A. INTRODUCTION

Based on the *New York City Environmental Quality Review (CEQR) Technical Manual* and its coverage of public health issues, an environmental impact statement (EIS) should address public health as it pertains to "the activities that society undertakes to create and maintain conditions in which people can be healthy." Thus, the *CEQR Technical Manual* broadly defines public health and an EIS should therefore address the range of potential issues that could be raised by a proposed action or project. This chapter provides an examination of the potential for adverse impacts on public health from the proposed project, from the perspective of human exposure to ambient air, groundwater, surface water, sediment, and soil conditions at the project site. The chapter also provides an overview of health effects related to asthma, including a general discussion of particulate matter (PM) emissions, and a discussion of causes and triggers of asthma, its prevalence in New York City, and the area most likely affected by the proposed project.

As described in detail below, the analysis finds that the proposed project would not result in any significant adverse public health impacts related to air quality, noise, hazardous materials, groundwater, or unusual solid waste management practices.

B. METHODOLOGY

For determining whether a public health assessment is appropriate, the 2001 *CEQR Technical Manual* lists the following as public health concerns for which a public health assessment may be warranted:

- Increased vehicular traffic or emissions from stationary sources resulting in significant adverse air quality impacts;
- Increased exposure to heavy metals (e.g., lead) and other contaminants in soil/dust resulting in significant adverse impacts;
- The presence of contamination from historic spills or releases of substances that might have affected or might affect groundwater to be used as a source of drinking water;
- Solid waste management practices that could attract vermin and result in an increase in pest populations (e.g., rats, mice, cockroaches, and mosquitoes);
- Potentially significant adverse impacts to sensitive receptors from noise or odors;
- Vapor infiltration from contaminants within a building or underlying soil (e.g., contamination originating from gasoline stations or dry cleaners) that may result in significant adverse hazardous materials or air quality impacts;
- Actions for which the potential impact(s) result in an exceedance of accepted federal, state, or local standards; or

- Other actions that might not exceed the preceding thresholds but might, nonetheless, result in significant public health concerns.

The proposed project would not result in any unusual solid waste management practices that could attract vermin and result in an increase in pest populations. The proposed project would not be a source of odors; therefore, no significant adverse impacts to sensitive receptors from odors would occur. The proposed project also would not result in an exceedance of accepted federal, state, or local standards.

Construction of the proposed project would begin with environmental remediation to address hazardous materials currently existing on the project site, as well as demolition of discrete interior building elements. The environmental remediation would be conducted under a Remedial Action Plan (RAP) and Health and Safety Plan (HASP) that have been prepared and submitted to the New York City Department of Environmental Protection (DEP) and have been reviewed and approved. As described in Chapter 9, "Hazardous Materials," measures would be taken to avoid potential adverse impacts during construction activities due to the presence of known and potential subsurface contamination. Demolition, excavation, and construction activities could disturb hazardous materials and increase pathways for human exposure. However, impacts would be avoided by performing construction activities in accordance with the RAP and HASP which include procedures to identify and manage both known and unexpectedly encountered contamination, reduce the potential for exposure, and provide measures (e.g., air testing) to ensure that exposure to construction workers and the surrounding community would not occur. The project may also apply for the Brownfield Cleanup Program (BCP) with the New York State Department of Environmental Conservation (DEC), in which case DEC would also be involved in the review and approval of the RAP and HASP. With these measures in place, no significant adverse impacts related to hazardous materials would result from construction activities. Following construction, the proposed project would not be expected to have the potential to have significant adverse hazardous materials impacts.

As presented in Chapter 9, "Hazardous Materials," groundwater analytical results detected volatile and semivolatile organic compounds (VOCs and SVOCs), though the source (whether on-site or off-site) could not be determined. However, local groundwater would not be used for any purpose including, without limitation, consumption or irrigation. Thus, no public health impacts with respect to groundwater as a source of drinking water would be expected.

The proposed project's design would provide sufficient building attenuation measures (i.e., double-glazed windows, storm windows, etc.) to satisfy the building attenuation requirements listed in **Table 16-10** in Chapter 16, "Noise." The renovated Armory structure would include central air conditioning (i.e., alternative ventilation) and all existing windows to be replaced would be replaced with well-sealed windows. All single-paned windows to remain would be repaired/resealed to be weather-tight. With these measures, interior noise levels within all habitable spaces in the building would be expected to satisfy CEQR requirements. In addition, the building mechanical system (i.e., heating, ventilation, and air conditioning [HVAC] systems) would be designed to meet all applicable noise regulations and to avoid producing levels that would result in any significant increase in ambient noise levels. Furthermore, as noted in Chapter 17, "Construction," construction noise is regulated by the requirements of the New York City Noise Control Code, the DEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation, and the U.S. Environmental Protection Agency's (EPA) noise emission standards. As required by the New York City Noise Control Code, noise barriers (a minimum height of 8 feet) would be provided around the perimeter of the construction site. The majority of construction activity (i.e., stationary equipment and the loading/unloading of trucks) would occur inside the existing Kingsbridge Armory building. The brick façade of the Armory would act as a noise barrier and reduce noise levels associated with the proposed construction activity in the adjacent community. While noise associated with construction activities for the proposed project may be considered noisy and intrusive, potential increases in noise levels as a result of such activities would be expected to be of limited duration. Therefore, no significant adverse impacts to sensitive noise receptors are expected as a result of the proposed project, either during or after construction.

As discussed in Chapter 15, "Air Quality," and Chapter 17, "Construction," the proposed project would not result in significant adverse air quality impacts. However, for informational purposes, this chapter assesses potential health concerns related to air quality during the construction and operation of the proposed project. The assessment first describes the potential sources of air pollutants during construction and operation of the proposed project. Next, the pollutants of concern relating to air quality are identified, and the applicable standards and thresholds to which potential emissions from the proposed project's construction and operational activities will be compared are outlined. This is followed by a discussion of the characteristics of asthma and its causes and triggers. A summary of the project's air quality impact assessment is then presented, and the potential for public health impacts due to the proposed project is analyzed.

C. POTENTIAL SOURCES OF AIR POLLUTION

CONSTRUCTION

The two main sources of air pollution at a typical construction site are diesel engine emissions and fugitive dusts. In general, most construction engines are diesel-powered and produce relatively high levels of nitrogen oxides (NO_X) and particulate matter (PM). The stationary nature of construction emissions and the quantity of engines onsite could also lead to increased CO concentrations.

Construction activities also generate various levels of fugitive dust. An active construction project might include a wide variety of tasks that could generate or re-suspend fugitive dust on-site. Some of the more common activities are: excavating; dumping and grading of earthen materials; loading or drop operations that transfer materials (e.g., debris, soil, and fill) to and from dump trucks; demolition work; use of abrasives on building facades; and on-site travel across paved or unpaved roads/surfaces that cause particulate matter to become airborne.

PROJECT OPERATIONS

The primary source of mobile source pollutant emissions during project operations would be from project-generated vehicles using nearby intersections in the study area. The proposed project would increase traffic in the vicinity of the project site, potentially increasing pollutant emissions.

Potential stationary source emissions associated with operation of the proposed project would primarily be from fuel burned on-site for HVAC systems. In addition, the project's accessory parking garage may result in pollutant concentrations in the vicinity of the ventilation outlets.

D. POLLUTANTS OF CONCERN

As mentioned above, the primary source of air quality pollutant emissions from the proposed project would be from diesel engines during construction, construction activities, and emissions from project-generated vehicles and fuel-burning heating systems during project operations. Increases in airborne PM emitted by such sources may cause potential impacts on public health. Also, given the potential effects of PM emissions on asthma, PM has been identified as the primary pollutant of concern as it relates to the potential for the proposed project to result in significant adverse public health impacts. The potential air quality impacts of $PM_{2.5}$ and other pollutants of concern from the proposed project are analyzed in Chapter 15, "Air Quality."

PARTICULATE MATTER

PM is a broad class of air pollutants that exist as liquid droplets or solids, with a wide range of sizes and chemical composition. Generally, airborne concentrations of PM are expressed as the total mass of all material (often smaller than a specified aerodynamic diameter) per volume of air (in micrograms per cubic meter, $\mu g/m^3$). Thus, PM_{10} refers to suspended particles with diameters less than 10 μm, and $PM_{2.5}$ to suspended particles with diameters less than 2.5 μm.

PM is emitted by a variety of natural and man-made sources. Natural sources include the condensed and reacted forms of natural organic vapors; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, and bacteria; debris from live and decaying plant and animal life; particles eroded from beaches, desert, soil, and rock; and particles from volcanic and geothermal eruptions, and forest fires.

Major man-made sources of PM include the combustion of fossil fuels, such as vehicular exhaust, power generation and home heating; chemical and manufacturing processes; all types of construction; agricultural activities; and wood-burning fireplaces. Since the chemical and physical properties of PM vary widely, the assessment of potential public health effects of airborne pollutants in ambient air is extremely complicated.

$PM_{2.5}$

As mentioned above, PM is a byproduct of fossil fuel combustion. It is also derived from the mechanical breakdown of coarse PM such as pollen fragments. $PM_{2.5}$ does not refer to a single pollutant, but to an array of fine inhalable materials. For example, there are thousands of forms of natural ambient $PM_{2.5}$ and perhaps as many forms of man-made $PM_{2.5}$. Some PM is emitted directly to the atmosphere (i.e., primary PM), while other types of PM are formed in the atmosphere through various chemical reactions and physical transformations (i.e., secondary PM). The formation of secondary $PM_{2.5}$ is one determinant of ambient air quality and is extremely difficult to model.

The major constituents of $PM_{2.5}$ are typically sulfates, nitrates, organic carbon, elemental carbon (soot), ammonium, and metallic elements (not including sulfur). Secondary sulfates and nitrates are formed from their precursor gaseous pollutants, SO_2, and NO_x, at some distance from the source due to the time needed for the chemical conversion to occur within the atmosphere. Elemental carbon and metallic elements are components of primary PM, while organic carbon can be emitted either directly from a source or formed as a secondary pollutant in the atmosphere. Due to the influence of these "secondary" pollutants from distant or regional sources, regional ambient levels of $PM_{2.5}$ are typically more evenly distributed than their related class of pollutants PM_{10}, which is more highly influenced by local sources.[1,2]

Data from the New York Botanical Garden in the Bronx and Queens College in Queens indicate that the greatest contributors to ambient $PM_{2.5}$ concentrations in New York City are sulfates and organic carbon (approximately two-thirds of the total $PM_{2.5}$ mass). Studies confirming the contribution of long-range transport to ambient $PM_{2.5}$ levels compared the data from New York City monitors with monitors from a remote site within New York State, downwind from other states. These data show that high levels of sulfate and other pollutants come into New York State from areas to the west and south. The data also indicate that urban sites are more likely to experience increased nitrate and carbon levels than rural sites.[3]

E. AIR QUALITY REGULATIONS AND STANDARDS

THE NATIONAL AMBIENT AIR QUALITY STANDARD (NAAQS) FOR $PM_{2.5}$

Section 108 of the Clean Air Act (CAA) directs the EPA to identify criteria pollutants that may reasonably be anticipated to endanger public health and welfare. Section 109 of the CAA requires the EPA to establish NAAQS and periodically revise them for such criteria pollutants. Primary NAAQS are mandated to protect public health with an adequate margin of safety. In setting the NAAQS, the EPA must account for uncertainties associated with inconclusive scientific and technical information, and potential hazards not yet identified. The standard must also be adequate to protect the health of any sensitive group of the population. Secondary NAAQS are defined as standards that are necessary to prevent adverse impacts on public welfare, such as impacts to crops, soil, water, vegetation, wildlife, weather, visibility, and climate.

Beginning in 1994, the EPA conducted a five-year review of the NAAQS for PM, which included an in-depth examination of epidemiologic and toxicological studies. The studies are summarized in the EPA's Criteria Document for Particulates, Chapters 10–13 (1996); the EPA's Staff Papers on Particulates, in particular Chapter V[4]; and the EPA's proposed NAAQS for particulates, found in the December 13, 1996, Federal Register on page 65638. Based on this extensive analysis, in June 1997 the EPA revised the NAAQS for PM and proposed a new standard for $PM_{2.5}$ consisting of both a long-term (annual) limit of 15 $\mu g/m^3$ and a short-term (24-hour) limit of 65 $\mu g/m^3$.[5]

In establishing the NAAQS for $PM_{2.5}$ in 1997, the EPA conservatively assumed that moderate levels of airborne PM of any chemical, physical, or biological form might harm health. In setting the value of the annual average NAAQS for $PM_{2.5}$, the EPA found that an annual average $PM_{2.5}$

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[1] Ito K., Christensen W.F., Eatough D.J., Henry R.C., Kim E., Laden F., Lall R., Larson T.V., Neas L., Hopke P.K., and Thurston G.D. PM source apportionment and health effects: 2. An investigation of intermethod variability in associations between source-apportioned fine particle mass and daily mortality in Washington, DC. *Journal of Exposure Science and Environmental Epidemiology*. 2006 July; 16(4):300-10. Epub 2005 Nov 23.

[2] Lena T.S., Ochieng V., Carter M., Holguin-Veras J., and Kinney P.L.. Elemental carbon and $PM_{2.5}$ levels in an urban community heavily impacted by truck traffic. *Environmental Health Perspectives*. 2002 Oct;110(10):1009-15

[3] New York State Department of Environmental Conservation (DEC), Report to the Examiners on Consolidated Edison's East River Article X Project, Case No. 99-F-1314, February 2002.

[4] Many of the studies are found on EPA's website at http://www.epa.gov/ttn/oarpg/t1sp.html.

[5] 62 Federal Register 38652 (July 18, 1997).

concentration of 15µg/m^3 is below the range of data most strongly associated with both short- and long-term exposure effects. The EPA Administrator concluded that an annual NAAQS of 15µg/m^3 "would provide an adequate margin of safety against the effects observed in the epidemiological studies."[1]

The EPA subsequently revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3, and retaining the level of the annual $PM_{2.5}$ standard at 15 µg/m^3.

F. HEALTH EFFECTS RELATED TO ASTHMA

Urban populations, such as those in New York City, generally have a higher prevalence of asthma, and higher rates of hospitalization for asthma than non-urban populations.[2] Exposure to particulate matter—specifically, $PM_{2.5}$ emissions—could either aggravate pre-existing asthma, or induce asthma in an individual with no prior history of the disease. The following discussion includes a review of the characteristics, causes, and triggers of asthma.

BACKGROUND

Asthma is a chronic disorder characterized by tightening of the airways of the lungs, airway irritability, and inflammation of the bronchial tubes. Asthma is an episodic disease, with acute episodes interspersed with symptom-free periods. Asthma episodes may be triggered by specific substances, environmental conditions, and stress, as discussed below.

Asthma can generally be categorized as having either an allergic or a non-allergic basis.[3,4,5] About 75 percent of people suffering from asthma have allergic asthma.[6] For people with allergic asthma, exposure to allergens (substances that induce allergies) may be most important for eliciting asthma symptoms; in contrast, people with non-allergic asthma experience symptoms when confronted with exercise, breathing cold air, or respiratory infections.[7] Exercise, cold air, and respiratory infections also may exacerbate asthma in people with allergic asthma.

CAUSES AND TRIGGERS

The causes of asthma and its increase over the last two decades are not certain, and the triggers for its exacerbation are only partially understood. Scientists and clinicians have researched the causes and risk factors for the disease. Factors that have been investigated include indoor air

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[1] 62 Federal Register 28652, 38676 (July 18, 1997).

[2] Aligne C.A., Auinger P., Byrd R.S. 2000. Risk factors for pediatric asthma: contributions of poverty, race, and urban residence. *American Journal of Respiratory and Critical Care Medicine* 162:873-877.

[3] Scadding, J.G. 1985. "Chapter 1: Definition and clinical categorization." In *Bronchial Asthma: Mechanisms and Therapeutics,* Second Edition (Eds: Weiss, E.B, M.S. Segal, and M. Stein), Little, Brown, and Company, Boston, MA, pp. 3-13.

[4] McFadden, Jr., E.R. 2005. Asthma. In *Harrison's Principles of Internal Medicine*, 16th ed. McGraw-Hill, New York, NY, pp. 1508-1516.

[5] Sears, M.R. 1997. "Epidemiology of childhood asthma." *Lancet* 350:1015-1020.

[6] Centers for Disease Control (CDC). 2002. "Surveillance for Asthma-United States, 1980-1999." *Morbidity and Mortality Weekly Report* 51(SS01): 1-13. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5101a1.htm (accessed April 2009).

[7] McFadden, 2005.

pollution, outdoor air pollution, behaviors, food and food additives, medical practices, and illness in infancy. Current hypotheses tend to focus on three areas: (1) increases in individual sensitivity (possibly due to reduced respiratory infection); (2) increases in exposures to allergens and other environmental triggers; and (3) increases in airway inflammation of sensitized individuals. No single factor is likely to explain increased rates of asthma, however, and various factors will dominate in specific areas, homes, and individuals.

Some researchers have suggested that outdoor air pollution is not likely to contribute significantly to asthma because air pollution has decreased on the whole while asthma rates have increased. Yet, on a local scale air pollution may be important, and on a larger scale it is possible that specific pollutants, such as ozone or diesel exhaust, enhance the effects of other factors, such as allergens, even if the pollutants themselves are not triggers of asthma. In addition, weather conditions, and cold air in particular, can elicit asthmatic symptoms independent of air pollution.

The relationship between diesel exhaust and asthma has been studied experimentally and epidemiologically with inconclusive results.

PREVALENCE, MORBIDITY, AND MORTALITY

In the United States, approximately 6.8 million children (9 percent of children under age 18) have asthma.[1] In 2005, asthma prevalence in New York State was estimated at approximately 9.9 percent of children under age 18.[2]

Asthma morbidity and mortality rates have been rising throughout the U.S. over the last few decades,[3] with New York City experiencing a disproportionate increase in the early 1990s.[4] However, hospitalization rates in New York City have been gradually declining since the peak rates in the mid-1990s.

The borough of Bronx as a whole has experienced a 42 percent decrease in child hospitalization rates between 1997 and 2005.[5] A comparison of asthma hospitalization rates in 1997 and 2005 among children aged 0 to 14 years is presented in **Table 18-1** for zip codes within ½-mile of the project site, and for the Bronx and New York City as a whole.

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1 Bloom B, Cohen RA. Summary Health Statistics for U.S. Children: National Health Interview Survey, 2006. National Center for Health Statistics. *Vital Health Statistics* 10(234). 2007.

2 American Lung Association, November 2007. “Trends in Asthma Morbidity and Mortality.”

3 CDC, 2002.

4 Garg, R., Karpati, A., Leighton, J., Perrin, M., and Shah, M., 2003. *Asthma Facts, Second Edition*. New York City Department of Health and Mental Hygiene.

5 Under the direction of the New York City Department of Health and Mental Hygiene (DOHMH), an aggressive Asthma Initiative was begun in 1997, with goals of reducing illness and death from childhood asthma. Since its inception, major childhood asthma initiatives have been implemented in several low income neighborhoods with high hospitalization rates. Between 1997 and 2005, many of these neighborhoods have experienced substantial decreases in hospitalization rates, which may be an indication of success from extensive efforts by medical providers and community organizations participating in such initiatives.

Table 18-1
1997 and 2005 Hospitalization Rates per 1,000 Persons (Aged 0 to 14 Years)*

Location	1997	2005
Fordham–Bronx Park** (includes zip codes 10458 and 10468)	15.7	8.7
Kingsbridge–Riverdale** (includes zip code 10463)	6.6	4.0
Borough of Bronx	15.4	8.9
New York City	9.5	5.4

* New York City Department of Health and Mental Hygiene. *Updated Asthma Hospitalization Data by NYC Neighborhood* from website http://www.nyc.gov/html/doh/html/asthma/asthma.shtml. Site accessed April 2009.
** Neighborhoods within ½-mile of the project site, as defined by New York City Department of Health and Mental Hygiene

G. DETERMINING THE SIGNIFICANCE OF PUBLIC HEALTH IMPACTS

The New York State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a likely consequence (i.e., whether it is material, substantial, large, or important) should be assessed in connection with:

1) Its setting (e.g., urban or rural);
2) Its probability of occurrence;
3) Its duration;
4) Its irreversibility;
5) Its geographic scope;
6) Its magnitude; and
7) The number of people affected.

The potential public health impacts of $PM_{2.5}$ emissions due to the proposed project are based on the results of the air quality impact assessment presented in Chapter 15, “Air Quality” and Chapter 17, “Construction.” The following section presents the applicable standards and thresholds with which the results of the air quality modeling are compared in determining the potential significance of public health impacts, in consideration of the factors set forth above.

To maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants. All five counties of New York City have been designated non-attainment areas for $PM_{2.5}$. To determine the potential significance of impacts from $PM_{2.5}$ emissions for individual projects, DEC and DEP have provided interim guidance criteria, or threshold levels. Actions predicted to increase the concentrations of $PM_{2.5}$ above threshold levels in non-attainment areas require a detailed analysis to determine the potential for significant impacts. For actions with predicted exceedances of the thresholds levels, the significance of impacts is further determined in consideration of the various factors listed in the previous section.

INTERIM GUIDANCE CRITERIA (THRESHOLD LEVELS) REGARDING $PM_{2.5}$ IMPACTS

As mentioned above, DEP is currently recommending an interim guidance for $PM_{2.5}$, a threshold value that is used for comparison when determining potential significance of air quality impacts. The interim guidance states that a neighborhood analysis is warranted, given that $PM_{2.5}$ is a regional pollutant, with monitored annual background concentrations that are near or above the applicable annual average standard in the New York City metropolitan area. In the neighborhood analysis, an area of 1 km^2, centered at the maximum predicted ground-level concentration, is considered. According to the interim guidance, actions should not exceed an average annual $PM_{2.5}$ concentration increment of 0.1 $\mu g/m^3$ within the 1 km^2 area considered. To put this value in perspective: 0.1 $\mu g/m^3$ constitutes less than 1 percent of the annual NAAQS for $PM_{2.5}$. A concentration increment that is lower than the incremental neighborhood guidance concentration would not be registered by the ambient air monitors.

In addition, DEP is currently recommending interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts of projects subject to CEQR. The updated interim guidance criteria currently employed by DEP for determination of potential significant adverse $PM_{2.5}$ impacts under CEQR are as follows:

- 24-hour average $PM_{2.5}$ concentration increments which are predicted to be greater than 5 $\mu g/m^3$ at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average $PM_{2.5}$ concentration increments which are predicted to be greater than 2 $\mu g/m^3$ but no greater than 5 $\mu g/m^3$ would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- 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 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 a discrete receptor location (elevated or ground-level).

DEC has also published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts. This policy would apply only to facilities applying for permits or major permit modification under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. (These thresholds have also been referenced by DEP in its interim guidance policy.) The DEP community-based annual threshold of 0.1 $\mu g/m^3$ is considered more relevant and appropriate when determining potential public health impacts than the above-mentioned DEC thresholds, since it represents maximum ground-level concentrations averaged over a wider "neighborhood-scale" area.

Actions under CEQR that would increase $PM_{2.5}$ concentrations by more than the DEP or DEC interim guidance criteria described above will be considered to have potential significant adverse impacts. DEP recommends that its actions subject to CEQR that fail the interim guidance criteria prepare an EIS and examine potential measures to reduce or eliminate such potential significant adverse impacts.

As presented in Chapter 15, "Air Quality," both the DEC and DEP interim guidance criteria have been used to evaluate the potential significance of predicted air quality impacts of the proposed project on $PM_{2.5}$ concentrations, and to determine the need to minimize PM emissions from the proposed project. Therefore, the public health analysis considers both the DEC and DEP thresholds in the determination of the public health impacts from the proposed project.

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The following section summarizes the potential for the proposed project to have public health impacts related to air quality during its construction and operation.

CONSTRUCTION

As presented in Chapter 17, "Construction Impacts," although the air emission sources described above would generate some level of air pollutants released to the atmosphere, it is not expected that the construction activities would increase those pollutants by amounts that would be considered significant in ambient air. Foremost in this determination is the fact that the majority of activities (including an estimated 90 percent of loading/unloading for excavation) would occur inside the Armory building. Indoor work would significantly curtail emissions of fugitive (wind blown) dust. The walls of the Armory building would also act as a barrier to the transport of air pollutants that otherwise could affect nearby fence-line receptors at ground level.

In, addition, the intensity levels for specific work tasks are not expected to be great enough to generate significant levels of air pollution that could affect nearby sensitive receptors. No more than 20 pieces of heavy equipment are expected to be present on site at any one time. This equipment would be expected to operate intermittently and would be spread across a large area that is approximately 600 feet long by 358 feet wide (i.e., the interior dimensions of the Armory). Emissions from multiple engine exhausts are not expected to be concentrated close to sensitive receptors.

In order to minimize potential construction-period effects on air quality, the following measures would be implemented as part of the construction program, to the extent commercially feasible:

- Clean Fuel—Ultra-low-sulfur diesel (ULSD) fuel would be required for diesel engines throughout the construction program.
- Idle Time Restrictions—The construction specifications will include the restriction of on-site vehicle idle time to three minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete mixing trucks).
- Utilization of Tier 1[1] or Newer Equipment—The construction specifications will encourage the use of Tier 1 or later construction equipment for non-road diesel engines greater than 50

[1] The first federal regulations for new non-road diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment

hp. The "Tiers" are EPA standards that regulate criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and carbon monoxide (CO). Tier 1 standards are for construction equipment manufactured starting in 1998; Tier 2 and Tier 3 standards are for construction equipment manufactured in 2000 through 2008. The more recent the "Tier," the cleaner the engine for all criteria pollutants, including fine PM. Newer equipment with lower engine-out PM emission values would significantly reduce effects on air quality from diesel engines.

Construction also has the potential to affect air quality as a result of activities that generate fugitive dust. Although fugitive dusts will be contained indoors (with most work occurring inside the Armory), minimizing effects on air quality can be achieved by implementing, to the extent commercially feasible, the following work practices:

- Watering—Truck routes will be watered as needed;
- Cleaning—Truck exit areas will be established for washing off the wheels of all trucks that exit excavation areas; and
- Truck Covers—Dust covers for dump trucks will be required.

Therefore, the construction of the proposed project would not result in significant adverse public health impacts related to air quality.

PROJECT OPERATIONS

The potential for air quality impacts during the operation of the proposed project was examined in detail and is described in Chapter 15, "Air Quality." The DEP and DEC interim guidance criteria described above were used to evaluate the significance of predicted impacts of the proposed project on $PM_{2.5}$ concentrations.

The air quality analysis found that $PM_{2.5}$ concentration increments from mobile sources associated with the proposed project would be well below the DEP interim guidance criterion of $0.1\mu g/m^3$ for neighborhood scale impacts. Localized incremental impacts from mobile sources would also be less than the applicable 24-hour interim guidance criterion of $2\mu g/m^3$ and the applicable annual interim guidance criterion of $0.3\mu g/m^3$. In addition, the proposed project's estimated annual emissions of PM_{10} would be well below the 15-ton-per-year threshold under the DEC's $PM_{2.5}$ guidance. Therefore, no significant impacts from mobile sources associated with the proposed project are expected.

The proposed project's HVAC systems would use natural gas as a fuel source, and pollutant emissions would not result in any significant adverse impacts on sensitive receptors. Pollutant emissions from the proposed project's parking garage would not result in emission levels that would result in significant adverse air quality impacts on the public.

In summary, the operation of the proposed project would not result in significant adverse public health impacts related to air quality. ✷

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manufactured in 2000 through 2008. The Tier 1 through 3 standards regulate the EPA criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and carbon monoxide (CO). Prior to 1998, emissions from non-road diesel engines were unregulated. These engines are typically referred to as Tier 0.