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In addition, it may be necessary to coordinate with DOT's Office of Construction Mitigation and Coordination in the event rerouting of truck traffic during construction or other traffic-related or pedestrian-related mitigation measures are proposed during construction.

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ALTERNATIVES

CHAPTER 23

SEQR requires that alternatives to the proposed project be identified and evaluated in an EIS so that the decision-maker may consider whether alternatives exist that would minimize or avoid adverse environmental effects. 6 NYCRR 617.9(b)(5). The EIS should consider a range of reasonable alternatives to the project that have the potential to reduce or eliminate a proposed project's impacts and that are feasible, considering the objectives and capabilities of the project sponsor. If the EIS identifies a feasible alternative that eliminates or reduces significant adverse impacts, the lead agency may consider adopting that alternative as the proposed project. In some cases, this change may permit the agency to issue a negative declaration. In the case of a proposed comprehensive plan for the redevelopment of an area, the lead agency may sometimes include planning alternatives that may have either similar–or in some cases, greater–significant adverse environmental impacts than the proposed project or may not address all of the goals and objectives of the proposed project. Such alternatives may serve as an analytical tool that demonstrates the environmental consequences of the planning decisions being made.

100. IDENTIFICATION OF ALTERNATIVES

The selection of alternatives to a proposed project is determined by taking into account the nature of the specific project, its stated purpose and need, potential impacts, and the feasibility of potential alternatives. There is no prescribed number of alternatives that need to be examined. The only alternative required to be considered is the No-Action alternative and the lead agency should exercise its discretion in selecting the remaining alternatives to be considered. The following presents a nonexclusive list of the types of alternatives that may be appropriate and the rationale used to determine their reasonableness.

110. NO-ACTION ALTERNATIVE

As required by SEQR, the No-Action alternative must be examined. The No-Action alternative demonstrates environmental conditions that would exist if the project were not implemented. This analysis is essentially equivalent to the analysis of the future without the project that is formulated to provide a baseline for the evaluation of each type of potential impact associated with the proposed project.

120. ALTERNATIVE USE

Consideration of different uses may form a reasonable alternative where the impacts of a project relate to the proposed use. For privately sponsored projects, the feasibility of an alternative use should be considered carefully in relation to the objectives and capabilities of the sponsor. For city-sponsored projects, there may be more flexibility in considering an alternative use. The different use alternative is often considered when the proposed project involves a use change to an existing building. For example, an alternative use of an historic structure that better aligns with the physical and/or historic integrity of the resource may be considered for a project that proposes a use that would significantly and adversely impact the resource.

130. ALTERNATIVE SIZE OR LESSER DENSITY

This alternative may be reasonable for projects for which the degree of potential impact is related to the size or density of the project. In that event, a lesser size or density alternative with the potential to reduce the impacts of a proposed project while, to some extent, still meeting the project's stated purpose and need may be considered. For example, because of the magnitude of activity generated, traffic and associated air quality impacts are often related to the size of the project. An alternative that is smaller than the proposed project, but proposes the iden-

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tical use may result in less traffic generation and associated air quality impacts while meeting a portion of the objectives of the project. In fashioning an alternative size or lesser density alternative, the lead agency considers the relationship of project size or scale to the objectives and capabilities of the sponsor, taking into account factors that may affect the sponsor's ability to implement a project at a reduced size or scale. However, the size or scale of the project as defined by the proposed project should not be considered an essential objective of the project sponsor precluding consideration of a smaller size or lesser density as a reasonable alternative. In some cases, the detailed analysis of the alternative size or lesser density alternative in an EIS may demonstrate that it would not significantly reduce the impacts of the proposed project, while failing to fully meet the objectives of the sponsor.

140. ALTERNATIVE DESIGN OR CONFIGURATION

An alternative design or configuration may be considered for projects that have potential adverse impacts related to the proposed project's bulk, visual character, contextual or direct effect on historic or other environmentally sensitive resources, effects on stormwater runoff or energy consumption, or its physical relationship to another use, such as a power plant stack, a noise generator, or an area of soil contamination. Some examples of design or configuration alternatives include changing a building footprint to reduce interference with an historic building; changing the location, orientation, and height of a building in relation to an existing stack to reduce or eliminate a potential air quality impact; altering design elements such as setbacks, materials, and fenestration to relate the building(s) to the surrounding area; incorporating sustainable design measures to reduce stormwater runoff or energy consumption; or configuring the site plan to avoid excavation in an area containing contaminated soils or archaeological resources.

160. ALTERNATIVE SITE

The consideration of one or more alternative sites for a proposed project is appropriate when the objectives of the proposed project are not site dependent, and it is often considered when the project is a site selection. In order to consider an alternative site for private developments, the applicant must own or own a right to use the alternative site. Projects for which alternate site analyses may be appropriate include proposals for siting public facilities, such as a municipal garage, or projects where identified significant impacts may be reduced or eliminated on a different site without compromising project objectives. For example, if a project would result in significant impacts because of its proximity to a wetland, choosing an alternative site that is not near any wetlands would eliminate those impacts.

170. ALTERNATIVE TECHNOLOGY

Alternative technology should be considered when potential impacts of the proposed project may be reduced or eliminated by adopting an alternative technology and/or when the alternative technology would be less costly and adequately efficient to meet the objectives of the project. For example, if significant odor impacts are associated with a technical process of a particular project (*e.g.*, allowing solid waste to be stored at a facility), an alternative applying a different technique that is reasonably effective and reduces the identified impact might be analyzed (containerizing and moving the waste out of the facility more quickly).

180. PHASING ALTERNATIVE

Phasing alternatives are most often considered when a project is proposed in phases, is of large magnitude, is of uncertain timing, or contains several components with impacts related to the timing of their implementation. For example, an environmental assessment may assume that the commercial component, scheduled for early completion, of a large-scale residential and commercial development would create a traffic impact on a nearby congested intersection for which public improvements are planned, but not yet implemented. A project phasing alternative that schedules construction of t after implementation of the street improvements is appropriate to consider in this case, to the extent that it meets the project's objectives. Finally, for large projects where construc-

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tion of the second phase would take place during operation of the first phase, it may be appropriate to consider altering the phasing to reduce a traffic and air quality impact of combined construction and operation.

190. NO UNMITIGATED IMPACT ALTERNATIVE

When a project would result in significant adverse impacts that cannot be mitigated, it is often CEQR practice to include an assessment of an alternative to the project that would result in no unmitigated impacts. Often, this results in a smaller project, but may also result in a change of the proposed use or a change in site design. For example, if the proposed project would result in significant adverse impacts on a local subway station because of the new users that it would send to the station during rush hour, and physical conditions at that station make mitigation of this impact impracticable, the no unmitigated impact alternative considers a project small enough to avoid that impact. This alternative demonstrates those measures that would have to be taken to eliminate all of the project's unmitigated impacts. This alternative may not be feasible in relation to the objectives and capabilities of the project sponsor, may nevertheless serve as an analytical tool that demonstrates there is no alternative meeting the goals of the proposed project without resulting in unmitigated impacts.

200. ASSESSMENT METHODS

Evaluation of alternatives comprises three steps: (1) framing and describing the alternatives for consideration; (2) assessing impacts of alternatives; and (3) comparing the effects of the alternatives to those of the proposed project, as discussed below.

210. FRAMING AND DESCRIBING ALTERNATIVES

Once the alternatives to be considered are identified, each must be described adequately so that its impacts may be assessed. The level of detail in the description depends on the type of alternative and the impacts to be assessed. The No-Action alternative is described in each technical assessment area and is summarized in the alternatives section. Other alternatives to the proposed project should be described using text and graphics including such information as program elements, square footages, site plans, bulk drawings, elevations, axonometric drawings, and any other information pertinent to their comparison with the proposed project.

220. ASSESSING IMPACTS OF ALTERNATIVES

In general, impacts of alternatives do not need to be assessed at the same level of detail as that of the proposed project. In areas where no significant impact of the proposed project was identified, a qualitative assessment is sufficient. However, where a significant impact of the proposed project has been identified, it is usually appropriate to quantify the impact of the alternative so that a comparison may be meaningful. Quantification is accomplished by applying the same methodology used for assessment of the proposed project. Sometimes it is possible to estimate the difference between the alternative and the proposed project by applying a ratio. This technique is used when impacts are directly proportional to the size of the project, such as trip generation and transportation analysis. When the alternative would create impacts in different technical areas from those of the proposed project (such as a school impact caused by a residential alternative to a proposed commercial project), the assessment should follow the techniques set forth in the appropriate technical guidance, Chapters 4 through 22. The impacts of the alternative are assessed for the same build year as were used to analyze the proposed project. If the project would be built in phases and the other technical areas consider interim build years for those phases, it may be appropriate to consider those interim years for the alternative as well.

230. COMPARING THE EFFECTS OF THE ALTERNATIVES TO THOSE OF THE PROPOSED PROJECT

The environmental effects of each alternative, including the No-Action alternative, are compared to the proposed project without mitigation. Consider the following example:

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1. The analysis of the proposed project shows that it would have significant traffic impacts at five intersections;
2. The analysis of the No-Action alternative shows that three of those five intersections would have moderately congested traffic conditions;
3. The analysis of the lesser-density alternative shows that it would result in significant traffic impacts at four of the five intersections.

In this example, quantitative information should be presented for each alternative, including the No-Action alternative. More specifically, for each alternative, the volume-to-capacity ratios or levels of service at each of the five intersections should be compared with those of the proposed project. After addressing relative impacts without mitigation, the comparison should consider the types, availabilities and levels of mitigation required to reduce the significant impacts under each alternative, and compare these with mitigation under the proposed project. If the same mitigation is needed to address the impacts that would occur under an alternative as under the proposed project, then the difference in level of impact between the proposed project and the alternative may be of less significance to the decision-maker. If, however, more mitigation is required for the proposed project compared with an alternative, that difference may be of greater relevance to the decision-maker.

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EIS Summary Chapters

Chapter 24

The EIS contains several chapters that summarize the conclusions of the technical assessments and permit the decision-maker to examine the trade-offs between project objectives and identified impacts. These chapters are not required for an EAS, but in some instances the lead agency may choose to include them in the documentation to support the determination of significance. Conversely, if one of the chapters is not relevant to the proposed project and its analysis in the EIS, then it should not be included.

100. Executive Summary

The executive summary is extremely important and is required in all EISs. It should provide a concise summary that adequately and accurately summarizes the EIS. In general, the executive summary should include:

1. A brief project description;
2. A summary and list of each action;
3. A summary of the significant adverse impacts, if any;
4. A summary of the mitigation measures, if any, to reduce or eliminate any significant adverse impacts;
5. Any important trade-offs identified in the other summary chapters;
6. A summary of the unavoidable adverse impacts, if any;
7. A short discussion of alternatives;
8. The analysis areas examined in the EIS; and
9. The analysis areas eliminated in the EAS for further study, and the reasons why.

The executive summary should be as short as possible and contain only the information necessary to allow the reader to understand the conclusions of the EIS. The lead agency is strongly encouraged to limit the length of an executive summary to 30-pages or less.

200. Mitigation Measures

Where significant adverse impacts are identified, mitigation to reduce or eliminate the impacts to the fullest extent practicable is developed and evaluated. This work, undertaken in conjunction with the technical area impact analyses described in Chapters 4 through 22 should be presented in a separate chapter along with a summary of the impacts to be mitigated. In the DEIS, options for mitigation must be recommended and assessed. A range of feasible mitigation measures may be presented for public review and discussion. In the FEIS, mitigation and its method of implementation must be described. Certain mitigation measures that require implementation by, or approval from, City agencies should be agreed to in writing by the implementing agency before such mitigation is included in the FEIS. In addition, in the absence of a commitment to mitigation or when no feasible mitigation measures can be identified, a reasoned elaboration as to why mitigation is not practicable should be put forth, and the potential for unmitigated or unmitigatible significant adverse impacts must be disclosed.

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300. UNAVOIDABLE ADVERSE IMPACTS

When significant adverse impacts would be unavoidable if the project is implemented regardless of the mitigation employed (or if mitigation is impossible), they are summarized and presented in a separate chapter of the EIS.

400. GROWTH-INDUCING ASPECTS OF THE PROPOSED PROJECT

SEQRA specifies that the assessment of impacts focus on the growth-inducing aspects of a proposed project. These generally refer to "secondary" impacts of a proposed project that trigger further development. Proposals that add substantial new land use, new residents, or new employment could induce additional development of a similar kind or of support uses (*e.g.*, stores to serve new residential uses). Projects that introduce or greatly expand infrastructure capacity (*e.g.*, sewers, central water supply) might also induce growth.

500. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section summarizes the proposed project and its impacts on the loss of environmental re-sources, both in the immediate future and in the long term. Resources include both man-made and natural resources. Examples of losses include removal of vegetation without replacement, use of fossil fuels and materials for construction, *etc.* The extent to which the proposed project forecloses future options or involves trade-offs between short-term environmental gains and long-term losses should also be addressed. In considering the trade-offs of the project, it is also possible to compare short-term losses with long-term benefits.

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GLOSSARY

The following terms and acronyms are used throughout the CEQR Technical Manual and are separated into three categories:

1. Agency Acronyms
2. Key CEQR Terms
3. Technical Terms

AGENCY ACRONYMS

ACS: New York City Administration for Children's Services

CAU: Mayor's Community Affairs Unit

DCAS: New York City Department of Citywide Administrative Services

DCLA: New York City Department of Cultural Affairs

DCP: New York City Department of City Planning

DDC: New York City Department of Design and Construction

DEP: New York City Department of Environmental Protection

DHS: New York City Department of Homeless Services

DOB: New York City Department of Buildings

DOC: New York City Department of Correction

DOE: New York City Department of Education

DOHMH: New York City Department of Health and Mental Hygiene

DOITT: New York City Department of Information Technology & Telecommunications

DOT: New York City Department of Transportation

DPR: New York City Department of Parks and Recreation

DSNY: New York City Department of Sanitation

DYCD: New York City Department of Youth & Community Development

FDNY: New York City Fire Department

HDC: New York City Housing Development Corporation

HHC: New York City Health and Hospitals Corporation

HPD: New York City Department of Housing Preservation & Development

HRA: New York City Human Resources Administration

HUD: U.S. Department of Housing and Urban Development

LPC: New York City Landmarks Preservation Commission

MOEC: Mayor's Office of Environmental Coordination

MOLTPS: Mayor's Office of Long-Term Planning and Sustainability

NYCEDC: New York City Economic Development Corporation

NYCIDA: New York City Industrial Development Agency

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NYPD: Police Department of the City of New York

NYSDEC: New York State Department of Environmental Conservation

NYSDHCR: New York State Division of Housing and Community Renewal

NYSESDC: New York State Urban Development Corporation d/b/a New York State Empire State Development Corporation

NYSDOH: New York State Department of Health

OEM: New York City Office of Emergency Management

OER: New York City Office of Environmental Remediation

SBS: New York City Department of Business Services

SCA: New York City School Construction Authority

TLC: New York City Taxi & Limousine Commission

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KEY CEQR TERMS

ACTION SCENARIO OR CONDITION: See ***WITH-ACTION SCENARIO OR CONDITION***.

ACTION: That which is to be approved, funded, or undertaken at the discretion of a city agency. An action (or set of actions), if approved, would allow a project to proceed.

ACTION-WITH-MITIGATION CONDITION: Scenario of the future with the proposed project and any proposed mitigation measures in place that avoid or eliminate identified significant adverse impacts of the project.

BUILD YEAR: The year a proposed project would be substantially operational; this is the year for which the project's effects are predicted in environmental analyses.

CEQR: CEQR is New York City's (NYC) process for implementing SEQRA, and cannot be less stringent than its state counterpart. CEQR adapts and refines the state rules to take into account the special circumstances of New York City. CEQR is governed by SEQRA, NYC's Executive Order No. 91 (43 RCNY Chapter 6), and the CEQR Rules of Procedure, 62 RCNY Chapter 5.

CONDITIONAL NEGATIVE DECLARATION: A lead agency's written statement and determination that a project may have a significant adverse effect on the environment, but that all such effects can be eliminated or avoided by specific changes in the project or mitigation imposed by the lead agency, if implemented. To issue a conditional negative declaration, the action must be unlisted and involve an applicant. 6 NYCRR.617.2(h).

DEIS: DRAFT ENVIRONMENTAL IMPACT STATEMENT. See ***ENVIRONMENTAL IMPACT STATEMENT.***

DETERMINATION OF SIGNIFICANCE: Based on the information presented in an EAS, the decision made by the lead agency whether or not a project significantly and adversely impacts the environment. The three types are: a ***NEGATIVE DECLARATION***, ***A POSITIVE DECLARATION***, or a ***CONDITIONAL NEGATIVE DECLARATION***.

ENVIRONMENTAL ASSESSMENT STATEMENT (EAS): An environmental assessment statement is a form used to describe the proposed project, its location, and contains a first level of analysis of the environmental review impact areas to determine potential effects on the environment. It is used by a lead agency to inform the ***DETERMINATION OF SIGNIFICANCE.***

ENVIRONMENTAL IMPACT STATEMENT (EIS): An environmental impact statement (EIS) is a disclosure document that provides a complete analysis of all appropriate impact areas and provides a means for agencies, project sponsors, and the public to consider a project's significant adverse environmental impacts, alternatives, and mitigations. An EIS facilitates the weighing of social, economic, and environmental factors early in the planning and decision-making process. A ***DRAFT EIS (DEIS)*** is the initial statement that is circulated for public review and comment, which are then incorporated (as appropriate) into the DEIS to produce a ***FINAL EIS (FEIS).*** The FEIS is the disclosure document upon which the lead and involved agencies base their decisions as set forth in a Statement of Findings.

FEIS: Final Environmental Impact Statement. See ***ENVIRONMENTAL IMPACT STATEMENT.***

GENERIC ACTION: A program or plan that has wide application or affects a large area or range of future policies. It may also be referred to as a "programmatic action."

INCREMENT: The difference(s) in conditions between the future without the project in place (***NO-ACTION CONDITION***) and the future with the project in operation (***WITH-ACTION CONDITION***). The environmental assessment examines this difference to determine whether a project has the potential to significantly and adversely impact the environment.

INTERESTED AGENCY: An agency requests or is requested to participate in the environmental review because of special concerns or expertise. Interested agencies do not directly approve, fund or undertake a discrete action.

INVOLVED AGENCY: An agency, other than the lead agency, with jurisdiction to fund, approve, or undertake an action.

LEAD AGENCY: The agency principally responsible for carrying out, funding, or approving an action; therefore, the agency responsible for determining whether an environmental review is required.

MITIGATION: Measures to minimize or avoid an project's significant adverse impacts to the fullest extent practicable.

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MOEC (MAYOR'S OFFICE OF ENVIRONMENTAL COORDINATION): The Mayoral Office that coordinates the environmental review process in New York City. MOEC provides assistance to all City agencies in fulfilling their environmental review responsibilities and maintains a repository of City environmental review documents.

NEGATIVE DECLARATION: A written document issued when the lead agency determines that there would not be a significant impact on the environment as a result of the project. See 6 NYCRR 617.2 (y).

NEPA (NATIONAL ENVIRONMENTAL POLICY ACT OF 1969): If a federal agency funds part of a project, approves a permit, or undertakes a project, that agency must comply with NEPA before taking its action. NEPA requires all federal agencies to evaluate the environmental consequences of proposed projects and to consider alternatives.

NO-ACTION SCENARIO OR CONDITION: Scenario of the future without the proposed project, used as a baseline against which incremental changes generated by a project are evaluated in environmental review.

NOTICE OF COMPLETION: A written document issued by the lead agency that a ***DEIS*** or ***FEIS*** has been completed, contains prescribed information about the environmental review, and, for a DEIS, information about the public comment period.

NYCRR: The official compilation of New York Codes, Rules and Regulations.

POSITIVE DECLARATION: A written document issued when the lead agency determines there is the potential for significant adverse impacts in one or more technical areas as a result of the project. A positive declaration leads to the preparation of a ***DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS).*** See 6 NYCRR 617.2 (ac).

PROJECT: The result of an action or set of actions that is approved, funded, or undertaken at the discretion of a city agency.

PROJECT SITE: The site that would be directly affected by a proposed project.

PUBLIC COMMENT PERIOD: The period of time that must elapse after the issuance of a draft document when the public may review and comment on the draft. It generally must be a minimum of thirty (30) calendar days.

For a draft scope of work, the public comment period begins at the issuance of the draft scope. A public meeting must be held between thirty (30) and forty-five (45) calendar days after its issuance and the comment period remains opens for a minimum of ten (10) calendar days after the public meeting.

For a DEIS, the public comment period begins at the issuance of the Notice of Completion for the DEIS. A public hearing must be held between 15 and 60 calendar days after the issuance of the Notice of Completion and the comment period must remain open for at least thirty (30) calendar days or for a minimum of ten (10) calendar days after the public hearing, whichever is later.

REASONABLE WORSE CASE DEVELOPMENT SCENARIO (RWCDS): This is the development scenario that is more likely to occur given conditions at the projected project site. From the range of possible scenarios that are considered reasonable and likely, the scenario with the worst environmental consequences should be analyzed in an environmental assessment. The use of a RWCDS ensures that, regardless of which scenario actually occurs, a project's impacts would be no worse than those considered in the environmental review.

RCNY: Rules of the City of New York.

SCOPE OF WORK: A document that identifies in detail all topics to be addressed in the EIS, including the methods for study, possible alternatives to the proposed project, and mitigation measures.

SITE-SPECIFIC ACTION: Actions proposed for a specific location.

STATE ENVIRONMENTAL QUALITY REVIEW ACT: (SEQRA): Article 8 of the New York State Environmental Conservation Law. SEQRA is implemented by 6 NYCRR Part 617. SEQRA requires that state and local governmental agencies assess environmental effects of discretionary actions before undertaking, funding or approving such actions, unless they fall within certain statutory or regulatory exemptions from the requirements for review.

STATEMENT OF FINDINGS: A Statement of Findings is a written statement prepared by each involved agency after an FEIS has been filed that considers the relevant environmental impacts presented in an EIS, weighs and balances them with social, economic, and other essential considerations, provides a rationale for the agency's decision, and certifies that the CEQR requirements have been met.

STUDY AREA: The geographic area likely to be affected by the proposed project for a given technical area, or the area in which impacts of that type could occur. This is the area subject to assessment for that technical area.

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TYPE I ACTION: An action that is more likely to have a significant adverse impact on the environment than other actions or classes of actions. A list of Type I actions appears in the SEQR regulations at 6 NYCRR 617.4 and are supplemented with a city-specific list, found at 43 RCNY 6-15.

TYPE II ACTION: An action that has been either found categorically not to have significant adverse impacts on the environment or statutorily exempted from review under SEQRA, and correspondingly, CEQR. Any action or class of actions listed as Type II in 6 NYCRR 617.5 requires no further review under CEQR.

ULURP (UNIFORM LAND USE REVIEW PROCEDURE): The procedure by which uses, development, or improvement of real property subject to city regulation are reviewed pursuant to NYC Charter Section 197-c.

UNLISTED ACTION: An action that is neither a Type I Action nor a Type II Action.

WITH-ACTION SCENARIO OR CONDITION: Scenario of the future with the proposed project in place, used to compare with the No-Action condition to assess effects on the environment due to the project. It may also be referred to as the "Action Condition."

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TECHNICAL TERMS

A-WEIGHTING: The system of modifying measured sound pressure levels to simulate the actual response of the human ear to different sound frequencies.

AADT (AVERAGE ANNUAL DAILY TRAFFIC): The total volume of traffic passing a point or segment of a highway facility, in both directions, for one year, divided by the number of days in the year.

ABSOLUTE IMPACT CRITERION (NOISE): An absolute noise level at a receptor, above which a significant impact would occur (see also Relative Impact Criterion).

ACCESSORY PARKING: Parking spaces restricted for use only by employees or patrons of specific local businesses, schools, organizations, *etc.*

ACOUSTICS: The science or study of sound.

ADAPTIVE REUSE: The fitting of new requirements, functions, or uses into an existing historic space; may be a mitigation option.

AERMOD: A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

AGC: Annual Guideline Concentrations for noncriteria air pollutants listed in DEC's Air Guide-1.

AIR GUIDE-1: 2007 Guidelines for the Control of Toxic Ambient Air Contaminants, published by the New York State Department of Environmental Conservation, in which maximum allowable guideline concentrations for certain air pollutants for which EPA has no established standards are listed.

AMBIENT AIR: The surrounding air, to which the public is exposed on a regular basis.

AMBIENT NOISE LEVEL: The total noise level in the acoustical environment, excluding the proposed project. When measurements are made, each noise source (*i.e.*, traffic noise, aircraft noise) is measured separately.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE): A voluntary federation of U.S. organizations that oversees the development of standards. ANSI standards are drafted by committees of industry experts and published only after board review and determination of national consensus.

AMERICAN REPORT ON SOCIAL INDICATORS: Provides summary data for the city, and, where available, for boroughs and community districts. Source: DCP, Housing, Economic, and Infrastructure Planning Division.

ANQZ: Ambient Noise Quality Zones established by the New York City Noise Code.

AP-42: Workbook of Atmospheric Dispersion Estimates, EPA document that provides air pollutant emission factors for many sources.

AQUIFER: A subsurface rock or sediment formation that contains sufficient saturated permeable material to transmit significant quantities of groundwater.

ARCHAEOLOGICAL TESTING: A systematic process of controlled excavations conducted to establish the physical presence or absence of archaeological re-sources on a site.

ARCHAEOLOGICAL POTENTIAL OR SENSITIVITY: The likelihood that a location or site contains significant archaeological resources; potential is usually characterized as low, moderate, or high.

ARCHAEOLOGICAL RESOURCE: Physical remains, usually subsurface, of the prehistoric, Native American and historic periods, such as burial hearths, foundations, artifacts, wells, and privies. Generally, archeological resources do not include 20th and 21st Century artifacts.

ARCHAEOLOGY: The study of prehistoric and historic cultures through excavation and analysis of physical remains.

ARCHITECTURAL RESOURCE: Historically or architecturally important buildings, structures, objects, sites, or districts.

ARCHIVAL RESEARCH: The retrieval and evaluation of historical documents, including local histories, cartographic materials, deeds, and other instruments. Archival research is necessary for predicting the existence and assessing the significance of an historic resource and determining archeological potential/sensitivity.

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AREA SOURCES: Sources of air pollutants distributed over a large area such as a parking lot.

ARTERIAL: Signalized streets that serve primarily through traffic and provide access to abutting properties as a secondary function.

ARTIFACT: The physical or tangible result of human action or behavior, commonly associated with archaeological investigation; it may be complete, incomplete, intentional or a by-product of the subject action or behavior.

ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.

ASSIGNMENT: The routing of vehicle trips to and from a project site.

ASSOCIATIVE VALUE: Attributes of an historic resource that link it with historic events, activities, or persons, and contribute to a property's significance.

AST: Above-ground storage tank.

ASTM: American Society for Testing of Materials.

ATR (AUTOMATIC TRAFFIC RECORDER) COUNTS: ATR traffic volume counts recorded by machines with connected tubes placed across the roadway being counted. These counts are generally recorded every 15 minutes for 24 hours per day.

ATTENUATION (NOISE): Reduction in noise level.

AFC (AUTOMATIC FARE COLLECTION): A system whereby entry to the transit system does not require a token or money, but is activated by a card in the possession of the transit rider that is "read" by a machine at the entry point to the station, either by inserting the card into and through the "reader" or "swiping" it through the reader.

AVERAGE VEHICLE OCCUPANCY: The total number of occupants in an automobile (or a taxi), on average.

BACKGROUND AIR POLLUTANT CONCENTRATIONS: Ambient air pollutant concentrations that are a function of regional emissions.

BACKGROUND NOISE LEVEL: Noise levels that exist much of the time and that individual occurrences intrude upon. Usually, this "background" is coming from many directions from a multitude of unrecognizable sources. L90 is considered a reasonable indication of this background noise (see also ***STATISTICAL NOISE LEVELS*** below).

BACKGROUND TRAFFIC GROWTH FACTOR: An annual traffic growth percentage to be applied to traffic volumes in an area to account for normal expected traffic volume increases. Generally, it does not account for major new developments that may be proposed for an area.

BASE FLOOD: See 100-year flood.

BAY: The space between architectural features, such as walls, piers, or columns; used in reference to the way in which windows, doors, and other openings relate to each other.

BLUFFS: Steep formations of soft erodible materials, such as sand and clay.

BMP (BEST MANAGEMENT PRACTICES): Source controls or technologies designed to improve the infiltration, retention and detention of storm water runoff.

BTU (BRITISH THERMAL UNIT): The amount of heat required to raise one pound of water one degree Fahrenheit at one atmosphere. It is the unit of measurement used for heat inputs and outputs of boilers or other fuel burning equipment.

BUILDING: A structure created to shelter human activity.

BULK: The size and shape of a building, including height and floor area, relative to the size of its lot.

CELSIUS OR (C): The temperature scale in which the freezing point of water is assigned as 0o and the boiling point of water is assigned as 100o. The Celsius scale may also be termed Centigrade.

C-WEIGHTING: Electronic filtering in sound level meters that models a flat response (output = input) over the range of maximum human hearing sensitivity.

CAA(CLEAN AIR ACT): The federal law mandating air pollutant emissions standards for stationary and mobile sources.

CAAA: Clean Air Act Amendments.

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CAL3QHC: Mathematical dispersion model for simulation of carbon monoxide concentrations near roadway intersections.

CAPACITY: For vehicular traffic, the maximum volume of vehicles that can pass a point on a street or highway during a specified time period, usually expressed as vehicles per hour. For pedestrians, the maximum volume of persons that can be accommodated along a given point of a sidewalk or transit corridor per hour, or that can be accommodated within a crosswalk, intersection corner reservoir, transit vehicle, or turnstile.

CARBON MONOXIDE (CO): An odorless, colorless gas that is a ***CRITERIA AIR POLLUTANT***, principally associated with motor vehicle exhaust.

CARBON DIOXIDE EQUIVALENT (CO_2E): A common measure that allows gases with different global warming potentials (potential to trap heat in atmosphere) to be added together and compared. According to standard GHG accounting protocols, projects should calculate emissions of all six ***GREENHOUSE GASES***, where applicable.

CAVITY: Region of air recirculation adjacent to a solid structure.

CEPO-CEQR (CITY ENVIRONMENTAL PROTECTION ORDER CITY ENVIRONMENTAL QUALITY REVIEW): The NYC Department of Environmental Protection policy that sets standards on noise exposure and designates mitigation measures. The standards are used for evaluating the noise impact of the environment on the projects described in EASs and EISs. The numbers are in terms of absolute limits.

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSIBILITY, COMPENSATION AND LIABILITY ACT; ALSO KNOWN AS SUPERFUND): The federal law authorizing identification and remediation of sites contaminated by hazardous substances.

CERCLIS (COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY INFORMATION SYSTEM): An EPA inventory of sites (including federal facilities) suspected to be contaminated by hazardous substances. It contains site identification data, financial expenditure data, and site tasks plans (if applicable). CERCLIS also includes some enforcement data on milestones and clean-up schedules (if applicable).

CFM: (CUBIC FEET PER MINUTE): The unit of measurement for flow rates through exhaust stacks.

CHANNELIZATION: Physical roadway improvements that direct, or "channel," the traffic flow into one or more lanes by either painted striping or by physical means such as curbs or raised "islands" in the roadway.

CITY DRAINAGE PLAN: A plan for the proper sewage and drainage of New York City, or any part thereof, prepared and adopted in accordance with Section 24-503 of the Administrative Code of the City of New York.

COASTAL FRESH MARSH: A ***TIDAL WETLAND*** zone consisting of the vegetated area of land located primarily along the tidal portions of rivers and streams and subject to inundation by tidal and freshwater flows every day.

COASTAL SHOALS, BARS, AND FLATS: A ***TIDAL WETLAND*** zone consisting of the unvegetated area along the shore that is covered by water at high tide and exposed or covered by water of less than 1 foot at low tide.

COASTAL ZONE: As mapped in the City's Coastal Zone Boundaries maps, a geographic area of NYC's coastal waters and adjacent shorelines, generally including islands, tidal wetlands, beaches, dunes, barrier islands, cliffs, bluffs, estuaries, flooding- and erosion-prone areas, port facilities, and other coastal features.

COLD START: Vehicle started after not operating within the last 12 hours (720 minutes).

COMBINED SEWER: A sewer system that collects both dry-weather wastewater and storm water.

CSO (COMBINED SEWER OVERFLOW: Wastewater in excess of the combined sewer system's capacity that is discharged into the nearest waterway rather than being sent to a water pollution control plant for treatment.

COMPREHENSIVE HOUSING AFFORDABILITY STRATEGY: Published annually. Provides information on government-assisted housing, Source: DCP, Housing, Economic and Infrastructure Planning Division.

COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN (SWMP OR PLAN): A plan developed by the NYC Department of Sanitation pursuant to Article 27, Title 1, Section 27-0107 of the NYS Environmental Conservation Law and 6 NYCRR Section 360-15.9 that establishes the City's long-term strategy for solid waste management with certain required elements that include waste stream projections, a recycling analysis, determination of the appropriate sizing of solid waste management facilities, selection of an integrated system for managing various kinds of waste, certification of disposal capacity, and a timetable to implement the integrated system.

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COMPREHENSIVE WATERFRONT PLAN: A report entitled *New York City Comprehensive Waterfront Plan: Reclaiming the City's Edge*, prepared by the Department of City Planning that presents a detailed assessment of neighborhood conditions, principles and recommendations to guide planning and development adjacent to NYC's shoreline. Revised in 2011, Vision 2020: New York City's Comprehensive Waterfront Plan builds on these policies and sets the stage for expanded use of the waterfront for parks, housing and economic development, and the waterways for transportation, recreation and natural habitats.

CONFINED AQUIFER: An aquifer bounded above and below by more impermeable materials in which the pore water pressure is greater than atmospheric pressure.

CORDON LINE: An imaginary line drawn around an area, usually used to define an area being studied or an area through which traffic volumes are being counted or surveyed.

CORNER RESERVOIR: The sidewalk area at the corner of an intersection within which pedestrians wait for a green light to cross the intersection.

CORNICE: A projecting horizontal band that tops the element to which it is attached, particularly above the frieze and below the roofline on a building.

CRITERIA AIR POLLUTANTS: Air pollutants with corresponding federal or state ambient air quality standards.

CRITICAL ENVIRONMENTAL AREA: A specific geographic area designated by a state or local agency as having exceptional or unique environmental characteristics.

CRUISE SPEED: Travel speed along a block without any stopped delay.

CYCLE LENGTH: The length of time it takes a traffic light to pass through a full sequence of green, yellow, and red signal indications for all traffic movements.

DATA RECOVERY: Systematic retrieval of information from a cultural resource through excavation, analysis, recordation (*i.e.*, drawings, photographs), and reporting.

DAY-NIGHT SOUND LEVEL (LDN OR DNL): A 24-hour continuous L_{eq} with 10 dBA added to levels occurring between 10 PM and 7 AM to account for greater sensitivity during typical sleeping hours.

DB: See Decibel.

DBA: A-weighted unit of sound pressure level in decibels.

DBC: C-weighted unit of sound pressure level in decibels.

DE MINIMIS: Minimum incremental increase in 8-hour average carbon monoxide levels that would constitute a significant adverse air quality impact under CEQR.

DECIBEL (DB): A unit of sound level or pressure level. It implies 10 multiplied by a logarithmic ratio of power or some quantity proportional to power. The logarithm is to the base 10.

DECORATIVE ELEMENTS: Ornamental features of a structure, such as cornices, lintels, and bracketing. The existence or absence of a building's original decorative elements, particularly exterior features, is considered in the assessment of a building's architectural significance.

DESCRIPTORS: Units of measurement for noise analysis, such as L_{eq}, Ldn, *etc.*

DESIGNATED RESOURCE: Resource or properties recognized and protected under local, state, and federal historic preservation programs.

DISPERSION MODEL: Mathematical model that estimates dissipation of air pollutant concentrations from line, area, or point sources.

DISPLACEMENT (DIRECT): The involuntary displacement of residents or businesses from the site of a project.

DISPLACEMENT (INDIRECT): The involuntary displacement of residents, businesses, or employees that results from a change in socioeconomic conditions created by a project.

DIVERTED-LINKED TRIPS: Trips attracted to a proposed project from streets near the project site, but not immediately adjacent to the site. Thus, these trips need to "divert" to other streets to access the site.

DORMER: An opening, usually a window, which projects from the main roof of a building and has a separate roof.

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DOWNSTREAM: The direction toward which traffic is headed.

DOWNWASH: Emissions from stationary sources that are rapidly transported toward the ground because of building-induced turbulence.

DUNES: Recent accumulations of sand formed by sea winds and waves.

(E) DESIGNATED SITE: An area designated on a zoning map pursuant to Section 11-15 of the Zoning Resolution of the City of New York within which no change of use or development requiring a NYC Department of Buildings permit may be issued without approval of OER. (E) designated sites require OER's review to insure protection of human health and the environment from known or suspected hazardous materials, air quality, or noise conditions associated with the site.

ECL: New York State Environmental Conservation Law.

EFFECTIVE WIDTH: The width of a walkway that is usable by pedestrians; the total walkway width minus the width of physical obstacles and unusable buffer zones at such obstacles.

ELEVATION: A straight-on view of the exterior face of a building on a vertical plane showing a building's external components.

ELIGIBLE RESOURCE: Historic resource meeting the criteria for listing on the State and/or National Registers of Historic Places or for designation as a New York City Landmark.

EMISSION MODEL: Mathematical model that estimates emissions from vehicle exhaust systems.

ENTERING ANGLE: A shadow's angle from true north when it enters an open space.

EPA: U.S. Environmental Protection Agency.

EQUIVALENT SOUND LEVEL (LEQ): The level of continuous sound containing the same amount of acoustical energy as the fluctuating sound over the same period of time. The reference time period is usually specified in terms of hours in parentheses (*i.e.*, $L_{eq}(1)$ refers to a 1-hour L_{eq} value).

EROSION: The loss or displacement of land along the coastline because of the action of waves, currents running along the shore, tides, wind, runoff of surface waters, or groundwater seepage, wind driven water or waterborne ice, or other effects of coastal storms.

EROSION HAZARD AREAS: Erosion-prone areas of the shore designated under the State Erosion Hazard Areas Act that are likely to be subject to erosion within a 4-year period and that constitute natural protective features (*i.e.*, beaches, dunes, shoals, bars, spits, barrier islands, bluffs and wetlands, natural protective vegetation).

ESTUARY: Any area where fresh and salt water mix and tidal effects are evident, or any partially enclosed coastal body of water where the tide meets the current of any stream or river.

EXIT VELOCITY: Rate at which exhaust gas passes through a stack.

EXITING ANGLE: A shadow's angle from true north when it exits an open space.

EXTRACTION WELL: A well used to remove contaminated groundwater by pumping.

EXTREME HIGH WATER: The extreme high water of spring tides is the highest tide occurring during a lunar month, usually near the new or full moon. This is equivalent to extreme high water of mixed semidiurnal tides.

FABRIC: The juxtaposition of the physical components of a building.

FACADE: The exterior of a building, usually pertaining to the front.

FAHRENHEIT (F): The temperature scale in which the freezing point of water is assigned as 32o and the boiling point of water is assigned as 212°.

FAIR SHARE CRITERIA: Criteria to guide the siting of city facilities so as to further the fair distribution of the burdens and benefits associated with such facilities. *Fair Share Criteria: A Guide for City Agencies* was developed by DCP pursuant to City Charter Section 203.

ARCHAEOLOGICAL FEATURE: Archaeological evidence that typically cannot be excavated or removed from the site, but must be recorded in place, such as floors, walls, pits, postholes, foundation walls, privies, and cisterns.

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FEDERAL STYLE: A style of architecture dating to ca. 1790-1820, found in New York City on town houses in Greenwich Village and Brooklyn Heights.

FENESTRATION: The arrangement of the window and door openings of a building.

FLOODPLAIN: The lowlands adjoining the channel of a river, stream, or watercourse, or ocean, lake, or other body of standing water, which have been or may be inundated by floodwater (as established by the National Flood Insurance Act).

FLOOR AREA RATIO (FAR): The total floor area on a zoning lot divided by the area of that zoning lot.

FOOTPRINT: The area of the ground occupied by a building.

FORM: The shape or ground plan of a building.

FORMERLY CONNECTED TIDAL WETLANDS: A tidal wetland zone consisting of lowland areas whose connections to tidal waters have been limited by construction of dikes, roads, or other structures.

FREQUENCY OF SERVICE: The frequency with which bus or subway service is provided (*i.e.*, 10 buses per hour).

FRESHWATER WETLAND: Wetland associated with freshwater systems.

FRIEZE: A horizontal band placed above a wall, but below the cornice. It may appear in both the interior and exterior of a building.

G/SEC: Grams per second.

GEP (GOOD ENGINEERING PRACTICE):Reference to stacks of sufficient heights so that no downwash occurs.

GOTHIC STYLE: A style of architecture that first became popular in the 1840s, commonly used for residential buildings, schools, and churches.

GREENHOUSE GAS EMISSIONS (GHG): There are six internationally-recognized greenhouse gases regulated under the Kyoto Protocol: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These atmospheric gases are the key contributors to climate change.

GROUNDWATER: The water contained beneath the surface in soils and rock.

HAZARDOUS WASTES: Substances regulated under the federal Resource Conservation and Recovery Act (RCRA). Hazardous wastes are solid wastes that meet one of the four characteristics of being chemically reactive, ignitable, corrosive, or toxic.

HEADWAY: The amount of time elapsing between the arrival of buses or subway trains on a given route. For example, a bus route may operate at a headway of 6 minutes, meaning buses are scheduled to arrive at a given stop every 6 minutes.

HEAVY TRUCK: A truck with three or more axles weighing more than 25,000 pounds gross weight.

HIGH MARSH: A tidal wetland zone consisting of the area periodically flooded by spring and storm tides, usually dominated by salt hay and spike grasses. It may also be called "salt meadow."

HISTORIC LANDSCAPE: A geographic area, including both cultural resources and natural resources therein, that has been influenced by or reflects human history, and for which form, layout, and/or designer, rather than significant events or persons, are the primary reasons for its importance.

HISTORIC AND CULTURAL RESOURCE: Districts, buildings, structures, sites, and objects of historical, aesthetic, cultural, and archaeological importance, including designated resources and eligible resources.

HISTORIC SIGNIFICANCE: An historic and cultural resource that retains integrity and has important and meaningful ***ASSOCIATIVE VALUES.***

HISTORIC ARCHAEOLOGY: Archaeological study of cultures after the advent of written records.

HISTORIC DISTRICT: A geographically definable area that possesses a significant concentration of associated buildings, structures, objects, or sites, united historically or aesthetically by plan and design or historical and/or architectural relationships. This may include historic districts listed on the State or National Register of Historic Places or New York City Historic Districts. New York City Historic Districts are further defined as distinct sections of the City that contain buildings, structures, places, or objects that have a special character or special historical or aesthetic interest or value, and that represent one or more periods or styles of architecture typical of one or more eras in the history of New York City.

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HISTORIC AND CULTURAL RESOURCE OR PROPERTY: Buildings, structures, sites, or objects that provide, or may potentially yield, important cultural and/or archaeological information.

HOT START: A vehicle that has not been operating for between 9 and 10 minutes.

HOT STABILIZED: A vehicle that has been on and operating for more than 505 seconds.

HOUSEHOLD MEDICAL WASTE: Items that are used in the course of home health care such as intravenous tubing and syringes with needles attached.

HOV (HIGH OCCUPANCY VEHICLE) LANE: Lanes reserved for the exclusive use of buses and other vehicles carrying a minimum of generally two, three or more occupants.

HSWA (HAZARDOUS AND SOLID WASTE AMENDMENTS, 1984): Amendments to RCRA establishing a timetable for landfill bans and more stringent UST requirements.

HUMAN REMAINS: See LPC's 2002 The Guidelines for Archaeological Work in New York

HVAC: Heating, ventilation, and air conditioning.

HYDRAULIC ANALYSIS: A study of how much flow (or capacity) the City's sanitary and stormwater pipes currently have and which sewer segments can accommodate extra flow from new development.

HERTZ (HZ): A measurement of frequency for sound waves and is the same as cycle per second.

I&M: Inspection and maintenance program.

IDEAL SATURATION FLOW RATE: The maximum rate of flow at which passenger cars can pass through an intersection under a set of ideal operating conditions.

INCREMENTAL SHADOW: The additional shadow a building would cast, beyond the shadows that would be cast by surrounding buildings.

INDUSTRIAL ARCHAEOLOGY: The study of sites and structures reflecting changing industrial technology, processes, and practices.

INDUSTRIAL PRETREATMENT PROGRAM (IPP): A federally authorized city program administered by the DEP, that identifies and monitors industrial uses that discharge pollutants of concern into the sewer system.

INPUFF: A mathematical model used to simulate spills and short-term releases of toxic chemicals.

INTEGRITY: The unimpaired ability of a property to convey its historic or archaeological significance, evidenced by the survival of physical attributes that existed during the property's historic or prehistoric period.

INTERCEPTORS: Large sewers that connect the sewer system via ***REGULATORS*** to treatment plants and are built to deliver at least two times design dry weather flow to ***WASTE WATER TREATMENT PLANTS***.

INTERIOR LANDMARK: An interior, or part thereof, any part of which is thirty (30) years old or older, and that is customarily open or accessible to the public, or to which the public is customarily invited, and that has a special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the city, state, or nation, and that has been designated as an Interior Landmark pursuant to the New York City Landmarks Law.

INTERMODAL TRANSFER: The transfer of passengers between travel modes, *i.e.*, from bus to subway or from railroad to subway, *etc.*

INTERTIDAL MARSH: A tidal wetland zone consisting of the vegetated area of land subject to inundation by tidal flows every day; the area between average high and low tides.

INVASIVE TESTING: Testing of groundwater and soils in which the soil surfaces are penetrated for subsurface sample collection.

INVERSE SQUARE LAW: The condition in open spherical sound propagation from a point source that intensity drops off as the reciprocal of the square of the distance from the source. This translates to the ideal condition that SPL drops off at a rate of 6 dB per doubling of distance from the source.

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ITALIANATE STYLE: A style of architecture that first came into fashion in the mid-19th century in New York City; many buildings in New York City, including tenements, town houses, and commercial structures, are designed in this style.

KELVIN (K): The temperature scale in which absolute zero is assigned as 0°K, and the degree size is the same as in the ***CELSIUS*** scale.

LDN: Day-night sound level.

L_{EQ}: Equivalent sound level.

L_{EQ}(1): The one-hour equivalent sound level (see ***EQUIVALENT SOUND LEVEL***).

L_{EQ}(24): The 24-hour equivalent sound level.

LANDMARK: Any building, structure, work of art, or object, any part of which is thirty (30) years old or older, that has a special character or special historical or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the city, state, or nation, and that has been designated a Landmark pursuant to the New York City Landmarks Law.

LAND USE: The activity occurring on land and within the structures that occupy it; *i.e.*, residential, commercial, industrial.

LEVEL OF SERVICE (LOS): A qualitative measure describing operational conditions within a vehicular or pedestrian traffic stream.

LIGHT-DUTY TRUCK: For noise analysis purposes, a truck weighing less than 9,400 pounds gross weight; for air quality analysis purposes, a truck with four wheels, including vans and ambulances.

LINE SOURCES: Sources of air pollutant emissions that can be simulated as a group of lines in a mathematical model, such as a roadway.

LINE-HAUL CAPACITY: The capacity of a subway or rail line to transport passengers past a given point.

LINK: The section of roadway between traffic signals.

LINKED TRIPS: The multi-destination characteristic of trips in downtown type areas.

LINTEL: A decorative feature of a building's exterior, placed horizontally above a window; corresponds to the sill, a similar horizontal element located underneath a window.

LITTORAL ZONE: A tidal wetland zone consisting of that portion of a tidal water that is shallow enough (usually less than 6 feet deep) to let sunlight penetrate to the land on the bottom; in New York City, the land under water adjacent to nearly all the City's shoreline is considered littoral zone.

LOAD FACTOR: The number of passengers occupying a transit vehicle divided by the number of seats on the vehicle.

LOOP DETECTOR: A physical electrical loop embedded within a street that allows it to monitor the volume and/or speed of traffic passing over it and which can often communicate with a traffic control system to alter signal timing patterns.

LOW-SULFUR OIL: Number 2 distillate oil with a sulfur content of 500 PPM, commonly used for boilers.

M/S: Meter(s) per second.

MACROSCALE: Analysis of air pollutant sources and levels over a very large region.

MALODOROUS: Ill-smelling; with an offensive odor.

MAXIMUM LOAD POINT: The geographic location of a subway or bus line that has the highest ridership level.

MAXIMUM SURGE CONDITION: The point at which the maximum number of pedestrians are in a crosswalk; usually occurs shortly after pedestrian signals change to green, when the lead pedestrian in opposing crossing platoons reach the opposite corner.

MEAN LOW WATER LINE: The line where the arithmetic mean of the low water heights observed over a specific 19-year Metonic cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce.

MEAN HIGH WATER LINE: The line where the arithmetic mean of the high water heights observed over a specific 19-year Metonic cycle (the National Tidal Datum Epoch) meets the shore and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce.

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MEDIUM TRUCK: A truck with two axles and six wheels, weighing between 9,400 and 25,000 pounds gross vehicle weight.

METEOROLOGICAL DATA: Measurements of atmospheric parameters such as temperature, wind speed, and wind direction.

MG/KG: One microgram per kilogram, which is equal to one part per billion, ppb.

MG/L: One microgram per liter, which is equal to one part per billion, ppb.

MG/M^3: Micrograms per cubic meter.

MM: A micrometer, which is a unit of length equal to one millionth of a meter.

MG/KG: Milligrams per kilogram, which are equal to parts per million, ppm.

MG/L: Milligrams per liter, which are equal to parts per million, ppm.

MG/M^3: Milligrams per cubic meter.

MICROSCALE: Analysis of air pollutant sources and levels on a localized basis.

MIXED USE DISTRICT: A mixed use district is a special zoning district in which new residential and non-residential (commercial, community facility and light industrial) uses are permitted as-of-right. In these districts, designated on zoning maps as MX with a numerical suffix, an M1 district is paired with an R3 through R9 district.

MOBILE SOURCES: Sources of air pollutant emissions such as motor vehicles, planes, boats, *etc.*

MOBILE: A series of air pollutant emissions simulation models prepared by EPA and periodically updated and adjusted for use in New York City.

MODAL SPLIT: The extent to which persons traveling to or from a site or an area utilize specific travel modes, such as autos, taxis, subways, buses, commuter rail, ferries, bicycles, or walking. It is usually expressed as a percentage of all travel.

MONITORING WELL: A tube or pipe set in the ground, open to the atmosphere at the top and to water at the bottom, usually along an interval of slotted screen, used for taking groundwater samples.

MATERIAL SAFETY DATA SHEET (MSDS): Documentation provided by manufacturers that details the constituent compounds and their relative proportions in trade products.

MSW: Municipal solid waste.

MUNICIPAL PARKING: Parking spaces available to the public within a facility (parking lot or garage) operated by, or on behalf of, the City of New York.

MW: Megawatt(s).

NAAQS: National Ambient Air Quality Standards.

NATURAL RESOURCE: Any area capable of providing habitat for plant and animal species or capable of functioning to support environmental systems—*i.e.*, surface and groundwater, natural drainage systems, wetlands, dunes and beaches, grasslands, woodlands, *etc.*

NEW HOUSING MARKETPLACE PLAN: Annual reports and database for new housing completions.

NEW YORK CITY NOISE CONTROL CODE: The noise ordinance for New York City that establishes limits and regulations for the enforcement of noise levels within city limits. For construction activity, it requires that all exhausts be muffled, prohibits all unnecessary noise adjacent to schools, hospitals, or courts, and limits construction activity to weekdays between 7 AM and 6 PM. The Noise Code also defines the Ambient Noise Quality Zones (ANQZ), which sets limits on the noise impact of a project on the environment.

NESHAPS: National Emission Standards for Hazardous Air Pollutants.

NIOSH: National Institute for Occupational Safety and Health.

NOISE: Unwanted, disturbing sound.

NOISE ABATEMENT CRITERIA (NAC): Noise level limits, in terms of $L_{eq}(1)$ or $L_{10}(1)$, promulgated by Federal Highway Administration regulations for vehicular traffic noise generated by the construction of new highways or the expansion of existing ones.

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NOISE LEVEL REDUCTION (NLR): The outdoor to indoor attenuation of noise levels afforded by a building's exterior wall. NLR is used only in FAA mitigation recommendations.

NOISE REDUCTION COEFFICIENT (NRC): A single number rating system for absorption coefficients over the speech frequency range. NRC is defined mathematically as the arithmetic average of the absorption coefficients at 250, 500, 1000, and 2000 Hz.

NONCRITERIA AIR POLLUTANTS: Air pollutants that lack criteria standards by EPA, but are listed by the DEC in Air Guide-1.

NONPOINT SOURCES: Sources of air pollutants that are not emitted from one small, restricted area; these include line sources and area sources.

NON-PUTRESCIBLE SOLID WASTES: Solid wastes that do not contain organic matter.

NO_X: Nitrogen oxides—a class of compounds that includes NO and NO_2, which are of concern in their roles as ozone precursors and are ***CRITERIA AIR POLLUTANTS***.

NATIONAL PRIORITIES LIST (NPL): The official list of uncontrolled hazardous wastes sites to be remediated under ***CERCLA***.

OBJECT (HISTORIC OR ARCHAEOLOGICAL): Item of functional, aesthetic, cultural, historical, or scientific value that may be movable but is related to a given environment or setting.

OCTAVE BAND: A frequency band with an upper limit that is twice the lower limit, and is identified by a geometric mean frequency, called the center frequency. Standard octave band center frequencies are defined in ANSI Standard S1.6 - 1984 (R2006), entitled "Preferred Frequencies, Frequency Levels, and Band Numbers for Acoustical Measurements."

100-YEAR FLOOD: The flood having a 1 percent chance of being equaled or exceeded in a given year.

OPEN SPACE (DESIGNATED): Includes both mapped parkland and other land that, although not officially mapped, is under the jurisdiction of DPR or another official body and has been set aside for public open space purposes. It excludes vacant land not designated for open space purposes.

OPEN SPACE (IMPROVED): Open space that is developed to its intended potential such as a playground, ball field, or promenade.

OPEN SPACE (MAPPED): See ***PARKLAND (MAPPED)***.

OPEN SPACE (PRIVATE): Property designated for open space use that is under private ownership and that may or may not be publicly accessible.

ZONING OPEN SPACE RATIO: The percentage of total floor area of a building that must be provided as open space on a lot within certain residential districts.

OPEN SPACE (UNDEVELOPED): Natural areas not intended for development, such as wetlands.

OPEN SPACE (UNIMPROVED): Open space that has been acquired or mapped and is planned for further development but has not yet been developed for open space use.

ORIGIN/DESTINATION (O/D): The beginning and end points of a trip, used in determining the routing of vehicle trips to and from a project site.

OSHA: U.S. Occupational Safety and Health Administration.

OUTFALL: During wet weather, the point of discharge for separate storm sewer flows or, for combined sewers, if flows greater than two times the average design dry-weather flow reach the ***REGULATOR***, the excess flow is discharged to outfalls, located in the city's waterways (*i.e.*, Hudson River).

OZONE (O_3): A ***CRITERIA AIR POLLUTANT*** formed by the reaction of hydrocarbons and nitrogen oxides with sunlight over long time periods and large regions.

PACKAGE TREATMENT PLANT: Small, non-municipal wastewater treatment plant.

PARK: Mapped open space under federal, state, or city jurisdiction.

PARKING ENFORCEMENT AGENT (PEA): New York City Police Department personnel, one of whose responsibility it is to maintain clear curb lanes where posted parking regulations mandate it.

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PARKLAND (MAPPED): Public open space that is denoted as parkland on official city maps and as such cannot be "alienated" from park and open space use without city review and state legislative action.

PARKING SHORTFALL: The amount by which the parking demand generated by a proposed project exceeds the amount of parking it is proposing to provide.

PASS-BY TRIPS: Trips attracted to a proposed project from the streets immediately adjacent to the project site; these trips are usually intermediate stops being made en route from the vehicle's trip origin to its ultimate destination.

POLYCHLORINATED BIPHENYLS (PCBS): Pathogenic (disease-causing) and teratogenic (causing developmental malformations) industrial compounds formerly used as heat-transfer agents.

PCE: Passenger Car Equivalent

PEAK HOUR FACTOR: A measure of traffic volume demand fluctuation within the peak hour. It is the peak hour volume divided by four times the peak 15-minute period within that hour.

PEDESTRIAN WIND: Channelized wind pressure from between tall buildings and downwashed wind pressure from parallel tall buildings may cause winds that jeopardize pedestrian safety.

PERCENTILE LEVELS (L_N, 0<N<100): The percentage of observation time that a certain SPL has been exceeded. For example, L_{10} corresponds to the SPL exceeded 10 percent of the observation time. The observation time is usually specified in terms of hours in parentheses (*i.e.*, $L_{10}(1)$ refers to a 1-hour L_{10} value).

PERSISTENCE FACTORS: Empirical constants that relate 1-hour air pollutant concentrations to longer time averaging periods.

PESTICIDES: substances or mixtures of substances used to destroy or mitigate insects, rodents, fungi, weeds, or other plant life. Many pesticides are also toxic to humans and animals.

PIEZOMETER: A tube or pipe, open to the atmosphere at the top and to water at the bottom, and sealed along its length, used to measure the hydraulic head in a geologic unit to determine ground water flow direction.

PLATOON: A group of vehicles traveling together as a group, either voluntarily or involuntarily, due to signal control, geometrics, or other factors; or the movement of a large group of pedestrians through an area, which often occurs when a large volume of bus or subway riders exit from those travel modes.

PM_{10}: A criteria air pollutant comprised of particulates that are less than 10 µm in diameter.

$PM_{2.5}$: A criteria air pollutant comprised of particulates that are less than 2.5 µm in diameter.

POINT SOURCES: Sources of air pollutants that are discharged from a small, restricted area, such as boiler exhaust stacks.

POLYCHLORINATED DIBENZODIOXINS AND BIBENZOFURANS (ALSO REFERRED TO AS DIOXINS): have never been commercially manufactured for use. Their main sources are from combustion processes, and chemical industries.

PPB: Parts per billion.

PPM: Parts per million.

PREHISTORIC ARCHAEOLOGY: Archaeological study of aboriginal cultures before the advent of written records.

PROTECTED TURNS: Left or right turns made at a signalized intersection with no opposing or conflicting vehicular or pedestrian flows.

PSD: Prevention of Significant Deterioration—Federal permit required for new or significant modifications to major stationary sources of air pollution.

WATERFRONT PUBLIC ACCESS: Any area of publicly accessible open space on a waterfront property, as well as pedestrian ways that provide a route from a waterfront public access area to a public street, public park, public place, or public access area.

PUBLIC PARKING: Parking spaces available to the public, rather than restricted to employees or patrons of specific local businesses, schools, or organizations.

PULSED PUMPING: Pump-and-treat enhancement where ***EXTRACTION WELLS*** are periodically not pumped to allow concentrations in the extracted water to increase.

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PUMP STATION: Stations that direct combined and separate flow to downstream locations in the City's sewer infrastructure when gravity cannot direct the flow.

PUMP TEST: Test for estimating the values of various hydrogeologic parameters in which water is continuously pumped from a well and the consequent effect on water levels in surrounding piezometers or monitoring wells is monitored.

PUTRESCIBLE SOLID WASTES: Solid wastes containing organic matter having the tendency to decompose with the formation of malodorous by-products.

QUEUE: A line of delayed vehicles.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA): The federal law regulating management and disposal of hazardous wastes.

RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM (RCRIS): An inventory of registered hazardous waste generators, transporters, and treatment, storage, and disposal facilities.

RECEPTOR: Location to which the public has access on a more or less continuous basis used for air quality predictions.

RECEPTOR (SENSITIVE): See ***SENSITIVE RECEPTOR.***

RECIRCULATION: Entrapment of exhaust plumes into operable windows or air intakes.

REFLECTION: The act of sound bouncing off a partition, usually occurring from smooth, flat, hard surfaces.

REGULATORS: Chambers set to divert two times the average design dry-weather flow into the interceptor during storms; if a greater amount of combined flow reaches the regulator, the excess is directed to ***OUTFALLS*** into the nearest waterway (*i.e.*, the Hudson River, East River, *etc.*).

RELEASE: Any occurrence in which a regulated substance is emitted into air, soil, or water.

RELATIVE IMPACT CRITERION (NOISE): A change in noise level at a receptor that is great enough to be considered a significant impact.

REPOSITORY: An appropriate facility that curates the artifact collection from significant archaeological sites to professional standards; see LPC's 2002 The Guidelines for Archaeological Work in New York.

RESERVE CAPACITY: The capacity of a traffic lane at an unsignalized intersection minus the volume using that lane. It is the determinant of level of service at unsignalized intersections.

REVERBERATION: The amplification of sound within an enclosed space caused by multiple reflections off of reflective terminations (*i.e.*, walls, ceilings, floors, or obstacles) of the room.

RIDESHARING: Also referred to as carpooling; a means of reducing vehicle trips by increasing the ***AVERAGE OCCUPANCY*** of vehicles traveling in a given area.

RISK ASSESSMENT: Evaluation of the magnitude of effect to human health and the environment posed by the presence of hazardous substances and proposed controls to limit or eliminate effects.

RVP: Reid Vapor Pressure, a measurement of gasoline volatility.

SALINITY: The total amount of solid material in grams contained in 1 kg of water when all the carbonate has been converted to oxide, the bromine and iodine re-placed by chlorine, and all the organic matter completely oxidized.

SALT MEADOW: A ***TIDAL WETLAND*** zone consisting of the area periodically flooded by spring and storm tides, usually dominated by salt hay and spike grasses. It may also be called "high marsh."

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (1986) (SARA): Federal law reauthorizing and expanding and jurisdiction of CERCLA.

SARA TITLE III: Section of ***SARA*** requiring public disclosure of chemical information and development of emergency response plans.

SATURATED ZONE: A subsurface area that contains sufficient water to fill all interconnected voids or pore spaces.

SCENIC LANDMARK: Any ***LANDSCAPE FEATURE*** or aggregate of landscape features, any part of which is thirty (30) years old or older, which has or have a special character of special historical or aesthetic interest or values as part of the development,

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heritage, or cultural characteristics of the city, state, or nation, and that has been designated a Scenic Landmark pursuant to the New York City Landmarks Law.

SCFM: Standard cubic feet per minute.

SCREEN: An EPA mathematical model that estimates air pollutant impacts from stationary sources.

SEPARATE SEWER: A sewer system in which dry-weather wastewater is sent to a water pollution control plant for treatment and storm water is sent through separate pipes into the nearest waterway.

SENSITIVE RECEPTOR: A defined area where human activity may be adversely affected when noise levels exceed predefined thresholds of acceptability or when levels increase by predefined thresholds of change, used for noise analyses. Examples include, but are not limited to, residences, hotels, motels, health care facilities, nursing homes, schools, houses of worship, court houses, public meeting facilities, museums, libraries, parks, outdoor theaters, golf courses, zoos, campgrounds, beaches, *etc.*

SETBACK: A recession or stepping back of a building's facade.

SGC: Short-term Guideline Concentrations for ***NONCRITERIA AIR POLLUTANTS***, listed in DEC's ***AIR GUIDE-1***.

SHORT-TERM NOISE IMPACT: An impact caused by a temporary noise source, such as construction activity.

SIGNAL PHASING: The allocation of a signal cycle into phases that are used by different traffic movements passing through an intersection.

SIGNAL WARRANT ANALYSIS: An analysis of traffic volume, pedestrian volume, and safety conditions at an intersection to determine whether the installation of a traffic signal is warranted.

SIGNIFICANT COASTAL FISH AND WILDLIFE HABITATS: Habitats designated by the New York State Department of State, on the recommendation of DEC, because they (a) are essential to the survival of a large portion of a particular fish and wildlife population; (b) support populations of protected species; (c) support fish and wildlife populations that have significant commercial, recreational, or educational value; and/or (d) are habitat types not commonly found in the state or region.

SIP: New York State Implementation Plan. The Clean Air Act requires each state to demonstrate in a SIP the manner in which it will attain compliance with the National Ambient Air Quality Standards.

SITE (HISTORIC OR ARCHAEOLOGICAL): Location or place where a significant event or sequence of events took place.

SLOT: Space for one child in a day care center.

SLUG TEST: A test for estimating hydraulic conductivity values in which a rapid water-level change is produced in a piezometer or monitoring well, usually by introducing or withdrawing a "slug" of water or a weight. The resultant rise or decline in the water level is monitored.

SOFT SITE: A site where no particular development is planned or proposed, but where development can reasonably be expected to occur (for example, a property that is underbuilt with respect to its zoning in an area with high development demand).

SOIL GAS SURVEY: A technique used to obtain air from subsurface cavities (*i.e.*, using a soil gas probe); the soil gas sample is analyzed and used as an indicator of volatile organic compounds in groundwater or soil.

SOIL EROSION AND SEDIMENT CONTROL PLANS: Plans for construction that can prevent adverse impacts by incorporating measures that prevent the transport of sediments off-site and that prevent increased turbidity or pollution from affecting surface water or wetlands.

SOLID WASTE MANAGEMENT FACILITIES: See ***TRANSFER STATION.***

SOUND EXPOSURE LEVEL (SEL): A rating, in dB, of discrete events, such as aircraft flyovers or train passbys, that compresses the total sound energy of the event into a 1 second time period.

SOUND LEVEL: The weighted sound pressure level measured by use of a metering device.

SOUND LEVEL METER (SLM): An instrument used to measure sound pressure levels.

SOUND POWER LEVEL (LW): 10 log (W/Wref), where W=power and Wref=1x10-12 Watts.

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SOUND PRESSURE LEVEL (SPL OR LP): 20 log (p/pref), where p=root mean square acoustic pressure and pref=2x10-5 Newtons/meter2. pref corresponds to the pressure at the threshold of hearing.

SOUND TRANSMISSION CLASS (STC): A single-number rating for a TL spectrum of a partition matched to a standard curve.

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT SPDES PERMIT): issued by the New York State Department of Environmental Conservation.

SPECTRUM ANALYZER: A device that measures and manipulates spectra, available in many bandwidth possibilities. Octave band analyzers are the most common types of spectrum analyzers.

SRO: Single-room occupancy hotel.

STABILITY: Description of the rate at which air pollutants are dispersed depending on atmospheric conditions.

STACK: Structure through which concentrated airborne pollutants are emitted.

STATE HISTORIC PRESERVATION OFFICER: Official within the State, authorized by the state at the request of the U.S. Secretary of the Interior, to act as liaison for purposes of implementing federal historic preservation requirements and pro-grams, or the said official's designated representative.

STATISTICAL NOISE LEVELS/PERCENTILE LEVELS (L_1, L_5, L_{10}, ETC.): The practice to describe several important features of fluctuating or time-varying noise using statistical quantities. These percentile levels represent the percentage of the observed time period during which a given noise level is exceeded. For example, L_{90}, the noise level exceeded 90 percent of the time, is often considered to be the background noise level, while L_{10} gives some indication of the intrusive nature of the noise.

STATIONARY SOURCES: Sources of airborne emissions from fixed facilities.

STEL: Short-Term Exposure Limits for air pollutants in the workplace, promulgated by the U.S. Occupational Safety and Health Administration.

STOPPED DELAY: Average vehicle delay at signalized intersections.

STREETSCAPE: The character and urban design features of a street or block, including such features as setbacks, architectural styles, and materials.

STREETWALL: The wall created by the front face or faces of a building or several buildings.

STRUCTURE: Built work made up of interdependent parts or elements in an organized pattern.

SUPERFUND: See CERCLA.

SYMPATHETIC CONTEXTUAL DESIGN: A plan for a new building or development that takes into account the setting, landscaping, shadow, and the visual impact that the proposed construction may have on an nearby existing historic resource; a mitigation option.

TARGET COMPOUND LIST (TCL): A list of analytes prepared by ***EPA***, with a variety of corresponding analytical methods.

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP): The toxicity test required under RCRA to determine if a waste is considered hazardous.

TEMPORAL DISTRIBUTION: The distribution of trips by hour or by 15-minute periods over the course of a given day.

THERMAL STATE: Term used to describe how long a vehicle has been turned on and operating.

THERMAL TREATMENT TECHNOLOGIES: Methods that use heat to thermally separate the contaminants from the media they are found in. These technologies do not destroy the contaminants, so typically these technologies include off-site disposal of a concentrated amount of the original contaminants.

THRESHOLD OF HEARING (0 DBA): The SPL below which sound cannot be heard by the average person with a healthy hearing mechanism.

TIDAL WETLAND: Wetlands found in and around tidal zones; tidal wetlands may be grouped according to characteristic ecological zones—littoral zone; coastal shoals, bars, and flats; intertidal marsh; coastal fresh marsh; high marsh or salt meadow; and formerly connected tidal wetlands.

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TIME-SPACE ANALYSIS: A methodology for evaluating pedestrian level of service for station platforms, waiting areas, street plazas, and other open space areas.

TPY: Tons per year.

TRAFFIC ENFORCEMENT AGENT (TEA): New York City Police Department personnel generally responsible for maintaining proper traffic flow through problem intersections.

TRANSFER STATION: Facility at which solid wastes are received for the purpose of subsequent transfer to another location, regardless of whether these solid wastes are subject to any processing or reduction in volume.

TRANSIT SHARE: The percentage of all person trips made to a given project or area by public transportation.

TRANSMISSION LOSS (TL): A measure of the sound attenuation effectiveness of a partition in units of dB.

TOXIC RELEASE INVENTORY (TRI): The annual report on chemical releases that regulated industries must file with EPA under ***SARA TITLE III***.

TRIP ASSIGNMENT: The assumed routing, or "assignment," of trips (either vehicular or pedestrian) through an area en route to their destination.

TRIP GENERATION: The volume of trips generated, or produced, by a particular land use or project. Trip generation may be specified in terms of person trips or vehicular trips.

TOXIC SUBSTANCES CONTROL ACT (TSCA): The federal law authorizing EPA to gather information on chemical risks; TSCA regulates PCS's and certain other toxic substances.

UNSATURATED ZONE: That subsurface region that lies above the ***SATURATED ZONE*** or ***WATER TABLE***.

UPSTREAM: The direction from which traffic is coming.

USE: Any activity, occupation, business, or operation carried on, or intended to be carried on, in a building or on a tract of land.

USE GROUP: Uses that have similar functional and/or nuisance characteristics, as listed in the Zoning Resolution.

UNDERGROUND STORAGE TANK (UST): A tank with 10 percent or more of its volume underground, with connected piping, regulated under ***RCRA***; used to store petroleum products or ***CERCLA***-regulated hazardous chemicals.

VACUUM EXTRACTION: Extraction of subsurface gases including advective-vapor transport by withdrawing or injecting air through wells screened in the unsaturated zone.

VADOSE ZONE: See Unsaturated Zone.

VANPOOL: A grouping of individuals traveling together in a higher-occupancy vehicle than an automobile, such as a van.

VEHICLE CLASSIFICATION: Mix of vehicular traffic segmented into autos, taxis, light-duty gas trucks, heavy-duty gas trucks, and heavy-duty diesel trucks.

VIEW CORRIDOR: See ***VISUAL CORRIDOR.***

VISUAL CORRIDOR: An open area (including streets) that provides a continuous view from a public place of the sky or focal object, such as the waterfront. A visual corridor is generally linear and unobstructed from its base to the sky.

VOLATILE ORGANIC COMPOUND (VOC): A family of highly evaporative organic materials used in a variety of industrial applications, such as paints and solvents.

VOLATILIZATION: The change of a chemical from liquid to gas.

VOLUME SOURCES: Sources of air pollutants distributed over a large volume of space.

VOLUME-TO-CAPACITY (V/C) RATIO: The ratio of the vehicular or pedestrian volume passing a point on a street (or transit line) to the capacity of the street (or line).

WAKE: Region of air flow that is disturbed by a solid structure

WASTE-TO-ENERGY FACILITIES: Facilities that recover usable energy from the incineration process.

WATER TABLE: The surface in an aquifer at which pore water pressure is equal to atmospheric pressure.

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WATER TABLE AQUIFER: An aquifer in which the water table forms the upper boundary.

WATER-DEPENDENT USES: Uses that require direct access to a body of water to function or that use waterways for transport of materials, products, or people.

WATER-ENHANCING USES: Primarily recreational, cultural, entertainment, or retail uses that, when located at the water's edge, add to the public use and enjoyment of the waterfront.

WATERFRONT REVITALIZATION PROGRAM: New York City's Local Waterfront Revitalization Program, adopted as a 197 a Plan, which applies to all projects in a designated Coastal Zone.

WASTE WATER TREATMENT PLANT (WWTP): Plant used to treat wastewater, including sanitary sewage; also known as a Water Control Pollution Plant (WPCP).

WEAVING ANALYSIS: An analysis of traffic conditions at a location (generally a length of highway) where different traffic streams cross each other's path without the aid of traffic signals.

WILDLIFE: All mammals, birds, reptiles, and amphibians, and all vertebrate and invertebrate animal species.

WIND TUNNEL: Fluid dispersion modeling using physical scale representations.

ZONE OF INFLUENCE: Area surrounding a pumping or recharging well within which the water table of an unconfined aquifer or water pressure of a confined aquifer has been changed due to the well's pumping or recharge.

ZONING DENSITY: The number of dwelling units or zoning rooms permitted on a site.

ZONING NONCOMPLIANCE: The situation of a building that does not comply with one or more of the bulk regulations of a zoning district.

ZONING NONCONFORMANCE: The situation of a use that does not conform to one or more of the use regulations of a zoning district.

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§5-01.
Source of authority and statement of purpose.

Section 192(e) of the Charter provides that the City Planning Commission "shall oversee implementation of laws that require environmental reviews of actions taken by the city" and that the Commission "shall establish by rule procedures for environmental reviews of proposed actions by the city where such reviews are required by law." These rules are intended to exercise that mandate by redefining lead agencies within the city in accordance with law, prescribing the relationship of the new Office of Environmental Coordination with those agencies and regulating scoping. The organization and numbering of the various sections of these rules are not intended to correspond precisely to Executive Order 91. [43RCNY Chapter 6, also see Appendix A hereto] Rather, these rules are an overlay on Executive Order 91. Where these rules conflict with Executive Order 91, these rules supersede the Executive Order.

In deciding upon the appropriate lead agency for certain classes of actions taken by the city, the City Planning Commission has selected the involved agency "principally responsible for carrying out, funding or approving" those actions. 6 NYCRR §617.2(v). For private ULURP applications, for section 197-a plans and for all actions primarily involving a zoning map or text change, the City Planning Commission, responsible under the Charter "for the conduct of planning relating to the orderly growth, improvement and future development of the city" (Charter section 192(d)), is the lead agency. For other ULURP applications, the city agency applicant, the agency that will generally be involved with ensuring programmatic implementation of the action, is the lead agency. Most of the remaining lead agency designations in the rules similarly address other approvals required by the Charter by designating the agency charged with ensuring programmatic implementation as the lead agency for those approvals. In appropriate cases, a lead agency designated by the rules may transfer its lead agency status to another involved agency.

The rules ensure that lead agencies have access to the technical and administrative expertise of the Office of Environmental Coordination. Finally, the rules provide for involved and interested agencies, including the City Council, to participate in the environmental review process, and ensure a role for the public in scoping.

§5-02.
General provisions.

(a) CONTINUATION OF EXECUTIVE ORDER NO. 91. [43RCNY §6-01 et seq., Appendix A]

Until the City Planning Commission promulgates further rules governing environmental review of actions taken by the city, Executive Order No. 91 of August 24, 1977, as amended (Executive Order 91), shall continue to govern environmental quality review in the city except where inconsistent with these rules, provided, however, that the following provisions of Executive Order 91 shall not apply: the definitions of "Agency", "Lead Agencies" and "Project Data Statement" defined in §6-02, subdivision (b) of §6-03, subdivision (a) of §6-05, the introductory paragraph of subdivision (b) of §6-05, paragraphs one and two of subdivision (a) of §6-12, §6-14, and subdivision (b) of the TYPE II part of §6-15.

(b) RULES OF CONSTRUCTION.

(1) All functions required by Executive Order 91 to be performed by the "lead agencies," as formerly defined in §6-02 of such Executive Order, shall be performed by the lead agency prescribed by or selected pursuant to these rules or by the Office of Environmental Coordination where authorized by these rules.

(2) Wherever Executive Order 91 explicitly or by implication refers to subdivision (b) of the Type II part of §6-15 of such Executive Order, such reference shall be deemed to be to section 617.13(d) of the SEQRA Regulations.

(3) The reference to "a determination pursuant to §6-03(b) of this Executive Order" contained in Executive Order 91 §6-05(b)(1) shall be deemed to refer to selection of a lead agency pursuant to §5-03 of these rules.

(4) The Office of Environmental Coordination shall succeed to functions performed by the City Clerk pursuant to Executive Order 91 with respect to the receipt and filing of documents.

(5) References in these rules and in Executive Order 91 to specific agencies and provisions of law shall be deemed to apply to successor agencies and provisions of law.

(c) DEFINITIONS.

(1) All definitions contained in Executive Order 91, other than the definitions of "agency" and "lead agencies", shall apply to these rules.

(2) "Action" as defined in §6-02 of Executive Order 91 includes all contemporaneous or subsequent actions that are included in a review pursuant to City Environmental Quality Review.

(3) The following additional definitions shall apply to these rules unless otherwise noted:

Agency."Agency" shall mean any agency, administration, department, board, commission, council, governing body or other governmental entity of the city of New York, including but not limited

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to community boards, borough boards and the offices of the borough presidents, unless otherwise specifically referred to as a state or federal agency.

City Environmental Quality Review. "City Environmental Quality Review" (CEQR) shall mean the environmental quality review procedure established by Executive Order 91 as modified by these rules.

Determination of significance. "Determination of significance" shall mean a negative declaration, conditional negative declaration or notice of determination (positive declaration).

Interested agency. "Interested agency" shall mean an agency that lacks jurisdiction to fund, approve or directly undertake an action but requests or is requested to participate in the review process because of its specific concern or expertise about the proposed action.

Involved agency. "Involved agency" shall mean any agency that has jurisdiction to fund, approve or directly undertake an action pursuant to any provision of law, including but not limited to the Charter or any local law or resolution. The City Council shall be an involved agency for all actions for which, as a component of the approval procedure for the action or a part thereof, the City Council has the power to approve or disapprove, regardless of whether the City Council chooses to exercise such power.

Lead agency. "Lead agency" shall mean the agency principally responsible for environmental review pursuant to these rules.

Scoping. "Scoping" shall mean the process by which the lead agency identifies the significant issues related to the proposed action which are to be addressed in the draft environmental impact statement including, where possible, the content and level of detail of the analysis, the range of alternatives, the mitigation measures needed to minimize or eliminate adverse impacts, and the identification of non-relevant issues.

SEQRA Regulations. "SEQRA Regulations" shall mean Part 617 of Volume 6 of New York Codes, Rules and Regulations.

(d) APPLICABILITY.

These rules and Executive Order 91 shall apply to environmental review by the city that is required by the State Environmental Quality Review Act (Environmental Conservation Law, Article 8) and regulations of the State Department of Environmental Conservation thereunder and shall not be construed to require environmental quality review of an action where such review would not otherwise be required by such act and regulations, or to dispense with any such review where it is otherwise required.

§5-03. Establishment of lead agency.

(a) GENERAL RULE.

Where only one agency is involved in an action, that agency shall be the lead agency.

(b) ACTIONS SUBJECT TO ULURP AND CHARTER SECTIONS 197-a, 200, 201, and 668.

(1) For actions subject to the Uniform Land Use Review Procedure of section 197-c of the Charter (ULURP), and for which the applicant is not a city agency, the City Planning Commission shall be the lead agency.

(2) For actions that involve plans for the development, growth and improvement of the city, its boroughs and community districts (Charter section 197-a), the City Planning Commission shall be the lead agency.

(3) For actions that involve zoning map or text changes (Charter section 200 and/or 201), the following rules shall apply:

(i) If the only approval subject to ULURP or to Charter section 200 or 201 is a zoning map or text change, the City Planning Commission shall be the lead agency.

(ii) If the applicant for any action requiring a zoning map or text change is not a city agency, the City Planning Commission shall be the lead agency.

(iii) If the action involves a zoning map or text change, in addition to another approval under Charter section 197-c (ULURP) for which there is a city agency applicant, then the city agency applicant shall be the lead agency, provided, however, that the City Planning Commission shall be the lead agency if:

(A) the action involves a zoning map or text change that covers or may apply to areas substantially larger than the properties covered by the non-zoning approvals required under Charter section 197-c; or

(B) the city agency applicant and the Chair of the City Planning Commission agree that the action involves a zoning map or text change that changes the uses permitted so as to substantially alter the area zoning pattern.

(4) For all other actions subject to section 197-c of the Charter (ULURP) for which the applicant is a city agency, and for actions subject to section 668 of the Charter for which the applicant is a city agency, the city agency applicant shall be the lead agency. Where there is more than one city agency applicant, the city agency applicants shall agree upon which of them will be the lead

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agency, using the selection procedure set forth in subdivision (h) of this section.

(5) Where no other provision of this section applies and an action involves a special permit or variance from the Board of Standards and Appeals (Charter section 668) for which the applicant is not a city agency, the Board of Standards and Appeals shall be the lead agency.

(c) SECTION 195 ACQUISITIONS OF OFFICE SPACE OR EXISTING BUILDINGS FOR OFFICE USE.

For actions involving acquisitions of office space or existing buildings for office use (Charter section 195), the agency filing the notice of intent to acquire shall be the lead agency.

(d) LOCAL LAWS.

The City Council and the Office of the Mayor shall be co-lead agencies for local laws. Either agency may at any time delegate to the other its lead agency status and act instead as an involved agency. In addition, after introduction of a proposed local law, the City Council may assume sole lead agency status after giving the Mayor five days notice.

(e) FRANCHISES, REVOCABLE CONSENTS, AND CONCESSIONS.

For actions involving franchises, revocable consents and concessions, the responsible agency as defined in Charter section 362(c) shall be the lead agency.

(f) LEASING OF WHARF PROPERTY FOR WATERFRONT COMMERCE OR NAVIGATION AND WATERFRONT PLANS.

For actions involving the leasing of wharf property belonging to the city primarily for purposes of waterfront commerce or in furtherance of navigation (Charter section 1301(2)(f)), the Department of Business Services shall be the lead agency, provided that the Department of Transportation shall be the lead agency for such actions when it is acting pursuant to Charter section 2903(c)(2). For actions involving determinations of the Commissioner of Business Services pursuant to Charter section 1302 (waterfront plans), the Department of Business Services shall be the lead agency.

(g) SELECTION OF LEAD AGENCY IN THE CASE OF MULTIPLE INVOLVED AGENCIES.

(1) Subdivision (b) of this section, which governs lead agency designation for actions involving approvals pursuant to ULURP or section 197-a, 200, 201 or 668 of the Charter, shall always govern determination of the lead agency regardless of whether the action involves additional approvals pursuant to other provisions of law.

(2) For any other action involving more than one agency, the agencies designated in subdivisions (c) through (f) of this section and any agencies involved in any required city approval, other than approvals described in such subdivisions, shall agree upon which of them will be the lead agency, using the selection procedure set forth in subdivision (h) of this section.

(h) PROCEDURE FOR SELECTION OF LEAD AGENCY.

In selecting a lead agency where agreement among agencies is required by this section, and in deciding whether transfer of lead agency status is appropriate, the agencies making the selection or decision shall determine which agency is most appropriate to act as lead agency for the particular action. In making such determination, such agencies shall consider, but shall not be limited to considering, the following criteria:

(i) the agency that will have the greater degree of responsibility for planning and implementing the action;

(ii) the agency that will be involved for a longer duration;

(iii) the agency that has the greater capability for providing the most thorough environmental assessment;

(iv) the agency that has the more general governmental powers as compared to single or limited powers or purposes;

(v) the agency that will provide the greater level of funding for the action;

(vi) the agency that will act earlier on the proposed action; and

(vii) the agency that has the greater role in determining the policies resulting in or affecting the proposed action.

(i) TRANSFER OF LEAD AGENCY STATUS.

Lead agency status may be transferred from the lead agency, at its discretion, to an involved agency that agrees to become the lead agency. In deciding whether a transfer of lead agency status is appropriate, agencies shall use the selection

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procedure set forth in subdivision (h) of this section. Notice of transfer of lead agency status must be given by the new lead agency to the applicant and all other involved and interested agencies within 10 days of the transfer. The Chair of the City Planning Commission may act on behalf of such Commission pursuant to this subdivision.

(j) SELECTION OF LEAD AGENCY WHERE ACTIONS INVOLVE CITY AND STATE AGENCIES.

Where an action involves both city and state agencies, the city agency prescribed by or selected pursuant to subdivisions (a) through (i) of this section shall, together with such state agencies, participate in selection of the lead agency pursuant to SEQRA, and such selection shall be binding upon the city. The criteria set forth in section 617.6(e)(5) of the SEQRA Regulations shall be considered in deciding whether or not a city agency shall serve as lead agency. The Office of Environmental Coordination shall perform the functions set forth in subdivision (d) of §5-04 of these rules.

§5-04. The Office of Environmental Coordination.

(a) The Director of City Planning and the Commissioner of the Department of Environmental Protection shall designate persons from the staffs of the Departments of City Planning and Environmental Protection who shall comprise the Office of Environmental Coordination (OEC). The OEC shall provide assistance to all city agencies in fulfilling their environmental review responsibilities.

(b) The OEC shall perform any environmental review function assigned to it by a lead agency, except the OEC may not issue, amend or rescind a determination of significance, notice of completion of a draft or final environmental impact statement, written findings following issuance of a final environmental impact statement, or analogous statements, notices or findings for a supplemental environmental impact statement. In addition, the lead agency may not delegate to the OEC its responsibility to issue the final scope or to attend the scoping meeting; however, the lead agency may delegate to the OEC the power to chair the scoping meeting.

(c) In addition to any other functions the OEC may perform pursuant to these rules, the OEC shall:

(1) work with appropriate city agencies to develop and maintain technical standards and methodologies for environmental review and, upon request, assist in the application by agencies of such standards and methodologies;

(2) work with appropriate city agencies to develop and maintain a technical database that may be utilized by applicants and city agencies in completing the standardized environmental assessment statement described in this subdivision and in preparation of draft and final environmental impact statements;

(3) prepare and maintain a standardized environmental assessment statement, which shall provide guidance in determining whether the action may have a significant effect on the environment;

(4) at the request of a lead agency, coordinate the work of the technical staffs of interested agencies in order to complete environmental review, and expedite responses by interested agencies to requests of the lead agency;

(5) (i) receive and maintain on file notifications of commencement of environmental review, determinations of significance (including completed environmental assessment statements), draft and final scopes issued pursuant to §5-07 of these rules, draft and final environmental impact statements, and significant supporting documentation comprising the official records of environmental reviews, (ii) provide to the public upon request, or make available for inspection by the public during normal business hours, materials maintained on file pursuant to this paragraph, (iii) publish a quarterly listing of all notifications of commencement, determinations of significance, draft and final scopes and draft and final environmental impact statements received and filed pursuant to this paragraph, and (iv) in its discretion, advise lead agencies as to whether such documents are consistent with standards and methodologies developed pursuant to this subdivision and reflect proper use of the standardized environmental assessment statement;

(6) provide to lead agencies staff training, management assistance, model procedures, coordination with other agencies, and other strategies intended to remedy any problems that arise with respect to consistency with standards and methodologies developed pursuant to this subdivision or proper use of the standardized environmental assessment statement;

(7) provide to lead agencies a format for notices of public scoping meetings, assist lead agencies in ensuring that public scoping meetings are conducted in an effective manner, and, to the extent the OEC deems appropriate, comment on the draft scope and participate in such meetings;

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(8) prepare standardized forms for notifications of commencement of environmental review, determinations of significance, notices of completion of draft and final environmental impact statements, and, as may be appropriate, other environmental review documents; and

(9) work with appropriate city agencies to develop and implement a tracking system to ensure that mitigation measures are implemented in a timely manner, and to evaluate and report on the effectiveness of mitigation measures.

(d) Any state agency that seeks a determination whether a city agency shall serve as the lead agency for an action that involves city and state agencies should initially communicate with the OEC. Upon receipt of such communication, the OEC shall ascertain the city agency which is designated as lead agency by or pursuant to these rules and shall notify such agency of such communication. Such designated agency may then act pursuant to subdivision (j) of §5-03 of these rules.

(e) Where an action or part thereof has been or will be reviewed by a federal agency, the OEC shall assist city agencies in coordinating review with the appropriate federal agency.

§5-05.
Environmental review procedures.

(a) THRESHOLD DETERMINATION.

(1) In the case of any action for which a lead agency is prescribed by §5-03 of these rules, and thus for which no agreement among involved agencies is necessary, only such lead agency may determine that such action, considered in its entirety, requires environmental review, and such determination shall be binding upon the city. The OEC shall, upon the request of such agency, assist in such determination.

(2) In the case of any action for which agreement among involved agencies is necessary for selection of a lead agency, if an agency that could be the lead agency for the particular action pursuant to subdivisions (b) through (g) of §5-03 of these rules determines that such action may require environmental review, then the lead agency shall be agreed upon as provided in §5-03 of these rules, and such lead agency shall determine whether such action, considered in its entirety, requires environmental review. Such determination shall be binding upon the city. The OEC shall assist in any determination made pursuant to this paragraph upon the request of the agency making such determination.

(3) Nothing contained in this subdivision shall be construed to require an affirmative determination, whether formal or informal, that an action is exempt from environmental review, or is a Type II action pursuant to the SEQRA Regulations, where such determination would not otherwise be required by law.

(b) OTHER DETERMINATIONS.

(1) After the determination that an action requires environmental review, the lead agency shall notify the OEC that it is commencing environmental review and complete or cause to be completed the standardized environmental assessment statement provided by the OEC. Such statement shall provide guidance in determining whether the action may have a significant effect on the environment. The OEC and interested and involved agencies shall, upon the request of the lead agency, assist the lead agency in completing such statement.

(2) The OEC and interested and involved agencies shall, upon the request of the lead agency, assist such lead agency with respect to any aspect of a determination of significance and/or a draft, final and/or supplemental environmental impact statement.

(3) Whenever, in the preparation of a draft environmental impact statement, the lead agency identifies a potential significant impact, the lead agency shall consult with any agency that has primary jurisdiction to carry out possible mitigations, and with any city agency that has primary regulatory jurisdiction over the subject matter of such impact.

(4) Lead agencies shall send copies of the following to the OEC upon issuance: notifications of commencement of environmental review, determinations of significance (including completed environmental assessment statements), draft and final scopes, draft and final environmental impact statements. In addition, lead agencies shall forward to the OEC significant supporting documentation comprising the official records of environmental reviews.

§5-06.
Involved and interested agencies; required circulation.

(a) The lead agency and the OEC shall make every reasonable effort to keep involved and interested agencies informed during the environmental review process and to facilitate their participation in such process. If the City Council is involved in an action, staff of the lead agency and/or staff of the OEC shall be made available to explain determinations made by the lead agency to the City Council or the appropriate City Council committee or staff.

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(b) Any written information submitted by an applicant for purposes of a determination by the lead agency whether an environmental impact statement will be required by law, and documents or records intended to define or substantially redefine the overall scope of issues to be addressed in any draft environmental impact statement required by law, shall be circulated to all affected community or borough boards, where such circulation is required by the Charter.

(c) If the City Council is involved in an action, any written information, documents or records that are required to be circulated to involved agencies or to affected community boards or borough boards shall be circulated to the City Council.

§5-07. Scoping.

Following the issuance of a notice of determination (positive declaration), the lead agency shall coordinate the scoping process, which shall ensure that all interested and involved agencies (including the City Council where it is interested or involved), the applicant, the OEC, community and borough boards, borough presidents and the public are able to participate. The scoping process shall include a public scoping meeting and take place in accordance with the following procedure:

(a) DRAFT SCOPE.

Within fifteen days after issuance of a notice of determination (positive declaration), the lead agency shall issue a draft scope, which may be prepared by the applicant but must be approved by the lead agency. The lead agency may consult with the OEC and other agencies prior to issuance of the draft scope.

(b) PUBLIC NOTICE AND COMMENT.

Upon issuance of the draft scope and not less than thirty nor more than forty-five days prior to the holding of the public scoping meeting, the lead agency shall publish in the City Record a notice indicating that a draft environmental impact statement will be prepared for the proposed action and requesting public comment with respect to the identification of issues to be addressed in the draft environmental impact statement. Such notice shall be in a format provided by the OEC and shall state that the draft scope and the environmental assessment statement may be obtained by any member of the public from the lead agency and/or the OEC. Such notice shall also contain the date, time and place of the public scoping meeting, shall provide that written comments will be accepted by the lead agency through the tenth day following such meeting, and shall set forth guidelines for public participation in such meeting.

(c) AGENCY NOTICE AND COMMENT.

Upon issuance of the draft scope and not less than thirty nor more than forty-five days prior to the holding of the public scoping meeting, the lead agency shall circulate the draft scope and the environmental assessment statement to all interested and involved agencies (including the City Council where it is interested or involved), to the applicant, to the OEC and to agencies entitled to send representatives to the public scoping meeting pursuant to section 197-c(d) or 668(a)(7) of the Charter. Together with the draft scope and the environmental assessment statement, a letter shall be circulated indicating the date, time and place of the public scoping meeting, and stating that comments will be accepted by the lead agency through the tenth day following such meeting. The lead agency may consult with other agencies regarding their comments, and shall forward any written comments received pursuant to this subdivision to the OEC.

(d) PUBLIC SCOPING MEETING.

The lead agency shall chair the public scoping meeting. In addition to the lead agency, all other interested and involved agencies that choose to send representatives (including the City Council where it is interested or involved), the applicant, the OEC, and agencies entitled to send representatives pursuant to section 197-c(d) or 668(a)(7) of the Charter may participate. The meeting shall include an opportunity for the public to observe discussion among interested and involved agencies, agencies entitled to send representatives, the applicant and the OEC. Reasonable time shall be provided for the public to comment with respect to the identification of issues to be addressed in the draft environmental impact statement. The OEC shall assist the lead agency in ensuring that the public scoping meeting is conducted in an effective manner.

(e) FINAL SCOPE.

Within thirty days after the public scoping meeting, the lead agency shall issue a final scope, which may be prepared by the applicant and approved by the lead agency. The lead agency may consult further with the OEC and other agencies prior to issuance of the final scope. Where a lead agency receives substantial new information after issuance of a final scope, it may amend the final scope to reflect such information.

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(f) SCOPING OF CITY AGENCY ACTIONS.

For actions which do not involve private applications, nothing contained in these rules shall be construed to prevent a lead agency, where deemed necessary for complex actions, from extending the time frames for scoping set forth in this section, or from adding additional elements to the scoping process.

§5-08. Applications and fees.

(a) APPLICATIONS.

Applications submitted for City Environmental Quality Review for actions that require such review shall be submitted to the lead agency prescribed by these rules, or to an agency that could be the lead agency for the particular action pursuant to §5-03 of these rules. Such applications shall include information required to be obtained from applicants in order for the lead agency to complete or cause to be completed the standardized environmental assessment statement, and such other documents and additional information as the lead agency may require to make a determination of significance. In addition, except as otherwise provided in these rules, such applications shall conform to the requirements of Executive Order 91. Applicants shall file twenty-five copies of each application.

(b) FEES.

Except as otherwise provided by this section, fees in effect on the effective date of these rules pursuant to Executive Order 91 shall continue to govern City Environmental Quality Review applications, unless the City Planning Commission shall by rule modify such fees. Such fees shall be submitted to the lead agency prescribed by these rules, or to an agency that could be the lead agency for the particular action pursuant to §5-03 of these rules, and shall be in the form of a check or money order made out to the "City of New York."

§5-09. Transition section.

(a) An action shall not be subject to these rules, but shall comply with Executive Order 91, as in effect prior to the effective date of these rules, where: (1) a classification as exempt, excluded or Type II has been made prior to the effective date of these rules; (2) a project data statement has been completed more than thirty days prior to the effective date of these rules and a determination of significance has not been made prior to the effective date of these rules; (3) a negative declaration or a conditional negative declaration has been issued prior to the effective date of these rules; or (4) a notice of determination (positive declaration) has been issued more than thirty days prior to the effective date of these rules; provided, however, that if a negative declaration or conditional negative declaration is rescinded, or if a classification as exempt, excluded or Type II is no longer applicable, or if a supplemental environmental impact statement is required, or if a notice of determination (positive declaration) has been issued less than thirty days prior to the effective date of these rules or is issued on or after the effective date of these rules, these rules shall apply, and the lead agency prescribed by or selected pursuant to these rules shall thereupon assume lead agency status at the earliest time practicable.

(b) Except as provided in subdivision (a) of this section, the lead agency prescribed by or selected pursuant to these rules shall assume lead agency status at the earliest time practicable. If a determination of significance has not been made and such lead agency determines that the action requires environmental review, it shall notify the OEC that it is commencing environmental review and shall complete or cause to be completed the standardized environmental assessment statement provided by the OEC, regardless of whether a project data statement has been completed. However, such lead agency shall not be required to engage in scoping pursuant to §5-07 of these rules if a final scope has already been prepared. Until the lead agency prescribed by or selected pursuant to these rules assumes lead agency status, the action shall be subject to Executive Order 91 as in effect prior to the effective date of these rules; however, after the effective date of these rules, the prior lead agency or agencies shall not issue a determination of significance or notice of completion of a draft or final environmental impact statement, classify an action as exempt, excluded or Type II, convene a scoping meeting or conduct a public hearing pursuant to CEQR.

§5-10. Severability.

The provisions of these rules shall be severable and if any phrase, clause, sentence, paragraph, subdivision or section of these rules, or the applicability thereof to any person or circumstance, shall be held invalid, the remainder of these rules and the application thereof shall not be affected thereby.

§5-11. Effective date.

These rules shall take effect on October 1, 1991.

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CITY ENVIRONMENTAL QUALITY REVIEW

Executive Order No. 91 of 1977 as amended

Cross reference to CEQR Rules of Procedure

Supplemented by new statement of authority and purpose, Rules, §5-01.

WHEREAS, the improvement of our urban environment is critically important to the overall welfare of the people of the City; and

WHEREAS, the development and growth of the City can and should be reconciled with the improvement of our urban environment; and

WHEREAS, it is the continuing policy of the City that environmental, social and economic factors be considered before governmental approval is given to proposed activities that may significantly affect our urban environment; and

WHEREAS, subdivision (3) of section 8-0113 of Article 8 of the New York State Environmental Conservation Law (State Environmental Quality Review Act, or "SEQRA") and the regulations promulgated thereunder (6 NYCRR 617) authorizes local governments to adopt rules, procedures, criteria and guidelines for incorporating environmental quality review procedures into existing planning and decision making processes; and

WHEREAS, the procedures formulated in this Executive Order are intended to be integrated into existing agency procedures, including the Uniform Land Use Review Procedure contained in section 197-c of Chapter 8 of the City Charter, in order to avoid delay and to encourage a one-stop review process; and

WHEREAS, section 8-0117 of SEQRA, as amended, provides that only actions or classes of actions identified by the State Department of Environmental Conservation as likely to require preparation of an environmental impact statement shall be subject to this Executive Order until November 1, 1978, after which date non-exempt actions will be fully subject to this Executive Order; and

WHEREAS, the implementation of SEQRA in the City by this Executive Order will accomplish the purposes for which Executive Order No. 87 of October 18, 1973 ("Environmental Review of Major Projects") was promulgated and will continue the policy established therein.

NOW, THEREFORE, by the power vested in me as Mayor of the City of New York, Executive Order No. 87 of October 18, 1973 is, in accordance with the provisions of sections 16 and 18 hereunder, hereby replaced by this Executive Order as follows:

Exec. Order 91 continued except as, otherwise provided, Rules §5-02(a). See new Rules of Construction, Rules §5-02(b).

Except as modified by Rules §5-02(a) and (d).

§6-01. Applicability

No final decision to carry out or approve any action which may have a significant effect on the environment shall be made by any agency until there has been full compliance with the provisions of this chapter.

§6-02. Definitions

As used herein, the following terms shall have the indicated meanings unless noted otherwise:

Additional definitions, Rules §5-02(c).

Subdiv. (a) modified by Rules §5-02(c) (2).

(a) Action. "Action" means any activity of an agency, other than an exempt action enumerated in §6-04 of this Executive Order, including but not limited to the following:

(1) non-ministerial decisions on physical activities such as construction or other activities which change the use or appearance of any natural resource or structure;

(2) non-ministerial decisions on funding activities such as the proposing, approval or disapproval of contracts, grants,

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subsidies, loans, tax abatements or exemptions or other forms of direct or indirect financial assistance, other than expense budget funding activities;

(3) planning activities such as site selection for other activities and the proposing, approval or disapproval of master or long range plans, zoning or other land use maps, ordinances or regulations, development plans or other plans designed to provide a program for future activities;

(4) policy making activities such as the making, modification or establishment of rules, regulations, procedures, policies and guidelines;

(5) non-ministerial decisions on licensing activities, such as the proposing, approval or disapproval of a lease, permit, license, certificate or other entitlement for use or permission to act.

~~(b) Agency. "Agency" means any agency, administration, department, board, commission, council, governing body or any governmental entity of the City of New York, unless otherwise specifically referred to as a state or federal agency.~~

Inapplicable. See Rules §5-02(a), §5-02(c) (3) (i).

(c) Applicant. "Applicant" means any person required to file an application pursuant to this Executive Order.

(d) Conditional negative declaration. "Conditional negative declaration" means a written statement prepared by the lead agencies after conducting an environmental analysis of an action and accepted by the applicant in writing, which announces that the lead agencies have determined that the action will not have a significant effect on the environment if the action is modified in accordance with conditions or alternatives designed to avoid adverse environmental impacts.

(e) DEC. "DEC" means the New York State Department of Environmental Conservation.

(f) Environment. "Environment" means the physical conditions which will be affected by a proposed action, including land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance, existing patterns of population concentration, distribution or growth, and existing community or neighborhood character.

(g) Environmental analysis. "Environmental analysis" means the lead agencies' evaluation of the short and long term, primary and secondary environmental effects of an action, with particular attention to the same areas of environmental impacts as would be contained in an EIS. It is the means by which the lead agencies determine whether an action under consideration may or will not have a significant effect on the environment.

(h) Environmental assessment form. "Environmental assessment form" means a written form completed by the lead agencies, designed to assist their evaluation of actions to determine whether an action under consideration may or will not have a significant effect on the environment.

Retitled Environmental Assessment Statement; see Rules §5-04(c) (3).

(i) Environmental impact statement (EIS). "Environmental impact statement (EIS)" means a written document prepared in accordance with §6-08, §6-10, §6-12 and §6-13 of this Executive Order. An EIS may either be in a draft or a final form.

Cross reference to CEQR Rules of Procedure

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(j) Environmental report. "Environmental report" means a report to be submitted to the lead agencies by a non-agency applicant when the lead agencies prepare or cause to prepared a draft EIS for an action involving such an applicant. An environmental report shall contain an analysis of the environmental factors specified in §6-10 of this Executive Order as they relate to the applicant's proposed action and such other information as may be necessary for compliance with this Executive Order, including the preparation of an EIS.

~~(k) Lead agencies. "Lead agencies" means the Department of Environmental Protection and the Department of City Planning of the City of New York, as designated by the Mayor pursuant to section 617.4 of Part 617 of Volume 6 of the New York Code of Rules and Regulations, for the purpose of implementing the provisions of Article 8 of the Environmental Conservation Law (SEQRA) in the City of New York, by order dated December 23, 1976.~~

(l) Ministerial action. "Ministerial action" means an action performed upon a given state of facts in a prescribed manner imposed by law without the exercise of any judgment or discretion as to the propriety of the action, although such law may require, in some degree, a construction of its language or intent.

(m) Negative declaration. "Negative declaration" means a written statement prepared by the lead agencies after conducting an environmental analysis of an action which announces that the lead agencies have determined that the action will not have a significant effect on the environment.

(n) Notice of determination. "Notice of determination" means a written statement prepared by the lead agencies after conducting an environmental analysis of an action which announces that the lead agencies have determined that the action may have a significant effect on the environment, thus requiring the preparation of an EIS.

(o) NYCRR. "NYCRR" means the New York Code of Rules and Regulations.

(p) Person. "Person" means an agency, individual, corporation, governmental entity, partnership, association, trustee or other legal entity.

~~(q) Project data statement. "Project data statement" means a written submission to the lead agencies by an applicant on a form prescribed by the lead agencies, which provides an identification of and information relating to the environmental impact of a proposed action. The project data statement is designed to assist the lead agencies in their evaluation of an action to determine whether an action under consideration may or will not have significant effect on the environment.~~

(r) SEQRA. "SEQRA" means the State Environmental Quality Review Act (Article 8 of the New York State Environmental Conservation Law).

(s) Typically associated environmental effect. "Typically associated environmental effect" means changes in one or more natural resources which usually occur because of impacts on other such resources as a result of natural interrelationships or cycles.

(t) ULURP. "ULURP" means the Uniform Land Use Review Procedure (section 197-c of Chapter 8 of the New York City Charter).

Cross reference to CEQR Rules of Procedure

Inapplicable, Rules §5-02(a). Superseded by Rules §5-02(b) (1) and §5-02(c) (3) (vi); also see Rules §5-03 for choice of lead agency.

See also Rules §5-02(c) (3) (iii).

See also Rules §5-02(c) (3) (viii).

Inapplicable, Rules §5-02(a). Superseded by Environmental Assessment Statement, see Rules §5-04(c) (3). See also Rules §5-05(b) (1) and 5-08(a).

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§6-03. Actions Involving Federal or State Participation

Cross reference to CEQR Rules of Procedure

See also Rules §5-04(e).

(a) If an action under consideration by any agency may involve a "major federal action significantly affecting the quality of the human environment under the National Environmental Policy Act of 1969," then the following procedures shall apply:

(1) in the case of an action for which there has been duly prepared both a draft EIS and final EIS, no agency shall have an obligation to prepare an EIS or to make findings pursuant to §6-12 of this Executive Order.

(2) in the case of an action for which there has been prepared a Negative Declaration or other written threshold determination that the action will not require a federal impact statement under the National Environmental Policy Act of 1969, the lead agencies shall determine whether or not the action may have a significant effect on the environment pursuant to this Executive Order, and the action shall be fully subject to the same.

~~(b) If an action under consideration by any agency may involve any state action which may have a significant effect on the environment under SEQRA, pursuant to which a state agency is required to comply with the procedures specified in 6 NYCRR 617, then the determination as to whether the state agency or the lead agencies shall be responsible for the environmental review shall be made on the basis of the following criteria:~~

Inapplicable, Rules §5-02(a). Entire subdivision (b) superseded by Rules §5-03(j) and §5-04(d).

~~(1) the agency to first act on the proposed action;~~

~~(2) a determination of which agency has the greatest responsibility for supervising or approving the action as a whole;~~

~~(3) a determination of which agency has more general governmental powers as compared to single or limited powers or purposes;~~

~~(4) a determination of which agency has the greatest capability for providing the most thorough environmental assessment of the action;~~

~~(5) a determination of whether the anticipated impacts of the action being considered are primarily of statewide, regional or local concern, e.g., if such impacts are primarily of local concern, the lead agencies shall conduct the environmental review.~~

~~If this determination cannot be made within 30 days of the filing of an application, the Commissioner of DEC shall be requested, in writing, to make such determination.~~

§6-04. Exempt Actions

See also Rules §5-02(d).

The following actions shall not be subject to the provisions of this Executive Order:

(a) projects or activities classified as Type I pursuant to §6-15 of this Executive Order directly undertaken or funded by an agency prior to June 1, 1977 except that if such action is sought to be modified after June 1, 1977 which modification may have a significant adverse effect on the environment, then such modification shall be an action fully subject to the requirements of this Executive Order;

(1) such actions include, but are not limited to, those actions defined in §6-02 "Action" (1), (2), (3) and (4) of this Executive Order;

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(2) an action shall be deemed to be undertaken at the point that:
(i) the agency is irreversibly bound or committed to the ultimate completion of a specifically designed activity or project; or
(ii) in the case of construction activities, a contract for substantial construction has been entered into or if a continuous program of on-site construction or modification has been engaged in; or
(iii) the agency gives final approval for the issuance to an applicant of a discretionary contract, grant subsidy, loan or other form of financial assistance; or
(iv) in the case of an action involving federal or state participation, a draft EIS has been prepared pursuant to the National Environmental Policy Act of 1969 or SEQRA, respectively.

(b) projects or activities classified as Type I pursuant to §6-15 of this Executive Order approved by an agency prior to September 1, 1977 except that if such action is sought to be modified after September 1, 1977, which modification may have a significant adverse effect on the environment, then such modification shall be an action fully subject to the requirements of this Executive Order;

(1) such actions include, but are not limited to, those actions defined in §6-02 "Action" (2) and (5) of this Executive Order;

(2) an action shall be deemed to be approved at the point that:
(i) the agency gives final approval for the issuance to an applicant of a discretionary contract, grant, subsidy, loan or other form of financial assistance; or
(ii) the agency gives final approval for the issuance to an applicant of a discretionary lease, permit, license, certificate or other entitlement for use or permission to act; or
(iii) in the case of an action involving federal or state participation, a draft EIS has been prepared pursuant to the National Environmental Policy Act of 1969 or SEQRA, respectively.

(c) projects or activities not otherwise classified as Type I pursuant to §6-15 of this Executive Order directly undertaken, funded or approved by an agency prior to November 1, 1978 except that if such action is sought to be modified after November 1, 1978, which modification may have a significant adverse effect on the environment, then such modification shall be an action fully subject to the requirements of this Executive Order;

(1) such actions include, but are not limited to, those actions defined in §6-02 "Action" of this Executive Order;

(2) an action shall be deemed to be undertaken as provided in subsections (a)(2) and (b)(2) of this section, as applicable.

(d) enforcement or criminal proceedings or the exercise of prosecutorial discretion in determining whether or not to institute such proceedings;

(e) ministerial actions, which shall appear on a list compiled, certified and made available for public inspection by the lead agencies, except as provided in §6-15(a), Type I, of this Executive Order, relating to critical areas and historic resources;

(f) maintenance or repair involving no substantial changes in existing structures or facilities;

(g) actions subject to the provisions requiring a certificate of environmental compatibility and public need in Articles 7 and 8 of the Public Service Law;

Cross reference to CEQR Rules of Procedure

See Rules §5-02(d).

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(h) actions which are immediately necessary on a limited emergency basis for the protection or preservation of life, health, property or natural resources; and

(i) actions of the Legislature of the State of New York or of any court.

Cross reference to CEQR Rules of Procedure

§6-05. Determination of Significant Effect; Applications

~~(a) Each agency shall ascertain whether an application need be filed pursuant to this section, employing lists of actions, classified as either exempt, Type I or Type II pursuant to §6-04 and §6-15 of this Executive Order, respectively, which lists shall be certified by the lead agencies.~~

Inapplicable, Rules §5-02(a). Superseded by Rules §5-05(a). See also Rules §5-02(b) (2) and §5-02(d).

(b) The applicant initiating the proposed action, other than an exempt or Type II action pursuant to §6-04 ~~and §6-15~~ of this Executive Order, shall file an application with the lead agencies, which application shall include a Project Data Statement and such other documents and additional information as the lead agencies may require to conduct an environmental analysis to determine whether the action may or will not have a significant effect on the environment. Where possible existing City applications shall be modified to incorporate this procedure and a one-stop review process developed;

Introductory paragraph inapplicable, Rules §5-02(a). Paragraph (b) superseded by Rules §5-08.

(1) within 20 calendar days of receipt of the application, or of a determination pursuant to §6-03(b) of this Executive Order, if applicable, the lead agencies shall notify the applicant, in writing, whether the application is complete or whether additional information is required;

(2) when all required information has been received, the lead agencies shall notify the applicant, in writing, that the application is complete.

Determination pursuant to §5-03(b) deemed to refer to lead agency selection pursuant to Rules §5-03. See Rules §5-02(b) (3).

(c) Each application shall include an identification of those agencies, including federal and state agencies, which to the best knowledge of the applicant, have jurisdiction by law over the action or any portion thereof.

(d) Where appropriate, the application documents may include a concise statement or reasons why, in the judgment of the applicant, the proposed action is one which will not require the preparation of an EIS pursuant to this Executive Order.

(e) Initiating applicants shall consider the environmental impacts of proposed actions and alternatives at the earliest possible point in their planning processes, and shall develop wherever possible, measures to mitigate or avoid adverse environmental impacts. A statement discussing such considerations, alternatives and mitigating measures shall be included in the application documents.

(f) Nothing in this section shall be deemed to prohibit an applicant from submitting a preliminary application in the early stages of a project or activity for review and comment by the lead agencies.

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§6-06. Determination of Significant Effect; Criteria

Cross reference to CEQR Rules of Procedure

(a) An action may have a significant effect on the environment if it can reasonably be expected to lead to one of the following consequences:

(1) a substantial adverse change to ambient air or water quality or noise levels or in solid waste production, drainage, erosion or flooding;

(2) the removal or destruction of large quantities of vegetation or fauna, the substantial interference with the movement of any resident or migratory fish or wildlife species, impacts on critical habitat areas, or the substantial affecting of a rare or endangered species of animal or plant or the habitat of such a species;

(3) the encouraging or attracting of a large number of people to a place or places for more than a few days relative to the number of people who would come to such a place absent the action;

(4) the creation of a material conflict with a community's existing plans or goals as officially approved or adopted;

(5) the impairment of the character or quality of important historical, archeological, architectural or aesthetic resources (including the demolition or alteration of a structure which is eligible for inclusion in an official inventory of such resources), or of existing community or neighborhood character;

(6) a major change in the use of either the quantity or type of energy;

(7) the creation of a hazard to human health or safety;

(8) a substantial change in the use or intensity of use of land or other natural resources or in their capacity to support existing uses, except where such a change has been included, referred to, or implicit in a broad "programmatic" EIS prepared pursuant to §6-13 of this Executive Order;

(9) the creation of a material demand for other actions which would result in one of the above consequences;

(10) changes in two or more elements of the environment, no one of which is substantial, but when taken together result in a material change in the environment.

(b) For the purpose of determining whether an action will cause one of the foregoing consequences, the action shall be deemed to include other contemporaneous or subsequent actions which are included in any long-range comprehensive integrated plan of which the action under consideration is a part, which are likely to be undertaken as a result thereof, or which are dependent thereon. The significance of a likely consequence (i.e. whether it is material, substantial, large, important, etc.) should be assessed in connection with its setting, its probability of occurring, its duration, its irreversibility, its controllability, its geographic scope and its magnitude (i.e. degree of change or its absolute size). §6-15 of this Executive Order refers to lists of actions which are likely to have a significant effect on the environment and contains lists of actions found not to have a significant effect on the environment.

Reference to §6-15(b), Type II list, deemed to be State Type II list of 6 NYCRR Part 617.13. See Rules §5-02(b) (2).

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§6-07. Determination of Significant Effect; Notification

Cross reference to CEQR Rules of Procedure

(a) The lead agencies shall determine within 15 calendar days following notification of completion of the application pursuant to §6-05(a) of this Executive Order whether the proposed action may have a significant effect on the environment;

Error. Reference to §6-05(a) should be to §6-05(b).

(1) in making their determination, the lead agencies shall employ the Environmental Assessment Form, apply the criteria contained in §6-06 and consider the lists of actions contained in §6-15 of this Executive Order;

Reference to §6-15(b) Type II list, deemed to be State Type II list of 6 NYCRR Part 617.13. See Rules §5-02(b) (2).

(2) the lead agencies may consult with, and shall receive the cooperation of any other agency before making their determination pursuant to this subdivision (a).

(b) The lead agencies shall provide written notification to the applicant immediately upon determination of whether the action may or will not have a significant effect on the environment. Such determination shall be in one of the following forms:

(1) Negative Declaration. If the lead agencies determine that the proposed action is not an exempt action or a Type II action pursuant to §6-04 and §6-15 of this Executive Order, respectively, and that the action will not have a significant effect on the environment, they shall issue a Negative Declaration which shall contain the following information:

Reference to §6-15(b) Type II list, deemed to be State Type II list of 6 NYCRR Part 617.13. See Rules §5-02(b) (2).

(i) an action identifying number;

(ii) a brief description of the action;

(iii) the proposed location of the action;

(iv) a statement that the lead agencies have determined that the action will not have a significant effect on the environment;

(v) a statement setting forth the reasons supporting the lead agencies' determination.

(2) Conditional Negative Declaration. If the lead agencies determine that the proposed action is not an exempt action or a Type II action pursuant to §6-04 and §6-15 of this Executive Order, respectively, and that the action will not have a significant effect on the environment if the applicant modifies its proposed action in accordance with conditions or alternatives designed to avoid adverse environmental impacts, they shall issue a Conditional Negative Declaration which shall contain the following information (in addition to the information required for a Negative Declaration pursuant to paragraph (1) of this subdivision):

Reference to §6-15(b) Type II list, deemed to be State Type II list of 6 NYCRR Part 617.13. See Rules §5-02(b) (2).

(i) a list of the conditions, modifications or alternatives to the proposed action which supports the determination;

(ii) the signature of the applicant or its authorized representative, accepting the conditions, modifications or alternatives to the proposed action;

(iii) a statement that if such conditions, modifications or alternatives are not fully incorporated into the proposed action, such Conditional Negative Declaration shall become null and void. In such event, a Notice of Determination shall be immediately issued pursuant to paragraph (3) of this subdivision.

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(3) Notice of Determination. If the lead agencies determine that the proposed action is not an exempt action or a Type II action pursuant to §6-04 and §6-15 of this Executive Order, respectively, and that the action may have a significant effect on the environment, they shall issue a Notice of Determination which shall contain the following information:

(i) an action identifying number;

(ii) a brief description of the action;

(iii) the proposed location of the action;

(iv) a brief description of the possible significant effects on the environment of the action;

(v) a request that the applicant prepare or cause to be prepared, at its option, a draft EIS in accordance with §6-08 and §6-12 of this Executive Order.

(c) The lead agencies shall make available for public inspection the Negative Declaration, Conditional Negative Declaration or the Notice of Determination, as the case may be, and circulate copies of the same to the applicant, the regional director of DEC, the commissioner of DEC, the appropriate Community Planning Board(s), the City Clerk, and all other agencies, including federal and state agencies, which may be involved in the proposed action.

§6-08. Draft Environmental Impact Statements; Responsibility for Preparation

(a) Non-agency applicants:

(1) after receipt of a Notice of Determination pursuant to §6-07(c)(3) of this Executive Order, a non-agency applicant shall notify the lead agencies in writing as to whether it will exercise its option to prepare or cause to be prepared a draft EIS, and as to whom it has designated to prepare the draft EIS, provided that no person so designated shall have an investment or employment interest in the ultimate realization of the proposed action;

(2) the lead agencies may prepare or cause to be prepared a draft EIS for an action involving a non-agency applicant. In such event, the applicant shall provide, upon request, an environmental report to assist the lead agencies in preparing or causing to be prepared the draft EIS and such other information as may be necessary. All agencies shall fully cooperate with the lead agencies in all matters relating to the preparation of the draft EIS.

(3) if the non-agency applicant does not exercise its option to prepare or cause to be prepared a draft EIS, and the lead agencies do not prepare or cause to be prepared such draft EIS, then the proposed action and review thereof shall terminate.

(b) Agency applicants:

(1) when an action which may have significant effect on the environment is initiated by an agency, the initiating agency shall be directly responsible for the preparation of a draft EIS. However, preparation of the draft EIS may be coordinated through the lead agencies.

Cross reference to CEQR Rules of Procedure

Reference to §6-15(b), Type II list, deemed to be State Type II list of 6 NYCRR Part 617.13. See Rules §5-02(b)(2).

See additional circulation provisions, Rules §5-06(b) and §5-06(c). City Clerk function transferred to OEC, Rules §5-02(b)(4).

Rules add formal scoping, Rules §5-07. Interested and involved agencies assist with DEIS on request. See Rules §5-05(b)(2).

See also Rules §5-05(b)(3) for requirements of lead consultation on mitigations.

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(2) all agencies, whether or not they may be involved in the proposed action, shall fully cooperate with the lead agencies and the applicant agency in all matters relating to the coordination of the preparation of the draft EIS.

(c) Notwithstanding the provisions contained in subdivisions (a) and (b) of this section, when a draft EIS is prepared, the lead agencies shall make their own independent judgment of the scope, contents and adequacy of such draft EIS.

Cross reference to CEQR Rules of Procedure

See Rules §5-05(b)(3) for requirements of lead consultation on mitigations.

§6-09. Environmental Impact Statements; Content

Lead to be guided by technical standards and methodologies developed by OEC, Rules §5-04(c).

(a) Environmental impact statements should be clearly written in a brief and concise manner capable of being read and understood by the public. Within the framework presented in subdivision (d) of this section, such statements should deal only with the specific significant environmental impacts which can be reasonably anticipated. They should not contain more detail than is appropriate considering the nature and magnitude of the proposed action and the significance of its potential impacts.

(b) All draft and final EIS's shall be preceded by a cover sheet stating:

(1) whether it is a draft or a final;

(2) the name or other descriptive title of the action;

(3) the location of the action;

(4) the name and address of the lead agencies and the name and telephone number of a person at the lead agencies to be contacted for further information;

(5) identification of individuals or organizations which prepared any portion of the statement; and

(6) the date of its completion.

(c) If a draft or final EIS exceeds ten pages in length, it shall have a table of contents following the cover sheet.

(d) The body of all draft and final EIS's shall at least contain the following:

(1) a description of the proposed action and its environmental setting;

(2) a statement of the environmental impacts of the proposed action, including its short-term and long-term effects, and typical associated environmental effects;

(3) an identification of any adverse environmental effects which cannot be avoided if the proposed action is implemented;

(4) a discussion of the social and economic impacts of the proposed action;

(5) a discussion of alternatives to the proposed action and the comparable impacts and effects of such alternatives;

(6) an identification of any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented;

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(7) a description of mitigation measures proposed to minimize adverse environmental impacts;

(8) a description of any growth-inducing aspects of the proposed action, where applicable and significant;

(9) a discussion of the effects of the proposed action on the use and conservation of energy, where applicable and significant;

(10) a list of underlying studies, reports or other information obtained and considered in preparing the statement; and

(11) (for the final EIS only) copies or a summary of the substantive comments received in response to the draft EIS and the applicant's response to such comments.

(c) An EIS may incorporate by reference all or portions of other documents which contain information relevant to the statement. The referenced documents shall be made available to the public in the same places where copies of the statement are made available. When a statement uses incorporation by reference, the referenced document shall be briefly described and its date of preparation provided.

Cross reference to CEQR Rules of Procedure

§6-10. Draft Environmental Impact Statements; Procedures

(a) Notice of Completion. Upon the satisfactory completion of a draft EIS, the lead agencies shall immediately prepare, file and make available for public inspection a Notice of Completion as provided in paragraphs (1), (2) and (3) of this subdivision. Where a proposed action is simultaneously subject to the Uniform Land Use Review Procedure ("ULURP"), the City Planning Commission shall not certify an application pursuant to ULURP until a Notice of Completion has been filed as provided in paragraph (3) of this subdivision.

(1) Contents of Notice of Completion. All Notices of Completion shall contain the following:

(i) an action identifying number;

(ii) a brief description of the action;

(iii) the location of the action and its potential impacts and effects; and

(iv) a statement that comments on the draft EIS are requested and will be received and considered by the lead agencies at their offices. The Notice shall specify the public review and comment period on the draft EIS, which shall be for not less than 30 calendar days from the date of filing and circulation of the notice, or not less than 10 calendar days following the close of a public hearing on the draft EIS, whichever last occurs.

(2) Circulating Notice of Completion. All Notices of Completion shall be circulated to the following:

(i) all other agencies, including federal and state agencies, involved in the proposed action;

(ii) all persons who have requested it;

(iii) the editor of the State Bulletin;

(iv) the State clearinghouse;

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(v) the appropriate regional clearinghouse designated under the Federal Office of Management and Budget Circular A-95.

Cross reference to CEQR Rules of Procedure

(3) Filing Notice of Completion. All Notices of Completion shall be filed with and made available for public inspection by the following:

(i) the Commissioner of DEC;

(ii) the regional director of DEC;

(iii) the agency applicant, where applicable;

(iv) the appropriate Community Planning Board(s);

(v) the City Clerk;

(vi) the lead agencies.

(b) Filing and availability of draft EIS. All draft EIS's shall be filed with and made available for public inspection by the same persons and agencies with whom Notices of Completion must be filed pursuant to paragraph (a)(3) of this section.

City clerk function transferred to OEC. Rules §5-02(b) (4).

(c) Public hearings on draft EIS.

(1) Upon completion of a draft EIS, the lead agencies shall conduct a public hearing on the draft EIS.

(2) The hearing shall commence no less than 15 calendar days or more than 60 calendar days after the filing of a draft EIS pursuant to subdivision (b) of this section, except where a different hearing date is required as appropriate under another law or regulation.

(3) Notice of the public hearing may be contained in the Notice of Completion or, if not so contained, shall be given in the same manner in which the Notice of Completion is circulated and filed pursuant to subdivision (a) of this section. In either case, the notice of hearing shall also be published at least 10 calendar days in advance of the public hearing in a newspaper of general circulation in the area of the potential impact and effect of the proposed action.

(4) Where a proposed action is simultaneously subject to ULURP, a public hearing conducted by the appropriate community or borough board and/or the City Planning Commission pursuant to ULURP shall satisfy the hearing requirement of this section. Where more than one hearing is conducted by the aforementioned bodies, whichever hearing last occurs shall be deemed the hearing for purposes of this Executive Order.

§6-11. Final Environmental Impact Statements; Procedures

(a) Except as provided in paragraph (1) of this subdivision, the lead agencies shall prepare or cause to be prepared a final EIS within 30 calendar days after the close of a public hearing.

Interested and involved agencies assist with FEIS on request, Rules §5-05(b) (2).

(1) If the proposed action has been withdrawn or if, on the basis of the draft EIS and the hearing, the lead agencies have determined that the action will not have a significant effect on the environment, no final EIS shall be prepared. In such cases, the lead agencies shall prepare, file and circulate a Negative Declaration as prescribed in §6-07 of this Executive Order.

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(2) The final EIS shall reflect a revision and updating of the matters contained in the draft EIS in the light of further review by the lead agencies, comments received and the record of the public hearing.

(b) immediately upon the completion of a final EIS, the lead agencies shall prepare, file, circulate and make available for public inspection a Notice of Completion of a final EIS in the manner specified in §6-11(a) of this Executive Order, provided, however, that the Notice shall not contain the statement described in subparagraph (a)(1)(iv) of such section.

(c) Immediately upon completion of a final EIS, copies shall be filed and made available for public inspection in the same manner as the draft EIS pursuant to §6-11(b) of this Executive Order.

Cross reference to CEQR Rules of Procedure

§6-12. Agency Decision Making

(a) No final decision to carry out or approve an action which may have a significant effect on the environment shall be made until after the filing and consideration of a final EIS.

~~(1) Except as provided in paragraph (2) of this subdivision where a final decision whether or not to carry out or approve an action is required by law to be made by any agency, such decision shall be made within 30 calendar days of the filing of a final EIS.~~

~~(2) Where a proposed action is simultaneously subject to ULURP, the final decision whether or not to carry out or approve the action shall be made by the Board of Estimate within 60 calendar days of the filing of the final EIS.~~

Inapplicable, Rules §5-02(a).

(b) When an agency decides to carry out or approve an action which may have a significant effect on the environment, it shall make the following findings in a written decision:

(1) consistent with social, economic and other essential considerations of state and city policy, from among the reasonable alternatives thereto, the action to be carried out or approved is one which minimizes or avoids adverse environmental effects to the maximum extent possible, including the effects disclosed in the relevant environmental impact statement;

(2) consistent with social, economic and other essential consideration of state and city policy, all practicable means will be taken in carrying out or approving the action to minimize or avoid adverse environmental effects.

(c) For public information purposes, a copy of the Decision shall be filed in the same manner as the draft EIS pursuant to §6-11(b) of this Executive Order.

§6-13. Programmatic Environmental Impact Statements

(a) Whenever possible, agencies shall identify programs or categories of actions, particularly projects or plans which are wide in scope or implemented over a long time frame, which would most appropriately serve as the subject of a single EIS. Broad program statements, master or area wide statements, or statements for comprehensive plans are often appropriate to assess the environmental effects of the following:

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(1) a number of separate actions in a given geographic area;

(2) a chain of contemplated actions;

(3) separate actions having generic or common impacts;

(4) programs or plans having wide application or restricting the range of future alternative policies or projects.

(b) No further EIS's need be prepared for actions which are included in a programmatic EIS prepared pursuant to subdivision (a) of this section. However:

(1) a programmatic EIS shall be amended or supplemented to reflect impacts which are not addressed or adequately analyzed in the EIS as originally prepared; and

(2) actions which significantly modify a plan or program which has been the subject of an EIS shall require a supplementary EIS;

(3) programmatic EIS's requiring amendment and actions requiring supplementary EIS's pursuant to this subsection shall be processed in full compliance with the requirements of this Executive Order.

Cross reference to CEQR Rules of Procedure

§6-14. ~~Rules and Regulations~~

~~The lead agencies shall promulgate such rules, regulations, guidelines, forms and additional procedures as may be necessary to implement this Executive Order.~~

Inapplicable, Rules §5-02(a).

§6-15. Lists of Actions

(a) **TYPE I.** Type I actions enumerated in §617.12 of 6 NYCRR 617 are likely to, but will not necessarily, require the preparation of an EIS because they will in almost every instance significantly affect the environment. However, ministerial actions never require the preparation of an EIS except where such actions may directly affect a critical area or an historic resource enumerated in paragraphs (22) and (23), respectively, of subdivision (a) of §617.12. In addition, for the purpose of defining paragraph (2) of said subdivision and section, the following thresholds shall apply:

See Rules §5-02(d).

(1) relating to public institutions:

(i) new correction or detention centers with an inmate capacity of at least 200 inmates;

(ii) new sanitation facilities, including:

(A) incinerators of at least 250 tons/day capacity;

(B) garages with a capacity of more than 50 vehicles;

(C) marine transfer stations;

(iii) new hospital or health related facilities containing at least 100,000 sq. ft. of floor area;

(iv) new schools with seating capacity of at least 1,500 seats;

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(v) any new community or public facility not otherwise specified herein, containing at least 100,000 sq. ft. of floor area, or the expansion of an existing facility by more than 50 percent ofsize or capacity, where the total size of the expanded facility exceeds 100,000 sq. ft. of floor area.

(2) relating to major office centers: any new office structure which has a minimum of 200,000 sq. ft. of floor area and exceeds permitted floor area under existing zoning by more than 20 percent, or the expansion of an existing facility by more than 50 percent of floor area, where the total size of the expanded facility exceeds 240,000 sq. ft. of floor area.

Cross reference to CEQR Rules of Procedure

(b) **TYPE II**.

See Rules §5-02(d).

(1) Type II actions will never require the preparation of an EIS because they are determined not to have a significant effect on the environment, except where such actions may directly affect a critical area or an historic resource enumerated in paragraphs (22) and (23), respectively, of subdivision (a) of §617.12 of 6 NYCRR 617.

~~(2) Pursuant to SEQRA, as amended, a list of Type II actions shall be promulgated prior to July 1, 1978, to become effective on September 1, 1978.~~

Inapplicable. Replaced by State Type II list 6 NYCRR Part 617.13. See Rules §5-02(a) and §5-02(b) (2).

§6-16. Related Orders; Repeal

(a) Executive Order No. 87 of October 18, 1973 shall remain in effect prior to the effective dates of this Executive Order pursuant to Article 8 of the Environmental Conservation Law.

(b) In the event of the repeal of Article 8 of the Environmental Conservation Law, Executive Order No. 87 of October 18, 1973 shall replace this Executive Order.

§6-17. Evaluation of Effectiveness

The lead agencies shall conduct a public hearing, not later than June 1, 1979, for the purpose of evaluating the effectiveness of this Executive Order in implementing the State Environmental Quality Review Act, and its impact on the City's physical and economic development process.

§6-18. Effective Date

This Executive Order shall take effect immediately.

See new transition Rules §5-08 and §5-11. New Rules effective Oct. 1, 1991.

ABRAHAM D. BEAME
Mayor, City of New York

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NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

617: State Environmental Quality Review

(Statutory Authority: Environmental Conservation Law Sections 3-0301(1)(B), 3-0301(2)(M) and 8-0113 (Applicable to All State and Local Agencies Within New York State Including All Political Subdivisions, Districts, Departments, Authorities, Boards, Commissions and Public Benefit Corporations)

[Adopted: September 20, 1995; Effective: January 1, 1996]

[Amended June 26, 2000; Effective: July 12, 2000]
[Includes July 2001 address change for DEC Central Office]

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§617.1 Authority, intent and purpose

(a) This Part is adopted pursuant to sections 3-0301(1)(b), 3-0301(2)(m) and 8-0113 of the Environmental Conservation Law to implement the provisions of the State Environmental Quality

Review Act (SEQR).

(b) In adopting SEQR, it was the Legislature's intention that all agencies conduct their affairs with an awareness that they are stewards of the air, water, land, and living resources, and that they have an obligation to protect the environment for the use and enjoyment of this and all future generations.

(c) The basic purpose of SEQR is to incorporate the consideration of environmental factors into the existing planning, review and decision-making processes of state, regional and local government agencies at the earliest possible time. To accomplish this goal, SEQR requires that all agencies determine whether the actions they directly undertake, fund or approve may have a significant impact on the environment, and, if it is determined that the action may have a significant adverse impact, prepare or request an environmental impact statement.

(d) It was the intention of the Legislature that the protection and enhancement of the environment, human and community resources should be given appropriate weight with social and economic considerations in determining public policy, and that those factors be considered together in reaching decisions on proposed activities. Accordingly, it is the intention of this Part that a suitable balance of social, economic and environmental factors be incorporated into the planning and decision-making processes of state, regional and local agencies. It is not the intention of SEQR that environmental factors be the sole consideration in decision-making.

(e) This Part is intended to provide a statewide regulatory framework for the implementation of SEQR by all state and local agencies. It includes:

(1) procedural requirements for compliance with the law;

(2) provisions for coordinating multiple agency environmental reviews through a single lead agency (section 617.6 of this Part);

(3) criteria to determine whether a proposed action may have a significant adverse impact on the environment (section 617.7 of this Part);

(4) model environmental assessment forms to aid in determining whether an action may have a significant adverse impact on the environment (Appendices A, B and C of section 617.20 of this Part); and

(5) examples of actions and classes of actions which are likely to require an EIS (section 617.4 of this Part), and those which will not require an EIS (section 617.5 of this Part).

§617.2 Definitions

As used in this Part, unless the context otherwise requires:

(a) Act means article 8 of the Environmental Conservation Law (SEQR).

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(b) Actions include:

(1) projects or physical activities, such as construction or other activities that may affect the environment by changing the use, appearance or condition of any natural resource or structure, that:

(i) are directly undertaken by an agency; or

(ii) involve funding by an agency; or

(iii) require one or more new or modified approvals from an agency or agencies;

(2) agency planning and policy making activities that may affect the environment and commit the agency to a definite course of future decisions;

(3) adoption of agency rules, regulations and procedures, including local laws, codes, ordinances, executive orders and resolutions that may affect the environment; and

(4) any combinations of the above.

(c) Agency means a state or local agency.

(d) Applicant means any person making an application or other request to an agency to provide funding or to grant an approval in connection with a proposed action.

(e) Approval means a discretionary decision by an agency to issue a permit, certificate, license, lease or other entitlement or to otherwise authorize a proposed project or activity.

(f) Coastal area means the state's coastal waters and the adjacent shorelands, as defined in article 42 of the Executive Law, the specific boundaries of which are shown on the coastal area map on file in the Office of the Secretary of State, as required by section 914(2) of the Executive Law.

(g) Commissioner means the Commissioner of the New York State Department of Environmental Conservation.

(h) Conditioned negative declaration (CND) means a negative declaration issued by a lead agency for an Unlisted action, involving an applicant, in which the action as initially proposed may result in one or more significant adverse environmental impacts; however, mitigation measures identified and required by the lead agency, pursuant to the procedures in subdivision 617.7(d) of this Part, will modify the proposed action so that no significant adverse environmental impacts will result.

(i) Critical environmental area (CEA) means a specific geographic area designated by a state or local agency, having exceptional or unique environmental characteristics.

(j) Department means the New York State Department of Environmental Conservation.

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(k) Direct action or directly undertaken action means an action planned and proposed for implementation by an agency. "Direct actions" include but are not limited to capital projects, promulgation of agency rules, regulations, laws, codes, ordinances or executive orders and policy making that commit an agency to a course of action that may affect the environment.

(l) Environment means the physical conditions that will be affected by a proposed action, including land, air, water, minerals, flora, fauna, noise, resources of agricultural, archeological, historic or aesthetic significance, existing patterns of population concentration, distribution or growth, existing community or neighborhood character, and human health.

(m) Environmental assessment form (EAF) means a form used by an agency to assist it in determining the environmental significance or nonsignificance of actions. A properly completed EAF must contain enough information to describe the proposed action, its location, its purpose and its potential impacts on the environment. The model full and short EAFs contained in Appendices A and C of section 617.20 of this Part may be modified by an agency to better serve it in implementing SEQR, provided the scope of the modified form is as comprehensive as the model.

(n) Environmental impact statement (EIS) means a written "draft" or "final" document prepared in accordance with sections 617.9 and 617.10 of this Part. An EIS provides a means for agencies, project sponsors and the public to systematically consider significant adverse environmental impacts, alternatives and mitigation. An EIS facilitates the weighing of social, economic and environmental factors early in the planning and decision-making process. A draft EIS is the initial statement prepared by either the project sponsor or the lead agency and circulated for review and comment. An EIS may also be a "generic" in accordance with section 617.10, of this Part, a "supplemental" in accordance with paragraph 617.9(a)(7) of this Part or a "federal" document in accordance with section 617.15 of this Part.

(o) Environmental Notice Bulletin (ENB) means the weekly publication of the department published pursuant to section 3-0306 of the Environmental Conservation Law , and accessible on the department's internet web site at http://www.dec.state.ny.us.

(p) Findings statement means a written statement prepared by each involved agency, in accordance with section 617.11 of this Part, after a final EIS has been filed, that considers the relevant environmental impacts presented in an EIS, weighs and balances them with social, economic and other essential considerations, provides a rationale for the agency's decision and certifies that the SEQR requirements have been met.

(q) Funding means any financial support given by an agency, including contracts, grants, subsidies, loans or other forms of direct or indirect financial assistance, in connection with a proposed action.

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(r) Impact means to change or have an effect on any aspect(s) of the environment.

(s) Involved agency means an agency that has jurisdiction by law to fund, approve or directly undertake an action. If an agency will ultimately make a discretionary decision to fund, approve or undertake an action, then it is an "involved agency", notwithstanding that it has not received an application for funding or approval at the time the SEQR process is commenced. The lead agency is also an "involved agency".

(t) Interested agency means an agency that lacks the jurisdiction to fund, approve or directly undertake an action but wishes to participate in the review process because of its specific expertise or concern about the proposed action. An "interested agency" has the same ability to participate in the review process as a member of the public.

(u) Lead agency means an involved agency principally responsible for undertaking, funding or approving an action, and therefore responsible for determining whether an environmental impact statement is required in connection with the action, and for the preparation and filing of the statement if one is required.

(v) Local agency means any local agency, board, authority, district, commission or governing body, including any city, county and other political subdivision of the state.

(w) Ministerial act means an action performed upon a given state of facts in a prescribed manner imposed by law without the exercise of any judgment or discretion as to the propriety of the act, such as the granting of a hunting or fishing license.

(x) Mitigation means a way to avoid or minimize adverse environmental impacts.

(y) Negative declaration means a written determination by a lead agency that the implementation of the action as proposed will not result in any significant adverse environmental impacts. A negative declaration may also be a conditioned negative declaration as defined in subdivision 617.2(h). Negative declarations must be prepared, filed and published in accordance with sections 617.7 and 617.12 of this Part.

(z) Person means any agency, individual, corporation, governmental entity, partnership, association, trustee or other legal entity.

(aa) Permit means a permit, lease, license, certificate or other entitlement for use or permission to act that may be granted or issued by an agency.

(ab) Physical alteration includes, but is not limited to, the following activities: vegetation removal, demolition, stockpiling materials, grading and other forms of earthwork, dumping, filling or depositing, discharges to air or water, excavation or trenching, application of pesticides, herbicides, or other chemicals, application of sewage sludge, dredging, flooding, draining or

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dewatering, paving, construction of buildings, structures or facilities, and extraction, injection or recharge of resources below ground.

(ac) Positive declaration means a written statement prepared by the lead agency indicating that implementation of the action as proposed may have a significant adverse impact on the environment and that an environmental impact statement will be required. Positive declarations must be prepared, filed and published in accordance with sections 617.7 and 617.12 of this Part.

(ad) Project sponsor means any applicant or agency primarily responsible for undertaking an action.

(ae) Residential means any facility used for permanent or seasonal habitation, including but not limited to: realty subdivisions, apartments, mobile home parks, and campsites offering any utility hookups for recreational vehicles. It does not include such facilities as hotels, hospitals, nursing homes, dormitories or prisons.

(af) Scoping means the process by which the lead agency identifies the potentially significant adverse impacts related to the proposed action that are to be addressed in the draft EIS including the content and level of detail of the analysis, the range of alternatives, the mitigation measures needed and the identification of nonrelevant issues. Scoping provides a project sponsor with guidance on matters which must be considered and provides an opportunity for early participation by involved agencies and the public in the review of the proposal.

(ag) Segmentation means the division of the environmental review of an action such that various activities or stages are addressed under this Part as though they were independent, unrelated activities, needing individual determinations of significance.

(ah) State agency means any state department, agency, board, public benefit corporation, public authority or commission.

(ai) Type I action means an action or class of actions identified in section 617.4 of this Part, or in any involved agency's procedures adopted pursuant to section 617.14 of this Part.

(aj) Type II action means an action or class of actions identified in section 617.5 of this Part. When the term is applied in reference to an individual agency's authority to review or approve a particular proposed project or action, it shall also mean an action or class of actions identified as Type II actions in that agency's own procedures to implement SEQR adopted pursuant to section 617.14 of this Part. The fact that an action is identified as a Type II action in any agency's procedures does not mean that it must be treated as a Type II action by any other involved agency not identifying it as a Type II action in its procedures.

(ak) Unlisted action means all actions not identified as a Type I or Type II action in this Part, or, in the case of a particular agency action, not identified as a Type I or Type II action in the agency's

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own SEQR procedures.

§617.3 General rules

(a) No agency involved in an action may undertake, fund or approve the action until it has complied with the provisions of SEQR. A project sponsor may not commence any physical alteration related to an action until the provisions of SEQR have been complied with. The only exception to this is provided under paragraphs 617.5(c)(18), (21) and (28) of this Part. An involved agency may not issue its findings and decision on an action if it knows any other involved agency has determined that the action may have a significant adverse impact on the environment until a final EIS has been filed. The only exception to this is provided under subparagraph 617.9(a)(5)(i) of this Part.

(b) SEQR does not change the existing jurisdiction of agencies nor the jurisdiction between or among state and local agencies. SEQR provides all involved agencies with the authority, following the filing of a final EIS and written findings statement, or pursuant to subdivision 617.7(d) of this Part to impose substantive conditions upon an action to ensure that the requirements of this Part have been satisfied. The conditions imposed must be practicable and reasonably related to impacts identified in the EIS or the conditioned negative declaration.

(c) An application for agency funding or approval of a Type I or Unlisted action will not be complete until:

(1) a negative declaration has been issued; or

(2) until a draft EIS has been accepted by the lead agency as satisfactory with respect to scope, content and adequacy. When the draft EIS is accepted, the SEQR process will run concurrently with other procedures relating to the review and approval of the action, if reasonable time is provided for preparation, review and public hearings with respect to the draft EIS.

(d) The lead agency will make every reasonable effort to involve project sponsors, other agencies and the public in the SEQR process. Early consultations initiated by agencies can serve to narrow issues of significance and to identify areas of controversy relating to environmental issues, thereby focusing on the impacts and alternatives requiring in-depth analysis in an EIS.

(e) Each agency involved in a proposed action has the responsibility to provide the lead agency with information it may have that may assist the lead agency in making its determination of significance, to identify potentially significant adverse impacts in the scoping process, to comment in a timely manner on the EIS if it has concerns which need to be addressed and to participate, as may be needed, in any public hearing. Interested agencies are strongly encouraged to make known their views on the action, particularly with respect to their areas of expertise and jurisdiction.

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(f) No SEQR determination of significance, EIS or findings statement is required for actions which are Type II.

(g) Actions commonly consist of a set of activities or steps. The entire set of activities or steps must be considered the action, whether the agency decision-making relates to the action as a whole or to only a part of it.

(1) Considering only a part or segment of an action is contrary to the intent of SEQR. If a lead agency believes that circumstances warrant a segmented review, it must clearly state in its determination of significance, and any subsequent EIS, the supporting reasons and must demonstrate that such review is clearly no less protective of the environment. Related actions should be identified and discussed to the fullest extent possible.

(2) If it is determined that an EIS is necessary for an action consisting of a set of activities or steps, only one draft and one final EIS need be prepared on the action provided that the statement addresses each part of the action at a level of detail sufficient for an adequate analysis of the significant adverse environmental impacts. Except for a supplement to a generic environmental impact statement (see subdivision 617.10(d) of this Part), a supplement to a draft or final EIS will only be required in the circumstances prescribed in paragraph 617.9(a)(7) of this Part.

(h) Agencies must carry out the terms and requirements of this Part with minimum procedural and administrative delay, must avoid unnecessary duplication of reporting and review requirements by providing, where feasible, for combined or consolidated proceedings, and must expedite all SEQR proceedings in the interest of prompt review.

(i) Time periods in this Part may be extended by mutual agreement between a project sponsor and the lead agency, with notice to all other involved agencies by the lead agency.

§617.4 Type I actions

(a) The purpose of the list of Type I actions in this section is to identify, for agencies, project sponsors and the public, those actions and projects that are more likely to require the preparation of an EIS than Unlisted actions. All agencies are subject to this Type I list.

(1) This Type I list is not exhaustive of those actions that an agency determines may have a significant adverse impact on the environment and require the preparation of an EIS. However, the fact that an action or project has been listed as a Type I action carries with it the presumption that it is likely to have a significant adverse impact on the environment and may require an EIS. For all individual actions which are Type I or Unlisted, the determination of significance must be made by comparing the impacts which may be reasonably expected to result from the proposed action with the criteria listed in subdivision 617.7(c) of this Part.

(2) Agencies may adopt their own lists of additional Type I actions, may adjust the thresholds to

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make them more inclusive, and may continue to use previously adopted lists of Type I actions to complement those contained in this section. Designation of a Type I action by one involved agency requires coordinated review by all involved agencies. An agency may not designate as Type I any action identified as Type II in section 617.5 of this Part.

(b) The following actions are Type I if they are to be directly undertaken, funded or approved by an agency:

(1) the adoption of a municipality's land use plan, the adoption by any agency of a comprehensive resource management plan or the initial adoption of a municipality's comprehensive zoning regulations;

(2) the adoption of changes in the allowable uses within any zoning district, affecting 25 or more acres of the district;

(3) the granting of a zoning change, at the request of an applicant, for an action that meets or exceeds one or more of the thresholds given elsewhere in this list;

(4) the acquisition, sale, lease, annexation or other transfer of 100 or more contiguous acres of land by a state or local agency;

(5) construction of new residential units that meet or exceed the following thresholds:

(i) 10 units in municipalities that have not adopted zoning or subdivision regulations;

(ii) 50 units not to be connected (at the commencement of habitation) to existing community or public water and sewerage systems including sewage treatment works;

(iii) in a city, town or village having a population of less than 150,000, 250 units to be connected (at the commencement of habitation) to existing community or public water and sewerage systems including sewage treatment works;

(iv) in a city, town or village having a population of greater than 150,000 but less than 1,000,000, 1,000 units to be connected (at the commencement of habitation) to existing community or public water and sewerage systems including sewage treatment works; or

(v) in a city or town having a population of greater than 1,000,000, 2,500 units to be connected (at the commencement of habitation) to existing community or public water and sewerage systems including sewage treatment works;

(6) activities, other than the construction of residential facilities, that meet or exceed any of the following thresholds; or the expansion of existing nonresidential facilities by more than 50 percent of any of the following thresholds:

(i) a project or action that involves the physical alteration of 10 acres;

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(ii) a project or action that would use ground or surface water in excess of 2,000,000 gallons per day;

(iii) parking for 1,000 vehicles;

(iv) in a city, town or village having a population of 150,000 persons or less, a facility with more than 100,000 square feet of gross floor area;

(v) in a city, town or village having a population of more than 150,000 persons, a facility with more than 240,000 square feet of gross floor area;

(7) any structure exceeding 100 feet above original ground level in a locality without any zoning regulation pertaining to height;

(8) any Unlisted action that includes a nonagricultural use occurring wholly or partially within an agricultural district (certified pursuant to Agriculture and Markets Law, article 25-AA, sections 303 and 304) and exceeds 25 percent of any threshold established in this section;

(9) any Unlisted action (unless the action is designed for the preservation of the facility or site) occurring wholly or partially within, or substantially contiguous to, any historic building, structure, facility, site or district or prehistoric site that is listed on the National Register of Historic Places, or that has been proposed by the New York State Board on Historic Preservation for a recommendation to the State Historic Preservation Officer for nomination for inclusion in the National Register, or that is listed on the State Register of Historic Places (The National Register of Historic Places is established by 36 Code of Federal Regulation (CFR) Parts 60 and 63, 1994 (see section 617.17 of this Part));

(10) any Unlisted action, that exceeds 25 percent of any threshold in this section, occurring wholly or partially within or substantially contiguous to any publicly owned or operated parkland, recreation area or designated open space, including any site on the Register of National Natural Landmarks pursuant to 36 CFR Part 62, 1994 (see section 617.17 of this Part); or

(11) any Unlisted action that exceeds a Type I threshold established by an involved agency pursuant to section 617.14 of this Part.

§617.5 Type II actions

(a) Actions or classes of actions identified in subdivision (c) of this section are not subject to review under this Part. These actions have been determined not to have a significant impact on the environment or are otherwise precluded from environmental review under Environmental Conservation Law, article 8. The actions identified in subdivision (c) of this section apply to all agencies.

(b) Each agency may adopt its own list of Type II actions to supplement the actions in subdivision

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(c) of this section. No agency is bound by an action on another agency's Type II list. An agency that identifies an action as not requiring any determination or procedure under this Part is not an involved agency. Each of the actions on an agency Type II list must:

(1) in no case, have a significant adverse impact on the environment based on the criteria contained in subdivision 617.7(c) of this Part; and

(2) not be a Type I action as defined in section 617.4 of this Part.

(c) The following actions are not subject to review under this Part:

(1) maintenance or repair involving no substantial changes in an existing structure or facility;

(2) replacement, rehabilitation or reconstruction of a structure or facility, in kind, on the same site, including upgrading buildings to meet building or fire codes, unless such action meets or exceeds any of the thresholds in section 617.4 of this Part;

(3) agricultural farm management practices, including construction, maintenance and repair of farm buildings and structures, and land use changes consistent with generally accepted principles of farming;

(4) repaving of existing highways not involving the addition of new travel lanes;

(5) street openings and right-of-way openings for the purpose of repair or maintenance of existing utility facilities;

(6) maintenance of existing landscaping or natural growth;

(7) construction or expansion of a primary or accessory/appurtenant, non-residential structure or facility involving less than 4,000 square feet of gross floor area and not involving a change in zoning or a use variance and consistent with local land use controls, but not radio communication or microwave transmission facilities;

(8) routine activities of educational institutions, including expansion of existing facilities by less than 10,000 square feet of gross floor area and school closings, but not changes in use related to such closings;

(9) construction or expansion of a single-family, a two-family or a three-family residence on an approved lot including provision of necessary utility connections as provided in paragraph (11) and the installation, maintenance and/or upgrade of a drinking water well and a septic system;

(10) construction, expansion or placement of minor accessory/appurtenant residential structures, including garages, carports, patios, decks, swimming pools, tennis courts, satellite dishes, fences, barns, storage sheds or other buildings not changing land use or density;

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(11) extension of utility distribution facilities, including gas, electric, telephone, cable, water and sewer connections to render service in approved subdivisions or in connection with any action on this list;

(12) granting of individual setback and lot line variances;

(13) granting of an area variance(s) for a single-family, two-family or three-family residence;

(14) public or private best forest management (silvicultural) practices on less than 10 acres of land, but not including waste disposal, land clearing not directly related to forest management, clear-cutting or the application of herbicides or pesticides;

(15) minor temporary uses of land having negligible or no permanent impact on the environment;

(16) installation of traffic control devices on existing streets, roads and highways;

(17) mapping of existing roads, streets, highways, natural resources, land uses and ownership patterns;

(18) information collection including basic data collection and research, water quality and pollution studies, traffic counts, engineering studies, surveys, subsurface investigations and soils studies that do not commit the agency to undertake, fund or approve any Type I or Unlisted action;

(19) official acts of a ministerial nature involving no exercise of discretion, including building permits and historic preservation permits where issuance is predicated solely on the applicant's compliance or noncompliance with the relevant local building or preservation code(s);

(20) routine or continuing agency administration and management, not including new programs or major reordering of priorities that may affect the environment;

(21) conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action;

(22) collective bargaining activities;

(23) investments by or on behalf of agencies or pension or retirement systems, or refinancing existing debt;

(24) inspections and licensing activities relating to the qualifications of individuals or businesses to engage in their business or profession;

(25) purchase or sale of furnishings, equipment or supplies, including surplus government property, other than the following: land, radioactive material, pesticides, herbicides, or other

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hazardous materials;

(26) license, lease and permit renewals, or transfers of ownership thereof, where there will be no material change in permit conditions or the scope of permitted activities;

(27) adoption of regulations, policies, procedures and local legislative decisions in connection with any action on this list;

(28) engaging in review of any part of an application to determine compliance with technical requirements, provided that no such determination entitles or permits the project sponsor to commence the action unless and until all requirements of this Part have been fulfilled;

(29) civil or criminal enforcement proceedings, whether administrative or judicial, including a particular course of action specifically required to be undertaken pursuant to a judgment or order, or the exercise of prosecutorial discretion;

(30) adoption of a moratorium on land development or construction;

(31) interpreting an existing code, rule or regulation;

(32) designation of local landmarks or their inclusion within historic districts;

(33) emergency actions that are immediately necessary on a limited and temporary basis for the protection or preservation of life, health, property or natural resources, provided that such actions are directly related to the emergency and are performed to cause the least change or disturbance, practicable under the circumstances, to the environment. Any decision to fund, approve or directly undertake other activities after the emergency has expired is fully subject to the review procedures of this Part;

(34) actions undertaken, funded or approved prior to the effective dates set forth in SEQR (see chapters 228 of the Laws of 1976, 253 of the Laws of 1977 and 460 of the Laws of 1978), except in the case of an action where it is still practicable either to modify the action in such a way as to mitigate potentially adverse environmental impacts, or to choose a feasible or less environmentally damaging alternative, the commissioner may, at the request of any person, or on his own motion, require the preparation of an environmental impact statement; or, in the case of an action where the responsible agency proposed a modification of the action and the modification may result in a significant adverse impact on the environment, an environmental impact statement must be prepared with respect to such modification;

(35) actions requiring a certificate of environmental compatibility and public need under articles VII, VIII or X of the Public Service Law and the consideration of, granting or denial of any such certificate;

(36) actions subject to the class A or class B regional project jurisdiction of the Adirondack Park

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Agency or a local government pursuant to section 807, 808 and 809 of the Executive Law, except class B regional projects subject to review by local government pursuant to section 807 of the Executive Law located within the Lake George Park as defined by subdivision one of section 43-0103 of the Environmental Conservation Law; and

(37) actions of the Legislature and the Governor of the State of New York or of any court, but not actions of local legislative bodies except those local legislative decisions such as rezoning where the local legislative body determines the action will not be entertained.

§617.6 Initial review of actions and establishing lead agency

(a) Initial review of actions.

(1) As early as possible in an agency's formulation of an action it proposes to undertake, or as soon as an agency receives an application for funding or for approval of an action, it must do the following:

(i) Determine whether the action is subject to SEQR. If the action is a Type II action, the agency has no further responsibilities under this Part.

(ii) Determine whether the action involves a federal agency. If the action involves a federal agency, the provisions of section 617.15 of this Part apply.

(iii) Determine whether the action may involve one or more other agencies.

(iv) Make a preliminary classification of an action as Type I or Unlisted, using the information available and comparing it with the thresholds set forth in section 617.4 of this Part. Such preliminary classification will assist in determining whether a full EAF and coordinated review is necessary.

(2) For Type I actions, a full EAF (see section 617.20, Appendix A, of this Part) must be used to determine the significance of such actions. The project sponsor must complete Part 1 of the full EAF, including a list of all other involved agencies that the project sponsor has been able to identify, exercising all due diligence. The lead agency is responsible for preparing Part 2 and, as needed, Part 3.

(3) For Unlisted actions, the short EAF (see section 617.20, Appendix C, of this Part) must be used to determine the significance of such actions. However, an agency may instead use the full EAF for Unlisted actions if the short EAF would not provide the lead agency with sufficient information on which to base its determination of significance. The lead agency may require other information necessary to determine significance.

(4) An agency may waive the requirement for an EAF if a draft EIS is prepared or submitted. The draft EIS may be treated as an EAF for the purpose of determining significance.

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(5) For state agencies only, determine whether the action is located in the coastal area. If the action is either Type I or Unlisted and is in the coastal area, the provisions of 19 NYCRR 600 also apply. This provision applies to all state agencies, whether acting as a lead or involved agency.

(6) Determine whether the Type I or Unlisted action is located in an agricultural district and comply with the provisions of subdivision (4) of section 305 of article 25-AA of the Agriculture and Markets Law, if applicable.

(b) Establishing lead agency.

(1) When a single agency is involved, that agency will be the lead agency when it proposes to undertake, fund or approve a Type I or Unlisted action that does not involve another agency.

(i) If the agency is directly undertaking the action, it must determine the significance of the action as early as possible in the design or formulation of the action.

(ii) If the agency has received an application for funding or approval of the action, it must determine the significance of the action within 20 calendar days of its receipt of the application, an EAF, or any additional information reasonably necessary to make that determination, whichever is later.

(2) When more than one agency is involved:

(i) For all Type I actions and for coordinated review of Unlisted actions involving more than one agency, a lead agency must be established prior to a determination of significance. For Unlisted actions where there will be no coordinated review, the procedures in paragraph 617.6(b)(4) of this Part must be followed.

(ii) When an agency has been established as the lead agency for an action involving an applicant and has determined that an EIS is required, it must, in accordance with subdivision 617.12(b) of this Part, promptly notify the applicant and all other involved agencies, in writing, that it is the lead agency, that an EIS is required and whether scoping will be conducted.

(iii) The lead agency will continue in that role until it files either a negative declaration or a findings statement or a lead agency is re-established in accordance with paragraph 617.6(b)(6) of this Part.

(3) Coordinated review.

(i) When an agency proposes to directly undertake, fund or approve a Type I action or an Unlisted action undergoing coordinated review with other involved agencies, it must, as soon as possible, transmit Part 1 of the EAF completed by the project sponsor, or a draft EIS and a copy of any application it has received to all involved agencies and notify them that a lead agency must be agreed upon within 30 calendar days of the date the EAF or draft EIS was transmitted to them. For the purposes of this Part, and unless otherwise specified by the department, all coordination and

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filings with the department as an involved agency must be with the appropriate regional office of the department.

(ii) The lead agency must determine the significance of the action within 20 calendar days of its establishment as lead agency, or within 20 calendar days of its receipt of all information it may reasonably need to make the determination of significance, whichever occurs later, and must immediately prepare, file and publish the determination in accordance with section 617.12 of this Part.

(iii) If a lead agency exercises due diligence in identifying all other involved agencies and provides written notice of its determination of significance to the identified involved agencies, then no involved agency may later require the preparation of an EAF, a negative declaration or an EIS in connection with the action. The determination of significance issued by the lead agency following coordinated review is binding on all other involved agencies.

(4) Uncoordinated review for Unlisted actions involving more than one agency.

(i) An agency conducting an uncoordinated review may proceed as if it were the only involved agency pursuant to subdivision (a) of this section unless and until it determines that an action may have a significant adverse impact on the environment.

(ii) If an agency determines that the action may have a significant adverse impact on the environment, it must then coordinate with other involved agencies.

(iii) At any time prior to its final decision an agency may have its negative declaration superseded by a positive declaration by any other involved agency.

(5) Actions for which lead agency cannot be agreed upon.

(i) If, within the 30 calendar days allotted for establishment of lead agency, the involved agencies are unable to agree upon which agency will be the lead agency, any involved agency or the project sponsor may request, by certified mail or other form of receipted delivery to the commissioner, that a lead agency be designated. Simultaneously, copies of the request must be sent by certified mail or other form of receipted delivery to all involved agencies and the project sponsor. Any agency raising a dispute must be ready to assume the lead agency functions if such agency is designated by the commissioner.

(ii) The request must identify each involved agency's jurisdiction over the action, and all relevant information necessary for the commissioner to apply the criteria in subparagraph (v) of this subdivision, and state that all comments must be submitted to the commissioner within 10 calendar days after receipt of the request.

(iii) Within 10 calendar days of the date a copy of the request is received by them, involved

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agencies and the project sponsor may submit to the commissioner any comments they may have on the action. Such comments must contain the information indicated in subparagraph (ii) of this subdivision.

(iv) The commissioner must designate a lead agency within 20 calendar days of the date the request or any supplemental information the commissioner has required is received, based on a review of the facts, the criteria below, and any comments received.

(v) The commissioner will use the following criteria, in order of importance, to designate lead agency:

(a) whether the anticipated impacts of the action being considered are primarily of statewide, regional, or local significance (i.e., if such impacts are of primarily local significance, all other considerations being equal, the local agency involved will be lead agency);

(b) which agency has the broadest governmental powers for investigation of the impact(s) of the proposed action; and

(c) which agency has the greatest capability for providing the most thorough environmental assessment of the proposed action.

(vi) Notice of the commissioner's designation of lead agency will be mailed to all involved agencies and the project sponsor.

(6) Re-establishment of lead agency.

(i) Re-establishment of lead agency may occur by agreement of all involved agencies in the following circumstances:

(*a)* for a supplement to a final EIS or generic EIS;

(*b*) upon failure of the lead agency's basis of jurisdiction; or

(*c*) upon agreement of the project sponsor, prior to the acceptance of a draft EIS.

(ii) Disputes concerning re-establishment of lead agency for a supplement to a final EIS or generic EIS are subject to the designation procedures contained in paragraph (5) of subdivision (b) of this section.

(iii) Notice of re-establishment of lead agency must be given by the new lead agency to the project sponsor within 10 days of its establishment.

§617.7 Determining significance

(a) The lead agency must determine the significance of any Type I or Unlisted action in writing in accordance with this section.

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(1) To require an EIS for a proposed action, the lead agency must determine that the action may include the potential for at least one significant adverse environmental impact.

(2) To determine that an EIS will not be required for an action, the lead agency must determine either that there will be no adverse environmental impacts or that the identified adverse environmental impacts will not be significant.

(b) For all Type I and Unlisted actions the lead agency making a determination of significance must:

(1) consider the action as defined in subdivisions 617.2(b) and 617.3(g) of this Part;

(2) review the EAF, the criteria contained in subdivision (c) of this section and any other supporting information to identify the relevant areas of environmental concern;

(3) thoroughly analyze the identified relevant areas of environmental concern to determine if the action may have a significant adverse impact on the environment; and

(4) set forth its determination of significance in a written form containing a reasoned elaboration and providing reference to any supporting documentation.

(c) Criteria for determining significance.

(1) To determine whether a proposed Type I or Unlisted action may have a significant adverse impact on the environment, the impacts that may be reasonably expected to result from the proposed action must be compared against the criteria in this subdivision. The following list is illustrative, not exhaustive. These criteria are considered indicators of significant adverse impacts on the environment:

(i) a substantial adverse change in existing air quality, ground or surface water quality or quantity, traffic or noise levels; a substantial increase in solid waste production; a substantial increase in potential for erosion, flooding, leaching or drainage problems;

(ii) the removal or destruction of large quantities of vegetation or fauna; substantial interference with the movement of any resident or migratory fish or wildlife species; impacts on a significant habitat area; substantial adverse impacts on a threatened or endangered species of animal or plant, or the habitat of such a species; or other significant adverse impacts to natural resources;

(iii) the impairment of the environmental characteristics of a Critical Environmental Area as designated pursuant to subdivision 617.14(g) of this Part;

(iv) the creation of a material conflict with a community's current plans or goals as officially approved or adopted;

(v) the impairment of the character or quality of important historical, archeological, architectural, or

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aesthetic resources or of existing community or neighborhood character;

(vi) a major change in the use of either the quantity or type of energy;

(vii) the creation of a hazard to human health;

(viii) a substantial change in the use, or intensity of use, of land including agricultural, open space or recreational resources, or in its capacity to support existing uses;

(ix) the encouraging or attracting of a large number of people to a place or places for more than a few days, compared to the number of people who would come to such place absent the action;

(x) the creation of a material demand for other actions that would result in one of the above consequences;

(xi) changes in two or more elements of the environment, no one of which has a significant impact on the environment, but when considered together result in a substantial adverse impact on the environment; or

(xii) two or more related actions undertaken, funded or approved by an agency, none of which has or would have a significant impact on the environment, but when considered cumulatively would meet one or more of the criteria in this subdivision.

(2) For the purpose of determining whether an action may cause one of the consequences listed in paragraph (1) of this subdivision, the lead agency must consider reasonably related long-term, short-term, direct, indirect and cumulative impacts, including other simultaneous or subsequent actions which are:

(i) included in any long-range plan of which the action under consideration is a part;

(ii) likely to be undertaken as a result thereof; or

(iii) dependent thereon.

(3) The significance of a likely consequence (i.e., whether it is material, substantial, large or important) should be assessed in connection with:

(i) its setting (e.g., urban or rural);

(ii) its probability of occurrence;

(iii) its duration;

(iv) its irreversibility;

(v) its geographic scope;

(vi) its magnitude; and

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(vii) the number of people affected.

(d) Conditioned negative declarations.

(1) For Unlisted actions involving an applicant, a lead agency may prepare a conditioned negative declaration (CND) provided that it:

(i) has completed a full EAF;

(ii) has completed a coordinated review in accordance with paragraph 617.6(b)(3) of this Part;

(iii) has imposed SEQR conditions pursuant to subdivision 617.3(b) of this Part that have mitigated all significant environmental impacts and are supported by the full EAF and any other documentation;

(iv) has published a notice of a CND in the ENB and a minimum 30-day public comment period has been provided. The notice must state what conditions have been imposed. An agency may also use its own public notice and review procedures, provided the notice states that a CND has been issued, states what conditions have been imposed and allows for a minimum 30-day public comment period; and

(v) has complied with subdivisions 617.7(b) and 617.12(a) and (b) of this Part.

(2) A lead agency must rescind the CND and issue a positive declaration requiring the preparation of a draft EIS if it receives substantive comments that identify:

(i) potentially significant adverse environmental impacts that were not previously identified and assessed or were inadequately assessed in the review; or

(ii) a substantial deficiency in the proposed mitigation measures.

(3) The lead agency must require an EIS if requested by the applicant.

(e) Amendment of a negative declaration.

(1) At any time prior to its decision to undertake, fund or approve an action, a lead agency, at its discretion, may amend a negative declaration when substantive:

(i) changes are proposed for the project; or

(ii) new information is discovered; or

(iii) changes in circumstances related to the project arise; that were not previously considered and the lead agency determines that no significant adverse environmental impacts will occur.

(2) The lead agency must prepare, file and publish the amended negative declaration in accordance with section 617.12 of this Part. The amended negative declaration must contain

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reference to the original negative declaration and discuss the reasons supporting the amended determination.

(f) Rescission of negative declarations.

(1) At any time prior to its decision to undertake, fund or approve an action, a lead agency must rescind a negative declaration when substantive:

(i) changes are proposed for the project; or

(ii) new information is discovered; or

(iii) changes in circumstances related to the project arise; that were not previously considered and the lead agency determines that a significant adverse environmental impact may result.

(2) Prior to any rescission, the lead agency must inform other involved agencies and the project sponsor and must provide a reasonable opportunity for the project sponsor to respond.

(3) If, following reasonable notice to the project sponsor, its determination is the same, the lead agency must prepare, file and publish a positive declaration in accordance with section 617.12 of this Part.

§617.8 Scoping

(a) The primary goals of scoping are to focus the EIS on potentially significant adverse impacts and to eliminate consideration of those impacts that are irrelevant or nonsignificant. Scoping is not required. Scoping may be initiated by the lead agency or the project sponsor.

(b) If scoping is conducted, the project sponsor must submit a draft scope that contains the items identified in paragraphs 617.8(f)(1) through (5) of this section to the lead agency. The lead agency must provide a copy of the draft scope to all involved agencies, and make it available to any individual or interested agency that has expressed an interest in writing to the lead agency.

(c) If scoping is not conducted, the project sponsor may prepare a draft EIS for submission to the lead agency.

(d) Involved agencies should provide written comments reflecting their concerns, jurisdictions and information needs sufficient to ensure that the EIS will be adequate to support their SEQR findings. Failure of an involved agency to participate in the scoping process will not delay completion of the final written scope.

(e) Scoping must include an opportunity for public participation. The lead agency may either provide a period of time for the public to review and provide written comments on a draft scope or provide for public input through the use of meetings, exchanges of written material, or other means.

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(f) The lead agency must provide a final written scope to the project sponsor, all involved agencies and any individual that has expressed an interest in writing to the lead agency within 60 days of its receipt of a draft scope. The final written scope should include:

(1) a brief description of the proposed action;

(2) the potentially significant adverse impacts identified both in the positive declaration and as a result of consultation with the other involved agencies and the public, including an identification of those particular aspect(s) of the environmental setting that may be impacted;

(3) the extent and quality of information needed for the preparer to adequately address each impact, including an identification of relevant existing information, and required new information, including the required methodology(ies) for obtaining new information;

(4) an initial identification of mitigation measures;

(5) the reasonable alternatives to be considered;

(6) an identification of the information/data that should be included in an appendix rather than the body of the draft EIS; and

(7) those prominent issues that were raised during scoping and determined to be not relevant or not environmentally significant or that have been adequately addressed in a prior environmental review.

(g) All relevant issues should be raised before the issuance of a final written scope. Any agency or person raising issues after that time must provide to the lead agency and project sponsor a written statement that identifies:

(1) the nature of the information;

(2) the importance and relevance of the information to a potential significant impact;

(3) the reason(s) why the information was not identified during scoping and why it should be included at this stage of the review.

(h) The project sponsor may incorporate information submitted consistent with subdivision 617.8(g) of this section into the draft EIS at its discretion. Any substantive information not incorporated into the draft EIS must be considered as public comment on the draft EIS.

(i) If the lead agency fails to provide a final written scope within 60 calendar days of its receipt of a draft scope, the project sponsor may prepare and submit a draft EIS consistent with the submitted draft scope.

§617.9 Preparation and content of environmental impact

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statements

(a) Environmental impact statement procedures.

(1) The project sponsor or the lead agency, at the project sponsor's option, will prepare the draft EIS. If the project sponsor does not exercise the option to prepare the draft EIS, the lead agency will prepare it, cause it to be prepared or terminate its review of the action. A fee may be charged by the lead agency for preparation or review of an EIS pursuant to section 617.13 of this Part. When the project sponsor prepares the draft EIS, the document must be submitted to the lead agency.

(2) The lead agency will use the final written scope, if any, and the standards contained in this section to determine whether to accept the draft EIS as adequate with respect to its scope and content for the purpose of commencing public review. This determination must be made in accordance with the standards in this section within 45 days of receipt of the draft EIS.

(i) If the draft EIS is determined to be inadequate, the lead agency must identify in writing the deficiencies and provide this information to the project sponsor.

(ii) The lead agency must determine whether to accept the resubmitted draft EIS within 30 days of its receipt.

(3) When the lead agency has completed a draft EIS or when it has determined that a draft EIS prepared by a project sponsor is adequate for public review, the lead agency must prepare, file and publish a notice of completion of the draft EIS and file copies of the draft EIS in accordance with the requirements set forth in section 617.12 of this Part. The minimum public comment period on the draft EIS is 30 days. The comment period begins with the first filing and circulation of the notice of completion.

(4) When the lead agency has completed a draft EIS or when it has determined that a draft EIS prepared by a project sponsor is adequate for public review, the lead agency will determine whether or not to conduct a public hearing concerning the action. In determining whether or not to hold a SEQR hearing, the lead agency will consider: the degree of interest in the action shown by the public or involved agencies; whether substantive or significant adverse environmental impacts have been identified; the adequacy of the mitigation measures and alternatives proposed; and the extent to which a public hearing can aid the agency decision-making processes by providing a forum for, or an efficient mechanism for the collection of, public comment. If a hearing is to be held:

(i) the lead agency must prepare and file a notice of hearing in accordance with subdivisions617.12(a) and (b) of this Part. Such notice may be contained in the notice of completion of the draft EIS. The notice of hearing must be published, at least 14 calendar days in

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advance of the public hearing, in a newspaper of general circulation in the area of the potential impacts of the action. For state agency actions that apply statewide this requirement can be satisfied by publishing the hearing notice in the ENB and the State Register;

(ii) the hearing will commence no less than 15 calendar days or no more than 60 calendar days after the filing of the notice of completion of the draft EIS by the lead agency pursuant to subdivision 617.12(b) of this Part. When a SEQR hearing is to be held, it should be conducted with other public hearings on the proposed action, whenever practicable; and

(iii) comments will be received and considered by the lead agency for no less than 30 calendar days from the first filing and circulation of the notice of completion, or no less than 10 calendar days following a public hearing at which the environmental impacts of the proposed action are considered, whichever is later.

(5) Except as provided in subparagraph (i) of this paragraph, the lead agency must prepare or cause to be prepared and must file a final EIS, within 45 calendar days after the close of any hearing or within 60 calendar days after the filing of the draft EIS, whichever occurs later.

(i) No final EIS need be prepared if:

(*a*) the proposed action has been withdrawn or;

(*b)* on the basis of the draft EIS, and comments made thereon, the lead agency has determined that the action will not have a significant adverse impact on the environment. A negative declaration must then be prepared, filed and published in accordance section 617.12 of this Part.

(ii) The last date for preparation and filing of the final EIS may be extended:

(a) if it is determined that additional time is necessary to prepare the statement adequately; or

(b) if problems with the proposed action requiring material reconsideration or modification have been identified.

(6) When the lead agency has completed a final EIS, it must prepare, file and publish a notice of completion of the final EIS and file copies of the final EIS in accordance with section 617.12 of this Part.

(7) Supplemental EISs.

(i) The lead agency may require a supplemental EIS, limited to the specific significant adverse environmental impacts not addressed or inadequately addressed in the EIS that arise from:

(a) changes proposed for the project; or

(b) newly discovered information; or

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(c) a change in circumstances related to the project.

(ii) The decision to require preparation of a supplemental EIS, in the case of newly discovered information, must be based upon the following criteria:

(a) the importance and relevance of the information; and

(b) the present state of the information in the EIS.

(iii) If a supplement is required, it will be subject to the full procedures of this Part.

(b) Environmental impact statement content.

(1) An EIS must assemble relevant and material facts upon which an agency's decision is to be made. It must analyze the significant adverse impacts and evaluate all reasonable alternatives. EISs must be analytical and not encyclopedic. The lead agency and other involved agencies must cooperate with project sponsors who are preparing EISs by making available to them information contained in their files relevant to the EIS.

(2) EISs must be clearly and concisely written in plain language that can be read and understood by the public. Within the framework presented in paragraph 617.9(b)(5) of this subdivision, EISs should address only those potential significant adverse environmental impacts that can be reasonably anticipated and/or have been identified in the scoping process. EISs should not contain more detail than is appropriate considering the nature and magnitude of the proposed action and the significance of its potential impacts. Highly technical material should be summarized and, if it must be included in its entirety, should be referenced in the statement and included in an appendix.

(3) All draft and final EISs must be preceded by a cover sheet stating:

(i) whether it is a draft or final EIS;

(ii) the name or descriptive title of the action;

(iii) the location (county and town, village or city) and street address, if applicable, of the action;

(iv) the name and address of the lead agency and the name and telephone number of a person at the agency who can provide further information;

(v) the names of individuals or organizations that prepared any portion of the statement;

(vi) the date of its acceptance by the lead agency; and

(vii) in the case of a draft EIS, the date by which comments must be submitted.

(4) A draft or final EIS must have a table of contents following the cover sheet and a precise

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summary which adequately and accurately summarizes the statement.

(5) The format of the draft EIS may be flexible; however, all draft EISs must include the following elements:

(i) a concise description of the proposed action, its purpose, public need and benefits, including social and economic considerations;

(ii) a concise description of the environmental setting of the areas to be affected, sufficient to understand the impacts of the proposed action and alternatives;

(iii) a statement and evaluation of the potential significant adverse environmental impacts at a level of detail that reflects the severity of the impacts and the reasonable likelihood of their occurrence. The draft EIS should identify and discuss the following only where applicable and significant:

(a) reasonably related short-term and long-term impacts, cumulative impacts and other associated environmental impacts;

(b) those adverse environmental impacts that cannot be avoided or adequately mitigated if the proposed action is implemented;

(*c)* any irreversible and irretrievable commitments of environmental resources that would be associated with the proposed action should it be implemented;

(d) any growth-inducing aspects of the proposed action;

(e) impacts of the proposed action on the use and conservation of energy (for an electric generating facility, the statement must include a demonstration that the facility will satisfy electric generating capacity needs or other electric systems needs in a manner reasonably consistent with the most recent state energy plan);

(f) impacts of the proposed action on solid waste management and its consistency with the state or locally adopted solid waste management plan;

(g) impacts of public acquisitions of land or interests in land or funding for non-farm development on lands used in agricultural production and unique and irreplaceable agricultural lands within agricultural districts pursuant to subdivision (4) of section 305 of article 25-AA of the Agriculture and Markets Law; and

(h) if the proposed action is in or involves resources in Nassau or Suffolk Counties, impacts of the proposed action on, and its consistency with, the comprehensive management plan for the special groundwater protection area program as implemented pursuant to article 55 or any plan subsequently ratified and adopted pursuant to article 57 of the Environmental Conservation Law for Nassau and Suffolk counties;

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(iv) a description of the mitigation measures;

(v) a description and evaluation of the range of reasonable alternatives to the action that are feasible, considering the objectives and capabilities of the project sponsor. The description and evaluation of each alternative should be at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. The range of alternatives must include the no action alternative. The no action alternative discussion should evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future, in the absence of the proposed action. The range of alternatives may also include, as appropriate, alternative:

(a) sites;

(b) technology;

(c) scale or magnitude;

(d) design;

(e) timing;

(f) use; and

(g) types of action. For private project sponsors, any alternative for which no discretionary approvals are needed may be described. Site alternatives may be limited to parcels owned by, or under option to, a private project sponsor;

(vi) for a state agency action in the coastal area the action's consistency: with the applicable coastal policies contained in 19 NYCRR 600.5; or when the action is in an approved local waterfront revitalization program area, with the local program policies;

(vii) for a state agency action within a heritage area or urban cultural park, the action's consistency with the approved heritage area management plan or the approved urban cultural park management plan;

(viii) a list of any underlying studies, reports, EISs and other information obtained and considered in preparing the statement including the final written scope.

(6) In addition to the analysis of significant adverse impacts required in subparagraph 617.9(b)(5)(iii) of this section, if information about reasonably foreseeable catastrophic impacts to the environment is unavailable because the cost to obtain it is exorbitant, or the means to obtain it are unknown, or there is uncertainty about its validity, and such information is essential to an agency's SEQR findings, the EIS must:

(i) identify the nature and relevance of unavailable or uncertain information;

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(ii) provide a summary of existing credible scientific evidence, if available; and

(iii) assess the likelihood of occurrence, even if the probability of occurrence is low, and the consequences of the potential impact, using theoretical approaches or research methods generally accepted in the scientific community.

This analysis would likely occur in the review of such actions as an oil supertanker port, a liquid propane gas/liquid natural gas facility, or the siting of a hazardous waste treatment facility. It does not apply in the review of such actions as shopping malls, residential subdivisions or office facilities.

(7) A draft or final EIS may incorporate by reference all or portions of other documents, including EISs that contain information relevant to the statement. The referenced documents must be made available for inspection by the public within the time period for public comment in the same places where the agency makes available copies of the EIS. When an EIS incorporates by reference, the referenced document must be briefly described, its applicable findings summarized, and the date of its preparation provided.

(8) A final EIS must consist of: the draft EIS, including any revisions or supplements to it; copies or a summary of the substantive comments received and their source (whether or not the comments were received in the context of a hearing); and the lead agency's responses to all substantive comments. The draft EIS may be directly incorporated into the final EIS or may be incorporated by reference. The lead agency is responsible for the adequacy and accuracy of the final EIS, regardless of who prepares it. All revisions and supplements to the draft EIS must be specifically indicated and identified as such in the final EIS.

§617.10 Generic environmental impact statements

(a) Generic EISs may be broader, and more general than site or project specific EISs and should discuss the logic and rationale for the choices advanced. They may also include an assessment of specific impacts if such details are available. They may be based on conceptual information in some cases. They may identify the important elements of the natural resource base as well as the existing and projected cultural features, patterns and character. They may discuss in general terms the constraints and consequences of any narrowing of future options. They may present and analyze in general terms a few hypothetical scenarios that could and are likely to occur.

A generic EIS may be used to assess the environmental impacts of:

(1) a number of separate actions in a given geographic area which, if considered singly, may have minor impacts, but if considered together may have significant impacts; or

(2) a sequence of actions, contemplated by a single agency or individual; or

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(3) separate actions having generic or common impacts; or

(4) an entire program or plan having wide application or restricting the range of future alternative policies or projects, including new or significant changes to existing land use plans, development plans, zoning regulations or agency comprehensive resource management plans.

(b) In particular agencies may prepare generic EISs on the adoption of a comprehensive plan prepared in accordance with subdivision 4, section 28-a of the General City Law; subdivision 4, section 272-a of the Town Law; or subdivision 4, section 7- 722 of the Village Law and the implementing regulations. Impacts of individual actions proposed to be carried out in conformance with these adopted plans and regulations and the thresholds or conditions identified in the generic EIS may require no or limited SEQR review as described in subdivisions (c) and (d) of this section.

(c) Generic EISs and their findings should set forth specific conditions or criteria under which future actions will be undertaken or approved, including requirements for any subsequent SEQR compliance. This may include thresholds and criteria for supplemental EISs to reflect specific significant impacts, such as site specific impacts, that were not adequately addressed or analyzed in the generic EIS.

(d) When a final generic EIS has been filed under this part:

(1) No further SEQR compliance is required if a subsequent proposed action will be carried out in conformance with the conditions and thresholds established for such actions in the generic EIS or its findings statement;

(2) An amended findings statement must be prepared if the subsequent proposed action was adequately addressed in the generic EIS but was not addressed or was not adequately addressed in the findings statement for the generic EIS;

(3) A negative declaration must be prepared if a subsequent proposed action was not addressed or was not adequately addressed in the generic EIS and the subsequent action will not result in any significant environmental impacts;

(4) A supplement to the final generic EIS must be prepared if the subsequent proposed action was not addressed or was not adequately addressed in the generic EIS and the subsequent action may have one or more significant adverse environmental impacts.

(e) In connection with projects that are to be developed in phases or stages, agencies should address not only the site specific impacts of the individual project under consideration, but also, in more general or conceptual terms, the cumulative impacts on the environment and the existing natural resource base of subsequent phases of a larger project or series of projects that may be developed in the future. In these cases, this part of the generic EIS must discuss the important elements and constraints present in the natural and cultural environment that may bear on the

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conditions of an agency decision on the immediate project.

§617.11 Decision-making and findings requirements

(a) Prior to the lead agency's decision on an action that has been the subject of a final EIS, it shall afford agencies and the public a reasonable time period (not less than 10 calendar days) in which to consider the final EIS before issuing its written findings statement. If a project modification or change of circumstance related to the project requires a lead or involved agency to substantively modify its decision, findings may be amended and filed in accordance with subdivision 617.12(b) of this Part.

(b) In the case of an action involving an applicant, the lead agency's filing of a written findings statement and decision on whether or not to fund or approve an action must be made within 30 calendar days after the filing of the final EIS.

(c) No involved agency may make a final decision to undertake, fund, approve or disapprove an action that has been the subject of a final EIS, until the time period provided in subdivision 617.11(a) of this section has passed and the agency has made a written findings statement. Findings and a decision may be made simultaneously.

(d) Findings must:

(1) consider the relevant environmental impacts, facts and conclusions disclosed in the final EIS;

(2) weigh and balance relevant environmental impacts with social, economic and other considerations;

(3) provide a rationale for the agency's decision;

(4) certify that the requirements of this Part have been met;

(5) certify that consistent with social, economic and other essential considerations from among the reasonable alternatives available, the action is one that avoids or minimizes adverse environmental impacts to the maximum extent practicable, and that adverse environmental impacts will be avoided or minimized to the maximum extent practicable by incorporating as conditions to the decision those mitigative measures that were identified as practicable.

(e) No state agency may make a final decision on an action that has been the subject of a final EIS and is located in the coastal area until the agency has made a written finding that the action is consistent with applicable policies set forth in 19 NYCRR 600.5. When the Secretary of State has approved a local government waterfront revitalization program, no state agency may make a final decision on an action, that is likely to affect the achievement of the policies and purposes of such program, until the agency has made a written finding that the action is consistent to the maximum extent practicable with that local waterfront revitalization program.

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§617.12 Document preparation, filing, publication and distribution

The following SEQR documents must be prepared, filed, published and made available as prescribed in this section.

(a) Preparation of documents.

(1) Each negative declaration, positive declaration, notice of completion of an EIS, notice of hearing and findings must state that it has been prepared in accordance with article 8 of the Environmental Conservation Law and must contain: the name and address of the lead agency; the name, address and telephone number of a person who can provide additional information; a brief description of the action; the SEQR classification; and, the location of the action.

(2) In addition to the information contained in paragraph (a)(1) of this subdivision:

(i) A negative declaration must meet the requirements of subdivision 617.7(b) of this Part. A conditioned negative declaration must also identify the specific conditions being imposed that have eliminated or adequately mitigated all significant adverse environmental impacts and the period, not less than 30 calendar days, during which comments will be accepted by the lead agency.

(ii) A positive declaration must identify the potential significant adverse environmental impacts that require the preparation of an EIS and state whether scoping will be conducted.

(iii) A notice of completion must identify the type of EIS (draft, final, supplemental, generic) and state where copies of the document can be obtained. For a draft EIS the notice must include the period (not less than 30 calendar days from the date of filing or not less than 10 calendar days following a public hearing on the draft EIS) during which comments will be accepted by the lead agency.

(iv) A notice of hearing must include the time, date, place and purpose of the hearing and contain a summary of the information contained in the notice of completion. The notice of hearing may be combined with the notice of completion of the draft EIS.

(v) Findings must contain the information required by subdivisions 617.11(d) and (e) of this Part.

(b) Filing and distribution of documents.

(1) A Type I negative declaration, conditioned negative declaration, positive declaration, notice of completion of an EIS, EIS, notice of hearing and findings must be filed with:

(i) the chief executive officer of the political subdivision in which the action will be principally located;

(ii) the lead agency;

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(iii) all involved agencies (see also paragraph 617.6(b)(3)) of this Part;

(iv) any person who has requested a copy; and

(v) if the action involves an applicant, with the applicant.

(2) A negative declaration prepared on an Unlisted action must be filed with the lead agency.

(3) All SEQR documents and notices, including but not limited to, EAFs, negative declarations, positive declarations, scopes, notices of completion of an EIS, EISs, notices of hearing and findings must be maintained in files that are readily accessible to the public and made available on request.

(4) The lead agency may charge a fee to persons requesting documents to recover its copying costs.

(5) If sufficient copies of the EIS are not available to meet public interest, the lead agency must provide an additional copy of the documents to the local public library.

6) A copy of the EIS must be sent to the Department of Environmental Conservation, Division of Environmental Permits, 625 Broadway, Albany, NY 12233-1750.

(7) For state agency actions in the coastal area a copy of the EIS must be provided to the Secretary of State.

(c) Publication of notices.

(1) Notice of a Type I negative declaration, conditioned negative declaration, positive declaration and completion of an EIS must be published in the Environmental Notice Bulletin (ENB) in a manner prescribed by the department. Notice must be provided by the lead agency directly to Environmental Notice Bulletin, 625 Broadway, Albany, NY 12233-1750 for publication in the ENB. The ENB is accessible on the department's internet web site at http://www.dec.state.ny.us.

(2) A notice of hearing must be published, at least 14 days in advance of the hearing date, in a newspaper of general circulation in the area of the potential impacts of the action. For state agency actions that apply statewide this requirement can be satisfied by publishing the hearing notice in the ENB and the State Register.

(3) Agencies may provide for additional public notice by posting on sign boards or by other appropriate means.

(4) Notice of a negative declaration must be incorporated once into any other subsequent notice required by law. This requirement can be satisfied by indicating the SEQR classification of the action and the agency's determination of significance.

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§617.13 Fees and costs

(a) When an action subject to this Part involves an applicant, the lead agency may charge a fee to the applicant in order to recover the actual costs of either preparing or reviewing the draft and/or final EIS. The fee may include a chargeback to recover a proportion of the lead agency's actual costs expended for the preparation of a generic EIS prepared pursuant to section 617.10 of this Part for the geographic area where the applicant's project is located. The chargeback may be based on the percentage of the remaining developable land or the percentage of road frontage to be used by the project, or any other reasonable methods. The fee must not exceed the amounts allowed under subdivisions (b) through (d) of this section. If the lead agency charges for preparation of a draft and/or final EIS, it may not also charge for review; if it charges for review of a draft and/or final EIS, it may not also charge for preparation. Scoping will be considered part of the draft EIS for purposes of determining a SEQR fee; no fee may be charged for preparation of an EAF or determination of significance.

(b) For residential projects, the total project value will be calculated on the actual purchase price of the land or the fair market value of the land (determined by assessed valuation divided by equalization rate) whichever is higher, plus the cost of all required site improvements, not including the cost of buildings and structures, as determined with reference to a current cost data publication in common use. In the case of such projects, the fee charged by an agency may not exceed two percent of the total project value.

(c) For nonresidential construction projects, the total project value will be calculated on the actual purchase price of the land or the fair market value of the land (determined by the assessed valuation divided by equalization rate) whichever is higher, plus the cost of supplying utility service to the project, the cost of site preparation and the cost of labor and material as determined with reference to a current cost data publication in common use. In the case of such projects the fee charged may not exceed one half of one percent of the total project value.

(d) For projects involving the extraction of minerals, the total project value will be calculated on the cost of site preparation for mining. Site preparation cost means the cost of clearing and grubbing and removal of over-burden for the entire area to be mined plus the cost of utility services and construction of access roads. Such costs are determined with reference to a current cost data publication in common use. The fee charged by the agency may not exceed one half of one percent of the total project value. For those costs to be incurred for phases occurring three or more years after issuance of a permit, the total project value will be determined using a present value calculation.

(e) Where an applicant chooses not to prepare a draft EIS, the lead agency will provide the applicant, upon request, with an estimate of the costs for preparing the draft EIS calculated on the total value of the project for which funding or approval is sought.

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(f) "Appeals procedure". When a dispute arises concerning fees charged to an applicant by a lead agency, the applicant may make a written request to the agency setting forth reasons why it is felt that such fees are inequitable. Upon receipt of a request the chief fiscal officer of the agency or his designee will examine the agency record and prepare a written response to the applicant setting forth reasons why the applicant's claims are valid or invalid. Such appeal procedure must not interfere with or cause delay in the EIS process or prohibit an action from being undertaken.

(g) The technical services of the department may be made available to other agencies on a fee basis, reflecting the costs thereof, and the fee charged to any applicant pursuant to this section may reflect such costs.

§617.14 Individual agency procedures to implement SEQR

(a) Article 8 of the Environmental Conservation Law requires all agencies to adopt and publish, after public hearing, any additional procedures that may be necessary for them to implement SEQR. Until an agency adopts these additional procedures, its implementation of SEQR will be governed by the provisions of this Part. If an agency rescinds its additional SEQR procedures, it will continue to be governed by this Part. The agency must promptly notify the commissioner, and the commissioner shall publish a notice in the ENB, of the adoption of additional procedures or the rescission of agency SEQR procedures.

(b) To the greatest extent possible, the procedures prescribed in this Part must be incorporated into existing agency procedures. An agency may by local law, code, ordinance, executive order, resolution or regulation vary the time periods established in this Part for the preparation and review of SEQR documents, and for the conduct of public hearings, in order to coordinate the SEQR environmental review process with other procedures relating to the review and approval of actions Such time changes must not impose unreasonable delay. Individual agency procedures to implement SEQR must be no less protective of environmental values, public participation and agency and judicial review than the procedures contained in this Part. This Part supersedes any SEQR provisions promulgated or enacted by an agency that are less protective of the environment.

(c) Agencies may find it helpful to seek the advice and assistance of other agencies, groups and persons on SEQR matters, including the following:

(1) advice on preparation and review of EAFs;

(2) recommendations on the significance or non-significance of actions;

(3) preparation and review of EISs and recommendations on the scope, adequacy, and contents of EISs;

(4) preparation and filing of SEQR notices and documents;

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(5) conduct of public hearings; and

(6) recommendations to decisionmakers.

(d) Agencies are strongly encouraged to enter into cooperative agreements with other agencies regularly involved in carrying out or approving the same actions for the purposes of coordinating their procedures.

(e) All agencies are subject to the lists of Type I and Type II actions contained in this Part, and must apply the criteria provided in subdivision 617.7(c) of this Part. In addition, agencies may adopt their own lists of Type I actions, in accordance with section 617.4 of this Part and their own lists of Type II actions in accordance with section 617.5 of this Part.

(f) Every agency that adopts, has adopted or amends SEQR procedures must, after public hearing, file them with the commissioner, who will maintain them to serve as a resource for agencies and interested persons. The commissioner will provide notice in the ENB of such procedures upon filing. All agencies that have promulgated their own SEQR procedures must review and bring them into conformance with this Part. Until agencies do so, their procedures, where inconsistent or less protective, are superseded by this Part.

(g) A local agency may designate a specific geographic area within its boundaries as a critical environmental area (CEA). A state agency may also designate as a CEA a specific geographic area that is owned or managed by the state or is under its regulatory authority. Designation of a CEA must be preceded by written public notice and a public hearing. The public notice must identify the boundaries and the specific environmental characteristics of the area warranting CEA designation.

(1) To be designated as a CEA, an area must have an exceptional or unique character covering one or more of the following:

(i) a benefit or threat to human health;

(ii) a natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space and areas of important aesthetic or scenic quality);

(iii) agricultural, social, cultural, historic, archaeological, recreational, or educational values; or

(iv) an inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change.

(2) Notification that an area has been designated as a CEA must include a map at an appropriate scale to readily locate the boundaries of the CEA, the written justification supporting the designation, and proof of public hearing and, must be filed with:

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(i) the commissioner;

(ii) the appropriate regional office of the department; and

(iii) any other agency regularly involved in undertaking, funding or approving actions in the municipality in which the area has been designated.

(3) This designation shall take effect 30 days after filing with the commissioner. Each designation of a CEA must be published in the ENB by the department and the department will serve as a clearinghouse for information on CEAs.

(4) Following designation, the potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to Section 617.7 of this Part.

§617.15 Actions involving a federal agency

(a) When a draft and final EIS for an action has been duly prepared under the National Environmental Policy Act of 1969, an agency has no obligation to prepare an additional EIS under this Part, provided that the federal EIS is sufficient to make findings under section 617.11 of this Part. However, except in the case of Type II actions listed in section 617.5 of this Part, no involved agency may undertake, fund or approve the action until the federal final EIS has been completed and the involved agency has made the findings prescribed in section 617.11 of this Part.

(b) Where a finding of no significant impact (FNSI) or other written threshold determination that the action will not require a federal impact statement has been prepared under the National Environmental Policy Act of 1969, the determination will not automatically constitute compliance with SEQR. In such cases, state and local agencies remain responsible for compliance with SEQR.

(c) In the case of an action involving a federal agency for which either a federal FNSI or a federal draft and final EIS has been prepared, except where otherwise required by law, a final decision by a federal agency will not be controlling on any state or local agency decision on the action, but may be considered by the agency.

§617.16 Confidentiality

When a project sponsor submits a completed EAF, draft or final EIS, or otherwise provides information concerning the environmental impacts of a proposed project, the project sponsor may request, consistent with the Freedom of Information Law (FOIL), article 6 of the Public Officers Law, that specifically identified information be held confidential. Prior to divulging any such information, the agency must notify the applicant of its determination of whether or not it will hold the information confidential.

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§617.17 Referenced material

The following referenced documents have been filed with the New York State Department of State. The documents are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, and for inspection and copying at the Department of Environmental Conservation, 625 Broadway, Albany, New York 12233-1750.

(a) National Register of Historic Places, (1994), 36 Code of Federal Regulation (CFR) Parts 60 and 63.

(b) Register Of National Natural Landmarks,(1994), 36 Code of Federal Regulation (CFR) Part62.

§617.18 Severability

If any provision of this Part or its application to any person or circumstance is determined to be contrary to law by a court of competent jurisdiction, such determination shall not affect or impair the validity of the other provisions of this Part or the application to other persons and circumstances

§617.19 Effective date

This Part, as revised, applies to actions for which a determination of significance has not been made prior to January 1, 1996. Actions for which a determination of significance has been made prior to January 1, 1996 must comply with Part 617 effective June 1, 1987.

§617.20 Appendices

Appendices A, B and C are model environmental assessment forms which may be used to satisfy this Part or may be modified in accordance with sections 617.2 and 617.14 of this Part.

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OPEN SPACE APPENDIX: MAPS

Below are maps outlining the areas identified as underserved or well-served by open space for each community district. Some community districts contain both underserved and well-served areas, while others do not have any underserved or well-served open space areas.

- **Underserved areas** are areas of high population density in the City that are generally the greatest distance from parkland where the amount of open space per 1000 residents is currently less than 2.5 acres.
- **Well-served areas**
  - Have an open space ratio above 2.5 accounting for existing parks that contain developed recreational resources; or
  - Are located within 0.25 mile (approximately a 10-minute walk) from developed and publicly accessible portions of regional parks.

For the methodologies used to identify underserved and well-served areas.

THRESHOLDS FOR ASSESSMENT:

- If a project is located in an underserved area, an open space assessment should be conducted if that project would generate more than 50 residents or 125 workers.
- If the project is located in a well-served area, an open space assessment should be conducted if that project would generate more than 350 residents or 750 workers in a well-served area.
- If a project is not located within an underserved or well-served area, an open space assessment should be conducted if that project would generate more than 200 residents or 500 employees.

To view a map, click on a link in the table to see the specific area within a community district identified as underserved or well-served. To examine the underserved and well-served open space areas, click one of the links below:

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BRONX		
	Underserved Areas	**Well-Served Areas**
Community District 1		Randall's Island Park
Community District 2	Crotona	
Community District 3	Crotona	Crotona Park
Community District 4		
Community District 5	Fordham	
Community District 6	Fordham	Crotona Park
Community District 7	Fordham	Bronx Park Van Cortlandt Park
Community District 8		Van Cortlandt Park
Community District 9		Soundview Park
Community District 10	Co-Op City Eastchester	Ferry Point Park Pelham Bay Park
Community District 11		Bronx Park
Community District 12	Co-Op City North Bronx	Bronx Park Pelham Bay Park Van Cortlandt Park

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BROOKLYN		
	Underserved Areas	**Well-Served Areas**
Community District 1	Greenpoint	North Side Williamsburg
Community District 2		Prospect Heights
Community District 3	Bushwick	
Community District 4	Bushwick Ridgewood	
Community District 5	Woodhaven	
Community District 6	Gowanus	Prospect Park
Community District 7	Gowanus Sunset Park	Parade Ground Prospect Park
Community District 8	Crown Heights	Prospect Park
Community District 9	Crown Heights	Prospect Park
Community District 10	Bay Ridge Borough Park Sunset Park	Dyker Beach Park
Community District 11	Borough Park Ocean Parkway	Dyker Beach Park Calvert Vaux Park

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Community District 12	Borough Park Ocean Parkway Sunset Park	Parade Ground
Community District 13		Calvert Vaux Park
Community District 14	Flatbush Marine Park Midwood	Prospect Park Parade Ground
Community District 15	Marine Park Ocean Parkway	Marine Park
Community District 16		
Community District 17	Flatbush	
Community District 18		Canarsie Park Marine Park

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MANHATTAN		
	Underserved Areas	**Well-Served Areas**
Community District 1		
Community District 2	NOHO	
Community District 3	NOHO	
Community District 4		Central Park
Community District 5		Central Park
Community District 6		
Community District 7		Central Park Riverside Park Riverside Park South
Community District 8	Upper East Side	Central Park
Community District 9		Central Park Highbridge Park Riverside Park
Community District 10		Central Park Highbridge Park
Community District 11		Central Park Randall's Island/Wards Island

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Community District 12	Washington Heights	Fort Washington Park Highbridge Park Inwood Hill Park

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QUEENS		
	Underserved Areas	**Well-Served Areas**
Community District 1	Astoria	
Community District 2	Sunnyside	
Community District 3	Jackson Heights	
Community District 4	Jackson Heights Rego Park	Flushing Meadows/Corona Park
Community District 5	Rego Park Ridgewood	Forest Park
Community District 6	Rego Park	Flushing Meadows/Corona Park Forest Park
Community District 7	Bayside Murray Hill	Flushing Meadows/Corona Park Kissena Corridor Park Kissena Park
Community District 8	Hillcrest	Cunningham Park Flushing Meadows/Corona Park Kissena Corridor Park

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Community District 9	Ozone Park West Jamaica Woodhaven	Forest Park
Community District 10	Ozone Park	Tutor Village
Community District 11	Bayside	Alley Pond Park Cunningham Park Kissena Corridor Park Kissena Park
Community District 12	Queens Village St. Albans	Baisley Park Springfield Gardens South
Community District 13	Floral Park Laurelton Queens Village	Alley Pond Park (Part 1) Alley Pond Park (Part 2)
Community District 14		Broad Channel

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STATEN ISLAND		
	Underserved Areas	**Well-Served Areas**
Community District 1	Port Richmond Westerleigh	Clove Lakes Park Silver Lake Park
Community District 2		Springville / Dongan Hills / Mid-land Beach
Community District 3	Eltingville	Wolfes Pond Park

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SHADOWS APPENDIX: MANUAL METHODS FOR CALCULATING SHADOWS

If access to the use of three-dimensional computer modeling software is not available it is possible to graphically calculate the shadows for the Tier 4 Screening Analysis (Subsection 314) and the Detailed Shadow Analysis (Section 320), without the use of a computer. The methodologies outlined in this appendix can be used to carry out in a graphic form the shadow analyses described in Sections 314 and 320. All other analyses and assessments should be performed as outlined in the remaining sections of Chapter 8, "Shadows."

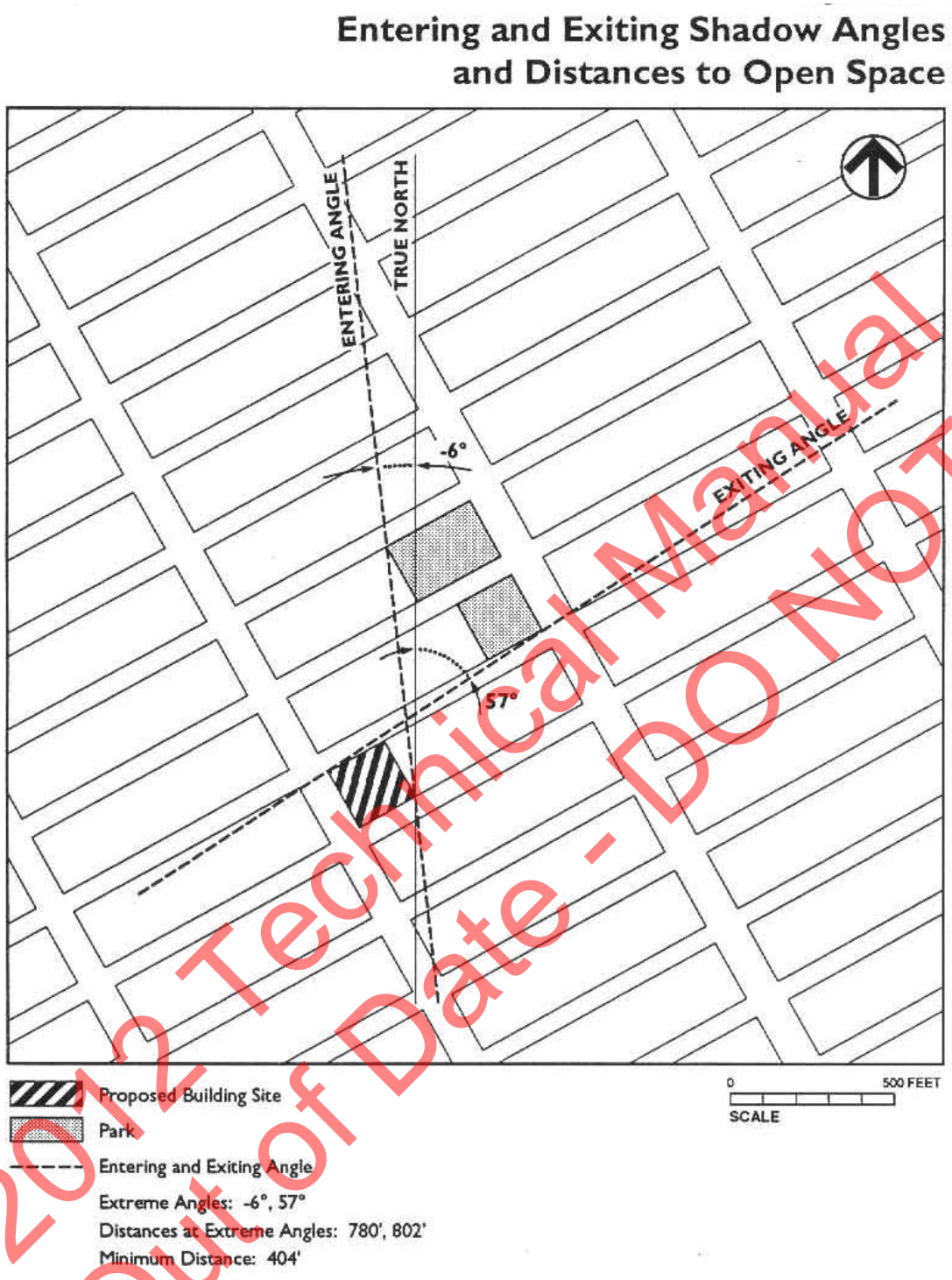
A. MANUAL METHOD FOR CALCULATING SHADOWS FOR THE TIER 4 SCREENING ANALYSIS

For an introduction to this part and related material regarding shadows analyses, see Subsection 314 (Tier 4 Screening Analysis).

The first step in the Tier 4 screening analysis is to determine the angle of the project's shadow on each sunlight-sensitive resource in relation to true north. On the base map (see Subsection 311), draw a line from the point on the building's footprint (or the corner of the project site, if the shape of the building is unknown) that will cast the earliest shadow on each open space or sun-sensitive architectural resource to the point on the open space or architectural resource that will first be in shadow. As explained in Section 100, above, because the sun rises in the east and travels across the southern part of the sky to set in the west, a project's earliest shadows would be cast almost directly westward. Throughout the day, they would shift clockwise (moving northwest, then north, then northeast) until sunset, when they would fall east. Therefore, a project's earliest shadow on an open space or architectural resource would occur in this same pattern, depending on the location of the open space or resource in relation to the project site. A simple method to find the earliest shadow is to begin with a line running due west from the project site. If this line does not meet the open space or architectural resource, rotate the line clockwise until it does. In the example in Figure A1, the earliest shadow on an open space is represented by a line between the southeast corner of the project site and the northwest corner of the open space. Intersect this line with a vertical line (a line drawn true north). This displays the shadow's angle from true north when it enters the open space or reaches the architectural resource. This is referred to as the "entering angle" in this discussion.

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FIGURE A1



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Using the same approach, draw a line from the point on the building's footprint that will cast the latest shadow on the open space or architectural resource to the point in the open space that will last be in shadow. In the example, this is the line between the northwest corner of the site and the southeast corner of the open space. Intersect this line with a vertical line (a line drawn true north) to display the shadow's angle from true north as it leaves the open space or resource. This is the "exiting angle."

All angles between the two angles obtained above represent the portions of the open space or resource that could be in shadow from the proposed project at some time during the year. In this example, these angles, measured using a protractor, are -6 degrees (a minus sign means that the shadow occurs before approximately noon) and 57 degrees for the entering and exiting shadows, respectively.

The entering and exiting angles set the limits of shadows that the project would cast on the open space or resource at all times of the year. In this example, these angles, measured using a protractor, are -6 degrees (minus sign means that the shadow occurs in the morning) and 57 degrees. This means that at any angle from -6 degrees to 57 degrees the building could potentially cast a shadow that would reach the open space.

Next, using Table A1, which gives the maximum shadow length factors for all shadow angles, determine the maximum shadow length of the building in question. The longest shadow that any building will cast during the year occurs on December 21st. The maximum shadow length for all angles between -6 and 57 degrees is 4.3 for 42 degrees on December 21st. This means that a 200-foot building, for example, would cast a maximum shadow of 860 feet.

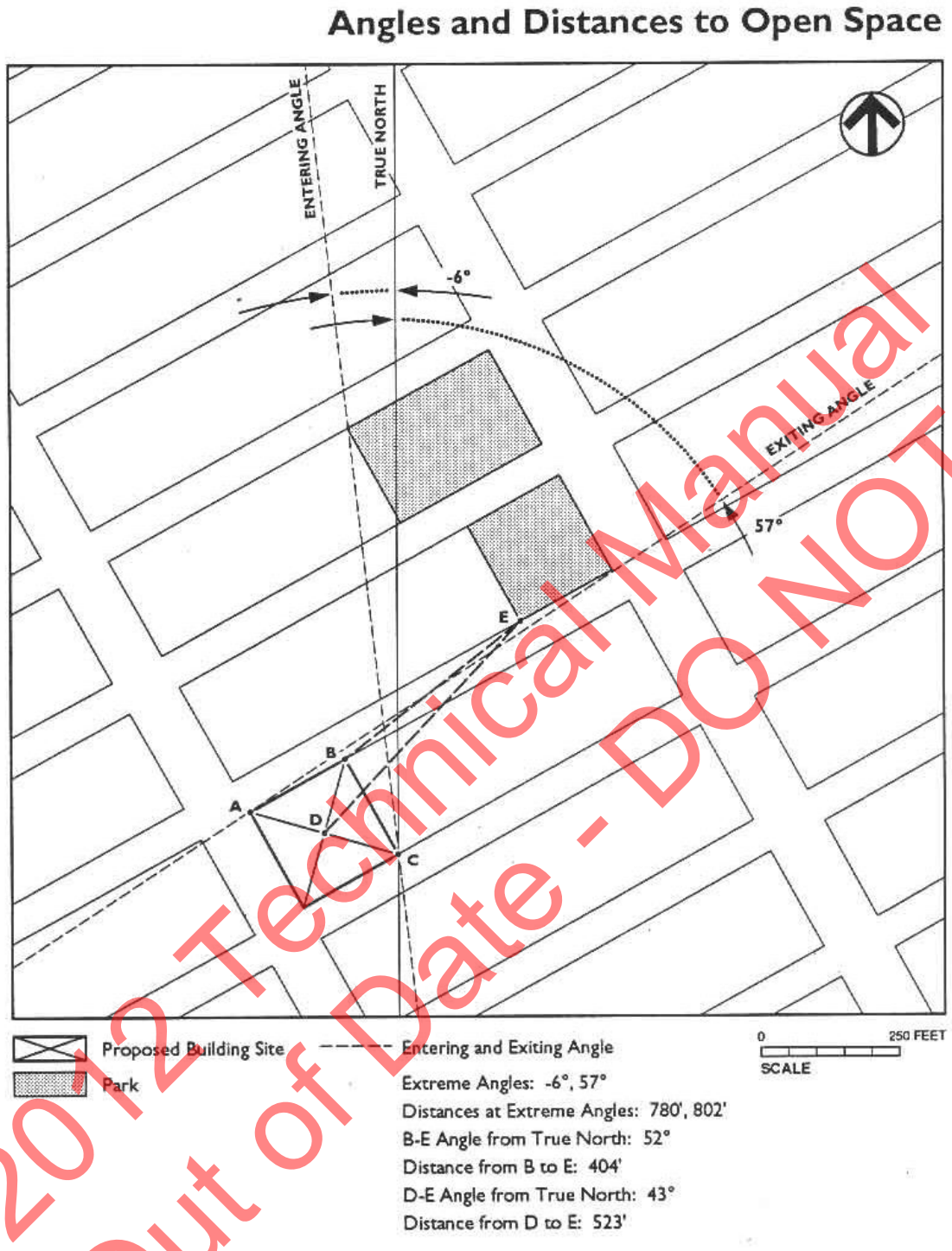
It may be necessary to adjust this calculation to account for differences in elevation between the building and the park or resource in question. If inspection of available maps shows, for example, that the building site is at an elevation approximately 20 feet higher than the park, that 20 feet is added to the building height in making the calculation. This provides the building height relative to the elevation of the park. With the difference in elevation, the maximum shadow length that could occur would be 946 feet (4.3 times 220), about 86 feet longer than the shadow for the building at the same elevation as the open space.

As shown on Figure A2, the distances between the project site and the open space range from 404 to 802 feet. Therefore, a 200-foot building would cast a shadow reaching the open space at some point in the year, and the next step in the screening is required.

If the analysis above indicates or cannot rule out that shadows from the proposed project would reach a sunlight-sensitive resource at any time during the year, a detailed shadow analysis is required. The manual method for performing this detailed analysis is described in Part B. If the results of the screening analysis demonstrate that no shadows will reach any sunlight-sensitive resources, no further shadow assessment is needed. Provide the necessary documentation to support this conclusion illustrating the screening analysis.

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FIGURE A2



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B. MANUAL METHOD FOR CALCULATING SHADOWS FOR THE DETAILED SHADOW ANALYSIS

For an introduction to this part and related material regarding shadows analyses, see Subsection 316 (Determining the "worst case" scenario for shadows), Subsection 317 (Months of interest and representative days for analysis), Subsection 318 (Timeframe window of analysis), Section 320 (Detailed Shadow Analysis), Subsection 321 (Future No-Action conditions), Subsection 322 (Future With-Action conditions), Subsection 324 (Performing the shadow analysis), and Subsection 325 (Documenting the extent and duration of incremental shadows).

The example presented here supposes an existing open space and a building that rises 640 feet without setback and then slopes back to a pointed, dome-like, symmetrical top at 850 feet. Therefore, the positions on the ground from which to measure the length of the shadow (and distance to the open space) would be the three leading corners and the center of the site, labeled A, B, C, and D, respectively on Figure A2. As shown on this example, the shortest distance to the open space is a line drawn from B to E, which yields an angle of 52 degrees from true north and measures 404 feet. The shortest distance from the building's tallest point, D, to the open space (at E) is at an angle of 43 degrees from true north and measures 523 feet.

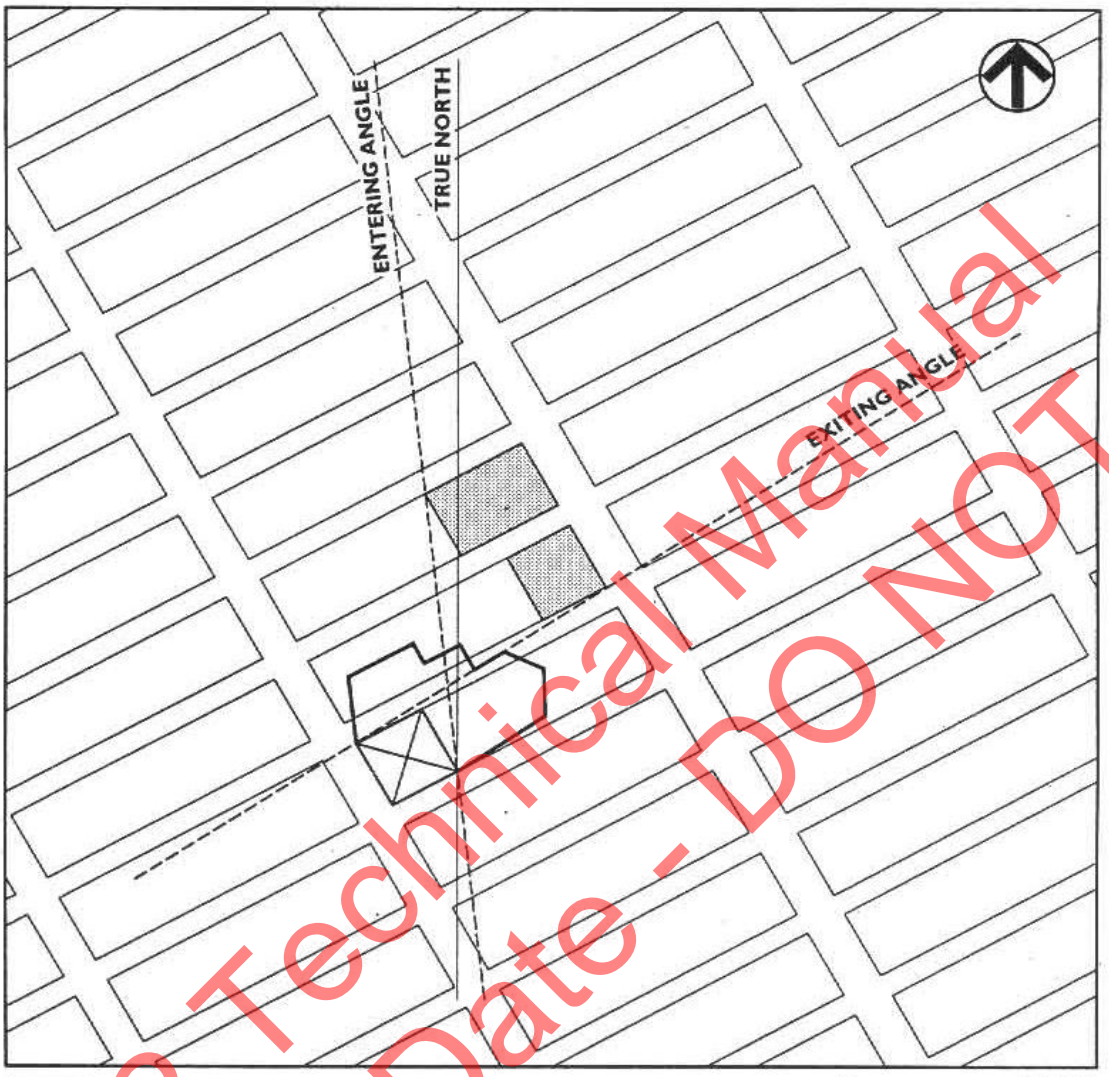
Having identified "worst case" shadow conditions (see *Subsection* 316), next consult Table A2, which provides shadow length factors for all shadows angles for four representative days within the months of concern. Consider whether the entering and exiting angles and the angle defining the shortest distance between the building and the open space or resource would cast shadows long enough to reach the open space or resource. Figures B1, B2, B3, and B4 illustrate the shadows that would occur from the 850-foot building example on an open space nearby. As shown in these figures, entering and/or exiting shadows would reach the park on December 21 and March 21. For May 6, the entering and exiting shadows would not reach the open space, but at the shortest point (52 degrees), the shadow angle factor would be 0.68, the length of the shadow would be 0.68 times 640, or 435 feet. This is more than the distance between the site and the park at that point; therefore, the shadow would enter and extend into the park.

In the example, on June 21, no shadow from the building would extend into the open space. The entering and exiting shadows would not reach the open space. The shadow over the shortest distance from the site to the park (B to E) would be 0.46 times 640, or 294 feet (110 feet less than 404 feet). Over the shortest distance from the tallest point to the park (D to E) the shadow would be 0.40 times 850, or 340 feet. This is less than the distance between D and E on the ground (523 feet). Thus, no project shadow would enter the open space on June 21.

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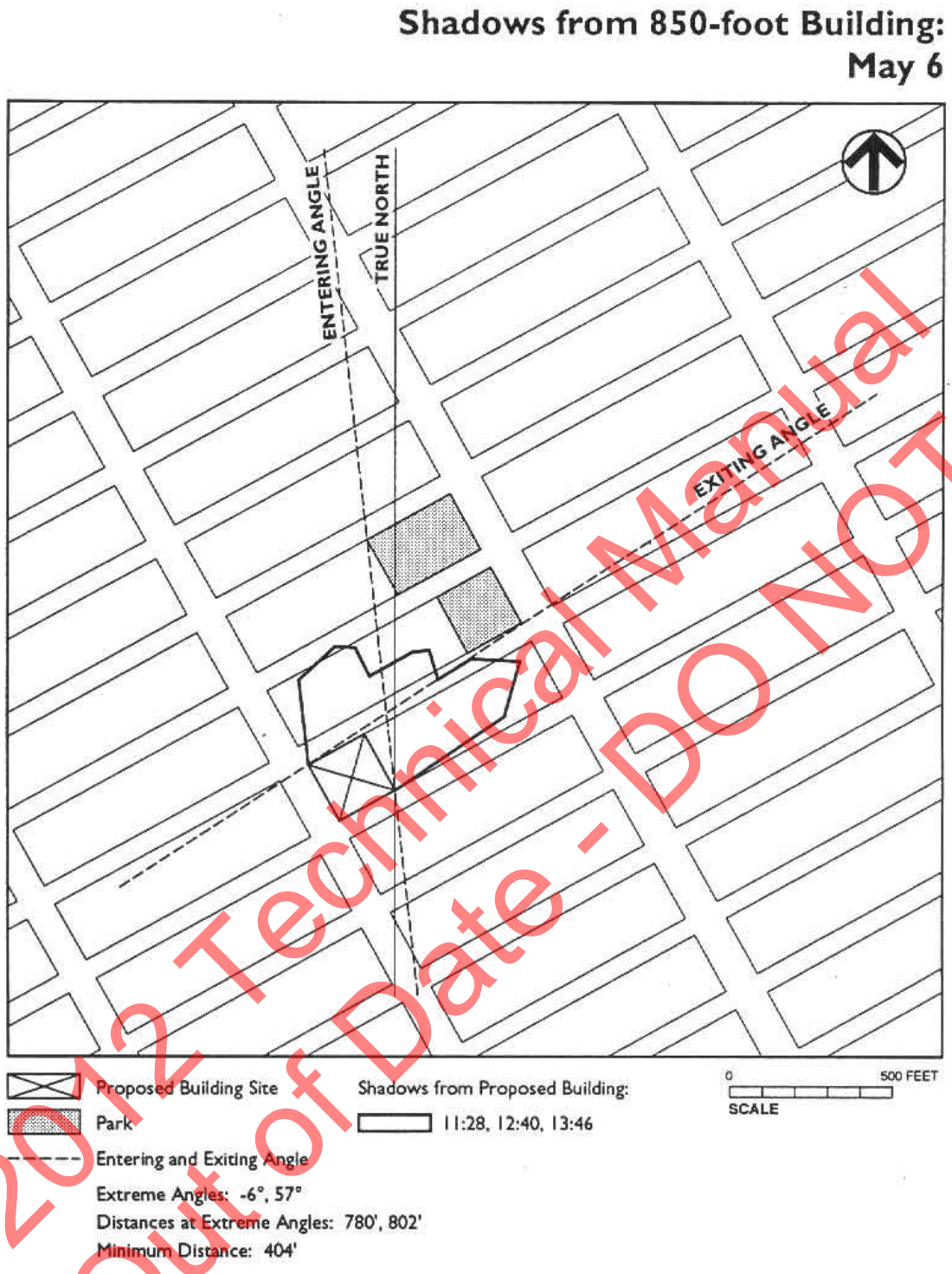
FIGURE B1

Shadows from 850-foot Building: June 21



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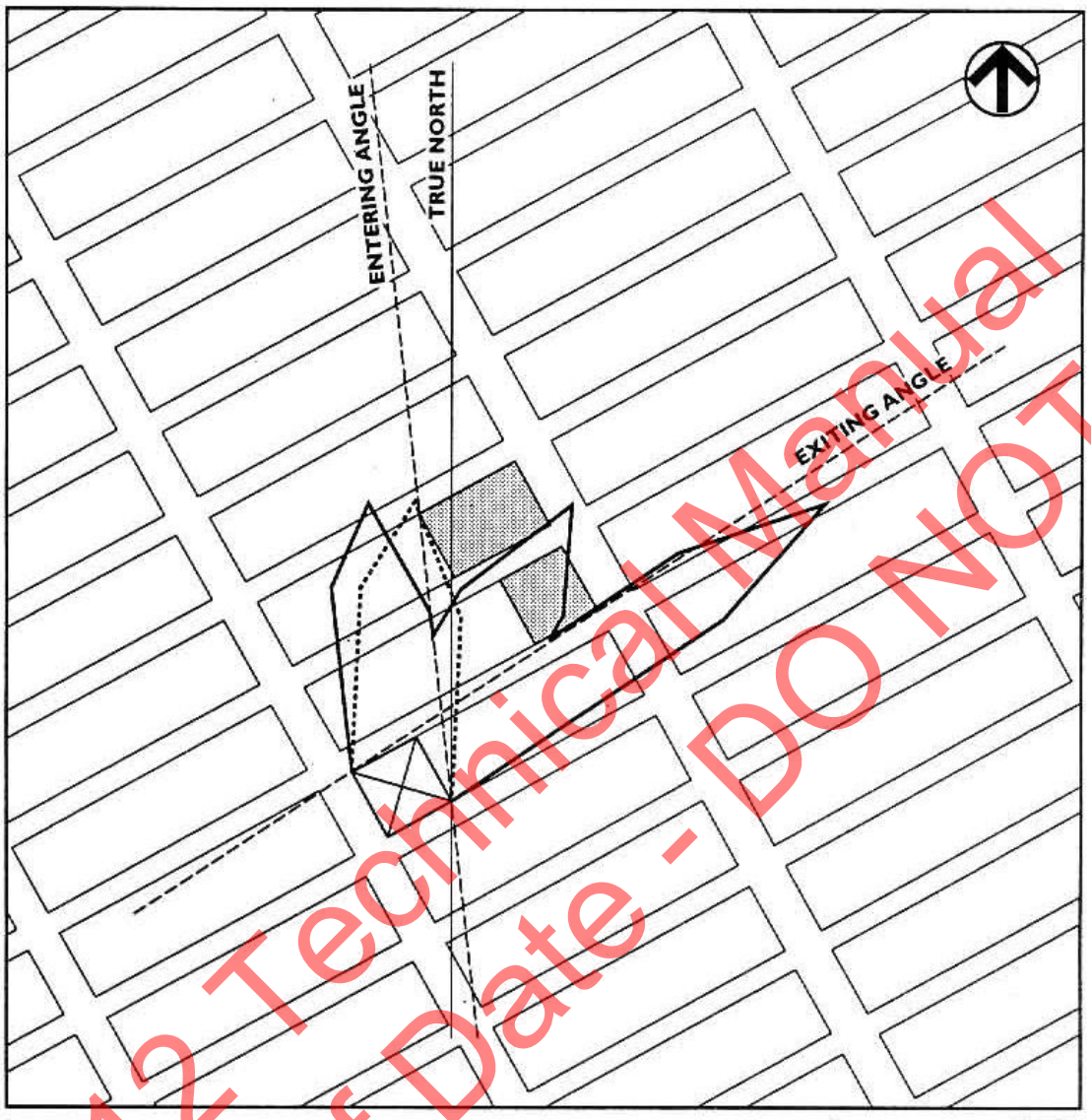
FIGURE B2



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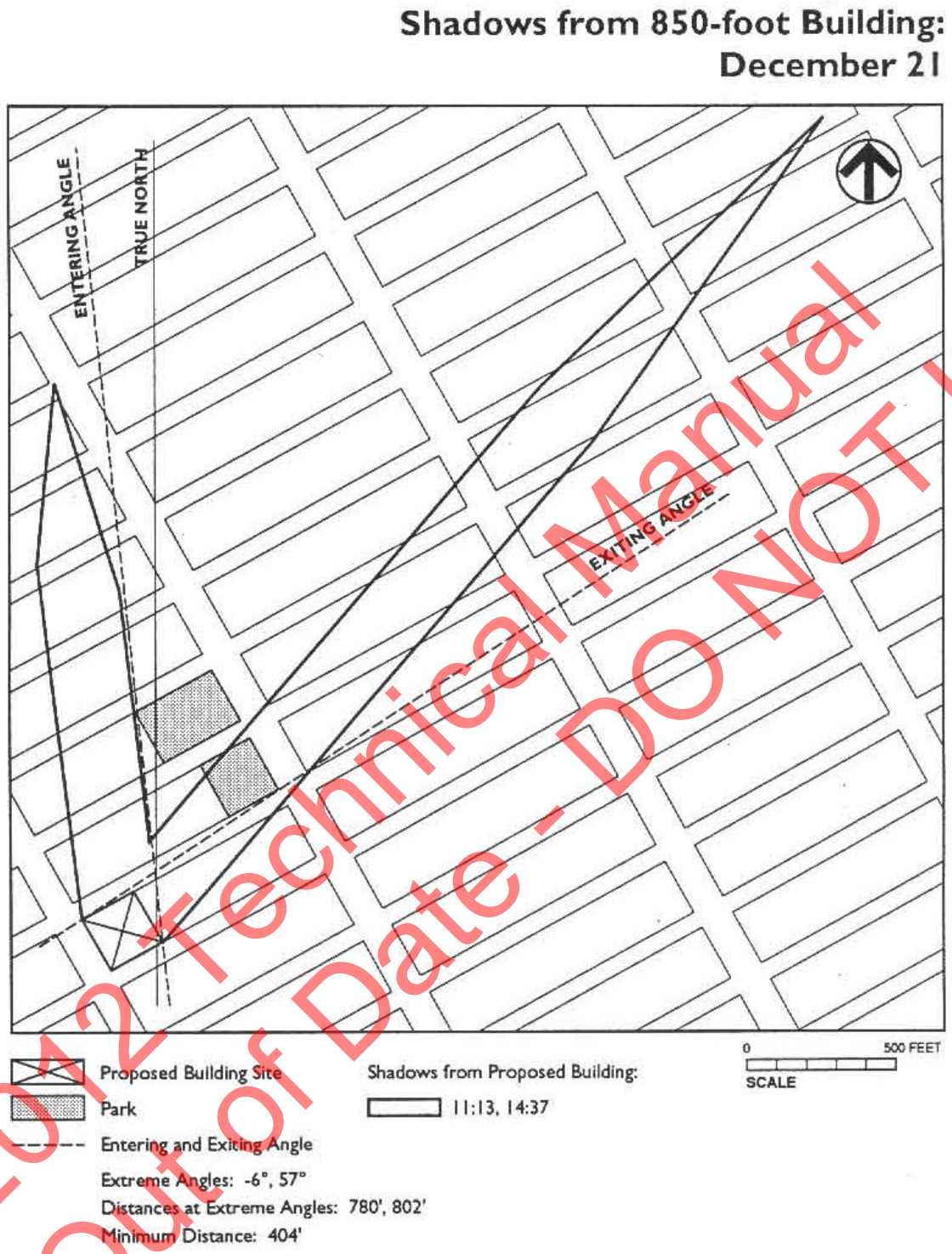
FIGURE B3

Shadows from 850-foot Building: March 21



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FIGURE B4



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An exception to the above is if the entering and exiting angles are greater than 42 degrees; then, no shadows from the project would exist on December 21 for areas beyond 42 degrees. Since the sun rises and sets in the narrowest arc on that day, during the period from an hour and a half after sunrise to an hour and a half before sunset, the shadows lie between -42 and +42 degrees from true north (see Table A2). In this case, pick the date closest to December 21 in which at least one of the entering or exiting angles occurs, and assess winter conditions on that date. If the longest

shadow for the building in question does not occur in any of the months between November and February (shadow angle more than 63 degrees), it is not necessary to consider a winter case.

To understand the shadow that would be added to an open space or natural or architectural resource by a proposed project, shadows that would exist without the project must also be defined. Other buildings may already cast shadows (or be expected to cast shadows in the future) that would eliminate any new shadows cast by the proposed project. The analysis entails calculating and displaying the shadows from all buildings and structures that will be present in both the future With-Action and future No-Action conditions between the project site and the open space and that are also located within the two relevant entering and exiting angles from true north. The buildings in the surrounding area should also be considered for unusual circumstances: for example, extremely tall buildings farther from the open space than the project that may cast shadows within the entering and exiting angles (see Figure 8-8, Effects of existing buildings).

The analysis is straightforward and requires an accurate map showing the footprints of existing and proposed or planned buildings and structures. The analyst should obtain as accurate data as possible on the heights of each building and its setbacks. Entering and exiting shadows are calculated and displayed for each of the representative days for analysis in the months of interest, within the timeframe window of analysis, as described in Subsections 317 and 318, above.

The project's shadow effect is the increment beyond shadows that would exist in the future No-Action conditions. Therefore, the project's shadows should be calculated and displayed clearly as an increment beyond the No-Action conditions shadows on the open space. Figures B5 and B6 illustrate a full and a partially blocked shadow from the 850-foot example building.

The length of time that the project shadows stay on the open space or resource depends on the entering and exiting angles from true north and the time of year. As described in Section 100, because of differences in the sun's height in the sky throughout the year, shadows are longer but move more quickly (are of shorter duration) during the winter than during the summer. Using Table A2, it is possible to estimate shadow duration for each of the analysis months. For example, on March 21, the entering angle of -6 degrees would occur at approximately 11:47 a.m., and the exiting angle of 57 degrees would occur at approximately 3:04 p.m. (shown as 15:04 on the table). Thus, for a building tall enough that its shadow reaches an open space at both the entering and exiting angles, the shadow would be on some part of the park for 3 hours and 17 minutes.

If the shadow does not reach the open space or resource at both the entering and exiting angles, then the duration would be less. Using Table A2, it is possible to identify the angle (and thus the time) when the shadow would be long enough to reach and enter the park. In the March 21 example on Figure B3, because of the shape of the hypothetical building's top (it comes to a point), the shadow would not enter the park at the -6 degree angle. A line drawn from the center of the project site (the location of the top of the roof) to the westerly point of the park yields an angle of 3 degrees. Thus, the shadow would enter the park at 12:10 p.m. EST and exit at 3:04 p.m. EST for a duration of 2 hours and 54 minutes.

Once the shadows affecting the sunlight-sensitive resources have been calculated document the results as described in Section 325 and proceed with the assessment of shadow impacts as described in Section 400.

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FIGURE B5

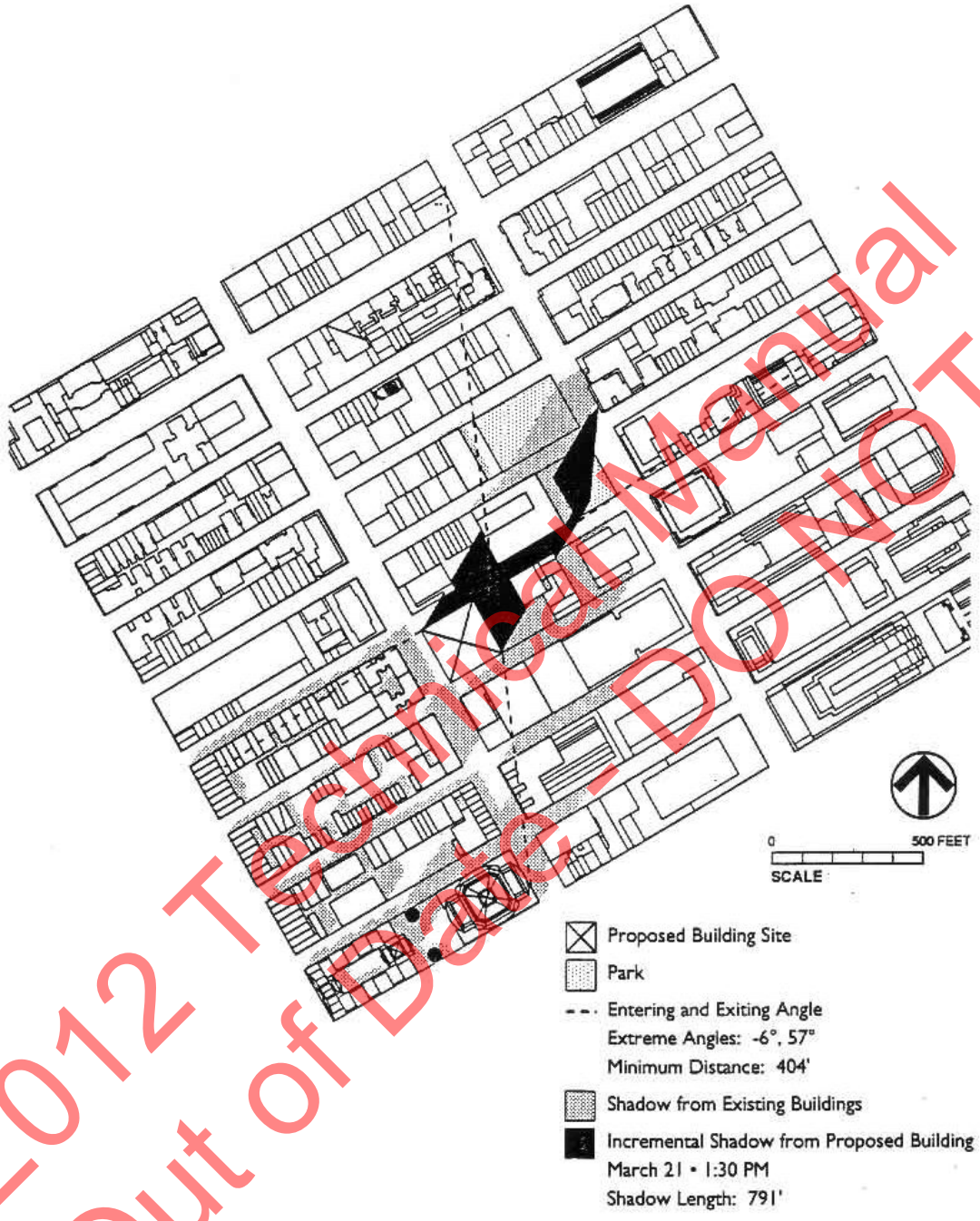
Incremental Shadows from 850-Foot Building: Example 1



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FIGURE B6

Incremental Shadows from 850-Foot Building: Example 2



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TABLE A1 - MAXIMUM SHADOW LENGTH FACTOR FOR EACH ANGLE FROM TRUE NORTH

Angle	Shadow Length Factor*	Dates	Time (Eastern Standard Time)	
0	2.07	12/21	11:53	
1	2.07	12/21	11:49	11:56
2	2.07	12/21	11:45	12:00
3	2.07	12/21	11:41	12:04
4	2.07	12/21	11:37	12:08
5	2.08	12/21	11:33	12:12
6	2.09	12/21	11:29	12:16
7	2.09	12/21	11:25	12:20
8	2.10	12/21	11:21	12:24
9	2.11	12/21	11:17	12:28
10	2.13	12/21	11:13	12:32
11	2.14	12/21	11:09	12:36
12	2.15	12/21	11:05	12:41
13	2.17	12/21	11:01	12:44
14	2.19	12/21	10:57	12:48
15	2.21	12/21	10:53	12:52
16	2.23	12/21	10:49	12:56
17	2.25	12/21	10:45	13:00
18	2.28	12/21	10:41	13:04
19	2.30	12/21	10:37	13:08
20	2.34	12/21	10:32	13:13
21	2.37	12/21	10:28	13:17
22	2.40	12/21	10:24	13:21
23	2.44	12/21	10:22	13:25
24	2.48	12/21	10:15	13:30
25	2.52	12/21	10:11	13:34
26	2.57	12/21	10:07	13:38
27	2.62	12/21	10:02	13:43
28	2.67	12/21	9:58	13:47
29	2.73	12/21	9:54	13:51
30	2.79	12/21	9:49	13:56
31	2.86	12/21	9:45	14:00
32	2.93	12/21	9:40	14:05
33	3.02	12/21	9:35	14:10
34	3.10	12/21	9:31	14:14
35	3.20	12/21	9:26	14:19
36	3.31	12/21	9:21	14:24
37	3.44	12/21	9:16	14:29
38	3.55	12/21	9:12	14:33
39	3.69	12/21	9:07	14:38
40	3.85	12/21	9:02	14:43
41	4.02	12/21	8:57	14:48
42	4.27	12/20 12/21 12/22 12/23 12/24 12/25	8:51 8:51 8:52 8:53 8:53 8:54	14:55 14:55 14:56 14:57 14:57 14:58
43	4.27	12/29 1/4	8:54 8:55	15:00 15:07
44	4.19	12/7 1/7	8:41 8:56	14:53 15:08
45	4.19	12/2 1/12	8:35 8:54	14:55 15:14

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46	4.10	11/26 1/18	8:29 8:52	14:57 15:20
47	4.04	11/24 1/22	8:28 8:50	14:58 15:26
48	3.99	11/20 1/23	8:24 8:50	15:00 15:26
49	3.96	11/17 1/27	8:19 8:47	15:03 15:31
50	3.92	11/13 1/30	8:14 8:43	15:06 15:35
51	3.84	11/11 2/1	8:13 8:43	15:07 15:37
52	3.84	11/8 2/3	8:08 8:40	15:12 15:40
53	3.77	11/7 2/6	8:08 8:38	15:12 15:42
54	3.78	11/4 2/8	8:04 8:34	15:16 15:46
55	3.72	11/1 2/12	8:00 8:30	15:20 15:50
56	3.66	10/30 2/13	7:59 8:29	15:21 15:51
57	3.65	10/28 2/15	7:56 8:26	15:24 15:54
58	3.62	10/25 2/18	7:52 8:22	15:28 15:58
59	3.57	10/24 2/19	7:51 8:22	15:29 15:58
60	3.59	10/22 2/21	7:47 8:18	15:33 16:02
61	3.55	10/19 2/24	7:45 8:13	15:37 16:05
62	3.49	10/18 2/25	7:45 8:13	15:37 16:05
63	3.50	10/16 2/28	7:42 8:09	15:42 16:07
64	3.47	10/14 3/1	7:40 8:06	15:44 16:10
65	3.44	10/11 3/4	7:37 8:02	15:49 16:14
66	3.40	10/10 3/5	7:36 8:01	15:50 16:13
67	3.41	10/8 3/7	7:34 7:57	15:54 16:17
68	3.39	10/5 3/10	7:30 7:52	15:58 16:20
69	3.36	10/4 3/11	7:38 7:51	16:00 16:21
70	3.36	10/2 3/13	7:27 7:48	16:03 16:24
71	3.34	10/1 3/14	7:27 7:46	16:05 16:24
72	3.34	9/29 3/16	7:24 7:43	16:08 16:27
73	3.32	9/26 3/19	7:21 7:39	16:13 16:31
74	3.30	9/25 3/20	7:21 7:37	16:15 16:31
75	3.30	9/23	7:18	16:18

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		3/22	7:33	16:33
76	3.32	9/22 3/23	7:17 7:31	16:21 16:35
77	3.31	9/19 3/26	7:14 7:25	16:26 16:37
78	3.24	9/17 3/28	7:14 7:24	16:28 16:38
79	3.30	9/16 3/29	7:11 7:21	16:31 16:41
80	3.29	9/13 4/1	7:08 7:16	16:36 16:44
81	3.24	9/12 4/2	7:08 7:16	16:36 16:44
82	3.29	9/10 4/4	7:05 7:11	16:41 16:47
83	3.23	9/8 4/6	7:05 7:10	16:43 16:48
84	3.29	9/7 4/7	7:02 7:06	16:46 16:50
85	3.30	9/4 4/10	6:59 7:01	16:51 16:53
86	3.24	9/2 4/12	6:59 7:00	16:53 16:54
87	3.31	9/1 4/13	6:56 6:57	16:56 16:57
88	3.29	8/30 4/15	6:55 6:54	16:59 16:58
89	3.31	8/27 4/18	6:52 6:49	17:04 17:01
90	3.29	8/25 4/19	6:51 6:48	17:05 17:02
91	3.33	8/24 4/21	6:48 6:45	17:08 17:05
92	3.35	8/21 4/24	6:45 6:40	17:13 17:08
93	3.30	8/19 4/26	6:45 6:39	17:15 17:09
94	3.37	8/17 4/27	6:42 6:36	17:18 17:12
95	3.37	8/14 5/1	6:39 6:31	17:23 17:15
96	3.33	8/12 5/3	6:38 6:30	17:24 17:16
97	3.40	8/9 5/4	6:35 6:27	17:29 17:19
98	3.42	8/6 5/8	6:31 6:22	17:33 17:22
99	3.42	8/5 5/10	6:30 6:20	17:34 17:24
100	3.43	8/2 5/14	6:29 6:16	17:35 17:28
101	3.42	7/30 5/16	6:25 6:15	17:39 17:29
102	3.48	7/28 5/18	6:22 6:12	17:42 17:32
103	3.52	7/24 5/22	6:18 6:09	17:46 17:37
104	3.56	7/19 5/27	6:14 6:05	17:50 17:41

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105	3.53	7/18 5/28	6:14 6:05	17:50 17:41
106	3.59	7/13 6/2	6:10 6:02	17:54 17:46
107	3.63	7/5 6/10	6:04 5:59	17:56 17:51
108	3.61	6/16	6:00	17:54

Note: Negative angles and positive angles of the same value would have similar shadow length factors.
All values are for New York City, City Hall:
Latitude: 40°42'23" north (40.706389°)
Longitude: 74°0'29" west (74.008056°)
All times are Eastern Standard Time. Daylight Savings Time is NOT considered.

* Factor for shadow angle by degree (azimuth) from true north (0°).

TABLE A2 - SHADOW FACTORS AND TIME OF DAY FOR EACH SHADOW ANGLE, JUNE 21, MAY 6, MARCH 21, DECEMBER 21

Angle	21 June		6 May[a]		21 March[a]		21 December	
	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time
-108	3.66	5:57						
-107	3.37	6:04						
-106	3.12	6:11						
-105	2.90	6:17						
-104	2.71	6:24						
-103	2.54	6:31						
-102	2.38	6:38						
-101	2.24	6:45						
-100	2.11	6:51						
-99	2.00	6:58						
-98	1.89	7:05						
-97	1.80	7:11	3.31	6:27				
-96	1.71	7:18	3.07	6:33				
-95	1.63	7:25	2.87	6:40				
-94	1.55	7:31	2.68	6:46				
-93	1.48	7:38	2.52	6:52				
-92	1.42	7:44	2.38	6:59				
-91	1.36	7:51	2.25	7:05				
-90	1.30	7:57	2.13	7:11				
-89	1.25	8:03	2.02	7:17				
-88	1.20	8:09	1.92	7:23				
-87	1.15	8:15	1.84	7:29				
-86	1.11	8:20	1.75	7:35				
-85	1.07	8:26	1.68	7:41				
-84	1.03	8:32	1.61	7:46				
-83	0.99	8:37	1.54	7:52				
-82	0.96	8:42	1.48	7:58				
-81	0.93	8:47	1.43	8:03				
-80	0.90	8:53	1.37	8:09				
-79	0.87	8:57	1.33	8:14				
-78	0.84	9:02	1.28	8:19				
-77	0.82	9:07	1.24	8:24				

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Angle	21 June		6 May[a]		21 March[a]		21 December	
	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time
-76	0.79	9:12	1.20	8:29				
-75	0.77	9:16	1.16	8:34				
-74	0.75	9:20	1.12	8:39	3.24	7:36		
-73	0.73	9:25	1.09	8:44	3.05	7:41		
-72	0.71	9:29	1.05	8:48	2.88	7:47		
-71	0.69	9:33	1.03	8:53	2.73	7:52		
-70	0.67	9:37	1.00	8:57	2.59	7:57		
-69	0.66	9:41	0.98	9:02	2.47	8:03		
-68	0.64	9:44	0.95	9:06	2.36	8:08		
-67	0.62	9:48	0.93	9:10	2.26	8:13		
-66	0.61	9:51	0.90	9:14	2.17	8:18		
-65	0.59	9:55	0.88	9:18	2.09	8:23		
-64	0.58	9:58	0.86	9:22	2.01	8:28		
-63	0.57	10:01	0.84	9:26	1.94	8:33		
-62	0.55	10:04	0.82	9:30	1.88	8:38		
-61	0.54	10:07	0.81	9:33	1.82	8:42		
-60	0.53	10:10	0.79	9:37	1.76	8:47		
-59	0.52	10:13	0.77	9:40	1.71	8:52		
-58	0.51	10:16	0.76	9:44	1.66	8:56		
-57	0.50	10:19	0.74	9:47	1.61	9:01		
-56	0.49	10:21	0.73	9:50	1.57	9:05		
-55	0.48	10:24	0.72	9:54	1.53	9:09		
-54	0.48	10:27	0.70	9:57	1.49	9:14		
-53	0.47	10:29	0.69	10:00	1.46	9:18		
-52	0.46	10:31	0.68	10:03	1.42	9:22		
-51	0.45	10:34	0.67	10:06	1.39	9:26		
-50	0.45	10:36	0.66	10:09	1.36	9:30		
-49	0.44	10:38	0.65	10:11	1.34	9:34		
-48	0.43	10:41	0.64	10:14	1.31	9:38		
-47	0.43	10:43	0.63	10:17	1.28	9:42		
-46	0.42	10:45	0.62	10:20	1.26	9:45		
-45	0.41	10:47	0.61	10:22	1.24	9:49		
-44	0.41	10:49	0.60	10:25	1.22	9:53		
-43	0.40	10:51	0.59	10:27	1.20	9:56		
-42	0.40	10:53	0.59	10:30	1.18	10:00	4.27	8:51
-41	0.40	10:55	0.58	10:32	1.16	10:03	4.02	8:57
-40	0.39	10:57	0.57	10:35	1.14	10:07	3.85	9:02
-39	0.38	10:59	0.57	10:37	1.13	10:10	3.69	9:07
-38	0.38	11:00	0.56	10:40	1.11	10:14	3.55	9:12
-37	0.38	11:02	0.55	10:42	1.10	10:17	3.42	9:16
-36	0.37	11:04	0.55	10:44	1.08	10:20	3.30	9:21
-35	0.37	11:06	0.54	10:46	1.07	10:24	3.20	9:26
-34	0.37	11:07	0.54	10:49	1.06	10:27	3.10	9:31
-33	0.36	11:09	0.53	10:51	1.04	10:30	3.01	9:35
-32	0.36	11:11	0.53	10:53	1.03	10:33	2.93	9:40
-31	0.35	11:12	0.52	10:55	1.02	10:36	2.86	9:45
-30	0.35	11:14	0.52	10:57	1.01	10:39	2.79	9:49
-29	0.35	11:15	0.51	10:59	1.00	10:42	2.73	9:54

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Angle	21 June		6 May[a]		21 March[a]		21 December	
	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time
-28	0.35	11:17	0.51	11:01	0.99	10:45	2.67	9:58
-27	0.34	11:19	0.51	11:03	0.98	10:48	2.62	10:02
-26	0.34	11:20	0.50	11:05	0.97	10:51	2.57	10:07
-25	0.34	11:22	0.50	11:07	0.96	10:54	2.52	10:11
-24	0.34	11:23	0.50	11:09	0.96	10:57	2.48	10:15
-23	0.33	11:25	0.49	11:11	0.95	11:00	2.44	10:22
-22	0.33	11:26	0.49	11:13	0.94	11:03	2.40	10:24
-21	0.33	11:27	0.49	11:15	0.94	11:06	2.37	10:28
-20	0.33	11:29	0.48	11:17	0.93	11:09	2.33	10:32
-19	0.33	11:30	0.48	11:19	0.92	11:11	2.30	10:37
-18	0.32	11:32	0.48	11:21	0.92	11:14	2.28	10:41
-17	0.32	11:33	0.48	11:22	0.91	11:17	2.25	10:45
-16	0.32	11:34	0.47	11:24	0.91	11:20	2.23	10:49
-15	0.32	11:36	0.47	11:26	0.90	11:23	2.21	10:53
-14	0.32	11:37	0.47	11:28	0.90	11:25	2.19	10:57
-13	0.32	11:38	0.47	11:30	0.90	11:28	2.17	11:01
-12	0.32	11:40	0.47	11:31	0.89	11:31	2.15	11:05
-11	0.32	11:41	0.47	11:33	0.89	11:33	2.14	11:09
-10	0.32	11:42	0.46	11:35	0.89	11:36	2.13	11:13
-9	0.31	11:44	0.46	11:37	0.88	11:39	2.11	11:17
-8	0.31	11:45	0.46	11:39	0.88	11:41	2.10	11:21
-7	0.31	11:46	0.46	11:40	0.88	11:44	2.09	11:25
-6	0.31	11:48	0.46	11:42	0.88	11:47	2.09	11:29
-5	0.31	11:49	0.46	11:44	0.88	11:49	2.08	11:33
-4	0.31	11:50	0.46	11:46	0.88	11:52	2.07	11:37
-3	0.31	11:52	0.46	11:47	0.87	11:55	2.07	11:41
-2	0.31	11:53	0.46	11:49	0.87	11:57	2.07	11:45
-1	0.31	11:54	0.46	11:51	0.87	12:00	2.07	11:49
0	0.31	11:56	0.46	11:53	0.87	12:03	2.07	11:53
1	0.31	11:57	0.46	11:54	0.87	12:05	2.07	11:56
2	0.31	11:58	0.46	11:56	0.87	12:08	2.07	12:00
3	0.31	11:59	0.46	11:58	0.87	12:10	2.07	12:04
4	0.31	12:01	0.46	11:59	0.88	12:13	2.07	12:08
5	0.31	12:02	0.46	12:01	0.88	12:16	2.08	12:12
6	0.31	12:03	0.46	12:03	0.88	12:18	2.09	12:16
7	0.31	12:05	0.46	12:05	0.88	12:21	2.09	12:20
8	0.31	12:06	0.46	12:06	0.88	12:24	2.10	12:24
9	0.31	12:07	0.46	12:08	0.88	12:27	2.11	12:28
10	0.32	12:09	0.46	12:10	0.89	12:29	2.13	12:32
11	0.32	12:10	0.47	12:12	0.89	12:32	2.14	12:36
12	0.32	12:11	0.47	12:14	0.89	12:34	2.15	12:41
13	0.32	12:13	0.47	12:15	0.90	12:37	2.17	12:44
14	0.32	12:14	0.47	12:17	0.90	12:40	2.19	12:48
15	0.32	12:15	0.47	12:19	0.90	12:42	2.21	12:52
16	0.32	12:17	0.48	12:21	0.91	12:45	2.23	12:56
17	0.32	12:18	0.48	12:23	0.91	12:48	2.25	13:00
18	0.32	12:19	0.48	12:24	0.92	12:51	2.28	13:04
19	0.33	12:21	0.48	12:26	0.93	12:54	2.30	13:08

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Angle	21 June		6 May[a]		21 March[a]		21 December	
	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time
20	0.33	12:22	0.48	12:28	0.93	12:57	2.34	13:13
21	0.33	12:24	0.49	12:30	0.94	12:59	2.37	13:17
22	0.33	12:25	0.49	12:32	0.94	13:02	2.40	13:21
23	0.33	12:26	0.49	12:34	0.95	13:05	2.43	13:25
24	0.34	12:28	0.50	12:36	0.96	13:08	2.49	13:30
25	0.34	12:29	0.50	12:38	0.97	13:11	2.52	13:34
26	0.34	12:31	0.50	12:40	0.97	13:14	2.56	13:38
27	0.34	12:32	0.51	12:42	0.98	13:17	2.62	13:43
28	0.35	12:34	0.51	12:44	0.99	13:20	2.67	13:47
29	0.35	12:36	0.51	12:46	1.00	13:23	2.71	13:51
30	0.35	12:37	0.52	12:48	1.01	13:26	2.79	13:56
31	0.36	12:39	0.52	12:50	1.02	13:29	2.84	14:00
32	0.36	12:40	0.53	12:52	1.03	13:32	2.93	14:05
33	0.36	12:42	0.53	12:54	1.04	13:35	3.02	14:10
34	0.37	12:44	0.54	12:56	1.05	13:38	3.09	14:14
35	0.37	12:45	0.54	12:59	1.06	13:41	3.20	14:19
36	0.37	12:47	0.55	13:01	1.08	13:45	3.31	14:24
37	0.38	12:49	0.55	13:03	1.10	13:48	3.44	14:29
38	0.38	12:51	0.56	13:05	1.11	13:51	3.52	14:33
39	0.38	12:52	0.57	13:08	1.13	13:55	3.67	14:38
40	0.39	12:54	0.57	13:10	1.14	13:58	3.83	14:43
41	0.39	12:56	0.58	13:13	1.16	14:02	4.00	14:48
42	0.40	12:58	0.59	13:15	1.18	14:05	4.19	14:53
43	0.40	13:00	0.60	13:18	1.20	14:09		
44	0.41	13:02	0.60	13:20	1.21	14:12		
45	0.41	13:04	0.61	13:23	1.24	14:15		
46	0.42	13:06	0.62	13:25	1.26	14:20		
47	0.42	13:08	0.63	13:28	1.28	14:23		
48	0.43	13:10	0.64	13:31	1.31	14:27		
49	0.44	13:13	0.65	13:34	1.33	14:31		
50	0.45	13:15	0.66	13:36	1.36	14:35		
51	0.45	13:17	0.67	13:39	1.39	14:39		
52	0.46	13:20	0.68	13:42	1.42	14:43		
53	0.47	13:22	0.69	13:45	1.45	14:47		
54	0.47	13:24	0.70	13:48	1.49	14:51		
55	0.48	13:27	0.71	13:18	1.54	14:56		
56	0.50	13:30	0.73	13:55	1.57	15:00		
57	0.50	13:32	0.74	13:58	1.61	15:04		
58	0.51	13:35	0.76	14:01	1.66	15:09		
59	0.52	13:38	0.78	14:05	1.70	15:13		
60	0.53	13:41	0.79	14:08	1.76	15:18		
61	0.55	13:44	0.81	14:12	1.83	15:23		
62	0.56	13:47	0.82	14:15	1.87	15:27		
63	0.57	13:50	0.84	14:19	1.94	15:32		
64	0.58	13:53	0.86	14:23	2.02	15:37		
65	0.59	13:56	0.88	14:27	2.09	15:42		
66	0.61	14:00	0.91	14:31	2.18	15:47		
67	0.62	14:03	0.93	14:35	2.27	15:52		

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Angle	21 June		6 May[a]		21 March[a]		21 December	
	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time	Shadow Length Factor[b]	Eastern Standard Time
68	0.64	14:07	0.95	14:39	2.36	15:57		
69	0.66	14:11	0.97	14:43	2.46	16:02		
70	0.67	14:14	1.01	14:48	2.62	16:08		
71	0.68	14:18	1.03	14:52	2.73	16:13		
72	0.70	14:22	1.06	14:57	2.86	16:18		
73	0.72	14:26	1.09	15:01	3.06	16:24		
74	0.75	14:31	1.12	15:06	3.22	16:29		
75	0.77	14:35	1.16	15:11				
76	0.79	14:39	1.20	15:16				
77	0.81	14:44	1.24	15:21				
78	0.84	14:49	1.28	15:26				
79	0.87	14:54	1.32	15:31				
80	0.89	14:58	1.37	15:36				
81	0.93	15:04	1.43	15:42				
82	0.96	15:09	1.48	15:47				
83	0.99	15:14	1.55	15:53				
84	1.02	15:19	1.62	15:59				
85	1.07	15:25	1.67	16:04				
86	1.11	15:31	1.75	16:11				
87	1.14	15:36	1.84	16:16				
88	1.19	15:42	1.93	16:22				
89	1.24	15:48	2.02	16:28				
90	1.29	15:54	2.13	16:34				
91	1.36	16:01	2.24	16:40				
92	1.42	16:07	2.36	16:46				
93	1.48	16:13	2.54	16:53				
94	1.56	16:20	2.68	16:59				
95	1.62	16:26	2.84	17:05				
96	1.72	16:33	3.09	17:12				
97	1.79	16:39	3.29	17:18				
98	1.89	16:46						
99	2.01	16:53						
100	2.13	17:00						
101	2.23	17:06						
102	2.37	17:13						
103	2.54	17:20						
104	2.72	17:27						
105	2.92	17:34						
106	3.09	17:40						
107	3.35	17:47						
108	3.65	17:54						
109	4.00	18:01						

Notes: All calculations are for New York City, City Hall.

Latitude: 40°42'23" north (40.706389°)
Longitude: 74°0'29" west (74.008056°)
Times are Eastern Standard times. Daylight Savings Time is NOT considered. To find apparent solar time, add 4 minutes to the clock time. Then, for 21 June, no change; for 6 May, add 3 minutes; for 21 March, subtract 7 minutes; for 21 December, add 3 minutes.

[a] Factors for May 6 and March 21 may be used for August 6 and September 21, respectively.
[b] Factor for shadow length by degree (azimuth) from true north 0°.

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LIST OF FACILITIES, ACTIVITIES, OR CONDITIONS REQUIRING ASSESSMENT

1. A facility, on or adjacent to a tax lot, which generates (including small quantity generators), stores, treats, or disposes of hazardous waste, as defined by RCRA and regulated by EPA and/or DEC.
2. A facility, on or adjacent to a tax lot, which manufactures, produces, prepares, compounds, processes uses, repackages or disposes of hazardous chemicals, as defined under New York City's Community Right-to-Know Law, N.Y.C. Admin. Code tit. 24, Ch. 7 (1992).
3. A facility, on or adjacent to a tax lot, which is included on the following list:

- Adhesives and sealants manufacture
- Advertising displays manufacture
- Agricultural machinery manufacture (including repairs)
- Aluminum manufacture or aluminum produces manufacture
- Aircraft manufacture (including parts)
- Airports Appliance (electrical) manufacture
- Art goods manufacturer
- Asphalt or asphalt products manufacture
- Athletic equipment manufacture
- Automobile and other laundries
- Automobile manufacture
- Automobile rental establishments
- Automobile wrecking establishments
- Automobile service stations
- Battery manufacture
- Bicycle manufacture
- Blacksmith shops
- Boat repair
- Boat fuel sales
- Boat storage
- Business machine manufacture
- Camera manufacture
- Canvas or canvas products manufacture
- Carpet cleaning establishments
- Carpet manufacture
- Cement manufacture
- Ceramic products manufacture
- Charcoal manufacture
- Chemical compounding or packaging
- Chemical manufacture
- Cleaning or cleaning and dyeing establishments
- Clock manufacture
- Clothing manufacture
- Coal products manufacture
- Coal sales or storage
- Coke products manufacture
- Coil coating
- College, university, trade school laboratories
- Construction machinery manufacture
- Copper forming or copper products manufacture
- Cosmetics or toiletries manufacture
- Dental instruments manufacture
- Dental laboratories
- Disinfectant manufacture
- Drafting instruments manufacture
- Dry cleaning establishments
- Dumps
- Electric power or steam generating plants
- Electric power substations
- Electric and electronic components manufacture
- Electric appliance manufacture

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- Electric supplies manufacture
- Electroplating or stereotyping
- Engraving or photo-engraving
- Exterminators
- Explosives manufacture
- Felt products manufacture
- Felt products bulk processing, washing or curing
- Fertilizer manufacture
- Filling stations
- Film manufacture
- Fire stations
- Foundries ferrous or non-ferrous
- Fuel sales
- Fungicides manufacture
- Fur tanning, curing, finishing or dyeing
- Furniture manufacture
- Garbage incineration, storage or reduction
- Gas manufacture, storage
- Gasoline service stations
- Generating plants, electric or steam
- Glass manufacture
- Glue manufacture
- Golf courses
- Graphite or graphite products manufacture
- Gum and wood chemicals manufacture or processing
- Hair products manufacture
- Hardware manufacture
- Heliports
- Incineration or garbage reduction
- Ink or ink ribbon manufacture
- Insecticides manufacture
- Inorganic chemicals manufacture
- Iron and steel manufacture
- Jewelry manufacture
- Junk yards
- Laboratories, medical, dental, research, experimental
- Leather tanning, curing, finishing or dyeing
- Linoleum manufacture
- Luggage manufacture
- Lumber processing
- Machine shops including tool, die, or pattern making
- Machine tools manufacture
- Machinery manufacture or repair
- Mechanical products manufacture
- Medical appliance manufacture
- Medical instruments manufacture
- Medical laboratories
- Metals manufacture including alloys or foil
- Metal casting or foundry products
- Metal finishing, plating, grinding, polishing, cleaning, rust-proofing, heat treatment
- Metal ores reduction or refining
- Metal product treatment or processing
- Metal reduction, refining, smelting or alloying
- Metal treatment or processing
- Mining machinery manufacture
- Mirror silvering shops
- Motorcycle manufacturer
- Motor freight stations musical instruments manufacture
- Newspaper publishing
- Non-ferrous metals manufacture
- Office equipment or machinery repair shops
- Oil, public utility stations for metering or regulating oil sales
- Oil storage
- Optical equipment manufacture
- Organic chemicals manufacture
- Orthopedic appliance manufacture

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- Ore mining
- Paint and ink manufacture
- Paper and pulp mills
- Paper products manufacture
- Pesticides manufacture
- Petroleum or petroleum products refining
- Petroleum or petroleum products storage and handling
- Pharmaceutical products manufacture or preparation
- Photographic equipment and supplies manufacture
- Plastics and synthetic products manufacture and processing
- Plastics raw manufacture
- Plumbing equipment manufacture
- Porcelain enameling
- Precision instruments manufacture
- Printing and publishing
- Pumping stations, sewage
- Radioactive waste disposal services
- Railroad equipment manufacture
- Railroad rights-of-ways, substations
- Railroad freight terminals, yards or appurtenances
- Refrigerating plants
- Rubber processing of manufacture
- Rubber products manufacture
- Sewage disposal plants, pumping stations
- Ship or boat building repair yards
- Shipping waterfront
- Shoes manufacture
- Sign painting shops
- Silver-plating shops
- Silverware manufacture, plate or sterling
- Slag piles
- Soap and detergent manufacture
- Soldering shops
- Solvent extraction
- Steam electric power plants
- Steel products manufacture
- Tar products manufacture
- Textiles bleaching, products manufacture or dyeing
- Textile mills
- Thermometer manufacture or assembly
- Tile manufacture
- Timber products manufacture
- Tool or hardware manufacture
- Toys manufacture
- Trailer manufacture
- Transit substations
- Truck manufacture
- Trucking terminal or motor freight stations
- Turpentine manufacture
- Varnish manufacture
- Vehicles manufacture
- Venetian blind manufacture
- Welding shops
- Wood distillation

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DOCUMENTS DESCRIBING NEW YORK STATE AND FEDERAL ANALYTICAL METHODOLOGY

The NYSDEC Analytical Services Protocol (ASP) was last updated in July 2005. The reports documenting the latest version of ASP can be obtained from NYSDEC Division of Water Assessment and Management within the Division of Water. (518) 402-8156 or http://www.dec.ny.gov/chemical/23850.html.

The NYSDEC Division of Environmental Remediation provides guidance on sampling, analysis and quality assurance in its Draft DER-10 Technical Guidance for Site Investigation and Remediation in Chapter 2. The guidance can be obtained from the NYSDEC Division of Environmental Remediation. http://www.dec.ny.gov/regulations/2393.html.

Guidance on soil cleanup objectives are provided by the NYSDEC in Part 375 Remedial Program Soil Cleanup Objectives. The Soil Cleanup Object guidance can be found at the following web page: http://www.dec.ny.gov/regs/15507.html.

Guidance on ambient water quality standards are provided by the NYSDEC in Technical & Operational Guidance Series (TOGS). The TOGS guidance can be found at the following web page: http://www.dec.ny.gov/regulations/2652.html.

Guidance on soil vapor and vapor intrusion is provided New York State Department of Health (NYSDOH), Center for Environmental Health, Bureau of Environmental Exposure Investigation. "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York." October 2006. The guidance can be found at the following webpage: http://www.health.state.ny.us/environmental/indoors/vapor_intrusion/

The analytical methods of solid matrices are published in US EPA SW-846: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 3rd edition, 4 volumes. Information for obtaining official printed copy of SW-846 Manual, to obtain CD-ROM, to view the manual and its updates are available at http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm.

Wastewater and drinking water analytical methods are provided by the US EPA Office of Water. Regulations and guidance are available from: http://www.epa.gov/safewater/regs.html and http://www.epa.gov/safewater/methods/analyticalmethods.html.

The analytical methods for collection and analysis of environmental vapor samples are published in US EPA Center for Environmental Research Information, Office of Research and Development. "Compendium Method TO-15: Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)." January 1999. The guidance can be found at the following webpage: http://www.epa.gov/ttnamti1/files/ambient/airtox/to-15r.pdf.

Guidance Documents for the Preparation of a Quality Assurance Project Plan (QAPP) is available from US EPA's Quality System for Environmental Data and Technology. Guidance is available at http://www.epa.gov/quality/qapps.html.

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Examples of the Required Level of Effort for Phase II ESAs at Typical Sites

Recognized Environmental Concerns	Contaminant of Concern	Geophysical Survey (GPR) recommended	Waste & Surface Samples	Soil Sampling				Groundwater Sampling		
				Preferred Method	# of Probes	Suggested Depths	Groundwater Sampling	Preferred Method	Comments	Estimated Range of Phase II Costs
Single UST	Product Stored	Yes	Soils/Sediments near line and remote or direct fill port	Soil Probes	2 per tank (minimum of)	Into water table or 10 ft below tank bottom	Yes – variable depths	Temporary well points-upgradient and downgradient	1	Low
Multiple USTs	Product Stored	Yes	Soils/Sediments near lines and remote or direct fill port(s)	Soil Probes	2 per tank or tank cluster (minimum of)	Into water table or 10 ft below tank bottom	Yes-variable depths	Temporary well points-upgradient and downgradient	1	Medium
Former Drum Storage Area	Product Stored	Yes	Surface soils, stained soils	Soil Probes	1 per ten drums stored or 1 per 0.25 acre	3 depths (1 ft bgs, 5 ft bgs, and water table)	Yes-variable depths	Temporary well points	1.2	Medium
Area of Suspect Fill Material	Various	Yes – If Phase I shows UST/AST history	Surface soils/ waste piles	Soil Probes	1 per 0.25 acre	2 depths (surface and 5 feet into native or natural material in-cluding)	Yes-variable depths	Temporary well points for small sites, wells for large sites	3	Medium depend-ing on size of area
Drywells/ Leachpools	Products Used on Site	Yes – for on-site drains/sumps	Bottom sediments	Soil Probes	1 per suspect location	3 depths (bottom, 5 feet below bottom & water table	Yes	Temporary well points adjacent to leachpool/drywell		Low
Former Dryc-leaners	VOC's	No	Surface soils, stained soils	Soils Probes or borings	As above per suspect loca-tion	As above per condi-tion	Yes	Temporary well point		Medium to High depending on site conditions
Former Gasoline Stations	VOC's, SVOC's, metals	Yes	Surface soils, stained soils	Soil Probes	As above per suspect loca-tion	As above per condi-tion	Yes-variable depths	Temporary well point - upgradient and downgradient	1.2, 4	Medium to High depending on site conditions
Junk Yard/ Au-tomobile Salvage	VOC's, SVOC's, metals	Yes	Surface soils, stained soils	Soil Probes	1 per suspect location, areas of stained soils	Surface soils pro-posed excavation depths	Yes-variable depths	Temporary well point- upgradient and downgradient	4	Medium depend-ing on size of area
Metal Plating/ Finishing	Metals, cya-nide, VOC's, SVOC's	Yes	Surface soils, stained soils, ACM	Soil Probes/ borings	1 per suspect location	Surface soils pro-posed excavation depths, watertable	Yes-variable depths	Minimum of one upgradient and two downgradient temporary well points	4	High
Small Industrial Sites (1 to 2 acres)	Various-Products Used	Yes	Surface soils, stained soils, ACM	Soil Probes/ borings	1 per suspect location	Surface soils pro-posed excavation depths, watertable	Yes	Additional temporary well points at potential One upgradient and two downgra-dient well points		High
Large Industrial Sites (2+ acres)	Various-Products Used	Yes	Surface soils, stained soils, ACM	Soil Probes & borings	1 per suspect location	Surface soils pro-posed excavation depths, watertable	Yes	Minimum of one upgradient and two downgradient temporary well points Additional well pointss at potential recommended	4	Very High

Comments:
Monitoring Wells needed if free products is found
Nearby catchbasins and drywells should also be examined
Fill materials should be adequately characterized for disposal
Fuel oil, waste oil tanks and any drywells should be investigated

Key to Estimated Phase II Costs:
Low- $1,000 to $15,000
Medium-$15,000 to $30,000
High-$30,000 to $50,000
Very High- $50,000 plus
Note this is only a guide to potential costs. If significant contamination is found the costs to determine the nature and extent of the contamination rise dramatically.

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TITLE 15, CHAPTER 24 OF THE RULES OF THE CITY OF NEW YORK

§24-01 AUTHORITY

These rules are promulgated pursuant to §1403 of the Charter of the City of New York and in accordance with §11-15(c), the Zoning Resolution of the City of New York.

§24-02 APPLICABILITY

These rules shall apply in connection with the environmental review pursuant to City Environmental Quality Review (CEQR) of any Zoning Map Amendment subject to review and approval pursuant to §§197-c and 197-d of the New York City Charter where one or more tax lots in the area subject to the Zoning Map Amendment and not under the control or ownership of the person seeking such Zoning Map Amendment, have been identified by the Lead Agency as likely to be developed as a direct consequence of the action. These rules shall not apply to the environmental review by the City of a Zoning Map Amendment as it affects property under the control or ownership of such person, which shall be conducted in accordance with CEQR requirements governing the review of potential hazardous material contamination or noise or air quality impacts for such property.

§24-03 DEFINITIONS

The following definitions shall apply to this rule, §24-01 et seq., unless the text specifically indicates otherwise.

CEQR. "CEQR" shall mean the City Environmental Quality Review, Chapter 5 of Title 62 of the Rules of the City of New York.

CEQR TECHNICAL MANUAL. "CEQR Technical Manual" shall mean the City Environmental Quality Review Technical Manual issued by OEC in December 1993 together with any updates, supplements and revisions thereto.

CITY. "City" shall mean the City of New York.

CONTAMINATION. "Contamination," "Contaminated," or "to Contaminate" shall mean the effect(s) on a tax lot(s) from hazardous materials, hazardous substances, hazardous wastes and/or petroleum.

DAY. "Day" shall mean a business day.

DCP. "DCP" shall mean the New York City Department of City Planning.

DEC. "DEC" shall mean the New York State Department of Environmental Conservation.

DEPARTMENT. "Department" shall mean the New York City Department of Environmental Protection.

DEVELOPMENT. "Development", or "Develop" shall mean a change of use and/or any work on a tax lot(s) that involves soil disturbance, including, but not limited to demolition, grading, or excavation related to the construction, enlargement, and/or extension of a new or existing structure(s) on a tax lot(s).

DEVELOPMENT SITE. "Development Site" shall mean a tax lot(s) located within the area of a proposed Zoning Map Amendment which is not under the control or ownership of the applicant for such Zoning Map Amendment and which the Lead Agency has identified pursuant to CEQR as likely to be developed as a direct consequence of the Zoning Map Amendment.

DOB. "DOB" shall mean the New York City Department of Buildings.

(E) DESIGNATION. "(E) Designation" shall mean the designation of an "E" on the Zoning Map pursuant to §11-15 of the Zoning Resolution of the City of New York.

EPA. "EPA" shall mean the United States Environmental Protection Agency.

HAZARDOUS MATERIAL. "Hazardous Material" shall mean any material, substance, chemical, element, compound, mixture, solution, product, solid, gas, liquid, waste, byproduct, pollutant, or contaminant which when released into the

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environment may present a substantial danger to the public health or welfare or the environment, including, but not limited to those classified or regulated as "hazardous" or "toxic" pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C.A. §9601 (1995) et seq., the Resource Conservation and Recovery Act (RCRA) 42 U.S.C.A. §6901 (1995) et seq., the Clean Water Act (CWA), 33 U.S.C.A. §1251 (1986) et seq., the Clean Air Act (CAA) 42 U.S.C.A. §7401 (1995) et seq., Toxic Substances Control Act (TSCA), 15 U.S.C.A. §2601 (1998) et seq., Transportation of Hazardous Materials Act, 49 U.S.C.A. §5101 (1997) et seq., the Hazardous Substances Emergency Response Regulations, 15 RCNY Chap. 11, and/or the List of Hazardous Substances, 6 NYCRR Part 597.

HAZARDOUS WASTE. "Hazardous Waste" shall mean any waste, solid waste or combination of waste and solid waste listed or regulated as a hazardous waste or characteristic hazardous waste pursuant to RCRA, 42 U.S.C.A. §6901 (1995), et seq. and/or Identification and Listing of Hazardous Wastes, 6 NYCRR Part 371, et seq.

LEAD AGENCY. "Lead Agency" shall mean the agency responsible under CEQR for the conduct of environmental review in connection with a Zoning Map Amendment.

NOTICE OF SATISFACTION. "Notice of Satisfaction" shall mean a written notice issued by the Department pursuant to §24-07 of this rule documenting completion of all applicable (E) Designation requirements under this rule.

OEC. "OEC" shall mean the New York City Mayor's Office of Environmental Coordination.

OWNER. "Owner" shall mean the person, including his or her successors or assigns, who is the recorded title holder of a tax lot(s).

PARTIES-IN-INTEREST. "Parties-in-Interest" shall mean any person with an enforceable property interest in a tax lot(s).

PE COMPLETION CONFIRMATION. "PE Completion Confirmation" shall mean a written notice of completion of a Department approved remediation plan from a Professional Engineer, in a form acceptable to the Department.

PERSON. "Person" shall mean any individual, trust, firm, corporation, joint stock company, association, partnership, consortium, joint venture, commercial entity or governmental entity.

PETROLEUM. "Petroleum" shall mean oil or petroleum of any kind and in any form, including, but not limited to oil, petroleum, fuel oil, oil sludge, oil refuse, oil mixed with other waste, crude oil, gasoline and kerosene.

PROJECT SITE. "Project Site" shall mean a tax lot(s) that is under the control or ownership of the applicant for the removal of an (E) Designation from the Zoning Map and is subject to proposed development by such applicant.

RESTRICTIVE DECLARATION. "Restrictive Declaration" shall mean an instrument recorded against a tax lot(s) in the county office of land records and executed by all Parties-in-Interest to such tax lot(s), setting forth restrictions and enforcement provisions with respect to implementation of a Remediation Plan pursuant to §24-07 of these rules.

TAX LOT. "Tax Lot" shall mean a tax lot identified by parcel number on the official tax maps of the City of New York.

ZONING MAP. "Zoning Map" shall have the meaning set forth in §12-10 of the Zoning Resolution of the City of New York.

ZONING MAP AMENDMENT. "Zoning Map Amendment" shall mean a proposed amendment to the Zoning Map subject to review and approval pursuant to §§197-c and 197-d of the New York City Charter.

§24-04 PRELIMINARY SCREENING

a. The Lead Agency may prepare or may cause to be prepared a preliminary screening assessment consisting of visual or historical documentation of any of the following past or current uses at a Development Site, and/or other tax lot(s) that might have affected or be affecting a Development Site.

(1) Incinerators;

(2) Underground and/or above ground storage tanks;

(3) Active solid waste landfills;

(4) Permitted hazardous waste management facilities;

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(5) Inactive hazardous waste facilities;

(6) Suspected hazardous waste sites;

(7) Hazardous substance spill locations;

(8) Areas known to contain fill material;

(9) Petroleum spill locations;

(10) Any past use identified in Appendix A.

b. Based on the visual or historical documentation prepared under subsection (a), the Lead Agency may determine that an (E) Designation should be placed on the Zoning Map for the tax lot(s) identified under subsection (a) in connection with adoption of the Zoning Map Amendment. In making such determination, the Lead Agency may consult with the Department.

c. A Phase I Environmental Site Assessment pursuant to §24-05 shall not be required prior to placement of an (E) Designation on the Zoning Map pursuant to this Section.

§24-05 PHASE I ENVIRONMENTAL SITE ASSESSMENT

d. For any Development Site that has not received an (E) Designation following review of visual or historical documentation pursuant to §24-04, the Lead Agency shall conduct, or shall cause to be conducted, a Phase I Environmental Site Assessment (Phase I ESA).

e. The Phase I ESA may be limited to:

(1) Historical land use review;

(2) Regulatory agency list review; and

(3) Site and surrounding area reconnaissance visit.

f. A report entitled "Phase I ESA Report" and any supplements thereto, summarizing the Phase I ESA shall be prepared by or for the Lead Agency and a copy of such report shall be provided to the Department. The Phase I ESA Report shall include any information discovered in the Phase I ESA. The Department may provide the Lead Agency with any additional information it deems relevant together with any comments regarding the contents of the Phase I ESA and any supplements thereto within twenty (20) days of receipt of the Phase I ESA Report.

g. The Lead Agency shall respond to the Department's comments and any additional information either by placing or causing DCP to place an (E) on the Zoning Map for the relevant tax lot(s) or by issuing a Final Phase I ESA Report that addresses any such comments and/or additional information. The Lead Agency shall inform the Department of such determination.

§24-06 PHASE II ENVIRONMENTAL SITE ASSESSMENT

h. Before an applicant may seek any building permit for development from DOB with respect to a tax lot(s) subject to an (E) Designation, the applicant shall:

(1) Complete a Phase II Environmental Site Assessment (Phase II ESA) in accordance with this section to determine the level and extent of contamination at the proposed Project Site; or

(2) Submit to the Department historical, regulatory or other evidence that a Phase II ESA is not required for the proposed Project Site, which the Department shall review in accordance with §24-09.

i. The applicant shall prepare and submit to the Department a Work Plan to undertake the Phase II ESA, prepared in accordance with the CEQR Technical Manual. Such Work Plan shall also include:

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(1) A detailed description of the proposed Project Site;

(2) A detailed description of the proposed development at the Project Site;

(3) A description of the projected time frame for development at the Project Site;

(4) A description of the proposed use of the Project Site;

(5) Copies of reports of any previous investigations related to the presence or suspected presence of contamination on the Project Site.

j. Where applicable and at a minimum, the following procedures or requirements shall be implemented in the Phase II ESA for all sampling techniques and methods:

(1) All samples shall be analyzed by a laboratory accredited by the New York State Department of Health Environmental Laboratory Approval Program (ELAP);

(2) Samples from sites on the DEC Registry of Inactive Hazardous Waste Sites shall use a laboratory certified under EPA's Contract Laboratory Program or DEC's Analytical Services Program (ASP);

(3) EPA SW-846, 40 C.F.R. 261, which delineates the EPA Target Compound List/Target Analyte List, or an EPA approved successor method shall be used;

(4) Toxicity Characteristic Leaching Procedure, Method 1311, as delineated in EPA SW-846, 40 C.F.R. 261, or an EPA approved successor method shall be used.

k. The Department will review the Work Plan in accordance with §24-09.

l. The applicant shall undertake the Work Plan as approved by the Department.

m. Upon completion of the Phase II ESA, a report entitled "Phase II ESA Report" summarizing the Phase II ESA shall be submitted to the Department. The Phase II ESA Report shall include:

(1) A summary of the findings of all the studies and/or investigations performed;

(2) A description of all assessment reconnaissance techniques in accordance with applicable Federal and State laws and Department guidelines;

(3) Sampling Results, which shall be presented in summary tables and compared to all relevant State and Federal guidance values, standards and regulations;

(4) Maps of the tax lots (1"=50') including but not limited to: USGS quadrangle map, name of quad and North arrow, on which the following is clearly indicated:

(i) All physical site characteristics with location of all soil borings, soil gas points, groundwater monitoring wells, USTs, vent lines, fill lines, and other pertinent information;

(ii) Where relevant based on the conditions of the Project Site, a depiction of groundwater elevation and flow direction;

(iii) Where relevant based on the conditions of the Project Site, a soil-gas concentration map with contours; and

(iv) All identified sources of releases and the extent and concentrations of contaminant plumes in all media.

(5) Appendices, which shall include:

(i) All raw data,

(ii) Laboratory methods,

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(iii) Chain-of-custody forms,

(iv) QA/QC plan,

(v) Field notes,

(vi) Soil boring/monitoring well logs,

(vii) As-built well construction details,

(viii) Modeling programs used,

(ix) Calculations and formulas, and

(x) Physical/chemical properties of chemical compounds of concern.

(6) An assessment, based on findings of the Phase II ESA, of whether or not a Remediation Plan is required for the Project Site.

n. The applicant may submit a Remediation Plan with the Phase II ESA Report.

o. The Department will review the Phase II ESA Report in accordance with §24-09.

p. Upon completion of its review of the Phase II ESA Report, the Department will determine whether a Remediation Plan is required.

(1) If the Department determines that a Remediation Plan is not required, the Department will issue a Notice of Satisfaction letter to DOB;

(2) If a Remediation Plan has been submitted, the Department will review it in accordance with §§24-07 and 24-09;

(3) If the Department determines that a Remediation Plan is required and a Remediation Plan has not already been submitted by the applicant, the applicant shall submit a Remediation Plan for review by the Department in accordance with §§24-07 and 24-09.

§24-07 REMEDIATION PLAN

q. Preparation of the Remediation Plan.

(1) Before an applicant may seek any building permits from DOB with respect to a tax lot(s) subject to an (E) Designation, where the Department has determined that Remediation Plan is required pursuant to §24-06, the applicant shall prepare a Remediation Plan. The Remediation Plan shall address all aspects of contamination, actual and/or potential, identified in the Phase II ESA Report, including, but not limited to:

(i) Elevated levels of contaminants pursuant to applicable law and/or DEC guidelines;

(ii) The sources of contamination;

(iii) The exposure pathways for contamination;

(iv) Environmental exposure to contamination;

(v) Human health exposure to contamination;

(vi) Proposed cleanup criteria;

(vii) Health and Safety of construction workers on the tax lot(s); and

(viii) Health and Safety of the public and future users of the tax lot(s) within the constraints of technical feasibility, remedial technology, and monitoring requirements.

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(2) In preparing a Remediation Plan, the applicant shall consider all applicable remediation techniques, including, but not limited to, those set forth in the CEQR Technical Manual. The Remediation Plan shall include a list of all techniques considered and an explanation for the acceptance or rejection of those techniques.

(3) The Department shall review the Remediation Plan in accordance with §24-09.

(4) In conjunction with its review of the Remediation Plan, the Department may require execution of a Restrictive Declaration by the owner, or the owner's designee approved by the Department, for the tax lot(s) subject to the (E) Designation.

(i) The Restrictive Declaration shall bind the owner, or the owner's designee approved by the Department, to performance of the Remediation Plan in accordance with its terms, and shall include restrictions upon development of the subject tax lot(s);

(ii) In accordance with the Remediation Plan, the Restrictive Declaration may require monitoring or other measures that extend beyond the issuance of a Temporary Certificate of Occupancy or a Certificate of Occupancy for the Project Site;

(iii) The Restrictive Declaration shall include a procedure for Department review of satisfaction of any requirements contained in the Restrictive Declaration pursuant to this subsection and release therefrom; and

(iv) The Restrictive Declaration shall be executed by all Parties-in-Interest to such tax lot(s) and shall be recorded against such tax lot(s) in the applicable county office of land records.

r. Implementation of the Remediation Plan.

(1) Prior to implementation of the Remediation Plan, the applicant shall:

(i) Provide the Department with ten (10) days written notice of such planned implementation; and

(ii) A copy of the recorded Restrictive Declaration, if such was required by the Department.

(2) After the Department has reviewed and approved the Remediation Plan in accordance with §24-09 and a Restrictive Declaration, if required by the Department, has been completed in accordance with paragraph (4) of subsection a. of this section, the Department may recommend to DOB issuance of such building permit or permits as are necessary to undertake the approved Remediation. In no event, however, shall the applicant seek or accept from DOB a Temporary Certificate of Occupancy or a Certificate of Occupancy until the Department issues a Notice of Satisfaction pursuant to paragraph (2) of subsection (c) of this section.

(3) If implementation of a Department-approved Remediation Plan does not commence within one year of the date of the Department's approval thereof, such approval shall expire.

(i) The applicant may request in writing to extend a Department approval for a Remediation Plan not less than thirty (30) days prior to the expiration of such Department approval.

(a) Any written request for an extension shall explain the circumstances for the delay in implementation of the Remediation Plan and document that the Remediation Plan remains valid.

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(b) The Department shall review a written request for an extension by the applicant in accordance with §24-09.

(ii) If an approval for a Remediation Plan expires, the Applicant shall:

(a) Submit a new Remediation Plan for Department review in accordance with §24-09; or

(b) Submit a written request for a renewed approval of the expired Remediation Plan.

(1) Any written request for a renewed approval shall explain the circumstances for the delay in implementation of the Remediation Plan and document that the Remediation Plan remains valid.

(2) The Department will review a written request for an extension by the Applicant in accordance with §24-09.

(3) The Department shall have the right to inspect any tax lot(s) subject to remediation pursuant to this rule with respect to the remediation, consistent with applicable health and safety regulations, and the applicant shall allow any such inspection by the Department.

s. Completion of the Remediation Plan.

(1) Upon the completion of the Department-approved Remediation Plan or written confirmation of completion of a substantially equivalent remediation from New York State, the applicant shall deliver to the Department, a PE Completion Confirmation in a form satisfactory to the Department.

(i) Requirements for monitoring or other measures in the Remediation Plan that extend beyond the issuance of a Temporary Certificate of Occupancy or a Certificate of Occupancy for the Project Site and are included in a Restrictive Declaration in accordance with paragraph (4) of subsection a of this section, shall not preclude the issuance of a PE Completion Confirmation.

(2) Upon the Department's review and approval of the PE Completion Confirmation, the Department shall issue a Notice of Satisfaction to the applicant, OEC, DOB and DCP within ten (10) days.

(i) The Notice of Satisfaction shall specify that the environmental requirements relating to the (E) Designation have been satisfied and if applicable, a summary of any requirements for monitoring or other measures in the Remediation Plan that extend beyond the issuance of a Temporary Certificate of Occupancy or a Certificate of Occupancy for the Project Site that have been included in a Restrictive Declaration in accordance with paragraph (4) of subsection a of this section.

§24-08 SATISFACTION OF (E) DESIGNATION REQUIREMENTS

t. Issuance of the Notice of Satisfaction by the Department constitutes the Department's report specifying that the environmental requirements relating to the (E) Designation have been satisfied.

u. The owner of any tax lot(s) subject to an (E) Designation may file a copy of a Notice of Satisfaction with the Department of City Planning. Upon receipt of such Notice of Satisfaction, DCP shall indicate such satisfaction as to the affected tax lot(s) on the listing of (E) Designations appended to the Zoning Map.

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v. When DCP has received Notices of Satisfaction for all tax lot(s) specified in the CEQR declaration with respect to the placement of an (E) Designation on the Zoning Map, it shall administratively remove such (E) Designation from the Zoning Map.

w. DCP shall notify DOB, OEC and DEP in writing of the satisfaction of (E) Designation requirements for a tax lot(s) or of the removal of an (E) Designation from a Zoning Map.

§24-09 DEPARTMENT REVIEW AND APPROVAL PROCEDURE

a. At the written request of the applicant, the Department will conduct a pre-submission conference with the applicant regarding the required contents of any submission required pursuant to §§24-06 and 24-07 of this rule and the schedule for proceeding with such submission.

b. Upon initial receipt of a submission required pursuant to this rule, the Department will review such submission and provide written comments within thirty (30) days of receipt of such initial submission.

c. If the Department requests additional information or a revised submission, the applicant shall resubmit the submission for review.

1. Revised submissions will be reviewed by the Department as expeditiously as possible;

2. Upon receipt of all information requested, the Department shall issue comments in writing with respect to the submission within thirty (30) days.

d. If the applicant disagrees with the Department's comments, the applicant shall have thirty (30) days, or such time as agreed upon by the Department and the applicant, to respond.

e. Upon receipt and review of all required submissions, the Department will issue its determination either approving or disapproving the submission within thirty (30) days.

f. If at any point in its review of a submission by the applicant, the Department requires more than the specified time period for the review, the Department will notify the applicant in writing of the necessity of such additional time.

g. If at any time the Department fails to provide written comments within a time period specified under this section, or such time as agreed upon by the Department and the applicant, and fails to provide written notice of the necessity of additional time, the applicant may submit a written notification to the Department requesting that any comments be provided within thirty (30) days.

§24-10 NOTIFICATION

a. Discovery of a petroleum spill or discharge on a tax lot(s) by the Department and/or the applicant must be reported in accordance with applicable Federal, State or local laws.

b. Discovery of evidence of "reportable quantities" of hazardous materials or hazardous wastes by the Department and/or the applicant on a tax lot(s) that pose a potential or actual significant threat to public health or the environment under Federal, State or local guidelines, must be reported in accordance with applicable Federal, State or local laws.

§24-11 LEAD AGENCY RECORDS/AGENCY CONSULTATION

a. The Lead Agency shall maintain a single file containing copies of all Phase I ESA Reports issued pursuant to §24-05 of this rule, together with the relevant Environmental Assessment Statement, Environmental Impact Statement, or other CEQR determinations made in connection therewith.

b. The Department, DCP, and OEC shall meet and confer on a periodic basis concerning the implementation of this rule.

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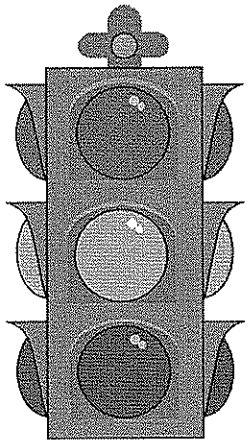
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INTERSECTION CONTROL ANALYSIS

LOCATION

New York City
Department of Transportation

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ELECTED OFFICIAL ACKNOWLEDGMENTS

Location_____

Borough_____ Reference #_____ CB# _____

Date notification was sent out _____

BOROUGH PRESIDENT _____

CONGRESS MEMBER _____

STATE SENATOR _____

ASSEMBLY MEMBER _____

COUNCIL MEMBER _____

C.B. MANAGER _____

REQUESTOR _____

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Signal Approval

Location

❒ RECOMMENDATION

❒ APPROVAL

❒ DENIAL

MELITA JAMES
Chief, Intersection Control Unit

Date

❒ APPROVAL

❒ DENIAL

ERNEST ATHANAILOS, P.E.
Director of Signals and ITS Engineering

Date

❒ APPROVAL

❒ DENIAL

ALAN BOROCK, P.E.
Director of Signal Operations & Street Lighting

Date

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Intersection Control Unit

Location: _____

File#: _____

Request: _____

Requestor: _____

Date: _____

Determination: _____

Comments:

Based upon our evaluation of data collected, it is our judgment that a traffic signal be approved under Warrant _____

_____

Melita James
Chief, Intersection Control Unit

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INTRODUCTION

A comprehensive investigation of traffic conditions and physical characteristics of the location is required to determine the necessity for a signal installation and to furnish necessary data for the proper design and operation of a signal that is found to be warranted. Such data is included in this Intersection Control Analysis.

An engineering study of traffic conditions, pedestrian characteristics, and pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.

The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

Warrant 1, Eight-Hour Vehicular Volume.
Warrant 2, Four-Hour Vehicular Volume.
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network.

Source: Manual on Uniform Traffic Control Devices (MUTCD) – FHWA
November ~~2003~~ 2009 Edition

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STUDY AREA MAP

THE STUDY AREA MAP SHOULD INCLUDE THE FOLLOWING:

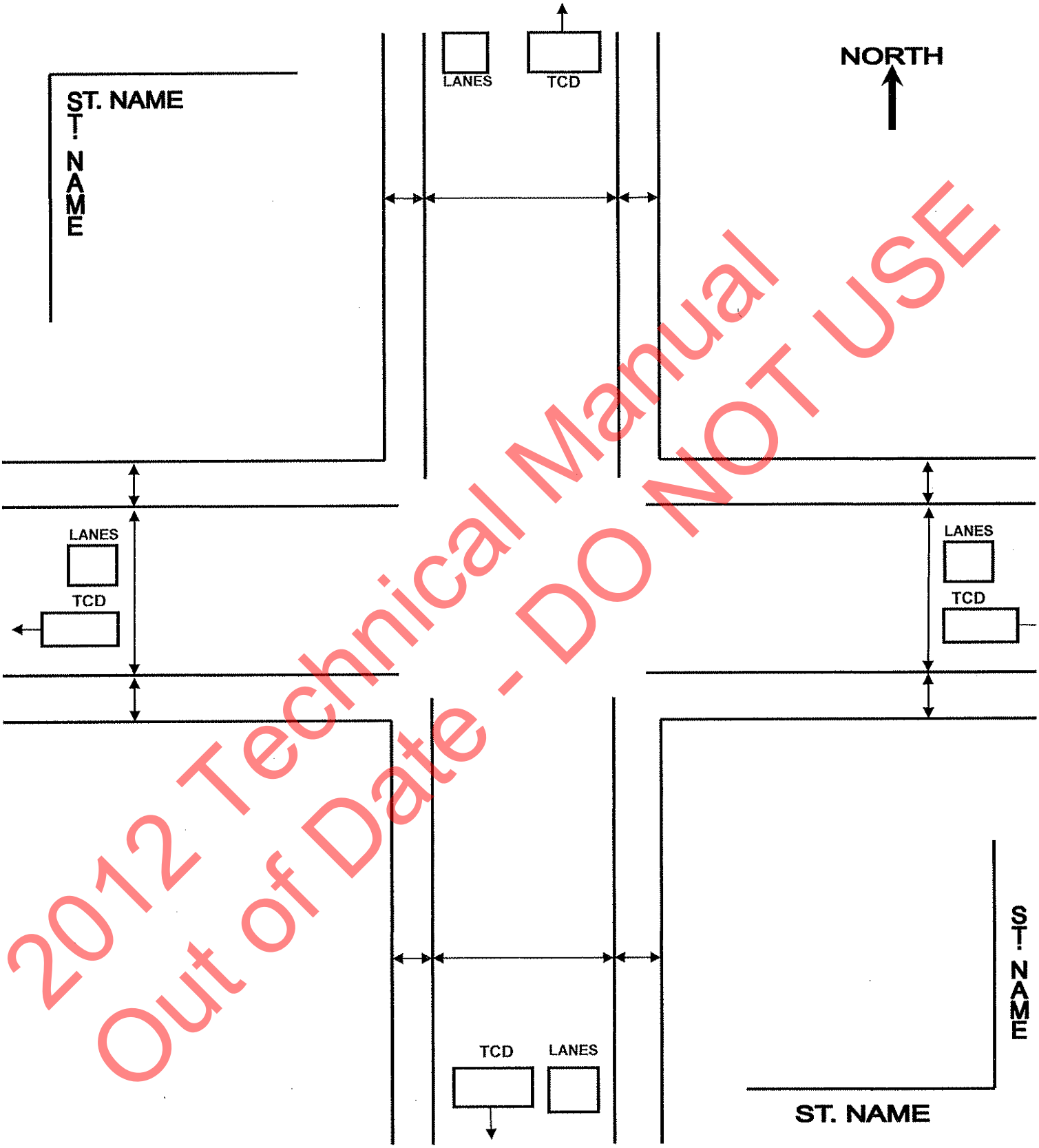
A. LOCATION OF REQUESTED SIGNAL IS TO BE HIGHLIGHTED BY A RED CIRCLE.

B. AN OFFICIAL SCHOOL MAP MAY BE USED AS A SUBSTITUTE.

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CONDITION DIAGRAM

Ref#_____ Date: _____ Day:_____ Inspector:_____



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TCD = DISTANCE TO NEAREST TRAFFIC CONTROL DEVICE (Feet)
LANES = NUMBER OF MOVING LANES

NOTE: Indicate all curb regulations, street furniture, curb cuts, and a pavement markings related to the intersection. The # of lane observed are the traveled lanes for each approach; parking lanes are not included. Show street direction by placing an arrow(s), indicating direction on all legs of the intersection.

CONDITION DIAGRAM

Ref#_____ Date: _____ Day:_____ Inspector:_____



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Out of Date - DO NOT USE

TCD = DISTANCE TO NEAREST TRAFFIC CONTROL DEVICE (Feet)
LANES = NUMBER OF MOVING LANES

NOTE: Indicate all curb regulations, street furniture, curb cuts, and a pavement markings related to the intersection. The # of lane observed are the traveled lanes for each approach; parking lanes are not included. Show street direction by placing an arrow(s), indicating direction on all legs of the intersection.

Survey Sheet



Block Front Survey

Reference: _____

Borough: _____

Date: _____

Inspector: _____

Street: _____

Side of St. _____

from: _____

to: _____

Type of Parking

Passenger _____%

Commercial _____%

Type of Area

Residential _____%

Commercial _____%

Industrial _____%

Other _____%

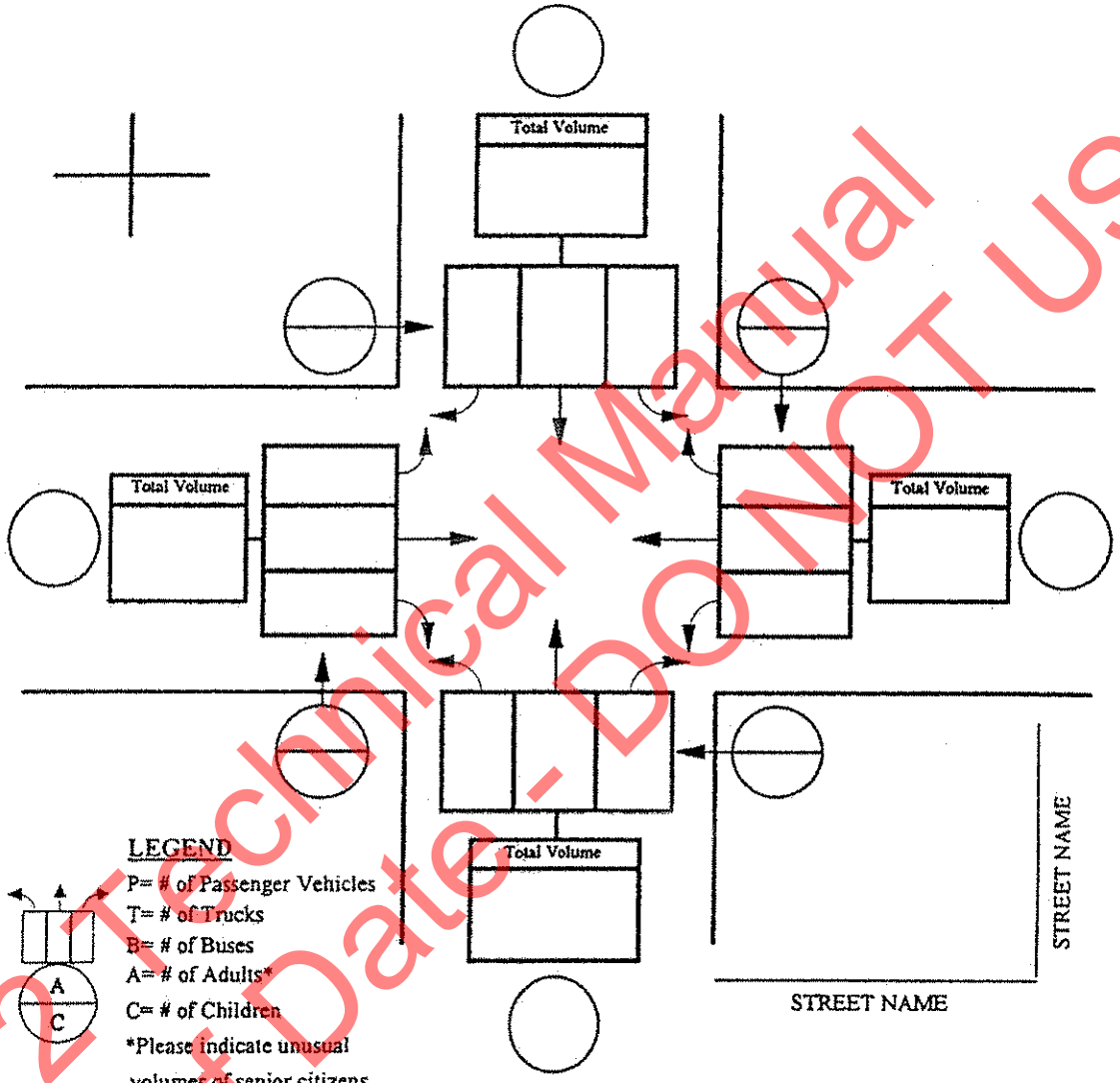
Comments: _____

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VOLUME CLASSIFICATION AND TURNING COUNTS

DATE:_____ TIME:_____

DAY:_____ INSPECTOR:_____



2012 Technical Manual
Out of Date - DO NOT USE

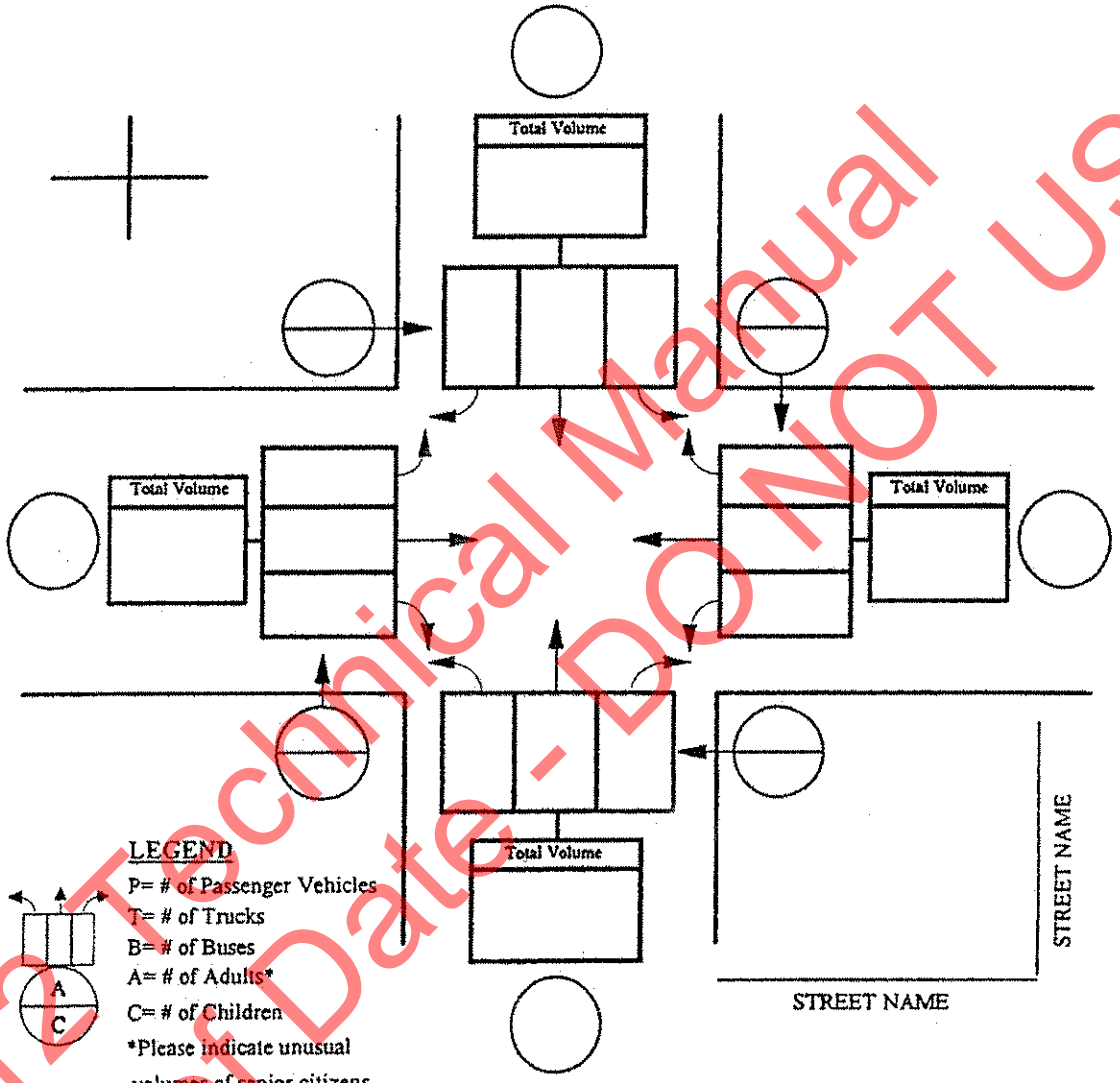
COMMENTS:

MAJOR	
MINOR	
PEDS	
SC	
Other	

VOLUME CLASSIFICATION AND TURNING COUNTS

DATE:_____ TIME:_____

DAY:_____ INSPECTOR:_____



COMMENTS:

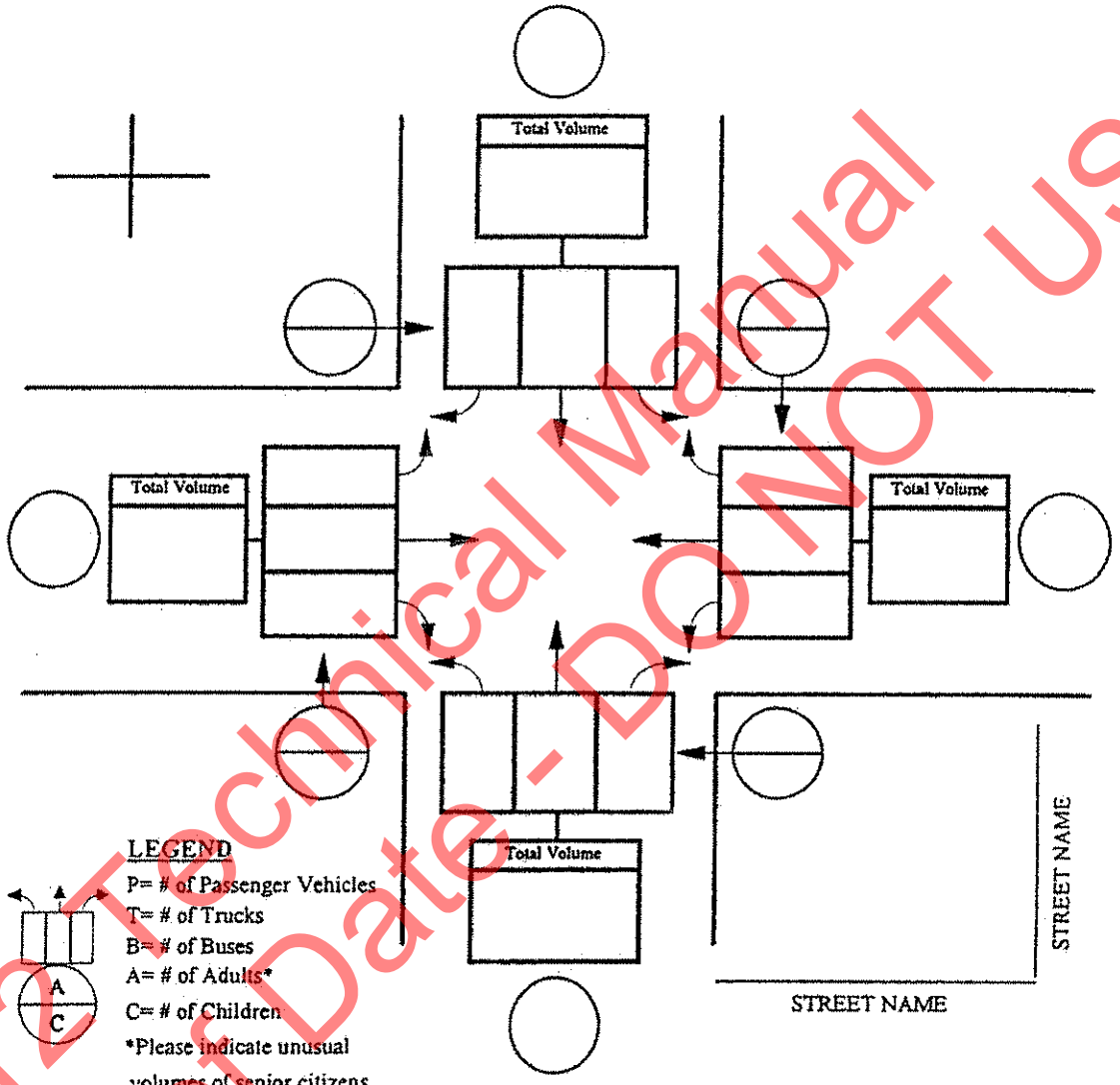
MAJOR	
MINOR	
PEDS	
SC	
Other	

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Out of Date - DO NOT USE

VOLUME CLASSIFICATION AND TURNING COUNTS

DATE:_____ TIME:_____

DAY:_____ INSPECTOR:_____



COMMENTS:

MAJOR	
MINOR	
PEDS	
SC	
Other	

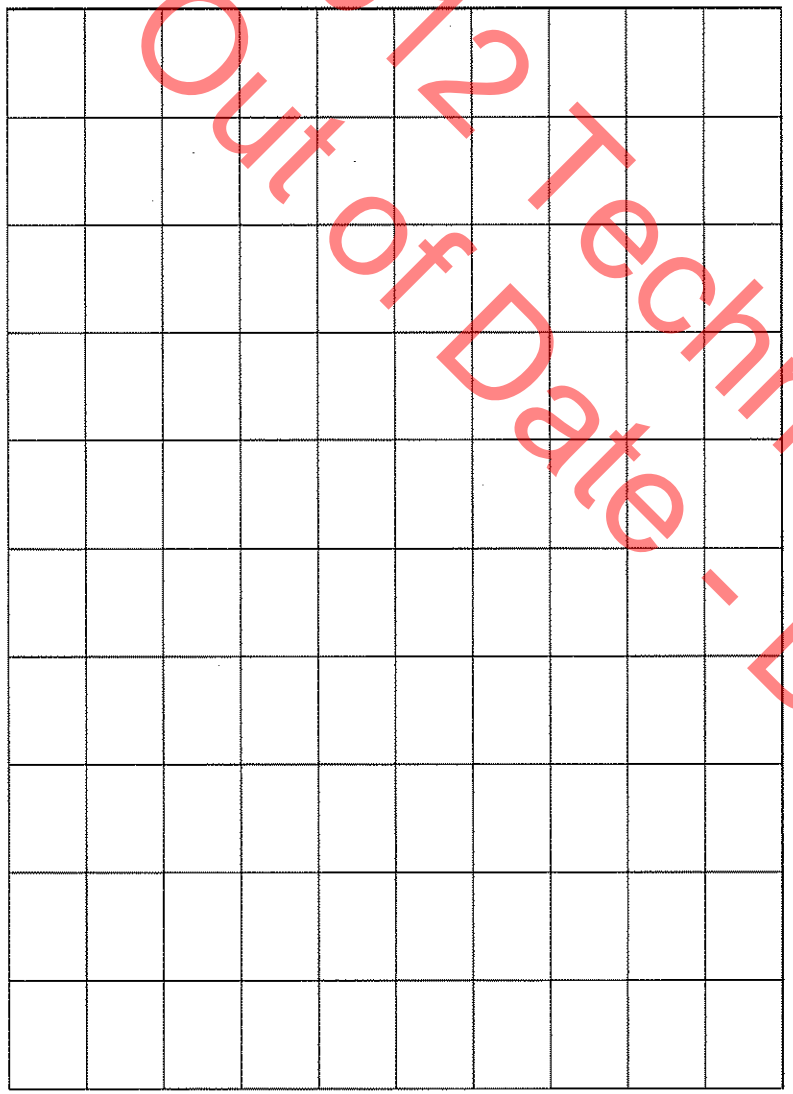
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REF. _____ START: _____ END: _____

WEATHER _____ DIRECTION: _____

MPH SPEED LIMIT: _____ POSTED: _____

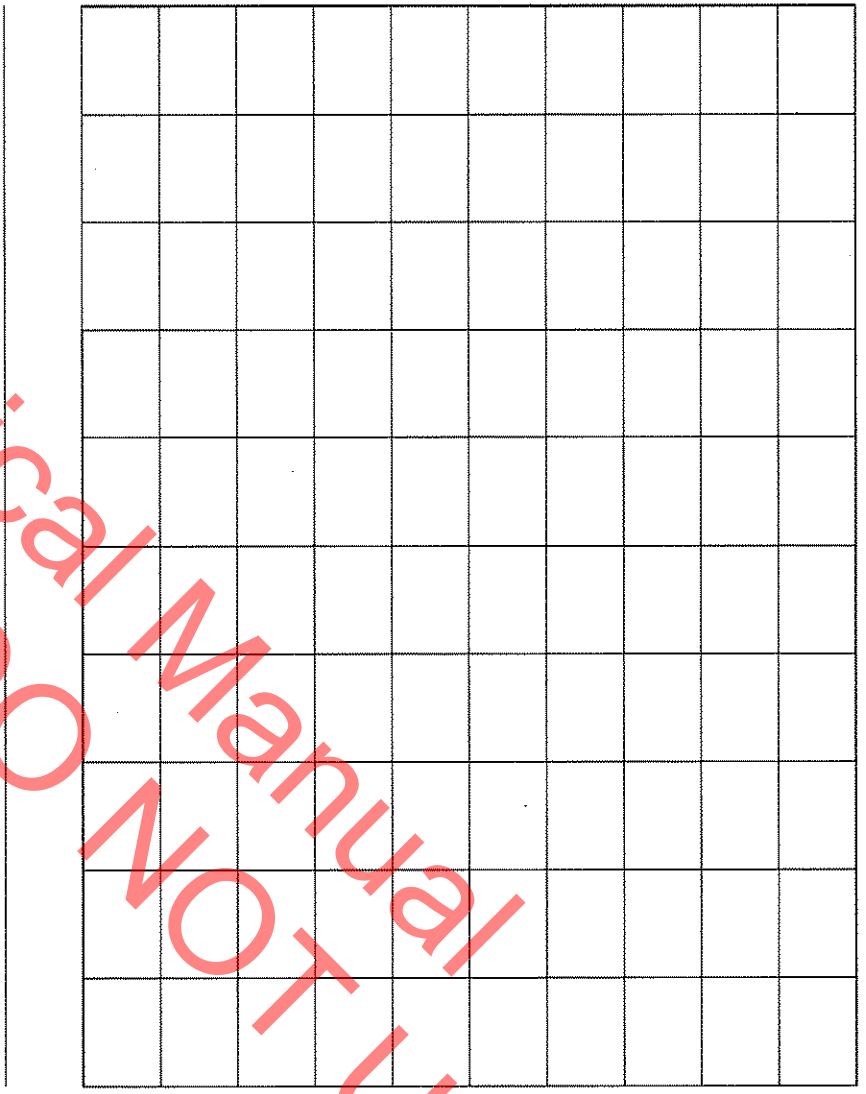
(MAJOR)



DATE: _____ START: _____ END: _____

DAY: _____ DIRECTION: _____

UNPOSTED: _____



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WARRANT ANALYSIS

INSPECTOR:_____ School X-Walk_____ GAP DATE & TIMES # OF GAPS VS. # OF MIN

School X-ING Guard_____

LOCATION: _____ _____ / / : - .M _____ MIN

85% SPEED:_____ B= _____ B=_____ / / : - .M _____ MIN

POSTED_____ MPH / UNPOSTED_____ / / : - .M _____ MIN

REFERENCE#_____ ATR'S _____

DISTANCE TO THE NEAREST TRAFFIC CONTROL DEVICE ON MAJOR STREET _____Feet

Warrant 1, Eight-Hour Vehicular Volume _____

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		MAJOR STREET VOLUMES Vehicles per hour on major street (total of both approaches)				MINOR STREET VOLUMES Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	Observer	100%[a]	80%[b]	70%[c]	Observer
1.....	1.....	500	400	350		150	120	105	
2 or more...	1.....	600	480	420		150	120	105	
2 or more...	2 or more...	600	480	420		200	160	140	
1.....	2 or more...	500	400	350		200	160	140	

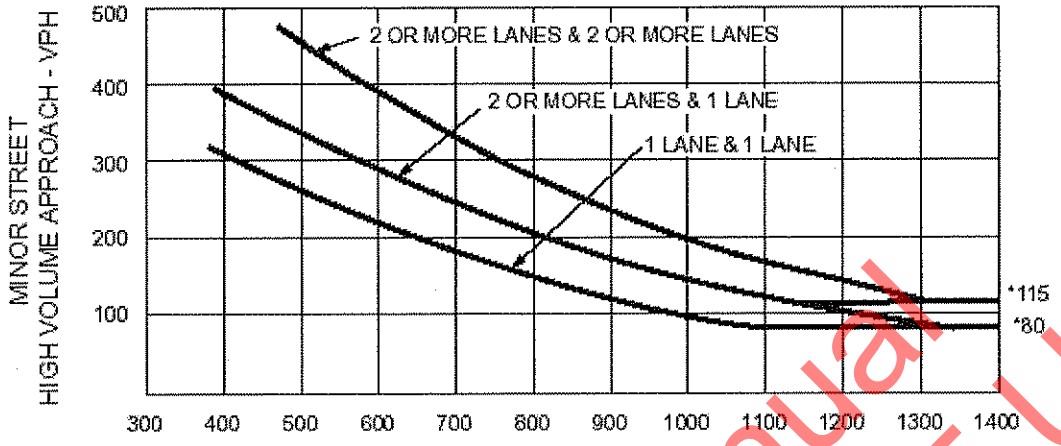
Condition B – Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		MAJOR STREET VOLUMES Vehicles per hour on major street (total of both approaches)				MINOR STREET VOLUMES Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	Observer	100%[a]	80%[b]	70%[c]	Observer
1.....	1.....	750	600	525		75	60	53	
2 or more...	1.....	900	720	630		75	60	53	
2 or more...	2 or more...	900	720	630		100	80	70	
1.....	2 or more...	750	600	525		100	80	70	

[a] Basic minimum hourly volume.
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures.
[c] May be used when the major street speed exceeds 70 km/h (40 mph) or in an isolated community with a population of less than 10,000.

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Warrant 2 – Four-Hour Vehicular Volume

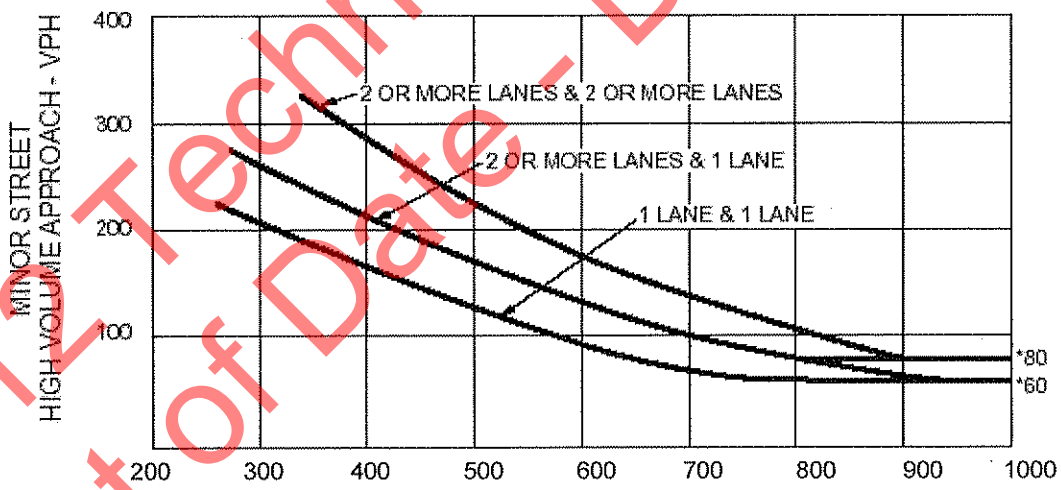


MAJOR STREET - TOTAL OF BOTH APPROACHES – VEHICLES PER HOUR (VPH)

*Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane.

Warrant 2 - Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)



MAJOR STREET - TOTAL OF BOTH APPROACHES – VEHICLES PER HOUR (VPH)

*Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

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WARRANT 3, PEAK HOUR 

INTERSECTION DELAY STUDY

TOTAL DELAY = TOTAL VEHICLES STOPPED * SAMPLING INTERVAL

= _____ * 15 = _____ Veh. Sec.

AVERAGE DELAY PER APPROACH VEHICLE = $\frac{\text{TOTAL DELAY}}{\text{APPROACH VOLUME}}$ = _____

= _____ Sec.

AVERAGE DELAY FOR WARRANT 3 = AVERAGE DELAY * PEAK HOUR VOLUME FROM MACHINE COUNTS

= _____ * _____

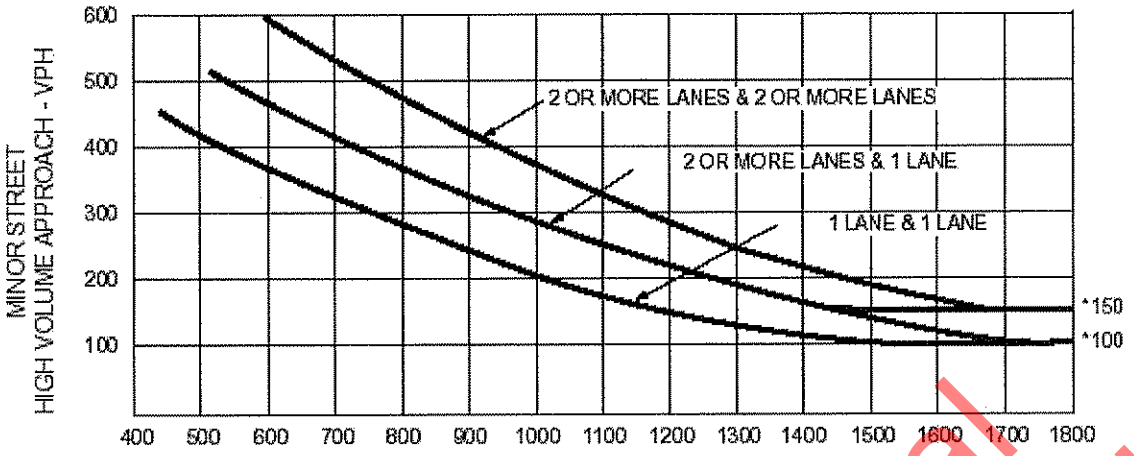
= _____ Veh. -Sec.

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NOTE:

The above information will be used for the Warrant 3 – Peak Hour analysis.

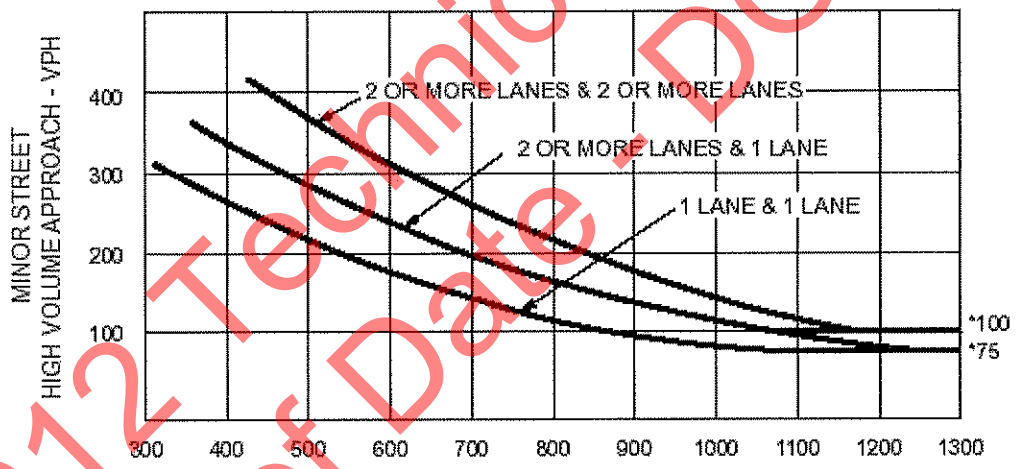
Warrant 3 - Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Warrant 3 - Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

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REVISED

WARRANT 4, PEDESTRIAN VOLUME ☐

*SEE LAST THREE PAGES OF DOCUMENT

WARRANT 5, SCHOOL CROSSING ☐

DATE	TIME		VOLUMES				DEFAULTS	
			STREET		PEDESTRIANS		ALL	SCHOOL/ ELDERLY
			MAJOR	MINOR	ALL	SC/ ELDERLY	> 100	> 75
		AM						
		PM						

WARRANT 6, COORDINATED SIGNAL SYSTEM ☐

The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

Note: The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less that 300 m (1000 ft).

WARRANT 7, CRASH EXPERIENCE ☐

ACC. TIME PERIOD	ACCIDENT TYPE											PREV. Acc.'s before N.R.'s	PREV. Acc.'s after N.R.'s
12 MONTH PERIOD	T	NR									PEDS		

Highest # of Preventables in any 12 month period: ___/___/___ - ___/___/___ # of Preventable Accidents _____

Comments: _____

Improvements/Changes: _____

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WARRANT 8, ROADWAY NETWORK



The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:

A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday, or

B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a nonnormal business day (Saturday or Sunday).

A major route as used in this signal warrant shall have one or more of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow, or

B. It includes rural or suburban highways outside, entering, or traversing a city, or

C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

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FIELD OBSERVATION REPORT

LOCATION:_____

BOROUGH: _____ DATE: _____

TIME: _____ OBSERVER: _____

OPERATIONAL CHECKLIST:	**NO**	**YES**	**WHERE AND WHAT**
1. Are there any obstructions blocking the view of opposing or conflicting vehicles?	____	____	_____
2. Are drivers complying with intersection controls?	____	____	_____
3. Are Speed limit signs posted?	____	____	_____
4. Is vehicle delay causing a safety problem?	____	____	_____
5. Is the approach grade causing safety problems?	____	____	_____
6. Do you recommend more stringent enforcement of any regulations?	____	____	_____
7. Are signs faded, turned or defaced?	____	____	_____
8. Do pavement markings have to be installed or refurbished? e.g.: STOP messages, STOP lines, lane lines, crosswalks, etc.)	____	____	_____
9. Is there a need to install channelizations to reduce conflict areas?	____	____	_____
10. Do signs exist in field match current C-Order?	____	____	_____
11. Other	____	____	_____

NOTE: (N/A) NOT APPLICABLE

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Section 4C.05 Warrant 4, Pedestrian Volume

Support:

01 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

02 **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**

- **A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or**
- **B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

Standard:

04 **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

05 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

Guidance:

06 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

- *A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
- *B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
- *C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

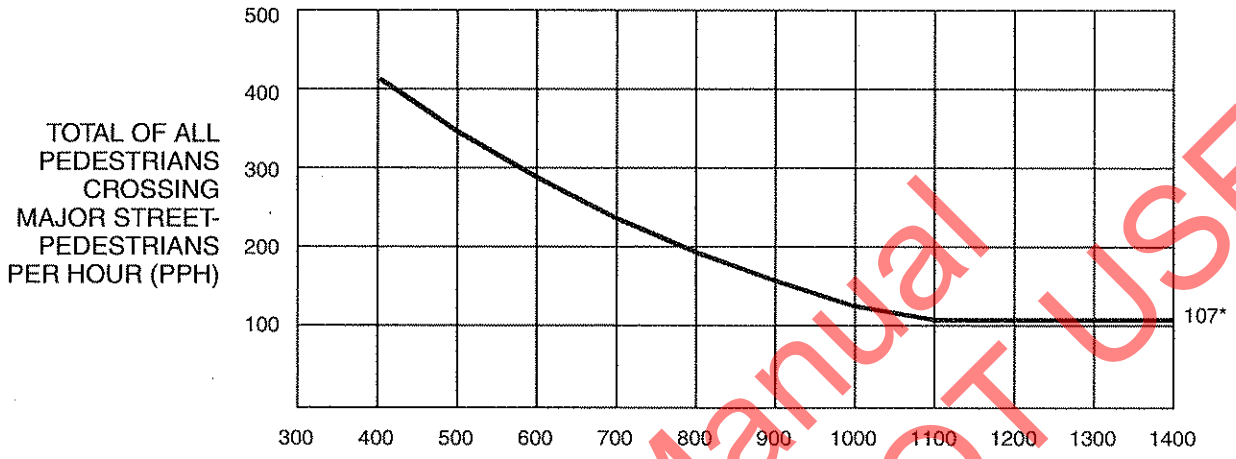
Option:

07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

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Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



*Note: 107 pph applies as the lower threshold volume.

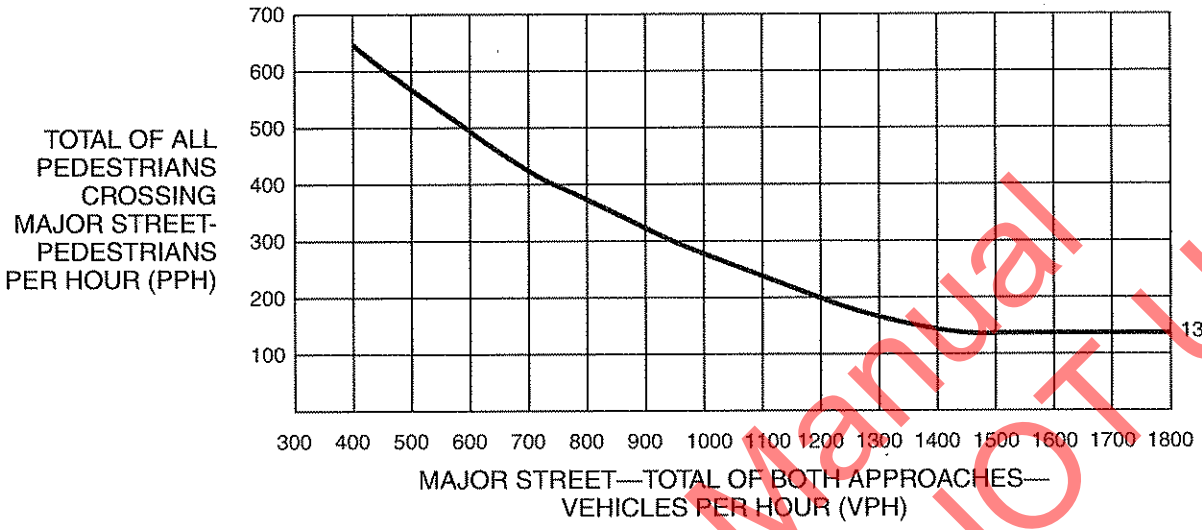
Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

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Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

2009 Technical Manual Out of Date - DO NOT USE

DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC

Rev. (06-14-00)

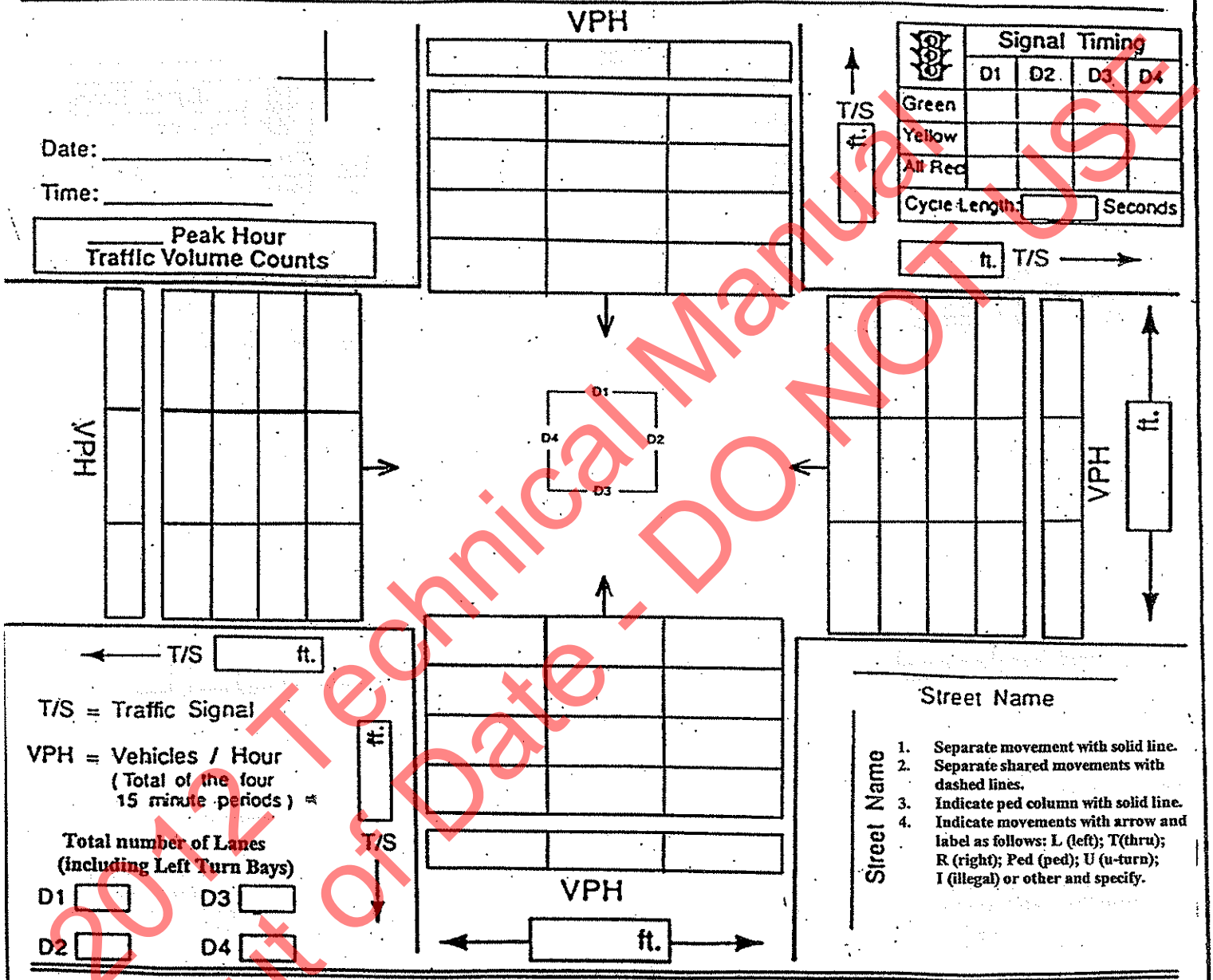
Left Turn Signal Survey Sheet

Borough: _____ BT #: _____ Ref. #: _____

Location: _____ CB #: _____

Requestor: _____ Investigator: _____

Date Completed: _____



Borough Engineer: _____ Date: _____

Reviewed ☐ _____ Date: _____ Satisfied ☐

Recommended ☐ _____ Date: _____ Warrant # ☐

Denied ☐ _____ Date: _____ Not Satisfied ☐

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NEW YORK CITY
DEPARTMENT OF TRANSPORTATION
BUREAU OF TRAFFIC

Left Turn Signal Survey Sheet

Borough: _____ BT #: _____ Ref. #: _____

Location: _____ CB #: _____

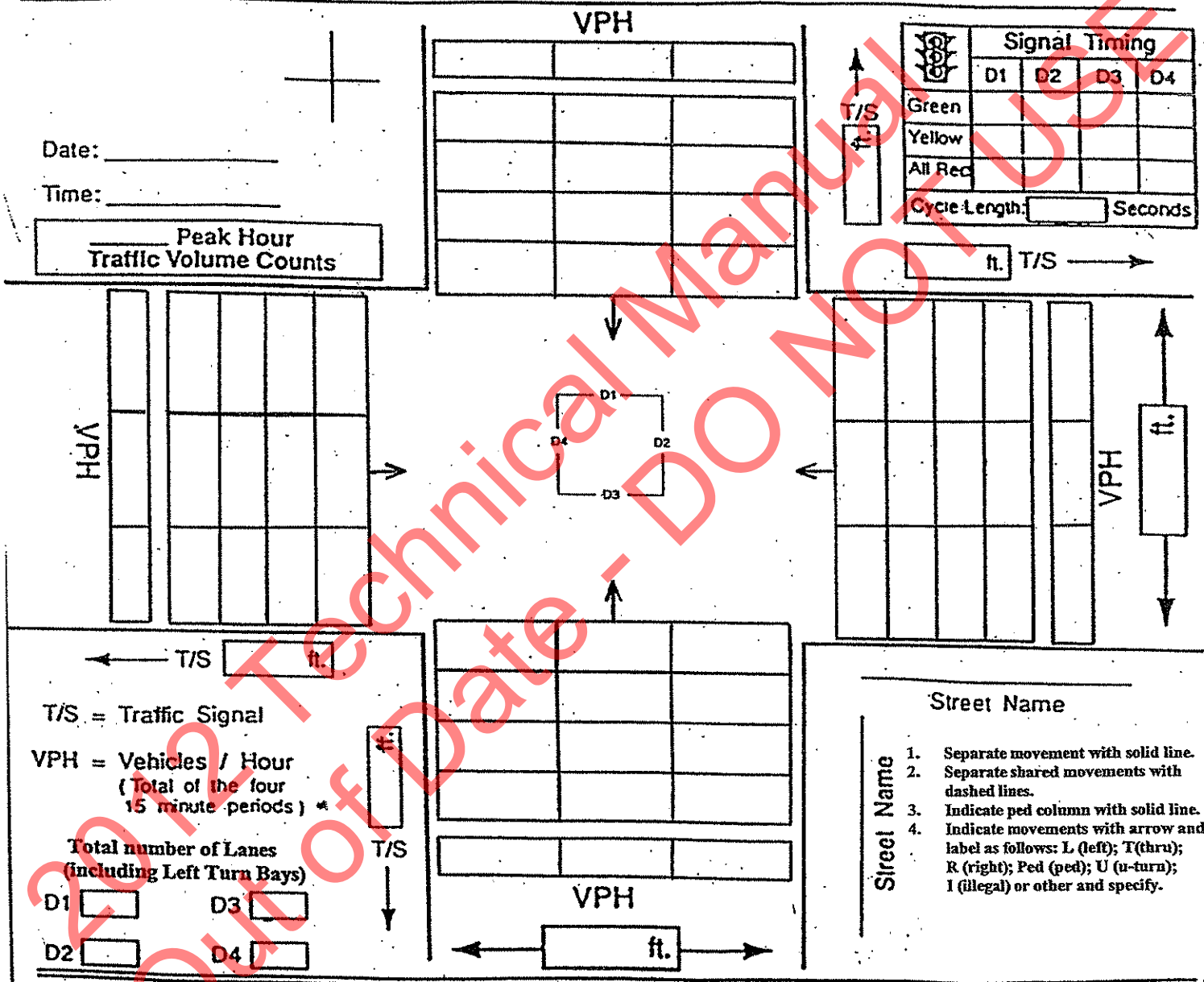
Requestor: _____ Investigator: _____

Date Completed: _____

Date: _____

Time: _____

_____ Peak Hour
Traffic Volume Counts



1. Separate movement with solid line.
2. Separate shared movements with dashed lines.
3. Indicate ped column with solid line.
4. Indicate movements with arrow and label as follows: L (left); T(thru); R (right); Ped (ped); U (u-turn); I (illegal) or other and specify.

Borough Engineer: _____ Date: _____

Reviewed ☐ _____ Date: _____ Satisfied ☐

Recommended ☐ _____ Date: _____ Warrant # ☐

Denied ☐ _____ Date: _____ Not Satisfied ☐

2012 Technical Manual
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Left Turn Signal Warrant Sheet

WARRANT 1 (Accident Experience)

Satisfied ☐
Not Satisfied ☐

This Warrant is satisfied when a minimum of 5 related left turn accidents exist in the latest 12 month period in which accident records are available.

Year	Total Accidents	Left Turn Accidents

Accident sheets must be attached.

WARRANT 2 (Left Turn Capacity)

Satisfied ☐
Not Satisfied ☐

This Warrant is satisfied when for the analyzed direction the Left-Turn flow rate exceeds the left-turn capacity.

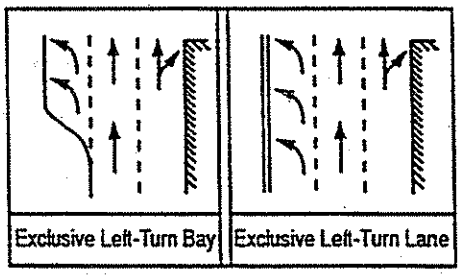
The left-turn capacity is the maximum flow rate that may be assigned to the designated phase.

- On approaches with exclusive left-turn bays / lanes, the left-turn capacity is computed by using the following equations:

(1A) $C_{ELT} = (1{,}400 - V_o)(g/c)_{LT}$

or

(2) C_{ELT} = 2 vehicles per signal cycle



where:

C_{ELT} = capacity of the left-turn protected / permitted phase, in vph;

V_o = opposing thru plus right-turn service flow rate*, in vph, and

$(g/c)_{LT}$ = effective green** ratio for the protected / permitted phase, in seconds.

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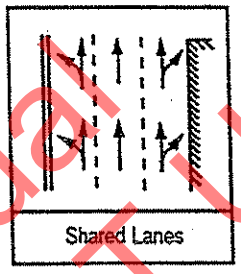
* Service flow rate is the equivalent hourly rate at which vehicles pass a roadway during a given time interval less than one hour, usually 15 minutes.

Service flow rate = (highest 15 minute count) × 4.

** Effective green time is the time during a given phase that is effectively available to the permitted movements; this is generally taken to be the green time (G) plus the change interval (Y + AR) minus the lost time (3.0 seconds) for the designated phase.

On approaches with shared left-turn and thru vehicles, the left-turn capacity is computed by using the following equations:

(1B) $C_{SLT} = [(1400 - V_o)(g/c)_{LT}]\, f_{SLT}$



Or

(2) $C_{SLT} =$ 2 vehicles per signal cycle

where:

C_{SLT} = capacity of the left-turn in the shared lane, in vph;

f_{SLT} = adjustment factor for left-turn vehicles

The adjustment factor basically accounts for the fact that the left-turn movements cannot be made at the same saturation flow rates as thru movements. They consume more of the available green time, and consequently, more of the intersection's available capacity.

The adjustment factor is computed as the ratio of the left-turn flow rate (which is converted to an approximate equivalent flow of thru vehicles) to the thru vehicles that share the same lane.

The following TABLE 1 may be used to convert the left -turn vehicles to equivalent thru vehicles.

TABLE 1

TOTAL OPPOSING FLOW RATE (V_o)	CONVERSION FACTOR (f_{PCE})	TOTAL OPPOSING FLOW RATE (V_o)	CONVERSION FACTOR (f_{PCE})
0 - 200	1.50	1001 - 1050	5.00
201 - 500	2.00	1051 - 1075	5.50
501 - 700	2.50	1076 - 1100	6.00
701 - 800	3.00	1101 - 1125	6.50
801 - 900	3.50	1126 - 1145	7.00
901 - 950	4.00	> 1146 *	
951 - 1000	4.50		

*Use exclusive Left-Turn lane procedure.

Comments: _____

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COMPUTATIONS
EXCLUSIVE LEFT-TURN LANE

Opposing Thru Plus Right Turn Service Flow Rate

V_o = (highest 15 minute count) × 4

V_o = [ ] × 4 = [ ] vph

Left Turn Service Flow Rate
(Direction analyzed for Left-Turn Phase)

V_{LT} = (highest 15 minute count) × 4

V_{LT} = [ ] × 4 = [ ] vph

Left Turn Capacity

$$C_{ELT} = (1400 - V_o)(g/c)_{LT}$$

where:

g = [G + Y + AR − 3.0] × f_q* = [ ] × [ ] = [ ] seconds

* Adjustment factor used to calculate the portion of the green phase that is not blocked by an opposing queue of vehicles. The f_q factor is given for each case in TABLE 2.

TABLE 2

OPPOSING THRU LANES	f_q
1	0.85
2	0.90
≥ 3	0.95

c = cycle length = [ ] seconds

thus, $(g/c)_{LT}$ = [ ]

and

C_{ELT} = (1400 − [ ])([ ])$_{LT}$ = [ ] vph

or

C_{ELT} = 2 vehicles per signal cycle

$$C_{ELT} = 2 \times \frac{3600}{C} = [\ ] \text{ vph}$$

V_{LT} = [ ] vph [>] or [<] C_{ELT}** = [ ] vph

** Select the highest left turn capacity

- If V_{LT} (left turn service flow rate) is greater than ([>]) the C_{ELT} (left turn capacity), the Warrant is satisfied and a left turn phase is needed.
- If V_{LT} is less than ([<]) the C_{ELT}, the Warrant is not satisfied because the signal and geometric design can accomodate the left turn volume at the intersection.

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COMPUTATIONS

SHARED LEFT-TURN / THRU LANE

Adjustment Factor for Left-Turn Vehicles

(Opposing Thru Plus Right Turn Service Flow Rate)

V_o = (highest 15 minute count) × 4

V_o = [ ] × 4 = [ ] vph

Using TABLE 1, f_{PCE} = [ ]

V_{TV} = [ ] × 4 = [ ] vph

where: V_{TV} = Thru vehicles in the shared lane.

Left Turn Service Flow Rate

(Direction analyzed for Left-Turn Phase)

V_{LT} = (highest 15 minute count) × 4

V_{LT} = [ ] × 4 = [ ] vph

$V_{PCE} = V_{LT} \times f_{PCE}$ = [ ] × [ ] = [ ] vph

$f_{SLT} = \frac{V_{PCE}}{V_{TV} + V_{PCE}}$ = [ ] / ([ ] + [ ]) = [ ]

Left Turn Capacity

$C_{SLT} = [(1400 - V_o) (g / c)_{LT}] f_{SLT}$

TABLE 2

OPPOSING THRU LANES	f_q
1	0.85
2	0.90
≥ 3	0.95

where:

$g = [G + Y + AR - 3.0] \times f_q$ = [ ] × [ ] = [ ] seconds

c = cycle length = [ ] seconds thus, $(g / c)_{LT}$ = [ ]

and

C_{SLT} = [(1400 − [ ]) ([ ])$_{LT}$] × [ ] = [ ] vph

or

C_{SLT} = 2 vehicles per signal cycle

$C_{SLT} = 2 \times \frac{3600}{c}$ = [ ] vph

V_{LT} = [ ] vph [>] or [<] C^*_{SLT} = [ ] vph

* Select the highest left turn capacity

- If V_{LT} (left turn service flow rate) is greater than ([>]) the C_{SLT} (left turn capacity), the Warrant is satisfied and a left turn phase is needed.
- If V_{LT} is less than ([<]) the C_{SLT}, the Warrant is not satisfied because the signal and geometric design can accomodate the left turn volume at the intersection.

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Level of Service Criteria (LOS) at Signalized Intersections	
LOS	**Control Delay per Vehicle (s/veh)**
A	≤ 10
B	$> 10 - 20$
C	$> 20 - 35$
D	$> 35 - 55$
E	$> 55 - 80$
F	> 80
Source: Transportation Research Board, *Highway Capacity Manual 2000*	

Level of Service Criteria at Unsignalized Intersections	
LOS	**Average Control Delay (s/veh)**
A	$0 - 10$
B	$> 10 - 15$
C	$> 15 - 25$
D	$> 25 - 35$
E	$> 35 - 50$
F	> 50
Source: Transportation Research Board, *Highway Capacity Manual 2000*	

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TOP HIGH ACCIDENT INTERSECTIONS 2010

INTERSECTION	NUMBER	RANK	BORO
PENNSYLVANIA AV \ LINDEN BL	60	1	BROOKLYN
J ROBINSON PY EN EB \ JAMAICA AV \ PENNSY	43	2	BROOKLYN
LIBERTY AV \ VAN WYCK EP SR W	42	3	QUEENS
ATLANTIC AV \ VAN WYCK EP SR W	42	3	QUEENS
UNION TP \ WOODHAVEN BL	41	5	QUEENS
ATLANTIC AV \ PENNSYLVANIA AV	41	5	BROOKLYN
BROOKVILLE BL \ S CONDUIT AV	40	7	QUEENS
ADAMS ST \ TILLARY ST	37	8	BROOKLYN
3 AV \ CROSS BX SVC RD S	37	8	BRONX
FLATBUSH AV EX \ TILLARY ST	36	10	BROOKLYN
EASTERN PY EX \ ATLANTIC AV	36	10	BROOKLYN
METROPOLITAN AV \ WOODHAVEN BL	35	12	QUEENS
NORTHERN BL \ UNION ST	35	12	QUEENS
AV J \ OCEAN PY	35	12	BROOKLYN
AV O \ CONEY ISLAND AV	35	12	BROOKLYN
HILLSIDE AV \ VAN WYCK EP SR W	35	12	QUEENS
QNSBORO BR AP \ 2 AV \ E 59 ST	34	17	MANAHATTAN
WHITESTONE EP SR W \ 20 AV	34	17	QUEENS
ATLANTIC AV \ NOSTRAND AV	34	17	BROOKLYN
EASTERN PY \ BUFFALO AV	34	17	BROOKLYN
BRUCKNER BL \ HUNTS POINT AV	34	17	BRONX
BROOKVILLE BL\ ROCKAWAY BL	33	22	QUEENS
LINDEN BL \ VAN WYCK EP SR W	32	23	QUEENS
CLEARVIEW EP SR W \ NORTHERN BL	32	23	QUEENS

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INTERSECTION	NUMBER	RANK	BORO
QUEENS BL \ 63 DR \ 63 RD	31	25	QUEENS
ROCKAWAY BL \ 150 RD \ UNNAMED ST \ GUY	30	26	QUEENS
LINDEN BL \ ROCKAWAY AV	30	26	BROOKLYN
E FORDHAM RD \ DR KAZIMIROFF BL	30	26	BRONX
EASTERN PY \ UTICA AV	30	26	BROOKLYN
WOODHAVEN BL \ 101 AV	29	30	QUEENS
WOODHAVEN BL \ CROSS BAY BL \ ROCKAWA	29	30	QUEENS
WEBSTER AV \ E GUN HILL RD	29	30	BRONX
3 AV \ E 57 ST	29	30	MANAHATTAN
8 AV \ W 34 ST	28	34	MANAHATTAN
CHRYSTIE ST \ DELANCEY ST	28	34	MANAHATTAN
GRND CNTRL PY ET EB \ GRND CNTRL PY SR W	28	34	QUEENS
GOWANUS EP \ CENSUS BLK BNDY	28	34	BROOKLYN
QUEENS BL \ 65 PL	27	38	QUEENS
WEBSTER AV \ E FORDHAM RD	27	38	BRONX
11 AV \ W 33 ST	27	38	MANAHATTAN
AV U \ FLATBUSH AV	27	38	BROOKLYN
COLLEGE POINT BL \ GRND CNTRL PY EN WB \	27	38	QUEENS
CANAL ST \ BOWERY	27	38	MANAHATTAN
BRUCKNER BL\ WHITE PLAINS RD	27	38	BRONX
JAMAICA AV \ WOODHAVEN BL	27	38	QUEENS
W 42 ST \ 11 AV	26	46	MANAHATTAN
QUEENS BL \ SKILLMAN AV	26	46	QUEENS
AMSTERDAM AV \ W 125 ST	26	46	MANAHATTAN
JAMAICA AV \ VAN WYCK EP SR W \ METROPO	26	46	QUEENS
FLATLANDS AV \ PAERDEGAT AV S \ RALPH AV	26	46	BROOKLYN
KINGS HY \ REMSEN AV	25	51	BROOKLYN
QUEENS BL \ VAN DAM ST	25	51	QUEENS
108 ST \ HOR HARDING EP SR N	25	51	QUEENS

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INTERSECTION	NUMBER	RANK	BORO
BEDFORD AV \ ATLANTIC AV	25	51	BROOKLYN
DIST BNDY \ OCEAN AV \ EMPIRE BL \ FLATBUS	25	51	BROOKLYN
ESSEX ST \ DELANCEY ST	25	51	MANAHATTAN
LINDEN BL \ 234 ST	24	57	QUEENS
TYSENS LA \ HYLAN BL	24	57	STATEN ISLAND
AMSTERDAM AV \ W 181 ST \ WASHINGTON BR	24	57	MANAHATTAN
BRUCKNER BL \ LONGWOOD AV	24	57	BRONX
DITMAS AV \ OCEAN PY	24	57	BROOKLYN
NORTHERN BL \ PARSONS BL	23	62	QUEENS
MAJOR DEEGAN EN NB \ E 135 ST \ WILLIS AV	23	62	BRONX
W 34 ST \ 7 AV	23	62	MANAHATTAN
2 AV \ E 34 ST	23	62	MANAHATTAN
75 AV \ METROPOLITAN AV	23	62	QUEENS
AV I \ OCEAN PY	23	62	BROOKLYN
ATLANTIC AV \ CRESCENT ST	23	62	BROOKLYN
KENSINGTON AV \ HYLAN BL	23	62	STATEN ISLAND
CLARENDON RD \ E 55 ST \ KINGS HY	23	62	BROOKLYN
GRND CNTRL PY SR N \ MAIN ST \ 141 ST	23	62	QUEENS
LOGAN ST \ ATLANTIC AV	22	72	BROOKLYN
LINDEN PL \ WHITESTONE EP SR W	22	72	QUEENS
OCEAN PY \ AV P	22	72	BROOKLYN
\ HUDSON RVR SHL	22	72	MANAHATTAN
ALBANY AV \ ATLANTIC AV	22	72	BROOKLYN
82 ST \ DITMARS BL \ GRND CNTRL PY ET WB \	22	72	QUEENS
BEVERLY RD \ OCEAN PY	22	72	BROOKLYN
FLATBUSH AV \ ATLANTIC AV	22	72	BROOKLYN
CROSS BAY BL \ PITKIN AV	22	72	QUEENS
LEFFERTS BL \ ATLANTIC AV	21	81	QUEENS
LINDEN BL \ UTICA AV	21	81	BROOKLYN

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INTERSECTION	NUMBER	RANK	BORO
UNIVERSITY AV \ W FORDHAM RD \ DR M L KIN	21	81	BRONX
N CONDUIT AV \ SPRINGFIELD BL	21	81	QUEENS
TRIBORO BR ET RP \ 2 AV \ E 125 ST \ TRIBORO	21	81	MANAHATTAN
WASHINGTON AV \ EASTERN PY	21	81	BROOKLYN
ROCKAWAY PY \ FLATLANDS AV	21	81	BROOKLYN
MYRTLE AV \ WOODHAVEN BL	21	81	QUEENS
SNYDER AV \ UTICA AV	21	81	BROOKLYN
3 AV \ E 34 ST	21	81	MANAHATTAN
ARTHUR KILL RD \ RICHMOND AV	21	81	STATEN ISLAND
ATLANTIC AV \ UTICA AV	21	81	BROOKLYN
ATLANTIC AV \ ROCKAWAY AV	21	81	BROOKLYN
E 138 ST \ MAJOR DEEGAN EP	21	81	BRONX
BROOKLYN AV \ EASTERN PY	21	81	BROOKLYN
EASTERN PY \ FRANKLIN AV	21	81	BROOKLYN
LINDEN BL \ NEW YORK AV	20	97	BROOKLYN
NOSTRAND AV \ LINDEN BL	20	97	BROOKLYN
RICHMOND HILL RD \ RICHMOND AV	20	97	STATEN ISLAND
STILLWELL AV \ NEPTUNE AV	20	97	BROOKLYN
SUNRISE HY \ FRANCIS LEWIS BL	20	97	QUEENS
YORK AV \ E 62 ST	20	97	MANAHATTAN
MERRICK BL \ LIBERTY AV	20	97	QUEENS
BAYCHESTER AV \ BARTOW AV	20	97	BRONX
4 AV \ TIMES PZ \ ATLANTIC AV	20	97	BROOKLYN
2 AV \ E 42 ST	20	97	MANAHATTAN
3 AV \ ATLANTIC AV	20	97	BROOKLYN
HOWARD AV \ EASTERN PY EX	20	97	BROOKLYN
GOLD ST \ FLATBUSH AV EX	20	97	BROOKLYN
KINGS HY \ CHURCH AV \ E 58 ST	20	97	BROOKLYN
RICHMOND AV \ FOREST HILL RD	19	111	STATEN ISLAND

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INTERSECTION	NUMBER	RANK	BORO
MOTT AV \ BEACH CHANNEL DR	19	111	QUEENS
MORRIS PK AV \ WHITE PLAINS RD	19	111	BRONX
QUEENS BL \ 108 ST \ 71 AV	19	111	QUEENS
OCEAN PY \ AV S	19	111	BROOKLYN
TROY AV \ EASTERN PY	19	111	BROOKLYN
RALPH AV \ CLARENDON RD \ DITMAS AV	19	111	BROOKLYN
VICTORY BL \ RICHMOND AV	19	111	STATEN ISLAND
UTOPIA PY \ HOR HARDING EP SR S	19	111	QUEENS
MAIN ST \ HOR HARDING EP SR N	19	111	QUEENS
LITTLE NECK PY \ HOR HARDING EP SR N	19	111	QUEENS
UTICA AV \ WINTHROP ST	19	111	BROOKLYN
NEW DORP LA \ HYLAN BL	19	111	STATEN ISLAND
WHITE PLAINS RD \ E GUN HILL RD	19	111	BRONX
ATLANTIC AV \ WASHINGTON AV \ UNDERHILL	19	111	BROOKLYN
3 AV \ 60 ST \ CENSUS BLK BNDY	19	111	BROOKLYN
AV D \ UTICA AV	19	111	BROOKLYN
DELANCEY ST S \ CLINTON ST	19	111	MANAHATTAN
ELDRIDGE ST \ DELANCEY ST	19	111	MANAHATTAN
KINGS HY \ CONEY ISLAND AV	19	111	BROOKLYN
BRUSH AV \ CROSS BX EP ET RP	19	111	BRONX
FLATBUSH AV EX \ PRINCE ST \ WILLOUGHBY ST	19	111	BROOKLYN
E 42 ST \ W 42 ST \ 5 AV	19	111	MANAHATTAN
EASTERN PY EX \ BUSHWICK AV \ VANDERVEER	19	111	BROOKLYN
KINGSTON AV \ EASTERN PY	18	135	BROOKLYN
ROCKAWAY BL \ VAN WYCK EP SR W	18	135	QUEENS
NOSTRAND AV \ EASTERN PY	18	135	BROOKLYN
WATERS PL \ EASTCHESTER RD	18	135	BRONX
LITTLE NECK PY \ NORTHERN BL	18	135	QUEENS
SEAVIEW AV \ ROCKAWAY PY	18	135	BROOKLYN

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TOP HIGH ACCIDENT INTERSECTIONS 2009

INTERSECTION	NUMBER	RANK	BORO
WOODHAVEN BL AND UNION TP	51	1	QUEENS
LINDEN BL AND PENNSYLVANIA AV	49	2	BROOKLYN
ROCKAWAY BL AND BROOKVILLE BL	44	3	QUEENS
LINDEN BL /REMESEN AV/KINGS HWY	41	4	BROOKLYN
BRUCKNER BL AND WHITE PLAINS RD	40	5	BRONX
LIBERTY AV AND IN678 SR	40	5	QUEENS
RMP E 135TH ST TO IN87 AND E 135TH ST	39	7	BRONX
AVENUE U AND FLATBUSH AV	38	8	BROOKLYN
BUSHWICK AV AND E NEW YORK AV	38	8	BROOKLYN
SOUTHERN BL AND E FORDHAM RD	37	10	BRONX
TILLARY ST AND ADAMS ST	37	10	BROOKLYN
NORTHERN BL AND JACKSON AV	37	10	QUEENS
FLATBUSH AV EXT AND TILLARY ST	36	13	BROOKLYN
NORTHERN BL AND UNION ST	36	13	QUEENS
NORTHERN BL AND RMP CIP TO NY25A	34	15	QUEENS
QUEENS BL/VANDAM ST AND THOMSON AV	33	16	QUEENS
FLATLANDS AV AND PAERDEGAT AV S	32	17	BROOKLYN
WEBSTER AV AND E FORDHAM RD	31	18	BRONX
ATLANTIC AV AND PENNSYLVANIA AV	31	18	BROOKLYN
WOODHAVEN BL AND ROCKAWAY BL	31	18	QUEENS
PEARTREE AV AND JEWEL AV	31	18	QUEENS
35TH AV AND IN295 SR	30	22	QUEENS
LINDEN BL AND IN678 SR	30	22	QUEENS
20TH AV AND IN678 SR	29	24	QUEENS

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INTERSECTION	NUMBER	RANK	BORO
NORTHERN BL AND DOUGLASTON PW	29	24	QUEENS
COLLEGE POINT BL AND IN495 SR	29	24	QUEENS
RMP E 125TH ST TO TBB AND E 125TH ST	29	24	MANHATTAN
RICHMOND AV AND ARTHUR KILL RD	28	28	STATEN ISLAND
HYLAN BL AND NEW DORP LA	28	28	STATEN ISLAND
BROADWAY AND W 230TH ST	28	28	BRONX
SPRINGFIELD BL AND IN495 SR	28	28	QUEENS
CLINTON ST AND DELANCEY ST	28	28	MANHATTAN
SOUTHERN PW AND RMP SP TO NY27	28	28	QUEENS
UTICA AV AND EASTERN PW	27	34	BROOKLYN
BAYCHESTER AV AND BARTOW AV	26	35	BRONX
3RD AV AND NO NAME	26	35	BRONX
BRUCKNER BL AND HUNTS POINT AV	26	35	BRONX
ATLANTIC AV AND LOGAN ST	26	35	BROOKLYN
ATLANTIC AV AND UTICA AV	26	35	BROOKLYN
NEW YORK BL/ROCKAWAY BL AND 150TH RD	26	35	QUEENS
QUEENS BL/WOODAHVEN BL AND 59 AV	26	35	QUEENS
WOODHAVEN BL AND JAMAICA AV	26	35	QUEENS
QUEENS BLVD AND SKILLMAN AVE	26	35	QUEENS
AVENUE I AND OCEAN PW	25	44	BROOKLYN
IN495 SR AND 108TH ST	25	44	QUEENS
BOWERY AND DELANCEY ST	25	44	MANHATTAN
VICTORY BL AND RMP WLE TO VICTORY BL	24	47	STATEN ISLAND
AVENUE P AND OCEAN PW	24	47	BROOKLYN
OCEAN PW AND CORTELYOU RD	24	47	BROOKLYN
UTICA AV AND KINGS HW	24	47	BROOKLYN
ATLANTIC AV AND EASTERN PW EXT	24	47	BROOKLYN
E GUN HILL RD AND WHITE PLAINS RD	24	47	BRONX
GRAND BL AND CONCOURSE AND E 165TH ST	24	47	BRONX

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INTERSECTION	NUMBER	RANK	BORO
11TH AV AND W 42ND ST	24	47	MANHATTAN
7TH AV AND W 34TH ST	24	47	MANHATTAN
QUEENS BL AND 58TH ST	24	47	QUEENS
ATLANTIC AV AND 94TH AV	24	47	QUEENS
GRAND CENTRAL PW SR AND 164TH ST	24	47	QUEENS
18TH AV AND OCEAN PW	23	59	BROOKLYN
OCEAN AV AND PARKSIDE AV	23	59	BROOKLYN
SNYDER AV AND KINGS HW	23	59	BROOKLYN
CASTLE HILL AV AND IN95 SR	23	59	BRONX
RALPH AV AND CLARENDON RD	23	59	BROOKLYN
LEXINGTON AV AND E 125TH ST	23	59	MANHATTAN
ESSEX ST AND DELANCEY ST	23	59	MANHATTAN
12TH AV AND W 57TH ST	23	59	MANHATTAN
8TH AV AND W 42ND ST	23	59	MANHATTAN
HYLAN BL AND GUYON AV	22	68	STATEN ISLAND
BRUCKNER BL AND BRUSH AV	22	68	BRONX
AVENUE D AND UTICA AV	22	68	BROOKLYN
UTICA AV AND GLENWOOD RD	22	68	BROOKLYN
ATLANTIC AV AND 5TH AV	22	68	BROOKLYN
ROCKAWAY AV AND ATLANTIC AV	22	68	BROOKLYN
BUSHWICK AV AND EASTERN PW EXT	22	68	BROOKLYN
ROCKAWAY PW AND KINGS HW	22	68	BROOKLYN
UTICA AV AND CLARKSON AV	22	68	BROOKLYN
MAJOR DEEGAN XW AND REST AREA	22	68	BRONX
BAYCHESTER AV AND BOSTON RD	22	68	BRONX
2ND AV AND E 59TH ST	22	68	MANHATTAN
WOODHAVEN BL AND METROPOLITAN AV	22	68	QUEENS
GRAND CENTRAL PW SR AND 254TH ST	22	68	QUEENS
1ST AV AND E 23RD ST	22	68	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
BROADWAY AND	22	68	MANHATTAN
PARK AV AND E 52ND ST	22	68	MANHATTAN
HENRY HUDSON PKWY AND	22	68	MANHATTAN
FLUSHING AV AND CLASSON AV	21	86	BROOKLYN
UNIVERSITY AV TU AND W FORDHAM RD	21	86	BRONX
GRAND ARMY PLAZA And FLATBUSH AV/ E PW	21	86	BROOKLYN
UTICA AV AND WINTHROP ST	21	86	BROOKLYN
UNION TP AND MAIN ST	21	86	QUEENS
12TH AV AND W 34TH ST	21	86	MANHATTAN
RICHMOND AV AND RICHMOND HILL RD	20	92	STATEN ISLAND
BOERUM PL AND LIVINGSTON ST	20	92	BROOKLYN
NEPTUNE AV AND OCEAN PW	20	92	BROOKLYN
BAY PW AND 65TH ST	20	92	BROOKLYN
ATLANTIC AV AND NOSTRAND AV	20	92	BROOKLYN
AVENUE R AND OCEAN PW	20	92	BROOKLYN
UTICA AV AND CHURCH AV	20	92	BROOKLYN
ATLANTIC AV AND TROY AV	20	92	BROOKLYN
ATLANTIC AV AND COURT ST	20	92	BROOKLYN
BEDFORD AV AND ATLANTIC AV	20	92	BROOKLYN
ATLANTIC AV AND RALPH AV	20	92	BROOKLYN
ATLANTIC AV AND 4TH AV	20	92	BROOKLYN
BOSTON RD AND E GUN HILL RD	20	92	BRONX
WEBSTER AV AND E 233RD ST	20	92	BRONX
HUNTS POINT AV AND RMP HUNTS PT AV TO IN895	20	92	BRONX
6TH AV AND W 57TH ST	20	92	MANHATTAN
NORTHERN BL AND ASTORIA BL	20	92	QUEENS
WOODHAVEN BL AND 101ST AV	20	92	QUEENS
BROOKVILLE BL AND S CONDUIT AV	20	92	QUEENS
PARK AV AND E 34TH ST	20	92	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
CONCOURSE VILLAGE E AND E 161ST ST	19	112	BRONX
LINDEN BL AND CHURCH AV	19	112	BROOKLYN
EMPIRE BL AND FLATBUSH AV	19	112	BROOKLYN
PROSPECT AV AND 4TH AV	19	112	BROOKLYN
LENOX AV AND W 125TH ST	19	112	MANHATTAN
7TH AV AND W 125TH ST	19	112	MANHATTAN
2ND AV AND E 34TH ST	19	112	MANHATTAN
ATLANTIC AV AND IN678 SR	19	112	QUEENS
UTOPIA PW AND IN495 SR	19	112	QUEENS
QUEENS BL AND 63RD RD	19	112	QUEENS
IN678 SR AND LINDEN PL	19	112	QUEENS
METROPOLITAN AV AND UNION TP	19	112	QUEENS
FRANCIS LEWIS BL AND IN495 SR	19	112	QUEENS
ALLISON AV AND EBBITTS AV	18	125	STATEN ISLAND
ROCKLAND AV AND FOREST HILL RD	18	125	STATEN ISLAND
BATH AV AND BAY PW	18	125	BROOKLYN
AVENUE D AND E 54TH ST	18	125	BROOKLYN
OCEAN PW AND KINGS HW	18	125	BROOKLYN
NOSTRAND AV AND FLATBUSH AV	18	125	BROOKLYN
BRONX AND PELHAM PW AND RMP BRP TO US1	18	125	BRONX
FLATBUSH AV AND CHURCH AV	18	125	BROOKLYN
BRUCKNER BL AND BARRETTO ST	18	125	BRONX
HOWARD AV AND ST JOHNS PL	18	125	BROOKLYN
GEORGIA AV AND ATLANTIC AV	18	125	BROOKLYN
CHURCH AV AND KINGS HW	18	125	BROOKLYN
E NEW YORK AV AND UTICA AV	18	125	BROOKLYN
FLATBUSH AV AND NEVINS ST	18	125	BROOKLYN
AVENUE J AND OCEAN PW	18	125	BROOKLYN
PENNSYLVANIA AV AND LIVONIA AV	18	125	BROOKLYN

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INTERSECTION	NUMBER	RANK	BORO
3 AV \ E 57 ST	14	1	MANHATTAN
NORTHERN BL \ UNION ST	14	1	QUEENS
8 AV \ W 34 ST	13	3	MANHATTAN
CENSUS BLK BNDY \ GOWANUS EP	13	3	BROOKLYN
EASTERN PY \ UTICA AV	12	5	BROOKLYN
W 34 ST \ 7 AV	11	6	MANHATTAN
2 AV \ E 42 ST	10	7	MANHATTAN
AMSTERDAM AV \ W 125 ST	9	8	MANHATTAN
1 AV \ E 59 ST	9	8	MANHATTAN
9 AV \ W 37 ST	9	8	MANHATTAN
9 AV \ W 43 ST	8	11	MANHATTAN
ATLANTIC AV \ NOSTRAND AV	8	11	BROOKLYN
JEROME AV \ E FORDHAM RD \ W FORDHAM RD	8	11	BRONX
AV OF THE AMERICAS \ W 23 ST	8	11	MANHATTAN
QUEENS BL \ 63 DR \ 63 RD	7	15	QUEENS
QUEENS BL \ 108 ST \ 71 AV	7	15	QUEENS
1 AV \ E 52 ST	7	15	MANHATTAN
2 AV \ E 34 ST	7	15	MANHATTAN
E 149 ST \ COURTLANDT AV	7	15	BRONX
UTICA AV \ MALCOLM X BL \ FULTON ST	7	15	BROOKLYN
SOUTHERN BL \ E 174 ST	7	15	BRONX
SNYDER AV \ UTICA AV	7	15	BROOKLYN
WEBSTER AV \ E GUN HILL RD	7	15	BRONX
ROCKAWAY PY \ FLATLANDS AV	7	15	BROOKLYN
JAMAICA AV \ WOODHAVEN BL	7	15	QUEENS
BROADWAY \ E 14 ST	7	15	MANHATTAN
DITMAS AV \ OCEAN PY	7	15	BROOKLYN

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INTERSECTION	NUMBER	RANK	BORO
7 AV \ W 45 ST \ BROADWAY	7	15	MANHATTAN
E 42 ST \ W 42 ST \ 5 AV	7	15	MANHATTAN
DIST BNDY \ FLUSHING AV \ BROADWAY	7	15	BROOKLYN
FLATBUSH AV \ HILLEL PL \ NOSTRAND AV	7	15	BROOKLYN
CROSS BAY BL \ PITKIN AV	7	15	QUEENS
HILLSIDE AV \ PARSONS BL	6	33	QUEENS
PRINCE ST \ ROOSEVELT AV	6	33	QUEENS
EASTERN PY \ BUFFALO AV	6	33	BROOKLYN
PENNSYLVANIA AV \ LINDEN BL	6	33	BROOKLYN
ATLANTIC AV \ CRESCENT ST	6	33	BROOKLYN
PROSPECT AV \ E 160 ST \ LONGWOOD AV \ WESTCHESTER AV	6	33	BRONX
UTOPIA PY \ HOR HARDING EP SR S	6	33	QUEENS
FLATLANDS AV \ PAERDEGAT AV S \ RALPH AV \ TB 8012.01 E/SD	6	33	BROOKLYN
GRAND CONCOURSE \ E 183 ST	6	33	BRONX
JAMAICA AV \ SUTPHIN BL	6	33	QUEENS
7 AV \ W 33 ST	6	33	MANHATTAN
UNIVERSITY AV \ W FORDHAM RD \ DR M L KING JR BL	6	33	BRONX
E 233 ST \ WHITE PLAINS RD	6	33	BRONX
WESTCHESTER AV \ E 150 ST \ 3 AV	6	33	BRONX
AV U \ FLATBUSH AV	6	33	BROOKLYN
7 AV \ W 42 ST	6	33	MANHATTAN
3 AV \ E 96 ST	6	33	MANHATTAN
CHAMBERS ST \ BROADWAY	6	33	MANHATTAN
1 AV \ E 62 ST	6	33	MANHATTAN
ICA AV \ VAN WYCK EP SR W \ METROPOLITAN AV \ KEW GARDE	6	33	QUEENS
E 125 ST \ 3 AV	6	33	MANHATTAN
WEBSTER AV \ E FORDHAM RD	6	33	BRONX
W 45 ST \ 9 AV	6	33	MANHATTAN
ALLERTON AV \ WHITE PLAINS RD	6	33	BRONX
KINGSTON AV \ EASTERN PY	6	33	BROOKLYN
2 AV \ E 116 ST	6	33	MANHATTAN
ASHLAND PL \ FULTON ST	6	33	BROOKLYN

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INTERSECTION	NUMBER	RANK	BORO
86 ST \ 4 AV	6	33	BROOKLYN
3 AV \ E 34 ST	6	33	MANHATTAN
AV K \ OCEAN AV	6	33	BROOKLYN
CHURCH AV \ NOSTRAND AV	6	33	BROOKLYN
CROTONA AV \ E TREMONT AV	6	33	BRONX
QUEENS BL \ GRAND AV \ BROADWAY	6	33	QUEENS
ARCHER AV \ SUTPHIN BL	6	33	QUEENS
8 AV \ W 53 ST	5	67	MANHATTAN
E 104 ST \ 3 AV	5	67	MANHATTAN
ADAM C POWELL BL \ W 125 ST	5	67	MANHATTAN
AV J \ OCEAN PY	5	67	BROOKLYN
9 AV \ W 47 ST	5	67	MANHATTAN
ASHFORD ST \ NEW LOTS AV	5	67	BROOKLYN
8 AV \ W 43 ST	5	67	MANHATTAN
SOUTHERN BL \ E 163 ST \ HUNTS POINT AV	5	67	BRONX
SMITH ST \ LIVINGSTON ST	5	67	BROOKLYN
SILVER ST \ EASTCHESTER RD \ WILLIAMSBRIDGE RD	5	67	BRONX
ARCHER AV \ PARSONS BL	5	67	QUEENS
SEDGWICK AV \ W FORDHAM RD	5	67	BRONX
ROOSEVELT AV \ 104 ST	5	67	QUEENS
TOMPKINS AV \ MYRTLE AV	5	67	BROOKLYN
DIST BNDY \ CHRISTOPHER ST \ WEST ST	5	67	MANHATTAN
OCEAN PY \ AV X	5	67	BROOKLYN
AMSTERDAM AV \ W 71 ST	5	67	MANHATTAN
BERGEN AV \ E 149 ST	5	67	BRONX
W 42 ST \ 11 AV	5	67	MANHATTAN
CORTELYOU RD \ OCEAN PY	5	67	BROOKLYN
BOWERY \ CENSUS BLK BNDY \ CT BNDY \ E HOUSTON ST	5	67	MANHATTAN
QNSBORO BR AP \ 2 AV \ E 59 ST	5	67	MANHATTAN
BCH 20 ST \ MOTT AV \ CENTRAL AV	5	67	QUEENS
BAY PY \ 86 ST	5	67	BROOKLYN
9 AV \ W 49 ST	5	67	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
WEST END AV \ W 72 ST	5	67	MANHATTAN
8 AV \ W 26 ST	5	67	MANHATTAN
4 AV \ TIMES PZ \ ATLANTIC AV	5	67	BROOKLYN
	5	67	BROOKLYN
VALENTINE AV \ E 196 ST	5	67	BRONX
7 AV \ W 23 ST	5	67	MANHATTAN
	5	67	STATEN ISLAND
UNION ST \ UTICA AV	5	67	BROOKLYN
PELHAM PY N \ WHITE PLAINS RD	5	67	BRONX
FLATBUSH AV \ ATLANTIC AV	5	67	BROOKLYN
FLATBUSH AV \ PARKSIDE AV	5	67	BROOKLYN
W 58 ST \ 9 AV	5	67	MANHATTAN
BURKE AV \ WHITE PLAINS RD	5	67	BRONX
FLATLANDS AV \ E 80 ST	5	67	BROOKLYN
MOTT ST \ PARK ROW \ WORTH ST \ CHATHAM SQ	5	67	MANHATTAN
MERRICK BL\ LIBERTY AV	5	67	QUEENS
LEXINGTON AV \ E 125 ST	5	67	MANHATTAN
NOSTRAND AV \ EASTERN PY	5	67	BROOKLYN
COURT ST \ ATLANTIC AV	5	67	BROOKLYN
E 167 ST \ GRAND CONCOURSE	5	67	BRONX
EMPIRE BL \ LEFFERTS AV \ UTICA AV	5	67	BROOKLYN
CHRYSTIE ST \ DELANCEY ST	5	67	MANHATTAN
EMPIRE BL \ ALBANY AV	5	67	BROOKLYN
FULTON ST \ BROOKLYN AV	5	67	BROOKLYN
LEXINGTON AV \ E 42 ST	5	67	MANHATTAN
DYER AV \ W 41 ST	5	67	MANHATTAN
AV C \ OCEAN PY	5	67	BROOKLYN
FLATBUSH AV \ KINGS HY	5	67	BROOKLYN
COLGATE AV \ WESTCHESTER AV	5	67	BRONX
FLATBUSH AV \ CHURCH AV	5	67	BROOKLYN
E 149 ST \ MORRIS AV	5	67	BRONX
JEROME AV \ E 208 ST	5	67	BRONX

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INTERSECTION	NUMBER	RANK	BORO
E 97 ST \ 1 AV	5	67	MANHATTAN
E 26 ST \ 3 AV	5	67	MANHATTAN
E GUN HILL RD \ BAINBRIDGE AV	5	67	BRONX
JEROME AV \ W 170 ST \ E 170 ST	5	67	BRONX
EASTERN PY \ BEDFORD AV	5	67	BROOKLYN
E 138 ST \ ST ANN'S AV	5	67	BRONX
JAMAICA AV \ PARSONS BL	5	67	QUEENS
W 86 ST \ COLUMBUS AV	5	67	MANHATTAN
E 116 ST \ LEXINGTON AV	5	67	MANHATTAN
NOSTRAND AV \ ST JOHN'S PL	5	67	BROOKLYN
E 49 ST \ 2 AV	5	67	MANHATTAN
18 AV \ OCEAN PY	5	67	BROOKLYN
LENOX AV \ W 125 ST	5	67	MANHATTAN
E 163 ST \ SIMPSON ST	4	137	BRONX
DWAY \ W 225 ST \ W 225 ST \ W 225 ST BR \ BROADWAY \ W 225	4	137	MANHATTAN
67 ST \ W 8 ST \ BAY PY	4	137	BROOKLYN
E 42 ST \ PARK AV \ PARK AV VI	4	137	MANHATTAN
3 AV \ E 156 ST	4	137	BRONX
2 AV \ 42 ST	4	137	BROOKLYN
9 AV \ 49 ST	4	137	BROOKLYN
4 AV \ 68 ST	4	137	BROOKLYN
DIVISION ST \ ELDRIDGE ST	4	137	MANHATTAN
E 23 ST \ 3 AV	4	137	MANHATTAN
E 23 ST \ LEXINGTON AV	4	137	MANHATTAN
E 138 ST \ WILLIS AV	4	137	BRONX
E 138 ST \ CYPRESS AV	4	137	BRONX
9 AV \ W 41 ST	4	137	MANHATTAN
E 51 ST \ LEXINGTON AV	4	137	MANHATTAN
E 59 ST \ MADISON AV	4	137	MANHATTAN
E 41 ST \ QN MDTWN TNL ET	4	137	MANHATTAN
3 AV \ E 63 ST	4	137	MANHATTAN
45 ST \ 9 AV	4	137	BROOKLYN

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TOP HIGH PEDESTRIAN ACCIDENT INTERSECTIONS 2009

INTERSECTION	NUMBER	RANK	BORO
1ST AV AND E 23RD ST	14	1	MANHATTAN
LEXINGTON AV AND E 125TH ST	11	2	MANHATTAN
ATLANTIC AV AND COURT ST	10	3	BROOKLYN
7TH AV AND W 23RD ST	10	3	MANHATTAN
8TH AV AND W 42ND ST	10	3	MANHATTAN
UTICA AV AND EASTERN PW	8	6	BROOKLYN
7TH AV AND W 34TH ST	8	6	MANHATTAN
2ND AV AND E 96TH ST	8	6	MANHATTAN
NORTHERN BL AND UNION ST	8	6	QUEENS
BRUCKNER BL AND HUNTS POINT AV	8	6	BRONX
4TH AV AND 39TH ST	8	6	BROOKLYN
1ST AV AND E 57TH ST	8	6	MANHATTAN
BROADWAY AND W 86TH ST	8	6	MANHATTAN
BOERUM PL AND LIVINGSTON ST	7	14	BROOKLYN
SPRINGFIELD BL AND HEMPSTEAD AV	7	14	QUEENS
COLUMBUS AV AND W 97TH ST	7	14	MANHATTAN
LEXINGTON AV AND E 86TH ST	7	14	MANHATTAN
ESSEX ST AND DELANCEY ST	7	14	MANHATTAN
BROADWAY AND W. 86th St	7	14	MANHATTAN
AVENUE D AND DITMAS AV	7	14	BROOKLYN
SUTPHIN BL AND ARCHER AV	7	14	QUEENS
5TH AV AND 34TH ST	7	14	BROOKLYN
LENOX AV AND W 125TH ST	7	14	MANHATTAN
FLATBUSH AV AND NEVINS ST	7	14	BROOKLYN
SOUTHERN BL AND WESTCHESTER AV	7	14	BRONX
ST NICHOLAS AV AND W 181ST ST	7	14	MANHATTAN
3RD AV AND EAST FORDHAM RD	7	14	BRONX

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INTERSECTION	NUMBER	RANK	BORO
LIBERTY AV AND 120TH ST	7	14	QUEENS
FLATLANDS AV AND PAERDEGAT AV S	7	14	BROOKLYN
3RD AV AND E 42ND ST	7	14	MANHATTAN
UTICA AV AND CHURCH AV	7	14	BROOKLYN
UNIVERSITY AV TU AND W FORDHAM RD	7	14	BRONX
8TH AV AND 60TH ST	7	14	BROOKLYN
FRANKLIN AV AND FULTON ST	6	34	BROOKLYN
MORRIS PARK AV AND WILLIAMSBRIDGE RD	6	34	BRONX
CRESTON AV AND E FORDHAM RD	6	34	BRONX
MORRIS AV AND E 149TH ST	6	34	BRONX
ATLANTIC AV AND RALPH AV	6	34	BROOKLYN
2ND AV AND E 26TH ST	6	34	MANHATTAN
BEDFORD AV AND FULTON ST	6	34	BROOKLYN
OCEAN AV AND PARKSIDE AV	6	34	BROOKLYN
PARSONS BL AND HILLSIDE AV	6	34	QUEENS
3RD AV AND E 53RD ST	6	34	MANHATTAN
FLATBUSH AV AND WESTBURY CT	6	34	BROOKLYN
6TH AV AND W 42ND ST	6	34	MANHATTAN
UTICA AV AND WINTHROP ST	6	34	BROOKLYN
FLATBUSH AV AND GLENWOOD RD	6	34	BROOKLYN
2ND AV AND E 23RD ST	6	34	MANHATTAN
WILLIS AV AND E 138TH ST	6	34	BRONX
BOOTH MEMORIAL AV AND MAIN ST	6	34	QUEENS
WEBSTER AV AND E FORDHAM RD	6	34	BRONX
3RD AV AND E 86TH ST	6	34	MANHATTAN
LEXINGTON AV AND E 116TH ST	6	34	MANHATTAN
LINDEN BL AND UTICA AV	6	34	BROOKLYN
1ST AV AND E 60TH ST	6	34	MANHATTAN
JEROME AV AND E FORDHAM RD	6	34	BRONX
3RD AV AND E 41ST ST	6	34	MANHATTAN
5TH AV AND E 34TH ST	6	34	MANHATTAN
2ND AV AND E 49TH ST	6	34	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
7TH AV AND W 125TH ST	6	34	MANHATTAN
6TH AV AND W 57TH ST	6	34	MANHATTAN
7TH AV AND W 14TH ST	6	34	MANHATTAN
AVENUE J AND CONEY ISLAND AV	6	34	BROOKLYN
ST NICHOLAS AV AND W 125TH ST	6	34	MANHATTAN
3RD AV AND E 58TH ST	6	34	MANHATTAN
BROADWAY AND W 138TH ST	6	34	MANHATTAN
NORTHERN BL AND JUNCTION BL	6	34	QUEENS
COLUMBUS AV AND W 96TH ST	5	68	MANHATTAN
SPRINGFIELD BL AND IN495 SR	5	68	QUEENS
NOSTRAND AV AND FULTON ST	5	68	BROOKLYN
JEROME AV AND E 210TH ST	5	68	BRONX
8TH AV AND W 46TH ST	5	68	MANHATTAN
NOSTRAND AV AND GLENWOOD RD	5	68	BROOKLYN
WOODHAVEN BL AND JAMAICA AV	5	68	QUEENS
ROCKAWAY PW AND RUTLAND RD	5	68	BROOKLYN
NOSTRAND AV AND CLARKSON AV	5	68	BROOKLYN
BROADWAY AND MARCY AV	5	68	BROOKLYN
CONCOURSE VILLAGE E AND E 161ST ST	5	68	BRONX
8TH AV AND W 28TH ST	5	68	MANHATTAN
7TH AV AND BAY RIDGE PW	5	68	BROOKLYN
LENOX AV AND W 116TH ST	5	68	MANHATTAN
SUTPHIN BL AND JAMAICA AV	5	68	QUEENS
BROADWAY AND WORTH ST	5	68	MANHATTAN
WEST END AV AND W 72ND ST	5	68	MANHATTAN
AVENUE A AND E 14TH ST	5	68	MANHATTAN
WILLOUGHBY ST AND JAY ST	5	68	BROOKLYN
AMSTERDAM AV AND W 125TH ST	5	68	MANHATTAN
8TH AV AND W 40TH ST	5	68	MANHATTAN
PARK AV AND E 125TH ST	5	68	MANHATTAN
AVENUE O AND CONEY ISLAND AV	5	68	BROOKLYN
9TH AV AND W 36TH ST	5	68	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
2ND AV AND E 38TH ST	5	68	MANHATTAN
9TH AV AND W 26TH ST	5	68	MANHATTAN
HUNTS POINT AV AND RMP HUNTS PT AV TO IN895	5	68	BRONX
ATLANTIC AV AND 5TH AV	5	68	BROOKLYN
KISSENA BL AND IN495 SR	5	68	QUEENS
OCEAN PW AND CORTELYOU RD	5	68	BROOKLYN
JAY ST AND TILLARY ST	5	68	BROOKLYN
AVENUE I AND OCEAN PW	5	68	BROOKLYN
DYRE AV AND E 233RD ST	5	68	BRONX
DYER AV AND W 41ST ST	5	68	MANHATTAN
DIX AV AND BEACH CHANNEL DR	5	68	QUEENS
AVENUE Z AND NOSTRAND AV	5	68	BROOKLYN
GUY R BREWER BL AND BAISLEY BL	5	68	QUEENS
E GUN HILL RD AND WHITE PLAINS RD	5	68	BRONX
RIVER AV AND E 161ST ST	5	68	BRONX
STANLEY AV AND PENNSYLVANIA AV	5	68	BROOKLYN
HILLSIDE AV AND 178TH ST	5	68	QUEENS
2ND AV AND E 116TH ST	5	68	MANHATTAN
WASHINGTON AV AND FULTON ST	5	68	BROOKLYN
7TH AV AND W 31ST ST	5	68	MANHATTAN
NOSTRAND AV AND NEWKIRK AV	5	68	BROOKLYN
THROOP AV AND FULTON ST	5	68	BROOKLYN
HILLSIDE AV AND 169TH ST	5	68	QUEENS
PARSONS BL AND ARCHER AV	5	68	QUEENS
11TH AV AND W 59TH ST	5	68	MANHATTAN
QUEENS BL AND 71ST AV	5	68	QUEENS
DALNY RD AND 184TH ST	5	68	QUEENS
1ST AV AND E 26TH ST	5	68	MANHATTAN
1ST AV AND E 14TH ST	5	68	MANHATTAN
7TH AV AND VARICK ST	5	68	MANHATTAN
1ST AV AND E 51ST ST	5	68	MANHATTAN
FT GEORGE HILL AND DYCKMAN ST	5	68	MANHATTAN

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INTERSECTION	NUMBER	RANK	BORO
CROSS BAY BL AND 157TH AV	5	68	QUEENS
6TH AV AND W 27TH ST	5	68	MANHATTAN
FLATBUSH AV AND CATON AV	5	68	BROOKLYN
6TH AV AND W 14TH ST	5	68	MANHATTAN
BAY PW AND 65TH ST	5	68	BROOKLYN
4TH AV AND 60TH ST	5	68	BROOKLYN
GRAND BL AND CONCOURSE AND E 183RD ST	4	130	BRONX
GRAND BL AND CONCOURSE AND E 181ST ST	4	130	BRONX
UNION TP AND MAIN ST	4	130	QUEENS
AVENUE U AND FLATBUSH AV	4	130	BROOKLYN
7TH AV AND BARROW ST	4	130	MANHATTAN
GRAND BL AND CONCOURSE AND E 167TH ST	4	130	BRONX
8TH AV AND 57TH ST	4	130	BROOKLYN
3RD AV AND E 122ND ST	4	130	MANHATTAN
JEROME AV AND E BURNSIDE AV	4	130	BRONX
MERRICK BL AND JAMAICA AV	4	130	QUEENS
3RD AVE AND	4	130	MANHATTAN
JEROME AV AND E MOSHOLU PW N	4	130	BRONX
1ST AV AND E 59TH ST	4	130	MANHATTAN
TILDEN AV AND FLATBUSH AV	4	130	BROOKLYN
NORTHERN BL AND MAIN ST	4	130	QUEENS
GERARD AV AND E 161ST ST	4	130	BRONX
7TH AV AND 60TH ST	4	130	BROOKLYN
JAMAICA AV AND 164TH ST	4	130	QUEENS
31ST RD AND UNION ST	4	130	QUEENS
ROCKAWAY PW AND WILLMOHR ST	4	130	BROOKLYN
7TH AV AND W 42ND ST	4	130	MANHATTAN
7TH AV AND W 28TH ST	4	130	MANHATTAN
AVENUE J AND RALPH AV	4	130	BROOKLYN
GUY R BREWER BLVD AND ARCHER AVE	4	130	QUEENS
ST ANNS AV AND E 138TH ST	4	130	BRONX
CONEY ISLAND AV AND BRIGHTON BEACH AV	4	130	BROOKLYN

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APPENDIX: AIR QUALITY

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GUIDELINES FOR EVALUATING AIR QUALITY IMPACTS FROM PARKING GARAGES

For air quality purposes, a parking garage is defined as a parking facility that would be totally (or almost totally) enclosed. This type of facility would require mechanical ventilation to limit the carbon monoxide (CO) concentrations within the garage to levels less than those mandated by the New York City Building Code. Table 1 displays the estimated hourly average ins and outs over a 24-hour period for a proposed auto parking garage. A sample air quality analysis is also provided for potential air quality impacts from ventilated exhaust CO emissions for an auto parking garage. This analysis does not use the most up-to-date MOBILE program or related emission factors, but the methodology used is still applicable. A spreadsheet is available here that could be used for the garage analysis.

Page 3 of the Appendix displays all input parameters that are required to estimate the maximum CO emission rates and concentrations within the parking garage. CO emission factors and background values are reported at the top of the page. In almost all cases, maximum hourly CO emission rates within the facility will be calculated for the time period with the maximum number of departing autos in an hour, since departing autos should be assumed to be "cold" and arriving cars should usually be assumed to be "hot" as part of the recommended procedures for estimating CO emissions for parking facilities. ("Cold" autos emit CO at considerably higher rates than "hot" autos as shown by the CO emission factors listed). Likewise, maximum hourly CO emission rates over a consecutive 8-hour period will normally be computed for the 8-hour time period that averages the largest number of departing autos per hour. Maximum hourly and 8-hour average CO emission rates should be determined based on the ins/outs (for the respective time averaging periods) and the mean traveling distance within the garage. The analysis should also assume that all departing autos would idle for one minute before travelling to the exits of the garage, and all arriving and departing autos would travel at 5 mph within the garage. The equations and definitions of the parameters used to determine the emission rates exhausted through the vents and the maximum CO concentrations within the garage are also presented on page 1.

Page 4 of the Appendix displays the calculations involved in determining the off-site impacts from the CO exhausted through the garage vent(s). These estimates of off-site CO impacts are based on equations pertaining to the dispersion of pollutants from a stack (EPA's Workbook of Atmospheric Dispersion Estimates, AP-26, pg. 6, equations 3.3 and 3.4). The initial horizontal and vertical distributions, $\sigma_y(0)$ and $\sigma_2(0)$, respectively, should be assumed to be equal and calculated by setting the CO concentration at the exit of the vent equal to the CO level within the facility. The sample analysis displays the recommended procedures for estimating 8-hor CO impacts at a receptor near the vent (5 feet from the vent, 6 feet below the midpoint height of the vent) and at a receptor across a street on the far sidewalk from the vent (50 feet away, also 6 feet below the vent midpoint). Page 3 displays contributions from on-street CO emissions to the far sidewalk receptor in this example that were calculated conservatively with a factor (307.7) that yields the maximum predicted impacts (which could be calculated by refined mathematical modeling), when multiplied by the on-street CO emission rate in grams/meter-second. Cumulative CO concentrations at the far sidewalk should be calculated by adding together the contributions from the garage exhaust vent, on-street sources, and background levels. An acceptable alternative method to the procedures detailed above would be to use only the peak hourly CO emissions to calculate the CO emission rates and concentrations at the vent outlet. This alternative procedure would yield very conservative estimates of off-site CO impacts.

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Air Quality Appendix Table 1
Garage Ins/Outs

HOUR	IN	OUT
12-1	1	1
1-2	1	0
2-3	0	0
3-4	0	0
4-5	0	1
5-6	1	5
6-7	5	8
7-8	7	9
8-9	14	31
9-10	17	8
10-11	18	11
11-12	15	12
12-1	31	32
1-2	14	11
2-3	10	10
3-4	10	11
4-5	13	16
5-6	35	30
6-7	17	20
7-8	13	10
8-9	9	6
9-10	1	2
10-11	1	0
11-12	1	0
Total	**234**	**234**

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Sample Mechanically Ventilated Parking Garage Analyses:

1997 Mobile 4.1 CO Emission Factors:			1997 CO background
Cold Idle @ 45F	[CI]:	779.91 G/HR	1-HR 5.7 PPM
5mph Cold Auto @ 45F	[CA]:	143.06 G/MI	8-HR 2.9 PPM
5mph Hot Auto @ 45F	[HA]:	25.73 G/MI	

	1997 INS/OUTS										
	MAXIMUM HOUR		MAXIMUM 8-HOUR			GARAGE	MEAN TRAV.DIS.	PEAK HOURLY	8-HR AVG. ER	MAX 1-HR CONC.W/O BKGD	PEAK 8-HR CONC.W/O BKGD	MAX 1HR CONC.W/ BKGD	MAX 8HR CONC.W/ BKGD
	PERIOD	INS OUTS	PERIOD	INS	OUTS	GSF	(FEET)	(G/SEC)	(G/SEC)	(PPM)	(PPM)	(PPM)	(PPM)
	12AM-1PM	31 32	11AM-7PM	18.1	17.8	48220	300	0.200	0.112	7.60	4.20	13.30	7.10

where:

maximum hour is 1-hour period with largest number of autos departing

maximum 8-hour period is usually the 8-hour period with largest average number of departing autos over 8 hours

garage GSF - total gross square feet of garage area, where garage area does not include mechanical areas

mean travel distance - conservative estimate (about two-thirds of the longest travel distance within the facility) of average travel distance for a typical vehicle entering/exiting the facility

Max 1-hour & 8-hour average ER - maximum hourly average CO emission rates within the facility for these respective time averaging periods

Max hour ER:

(max hr autos out)*((CI/60)+(CA)*(mean travel distance/5280))/3600+(max hr autos ins)*HA*(mean travel distance)/(5280*3600)

8-hour average ER

(max 8-hr autos out)*((CI/60)+(CA)*(mean travel distance/5280))/3600+(max 8 hr autos ins)*HA*(mean travel distance)/(5280*3600)

Max 1-hour & 8-hour concentration without background - CO concentrations calculated within the facility based on respective emission rates and New York City building code minimum ventilation rate of 1 cubic foot per minute per gross square feet of garage area for the respective time averaging periods

peak hour conc w/o bkgrd:

0.873*(peak hour ER)*1000/(GSF*0.000472)

8-hour average conc w/o bkgrd:

0.873*(8-hour ave ER)*1000/(GSF*0.000472)

Max 1-hour & 8-hour concentration - maximum 1 and 8-hour concentrations within garage when backgrounds are added to concentrations without backgrounds

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Calculation of Cumulative Carbon Monoxide Impacts from Garage and Adjacent Street Emissions

ASSUMPTIONS: 2 Vents (since it is a relatively large garage, smaller garages may only warrant 1 vent)

Middle of Vent is 12' above local grade

Receptor height is 6', at a distance of 5' from vent

$\chi(0) = Q / \pi * \sigma_y(0) * \sigma_z(0)$

1997

8-HOUR CO ER PER VENT = 0.112/2 = 0.056 g/sec = Q
8-HOUR CO CONCENTRATION = 4.29 PPM = 0.0049 g/m^3
8-HOUR CO BKGD = 2.9 PPM
8-HOUR PERSISTENCE FACTOR - 8-HR PF = 0.70

Solve for initial horizontal + vertical distributions:

Let $\sigma_z(0) = \sigma_y(0)$

$0.0049 = 0.056 / \pi * (\sigma_y(0))^2$

Therefore $\sigma_y(0) = 1.9m$

at 5' (1.52m) from vent, 6'(H = 1.83m) below vent height:

$\sigma_y(1.52) = 0.16 * 1.52 + 1.9 = 2.14m$
$\sigma_z(1.52) = 0.14 * 1.52 + 1.9 = 2.11m$

8-hr $\chi(1.52)$ = (8-hr PF)*Q*(exp(-0.5*(H/$\sigma_z(1.52)$)^2)) / $\pi * \sigma_y(1.52) * \sigma_z(1.52)$

Therefore, $\chi(1.52) = 0.00190\ g/m^3 = 1.7$ PPM

at 50' (15.24m) from vent, 6'(H = 1.83m) below vent height:

$\sigma_y(15.24) = 0.16 * 15.24 + 1.9 = 4.3m$
$\sigma_z(15.24) = 0.14 * 15.24 + 1.9 = 4.0m$

8-hr $\chi(15.24)$ = (8-hr PF)*Q*(exp(-0.5*(H/$\sigma_z(15.24)$)^2))/$\pi * \sigma_y(15.24) * \sigma_z(15.24)$

Therefore, $\chi(15.24) = 0.000653\ g/m^3 = 0.6$ PPM

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Highest On-Street Emissions

	g/mi-hr	g/m-sec
WB adjacent street	6423	0.00111
EB adjacent street	3272	0.00056
Total	9695	0.00167

Maximum Impacts from line source:

307.7 * (8-hr Persistence Factor) * 0.00167 = 0.36 PPM

Total 8-hr CO Concentration
@ receptor on opposite sidewalk = 0.6 + 0.36 + 2.9 = 3.8 PPM

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(192)

GUIDELINES FOR EVALUATING AIR QUALITY IMPACTS FROM PARKING LOTS

For air quality purposes, a parking lot is defined as a parking facility that would be an at-grade lot, exposed to the ambient air. Table 1 displays the estimated hourly average ins and outs over a 24-hour period for a proposed auto parking lot. A sample air quality analysis is also provided in the attachment for potential air quality impacts from CO emissions emitted by an auto parking lot. This analysis does not use the most up-to-date MOBILE program or related emission factors, but the methodology used is still applicable.

Figure 1 displays the overall dimensions of a proposed parking lot. Page 1 of the attachment displays all input parameters that are required to estimate the maximum CO emission rates within the parking lots. In almost all cases, maximum hourly CO emission rates within the facility will be calculated for the time period with the maximum number of departing autos in an hour, since departing autos should be assumed to be "cold" and arriving cars should usually be assumed to be "hot" as part of the recommended procedures for estimating CO emissions for parking lots. ("Cold" autos emit CO at considerably higher rates than "hot" autos as shown by the CO emission factors listed). Likewise, maximum hourly CO emission rates over a consecutive 8-hour period will normally be computed for the 8-hour time period that averages the largest number of departing autos per hour. Maximum hourly and 8-hour average CO emission rates should be determined based on the ins/outs (for the respective time averaging periods) and the mean traveling distance within the facility. The analysis should also assume that all departing autos would idle for one minute before travelling to the exits of the lot, and all arriving and departing autos would travel at 5 mph within the parking lot. The equations and definitions of the parameters used to determine the emission rates within the parking areas are identical to those found in the "Guidelines for Evaluating Air Quality Impacts from Parking Garages."

Equations 1, 2, and 3 display the calculations involved in determining the off-site impacts from CO emitted within the parking lot. These estimates of off-site CO impacts are based on EPA's guidelines pertaining to the dispersion of pollutants from a parking lot (*Guidelines for Air Quality Maintenance Planning and Analysis Volume 9 (Revised): Evaluating Indirect Sources*, pg.92, equations 35 and 36). Definitions of the various parameters in the equations area also provided on page 1 of the attachment. The sample analysis displays the recommended procedures for estimating 8-hour CO impacts at a pedestrian-height sidewalk receptor 6 feet from the lot and at a receptor across a street on the far sidewalk from the vent (62 feet away). On-street CO emissions contributions to the far sidewalk receptor in this example that were calculated conservatively with a factor (307.7) that yields the maximum predicted impacts (which could be calculated by refined mathematical modeling), when multiplied by the on-street CO emission rate in grams/meter-second. Cumulative CO concentrations at the far sidewalk should be calculated by adding together the contributions from the garage exhaust vent, on-street sources, and background levels. An acceptable alternative method to the procedures detailed above would be to use only the peak hourly CO emissions to calculate the CO emission rates within the facility and off-site 8-hour CO impacts. This alternative procedure would yield very conservative estimates of off-site CO impacts.

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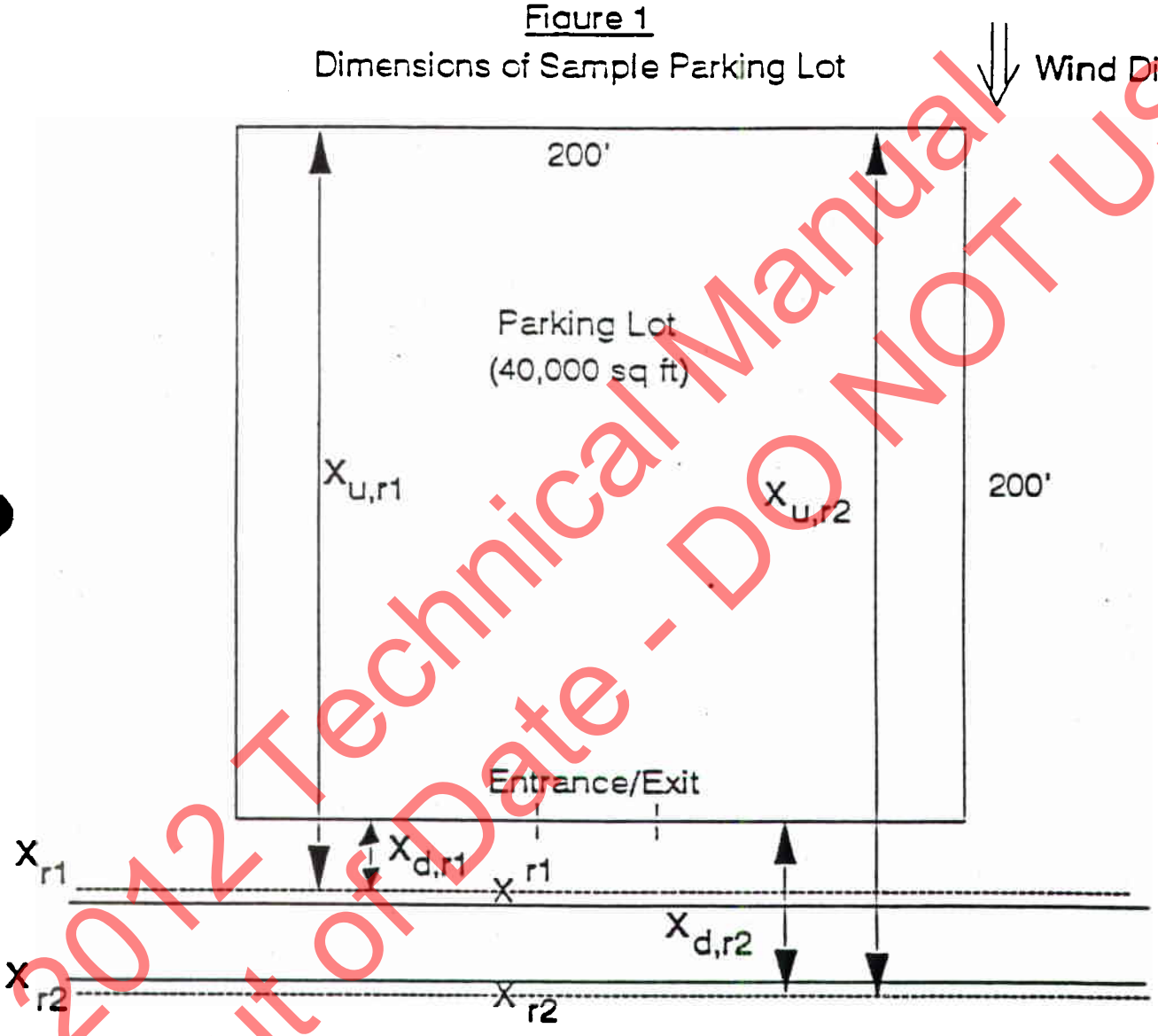
Air Quality Appendix Table 2
Garage Ins/Outs

HOUR	IN	OUT
12-1	1	1
1-2	1	0
2-3	0	0
3-4	0	0
4-5	0	1
5-6	1	5
6-7	3	8
7-8	26	10
8-9	69	20
9-10	16	3
10-11	10	5
11-12	10	5
12-1	13	20
1-2	7	8
2-3	16	19
3-4	28	34
4-5	30	81
5-6	36	40
6-7	24	29
7-8	16	19
8-9	9	7
9-10	1	3
10-11	1	1
11-12	1	0
Total	**319**	**319**

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Figure 1

Dimensions of Sample Parking Lot



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Sample Parking Lot Analyses:

1997 Mobile 4.1 CO Emission Factors:

Cold Idle @ 30F	[CI]:	1028.61 G/HR
5mph Cold Auto @ 30F	[CA]:	188.17 G/MI
5mph Hot Auto @ 30F	[HA]:	32.13 G/MI

1997 CO background
1-HR 5.7 PPM
8-HR 2.9 PPM

1997 INS/OUTS MAXIMUM HOUR PERIOD	INS	OUTS	MAXIMUM 8-HOUR PERIOD	INS	OUTS	PARKING LOT GSF	MEAN TRAV.DIS. (FEET)	PEAK HOURLY ER (G/SEC)	8-HR AVG. ER (G/SEC)	Qa, 8-hr
4-5PM	30	81	12-8PM	21.3	31.3	40,000	201	0.557	0.219	0.000059

$$\chi u/Q_a = \frac{0.8}{a(1-b)} (r_u^{1-b} - r_d^{1-b}) * PF \qquad (1)$$

$$r_u = x_u + x_o \qquad (2)$$

$$r_d = x_d + x_o \qquad (3)$$

where:

- χ - 8-hour CO concentration from parking lot emissions (g/m^3)
- u - wind speed (= 1 meter/sec)
- Q_a - CO emissions in parking lot per unit area of lot (g/m^2-sec)
- a,b - empirical constants (for almost all applications, a = 0.50, b = 0.77)
- r_u - effective distance from the receptor to the upwind edge of the parking lot (meters)
- r_d - effective distance from the receptor to the downwind edge of the parking lot (meters)
- x_u - measured distance from the receptor to upwind edge of the parking lot (meters)
- x_d - measured distance from the receptor to downwind edge of the parking lot (meters)
- x_o - virtual distance used to affect an initial vertical mixing of CO emissions (x_o = 19.9m)
- PF - 8-hour meteorological persistence factor (= 0.7)

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Since $x_{u,r1}$ = 62.8m (206 ft) & $x_{d,r1}$ = 1.8m (6 ft)
$x_{u,r2}$ = 79.9m (262 ft) & $x_{d,r2}$ = 18.9m (62 ft)

Therefore χ_{r1} = 0.00021 g/m^3 = 0.18 PPM
χ_{r2} = 0.00016 g/m^3 = 0.14 PPM

8-hr Total CO Conc @ r1 = χ_{r1} + bkgrd = 0.18 + 2.9 = 3.08 PPM

		ER	
		g/mi-hr	g/m-sec
WB adjacent street		6423	0.00111
EB adjacent street		3272	0.00056
	Total	9695	0.00167

On-street = 307.7 * PF * ER = 0.36 PPM

8-hr Total CO Conc @ r2 = χ_{r2} + On-street + bkgrd = 0.14 + 0.36 + 2.9 = 3.4 PPM

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GUIDELINES FOR EVALUATING AIR QUALITY IMPACTS FROM MULTILEVEL NATURALLY VENTILATED PARKING FACILITIES

A multi-level parking facility with at least 3 partially open sides is naturally ventilated by the ambient air. A sample air quality analysis is also provided in the Appendix for potential air quality impacts from CO emissions emitted by an auto parking lot. In this example, maximum hourly CO emissions will be used to conservatively estimate 8-hour CO impacts adjacent to the facility. The 5:00 p.m. to 6:00 p.m. period would have the largest number of departing autos and the largest hourly estimate of CO emissions in this sample analysis for a proposed 7-level naturally ventilated auto parking facility. This analysis does not use the most up-to-date MOBILE program or related emission factors, but the methodology used is still applicable.

Figure 1 provides a side view of a sample 7-level open-side facility, which would be built above a retail use. Figure 2 displays a top view applicable to each parking level. The proposed facility would have several entrances and exits. Page 15 of this Appendix displays all input parameters that are required to estimate the maximum CO emission rates within the parking lots. CO emission factors and background values are reported at the top of the page. The analysis should also assume that all departing autos would idle for one minute before travelling to the exits of the lot, and all arriving and departing autos would travel at 5 mph within the parking lot. The equations and definitions of the parameters used to determine the emission rates within the parking areas are identical to those found in the "Guidelines for Evaluating Air Quality Impacts from Parking Garages."

Estimates of CO emissions rates for each level should consist of two components: vehicles arriving/departing the level, and "excess" vehicles that are passing through a level, destined toward a higher or lower parking level within the facility. In this example, the total number of autos traveling in and out of the structure in the 5:00 p.m. to 6:00 p.m. hour have been divided by the number of parking levels (*i.e.*, 7) to determine the average number of vehicles parking or leaving each level in this hour (*e.g.*, a total of 679 departure averages out to 97 departures per level). $Q_{a,\,lvl}$ represents the CO emissions estimates per unit area for vehicles originating from or destined for each level. Excess CO emissions for each level should be calculated based on the number of excess autos traversing through the parking level and the distance traveled by such vehicles. As shown in the example, the number of excess vehicles increases to a maximum at level 1. $\mathcal{Q}_{\mathrm{exc}}$ represents the excess emissions per level, and $\mathcal{Q}_{\mathrm{a\ exc}}$ is $\mathcal{Q}_{\mathrm{exc}}$ divided by the floor area of the respective parking level. Q is defined as the total emission per unit area per level, and is the sum of $\mathcal{Q}_{\mathrm{a\ exc}}$ and $Q_{a,\,lvl}$ for each parking level.

The sample analysis displays the recommended procedures for estimating 8-hour CO impacts at a pedestrian height sidewalk receptor 70 feet from the facility. Equations 1, 2, and 3 are the calculations involved in determining the off-site impacts from CO emitted from an at-grade parking lot. Equation 4 is the recommended correction factor to adjust CO impacts calculated with $Q_{a,\,lvl}$ and equation 1 (i.e., χ center line) for each parking level to a pedestrian height receptor. The equation for this height correction factor is based on the correction term for elevated point sources in EPA's *Workbook of Atmospheric Dispersion Estimates*, AP-26 (pg. 6, equation 3.3.). Height corrections factors for each level should be based on the difference between pedestrian height (6 feet) and the respective parking level elevation, and should be multiplied to the χ centerline calculated for each level. The table at the bottom of page 16 shows the result of these products for each level of the parking facility in this example. Page 3 displays on-street CO emissions contributions to the receptor in this example, which were calculated with a factor (307.7) that yields the maximum predicted impacts (which could be calculated by refined mathematical modeling), when multiplied by the on-street CO emission rate in grams/meter-second. Cumulative CO concentrations at this receptor should be calculated by adding together the contributions from the parking facility, on-street sources, and background levels.

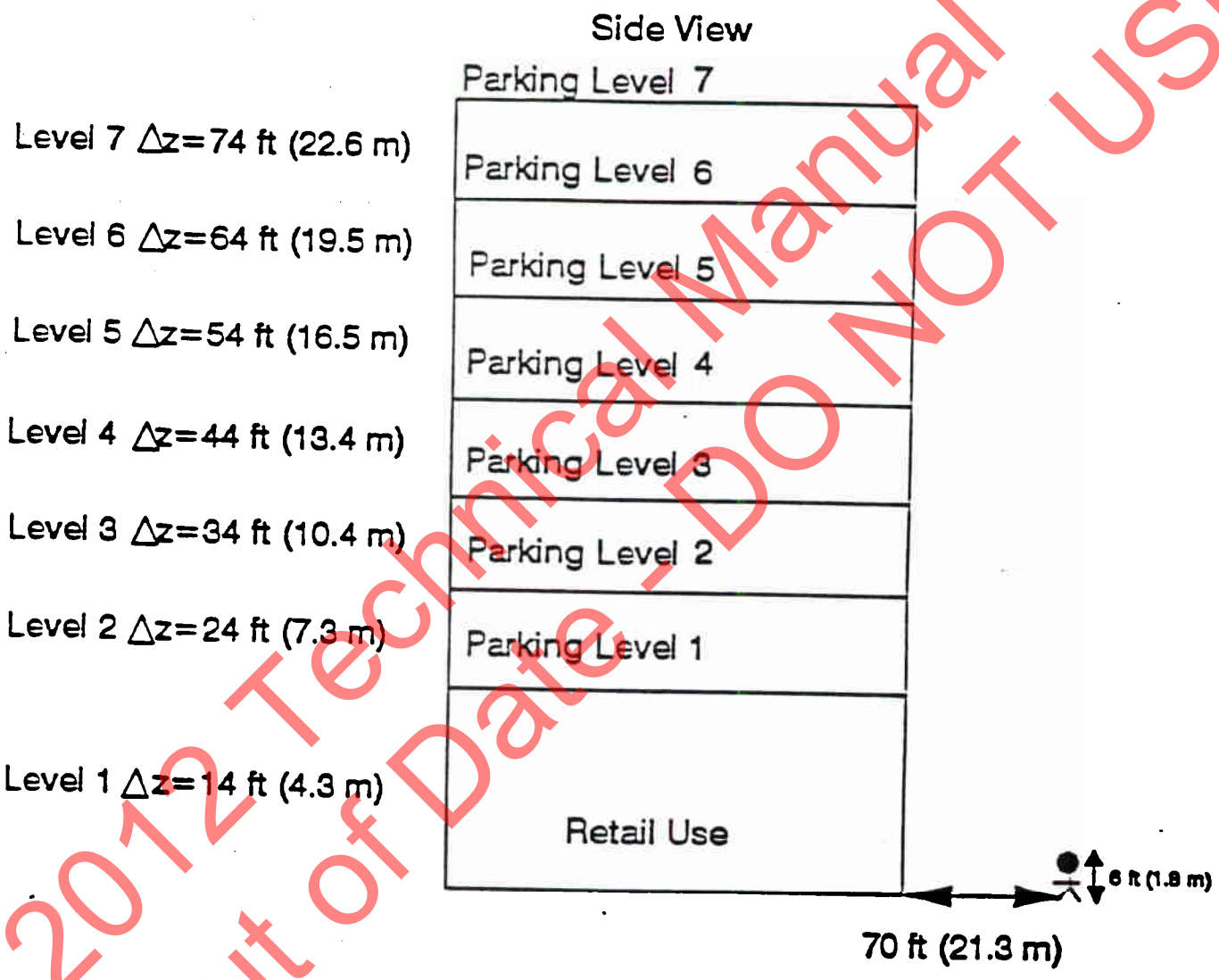
An acceptable alternative method to the procedures detailed above would be to use the hourly average CO emissions over the continuous 8-hour period with the largest CO emissions to calculate the CO emission rates within the facility and off-site 8-hour CO impacts. This alternative procedure should consider whether or not a larger proportion of vehicles would use the lower levels over an 8-hour average, as opposed to the equal averaging procedure used with the

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peak hourly emissions. The procedure employed in this sample analysis did not have to take this into account, since maximum hourly emissions were conservatively applied to estimate CO emission rates of an 8-hour period.

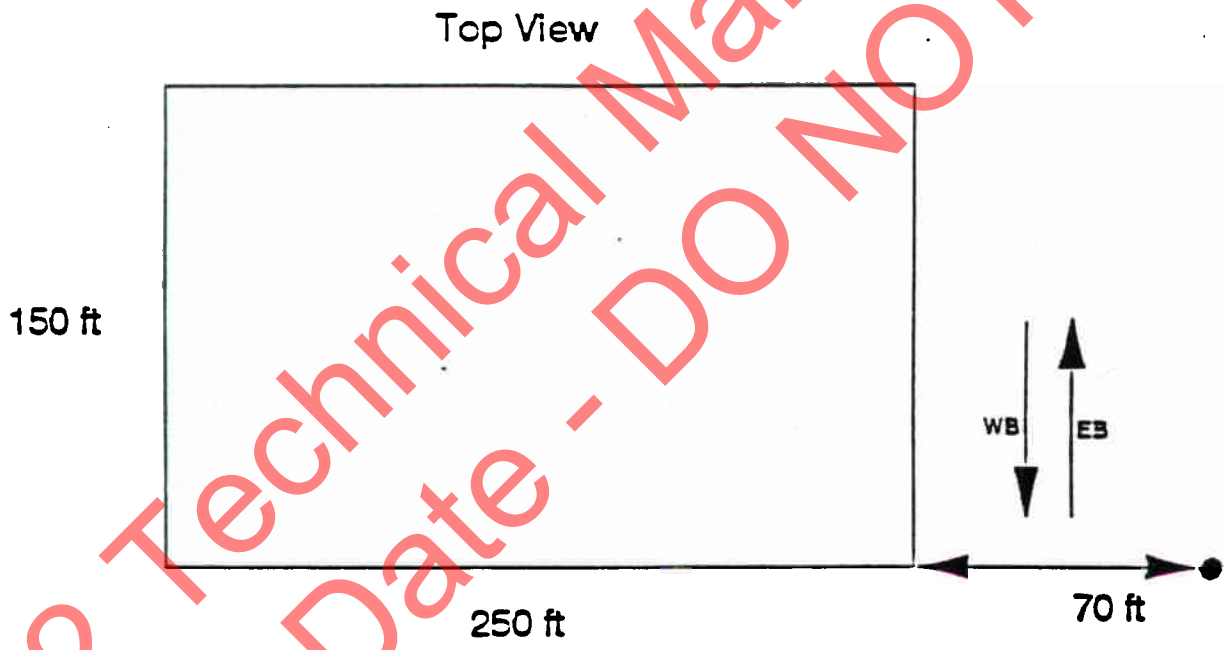
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Figure 1



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Figure 2



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Sample Multi-Level Naturally Ventilated Parking Facility Analysis:

1997 Mobile 4.1 CO Emission Factors:

Cold Idle @ 30F	[CI]:	1028.61 g/hr
5mph Cold Auto @ 30F	[CA]:	188.17 g/mi
5mph Hot Auto @ 30F	[HA]:	32.13 g/mi

1997 CO background
1-HR 5.7 PPM
8-HR 2.9 PPM

1997 INS/OUTS

MAXIMUM HOUR PERIOD	INS	OUTS	MAXIMUM HOUR PER LEVEL PERIOD	INS	OUTS	PARKING LOT GSF	MEAN TRAV.DIS. (FEET)	PEAK HOURLY ER PER LEVEL (G/SEC)	$Q_{a,lvl}$ (g/m^2-sec)
5-6PM	301	679	5-6PM	43	97	37,500	270	0.741	0.000213

Emissions from excess vehicles:

$$Q_{exc} = (N_{veh,dep} * [CA] * \Delta L + N_{veh,arr} * [HA] * \Delta L) / 3600$$

$$Q_{a,exc} = Q_{exc} / GSF$$

where: $N_{veh,dep}$ - number of excess departing autos from upper levels at each floor

$N_{veh,arr}$ - number of excess arriving autos from lower levels at each floor

ΔL - travel distance between floors (= 120 ft)

Level	Excess Vehicles Ins	Outs	Q_{exc}	$Q_{a,exc}$	$Q_{a,lvl}$	$Q_{a,tot}$
7	-	-	-	-	2.13×10^{-4}	2.13×10^{-4}
6	43	97	0.12	3.56×10^{-5}	2.13×10^{-4}	2.48×10^{-4}
5	86	194	0.25	7.12×10^{-5}	2.13×10^{-4}	2.84×10^{-4}
4	129	291	0.37	1.07×10^{-4}	2.13×10^{-4}	3.19×10^{-4}
3	172	388	0.50	1.42×10^{-4}	2.13×10^{-4}	3.55×10^{-4}
2	215	485	0.62	1.78×10^{-4}	2.13×10^{-4}	3.91×10^{-4}
1	258	582	0.74	2.13×10^{-4}	2.13×10^{-4}	4.26×10^{-4}

$$\chi u/Q_a = \frac{0.8}{a(1-b)} (r_u^{1-b} - r_d^{1-b}) * PF \quad (1)$$

$$r_u = x_u + x_o \quad (2)$$

$$r_d = x_d + x_o \quad (3)$$

with variables and constants as defined previously

Since x_u = 97.5m (320 ft) & x_d = 21.3m (70 ft),

Therefore $\chi u/Q_{a,tot} = 3.099$

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Vertical Diffusion Correction:

$$\bar{x} = \exp(-0.5 * (\Delta z / \sigma_z)^2) \qquad (4)$$

where: $\bar{x}$ - correction factor for difference between height of each parking level and pedestrian height

σ_z - urban vertical dispersion coefficient for Pooler-McElroy stability class D

σ_z - 0.14 * x, where x is the distance between the edge of the parking area and the receptor site (in meters)

Δz - difference in height between parking lot level and pedestrian height (= 6 ft)

since x - 70 ft = 21.3 m,

therefore $\sigma_z = 2.98$ and

$$\bar{x} = \exp(-0.5 * (\Delta z / 2.98)^2)$$

Level	Δz (ft)	Δz (m)	$\bar{x}$
1	14	4.3	0.35
2	24	7.3	0.050
3	34	10.4	0.0023
4	44	13.4	0.000041
5	54	16.5	= 0
6	64	19.5	= 0
7	74	22.6	= 0

Level	$Q_{a,tot}$	χ Center Line	$\bar{x}$	g/m3 @ receptor	PPM	PF*PPM
7	2.13×10^{-4}	0.00066	= 0	= 0	0.000	0.000
6	2.48×10^{-4}	0.00077	= 0	= 0	0.000	0.000
5	2.84×10^{-4}	0.00089	= 0	= 0	0.000	0.000
4	3.19×10^{-4}	0.00100	0.000041	$4.08E \times 10^{-8}$	0.000	0.000
3	3.55×10^{-4}	0.00111	0.0023	$2.55E \times 10^{-6}$	0.002	0.001
2	3.91×10^{-4}	0.00122	0.05	$6.09E \times 10^{-5}$	0.053	0.037
1	4.26×10^{-4}	0.00133	0.35	$4.65E \times 10^{-4}$	0.407	0.285
					total	0.32 = χ_{tot}

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		ER	
		g/mi-hr	g/m-sec
WB adjacent street		6423	0.00111
EB adjacent street		3272	0.00056
	Total	9695	0.00167

On-street = 307.7 * PF * ER = 0.36 PPM

8-hr Total CO Conc = χ_{tot} + On-street + bkgrd = 0.32 + 0.36 + 2.9 = 3.6 PPM

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GUIDELINES FOR PERFORMING VEHICLE CLASSIFICATION SURVEYS FOR AIR QUALITY ANALYSES

Collection of vehicle classification data for use in an air quality analysis should be performed according to the following general guidelines, to provide accurate and adequate descriptions of the vehicle mix required by the MOBILE models used to estimate emissions from motor vehicles. To get the most accurate estimate of traffic conditions, vehicle classification data should be taken concurrently with other traffic data collection efforts. Vehicle classification surveys should be performed at or near any sites where mobile source air quality analyses are performed.

1. Three good days of surveys for the midweek AM, midday (if necessary), and PM peak periods. Field surveyors should distinguish among autos, taxis, light duty trucks, heavy duty gas trucks, and heavy duty diesel vehicles. Buses should be considered to be heavy duty diesel vehicles.
2. If a weekend air quality analysis is required, surveys should be performed for at least one day for the weekend peak hour.
3. Field observers should use the following criteria to distinguish between light-duty trucks and heavy duty trucks:
    a. Light-duty trucks: vans, ambulances, pickup trucks, all trucks with 4 wheels.
    b. Heavy-duty trucks: basically all vehicles with 6 or more wheels. (Note: six wheels can be on 2- or 3-axle vehicles).
    c. The field observer should be acquainted with the stacks associated with heavy-duty diesel trucks in order to distinguish them from heavy duty gas trucks. Light-duty gas trucks should be divided into two groups (LDGT 1 and LDGT 2) based on local registration data. The registered split between LDGT 1 and LDGT 2 is 73 percent to 27 percent, respectively, at the time these guidelines were prepared. DEC or DEP can be contacted to determine if this split (73/27) is still appropriate.
4. The percentage of taxis for each link could be divided into fleet medallion (FM) and non-fleet medallion (NFM) taxis based on the ratio between FM and NFM listed in DEP's Report #34 (approximately 3 FM for every 1 NFM). Since field observers usually cannot distinguish between non-medallion (NM) taxis and private autos when taking surveys, the NM taxi fraction as listed in Report #34 could be subtracted from the auto fractions for each link, or instead, the NM taxi fraction could be treated as autos in the emissions calculations. The emissions for light-duty gas autos can then be calculated using the latest approved MOBILE model with these four distinct classifications (autos, FM, NFM, and NM taxis).
5. Raw survey counts should be summed by vehicle type. The average vehicle classification for the street corridor during the respective peak period should be based upon the summed values and the relative percentages among the vehicle types.

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GUIDELINES FOR CALCULATING RECIRCULATION FOR CHEMICAL SPILLS

To assess impacts from accidental chemical spills under a laboratory fume hood, effects from recirculation must be addressed. If an exhaust vent is located near operable windows or air intake vents, there is potential for recirculation of the pollutant back into the building.

The potential for recirculation is assessed using the method described by D.J. Wilson in *A Design Procedures for Estimating Air Intake Contamination from Nearby Exhaust Vents*, ASHRAE TRAS 89, Part 2A, p. 136-152 (1983). This procedures takes into account such factors as plume momentum, stack-tip downwash, and cavity recirculation effects. This recirculation analysis determines worst-case minimum dilution between exhaust and air intake.

Three separate effects produce the available dilution: internal system dilution (mixing in plenum chamber of multiple exhaust streams and fresh air); wind dilution, dependent on the distance from the vent to intake and the exit velocity; and dilution from stack, caused by stack height and plume rise from vertical exhaust velocity. The critical wind speed is dependent on exit velocity, distance from vent to intake, and the cross-sectional area of the exhaust stack.

The following information about the pollutant and exhaust system must be known: stack height (m), stack diameter (m), stack exit velocity (m/s), mass flow rate of pollutant (g/sec), molecular weight of pollutant (g/mol), and the stretched string distance from the stack to the nearest receptor.

An example recirculation for carbon tetrachloride is included in the attachment. The inputs are: molecular weight of carbon tetracholoride, assumed mass flow rate, assumed stack diameter, height and exit velocity, and assumed string distance between stack and nearby receptor.

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ASHRAE Dilution Calculations for Potential Spill

Carbon Tetrachloride

DTOTAL = DSYSTEM *DWIND *DSTACK

Diameter = 3.26 ft

Actual Stack Height = 11 ft

Exit Velocity = 24.38 m/s

DILUTION OF SYSTEM (DSYSTEM): CALCULATED AS TOTAL CONCENTRATION EXITING STACK

DSYSTEM= (flowrate/(velocity per stack) x 1000 x 24.45/mol wt)

flowrate of carbon tetrachloride = 0.9635 g/sec

molecular wt of carbon tetrachloride = 154

DSYSTEM = 6.3 PPM

DILUTION OF WIND (DWIND) = ((1+1.48 (S/@SQRTAe^.5)^2) **(from ASHRAE)**

WHERE S = STRING DISTANCE FROM STACK TO NEAREST RECEPTOR = 189 FT

AE = X-SECTIONAL AREA OF EXHAUST STACK (PI*D^2/4) = 8.35 FT^2

THEREFORE DWIND = 168.2

DILUTION FROM STACK (DSTACK) (BETA = 1 FOR UNCAPPED, VERTICAL EXHAUST) **(from ASHRAE)**

Ucrit/Ve = 20 x (sqrtAe)/S = 0.31

Therefore, Ve/Ucrit = 3.27 > 1.5 so Hd = 0

Hd = 2*diameter*(1.5-Ve/Ucrit) = 0.00 FT

Hs = actual stack height – Hd = 11.00 FT

DSTACK= exp ((4.23*hs/s+.707*beta)^2) = 2.5

THUS, DTOTAL = 0.015 PPM

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GUIDELINES FOR CALCULATING EVAPORATION RATE FOR CHEMICAL SPILLS

In order to calculate evaporation rate from an accidental chemical spill, the following physical properties must be known: boiling point (deg C), molecular weight (g/mol), density (g/cm^3), and vapor pressure (mm Hg).

The recommended procedures to determine the evaporation rate are displayed in the sample calculations provided in the attachment. Equations 1 and 3 are based on the Shell Model (Fleischer, M.T., *An Evaporation/Air Dispersion Model for Chemical Spills on Land*, Shell Development Company (Dec. 1980). Equations 2, 4, and 5 are based on *Mass Transfer Operations, 3rd Edition*, by R.E. Treybal, p. 31-33.

The evaporation rate, E, is dependent on the diffusivity of the component through air and saturated vapor density, among other factors. The diffusivity, D (equation 2), is based on several factors including a collision function that must be obtained from Figure 2.5 in *Mass Transfer Operations*, p. 32. The saturation vapor density, ρ*, is calculated from the ideal gas law: PV = nRT. Room temperature (20 C) and an air flow rate of 0.5 m/s are assumed for calculation of evaporation rate.

An example evaporation rate calculation for acetone is included in the attachment. Note that this example is limited by the size of the lab. A spill area of 0.25 m^2 is assumed.

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LAB SPILL ANALYSIS - EVAPORATION RATE

Sample Calculation for Acetone

Evaporation Rate

$E = D_{c\text{-}a} * Sh_L * (1/L) * (\rho^*)$ eq. (1)

where Dc-a is the diffusivity of component "c" through air, and defined as:

$$D_{c\text{-}a} = \frac{10^{-4} * (1.084 - 0.249\ \mathrm{sqrt}(1/M_c + 1/M_a)) * T^{3/2} * \mathrm{sqrt}(1/M_c + 1/M_a)}{P_t * (r_{ca})^2 * f(kT/E_{ca})}$$ eq. (2)

M_c, M_a are molecular weights of compound "c" and air, respectively [kg/kmol]
T = room temperature = 293 K
P_t = 1 std atm = 101.3×10^3 N/m^2
E_{ca} = energy of molecular attraction
r_{ca} = molecular separation at collision [nm]

$r_A = 1.18\ v^{1/3}$ (r in nm) v = MW / Density (v in m^3/kmol)

$r_{AB} = (1.3711 + r_A) / 2$ (r_{AB} in nm)

v --> $\frac{(g/mol) * (1000\ mol / 1\ kmol)}{(g/cm^3) * (100\ cm / 1\ m)^3}$ --> m^3/kmol

$E_A / k = 1.21 * T_b$

$E_{AB} / k = \mathrm{sqrt}\ (78.6 * (E_A / k))$

$f(kT/E_{AB})$ ---> estimate from Figure 2.5 on page 32 of *Mass Transfer Operations*

$$D_{acetone\text{-}air} = \frac{10^{-4} * (1.084 - 0.249\ \mathrm{sqrt}(1/58 + 1/29)) * (293)^{3/2} * \mathrm{sqrt}(1/58 + 1/29)}{(101.3 \times 10^3)\ (0.4331)^2\ (0.56)}$$

$= 1.10 \times 10^{-5}$ m^2/sec

ρ^* = saturated vapor density

Ideal Gas Law: PV = nRT
$\rho^* = n/V = P/RT$ R = Gas Constant = 0.082 L atm / mol K

$$\rho^* = \frac{180\ mmHg\ (1\ atm / 760\ mmHg)}{(0.082\ L\ atm / mol\ K)(293\ K)}$$ (vapor pressure of acetone = 180 mmHg)

$= 9.86 \times 10^{-3}$ mol/L or 9.86×10^{-6} mol/cm^3

$(9.86 \times 10^{-3}\ mol/L) * (1000\ L / 1\ m^3) * (58\ g/mol\ acetone)$

$\rho^* = 572$ g/m^3

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Sh_L = Sherwood # = $0.664\ S_c^{1/3}\ Re_L^{1/2}$ eq. (3)

where S_c = Schmidt # = $\mu / (\rho * D_{c\text{-}a}) = \upsilon_{air} / D_{c\text{-}a}$ eq. (4)

[μ = viscosity, ρ = density, $D_{c\text{-}a}$ = diffusivity, υ = kinematic viscosity (at 21 degrees C and std atm)]

$Re_L = vL/\upsilon$ eq. (5)

[L = length, v = velocity of wind = 0.5 m/sec]

$Sh_{acetone} = (0.664) * (1.482 \times 10^{-5}\ m^2/sec / 1.10 \times 10^{-5}\ m^2/sec)^{1/3} * [(0.5\ m/sec)(0.5\ m) / (1.482 \times 10^{-5}\ m^2/sec)]^{1/2}$

= 95.2

$E_{acetone} = (1.10 \times 10^{-5}\ m^2/sec)\ (95.2)\ (1 / 0.5\ m)\ (572)$

= 1.1980 $g/m^2.sec$ = evaporation rate for acetone

Emission Rate

Based on a spill area of 0.25 m^2, Q = Emission Rate

E x A = 1.1980 $g/m^2.sec$ x 0.25 m^2 = 0.299 g/sec

References

Eq (1), (3) from Shell Model
Eq (2), (4), (5) from *Mass Transfer Operations*, 3rd Ed., by Treybal

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Calculation of Evaporation Rate from Chemical Spill

23-Oct-01

Name	Container Size (liters)	Tb (C)	MW (g/mol)	d (g/cm^3)	r (nm)	E/(kT)	<r> (nm)	<E/(kT)>	<(kT)/E>	f(<>)	D (m^2/s)	P at 20C (mm Hg)	ro (g/m^3)	Evaporation Rate (g/m^2-s)
Example														
Acetone		56.2	58	0.7857	0.4950	1.3603	0.4331	0.6041	1.6554	0.56	1.10E-05	180	572	0.8480

REFINED SCREENING ANALYSES FOR HEAT AND HOT WATER SYSTEMS

Section 322.1 in Chapter 17, "Air Quality," provides a discussion which identifies that impacts from boiler emissions are a function of fuel type, stack height, minimum distance from the source to the nearest receptor (building), and square footage of development resulting from the project. The preliminary screening analysis outlined in Section 322.1 to determine a project's potential for significant impacts (Figure 17-3) is based on use of No #6 fuel oil in a residential building, the most conservative, 'worst case' scenario. If more detailed information regarding the boiler characteristics is available, then a more accurate screen can be performed.

These screens in the manual and appendices are based on emission factors obtained from EPA's, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources (http://www.epa.gov/ttn/chief/ap42) and fuel consumption data obtained from the Department of Energy (www.eia.doe.gov/emeu/recs and www.eia.doe.gov/emeu/cbecs/contents.html).

Appendix Figures 17-1 to 17-8 were specifically developed through detailed mathematical modeling to predict the threshold of development size below which a project would not likely have a significant impact based on the type of fuel, use of the proposed building(s), and distance to nearest building of a height similar to or greater than the stack height of the proposed building(s). In order to provide the most conservative screens for development size, NO_2 screens have been developed for fuel oil No. 6 and natural gas systems while SO_2 screens are provided for systems based on fuel oil No. 2 and No. 4. The step-by-step methodology outlined below explains how to use these figures. Similar to the screen described in 322.1, this methodology is only appropriate for single buildings or sources. It is also only appropriate for buildings at least 10 meters (approximately 33 feet) from the nearest building of similar or greater height.

1. Consider the type of fuel that would be used to provide heat/hot water. If the type of fuel is unknown, generally assume No. 4 fuel oil (a conservative assumption for air quality purposes).
2. Determine the maximum size and type of development that would use the boiler stack. For residential or mixed-use commercial and residential projects, refer to the figures indicating "residential development." For non-residential uses, refer to the "commercial and other non-residential development" figures.
3. Using Geographic Information Systems (GIS), a Borough President's map, Sanborn atlas, or equivalent, determine the minimum distance (in feet) between the building(s) resulting from or facilitated by the proposed project and the nearest building of similar or greater height.
4. If this distance is less than 33 feet, more detailed analyses than this step-by-step screen are required. If the distance is greater than 400 feet, assume 400 feet.
5. Determine the stack height of the building resulting from the proposed project, in feet above the local ground level. If unknown, assume 3 feet above the roof height of the building.
6. Select from the heights of 30, 100, and 165 feet, the number closest to but NOT higher than the proposed stack height.
7. Based on steps 1 through 6 above, select the appropriate Appendix Figure for the proposed project:
    a. Appendix Figure 17-1: Residential Development, Fuel Oil #6, NO_2
    b. Appendix Figure 17-2: Commercial and Other Non-Residential Development, Fuel Oil #6, NO_2
    c. Appendix Figure 17-3: Residential Development, Fuel Oil #4, SO_2
    d. Appendix Figure 17-4: Commercial and Other Non-Residential Development, Fuel Oil #4, SO_2
    e. Appendix Figure 17-5: Residential Development, Fuel Oil #2, SO_2
    f. Appendix Figure 17-6: Commercial and Other Non-Residential Development, Fuel Oil #2, SO_2
    g. Appendix Figure 17-7: Residential Development, Natural Gas, NO_2

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h. Appendix Figure 17-8: Commercial and Other Non-Residential Development, Natural Gas, NO_2

Locate a point on the appropriate chart by plotting the size of the development against the distance in feet to the edge of the nearest building of height similar to or greater than the stack of the proposed project.

If the plotted point is on or above the applicable curve, there is the potential for a significant air quality impact from the project's boiler(s), and detailed analyses may need to be conducted. If the plotted point is below the relevant curve, a potential significant impact due to boiler stack emissions is unlikely and no further analysis is needed.

In some cases, it may be possible to pass this screening analysis by restricting the type of fuel that could be used to supply heat and hot water. As illustrated in figures 17-1 through 17-8, No. 4 and No. 6 oils have greater emissions than No. 2 oil or natural gas. Limiting the fuel used by the proposed project to No. 2 oil or natural gas may eliminate the potential for significant adverse impacts and also the need for further analyses. This can be determined using steps 1 through 6 above. The project, however, would have to include the restriction on the boiler fuel type (and indicate the mechanism that would ensure the use of a specific fuel type) if this option is selected.

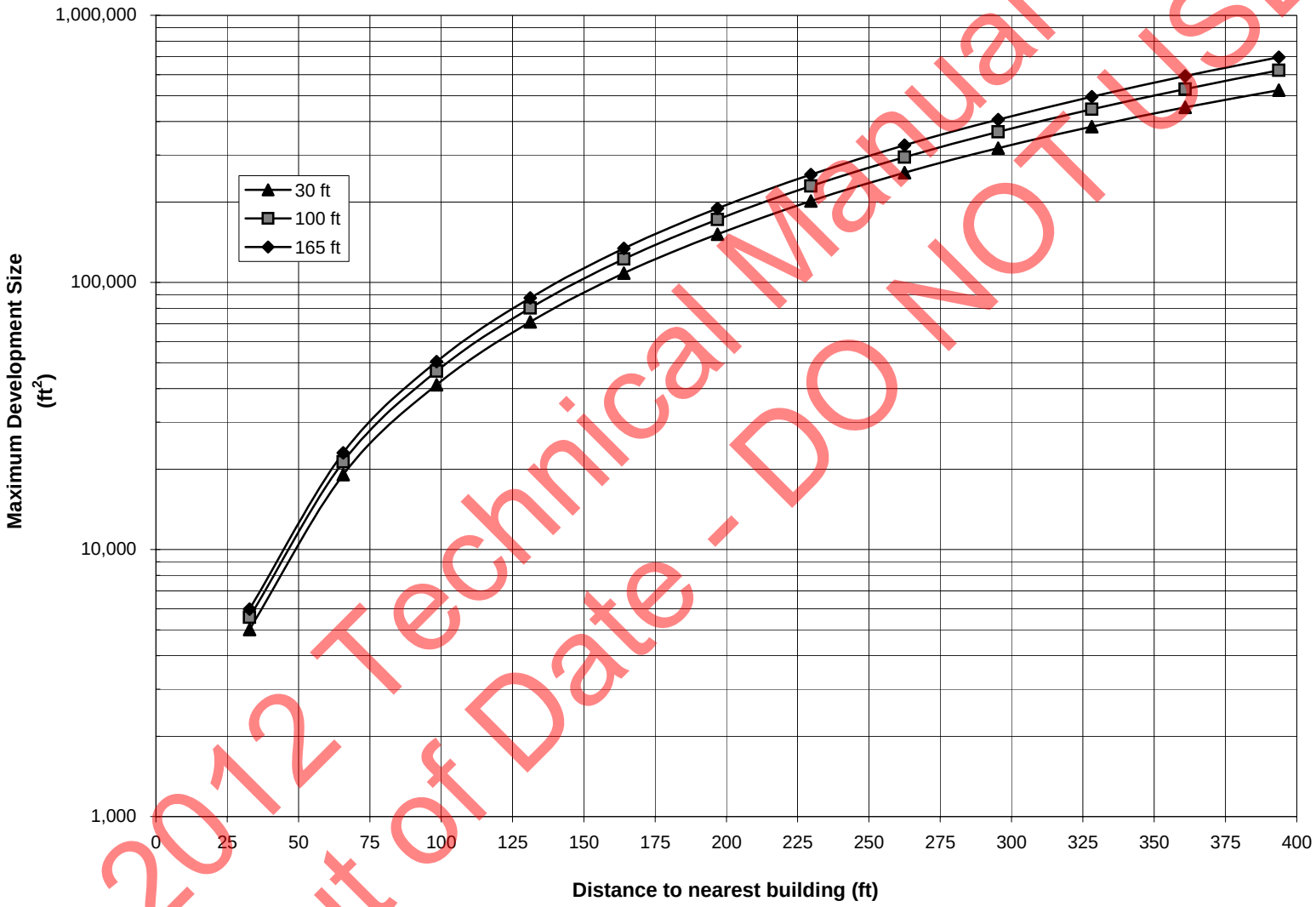
Alternatively, if a proposed project fails the initial screening analysis, but the maximum short-term 24-hour emissions of sulfur dioxide (for oil burning facilities) and annual emissions of nitrogen dioxide (for oil and gas burning facilities) have been estimated, Figures 17-9 and 17-10 can be used to determine the project's potential for significant impacts. Additionally, if the quantity of fuel consumption is known, the maximum short-term emissions can be calculated using EPA's AP-42 emission tables. For example, if the daily quantity of #6 fuel oil to be used is 100 gallons, the grams per second emissions can be calculated as follows:

$$\frac{100\ gallons}{day} \times \frac{0.0471\ lb}{gallon} \times \frac{453.59\ grams}{lb} \times \frac{1\ day}{86{,}400\ seconds} = \frac{0.025\ grams}{second}$$

The emission factor for SO2 for #6 fuel oil was obtained from EPA's AP-42, assuming 0.3 percent sulfur content. If the plotted point is on or above the curve corresponding to the appropriate stack height at the proper distance, there is the potential for a significant air quality impact from the project's boiler(s), and detailed analyses may need to be conducted. If the plotted point is below the applicable curve, a potential significant impact due to boiler stack emissions is unlikely and no further analysis is needed. For the above example, figure 17-10 indicates that for a proposed project that burns 100 gallons of #6 fuel oil daily and has a 100 foot stack, further analysis is necessary if there are any buildings within a distance of 60 feet.

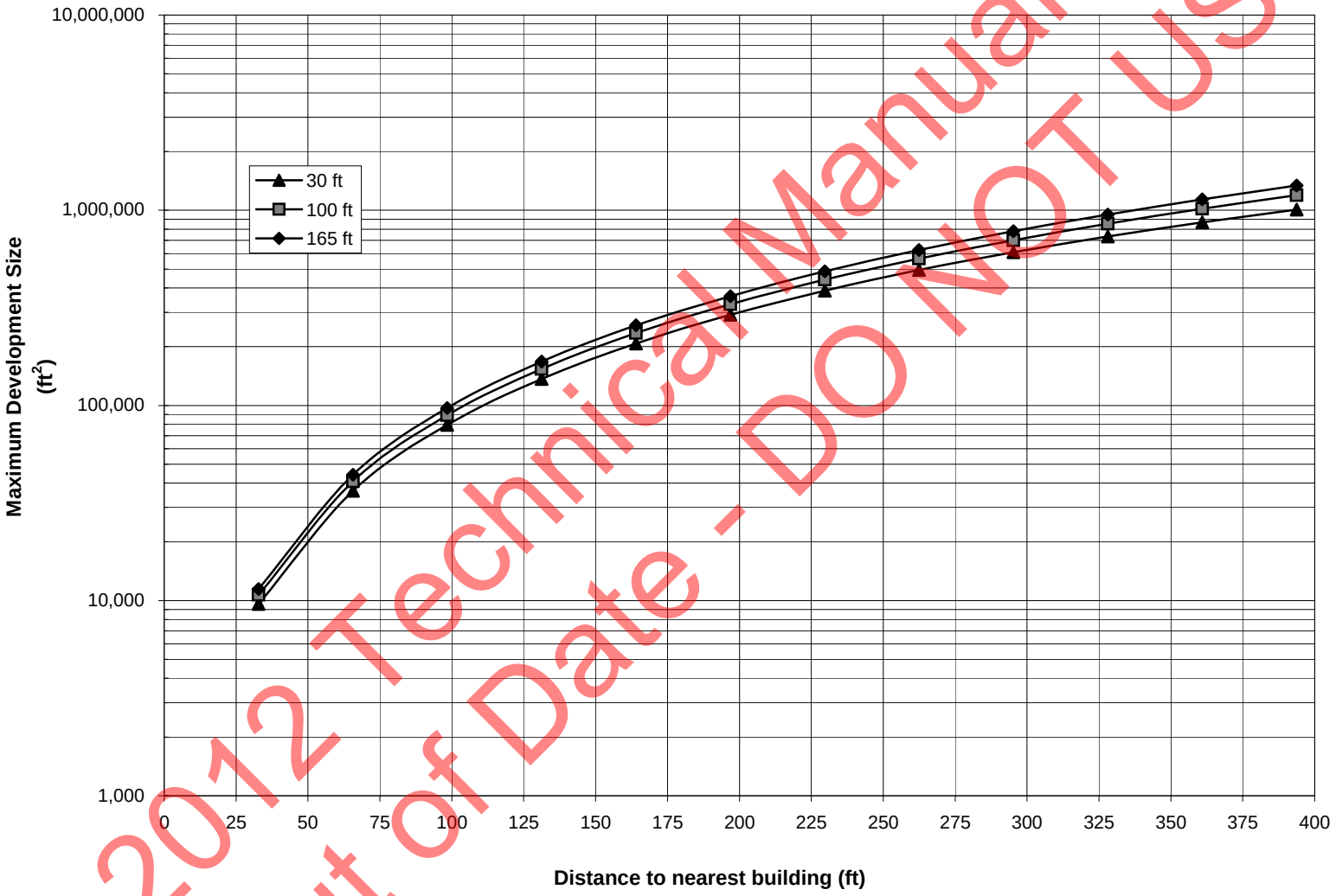
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FIG App 17-1
NO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - FUEL OIL #6



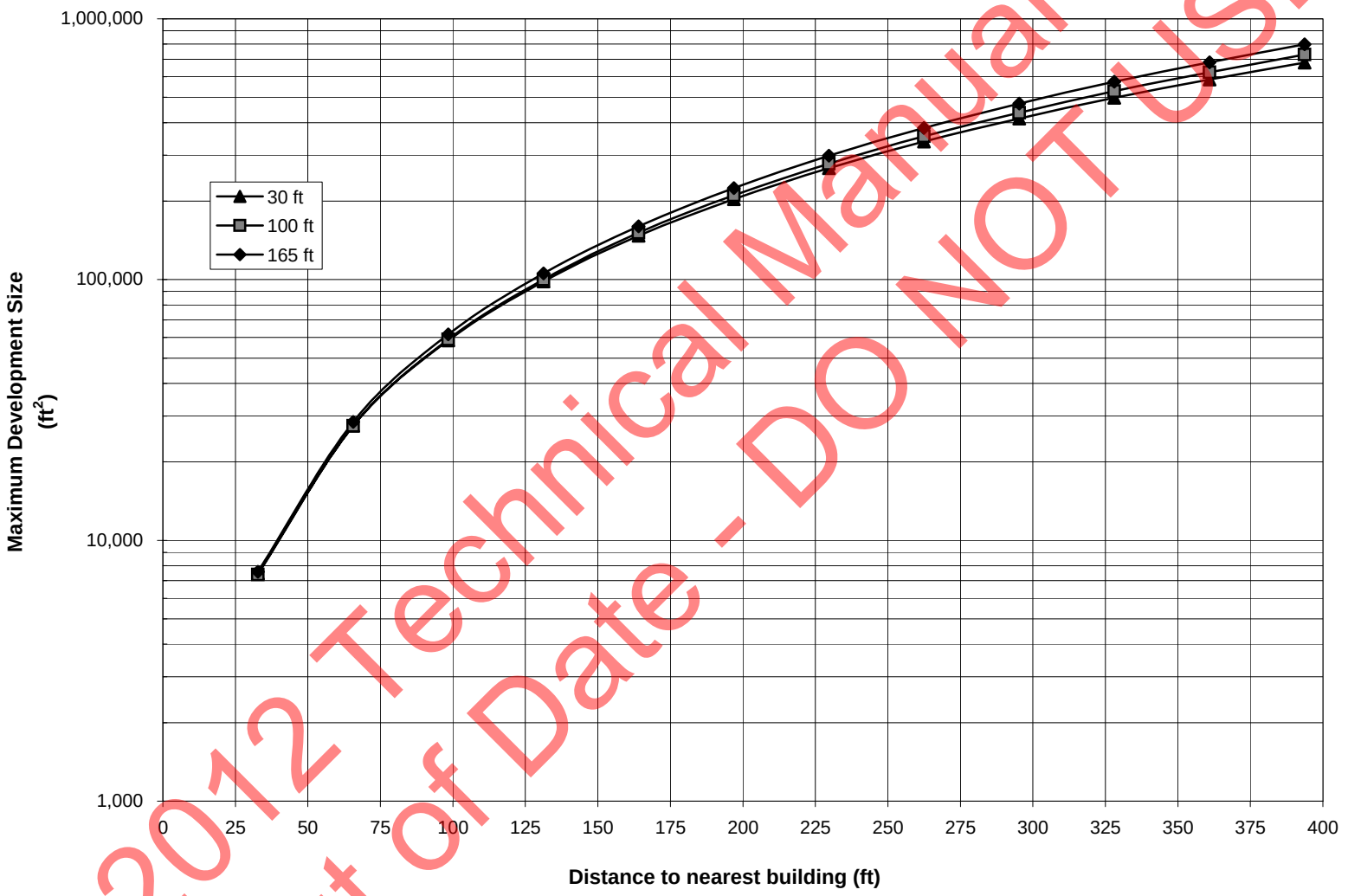
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FIG App 17-2
NO_2 BOILER SCREEN
COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - FUEL OIL #6



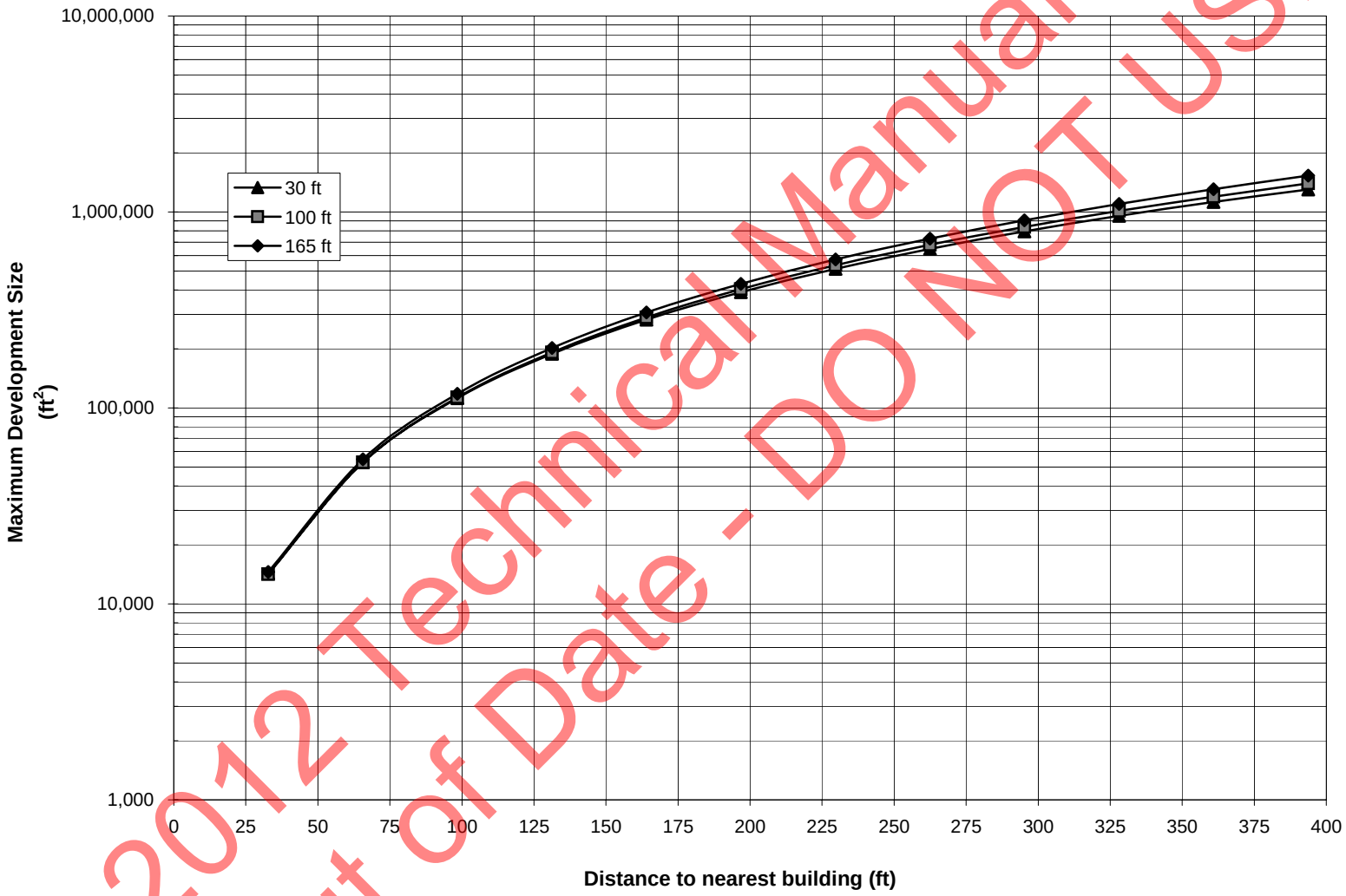
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FIG App 17-3
SO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - FUEL OIL #4



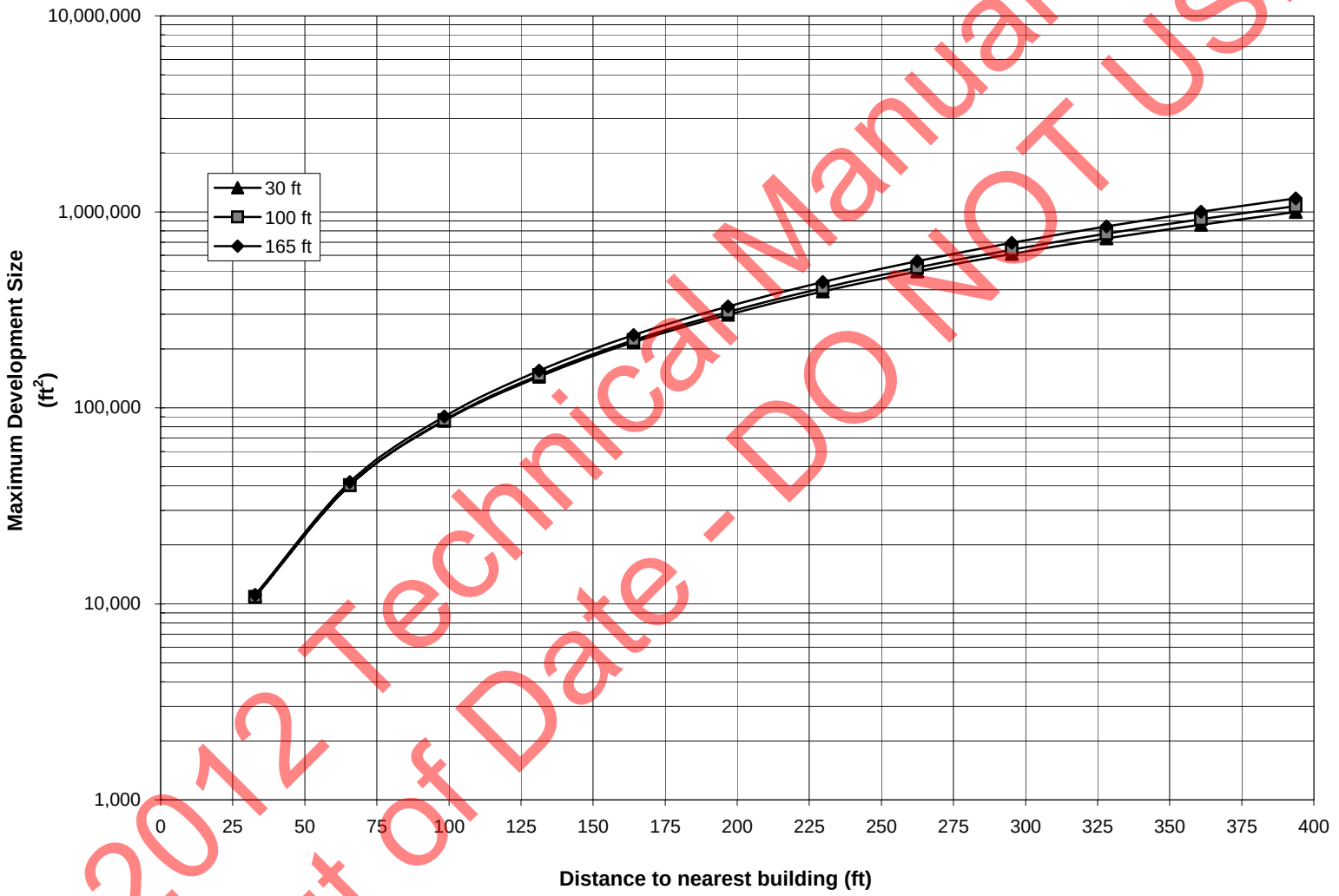
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FIG App 17-4
SO_2 BOILER SCREEN
COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - FUEL OIL #4



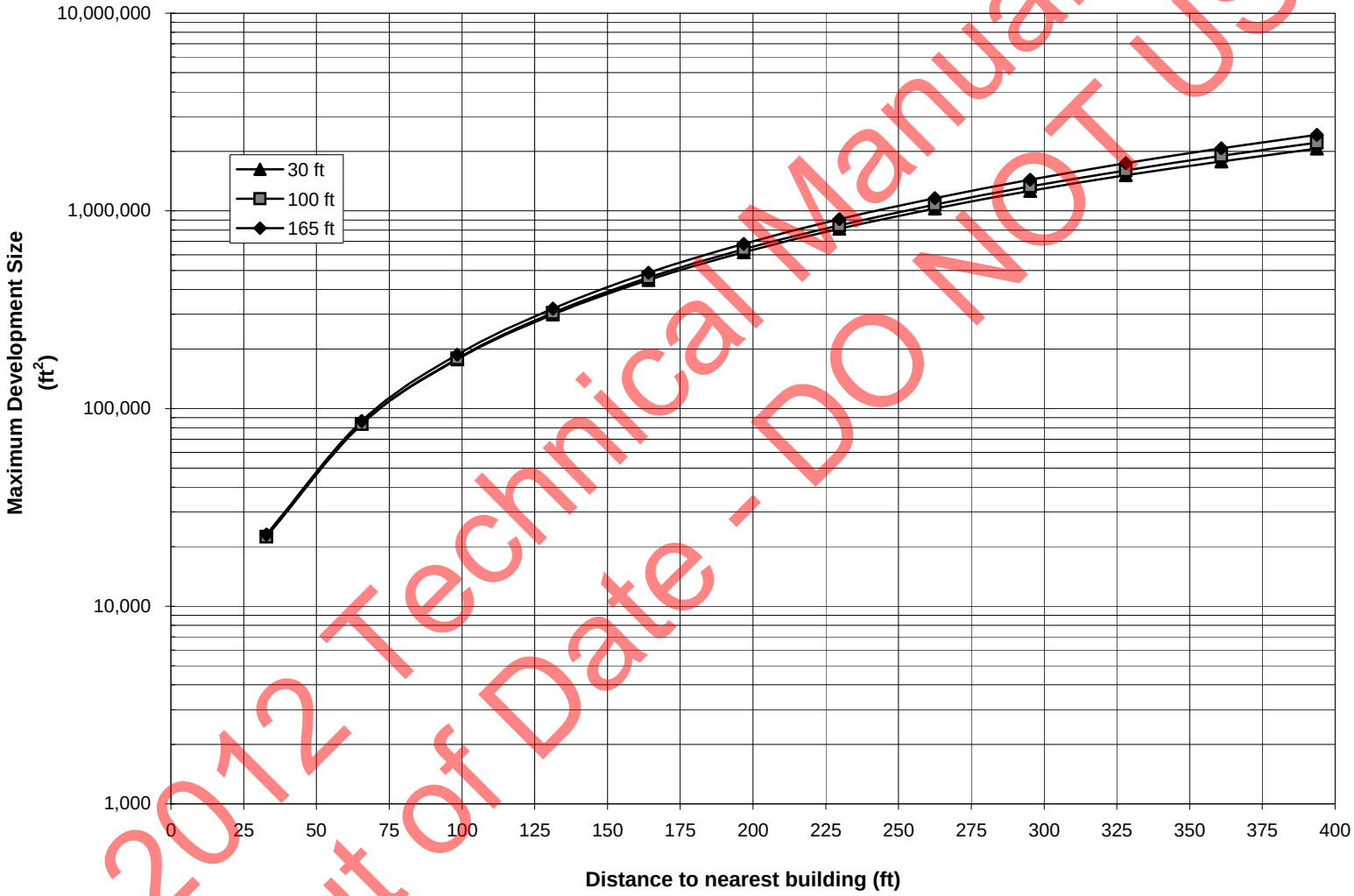
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FIG App 17-5
SO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - FUEL OIL #2



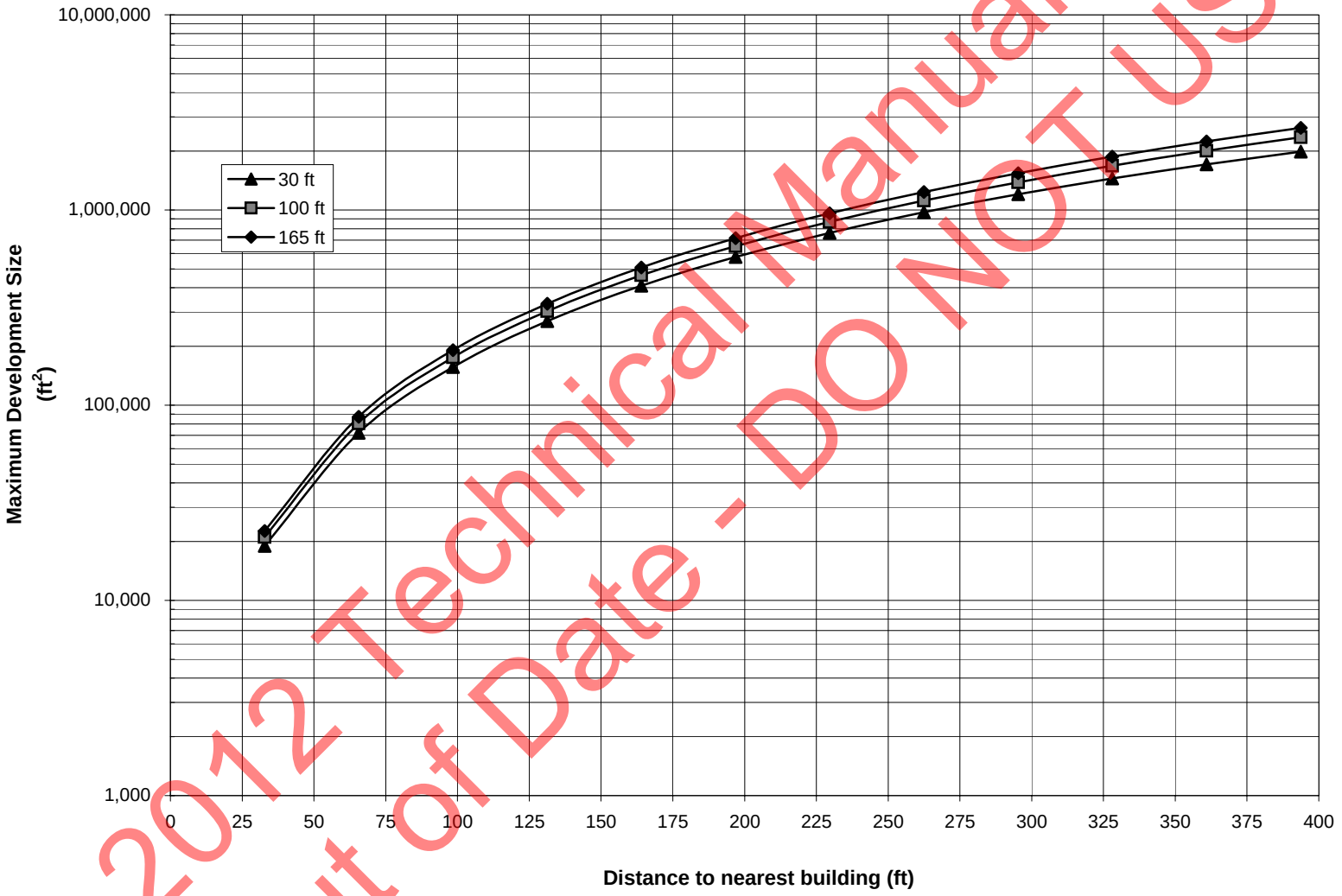
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FIG App 17-6
SO_2 BOILER SCREEN
COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - FUEL OIL #2



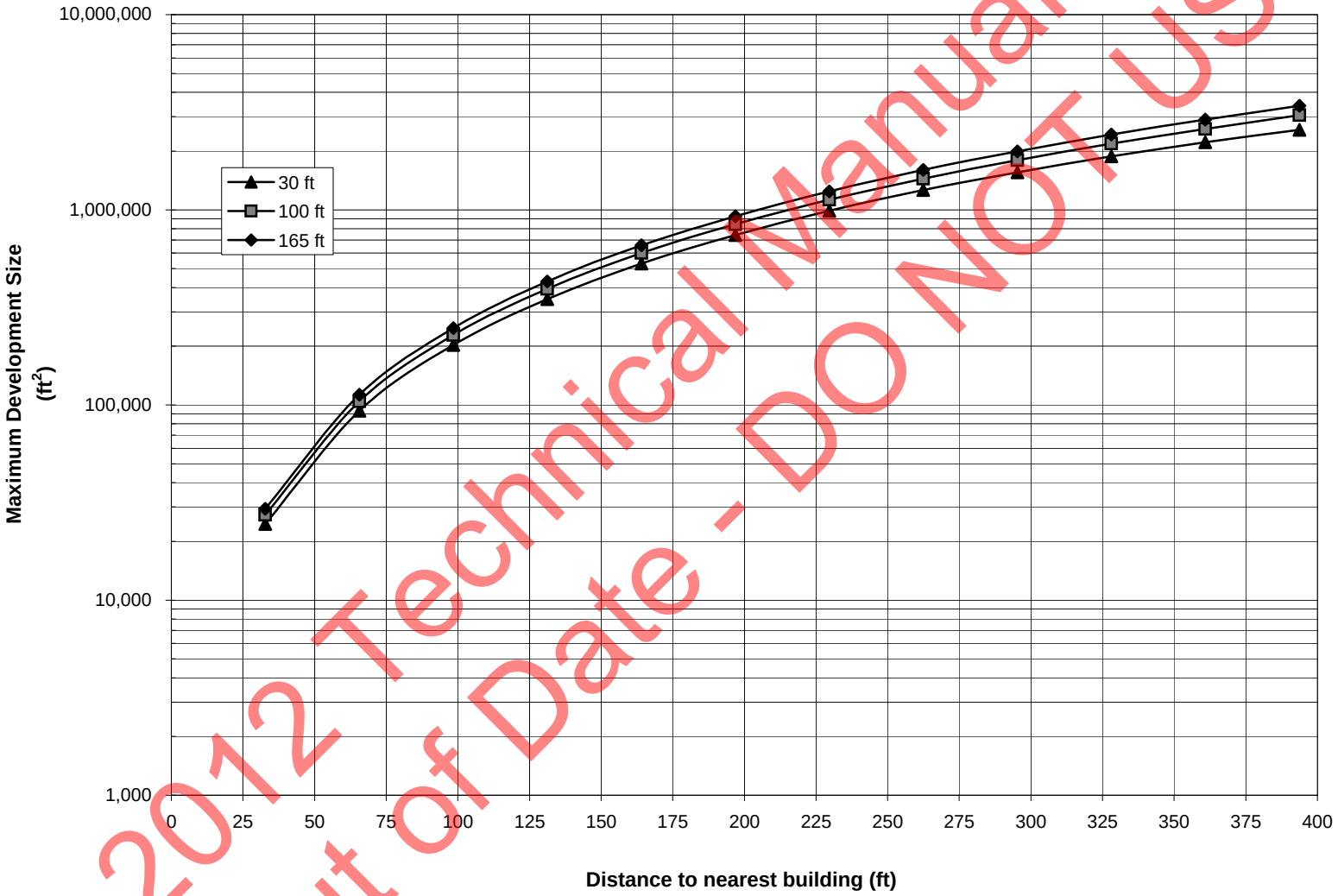
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FIGURE 17-7
NO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - NATURAL GAS



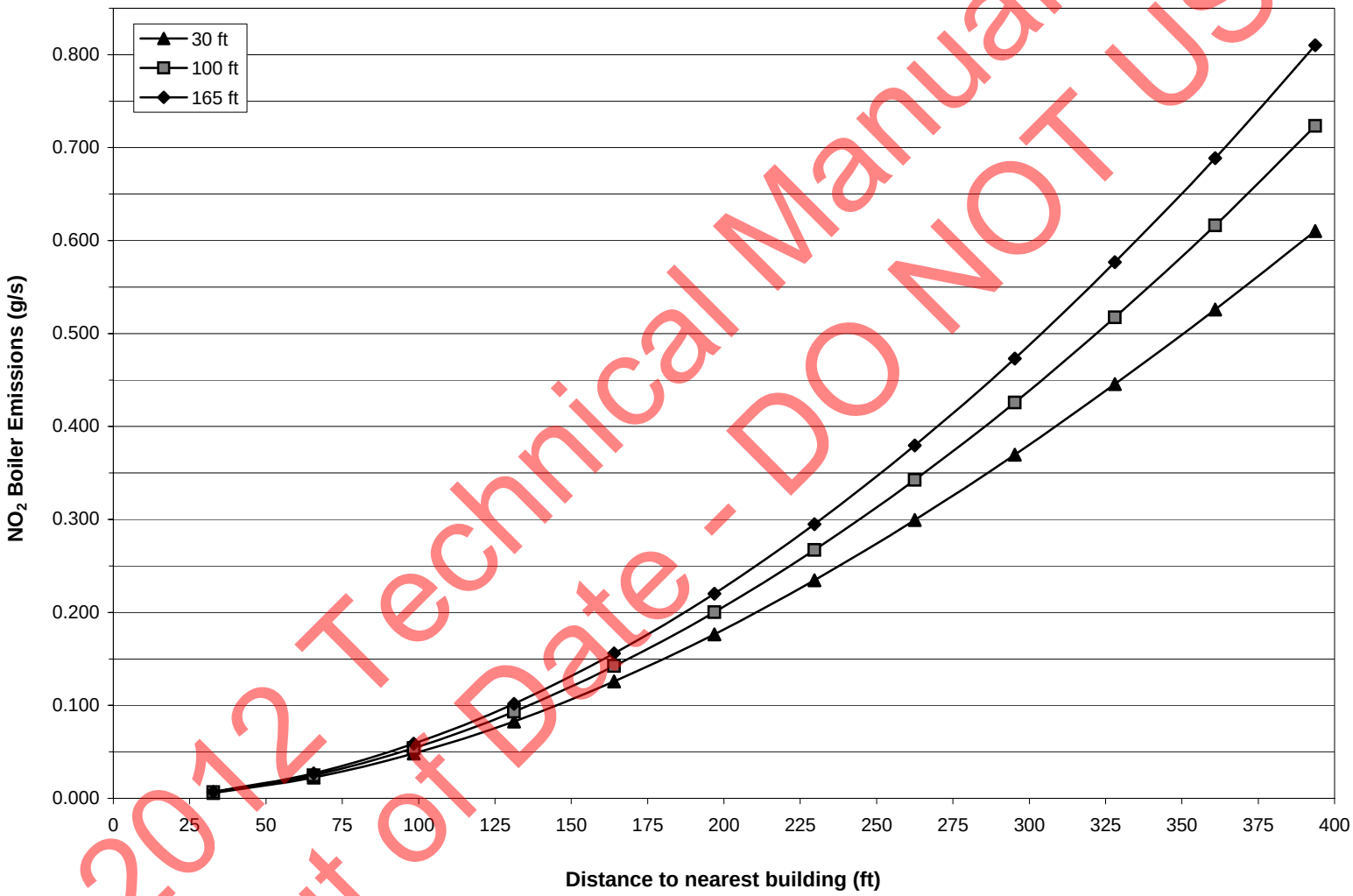
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FIG App 17-8
NO_2 BOILER SCREEN
COMMERCIAL AND OTHER NON-RESIDENTIAL DEVELOPMENT - NATURAL GAS



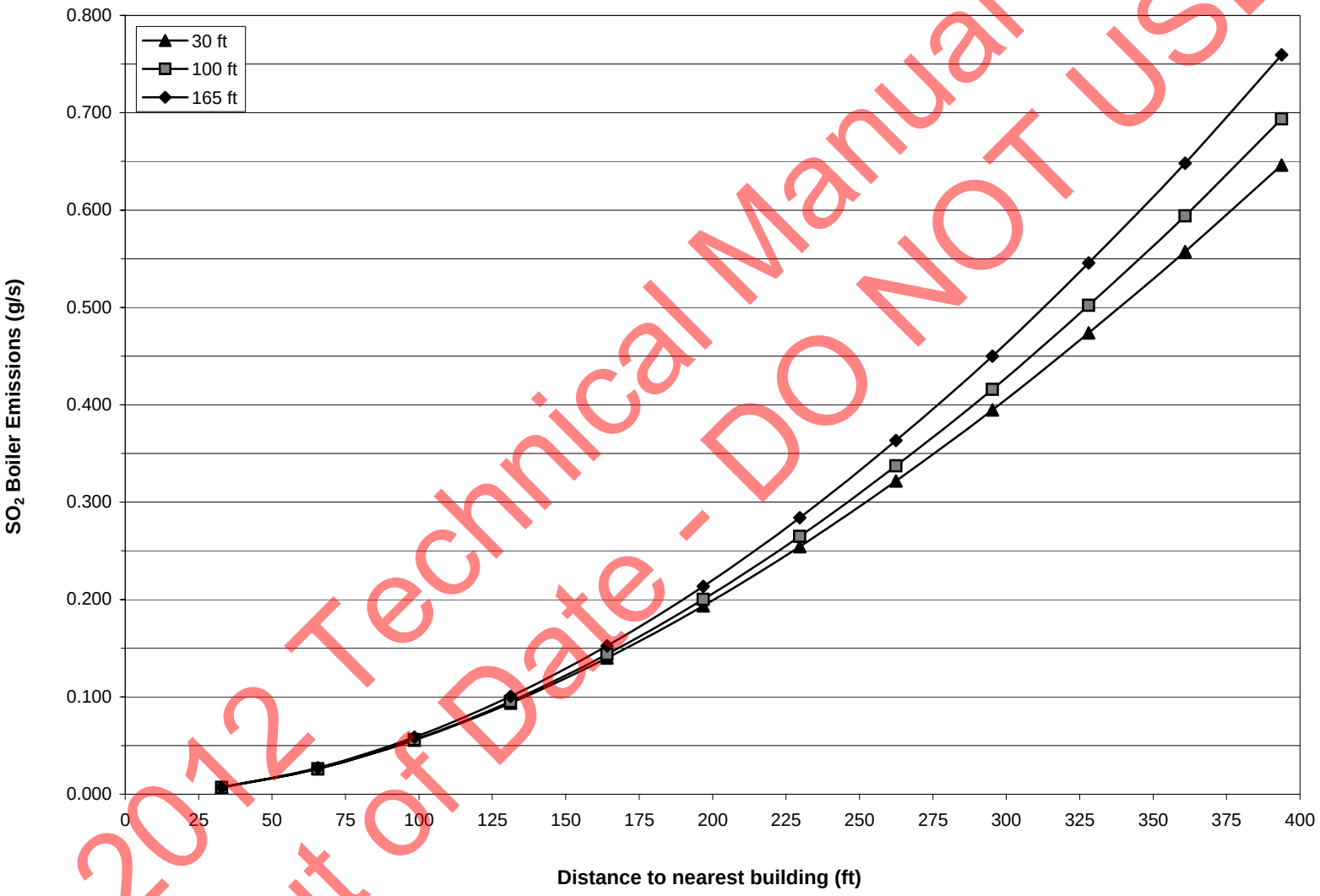
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FIG App 17-9
NO_2 EMISSIONS BOILER SCREEN (annual)



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FIG App 17-10
SO_2 EMISSIONS BOILER SCREEN (24-hour)



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Table 1.3-1. CRITERIA POLLUTANT EMISSION FACTORS FOR FUEL OIL COMBUSTION[a]

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e]		Filterable PM[f]	
	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING	Emission Factor ($lb/10^3$ gal)	EMISSION FACTOR RATING
Boilers > 100 Million Btu/hr										
No. 6 oil fired, normal firing (1-01-004-01), (1-02-004-01), (1-03-004-01)	157S	A	5.7S	C	47	A	5	A	9.19(S)+3.22	A
No. 6 oil fired, normal firing, low NO_x burner (1-01-004-01), (1-02-004-01)	157S	A	5.7S	C	40	B	5	A	9.19(S)+3.22	A
No. 6 oil fired, tangential firing, (1-01-004-04)	157S	A	5.7S	C	32	A	5	A	9.19(S)+3.22	A
No. 6 oil fired, tangential firing, low NO_x burner (1-01-004-04)	157S	A	5.7S	C	26	E	5	A	9.19(S)+3.22	A
No. 5 oil fired, normal firing (1-01-004-05), (1-02-004-04)	157S	A	5.7S	C	47	B	5	A	10	B
No. 5 oil fired, tangential firing (1-01-004-06)	157S	A	5.7S	C	32	B	5	A	10	B
No. 4 oil fired, normal firing (1-01-005-04), (1-02-005-04)	150S	A	5.7S	C	47	B	5	A	7	B
No. 4 oil fired, tangential firing (1-01-005-05)	150S	A	5.7S	C	32	B	5	A	7	B
No. 2 oil fired (1-01-005-01), (1-02-005-01), (1-03-005-01)	142S[h]	A	5.7S	C	24	D	5	A	2	A
No.2 oil fired, LNB/FGR, (1-01-005-01), (1-02-005-01), (1-03-005-01)	142S[h]	A	5.7S	A	10	D	5	A	2	A

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Table 1.3-1. (cont.)

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e]		Filterable PM[f]	
	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING
Boilers < 100 Million Btu/hr										
No. 6 oil fired (1-02-004-02/03) (1-03-004-02/03)	157S	A	2S	A	55	A	5	A	9.19(S)+3.22[i]	B
No. 5 oil fired (1-03-004-04)	157S	A	2S	A	55	A	5	A	10[i]	A
No. 4 oil fired (1-03-005-04)	150S	A	2S	A	20	A	5	A	7	B
Distillate oil fired (1-02-005-02/03) (1-03-005-02/03)	142S	A	2S	A	20	A	5	A	2	A
Residential furnace (A2104004/A2104011)	142S	A	2S	A	18	A	5	A	0.4[g]	B

a To convert from lb/103 gal to kg/103 L, multiply by 0.120. SCC = Source Classification Code.
b References 1-2,6-9,14,56-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.
c References 1-2,6-8,16,57-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.
d References 6-7,15,19,22,56-62. Expressed as NO2. Test results indicate that at least 95% by weight of NOx is NO for all boiler types except residential furnaces, where about 75% is NO. For utility vertical fired boilers use 105 lb/103 gal at full load and normal (>15%) excess air. Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are related to fuel nitrogen content, estimated by the following empirical relationship: lb NO2 /103 gal = 20.54 + 104.39(N), where N is the weight % of nitrogen in the oil. For example, if the fuel is 1% nitrogen, then N = 1.
e References 6-8,14,17-19,56-61. CO emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.
f References 6-8,10,13-15,56-60,62-63. Filterable PM is that particulate collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train. Particulate emission factors for residual oil combustion are, on average, a function of fuel oil sulfur content where S is the weight % of sulfur in oil. For example, if fuel oil is 1% sulfur, then S = 1.
g Based on data from new burner designs. Pre-1970's burner designs may emit filterable PM as high as 3.0 1b/103 gal.
h The SO2 emission factor for both no. 2 oil fired and for no. 2 oil fired with LNB/FGR, is 142S, not 157S. Errata dated April 28, 2000. Section corrected May 2010.
i The PM factors for No.6 and No. 5 fuel were reversed. Errata dated April 28, 2000. Section corrected May 2010.

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Next CBECS will be conducted in 2007

Table C35. Fuel Oil Consumption and Conditional Energy Intensity by Census Region for Non-Mall Buildings, 2003

	Total Fuel Oil Consumption (million gallons)				Total Floorspace of Buildings Using Fuel Oil (million square feet)				Fuel Oil Energy Intensity (gallons/square foot)			
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West
All Buildings*	1,265	170	104	63	6,080	2,832	4,122	2,123	0.21	0.06	0.03	Q
Building Floorspace (Square Feet)												
1,001 to 10,000	381	Q	Q	Q	757	Q	255	Q	0.50	Q	0.10	Q
10,001 to 100,000	375	63	Q	Q	1,704	643	833	351	0.22	0.10	Q	Q
Over 100,000	509	20	44	Q	3,618	1,983	3,034	1,673	0.14	0.01	0.01	Q
Principal Building Activity												
Education	282	Q	Q	Q	933	Q	Q	Q	0.30	Q	Q	Q
Health Care	Q	Q	17	7	Q	492	786	262	Q	Q	0.02	0.03
Office	105	6	14	1	1,379	714	1,235	748	0.08	0.01	0.01	0.00
All Others	837	Q	44	40	3,426	1,281	1,644	984	0.24	Q	0.03	Q
Year Constructed												
1945 or Before	555	Q	Q	Q	2,126	Q	Q	Q	0.26	Q	Q	Q
1946 to 1959	277	Q	Q	Q	1,233	343	Q	Q	0.22	Q	Q	Q
1960 to 1969	Q	Q	Q	Q	579	398	443	Q	0.34	Q	Q	Q
1970 to 1979	121	Q	25	Q	626	562	693	Q	0.19	Q	0.04	Q
1980 to 1989	45	Q	Q	5	620	Q	1,064	980	0.07	Q	Q	0.01
1990 to 2003	Q	18	Q	6	896	806	1,184	325	0.08	0.02	Q	Q
Climate Zone: 30-Year Average												
Under 2,000 CDD and --												
More than 7,000 HDD	295	Q	N	Q	1,009	1,158	N	331	0.29	0.13	N	Q
5,500-7,000 HDD	398	20	N	Q	2,207	1,461	N	Q	0.18	0.01	N	Q
4,000-5,499 HDD	Q	Q	Q	Q	2,863	Q	1,392	Q	0.20	Q	Q	Q
Fewer than 4,000 HDD	N	N	29	Q	N	N	1,245	1,092	N	N	0.02	Q
2,000 CDD or More and --												
Fewer than 4,000 HDD	N	N	6	Q	N	N	1,486	Q	N	N	0.00	Q
Number of Floors												
One	230	35	Q	Q	987	420	800	311	0.23	0.08	Q	Q
Two	390	Q	Q	Q	1,249	603	618	Q	0.31	Q	Q	Q
Three	234	Q	Q	Q	916	Q	Q	Q	0.26	Q	Q	Q
Four to Nine	328	Q	41	Q	1,704	1,007	887	503	0.19	Q	0.05	Q
Ten or More	Q	Q	6	1	1,224	Q	1,349	900	Q	Q	0.00	0.00
Number of Workers (main shift)												
Less than 10	436	Q	33	Q	1,221	374	376	Q	0.36	Q	0.09	Q
10 to 99	606	27	Q	Q	2,501	939	988	Q	0.24	0.03	Q	Q
100 or More	222	16	39	Q	2,358	1,520	2,758	1,681	0.09	0.01	0.01	Q
Weekly Operating Hours												
48 or fewer	441	Q	Q	Q	1,426	475	559	Q	0.31	Q	0.05	Q
49 to 84	374	Q	Q	10	1,859	915	1,526	805	0.20	Q	Q	0.01
85 to 168	450	33	45	31	2,795	1,442	2,037	1,209	0.16	0.02	0.02	Q

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Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A, C, and E of the 2003 Commercial Buildings Energy Consumption Survey. http://www.eia.doe.gov/emeu/cbecs

Released: Dec 2006
Next CBECS will be conducted in 2007

Table C25. Natural Gas Consumption and Conditional Energy Intensity by Census Region for Non-Mall Buildings, 2003

	Total Natural Gas Consumption (billion cubic feet)				Total Floorspace of Buildings Using Natural Gas (million square feet)				Natural Gas Energy Intensity (cubic feet/square foot)			
	North-east	Mid-west	South	West	North-east	Mid-west	South	West	North-east	Mid-west	South	West
All Buildings*	415	683	460	311	9,181	13,163	13,311	7,813	45.2	51.9	34.6	39.8
Building Floorspace (Square Feet)												
1,001 to 5,000	46	91	65	40	513	1,074	869	628	90.4	84.9	74.9	63.7
5,001 to 10,000	38	57	64	44	621	959	1,349	763	61.3	59.0	47.5	57.2
10,001 to 25,000	51	119	70	60	1,173	2,436	2,066	1,378	43.9	48.7	33.8	43.6
25,001 to 50,000	45	115	47	44	977	2,262	1,589	1,196	45.6	50.7	29.4	36.6
50,001 to 100,000	58	94	59	25	1,645	1,930	2,153	955	35.5	48.7	27.3	26.3
100,001 to 200,000	65	86	67	24	1,706	1,777	2,241	921	38.3	48.4	29.7	25.6
200,001 to 500,000	60	71	41	28	1,588	1,673	1,419	999	37.6	42.3	28.6	27.5
Over 500,000	51	51	49	Q	956	1,052	1,625	973	53.4	48.8	30.0	48.3
Principal Building Activity												
Education	51	113	47	48	1,347	2,184	2,291	1,222	38.2	51.8	20.6	39.6
Food Sales	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Food Service	Q	50	87	Q	Q	379	623	Q	Q	133.2	139.3	Q
Health Care	47	64	87	38	464	657	987	436	100.9	97.0	88.4	86.1
Inpatient	41	50	80	27	351	395	812	247	117.4	127.2	98.6	108.1
Outpatient	Q	14	Q	Q	Q	262	Q	Q	Q	51.5	Q	Q
Lodging	35	66	55	52	982	1,015	1,338	920	Q	65.0	41.1	56.6
Retail (Other Than Mall)	16	37	23	12	385	688	1,148	645	42.3	54.1	20.4	18.3
Office	89	104	33	35	2,301	2,447	1,915	1,544	38.8	42.3	17.2	23.0
Public Assembly	16	43	22	18	712	770	699	542	Q	56.4	32.1	32.4
Public Order and Safety	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Religious Worship	15	37	20	8	384	899	923	424	38.4	41.4	21.7	18.1
Service	23	57	28	Q	368	934	822	Q	62.2	61.3	34.6	Q
Warehouse and Storage	25	61	20	Q	985	1,921	1,617	971	25.8	31.9	12.1	Q
Other	45	Q	Q	Q	531	Q	Q	Q	85.5	Q	Q	Q
Vacant	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Year Constructed												
Before 1920	42	66	Q	Q	950	1,175	Q	Q	43.8	56.4	Q	Q
1920 to 1945	88	94	23	18	1,845	1,344	790	699	47.9	69.6	28.8	25.7
1946 to 1959	56	85	46	24	1,406	1,681	953	620	39.5	50.5	48.1	38.3
1960 to 1969	58	94	50	46	1,276	1,819	1,428	1,113	45.4	51.8	35.1	40.9
1970 to 1979	55	138	74	74	1,162	2,737	2,265	1,494	47.6	50.4	32.5	49.4
1980 to 1989	40	77	89	75	1,016	1,342	2,520	1,592	39.6	57.7	35.5	47.4
1990 to 1999	44	94	121	46	949	2,126	3,708	1,395	46.2	44.1	32.6	33.0
2000 to 2003	32	35	39	16	576	939	1,261	654	56.3	37.6	31.3	23.8
Climate Zone: 30-Year Average												
Under 2,000 CDD and --												
More than 7,000 HDD	Q	235	N	122	Q	4,382	N	2,102	53.3	53.6	N	57.9
5,500-7,000 HDD	188	405	N	66	3,692	7,947	N	1,211	51.0	51.0	N	54.1
4,000-5,499 HDD	165	44	104	14	4,328	834	2,508	443	38.1	52.3	41.5	30.8
Fewer than 4,000 HDD	N	N	249	99	N	N	6,748	3,761	N	N	36.8	26.2
2,000 CDD or More and --												
Fewer than 4,000 HDD	N	N	107	11	N	N	4,054	296	N	N	26.5	37.9

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A, C, and E of the 2003 Commercial Buildings Energy Consumption Survey. http://www.eia.doe.gov/emeu/cbecs

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Table US1. Total Energy Consumption, Expenditures, and Intensities, 2005
Part 1: Housing Unit Characteristics and Energy Usage Indicators

Housing Unit Characteristics and Energy Usage Indicators	U.S. Households (millions)	Number of Members per Household	Floorspace per Household (Square Feet)	Energy Consumption[2]			
				Total U.S. (quadrillion Btu)	Per Household (million Btu)	Per Household Member (million Btu)	Per Square Foot (thousand Btu)
Total	111.1	2.57	2,171	10.55	94.9	37.0	43.7
Census Region and Division							
Northeast	20.6	2.56	2,334	2.52	122.2	47.7	52.4
New England	5.5	2.34	2,472	0.71	129.3	55.3	52.3
Middle Atlantic	15.1	2.64	2,284	1.81	119.7	45.3	52.4
Midwest	25.6	2.47	2,421	2.91	113.5	46.0	46.9
East North Central	17.7	2.49	2,483	2.09	117.7	47.3	47.4
West North Central	7.9	2.43	2,281	0.82	104.1	42.9	45.7
South	40.7	2.52	2,161	3.25	79.8	31.6	37.0
South Atlantic	21.7	2.50	2,243	1.65	76.1	30.4	33.9
East South Central	6.9	2.42	2,137	0.60	87.3	36.1	40.9
West South Central	12.1	2.62	2,028	1.00	82.4	31.4	40.6
West	24.2	2.76	1,784	1.87	77.4	28.1	43.4
Mountain	7.6	2.67	1,951	0.68	89.8	33.7	46.0
Pacific	16.6	2.80	1,708	1.19	71.8	25.7	42.0
Four Most Populated States							
New York	7.1	2.72	1,961	0.84	118.2	43.5	60.3
Florida	7.0	2.51	1,869	0.42	60.0	23.9	32.1
Texas	8.0	2.76	2,168	0.65	81.5	29.5	37.6
California	12.1	2.75	1,607	0.81	67.1	24.4	41.7
All Other States	76.9	2.51	2,307	7.82	101.8	40.5	44.1
Urban/Rural Location (as Self-Reported)							
City	47.1	2.53	1,781	4.02	85.3	33.7	47.9
Town	19.0	2.58	2,167	1.94	102.3	39.7	47.2
Suburbs	22.7	2.70	2,688	2.46	108.6	40.3	40.4
Rural	22.3	2.52	2,472	2.13	95.1	37.8	38.5
Climate Zone[1]							
Less than 2,000 CDD and--							
Greater than 7,000 HDD	10.9	2.49	2,534	1.29	117.9	47.4	46.5
5,500 to 7,000 HDD	26.1	2.50	2,346	3.00	115.0	45.9	49.0
4,000 to 5,499 HDD	27.3	2.60	2,205	2.78	101.7	39.1	46.1
Fewer than 4,000 HDD	24.0	2.61	1,966	1.83	76.4	29.2	38.8
2000 CDD or More and--							
Less than 4,000 HDD	22.8	2.60	1,971	1.65	72.4	27.9	36.7
Type of Housing Unit and Number of Bedrooms							
Single-Family Homes							
Detached	72.1	2.73	2,720	7.81	108.4	39.7	39.8
Less than 3 Bedrooms	12.3	2.06	1,917	1.09	89.0	43.3	46.4
3 Bedrooms	38.8	2.65	2,568	3.91	100.9	38.1	39.3
4 Bedrooms	17.1	3.14	3,370	2.18	127.5	40.6	37.8
5 or More Bedrooms	3.9	3.81	3,920	0.62	160.2	42.1	40.9
Attached	7.6	2.48	1,941	0.68	89.3	36.1	46.0
Less than 3 Bedrooms	3.5	2.03	1,414	0.26	74.1	36.5	52.4
3 Bedrooms	3.2	2.67	2,124	0.31	96.3	36.1	45.3
4 or More Bedrooms	0.9	3.53	3,307	0.11	123.1	34.9	37.2
Apartments in							
2 to 4 Unit Buildings	7.8	2.42	1,090	0.66	85.0	35.1	78.0
Less than 2 Bedrooms	2.0	1.71	809	0.16	79.1	46.3	97.8
2 Bedrooms	4.3	2.45	1,092	0.32	74.7	30.5	68.4
3 or More Bedrooms	1.5	3.29	1,459	0.18	123.0	37.4	84.3
5 or More Unit Buildings	16.7	2.04	872	0.91	54.4	26.7	62.4
Less than 2 Bedrooms	7.9	1.47	672	0.37	46.4	31.7	69.0

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2 Bedrooms	7.4	2.34	978	0.45	60.7	25.9	62.1
3 or More Bedrooms	1.4	3.64	1,425	0.09	66.2	18.2	46.5
Mobile Homes	6.9	2.47	1,059	0.49	70.4	28.5	66.5
Less than 3 Bedrooms	3.5	2.05	838	0.22	63.0	30.8	75.2
3 or More Bedrooms	3.5	2.89	1,279	0.27	77.8	26.9	60.8
Ownership of Housing Unit							
Owned	78.1	2.59	2,586	8.16	104.4	40.3	40.4
Single-Family Detached	64.1	2.67	2,813	7.04	109.8	41.1	39.1
Single-Family Attached	4.2	2.36	2,400	0.40	94.9	40.2	39.5
Apartments in 2-4 Unit Buildings	1.8	2.23	1,604	0.20	110.5	49.5	68.9
Apartments in 5 or more Unit Buildings	2.3	1.65	1,116	0.12	50.9	30.8	45.6
Mobile Homes	5.7	2.39	1,099	0.40	70.5	29.5	64.1
Rented	33.0	2.51	1,188	2.39	72.4	28.9	61.0
Single-Family Detached	8.0	3.17	1,983	0.77	96.5	30.5	48.7
Single-Family Attached	3.4	2.62	1,383	0.28	82.6	31.5	59.7
Apartments in 2-4 Unit Buildings	5.9	2.48	930	0.46	77.1	31.1	82.9
Apartments in 5 or more Unit Buildings	14.4	2.10	833	0.79	55.0	26.2	66.0
Mobile Homes	1.2	2.84	866	0.08	70.0	24.6	80.8
Year of Construction							
Before 1940	14.7	2.46	2,325	1.77	120.4	48.9	51.8
1940 to 1949	7.4	2.44	2,047	0.77	104.0	42.7	50.8
1950 to 1959	12.5	2.43	2,052	1.23	98.3	40.5	47.9
1960 to 1969	12.5	2.64	1,969	1.18	94.9	35.9	48.2
1970 to 1979	18.9	2.49	1,863	1.58	83.4	33.5	44.8
1980 to 1989	18.6	2.52	1,992	1.51	81.4	32.3	40.9
1990 to 1999	17.3	2.80	2,501	1.64	94.4	33.7	37.7
2000 to 2005	9.2	2.76	2,827	0.87	94.4	34.2	33.4
Total Floorspace (Square Feet)							
Fewer than 500	3.2	1.90	375	0.18	56.5	29.8	150.8
500 to 999	23.8	2.14	765	1.48	62.0	29.0	81.1
1,000 to 1,499	20.8	2.66	1,235	1.71	82.0	30.9	66.4
1,500 to 1,999	15.4	2.67	1,745	1.45	93.8	35.1	53.8
2,000 to 2,499	12.2	2.68	2,233	1.25	102.3	38.2	45.8
2,500 to 2,999	10.3	2.69	2,735	1.16	112.2	41.7	41.0
3,000 to 3,499	6.7	2.57	3,239	0.78	115.6	45.0	35.7
3,500 to 3,999	5.2	2.64	3,742	0.68	129.2	48.9	34.5
4,000 or More	13.3	3.02	5,421	1.87	140.4	46.5	25.9
Weekday Home Activities							
Home Used for Business							
Yes	8.9	2.81	2,904	1.04	117.2	41.8	40.4
No	102.2	2.55	2,107	9.50	93.0	36.5	44.1
Energy-Intensive Activity							
Yes	2.2	2.82	2,437	0.25	110.9	39.4	45.5
No	108.9	2.56	2,165	10.30	94.6	36.9	43.7
Someone Home All Day							
Yes	56.4	2.72	2,207	5.59	99.2	36.4	45.0
No	54.7	2.41	2,134	4.95	90.5	37.6	42.4

1 One of five climatically distinct areas, determined according to the 30-year average (1971-2000) of the annual heating and cooling degree-days. to the 30-year average annual degree-days for an appropriate nearby weather station.
2 Energy consumption and expenditures in this table excludes primary electricity and wood.
Q = Data withheld either because the Relative Standard Error (RSE) was greater than 50 percent or fewer than 10 households were sampled.
N = No cases in the reporting sample.
(*) Number less than 0.5, 0.05, or 0.005 depending on the number of significant digits in the column, rounded to zero.
Notes: ● Because of rounding, data may not sum to totals. ● See "Glossary" for definition of terms used in this report.
Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-457 A-G of the 2005 Residential Energy Consumptic

Source:
http://www.eia.doe.gov/emeu/recs/recs2005/c&e/detailed_tables2005c&e.html

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INDUSTRIAL SOURCE SCREEN FOR POTENTIAL CUMULATIVE IMPACTS

Section 322.1 in Chapter 17, "Air Quality," outlines the methodology for analysis of an additional screen for industrial sources from a single point pollutant source. This appendix describes how to determine potential cumulative impact from multiple sources. Table 17-3 depicts maximum concentration values for various time periods (1-hour, 8-hour, 24-hour and annual) for the distances from 10 meters to 120 meters (33 feet to 394 feet) and the shortest stack and receptor height (10 meters). This table is based on the generic emission rate of 1 gram per second of pollutant from a point source and the latest five years of available meteorological data (2003-2007) from La Guardia airport. Default values from the CEQR manual were used: stack exit velocity employed was 0.001 m/s, stack diameter was assumed to be 0 meters and stack exit temperature was set at 293K. Step-by-step methodology outlined below explains how to accurately use the values in this table to determine the potential cumulative impact from industrial emissions on a new proposed project:

1. Identify all sources with potential impact on the proposed project.
2. Convert the estimated emissions of each pollutant from the industrial sources of concern into grams/second.
3. Determine distance to each point pollution source.
4. Using the look up table, find the corresponding concentration for distance between each industrial source and the new use of concern for desired averaging time.
5. For each point, multiply the emission rates from step 2 with the value from the table (step 4).
6. Combine these values to determine potential cumulative impact.

Table 17-3
Industrial Source Screen

20 Foot Source Height

Distance from Source	1-Hour Averaging Period (ug/m3)	8-Hour Averaging Period (ug/m3)	24-Hour Averaging Period (ug/m3)	Annual Averaging Period (ug/m3)
30 ft	126,370	64,035	38,289	6,160
65 ft	27,787	15,197	8,841	1,368
100 ft	12,051	7,037	4,011	598
130 ft	7,345	4,469	2,511	367
165 ft	4,702	2,967	1,643	236
200 ft	3,335	2,153	1,174	167
230 ft	2,657	1,720	924	131
265 ft	2,175	1,377	727	103
300 ft	1,891	1,142	594	84
330 ft	1,703	991	509	73
365 ft	1,528	857	434	62
400 ft	1,388	755	377	54

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Table 1.3-1. (cont.)

Firing Configuration (SCC)[a]	SO_2[b]		SO_3[c]		NO_x[d]		CO[e]		Filterable PM[f]	
	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING	Emission Factor (lb/10^3 gal)	EMISSION FACTOR RATING
Boilers < 100 Million Btu/hr										
No. 6 oil fired (1-02-004-02/03) (1-03-004-02/03)	157S	A	2S	A	55	A	5	A	9.19(S)+3.22[i]	B
No. 5 oil fired (1-03-004-04)	157S	A	2S	A	55	A	5	A	10[i]	A
No. 4 oil fired (1-03-005-04)	150S	A	2S	A	20	A	5	A	7	B
Distillate oil fired (1-02-005-02/03) (1-03-005-02/03)	142S	A	2S	A	20	A	5	A	2	A
Residential furnace (A2104004/A2104011)	142S	A	2S	A	18	A	5	A	0.4[g]	B

a To convert from lb/103 gal to kg/103 L, multiply by 0.120. SCC = Source Classification Code.
b References 1-2,6-9,14,56-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.
c References 1-2,6-8,16,57-60. S indicates that the weight % of sulfur in the oil should be multiplied by the value given. For example, if the fuel is 1% sulfur, then S = 1.
d References 6-7,15,19,22,56-62. Expressed as NO2. Test results indicate that at least 95% by weight of NOx is NO for all boiler types except residential furnaces, where about 75% is NO. For utility vertical fired boilers use 105 lb/103 gal at full load and normal (>15%) excess air. Nitrogen oxides emissions from residual oil combustion in industrial and commercial boilers are related to fuel nitrogen content, estimated by the following empirical relationship: lb NO2 /103 gal = 20.54 + 104.39(N), where N is the weight % of nitrogen in the oil. For example, if the fuel is 1% nitrogen, then N = 1.
e References 6-8,14,17-19,56-61. CO emissions may increase by factors of 10 to 100 if the unit is improperly operated or not well maintained.
f References 6-8,10,13-15,56-60,62-63. Filterable PM is that particulate collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train. Particulate emission factors for residual oil combustion are, on average, a function of fuel oil sulfur content where S is the weight % of sulfur in oil. For example, if fuel oil is 1% sulfur, then S = 1.
g Based on data from new burner designs. Pre-1970's burner designs may emit filterable PM as high as 3.0 1b/103 gal.
h The SO2 emission factor for both no. 2 oil fired and for no. 2 oil fired with LNB/FGR, is 142S, not 157S. Errata dated April 28, 2000. Section corrected May 2010.
i The PM factors for No.6 and No. 5 fuel were reversed. Errata dated April 28, 2000. Section corrected May 2010.

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Fuel Consumption 1993
Residential

	sq ft million	Total Btu (tril)	Btu/sq ft (thousand)	Electricity	minus Elec (tril Btu)	heating Btu/sq ft (thou)	cubic ft/sq ft NG	gallons/sq ft #2 fuel oil	gallons/sq ft #4 & 6 fuel oil
average	181200	9966	55.0	3280	6686	36.9	36.2	0.26	0.25
Year Constructed									
before 1939	40600	2639	65.0	510	2129	52.4	51.4	0.37	0.35
1940-1949	11600	777.2	67.0	200	577.2	49.8	48.8	0.36	0.33
1950-1959	24700	1482	60.0	420	1062	43.0	42.2	0.31	0.29
1960-1969	27200	1550.4	57.0	490	1060.4	39.0	38.2	0.28	0.26
1970-1979	31700	1585	50.0	710	875	27.6	27.1	0.20	0.18
1980-1984	14700	676.2	46.0	350	326.2	22.2	21.8	0.16	0.15
1985-1987	10800	475.2	44.0	230	245.2	22.7	22.3	0.16	0.15
1988-1990	10000	430	43.0	210	220	22.0	21.6	0.16	0.15
1991-1993	10000	400	40.0	160	240	24.0	23.5	0.17	0.16
Northeast	40100	2406	60	470	1936	48.3	47.3	0.34	0.32
New York	12800.0	819.2	64.0	130	689.2	53.8	52.8	0.38	0.36
Type of Housing Unit									
Single Family	152200	7914.4	52	2580	5334.4	35.0	34.4	0.25	0.23
Detached	139100	7233.2	52	2340	4893.2	35.2	34.5	0.25	0.23
Attached	13100	694.3	53	240	454.3	34.7	34.0	0.25	0.23
Mobile Home	5400	453.6	84	210	243.6	45.1	44.2	0.32	0.30
Multifamily	23600	1628.4	69	490	1138.4	48.2	47.3	0.34	0.32
2 -4 units	9600	796.8	83	170	626.8	65.3	64.0	0.47	0.44
5 or more units	14000	840	60	320	520	37.1	36.4	0.27	0.25

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Fuel Consumption - 1995
Commercial Use

	sq ft (million)	Total Btu (tril)	Btu/sq ft (thousand)	Electricity	minus Elec (tril Btu)	heating Btu/sq ft (thou)	cubic ft/sq ft NG	gallons/sq ft #2 fuel oil	gallons/sq ft #4 & 6 fuel oil
average	58772	5321	90.5	2608	2713	46.2	45.3	0.33	0.31
Year Constructed									
before 1919									
1900-1919	3673	292	79.5	99	193	52.5	51.5	0.38	0.35
1920-1945	6710	508	75.7	173	335	49.9	48.9	0.36	0.33
1946-1959	9298	826	88.8	325	501	53.9	52.8	0.38	0.36
1960-1969	10858	1024	94.3	472	552	50.8	49.8	0.36	0.34
1970-1979	11333	1125	99.3	615	510	45.0	44.1	0.32	0.30
1980-1989	12252	1059	86.4	648	411	33.5	32.9	0.24	0.22
1990-1992	2590	297	114.7	163	134	51.7	50.7	0.37	0.34
1993-1995	2059	190	92.3	113	77	37.4	36.7	0.27	0.25
size (sq. ft)									
1001-5000	6338.0	708	111.7	380	328	51.8	50.7	0.37	0.35
5001-10000	7530.0	624	82.9	238	386	51.3	50.3	0.37	0.34
10001-25000	11617.0	824	70.9	384	440	37.9	37.1	0.27	0.25
25001-50000	7676.0	630	82.1	316	314	40.9	40.1	0.29	0.27
50001-100000	7968.0	698	87.6	363	335	42.0	41.2	0.30	0.28
100001-200000	6776.0	687	101.4	337	350	51.7	50.6	0.37	0.34
200001-500000	5553.0	636	114.5	307	329	59.2	58.1	0.42	0.39
over 500000	5313.0	514	96.7	282	232	43.7	42.8	0.31	0.29
Northeast	11883.0	1035	87.1	436	599	50.4	49.4	0.36	0.34

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