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," fixed facilities, usually referenced as "stationary sources," or both. Under CEQR, an air quality assessment determines both a proposed project's effects on ambient air quality and 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 Sources

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 large new boilers that exhaust 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 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

121. Regulated Pollutants

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. 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, 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."

121.1. 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.

121.2. Ozone and its Precursors (Hydrocarbons and Nitrogen Oxides)

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.

121.3. Nitrogen Oxides

Nitrogen oxides (NO_x) are emitted from both mobile and stationary sources. The effects of NO_x emissions from mobile sources are generally examined on a regional basis. The NO_x regional mobile source emissions 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, and/or localized, or "microscale" analysis. Nitrogen dioxide (NO_2) (one component of NO_x) is also a regulated pollutant. NO_2 is mostly formed from the transformation of NO in the atmosphere and is of concern downwind from

large stationary sources. For proposed projects that would generate combustion sources, it is appropriate to examine the potential impact on local NO_2 concentrations.

121.4. 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, the U.S. Environmental Protection Agency (USEPA) 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 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 (rolling 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.

121.5. 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 respirable particulates of concern are: (i) particles with an aerodynamic diameter of less than or equal to 2.5 micrometers (µm) (referred to as $PM_{2.5}$); and (ii) particles with an aerodynamic diameter of less than or equal to 10 µm (referred to as PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ 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.

All gasoline-powered and diesel-powered mobile source vehicles, especially heavy trucks and buses operating on diesel fuel, 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 gasoline and diesel-powered vehicles. Vehicular traffic may also contribute to PM emissions through brake and tire wear and by disturbing dust on roadways.

Parking garages or lots that would accommodate large numbers of 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.

121.6. 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.

121.7. 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 (mutation-causing), 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 (malformation-causing). 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 development of new industrial sources, such as a solid waste incinerator, that could emit such compounds in potentially significant quantities.

121.8. 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 on-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, mercaptans, 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.

122. 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 (PM_{10} and $PM_{2.5}$), sulfur dioxide, and lead. Table 17-1 shows the primary and secondary standards for these pollutants. According to the USEPA, 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.

122.1. Other National Standards

The USEPA 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 and 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 (OSHA) and National Institute for Occupational Safety and Health's (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, the USEPA has promulgated regulations that govern emissions of 189 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.

122.2. 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 (Table 17-1). 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 (6 NYCRR 257).

NONCRITERIA POLLUTANTS

The New York State Department of Environmental Conservation (NYSDEC) also publishes maximum allowable guideline concentrations for certain pollutants, known as "noncriteria pollutants," for which the USEPA has no established standards. The NYSDEC'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 NYSDEC 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[1]		Secondary	
	PPM	Micrograms Per Cubic Meter	PPM	Micrograms Per Cubic Meter
Carbon Monoxide (CO)				
Maximum 8-Hour Concentration[2]	9	10,000	None	
Maximum 1-Hour Concentration[2]	35	40,000		
Lead (Pb) [3]				
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[4]	0.100	188	None	
Ozone (Photochemical Oxidants—O_3)				
8-Hour Maximum[5]	0.070		0.070	
Inhalable Particulates (PM_{10})				
Maximum 24-Hour Concentration[6]		150		150
Fine Particulate Matter ($PM_{2.5}$)				
Average of 3 Consecutive Annual Means		12		15
24-Hour Concentration[7]		35		35
Sulfur Dioxide (SO_2)				
Maximum 3-Hour Concentration[2]			0.50	1,300
Maximum 1-Hour Concentration[8]	0.075	196	None	

Note:

1 Gaseous concentrations for Federal standards are corrected to a reference temperature of 25°C and to a reference pressure of 760 millimeters of mercury.

2 Not to be exceeded more than once a year. A violation of standards occurs if these are exceeded more than once.

3 Federal standard is not to be exceeded. Federal standard for lead not yet officially adopted by NYS. Based upon the November 22, 2011 EPA designation for areas of New York State, which became effective on 12/31/11, the 0.15 µg/m³ standard will be effective throughout New York State on 1/1/2013 and will replace the previous level of 1.5 µg/m³. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard (12/31/12 throughout New York State).

4 The 0.100 ppm standard is effective 1/22/2010. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average within an area must not exceed 100 ppb.

5 Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards

6 Federal standard for PM_{10} not yet officially adopted by NYS, but is currently being applied to determine compliance status. Not to be exceeded more than once per year on average over 3 years.

7 Federal standard was changed from 65 to 35 µg/m³ on December 17, 2006. Compliance with the Federal standard is determined by using the average of 98th percentile 24 hour value during the past three years, which cannot exceed 35 µg/m³.

8 Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Source: "National Ambient Air Quality Standards (NAAQS)." https://www.epa.gov/criteria-air-pollutants/naaqs-table
"New York State Ambient Air Quality Monitoring" https://www.dec.ny.gov/chemical/8406.html

ODORS

The NYSDEC 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 211.1).

New York State has a one hour ambient air quality standard for hydrogen sulfide (which has a malodorous smell similar to rotten eggs) of 10 parts per billion (ppb). The 1-hour New York State ambient air standard is nuisance-based and is applicable at all off-site locations when analyzed under CEQR.

123. Compliance with Standards

The USEPA 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 a NAA for 8-hour ozone. New York County is also designated as a NAA for PM_{10}.

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. In March 2008, the USEPA revised the 8-hour ozone NAAQS to 0.075 parts per million (ppm). Separately, in June 2011, the state petitioned the USEPA to make a binding determination that the NY-NJ-CT metropolitan area (NYMA) has attained the 1997 8-hour ozone NAAQS of 0.08 ppm.

The USEPA designated New York County (Manhattan) as a NAA for respirable particulate matter (PM_{10}). The other four New York City boroughs are designated as in attainment for the PM_{10} standards. All the New York City boroughs were designated as NAA for both the 24-hour and annual average $PM_{2.5}$ standards from 2005 to 2013. Since April 18, 2014, all five New York City boroughs have been designated as $PM_{2.5}$ maintenance areas under the CAA, indicating that they are now consistently meeting the $PM_{2.5}$ NAAQS. All New York City boroughs are NAAs for ozone (8-hour). Up-to-date NAAQS attainment information for New York City can be found at EPA's Green Book.

New York State has withdrawn the PM_{10} SIP and requested a clean air finding in January 2013. New York State also submitted a redesignation demonstration and a maintenance plan to the USEPA in June 2013 for $PM_{2.5}$. On December 14, 2012, the USEPA promulgated a new annual primary NAAQS for $PM_{2.5}$ of 12 micrograms per cubic meter based on the annual arithmetic mean, averaged over 3 years.

Monitoring data for the other four national criteria pollutants (SO_2, NO_2, CO, and lead) demonstrate that New York City is in compliance with the corresponding NAAQS for these pollutants.

On February 9, 2010, the 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 of 100 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). 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 three most recent years of quality-assured air quality data from the 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). The 2010 rule required states to site NO_2 near-roadway monitors and have them operational by January 1, 2013. The USEPA proposed revisions to this rule on October 5, 2012 to require states to begin operating the near-road component of the NO_2 monitoring network in phases between January 1, 2014 and January 1, 2017. This means that sufficient air quality data from the new network will not be available to determine compliance with the revised NAAQS until after 2015 at the earliest.

Until the NO_2 designations are made, the USEPA rule states that major new and modified sources applying for New Source Review (NSR)/Prevention of Significant Deterioration (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) (referring to 40 C.F.R. 51.166(k)). The 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.

On June 22, 2010, the USEPA promulgated a new 1-hour NAAQS for SO_2 of 75 ppb. The final rule became effective on August 23, 2010. New York submitted a letter to the USEPA on June 1, 2011 recommending that New York City be designated as "attainment" for the new 1-hour NAAQS. Once areas are designated as ''attainment,'' ''nonattainment'' or ''unclassifiable'' for the new 1-hour NAAQS, the USEPA 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 SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards, and ensuring that federal actions will not: (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violation of any standard in any area; or (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The USEPA 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 (40 CFR 93.150-65). Currently, the general conformity requirements apply only in areas that are designated "nonattainment" or "maintenance" for CO, lead, NO_x, ozone, PM_{10}, $PM_{2.5}$ and SO_2. A "maintenance" area that has been redesignated to "attainment" from "nonattainment" must maintain the NAAQS for 20 years by following two sequential 10-year plans.

In addition to general conformity rules, the USEPA has promulgated 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, PM, and CO, which impact human health and the environment (40 CFR 93.100-29). Transportation conformity is a CAA requirement that calls for the USEPA, the U.S. Department of Transportation (USDOT), 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 (6 NYCRR 240), which are coordinated by the NYSDEC 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 a given location (called a "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 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 point sources, line sources, area sources, or volume sources, as follows:

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.

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 construction site; an outdoor storage area of fine particulate material; or an industrial process that is distributed over large sections of a manufacturing plant.

VOLUME SOURCES

Volume sources are used to simulate the effects of emissions from a wide variety of industrial sources. In general, the volume source model is used to simulate the effects of emissions from sources such as building roof monitors and line sources (for example, conveyor belts and rail lines).

The dispersion models are addressed in Appendix A of USEPA's *Guideline on Air Quality Models* (also published as Appendix W of 40 CFR Part 51). The guidelines are periodically revised to ensure that new model developments or expanded regulatory requirements are incorporated.

132. Mesoscale Analyses

Nitrogen oxides and hydrocarbons are precursors to ozone formation 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 mesoscale analysis is typically large, such as an entire borough, 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_{10}, 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.

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, or Laboratory	Induced Traffic	☐						
	Boilers		☐	☐	☐			
	Incinerators	☐	☐	☐	☐	☐	☐	☐
	Process	☐	☐	☐	☐	☐	☐	☐
Parking Lot/Garage	Induced Traffic	☐						
Bus or Truck Depot, Garage, Parking Lot or Franchise	Induced Bus or Truck Traffic	☐	☐					
New or Modified Roadway	Induced Traffic/Induced Trucks	☐	☐					
Cogeneration/Power Plant	Process	☐	☐	☐	☐	☐		☐
Demapping Built Streets	Traffic Diversion	☐	☐					
Transfer Station	Induced Traffic	☐	☐					
	Process	☐	☐	☐	☐			☐
Asphalt/Concrete Plant	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

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 (*e.g.,* diesel trains, helicopters, boats), or add new uses near mobile sources (*e.g.,* roadways, garages, parking lots). 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 list of projects:

- Projects that would result in placement of operable windows (*i.e.*, windows that may be opened and closed by the tenant), balconies, air intakes, or intake vents generally within 200 feet of an at-grade (*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. Consultation with the lead agency regarding whether an air quality analysis of parking facilities is necessary is recommended.
- Projects that would result in a sizable number of other mobile sources of pollution, such as a heliport, new railroad terminal, or trucking.

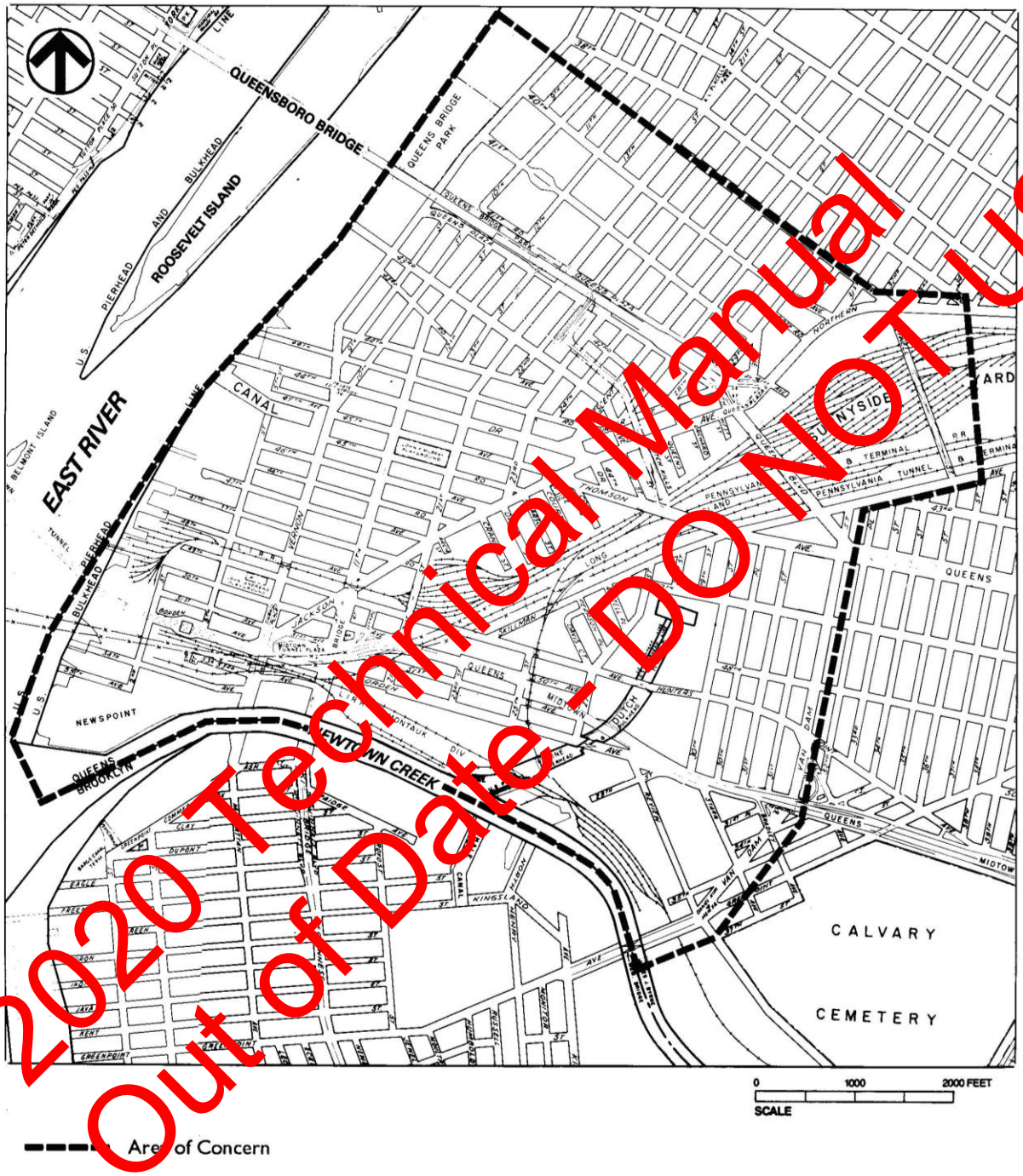
In addition, projects that would substantially increase the vehicle miles traveled in a large area (a borough, the city, or larger) may require mesoscale analyses.

Figure 17-1

Area of Concern in Downtown Brooklyn

Figure 17-2

Area of Concern in Long Island City



220. STATIONARY SOURCES

Projects may result in stationary source air quality impacts when they would (i) 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; (ii) introduce certain new uses near existing or planned emissions stacks that may affect the use; or (iii) introduce structures near such stacks so that changes in the dispersion of emissions from the stacks may affect surrounding uses.

The following projects may result in potentially significant adverse impacts related to stationary sources, and therefore require stationary source analyses:

- Projects that would use fossil fuels (*i.e.*, 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 major or 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. Major sources are identified as those sources located at Title V facilities that require Prevention of Significant Deterioration permits. Large sources are identified as sources located at facilities which require a State facility permit.
- Projects that would result in new uses (particularly schools, hospitals, parks, and residences) located near a major or 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 (particularly schools, hospitals, parks, and residences) within 400 feet of manufacturing or processing facilities.
- 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 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" requirements 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.

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 where 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 these locations for more than a few minutes. Sometimes, particularly for stationary source analyses, elevated receptors may be located high on the faces of existing or proposed buildings 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 is no balcony or other means of outside access. Study areas and receptor locations depend 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 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 must be taken in developing the proper study area because studying an area that is too large 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"). The study area 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:

CO

- 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 the rest of the city.

$PM_{2.5}$

- 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, accelerate 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 multi-lane highway or bridge.

For some projects, following the criteria for determining the study area presented 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, would be impacted the most from project-related traffic, 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.
- If warranted, repeat this procedure 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 should be 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 the project's implementation. The determination of the study area for 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

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, and playgrounds, and the entrances and air intakes to all other buildings;
- Portions of parking lots 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 OSHA workplace standards. In addition, other unreasonable receptor sites include:

- Median strips of roadways;
- Locations within the rights-of-way of 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 incremental concentration that would be 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 should be 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 in Subsection 321.1), 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), 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 occur at locations 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 parking lot/open-sided 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. Even though exhaust results from cars within a garage, the exhaust vents are assessed in the same way as stationary sources because the emissions emanate from a fixed location (see the discussion of analysis techniques, below in Section 321). 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 (*i.e.,* 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.
- If a project 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 major or 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).
- If the proposed project would result in major or large emission sources, the preparation of a cumulative air impact assessment may be required. A cumulative assessment considers 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 a 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 major or large stationary sources, analyze the effects of those sources on the proposed project.
- For projects that would create "non-point" sources, such as fugitive dust, consider effects on the nearest locations to which the public has general access.

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 or programmatic actions, consideration of the potential ranges of stationary sources that may be a concern is the first step. 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 are:

- Pedestrian-height locations on sidewalks;

- Locations with 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;
- 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.*;
- Edges of rights-of-way for roadways without sidewalks, if publicly accessible;
- Property lines of all residences, hospitals, schools, and playgrounds, and the entrances and air intakes to all other buildings; and
- Portions of parking lots to which the public has pedestrian access.

If there are substantial differences between the real 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 conducted. Models used for the air quality assessment generally should conform to the USEPA's *Guideline on Air Quality Models, Policy DAR-10: NYSDEC Guidelines on Dispersion Modeling Procedures for Air Quality Impact Analysis,* or should be approved by the lead agency as appropriate on a case-by-case basis. Because models and guidelines are periodically revised and updated, the lead agency or analyst should verify that the most recent edition of the appropriate model(s)/guideline(s) is used before performing the analysis. Certain stationary sources may require review through the USEPA New Source Review procedures (see Section 710 of this chapter). The assessments for these stationary sources have to be consistent with USEPA's *Guideline on Air Quality Models,* found here, and NYSDEC's Policy DAR-10, 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. Meteorological information should be obtained from NYSDEC; contact information is below in Section 730. A project's effects on air quality are determined by comparing predictions made for the future No-Action and the future With-Action conditions. 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 pollutant of concern at each receptor site.
- 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, respectively for existing, future No-Action, and future With-Action conditions. They describe the various models appropriate for mobile and stationary source analysis, 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 and PM are the primary pollutants of concern for most microscale mobile source analyses, including the assessments of roadways and automobile parking lots and garages.

The basic tool for analyzing pollutant concentrations from mobile sources is air pollutant dispersion models. These models estimate CO and PM concentrations under given traffic conditions, meteorological conditions, and roadway configurations. 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 PM) and their distribution over the roadway are estimated for that year, using a separate mathematical model. Then, the way these emissions are dispersed because of meteorological conditions, roadway geometry, and other factors is considered. 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.

321.1. Roadways

Mobile source analyses related to roadways are performed for projects that change traffic patterns, add traffic to an area's roadways, reconfigure roadways, or could be affected by pollutants from roadways. Typically, they assess at-grade intersections or street corridors with adjoining sidewalks. Sometimes, analyses are needed for sources of CO or PM, such as multilane highways or bridges or partially or fully covered roadways.

TRAFFIC DATA REQUIREMENTS

Vehicle classification determines 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 (*i.e.,* those with four wheels, including vans and ambulances), heavy-duty gasoline-powered trucks and buses (*i.e.,* 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;
- Stopped delay at the intersection;
- Number of moving lanes;
- Signal cycle length; and
- 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); and
- Signal type—pre-timed, 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

USEPA's models are used to predict emissions from vehicles' exhaust systems over the roadway (for both idling and moving vehicles). The primary pollutants of concern from mobile sources on roadways are CO and PM. A series of mathematical models developed by the USEPA are used to analyze CO and PM emissions from mobile sources. These models are periodically updated to account for the most recent test data on new vehicles under production and any revised standards for emissions from new vehicles (*i.e.*, "tailpipe" standards). The USEPA's MOVES program is the most recent version of the mobile emissions factor model for CO and PM emissions estimates. Projects undergoing CEQR review should use MOVES, a program available for project-level analysis.

MOVES estimates emissions for vehicular sources covering CO, PM, as well as greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). The model allows for multiple scale analyses 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 inventories. DEP should be consulted for information regarding new releases and updates to mobile emission models. In addition,

the USEPA continues to issue policy and technical guidance on running the MOVES, available here. These general guidelines are intended to provide conservative estimates. DEP should also be contacted for specific data regarding the various factors to be utilized when using the MOVES model for a specific project or location.

ESTIMATES OF FUGITIVE DUST EMISSIONS

Fugitive road dust emissions should be accounted for according to the guidelines and formulas contained in Chapter 13 of the USEPA'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, the following silt factors be used: 0.015 g/m^2 for expressways and limited access roadways, 0.10 g/m^2 for principal and minor arterials, 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 PM 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 PM 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 emission model (both discussed above) are analyzed together using a dispersion model. Mobile source dispersion models estimate the way CO and PM concentrations 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 that require a CO analysis, 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 the USEPA to predict the pollutant concentration from motor vehicles traveling near or through roadway intersections.

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 link simulates the emissions from vehicles over the blocks that are not delayed by traffic signals. Emission factors for idling vehicles from the mobile model are entered into the CAL3QHC version 2.0 model to estimate emission rates from these queued links. 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 V/C ratios.

For intersection locations which require a PM analysis and those intersections which require a more refined CO 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 is known as CAL3QHCR.

CAL3QHCR is employed if maximum predicted CO concentrations are greater than the applicable ambient air quality standards, if significant CO air quality impacts are predicted with the CAL3QHC modeling, and for PM modeling from mobile sources. Refined modeling with CAL3QHCR should also be performed before identifying mitigation measures for eliminating predicted air quality impacts.

The CAL3QHCR model offers two approaches with varying degrees of detail. 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 appropriate 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 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. 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, 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 Auer's land use classification technique).
- 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. NYSDEC should be contacted to obtain the latest five-year meteorological data set.

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). 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 using the alternate model.

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 a 24-hour maximum concentration; the $PM_{2.5}$ standards are for an annual mean and a 24-hour average concentration). 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 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 1-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 and PM 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 NYSDEC that are not

unduly influenced by local sources of pollutants. These monitors are indicative of pollutant levels associated with pollutants throughout the nearby region.

The primary application of mobile source modeling is to evaluate maximum predicted CO and PM concentrations at places with public access. Therefore, background CO and PM levels for the specific averaging periods of concern are required. Background concentrations are based on CO and PM measurements at the nearest NYSDEC monitoring stations. For CO and PM 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 various regions within New York City.

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) and the dispersion model differ.

PARKING LOTS

CO and PM are the primary pollutants 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 and PM are calculated using the USEPA MOVES program, discussed in Subsection 321.1 above, using the same ambient temperature profile utilized for the roadway intersection modeling. Additional information required for the mobile emission model includes the following: the dimensions (*i.e.*, length and width) of the parking lot; idle emission factors; emission factors at 5 miles per hour; 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. For PM, the averaging time period would be either 1-hour or 24-hour.

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 and/or PM levels calculated for 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 receptor locations 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. A sample air quality analysis of potential impacts from an automobile multilevel, naturally ventilated parking facility is included in the Appendix.

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 USEPA's *Guideline on Air Quality Models* provides more information.

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 at-grade parking lots. As with at-grade lots, CO and PM are the primary pollutants of concern for facilities used by automobiles, and PM is of concern for facilities used by diesel trucks or buses. The CO and PM impact analyses for these facilities are almost identical to those performed for parking lots, except that CO/PM 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 impacts at a ground-level receptor from the above-grade levels of the facility following calculations presented in the USEPA's Workbook of Atmospheric Dispersion Estimates (AP-26). A PM_{10} and $PM_{2.5}$ analysis for a multilevel, naturally ventilated facility used by diesel trucks or buses may be similarly modified. A sample air quality analysis of potential 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 and PM are the primary pollutants 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) as part of the mechanical ventilation system. Thus, pollutant levels could be elevated near the vents outside of the garage. The vents 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 and PM concentrations within the garage, it is recommended that emissions be conservatively estimated at an ambient temperature of 45°F. Total CO and PM emissions rates (for 1-hour, 8-hour, or 24-hour averaging periods, as appropriate) 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 added together.
- 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 impacts within the garage.
- The appropriate background concentrations are then added to the predicted concentrations.

- For concentrations near the garage vents, the 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 the USEPA'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 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 vents).
- Potential cumulative CO/PM 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 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 are multiplied by a persistence factor to determine multi-hour pollutant incremental impacts from parking facilities.

FUTURE NO-ACTION CONDITION

Similar to the assessment of roadways, analyses of parking facilities consider 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 the future No-Action condition to determine the potential for significant impacts.

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 (HVAC) systems in new buildings or building expansions.

- Ventilation exhaust systems for new manufacturing or industrial facilities, or medical, chemical, or research laboratories.
- Large or major emissions sources, such as power generating stations, that may affect surrounding uses or be affected by new structures nearby.
- Existing (or planned) manufacturing and industrial facilities that may affect nearby new sensitive uses.
- Industrial facilities that may potentially discharge malodorous pollutants into the nearby neighborhood.

For potential stationary source impacts related to boilers for HVAC 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 or large fossil fuel burning sources, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are the primary pollutants of concern. If such sources 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 approach 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

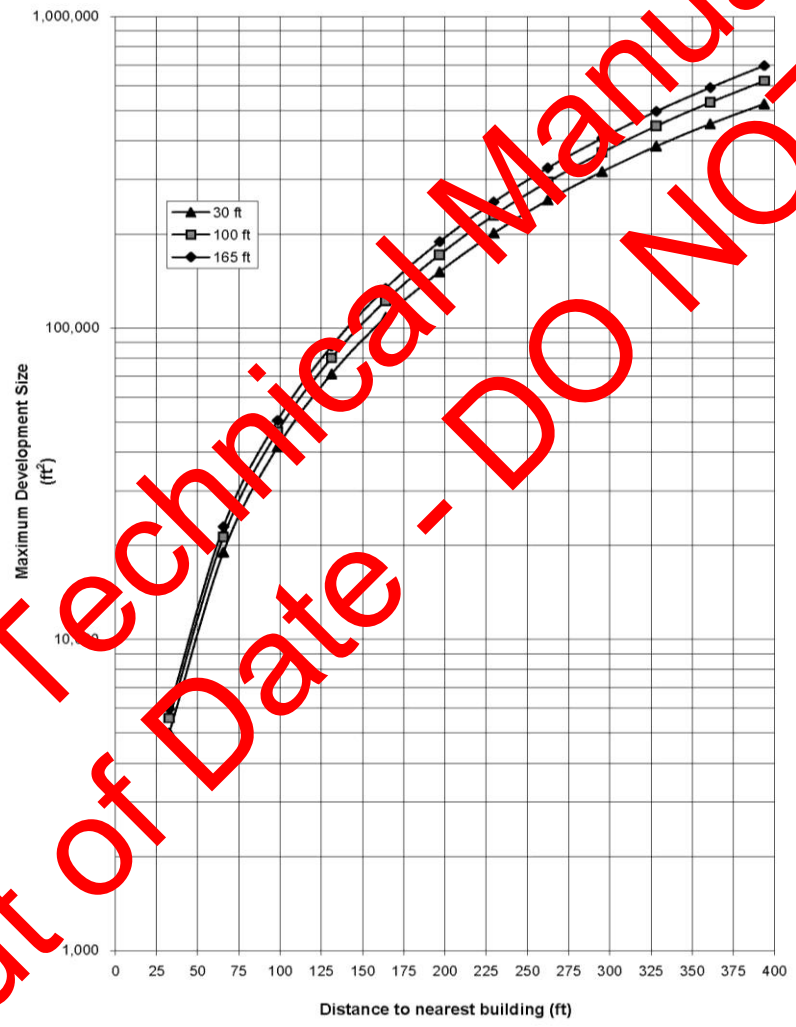
SCREEN FOR HEAT AND HOT WATER SYSTEM

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). Figure 17-3 predicts the threshold of development size below which a project is unlikely to 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. The following procedure should be used:

- Determine the maximum size of development that would use the boiler stack.
- Using a Borough President's map, Sanborn atlas, or Geographic 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 the four preceding steps, 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.
- 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 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



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 screening analysis figures in the appendices, No. 2 oil has greater emissions than natural gas. The use of No. 6 and No. 4 oils is being phased out by a rule finalized in April 2011. No new boiler or burner installations

may use No. 6 or No. 4 oils and all buildings must convert to one of the cleanest fuels by 2030 or upon boiler or burner replacement. 15 RCNY 2-15. Based on the fuel type to be used (natural gas or No. 2 oil), and the type of development (residential or commercial), the screening figures in the Appendix may be used following the six steps above. Limiting the fuel used by the proposed project to natural gas may eliminate the potential for significant adverse impacts and the need for further analysis. 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 Appendix.

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 ($\mu g/m^3$)	8-Hour Averaging Period ($\mu g/m^3$)	24-Hour Averaging Period ($\mu g/m^3$)	Annual Averaging Period ($\mu g/m^3$)
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 a proposed project fails the above screening procedures for heat and hot water systems and/or the industrial screen, the USEPA's AERSCREEN model may be used to determine any potential for significant adverse impacts. The AERSCREEN screening assessment should be consistent with USEPA's AERSCREEN guidance, described in the *AERSCREEN User's Guide* (EPA-454/B-11-001). If a proposed project fails the above screening procedures and/or if an AERSCREEN analysis determines 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.

For existing major or large fossil-fuel burning sources, emission rates may be obtained as follows:

- Almost all existing major or large fossil-fuel burning sources have a certificate-to-operate permit or a State facility permit that define the amount and type of fuel burned and/or pollutants that may be emitted through the exhaust stacks. These permits are either filed with DEP or issued by DEC. Even if an existing source discharges fewer emissions than those prescribed in a permit, the limits specified in the permits are considered 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 the USEPA'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 prepared for the next step.
- 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 (*e.g.,* for projects sponsored by governmental agencies) is first approved by DEP's counsel. Requests for copies of 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 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.

- USEPA or NYSDEC permits are generally available on the agencies' websites (USEPA: https://www.epa.gov/caa-permitting; NYSDEC: https://www.dec.ny.gov/permits/96330.html). If additional information is required, contact the regional office.
- When no permits are available from the NYSDEC or DEP for a given location, but emissions are expected at 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 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 U.S. 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 impacts are typically performed for fuel oil, while analyses of annual emissions are performed for natural gas. More information on this approach 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.
- Compare the emissions rate with the odor threshold of an indicator compound. 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: (i) the lowest odor threshold (the minimum concentration at which the odor is detectable), and/or (ii) 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.

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.

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 NYSDEC'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 of the conditions that may warrant fluid modeling rather than 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 major or 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 to predict 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 above nearby receptor locations. On the other hand, if a nearby receptor location is of a similar or equal height to the exhaust stack(s) under 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, the USEPA'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 to replace the USEPA Industrial Source Complex (ISC3) model and is approved for use by the USEPA. 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 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 guidelines should be used when executing 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. The USEPA'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 the Building Profile Input Program (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 decide 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. The latest recommended meteorological data set provided by NYSDEC should be used for modeling.

- If terrain elevation varies significantly within the study area, the variations should be accounted for. AERMAP is the terrain pre-processor for AERMOD and is used to characterize and generate receptor grids and terrain elevations. AERMAP is described in the *User's Guide for the AERMOD Terrain Preprocessor (AERMAP)*, (EPA-454/B-03-003).

- 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, a 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, 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. 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 cavity regions adjacent to the structure. For these 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 analyses may be included as part of the AERMOD modeling effort.

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 1.0 and 0.6 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 the NYSDEC 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 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 major or large emission sources within the 1,000-foot study area that may not be properly accounted for in the background concentrations 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 applicant to verify these parameters or to present the rationale behind modeling assumptions to be used if verification data cannot be obtained. Similarly, all major or 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 the final list of sources generally should follow the procedure outlined in Subsection 322.2.
- 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 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 construction of a scaled model of the proposed buildings, 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 the USEPA's Guideline for Fluid Modeling of Atmospheric Diffusion (EPA-600/8-81-009), April 1981, and Guideline for Use of Fluid 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 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. The monitored background levels of $PM_{2.5}$ have come down appreciably in recent years. Summaries of the background levels for these pollutants at various NYSDEC 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 NYSDEC reports on ambient air monitoring. These NYSDEC reports may be examined at the offices of DEP. New York State ambient air monitoring data may also be found at the NYSDEC website.

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. For 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 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 on the laboratory fume hood exhaust system. The techniques described below may be applied to chemical spills or any other short-term releases of pollutants.

EVAPORATION RATES. Evaporation rates for volatile hazardous chemicals 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 of these chemicals, 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 provided in the Appendix (Guidelines for Calculating Evaporation Rates for Chemical Spills).

RECIRCULATION. Analyses of chemical spills or other sources of hazardous pollutants also consider 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 handbook procedure and takes into account such factors as plume momentum, stack tip down-wash, and cavity recirculation effects. Additional information on performing such calculations is provided in the Appendix (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 USEPA AERMOD or CALPUFF model. The USEPA CALPUFF model version 5.8.5 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. The AERMOD and CALPUFF 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 changes expected 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 using 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.

323. 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 based on the latest planning assumptions developed by the municipal planning organization (MPO). Any revisions to these estimates are 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 should use the latest and most accurate emission estimation techniques available. For motor vehicle emissions, the most current USEPA emission models should be used. For stationary and area source emissions, the latest emissions factors specified by the USEPA 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 should be based on the applicable models, databases, and other requirements specified in the most recent version of the USEPA's *Guideline on Air Quality Models*.

The analyses are to be based on the total of emissions from the project and should reflect emission scenarios that are expected: (i) during the attainment year mandated by the CAA (or during the furthest year for which

emissions are projected in the maintenance plan); (ii) during the year for which the total emissions from the project are expected to be the greatest; and (iii) 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.

324. Mesoscale Analyses

As described earlier, NO_x 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, 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 NO_x or hydrocarbons in such a large region would be those that greatly increase the total number of vehicle miles traveled in the region (*e.g.,* a major roadway improvement or the construction of new bridges) or change regulations that affect numerous stationary sources (*e.g.,* 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 CO, NO_x, and hydrocarbons emitted in the region would increase (because of the increased vehicle miles) or decrease (because the new roadway would alleviate existing congestion).

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 concentrations of 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 result in a significant adverse air quality impact. In addition, for CO from mobile sources and for $PM_{2.5}$, 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 mobile and stationary sources, predictions for these pollutant concentrations must correspond to the appropriate NAAQS time averaging 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. There are various forms of the ambient air standards; annual standards are not to be exceeded; for some 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, while some short-term standards are based on a 3-year average percentile value not to be exceeded. 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 (i) would not contribute to any new violation of the NAAQS, (ii) would not increase the frequency or severity of existing violations, and (iii) would not delay attainment or required emission reductions. For projects subject to general conformity, *DAR-10* thresholds listed for such projects under federal regulations should be referenced.

412. *De Minimis* Criteria

412.1. Carbon Monoxide

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 criteria 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.

412.2. $PM_{2.5}$

The following criteria should be used for determination of significant adverse $PM_{2.5}$ incremental impacts for projects subject to CEQR:

- Predicted 24-hour maximum $PM_{2.5}$ concentration increase of more than half the difference between the 24-hour background concentration and the 24-hour standard; or
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.1 $\mu g/m^3$ 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 for mobile sources, 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 $\mu g/m^3$ at any receptor location for stationary sources.

Projects undergoing SEQRA review may have additional analysis requirements, and are encouraged to coordinate directly with the reviewing agencies.

413. 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.

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. 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 (i) on surrounding uses as a result of the proposed project; or (ii) 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.

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, or the $PM_{2.5}$ concentrations related to the background concentrations, exceed the *de minimis* criteria or when a project would result in the creation or exacerbation of a 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 *de minimis* and incremental criteria above. 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

SO_2, NO_2, and PM 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, an exceedance of the $PM_{2.5}$ *de minimis* criteria, or an exceedance of the guidance values for non-criteria pollutants.

When a proposed project causes the NAAQS or $PM_{2.5}$ *de minimis* criteria 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 mixes 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 $PM_{2.5}$ *de minimis* criteria 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 results for all other receptors may be reported in an appendix or be made available on request. Typically, when summarizing the results, impacts should be rounded to the number of significant figures that is appropriate for comparison to the applicable air quality standard or impact criteria.

All the backup data that are necessary for DEP or the reviewing agency to verify the results of any analysis should be submitted electronically 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, 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 (*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, documentation that clearly references how the emissions and stack parameters were obtained for the included sources.
- Input and output files for all the models used in the analyses.

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 $PM_{2.5}$ (24-hour and annual) resulting from the project should be identified. In addition, if potential concentrations exceed the 24-hour PM_{10} standard of 150 $\mu g/m^3$, 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 increased pollutant concentrations would usually occur at a sidewalk adjacent to an intersection with 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."

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, mitigation measures that avoid or minimize the project's impacts in other technical areas and affect pollutant concentrations 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;
- Modifying the design of the proposed project to 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);
- Controlling 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 that would result 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
- Implementing restrictions similar to those discussed above in the new boiler stack impact example.

530. GENERIC OR PROGRAMMATIC ACTIONS

For generic or programmatic 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 broader changes to the proposed project that would avoid the resulting significant impact.

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) Designation. The Mayor's Office of Environmental Remediation (OER) is responsible for administering (E) Designations and existing Restrictive Declarations post-CEQR, 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. 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 requirements 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 reduce or avoid significant impacts associated with a project. In addition to alternatives that incorporate these mitigation measures, there are other alternatives available that may also reduce or eliminate significant air quality impacts.

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.

620. STATIONARY SOURCES

In 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

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 (SO_2, PM, CO, ozone, NO_2, and hydrocarbons), the 1970 amendments also established the new source performance standard (NSPS) program and the NESHAP. These programs gave the USEPA the authority to regulate emissions from new stationary sources as well as the ability to regulate hazardous air pollutants not covered by NAAQS. The USEPA 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 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 the USEPA it becomes federally enforceable and subject to citizen suits.

The USEPA 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: Requirements for Preparation, Adoption, and Submittal of Implementation Plans.
- 40 CFR 52: Approval and Promulgation of Implementation Plans (which includes Prevention of Significant Deterioration).
- 40 CFR 53: Ambient Air Monitoring Reference and Equivalent 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), the USEPA has also established a list of 189 air toxics (HAPs) to be regulated (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.

Other relevant CAAA issues include provisions for attainment and maintenance of NAAQS in Title I; provisions relating to mobile sources in Title II (these promulgated emission reductions are accounted for in the latest mobile source emission models); and provisions relating to stratospheric ozone and global climate protection in Title VI. Title VI contains regulations governing various chlorofluorocarbons ("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, September 2007, also identifies recommended standards. Permissible Exposure Limits (PELs) include STELs (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

The NYSDEC provides applicable New York State air quality regulations under the New York Codes, Rules and Regulations, Title 6, Chapter III-Air Resources, Subchapters A (Prevention and Control of Air Contamination and Air Pollution) and B (Air Quality Classifications System).

713. New York City Regulations

- New York City Air Pollution Control Code, Title 24 of the Administrative Code of the City of New York, Chapter 1, Subchapter 6, Section 24-146, "Preventing Particulate Matter from Becoming Airborne; Spraying of Asbestos Prohibited; Spraying of Insulating Material and Demolition Regulated," governs fugitive dust.
- 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 24 of the Administrative Code of the City of New York, Chapter 1, Subchapter 7, Section 24-163.3, governs 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 SIP is of critical importance to New York City. If the state is found by the USEPA to be inconsistent with this SIP, federal transportation funding for the city may be suspended. DEP is the designated city agency for coordinating with the USEPA for SIP consistency. Therefore, under certain circumstances, the lead agency should 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 analyses for projects subject to CEQR indicate any of the following results: a potential violation of any ambient air quality standards predicted from mobile or stationary sources at any location in the project's build year(s); or an exceedance of any of the *de minimis* impact criteria due to mobile or stationary sources at any location.

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 are 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
Flushing, NY 11373

Requests for fee waivers for BEC searches should be addressed to DEP Bureau of Legal Affairs at the same address as BEC.

Meteorological data should be obtained from NYSDEC. Requests can be made to John Kent, Chief, Impact Assessment and Meteorology Section, NYSDEC Division of Air Resources, at (518) 402-8402.