2.Q PUBLIC HEALTH

INTRODUCTION

This section addresses the proposed action's overall effect on public health. Public health is the organized effort of society to protect and improve the health and well-being of the population through monitoring; assessment and surveillance; health promotion; prevention of disease, injury, disorder, disability and premature death; and reducing inequalities in health status. The goal of CEQR with respect to public health is to determine whether adverse impacts on public health may occur as a result of a proposed project, and if so, to identify measures to mitigate such effects.

The *CEQR Technical Manual* states that a public health assessment is not necessary for most actions. Where no significant unmitigated adverse impact is found in other CEQR analysis areas, such as air quality, water quality, hazardous materials, or noise, no public health analysis is warranted. If, however, an unmitigated significant adverse impact is identified in any of these other CEQR analysis areas, the lead agency may determine that a public health assessment is warranted for that specific technical area.

PRINCIPAL CONCLUSIONS

The Proposed Action would not result in significant adverse impacts to public health. The potential for the Proposed Action to cause a significant adverse impact regarding water quality, hazardous materials, air quality, and noise is discussed in Chapters 2.H, Natural Resources; 2.I, Hazardous Materials; 2.N, Air Quality; and 2.P, Noise, respectively. No significant impact has been identified in any of these chapters. The analysis in Chapter 2.S, Construction Impacts, concludes that there would be no significant adverse impact with regard to construction air quality; however, the Proposed Action would result in unmitigated, significant adverse impacts related to construction noise. These impacts, however, would not result in significant adverse impacts to public health.

The Central Bronx health statistics neighborhood, in which the proposed rezoning area is located, is one in which rodent infestation is prevalent. Construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be maintained with appropriate public agencies. Only U.S. Environmental Protection Agency (EPA) - and New York State Department of Environmental Conservation (NYSDEC)-registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to persons, domestic animals, and non-target wildlife. Therefore, construction of the Proposed Action would not result in any significant adverse impacts on rodent control.

For these reasons, the Proposed Action would not cause a significant adverse impact to public health.

METHODOLOGY

If a public health assessment is determined to be appropriate under Section 200 above, the assessment process involves evaluating whether and how exposure to environmental contaminants may occur and the extent of that expo-sure; characterizing the relationship between exposures and health risks; and applying that relationship to the population exposed.

The Proposed Action would only meet the thresholds warranting further assessment of public health impacts with respect to construction noise. However, given public concern about asthma and other air quality-related health effects, this chapter also addresses potential air quality-related health concerns during the construction and operation of the Proposed Action for informational purposes. A discussion of rodent control in connection with construction is also presented.

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 Action 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. Statistics regarding the Central Bronx health statistics neighborhood are also presented.

A summary of the air quality and noise impact assessments during the construction and operational periods of the Proposed Action is then presented, including a discussion of rodent control in connection with construction activities, and the potential for public health impacts due to the Proposed Action is determined.

SUMMARY OF AIR AND NOISE POLLUTION SOURCES FROM THE PROPOSED ACTION

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 diesel-powered and have produced relatively uncontrolled emissions of particulate matter (PM). Construction activities also emit fugitive dust. Impacts on traffic could also increase mobile source-related emissions.

Standard mitigation measures would be incorporated into the construction plans for the applicant-controlled properties to minimize potential impacts in accordance with all applicable laws, regulations, and building codes. All equipment will comply with applicable EPA regulations. To minimize fugitive dust emissions, vehicles on-site would be limited to a speed of 5 mph, and water would be used to wet working surfaces. Storage piles would be covered. Exposed areas will be stabilized after disturbance to minimize dust. Tracking pads will be established at construction exits to prevent dirt from being tracked onto roadways. Dust associated with demolition activities will be controlled with misting systems. Construction areas would be surrounded by perimeter fencing that would help contain fugitive dust emissions. Emission reduction and related construction measures will be included in the specifications of the construction contracts.

The construction of Site 2N, due to its relatively long construction period (2.5 years), has the potential to have a significant adverse impact on air quality with respect to the residential units to be constructed on Site 2S. To minimize the potential for impacts, the applicant has agreed to implement a diesel particulate matter (DPM) emissions reduction program that would include best management practices comprised of the following components:

1. *Diesel Equipment Reduction*. Construction on Site 2N would minimize the use diesel engines and maximize the use of electric engines where practical.

2. *Clean Fuel*. Ultra-low sulfur diesel fuel (ULSD) would be used exclusively for diesel engines throughout Site 2N. This would enable the use of tailpipe reduction technologies (see below) and would directly reduce DPM and sulfur oxides (SOx) emissions.
3. *Best Available Tailpipe Reduction Technologies*. Nonroad diesel engines with a power rating of 50 hp or greater and controlled truck fleets (i.e., truck fleets under long-term contract, such as concrete mixing and pumping trucks) would utilize the best available tailpipe reduction technology for reducing DPM emissions, such as diesel particle filters (DPFs).
4. *Utilization of Tier 2 or Newer Equipment*. In addition to the tailpipe controls commitments, the construction program would mandate the use of Tier 2 or later construction equipment for nonroad diesel engines greater than 50 hp.
5. *Location of Equipment*. In order to minimize their effects, some emissions sources such as concrete trucks and pumps would be located away from Site 2S to the extent practicable.
6. *Fugitive Dust.* The fugitive dust control plans described in the preceding paragraph would be required as part of contract specifications.
7. *Idle Times*. Restrictions would be placed on on-site vehicle idle times for all vehicles not using the engine to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) in compliance with applicable laws.
8. *Compliance*. In addition, the applicant would take such additional measures to reduce pollutant emissions during construction of the proposed development on Site 2N as are required under all applicable laws, regulations and building codes.

Noise

Community noise levels during construction 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 Action are expected to be impact equipment, such as jackhammers, excavators with ram hoes, drill rigs, rock drills, impact wrenches, tower cranes, and paving breakers, as well as the movements of trucks, and possible blasting.

The applicant will have site specific noise mitigation plans prepared and implemented at the applicant development sites as required as part of the New York City Noise Control Code. For non-applicant-controlled sites, noise mitigation plans would also be prepared and implemented, as required by the New York City Noise Control Code.

Even though no long-term construction noise impacts are expected to occur as a result of the Proposed Action, as noted above, there are shorter periods that would experience significant adverse impacts from construction noise.

Operation

Air Quality

The primary source of mobile source pollutant emissions during operations would be from project-generated vehicles using nearby intersections in the study area. The Proposed Action would increase passenger car traffic in the vicinity of the proposed rezoning area but would reduce the number of truck trips.

Potential stationary source emissions associated with operation of the Proposed Project would primarily be from fuel burned on-site for heating, ventilation, and cooling (HVAC) systems.

Noise

Because redevelopment of industrial sites under the RWCDS would reduce the number of truck trips, the Proposed Action would result in slightly lower noise levels at many locations and a significant lowering of noise levels, by 3.9 dBA, at the intersection of Boone Avenue and East 173rd Street.

The Proposed Project would include an outdoor children's playground on Site 3S, on the east side of Boone Avenue between East 172nd and 173rd Streets. The playground would increase noise levels affecting portions of the adjacent residential building, which is also part of the Proposed Project. The restrictive declaration for the site would impose window/wall attenuation requirements sufficient to prevent a significant adverse noise impact.

AIR QUALITY POLLUTANTS OF CONCERN AND RELATED HEALTH EFFECTS

As mentioned above, the primary source of air quality pollutant emissions from the Proposed Action would be diesel engines during construction, and emissions from project-generated vehicles 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 Project. The potential air quality impacts of $PM_{2.5}$ and other pollutants of concern from the Proposed Action are analyzed in Chapter 2.N, 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.[1]

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.

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. PM2.5 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 PM2.5 and perhaps as many forms of man-made PM2.5, which include the

[1] 1 A μm, or micron, is approximately 1/100 the width of a human hair.

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 PM2.5 is one determinant of ambient air quality and is extremely difficult to model.

The major constituents of PM2.5 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, sulfur dioxide (SO2) and (nitrogen oxide) NOx, 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.

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 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 of New York. The data also indicate that urban sites are more likely to experience increased nitrate and carbon levels than rural sites.

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. 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.

PM2.5-Related Health Effects

Introduction

An important issue associated with PM2.5 is that it has a direct causal effect on human health. Since PM in the ambient air is composed of a combination of discrete compounds or elements, its possible public health effects could vary depending on the specific components of PM in a region. For example, acid aerosols, such as sulfuric acid, may trigger reactions in pulmonary lung function, while bioaerosols, such as mold spores, may result in allergic reactions related to increased incidences of asthma. The EPA 2004 Criteria Document acknowledges the uncertainty regarding the shapes of PM exposure-response relationships; the magnitude and variability of risk assessments for PM; the ability to attribute observed health effects to specific PM constituents; the time intervals over which PM health effects are manifested; the extent to which findings in one location can be generalized to other locations; and the nature and magnitude of the overall public health risk imposed by ambient PM exposure.

Studies have shown the importance of separating total personal exposure to PM2.5 into its two major components. Ambient (or outdoor) exposure includes the ambient PM concentrations while outdoors, usually estimated by measurements at local air monitoring stations. Non-ambient

exposure is the result of indoor sources (e.g., cooking and cleaning) and personal sources (e.g., smoking and materials used for hobbies). Non-ambient exposure levels are independent of outdoor ambient PM concentrations. Among subjects of a large study of three cities, personal exposures to $PM_{2.5}$ were significantly higher than outdoor $PM_{2.5}$ concentrations.

The fact that personal PM exposures were higher than outdoor concentrations indicates that indoor sources of $PM_{2.5}$ contribute to, and in some cases dominate, personal exposures.

The potential for $PM_{2.5}$ to affect public health is dependent on the composition and the amount of PM in the atmosphere (i.e., the higher the ambient $PM_{2.5}$ concentration, the more likely that it would have an effect). The evidence cited by EPA in establishing the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ is derived from epidemiologic studies that found, at typical ambient levels, a statistical correlation of PM and increased levels of morbidity and mortality. It is unclear what forms of PM and what physiological mechanisms are responsible for the observed health effects. However, the extent of any adverse public health effect related to an increase in PM concentrations is anticipated to be proportional in some way to the concentration increase. A small increase in PM concentrations can, at most, lead to a small increase in the risk of PM-related public health effects.

The principal health effects of airborne PM are on the respiratory system, although recent research investigated the possible link between PM pollution and cardiovascular disease.

General Respiratory Effects

Numerous studies have correlated increased rates of hospital admissions for respiratory conditions, small decreases in lung function in children with or without asthma, and absences from school with changes in PM concentrations. As a result, EPA stated that these statistical associations reflect cause and effect and established the NAAQS for PM primarily on the basis of the associations.4The PM2.5 standard was established to protect public health.

Asthma

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. 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. Exercise, cold air, and respiratory infections also may exacerbate asthma in people with allergic asthma.

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, various factors dominate 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.

In the United States, approximately 6.8 million children (9 percent of children under age 18) have asthma. In 2003, current asthma prevalence in children in New York state was estimated at approximately 9.9 percent.

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

Other Health Effects, Including Cardiovascular, Lung Cancer, and Premature Mortality

People with heart disease, such as coronary artery disease and congestive heart failure, are at risk of serious cardiac effects. In people with heart disease, very short-term exposures of one hour to elevated fine PM concentrations have been linked to irregular heartbeats and heart attacks.

New epidemiological re-analyses of studies of long-term ambient PM exposure also show substantial evidence for increased lung cancer risk being associated with such PM exposures, especially exposure to fine PM or specific fine particles subcomponents.

The elderly are at increased risk from fine PM air pollution. Numerous community health studies have shown that when particle levels are high, senior citizens are more likely to be hospitalized for heart and lung problems, and some may die prematurely.

Inhaling fine PM has been attributed to increased hospital admissions, emergency room visits, and premature death among sensitive populations with pre-existing heart or lung disease. Studies estimate that tens of thousands of elderly people die prematurely each year from exposure to ambient levels of fine particles.

In summary, studies conducted in individual cities and using data pooled from multiple cities have demonstrated that increases in PM, SO2, and ozone exposures are associated with increases in daily mortality, and hospitalizations and emergency department utilization for asthma with increases in PM. While the epidemiologic literature demonstrates that variation in air quality is associated with these morbidity and mortality events, it does not, in general, demonstrate that air quality differences account for the large increases seen in the prevalence of asthma through the 1980s and 1990s, or the wide variability in the prevalence of asthma and heart disease across and within cities.

LOCAL HEALTH STATISTICS

The proposed rezoning area is within the Central Bronx health statistics neighborhood, also known as Crotona-Tremont, consisting of Crotona Park East, Crotona Park West, Tremont, East Tremont, West Farms, Bathgate, Morris Heights, and Mount Hope. It is one of 42 health

statistics neighborhoods into which the city is divided, including seven in the Bronx. As of the 2000 census, the neighborhood was home to approximately 199,500 people.[2]

The Department of Health and Mental Hygiene publishes statistics, for the city as a whole, the boroughs, and each of the 42 health statistics neighborhoods, regarding a range of health conditions, including several cancers, heart attacks, asthma, infant mortality, birth abnormalities, blood lead levels, and pest infestation. The Central Bronx does not rank abnormally high for blood lead levels, birth abnormalities, infant mortality, or cancers (with the single exception of leukemia rates among males). It does, however, rank high for the indicators related to asthma, heart attacks, and pest infestation.

For the most recent available reporting year, surveys indicated that 49.5 percent of Central Bronx households had cockroaches in their homes, 50.1 percent of households had mice or rats in their homes, and 60.4 percent of adults reported seeing mice or rats outside the buildings in which they lived.[3] These were respectively the third highest (a tie), highest, and highest (a three-way tie) percentages among the city's 42 neighborhoods. The citywide percentages were 28.5 percent, 21.8 percent, and 31.6 percent respectively, and for the Bronx they were 42.3 percent, 36.0 percent, and 41.7 percent.[4] These pests can cause disease by contaminating food, and they can trigger asthma attacks in sensitive people.

For the most recent available reporting year, the age-adjusted heart attack hospitalization rate for the Central Bronx was 43.1 per 10,000 residents, which was third highest among the 42 neighborhoods.[5] The three highest rates were for a cluster of Bronx neighborhoods: Hunts Point-Mott Haven, High Bridge-Morrisania, and Crotona-Tremont. The neighborhood rates ranged from 12.2 to 48.3 per 10,000 residents; the citywide and Bronx heart attack hospitalization rates were 28.6 and 38.1 per 10,000 residents. Heart disease results from a number of factors related to personal habits and heredity, but a contributing environmental factor is exposure to ambient air pollutants.[6]

The neighborhood's asthma hospitalization rate for children under five years old was 181.9 per 10,000 residents in that age group in 2007, compared with rates of 79.8 per 10,000 residents for New York City and 154.8 per 10,000 residents for the Bronx. It should be noted that the Bronx rate was far higher than for any other borough (the next highest being 70.5 per 10,000 residents in Queens). The 42 neighborhood rates ranged from 9.3 to 188.7 hospitalizations per 10,000 residents, with the Central Bronx (Crotona-Tremont in the Department of Health and Mental Hygiene table) ranking third. As in the case of heart attack hospitalizations, the three highest rates were for High Bridge-Morrisania, Hunts Point-Mott Haven, and Crotona-Tremont (188.7,

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[2] New York City Department of Health and Mental Hygiene (DOH), Community Health Profiles: Central Bronx (2006).

[3] DOH, Environmental Public Health Tracking Portal (gis.nyc.gov/doh/track). For pests inside the home, the numbers are for 2008 and are based on data from the New York City Housing and Vacancy Survey. They represent the percentages of households seeing at least one cockroach in the apartment during the last month and at least one rodent in the building during the past 90 days. For rodents outside the home, the reporting year is 2004, and the source is the New York City Community Health Survey. The number represents the percentage of surveyed adults reporting seeing mice or rats outside their building during the past 30 days.

[4] *Ibid.*

[5] DOH, Environmental Public Health Tracking Portal (gis.nyc.gov/doh/track). The data are from New York State Statewide Planning and Research Cooperative System hospital discharge data sets for 2007.

[6] *Ibid.*

184.2, and 181.9, compared with a fourth highest rate of 146.2 per 10,000 residents in Fordham-Bronx Park). For children between 5 and 14 years old, the neighborhood's 2007 asthma hospitalization rate was 61.3 per 10,000 residents in that age group, which was seventh highest and well below the peak of 104.3 hospitalizations per 10,000 residents, but well above the low of no such hospitalizations reported in Lower Manhattan. For this age group, the highest asthma hospitalization rates were in East Harlem and Central Harlem-Morningside Heights. The neighborhood's rate was well below the citywide rate of 35.4 hospitalizations per 10,000 residents but slightly below the Bronx rate of 62.2 per 10,000 residents. For residents over the age of 14, the neighborhood's age-adjusted asthma hospitalization rate was 85.3 per 10,000 residents in 2007, the second highest among the city's 42 neighborhoods, which had rates ranging from 4.8 to 94.4 per 10,000 residents. The highest rates were again for the Hunts Point-Mott Haven, Crotona-Tremont, and High Bridge-Morrisania cluster of neighborhoods. The citywide and boroughwide rates were 26.0 and 57.6 hospitalizations per 10,000 residents.[7] High asthma hospitalization rates may be related to lack of preventive care or access to primary care outside of the hospital, but they are also clearly correlated with environmental conditions, particularly exposure to diesel fumes and fine particulate matter and exposure to indoor air contaminated with dust mites, cockroach dander and feces, and rodent dander and urine.

REGULATIONS AND STANDARDS

Air Quality

Section 108 of the Clean Air Act (CAA) directs the U.S. Environmental Protection Agency (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, 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 1997 the EPA revised the NAAQS for PM and proposed a new standard for PM2.5 consisting of both a long-term (annual) limit of 15 µg/m3 and a short-term (24-hour) limit of 65 µg/m.

In establishing the NAAQS for PM2.5 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 PM2.5, the EPA found that an annual average PM2.5 concentration of 15µg/m3 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/m3 "would provide an adequate margin of safety against the effects observed in the epidemiological studies."

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[7] *Ibid.*

The EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour PM2.5 standard from 65 μg/m3 to 35 μg/m3, and retaining the level of the annual PM2.5 standard at 15 μg/m3. EPA is currently considering whether to lower the concentration level of the annual standard for PM2.5.

Noise

Noise levels associated with the construction and operation of development resulting from the Proposed Action would be subject to the emission source provisions of the New York City Noise Control Code and evaluated in accordance with the noise standards set forth in the *CEQR Technical Manual*. Construction equipment is regulated by the Noise Control Act of 1972 and the New York City Noise Control Code.

AIR QUALITY AND NOISE IMPACT CRITERIA

Air Quality

To maintain concentrations lower than 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. EPA finalized the designation of the New York City Metropolitan Area as nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS, effective in November 2009. To determine the potential significance of impacts from $PM_{2.5}$ emissions for individual projects, NYSDEC 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 threshold levels, the significance of impacts is further determined in consideration of the various factors listed in the previous section.

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts.[1] This policy would apply only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. Projects with emissions below this threshold are deemed by NYSDEC to be insignificant with respect to $PM_{2.5}$ and do not require further assessment under the policy. The policy states that 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. Projects that exceed either the annual or 24-hour threshold will be required to prepare an EIS to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

For projects subject to CEQR, the interim guidance criteria currently employed for determination of *potential* significant adverse $PM_{2.5}$ impacts 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 μg/m3 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;

• Annual average PM2.5 concentration increments which are predicted to be greater than 0.1 µg/m3 at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or

• Annual average $PM_{2.5}$ concentration increments which are predicted to be greater than 0.3µg/m_3 at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the CEQR or NYSDEC interim guidance criteria above will be considered to have a potential significant adverse impact. Actions subject to CEQR that fail the interim guidance criteria should prepare an EIS and examine potential measures to reduce or eliminate such potential significant adverse impacts.

Noise

In 1983, the New York City Department of Environmental Protection (NYCDEP) adopted the City Environmental Protection Order-City Environmental Quality Review (CEQR) noise standards for exterior noise levels. These Noise Exposure Guidelines are the basis for classifying noise exposure into four categories based on the L_{10}: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable, as shown in Table Q-1.

Table Q-1: Noise Exposure Guidelines for Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
1.Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	Ldn ≤ 60 dBA		Ldn ≤ 60 dBA		Ldn ≤ 60 dBA		Ldn ≤ 75 dBA
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55<L_{10}\leq 65$ dBA		$65<L_{10}\leq 80$ dBA		$L_{10}> 80$ dBA	
3. Residence, residential hotel or motel	7 am to 10 pm	$L_{10}\leq 65$dBA		$65<L_{10}\leq 70$dBA		$70<L_{10}\leq 80$ dBA		$L_{10}> 80$ dBA	
	10 pm to 7 am	L10≤ 55dBA		$55<L_{10}\leq 70$dBA		$70<L_{10}\leq 80$ dBA		$L_{10}> 80$ dBA	
4. School, museum, library, court house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM- 10 PM)		Same as Residential Day (7 AM –10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM –10 PM)		Same as Residential Day (7 AM-10 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:

(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more;

1 Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.

2 Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.

3 One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

4 External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Source: New York City Department of Environmental Protection (adopted policy 1983).

For sensitive receptors introduced by the Proposed Action, With-Action noise levels in dB(A) $L_{10(1)}$ are compared to the values contained in the Noise Exposure Guidelines. If these noise levels would exceed the marginally acceptable levels, a significant impact would occur unless the building design provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. These values are shown in Table Q-2.

Table Q-2: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				**Clearly Unacceptable**
Noise level with Proposed Action	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Attenuation[A]	(I) 28 dBA	(II) 31 dBA	(III) 33 dBA	(IV) 35 dBA	$36 + (L_{10} - 80)$[B] dBA

Note: [A]The above composite window/wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5 dBA less in each category. All the above categories require a closed window situation and hence alternate means of ventilation.

[B]Required attenuation values increase by 1 dBA increments for L_{10} values greater than 80 dBA.

Source: New York City Department of Environmental Protection.

For long-term noise increases caused by action-induced traffic, or for stationary noise sources introduced by the Proposed Action, if the No-Action levels are less than 60 dB(A) $L_{eq(1)}$ and the analysis period is not at nighttime, an increase of 5 dB(A) $L_{eq(1)}$ or more in the future with the project would be considered a significant impact. In order for the 5 dB(A) threshold to be valid, the resultant With-Action condition noise level would have to be equal to or less than 65 dB(A). If the No-Action noise level is equal to or greater than 62 dB(A) $L_{eq(1)}$, or if the analysis period is a nighttime analysis period, the incremental significant impact threshold would be 3 dB(A) $L_{eq(1)}$. If the No-Action noise level is 61dB(A) $L_{eq(1)}$, the maximum incremental increase would be 4 dB(A), since an increase higher than this would result in a noise level higher than the 65 dB(A) $L_{eq(1)}$ threshold and be considered significant.

For short-term noise increases 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.

IMPACT ASSESSMENT

The following section summarizes the potential public health impacts related to air quality, noise, and rodent control during the construction and operation of the Proposed Action.

Operational Air Quality

The additional traffic volumes anticipated as a result of the Proposed Action would not cause carbon monoxide (CO) or fine particulates ($PM_{2.5}$ and PM_{10}) concentrations to exceed either National Ambient Air Quality Standards (NAAQS) or New York City de minimis criteria at any intersection. Carbon monoxide emissions from the new garages would also not exceed those standards. No new building would be exposed to $PM_{2.5}$ or PM_{10} concentrations in excess of NAAQS as a result of the exhaust from vehicles traveling on the Cross Bronx Expressway. In

summary, the Proposed Action would not result in any significant adverse mobile source air quality impact.

HVAC system boiler emissions from new buildings that might be built on projected or potential development sites would not cause significant air pollutant concentrations at any existing residential building, school, or other sensitive receptor.

Assessment using the federal Environmental Protection Agency's (EPA's) AERMOD dispersion model indicated that, in the absence of restrictions on fuel sources or emissions stack locations, developments on many of the projected and potential development sites could potentially cause significant adverse air quality impacts on projected or potential new buildings on nearby sites, causing pollutant concentrations that would exceed NAAQS limits, if their boilers are fueled by oil rather than natural gas and if their exhaust stacks are located at rooftop locations sufficiently close to the potentially affected buildings. The Proposed Action would therefore include the placement of (E) designations on non-applicant-controlled sites and the recording of restrictive declarations against applicant-controlled sites that would require the use of natural gas rather than oil, require exhaust stacks to be set back from certain property lines by specified minimum distances, or both. In addition, the applicant proposes to construct exhaust stacks for the boilers that are on the mechanical penthouses and extend seven feet above the penthouses rather than follow the standard, less stringent practice of building stacks three feet higher than the surrounding roof. The more rigorous stack height requirement would be part of restrictive declarations recorded against the applicant-controlled sites. The placement of these (E) designations and the recording of these restrictive declarations would avoid the potential significant adverse air quality impacts and ensure that residents of the buildings on proposed and potential development sites would not be subjected to unhealthful levels of air pollution caused by other development resulting from the Proposed Action.

Operational Noise

A screening analysis based on action-generated increases in traffic showed no potential for noise increases of 3.0 dBA or more to the L_{eq} or L_{10}, relative to future no-action conditions, at any of the studied intersections. Because redevelopment of industrial sites under the RWCDS would reduce the number of truck trips, the Proposed Action would result in slightly lower noise levels at many locations and a significant lowering of noise levels, by 3.1 dBA, at the intersection of Boone Avenue and East 173rd Street.

The northernmost block of the proposed rezoning area is adjacent to an elevated subway trestle above Boston Road. Because of this, the noise levels at Projected Development Site 9C and Potential Development Sites 9A and 9B would be in the Clearly Unacceptable category of the NYCDEP Noise Exposure Guidelines. The highest noise levels, up to 86.1 dBA, are based on monitored noise levels at ground level and are partially due to the reverberation of rail noise on the elevated metal structure. Under guidelines in the *CEQR Technical Manual,* the development of new residential units at locations subject to these Clearly Unacceptable noise levels would ordinarily constitute a significant adverse impact because indoor noise levels could exceed the maximum acceptable level of 45 dBA. However, the Proposed Action would include the placement of (E) designations on Sites 9A (Block 3016, Lots 33 and 35), 9B (Block 3016, Lots 36 and 37), and 9C (Block 3016, Lots 38 and 42) that would require (1) specified levels of window/wall noise attenuation and (2) air conditioning or other alternative means of ventilation so that residents can maintain a closed window condition at all times of the year. The specified attenuation levels would be at least 42 dBA on the affected lower floors of the buildings. That

level of exterior-to-interior noise attenuation would ensure that indoor noise levels would be below 45 dBA, avoiding the potential significant adverse noise impact.

Other projected and potential development sites would be subject to noise levels in the marginally unacceptable categories because of highway and other traffic noise. If an action would introduce noise-sensitive uses at a location where the noise levels would exceed the marginally acceptable levels, the *CEQR Technical Manual* specifies that a significant impact would occur unless the building design provides a composite building attenuation that would be sufficient to reduce these levels to an acceptable interior noise level. Except at Sites 9A, 9B, and 9C, attenuation levels of from 28 to 33 dBA would be required to ensure acceptable indoor noise levels.

The Proposed Action would include the placement of (E) designations for non-applicant-controlled projected and potential development sites and the recording of restrictive declarations for Proposed Project sites. The provisions of both the (E) designations and the restrictive declarations would mandate the required OITC rating levels to ensure that interior noise levels would be at 45 dBA or less for residential uses and 50 dBA or less for commercial uses. Where the projected L_{10} noise levels would be 70 dBA or more, the (E) designation and restrictive declaration provisions also would require alternate means of ventilation to permit a closed-window condition during warm weather. Although the projected noise levels would be high enough to result in significant adverse noise impacts, the potential impacts would be avoided through the placement of (E) designations and recording of restrictive declarations that would mandate the requisite noise attenuation levels and, where necessary, require alternate means of ventilation.

The Proposed Project would include both an outdoor children's playground (a new stationary noise source) and wings of a residential building (new sensitive noise receptors) along the southern part of the Boone Avenue frontage between East 172nd and 173rd Streets, on Site 2S. One building wing would directly abut the playground's northern edge. For ground floor windows facing the playground, the total L_{10} would be 78.5 dBA, which would be in the Marginally Unacceptable IV category, requiring window/wall noise attenuation of 35 dBA. A façade of another wing would be about 15 feet from the playground's southern edge. For ground floor windows facing the playground, the total L_{10} would also be 78.5 dBA, which would be in the Marginally Unacceptable IV category, requiring window/wall noise attenuation of 35 dBA.

Under guidelines in the *CEQR Technical Manual,* these increases would constitute potential significant adverse impacts to the residential windows that would face the playground. However, the restrictive declaration associated with the LSGD would require window/wall noise attenuation of up to at least 35 dBA on the affected lower floors of the two building wings. Lesser noise attenuation requirements would be appropriate for floors above the second floor as both traffic noise and playground noise decrease with distance. The restrictive declaration provisions to ensure that interior noise levels remain at 45 dBA or less for residential uses would avoid the potential significant adverse noise impact.

Construction Air Quality

Based on the preliminary construction analysis, construction activities are not likely to cause mobile source air quality impacts. Although the construction-related trucks may exceed the increment projected for the future with-action conditions during some hours of the day and/or short-term periods, no significant long-term adverse impacts are anticipated.

With the exception of Site 2N, any potential impacts to adjacent residences would be temporary impacts lasting less than one year. Due to its long construction period when diesel equipment

would be on the site (70 weeks), the construction of Site 2N would have the potential for a significant adverse impact on air quality at the completed residential units facing it on Site 2S.

Accordingly, for this site, a more rigorous approach to reducing DPM emissions would be carried out. The proposed DPM emissions reduction measures would be sufficient to prevent significant adverse air quality impacts because they would reduce DPM emissions to acceptable rates. Notably, the same DPM reduction measures were proposed as part of a detailed construction analysis in the Riverside Center EIS, and the Proposed Action for the Crotona Rezoning would have a lower emissions intensity than the Riverside Center project, as described below.

Emissions intensity is the pollutant emission rate per square foot over the construction area. The emissions from all construction sources for a given pollutants, such as PM2.5, are summed and divided by the square area to determine an emissions intensity in over the construction area.

For the Riverside Center EIS, the projected worst-case construction period was from November 2011 through October 2012. During this period Building 2 would be constructed on Riverside's Parcel N. This building would be 526 feet tall with 493,614 gsf of residential use, 15,635 gsf of retail, and up to 151,598 gsf for a public school. In contrast, Parcel 2N of the Proposed Project is projected to have a smaller building, with a total of 407,123 gsf. Therefore, it would have a lower emissions intensity than Building 2 for Riverside Center, and the proposed DPM reduction measures for Parcel 2N would be sufficient to prevent potential construction air quality impacts.

Construction Noise

Based on the preliminary construction analysis, construction activities are not likely to cause long-term impacts due to mobile sources, impulse noise, or noise within a narrow range of frequencies.

Even though no long-term construction noise impacts are expected to occur as a result of the Proposed Action, there are shorter periods during which very high increases in construction-noise would occur for sensitive receptors along Longfellow Avenue between East 173rd and East 174th Streets. The high noise levels would be generated by construction activities on sites that are not under control of the applicant and therefore cannot be controlled through a restrictive declaration. Construction activities at these sites would be subject to Title 15 of the Rules of the City of New York, Chapter 28, Citywide Construction Noise Mitigation, which specifies requirements for a Construction Noise Mitigation Plan, required noise mitigation measures for general construction, and additional measures to be taken if DEP receives noise complaints concerning a construction site.

Further analysis conducted between the Draft and Final EIS revealed that the typical construction fence would not be sufficient to shield the rear façade windows above the second floor of one of the residential buildings along Longfellow Avenue between East 173rd and East 174th Streets from significant adverse construction noise impacts if construction of the non-applicant development sites adheres to the schedule predicted. The building is a six-story apartment building that occupies Block 3010, Lot 4.

Neither the extent nor the duration of the noise exposure, however, would be great enough to constitute a significant adverse public health impact. The significant adverse construction noise impact would affect the windows on the third through sixth floors of the rear facade of one six-story residential apartment building. The significant adverse impacts would not occur continuously over a long period of time (i.e., in excess of two years).. Furthermore, the noise levels at these windows would be below 85 dBA, the threshold cited in the *CEQR Technical Manual* at which health effects may occur.

Rodent Control

The Central Bronx health statistics neighborhood, in which the proposed rezoning area is located, is one in which rodent infestation is prevalent. Construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be maintained with appropriate public agencies. Only U.S. Environmental Protection Agency (EPA)- and New York State Department of Environmental Conservation (NYSDEC)-registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to persons, domestic animals, and non-target wildlife. Therefore, construction of the Proposed Action would not result in any significant adverse impacts on rodent control.

CONCLUSION

The potential for the Proposed Action to cause a significant adverse impact regarding water quality, hazardous materials, air quality, and noise is discussed in Chapters 2.H, Natural Resources; 2.I, Hazardous Materials; 2.N, Air Quality; and 2.P, Noise, respectively. No significant impact has been identified in any of these chapters. The analysis in Chapter 2.S, Construction Impacts, concludes that there would be no significant adverse impact with regard to construction period air quality.

Chapter 2.S does conclude, however, that even though no long-term construction noise impacts are expected to occur as a result of the Proposed Action, a significant adverse impact from construction noise would occur if construction activities adhere to the schedule predicted. This would affect the upper four stories of the rear facade of one existing residential building fronting on the east side of Longfellow Avenue between East 173rd and East 174th Streets, where increases of up to 17.8 dBA and noise levels of up to 83.0 dBA are predicted. The high noise levels would be generated by construction activities on sites that are not under control of the applicant, so the FEIS does not assume the use of construction noise screening measures other than those that are standard practice under the construction noise mitigation plans that are required on all construction sites in New York City. Therefore, an unmitigated significant adverse construction noise impact would occur. Neither the extent nor the duration of the noise exposure, however, would be great enough to constitute a significant adverse public health impact. The significant adverse impact would affect the windows on the third through sixth floors of the rear facade of one six-story residential apartment building. The significant adverse impacts not occur continuously over a long period of time (i.e., in excess of two years). Furthermore, the noise levels at these windows would be below 85 dBA, the threshold cited in the *CEQR Technical Manual* at which health effects may occur

With respect to rodent control, the Central Bronx health statistics neighborhood, in which the proposed rezoning area is located, is one in which rodent infestation is prevalent; however, standard measures would be taken during construction to control pests. Therefore, construction of the Proposed Action would not result in any significant adverse impacts on rodent control.

For these reasons, the Proposed Action would not cause a significant adverse impact to public health.