Chapter 21: Public Health

A. INTRODUCTION

This chapter reviews the potential health effects, including those related to air quality, noise, and hazardous materials during the construction and operation of the proposed development program. This 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 Actions.

The analysis finds that the Proposed Actions would not result in any significant adverse public health impacts related to air, noise, or hazardous materials during construction or operation of the proposed developments.

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.

As discussed in Chapter 17, "Air Quality," and Chapter 20, "Construction," the Proposed Actions would not result in significant adverse air quality impacts. The Proposed Actions would not result in any unusual solid waste management practices that could attract vermin and result in an increase in pest populations. Hazardous materials remediation is ongoing at the site of the

Proposed Actions pursuant to New York State Department of Environmental Conservation (NYSDEC) orders. With the ongoing remediation and implementation of health and safety measures during construction of the proposed development program, no significant adverse impacts related to hazardous materials would result from the Proposed Actions. During construction activities, significant adverse noise impacts may occur at some receptor locations.

This chapter assesses the potential health concerns during the construction and operation of the Proposed Actions, including assessments of air quality, noise, and hazardous materials.

The public health assessment first identifies the pollutants of concern relating to air quality, then outlines the applicable standards and thresholds to which potential emissions from construction and operational activities associated with the Proposed Actions will be compared. A description of the sources of air and noise pollutants during construction and operation are then presented, followed by a discussion of the characteristics of asthma and its causes and triggers.

A summary of the air quality and noise impact assessments during the construction and operational periods of the Proposed Actions is then presented, and the potential for public health impacts due to the Proposed Actions is determined. Summaries of potential impacts from hazardous materials are also presented.

C. SUMMARY OF AIR AND NOISE POLLUTION SOURCES FROM THE PROPOSED ACTIONS

CONSTRUCTION

AIR QUALITY

Construction activities have the potential to impact public health as a consequence of emissions from on-site construction engines, and emissions from on-road construction related vehicles and their impact on traffic conditions. Historically, most construction engines have been are diesel-powered and have produced relatively uncontrolled emissions of PM. Construction activities also emit fugitive dust. Impacts on traffic could also increase mobile source-related emissions.

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include dust suppression measures and the restriction of on-road 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).

In recognition of the potential construction-related air quality and public health effects of emissions from diesel engines, an emissions reduction program would also be implemented during construction for the Proposed Actions, as detailed in Chapter 20. These include dust control measures (watering and dust covers), truck idling restrictions, Ultra Low Sulfur Diesel (ULSD), electric engines in lieu of diesel engines, and best available tailpipe reduction technologies. In addition, large emission sources during construction would be located away from sensitive uses, such as residential buildings and playgrounds.

NOISE

Community noise levels during construction of the Proposed Actions could be affected by noise and vibration from construction equipment operation and from construction vehicles and delivery vehicles traveling to and from a building site. Noise levels caused by construction

activities would vary widely, depending on the phase of construction and the location of the construction relative to receptor locations. The most significant construction noise sources related to the Proposed Actions are expected to be impact equipment, such as jackhammers, impact wrenches, and paving breakers, as well as the movements of trucks and cranes. As detailed in Chapter 20, the project sponsors are committed to implementing a noise reduction program to reduce impacts on the surrounding community, which include a wide variety of measures that exceed standard construction practices. This commitment will be contained in the noise mitigation plan required as part of the New York City Noise Control Code.

PROJECT OPERATIONS

AIR QUALITY

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 Actions would increase traffic in the vicinity of the Project Area and along feeder streets to and from the Project Area, potentially increasing pollutant emissions.

Potential stationary source emissions associated with operation of the Proposed Actions would primarily be from fuel burned on-site for HVAC systems.

NOISE

The primary source of noise during project operations would be attributable to increased traffic in the area generated by the Proposed Actions.

D. POLLUTANTS OF CONCERN

As mentioned above, the primary source of air quality pollutant emissions from the Proposed Actions would be from diesel engines during construction, 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 potential public health impacts from the Proposed Actions. The potential air quality impacts of $PM_{2.5}$ and other pollutants of concern from the Proposed Actions are analyzed in Chapter 17.

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 the 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 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 $PM_{2.5}$, which include the products of fossil fuel combustion (such as diesel fuel), chemical/industrial processing, and burning of vegetation. 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 within the atmosphere. Elemental carbon and metallic elements are components of primary PM, while organic carbon can be either emitted 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 Botanical Gardens 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 the 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 of New York. The data also indicate that urban sites are more likely to experience increased nitrate and carbon levels than rural sites.[3]

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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., 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. J Expo Sci Environ Epidemiol. 2006 Jul;16(4):300-10. Epub 2005 Nov 23.

[2] Lena T.S., Ochieng V., Carter M., Holguin-Veras J., Kinney P.L.. Elemental carbon and $PM_{2.5}$ levels in an urban community heavily impacted by truck traffic. Environ Health Perspect. 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.

E. AIR QUALITY AND NOISE REGULATIONS AND STANDARDS

AIR QUALITY

THE NATIONAL AMBIENT AIR QUALITY STANDARD 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[1]; 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 $\mu g/m^3$.[2]

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 $PM_{2.5}$ concentration of 15$\mu g/m^3$ 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 15$\mu g/m^3$ "would provide an adequate margin of safety against the effects observed in the epidemiological studies."[3]

The EPA has 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 $\mu g/m^3$ to 35 $\mu g/m^3$, and retaining the level of the annual $PM_{2.5}$ standard at 15 $\mu g/m^3$.

NOISE

As discussed in Chapter 18, noise levels associated with the construction and operation of the Proposed Actions would be subject to the emission source provisions of the New York City Noise Control Code and evaluated in accordance with Noise Standards set for the CEQR process. Construction equipment is regulated by the Noise Control Act of 1972 and the New York City Noise Control Code.

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

[2] 62 Federal Register 38652 (July 18, 1997).

[3] 62 Federal Register 28652, 38676 (July 18, 1997).

F. 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 and noise levels due to the Proposed Actions are based on the results of the air quality and noise impact assessments in Chapters 17, "Air Quality," 18, "Noise," and 20, "Construction." The following section presents the applicable standards and thresholds with which the results of the air quality and noise modeling are compared in determining the potential significance of public health impacts in consideration of the factors set forth above.

AIR QUALITY

To maintain concentrations lower than the National Ambient Air Quality Standards (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. New York County has been designated a non-attainment area 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. 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 for 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 or ground level receptor location.

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 Proposed Actions' annual emissions of PM_{10} are estimated to be well below the 15-ton-per-year threshold under the DEC's $PM_{2.5}$ guidance. 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.

As presented in Chapter 17, both the DEC and DEP interim guidance criteria have been used to evaluate the potential significance of predicted air quality impacts of the Proposed Actions on $PM_{2.5}$ concentrations, and to determine the need to minimize PM emissions from the Proposed Actions. Therefore, the public health analysis considers both the DEC and DEP thresholds in the determination of the public health impacts from the Proposed Actions.

Actions under CEQR that would increase $PM_{2.5}$ concentrations by more than the DEP or DEC interim guidance criteria 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.

NOISE

As described in Chapter 18, in terms of CEQR, a significant noise impacts occurs when there is an increase in the one hour equivalent noise level ($L_{eq(1)}$) of between 3 and 5 dBA, depending upon the noise level without the proposed action. In terms of public health, significance is not determined based upon the incremental change in noise level, but is based principally upon the magnitude of the noise level and time frame of exposure.

G. 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.[1] Exposure to particulate matter—specifically, emissions of fine particulate matter with an aerodynamic diameter less than 2.5 micrometers in diameter ($PM_{2.5}$)— 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 of asthma and a review of asthma causes and triggers.

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.[2,3,4] About 75 percent of people suffering from asthma have allergic asthma.[5] 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.[6] Exercise, cold air, and respiratory infections also may exacerbate asthma in people with allergic asthma.

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[1] Aligne C.A., Auinger P., Byrd R.S. 2000. Risk factors for pediatric asthma: contributions of poverty, race, and urban residence. Am J Resp Crit Care Med 162:873-877.

[2] 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.

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

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

[5] 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 July 2006).

[6] McFadden, 2005.

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 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.[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 Manhattan as a whole has experienced a 55 percent decrease in child hospitalization rates between 1997 and 2005.[5] A comparison of asthma hospitalization rates in 1997 and 2005

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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 Stat 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., 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.

among children aged 0 to 14 years is presented in Table 21-1 for zip codes surrounding the Project Area, and for Manhattan and New York City as a whole.

Table 21-1
1997 and 2005 Hospitalization Rates per 1,000 Persons (Aged 0 to 14 Years)*

Location	1997	2005
Gramercy Park – Murray Hill** (includes zip codes 10010, 10016, 10017 and 10022)	6.7	2.8
Borough of Manhattan	12.3	5.5
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 December, 2007.
** The Project Area is included in this neighborhood as defined by New York City Department of Health and Mental Hygiene

H. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

The following section summarizes the potential public health impacts related to air quality, noise, and hazardous materials during the construction and operation of the proposed development program.[1]

AIR QUALITY

DURING CONSTRUCTION

As presented in Chapter 20, "Construction Impacts," from the on-site sources related to the construction of the Proposed Actions, there were no predicted 24-hour average $PM_{2.5}$ concentration increments greater than 2 $\mu g/m^3$ at residences where exposure for periods of 24-hours or more can be reasonably expected. Local annual average $PM_{2.5}$ concentration increments would not exceed the threshold level of 0.3 $\mu g/m^3$. The highest annual average neighborhood-scale $PM_{2.5}$ increment would potentially reach 0.01 $\mu g/m^3$, which is much lower than the threshold level of 0.1 $\mu g/m^3$.

The highest $PM_{2.5}$ concentration increments from the Proposed Actions' construction activity would occur at protected sidewalk locations immediately adjacent to the construction fence, however continuous, daily and annual exposures would not be likely to occur at these locations.

[1] In the future with the Proposed Actions, electromagnetic field (EMF) levels would remain below IRPA/ICNIR guidelines, and there would not be significant adverse impacts associated with EMF levels. Due to the proximity of the 685 First Avenue parcel to a Con Edison substation on the same block, the FGEIS included a detailed analysis of EMF levels at various locations in the vicinity of 685 First Avenue, and the potential effects of EMF on the illustrative development programs. As presented in the FGEIS, field measurements indicated that EMF levels would remain below the International Radiation Protection Association/International Commission on Non-Ionizing Radiation (IRPA/ICNIR) guidelines, and that there would not be any significant adverse impacts associated with EMF under the illustrative development programs analyzed by the FGEIS. Compared to the illustrative buildings analyzed in the FGEIS, the building footprint currently proposed for the 685 First Avenue parcel is located at a further distance from the Con Edison substation. Therefore, no further EMF analysis is necessary.

Therefore, the construction of the Proposed Actions would not result in predicted significant adverse impacts on air quality or public health.

DURING PROJECT OPERATIONS

The potential for impacts on air quality during the operation of the proposed development program was examined in detail and is described in Chapter 17, "Air Quality." NYCDEP and NYSDEC draft interim guidance criteria were used to evaluate the significance of predicted impacts of the Proposed Actions on $PM_{2.5}$ concentrations as well as the impact of the Queens-Midtown Tunnel (QMT) on $PM_{2.5}$ concentrations within the proposed development.

The air quality analysis found that $PM_{2.5}$ concentration increments from mobile sources associated with the Proposed Actions 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 $0.3\mu g/m^3$. Therefore, no significant impacts from mobile sources associated with the Proposed Actions are expected.

The air quality modeling analysis determined the highest predicted increase in 24-hour and annual average $PM_{2.5}$ concentrations from the Proposed Actions' heating, cooling and ventilation systems would be less than the applicable interim guidance criterion of 5 $\mu g/m^3$. On an annual basis, the projected $PM_{2.5}$ impacts would be less than the applicable interim guidance criterion of 0.3 $\mu g/m^3$, and the DEP interim guidance criterion of 0.1 $\mu g/m^3$ for neighborhood scale impacts.

The assessment also examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the revised interim guideline criterion of 2 $\mu g/m^3$ could occur for at least 24 hours. At each of the receptors where increments above 2 $\mu g/m^3$ were predicted, these levels would occur only a limited number of times per year (see Chapter 17 for details). At other locations on the proposed developments and within the community, maximum 24-hour concentration increments of $PM_{2.5}$ would be less than 2 $\mu g/m^3$, The number and frequency of concentration increments above 2 $\mu g/m^3$ is very low. Considering these factors, the analysis determined that no potential significant air quality impacts related to $PM_{2.5}$ are expected to occur with the Proposed Actions.

Therefore, no significant air quality or public health impacts are expected from the operation of the Proposed Actions.

In addition, there would be no significant adverse air quality or public health impacts from existing industrial facilities or the QMT ventilation system on the development parcels.

RELATIONSHIP OF AIR QUALITY EFFECTS TO PUBLIC HEALTH

In considering the public health significance of the predicted increments greater than applicable thresholds discussed above, it is important to recognize that ambient air quality emission standards are set to limit the public health risks within large populations. Thus, for example, increases in fine particulate matter measured by a rooftop air sampler, reflect exposures over a large geographic area, which, especially in urban areas, include large numbers of persons. By contrast, the determination of whether an identified increment in particulate matter has a public health impact necessarily takes into account a number of factors: (1) the extent of the increment, taking into account environmental epidemiological studies which demonstrate a variety of concentration-response functions; (2) duration and frequency of the added exposure; and (3) the geographic extent of the exposure in its setting. The air quality analyses discussed above show

24-hour average $PM_{2.5}$ concentration increments greater than 2 $\mu g/m^3$ during project operations, which reflect elevations in particulate matter for a very small number of days and within highly localized areas. For these reasons, no significant adverse public health impacts from $PM_{2.5}$ are expected from project operations and from construction activities.

NOISE

As noted in the noise analysis section of Chapter 20, "Construction Impacts," the Proposed Actions could result in increased noise levels from the operation of construction equipment, and construction and delivery vehicles. These increases would be noisy and intrusive and would be expected to result in significant noise impacts based upon CEQR impact criteria at various receptor locations for specific time periods as detailed in Chapter 20. While these noise levels would be noisy and intrusive, they would not be of a magnitude and duration that would result in significant adverse health effects. Consequently, they would not constitute a significant public health impact. With respect to vibration, no significant adverse impacts were predicted from the construction activities.

As discussed in Chapter 18, "Noise," project-generated traffic would result in barely perceptible increases in noise levels and would not result in any significant adverse noise impacts. Although noise levels within the new open space areas created on-site as part of the Proposed Actions would exceed the 55 dBA $L_{10(1)}$ noise level for outdoor areas requiring serenity and quiet, these levels would be comparable to noise levels in other open space areas that are also located adjacent to heavily trafficked roadways and would not result in a significant adverse noise impact.

In addition, while design work has not been completed, the proposed development program's mechanical systems would be designed to avoid producing levels that would exceed the allowable noise levels specified in the City of New York Noise Codes, and would be designed to avoid causing any significant adverse noise impacts.

Therefore, no significant adverse health impacts from noise are expected from construction and operation of the Proposed Actions.

HAZARDOUS MATERIALS

According to CEQR, a hazardous materials analysis assesses the potential of proposed actions to increase human or environmental exposure to hazardous materials. In this case, the FGEIS identified hazardous materials on each of the development parcels, and lead paint and asbestos-containing materials in various site structures. In addition, it outlined hazardous materials remediation that is currently being undertaken pursuant to NYSDEC orders. Chapter 11, "Hazardous Materials," summarizes the ongoing remediation activities on each development parcel. Remediation is occurring (independently of the Proposed Actions being considered in the SEIS) and will be completed prior to redevelopment of the development parcels. Furthermore, health and safety measures would be implemented during construction of the proposed development program, as discussed in Chapter 11. Therefore, significant adverse hazardous materials impacts associated with the Proposed Actions are not expected.

I. FUTURE CONDITIONS WITH THE UNDC PROJECT

The following section considers the potential public health impacts of the future development scenario with the Proposed Actions and the development of the UNDC project.

AIR QUALITY

As discussed above and in Chapter 17, "Air Quality," no significant adverse public health impacts are expected from mobile or stationary sources with or without the UNDC development as a background project**.**

NOISE

As discussed above and in Chapter 18, "Noise," no significant adverse public health impacts are expected from mobile or stationary noise sources with or without the UNDC development as a background project.

HAZARDOUS MATERIALS

As discussed in Chapter 11, "Hazardous Materials," ongoing remediation is occurring on each development parcel, independent of the Proposed Actions and the UNDC project, and will be completed prior to redevelopment of the parcels. Therefore, significant adverse hazardous materials impacts are not expected.

J. CONCLUSION

This analysis finds that the Proposed Actions would not result in any significant adverse public health impacts related to air quality, noise or hazardous materials. ✷