Chapter 16: Air Quality

A. INTRODUCTION

This chapter discusses sources of air pollutant emissions that could result from the Phased Redevelopment of Governors Island (the Proposed Project) and examines their potential effect on air quality. Air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heat and hot water systems. Indirect impacts are impacts from emissions associated with the transportation of people and goods or solid waste to and from a proposed project.

As discussed in Chapter 15, "Transportation," Phase 1 of the Proposed Project is not expected to significantly alter traffic conditions. The maximum hourly incremental traffic from Phase 1 and the Later Phases-Park and Public Spaces is not expected to exceed the *City Environmental Quality Review* (*CEQR) Technical Manual* carbon monoxide screening threshold of 170 peak hour vehicle trips at intersections in the traffic study area (near existing ferry terminals—the Battery Maritime Building, in Manhattan, and Pier 6 in Brooklyn Bridge Park), nor would it exceed the particulate matter emissions screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, a quantified assessment of emissions from transportation sources is not warranted for Phase 1 nor for the Later Phases-Park and Public Spaces of the Proposed Project.

The Later Phases-Island Redevelopment component of the Proposed Project would generate additional vehicle trips that are anticipated to exceed *CEQR Technical Manual* screening analysis thresholds. Therefore, the full development of the Proposed Project will require an assessment of the potential for significant adverse impacts on air quality. Since the specific future uses for the Later Phases-Island Redevelopment have not been proposed, defined, or designed and the associated level of ferry service has not been determined, it is not possible to perform a quantified air quality analysis of mobile source. Instead, a qualitative analysis is presented. When the Later Phases-Island Redevelopment has been planned and designed, it is anticipated that it would require zoning or other land use actions, which would be subject to CEQR, and that the associated future environmental review would take into account a quantified analysis of the potential for air quality impacts from mobile sources from the full development of the Proposed Project.

Phase 1 would not result in the development of new buildings. As part of the Later Phases-Park and Public Spaces, a new structure called the Shell would be constructed to provide protected outdoor seating, a food concession, and public restrooms. The Shell would require a natural-gas fired boiler for radiant floor heating. A stationary source assessment was therefore conducted to evaluate the potential for impacts on air quality from the Shell boiler. For the Later Phases-Island Redevelopment, fossil-fuel-burning heat and hot water systems would be needed for the proposed buildings. Since the specific future uses for the Later Phases-Island Redevelopment have not been proposed, defined, or designed, it is not possible to conduct an analysis of these

sources. Therefore, the chapter presents a framework for the analysis that will be undertaken in the future CEQR environmental review and identifies steps that could be taken to preclude the potential for significant adverse impacts on air quality.

This chapter also describes the expected use of potentially hazardous materials that would be employed in the public school, research facilities, or university laboratories that could be included in the Later Phases-Island Redevelopment. The assessment also describes the procedures and systems that would be employed to ensure the safety of staff, students, and the surrounding community in the event of a chemical spill in one of the proposed laboratories.

B. PRINCIPAL CONCLUSIONS

PHASE 1

Phase 1 of the Proposed Project would improve existing open spaces and open new areas to public access on Governors Island (the Island) and would not result in the development of new buildings. It would not result in a significant number of new vehicle or ferry trips or other significant changes. Therefore, Phase 1 would not result in a significant adverse impact on air quality.

LATER PHASES

Based on the traffic analysis conducted for the Later Phases-Park and Public Spaces, the number of peak hour trips at any one intersection is expected to be below the *CEQR Technical Manual* screening analysis thresholds. Therefore, the Later Phases-Park and Public Spaces would not have the potential for significant adverse impacts on air quality from the projected additional vehicle trips. The radiant heating system for the Shell that would be developed in the Later Phases-Park and Public Spaces would not have the potential for significant adverse impacts on air quality. Nor would the maximum predicted pollutant concentrations, and concentration increments from on-road transportation be likely to exceed the relevant guidance thresholds and ambient air quality standards. Ferry operations could have the potential to significantly affect pollutant concentrations locally in areas adjacent to the ferry landings; however, with appropriate site design and/or emission mitigation measures, significant adverse impacts on air quality can be avoided.

Since the specific future uses for the Later Phases-Island Redevelopment have not been proposed, defined, or designed, it is not possible to perform a detailed air quality analysis of potential transportation impacts from the full development of the Proposed Project. Therefore, the potential for impacts from transportation emissions is assessed qualitatively. Any new buildings constructed as part of the Later Phases-Island Redevelopment would require heat and hot water systems, which would likely use natural gas or oil as fuel. While a detailed assessment of these sources is not possible since the specific use and design of these buildings have not been determined, the assessment approach for future environmental review is described and reasonable measures that could be implemented to avoid the potential for significant adverse impact are identified. The public school, research, or university laboratories that could be included in the Later Phases-Island Redevelopment can be designed to avoid the potential for significant adverse impact on air quality in the event of an accidental chemical spill. The design and operational measures that may be required would be reasonable and typical for laboratory facilities.

At such time when the Later Phases-Island Redevelopment has been planned and designed, it is anticipated that it would be subject to CEQR, and that the associated future environmental review would take into account analyses of potential air quality impacts from the full development of the Proposed Project.

C. POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced both by motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of carbon monoxide (CO) are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide, NO, and nitrogen dioxide, NO_2, collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. These pollutants are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act, and are referred to as 'criteria pollutants.'

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

Phase 1 is not expected to significantly alter traffic conditions. Since Phase 1 would result in fewer new peak hour vehicle trips than the *CEQR Technical Manual* screening threshold of 170 trips at intersections in the study area, a quantified assessment of on-street CO emissions is not warranted for Phase 1. Similarly, the trips generated by the Later Phases-Park and Public Spaces would not exceed the peak hour trip screening threshold and would not have the potential for significant adverse impacts on air quality. The full development of the Proposed Project—cumulatively Phase 1, the Later Phases-Park and Public Spaces, and the Later Phases-Island Redevelopment—would likely result in peak vehicle trips that would exceed the peak hour screening thresholds and would therefore require further analysis. The potential for impacts from trips that would be generated by the full development of the Proposed Project is addressed qualitatively.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the

pollutants are advected downwind, elevated ozone levels are often found many miles from the sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions.

The Proposed Project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional NO_x emissions or on ozone levels is predicted. An analysis of Proposed Project-related emissions of these pollutants from transportation sources was therefore not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern farther downwind from large stationary point sources, and not a local concern from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may become of greater concern for this pollutant. Potential impacts on local NO_2 concentrations from fuel combustion for heat and hot water systems for the full development of the Proposed Project are addressed.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the Clean Air Act, and therefore, lead is not a pollutant of concern for the Proposed Project.

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOC; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, which are often toxic, and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles; it is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form

primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

Diesel-powered vehicles, such as heavy-duty trucks, buses, and marine vessels are a potentially significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy, diesel-powered vehicles.

Phase 1 and the Later Phases-Park and Public Spaces would not result in a significant increase in trucks, or other potentially significant increases in $PM_{2.5}$ vehicle emissions as defined in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, an analysis of potential impacts from PM emissions resulting from transportation from Phase 1 and the Later Phases-Park and Public Spaces was not warranted. $PM_{2.5}$ that would be emitted from diesel vehicle and marine vessel trips generated by the Later Phases-Island Redevelopment is addressed qualitatively. As discussed in the sections that follow, the heat and hot water systems for the proposed development to be completed in 2030 for the full development of the Proposed Porject would also not be significant sources of $PM_{2.5}$ emissions.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). Monitored SO_2 concentrations in New York City do not exceed national standards. However, SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as such under the New Source Review permitting program for large sources. Due to the federal restrictions on the sulfur content in diesel fuel for on-road and non-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore, analysis of SO_2 on-road vehicles is not warranted. These restrictions will be fully implemented for marine diesel engines in 2012, and therefore SO_2 is not of concern from ferries either.

As part of the Later Phases-Island Redevelopment, fuel oil could be used in the heat and hot water systems. By 2030, the build year for the full development of the Proposed Project, recently promulgated local laws will have phased out the use of Nos. 4 and 6 fuel oils, while a 2010 state law will have dramatically reduced the sulfur content of No. 2 fuel oil. As a result, SO_2 as well as particulate matter emissions from oil-burning heat and hot water systems would be lower than they currently are. The potential for impacts on air quality from heat and hot water systems' SO_2 emissions for the full development of the Proposed Project is qualitatively analyzed.

NONCRITERIA POLLUTANTS

In addition to the criteria pollutants discussed above, noncriteria pollutants may be of concern. Noncriteria pollutants are emitted by a wide range of man-made and naturally occurring sources. These pollutants are sometimes referred to as hazardous air pollutants (HAP), and when emitted from mobile sources, as Mobile Source Air Toxics (MSATs). Potential noncriteria pollutant emissions from laboratories at academic, research institutions, or the public school that could be included in the Later Phases-Island Redevelopment, require an assessment under CEQR and are discussed in this chapter.

D. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards are the same for NO_2 (annual), ozone, lead, and PM. There is no secondary standard for CO and the 1-hour NO_2 standard. The NAAQS are presented in **Table 16-1**. The NAAQS for CO, annual NO_2, and 3-hr SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particulate matter (TSP), settleable particles, non-methane hydrocarbons (NMHC), 24-hour and annual SO_2, and ozone that correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide (H_2S).

EPA 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 standard at 15 $\mu g/m^3$. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked.

EPA also revised the 8-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective as of May 2008. On January 6, 2010, EPA proposed a change in the 2008 ozone NAAQS, lowering the primary NAAQS from the current 0.075 ppm level to within the range of 0.060 to 0.070 ppm. EPA is also proposing a secondary ozone standard, measured as a cumulative concentration within the range of 7 to 15 ppm-hours aimed mainly at protecting sensitive vegetation.

EPA lowered the primary and secondary standards for lead to 0.15 $\mu g/m^3$, effective January 12, 2009. EPA revised the averaging time to a rolling 3-month average and the form of the standard to not-to-exceed across a 3-year span.

EPA established a 1-hour average NO_2 standard of 0.100 ppm, effective April 12, 2010, in addition to the annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

EPA also established a 1-hour average SO_2 standard of 0.075 ppm, replacing the 24-hour and annual primary standards, effective August 23, 2010. The statistical form is the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations (the 4th highest daily maximum corresponds approximately to the 99th percentile for a year.)

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the Clean Air Act.

Table 16-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	$\mu g/m^3$	ppm	$\mu g/m^3$
Carbon Monoxide (CO)				
8-Hour Average [1]	9	10,000	None	
1-Hour Average [1]	35	40,000		
Lead				
Rolling 3-Month Average [2]	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average [3]	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average [4,5]	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average [1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean	NA	15	NA	15
24-Hour Average [6,7]	NA	35	NA	35
Sulfur Dioxide (SO_2) [8]				
1-Hour Average [9]	0.075	197	NA	NA
Maximum 3-Hour Average [1]	NA	NA	0.50	1,300

Notes:
ppm – parts per million
$\mu g/m^3$ – micrograms per cubic meter
NA – not applicable
All annual periods refer to calendar year.
PM concentrations (including lead) are in $\mu g/m^3$ since ppm is a measure for gas concentrations.
Concentrations of all gaseous pollutants are defined in ppm and approximately equivalent concentrations in $\mu g/m^3$ are presented.

(1) Not to be exceeded more than once a year.
(2) EPA has lowered the NAAQS down from 1.5 $\mu g/m^3$, effective January 12, 2009.
(3) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(5) EPA has proposed lowering this standard further to within the range 0.060-0.070 ppm.
(6) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(7) EPA has lowered the NAAQS down from 65 $\mu g/m^3$, effective December 18, 2006.
(8) EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
(9) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

In 2002, EPA re-designated New York City as in attainment for CO. The Clean Air Act requires that a maintenance plan ensure continued compliance with the CO NAAQS for former non-attainment areas. New York City is also committed to implementing site-specific control measures throughout the City to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period.

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA took final action designating the five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties as a $PM_{2.5}$ non-attainment area under the Clean Air Act due to exceedance of the annual average standard. Based on recent monitoring data (2006-2009), annual average concentrations of $PM_{2.5}$ in New York City no longer exceed the annual standard.

As described above, EPA has revised the 24-hour average $PM_{2.5}$ standard. In October 2009 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. The nonattainment area includes the same 10-county area originally designated as nonattainment with the 1997 annual $PM_{2.5}$ NAAQS. By November 2012 New York will be required to submit a SIP demonstrating attainment with the 2006 24-hour standard by November 2014 (EPA may grant attainment date extensions for up to five additional years).

The Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five New York City counties were designated as a severe non-attainment area for ozone (1-hour average standard). In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone*, which was finalized and approved by EPA effective March 6, 2002, addressing attainment of the 1-hour ozone NAAQS by 2007.

On April 15, 2004, EPA designated these same counties as moderate non-attainment for the 8-hour average ozone standard which became effective as of June 15, 2004 (LOCMA was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). EPA revoked the 1-hour standard on June 15, 2005; however, the specific control measures for the 1-hour standard included in the 1-hour SIP are required to stay in place until the 8-hour standard is attained. The discretionary emissions reductions in the SIP would also remain but could be revised or dropped based on modeling. On February 8, 2008, NYSDEC submitted final revisions to the SIP to EPA to address the 1997 8-hour ozone standard. NYSDEC has determined that achieving attainment for ozone before 2012 is unlikely, and has therefore made a request for a voluntary reclassification of the New York nonattainment area as "serious."

In March 2008 EPA strengthened the 8-hour ozone standards. SIPs will be due three years after the final designations are made. On March 12, 2009, NYSDEC recommended that the counties of Suffolk, Nassau, Bronx, Kings, New York, Queens, Richmond, Rockland, and Westchester be designated as a non-attainment area for the 2008 ozone NAAQS (the NYMA MSA nonattainment area). EPA has proposed to determine that the Poughkeepsie nonattainment area (Dutchess, Orange, Ulster, and Putnam Counties) has attained the 1-hour and 1997 8-hour NAAQS for ozone. It is unclear at this time what the attainment status of these areas will be under the newly proposed standard due to the range of concentrations proposed.

New York City is currently in attainment of the annual-average NO_2 standard. EPA has promulgated a 1-hour standard. The existing monitoring data for New York City indicates background concentrations below the standard. NYSDEC has determined that the present monitoring does not meet the revised EPA requirements in all respects and has recommended a designation of "unclassifiable" for the entire state. Therefore, it is likely that New York City will

be designated by EPA as "unclassifiable" at first (January 2012), and then classified once three years of monitoring data are available (2016 or 2017).

EPA has established a 1-hour SO_2 standard that replaces the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. Additional monitoring will be required. EPA plans to make final attainment designations in June 2012, based on 2008 to 2010 monitoring data and refined modeling. SIPs for nonattainment areas will be due by June 2014.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large, or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[1] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 16-1**) would be deemed to have a potential significant adverse impact. Similarly, for noncriteria pollutants released in the event of an accidental chemical spill in a laboratory, predicted exceedance of short-term exposure levels set by federal occupational safety and health agencies would be considered a potentially significant adverse impact on air quality.

In order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the impact of proposed projects or actions on mobile sources, as set forth in the *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No Action) concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm.

$PM_{2.5}$ INTERIM GUIDANCE CRITERIA

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts[2]. This policy applies only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be

[1] *CEQR Technical Manual*, Chapter 17, section 400, May 2010; and State Environmental Quality Review Regulations, 6 NYCRR § 617.7

[2] CP33/Assessing and Mitigating Impacts of Fine Particulate Emissions, NYSDEC 12/29/2003.

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 Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

In addition, New York City uses interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts for projects subject to CEQR. The 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 that 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 that 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;
- Annual average $PM_{2.5}$ concentration increments that are predicted to be 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
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the above interim guidance criteria will be considered to have a potential significant adverse impact.

E. METHODOLOGY

MOBILE SOURCES

ON-ROAD SOURCES

As discussed in Chapter 15, "Transportation," detailed transportation analyses were conducted for the completion of Phase 1 and the Later Phases-Park and Public Spaces components of the Proposed Project and not for the Later Phases-Island Redevelopment period, because the development for the Later Phases-Island Redevelopment has not been specifically proposed, defined, or designed. The vehicle trips generated by Phase 1 and the Later Phases-Park and Public Spaces would not exceed the vehicle and emissions screening thresholds above which a detailed air quality analysis would be required. However, vehicle trips generated by the full development of the Proposed Project, including the Later Phases-Island Redevelopment, are expected to exceed the screening analysis thresholds and therefore would require a quantitative assessment. Since the specific future uses for the Later Phases-Island Redevelopment and the associated transportation information have not been determined, it is not possible to conduct a quantified assessment following the *CEQR Technical Manual* guidance. A qualitative

assessment is presented and the potential for significant adverse impacts on air quality is discussed. The assessment considers existing vehicle emission rates and projected emission rates for 2030, the build year for the full development of the Proposed Project.

Engine Emissions

Vehicular CO and PM engine emission factors are computed using the EPA mobile source emissions model, MOBILE6.2[1]. This emissions model is capable of calculating engine emissions factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOBILE6.2 incorporate the most current guidance available from NYSDEC and NYCDEP. An ambient temperature of 50.0 degrees Fahrenheit is used for Manhattan, and a temperature of 43 degrees Fahrenheit is used for other locations. The use of these temperatures is recommended in the 2010 *CEQR Technical Manual* for and is consistent with current NYCDEP guidance.

Road Dust

The contribution of re-entrained road dust to PM_{10} concentrations, as presented in the PM_{10} SIP, is considered to be significant; therefore, the PM_{10} estimates include both exhaust and road dust. In accordance with the $PM_{2.5}$ interim guidance criteria methodology, $PM_{2.5}$ emission rates are determined with fugitive road dust to account for their impacts in local microscale analyses. However, fugitive road dust is not included in the neighborhood scale $PM_{2.5}$ microscale analyses, since NYCDEP considers it to have an insignificant contribution on that scale. Road dust emissions factors are calculated according to the latest procedure delineated by EPA[2] and the 2010 *CEQR Technical Manual*.

FERRY SERVICE

Specific information regarding future levels of ferry service for the full development of the Proposed Project has not been determined. Since sufficient information for quantified analysis of ferry emissions and/or dispersion is not available, the discussion of air quality associated with ferry emissions is qualitative.

STATIONARY SOURCES

HEAT AND HOT WATER SYSTEM ANALYSIS

Emissions from heat and hot water systems can in general be analyzed following the methodology described in the 2010 *CEQR Technical Manual*. The approach is based on determining the threshold of development size or the threshold emission rates below which the action would not have a significant adverse impact. The screening procedure considers the fuel to be used, the maximum development size, type of development, and the stack height, to evaluate whether a significant adverse impact is likely. Based on the distance from the exhaust

[1] EPA, User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model, EPA420-R-03-010, August 2003.

[2] EPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42, January 2011.

location to the nearest building of similar or greater height, the analysis can be used to determine whether there is a potential for significant adverse air quality impacts. If the potential for impacts is identified, a refined dispersion modeling analysis using EPA/AMS AERMOD dispersion model[1] is conducted or measures are identified that would preclude the potential for significant adverse impact.

Phase 1 would not result in the development of new buildings and therefore does not warrant this analysis. For the full development of the Proposed Project, the screening analysis was conducted to assess the potential for impacts from the radiant heating system from the proposed Shell structure that would be developed in the Later Phases-Park and Public Spaces. The water boiler size for the Shell has been determined to have a capacity of up to 140 thousand British Thermal Units (BTUs) per hour and would run on natural gas. However, since the uses, size, and stack height for any of the buildings in the Later Phases-Island Redevelopment have not been determined, it is not possible to conduct a quantified analysis of emissions from the heat and hot water systems for the full development of the Proposed Project. Therefore, the assessment considers the pollutants of concern, the recent regulations that would reduce the sulfur content in heating oil, and the engineering and design measures that could be implemented in the future to preclude the potential for significant adverse impacts.

CHEMICAL SPILL ANALYSIS

Emissions from the fume hood exhaust systems in the event of an accidental chemical spill in laboratories in the public school, university, or research facility that could be developed under the Later Phases-Island Redevelopment require evaluation under CEQR. However, since the uses and designs for any of the buildings in the Later Phases-Island Redevelopment have not been determined, it is not possible to conduct a detailed chemical spill analysis. Therefore, the following summarizes the procedures and methodologies contained in the *CEQR Technical Manual* for a chemical spill analysis. The assessment for the full development of the Proposed Project includes a discussion of the results typically encountered when chemical spill analysis are conducted for public school, university, or research facility projects and identifies the measures that could be implemented in the future to preclude the potential for significant adverse impact on air quality.

Laboratory Hood Exhausts

All laboratories in which hazardous chemicals are used would be equipped with fume hoods. Fume hoods are enclosures that are maintained under negative pressure and continuously vented to the outside. Their function is to protect staff and students from potentially harmful fumes. By providing a continuous exhaust from laboratory rooms, they also prevent any fumes released within the laboratory from escaping into other areas of the building, or through windows to the outside. Typical fume hood exhaust fans are located at the building rooftop, have a diameter of 1 to 2 feet and maintain a minimum exhaust velocity of 1,000 to 1,500 feet per minute.

Estimates of Worst-Case Emissions Rates

An inventory of chemicals which may be present in a laboratory is obtained before an analysis of potential impacts of an accidental chemical spill is performed. Chemicals for analysis are selected

[1] *EPA, AERMOD: Description Of Model Formulation, 454/R-03-004, September 2004; and EPA, User's Guide for the AMS/EPA Regulatory Model AERMOD, 454/B-03-001, September 2004 and Addendum December 2006.*

for further examination, based on their toxicity and potential for air quality impacts. Common buffers, salts, enzymes, nucleotides, peptides, and other bio-chemicals are not considered since they are not typically categorized as air pollutants. Nonvolatile chemicals (a vapor pressure of less than 10 mm Hg) are excluded as well. The vapor pressure of a chemical is a measure of the material's volatility—its tendency to evaporate, or to form fumes or vapors, which is a critical parameter in determining potential impacts from chemical spills. The exposure standards (OSHA permissible exposure limit [PEL], National Institute for Occupational Safety and Health [NIOSH], immediately dangerous to life or health [IDLH], and OSHA and/or NIOSH short-term exposure level [STEL] and ceiling values) are measures of the material's toxicity—more toxic substances have lower exposure standards. Public schools have similar science programs and are generally assumed to use a standard set of chemicals. The chemical typically considered in analyses of potential accidental chemical spills in public school laboratories is nitric acid, a chemical with a relatively low vapor pressure and relatively high toxicity.

Evaporation rates for volatile hazardous chemicals are estimated using the model developed by the Shell Development Company[1]. This model, which was developed specifically to assess air quality impacts from chemical spills, calculates evaporation rates based on physical properties of the material, temperature, and rate of air flow over the spill surface. The *CEQR Technical Manual* recommends the use of room temperature conditions (20° C) and an air-flow rate of 0.5 meters per second as assumptions for calculating evaporation rates. The evaporation rate calculation is based on the conservative assumption that a full container of a chemical would be spilled in a fume hood and would cover the entire fume hood surface. For modeling purposes, the emission rates are calculated for a 15-minute period.

Recirculation Modeling

The potential for recirculation of the fume hood emissions back into the building air intakes is assessed using the Wilson method[2]. This empirical procedure, which has been verified by both wind-tunnel and full-scale testing, is a refinement of the 1981 ASHRAE Handbook procedure, and takes into account such factors as plume momentum, stack-tip downwash, and cavity recirculation effects. The procedure determines the worst-case, absolute minimum dilution between exhaust vent and air intake. Three separate effects determine the eventual dilution: internal system dilution, obtained by combining exhaust streams (e.g., mixing in plenum chambers of multiple exhaust streams, introduction of fresh air supplied from roof intakes); wind dilution, dependent on the distance from vent to intake and the exit velocity; and dilution from the stack, caused by stack height and plume rise from vertical exhaust velocity. The critical wind speed for worst-case dilution is dependent on the exit velocity, the distance from vent to intake, and the cross-sectional area of the exhaust stack.

The recirculation analysis determines the minimum potential dilution between the fan exhausts and the nearest air intake and the resulting maximum concentration of the chemicals analyzed. The predicted concentrations are then compared to the corresponding STEL values set by OSHA and/or NIOSH.

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[1] Fleischer, M.T., An Evaporation/Air Dispersion Model for Chemical Spills on Land, Shell Development Company, December 1980.

[2] D.J. Wilson, A Design Procedure for Estimating Air Intake Contamination from Nearby Exhaust Vents, ASHRAE TRAS 89, Part 2A, pp. 136-152, 1983.

Dispersion Modeling

Maximum concentrations at elevated locations downwind of the fume exhausts are estimated using the EPA INPUFF model, version 2.0[1]. This is the only EPA model designed to estimate impacts from short-term releases. INPUFF assumes a Gaussian dispersion of a pollutant "puff" (a brief release, as opposed to a continuous one) as it is transported downwind of a release point. Stable atmospheric conditions and a 1-meter/second wind speed are assumed for analysis of projects subject to CEQR. Concentrations are calculated at multiple heights at nearby building locations closest to the exhaust fans. Since the emissions resulting from chemical spills are short-term releases, a worst-case assumption of the wind blowing the exhaust directly to the window or air intake locations is made for modeling purposes.

F. EXISTING CONDITIONS

Representative criteria pollutant concentrations measured in recent years at NYSDEC air quality monitoring stations nearest to the Proposed Project are presented in **Table 16-2**. The values presented are consistent with the NAAQS format. For example, the 8-hour ozone concentration shown is the 3-year average of the 4th highest daily maximum 8-hour average concentrations. The concentrations were obtained from the 2009 New York State Ambient Air Quality Report, the most recent report available. As shown in **Table 16-2**, the recently monitored levels did not exceed the NAAQS.

Table 16-2
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	Queens College 2, Queens	ppm	8-hour	1.7	9
			1-hour	2.8	35
SO_2	Queens College 2, Queens[1]	$\mu g/m^3$	3-hour	89	1,300
			1-hour	91.4	196
PM_{10}	Division Street, Manhattan	$\mu g/m^3$	24-hour	51	150
$PM_{2.5}$	Division Street, Manhattan	$\mu g/m^3$	Annual	12.7	15
			24-hour	33	35
NO_2	Queens College 2, Queens[2]	$\mu g/m^3$	Annual	39	100
			1-hour	126.7	188
Lead	J.H.S. 126, Brooklyn	$\mu g/m^3$	3-month	0.019	0.15
Ozone	Susan Wagner, Staten Island	ppm	8-hour	0.074	0.075

Notes:
(1) The 1-hour value is based on a three-year average (2007-2009) of the 99th percentile of daily maximum 1-hour average concentrations. EPA replaced the 24-hr and the annual standards with the 1-hour standard.
(2) The 1-hour value is based on a three-year average (2007-2009) of the 98th percentile of daily maximum 1-hour average concentrations.
Source: NYSDEC, New York State Ambient Air Quality Report (2007-2009).

[1] Peterson, W.B., A Multiple Source Gaussian Puff Dispersion Algorithm—Users Guide, EPA, 600/8-86-024, August 1986.

G. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the Proposed Project, there would be no increase in emissions from transportation to and from Governors Island (i.e., vehicles and ferries). No new buildings would be constructed and therefore no new heat and hot water systems or associated air pollutant emissions would occur. As vehicle and marine engine technology improves, stationary sources become more efficient, and fuels become cleaner, pursuant to federal, state, and City regulations, it is expected that there will be an overall improvement in air quality in the City and on the Island.

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT

MOBILE SOURCES

ON-ROAD SOURCES

The potential for impacts on air quality from vehicle emissions for a proposed project is dependent on the average emission rate from individual vehicles and on the number of vehicle trips generated at a particular location. As vehicles become more fuel efficient, incorporate better emissions control technology, and as the vehicle fuels are improved, emissions from vehicles would decrease. The decrease in CO cruise emissions rates by 2030, the build year for the full development of the Proposed Project, was calculated using EPA's MOBILE6.2 model to be 22 percent. The PM_{10} cruise emission rate for heavy-duty trucks would decrease by 72 percent, and $PM_{2.5}$ cruise emission rates for heavy-duty trucks would decrease by approximately 83 percent. Based on the projected decrease in emission rates and the anticipated number of vehicle trips that would be generated by the full development Proposed Project, a significant adverse impact from mobile sources is very unlikely. However, the number of vehicle trips and average vehicle emissions are not the only factors that govern the potential for impacts on air quality from mobile sources. Specific configuration of intersections where the greatest number of vehicle trips would be generated, the expected speeds, and idling time also play a role. Since specific information needed to account for these factors is not known, future CEQR environmental review would ascertain the preliminary conclusions presented in this chapter. If needed in the future, traffic measures can be developed to reduce the potential for adverse impact on air quality.

FERRY SERVICE

Full development of the Proposed Project would require ferry transport of passengers and goods to and from the Island. It is possible that service to the Island would be incorporated in existing ferry routes and/or that dedicated trips to Brooklyn and Lower Manhattan would be expanded, predominantly for the Later Phases-Island Redevelopment. Accommodating the transportation to and from the Island on existing routes might be sufficiently served by the existing schedule or may require increased frequency. The specifics of the future level of ferry service have not been determined.

The increase in ferry emissions associated with the full development of the Proposed Project, even in the case of increased ferry trips, would not likely be significant on a region-wide scale in terms of attainment of NAAQS for either direct emissions or ozone precursors and secondary formation of pollutants. However, since ferry engines can be relatively large diesel engines, some of which may be older engines with little emissions control systems, PM and NO_2 may be

of concern at the local (microscale) level, impacting nearby uses. Whether this could result in significant adverse local air quality impacts or not would depend not only on the specific engines and controls, but also on the frequency of service, station dwell time, and the location of nearby sensitive uses (parks, residences, etc.) and the distance between these uses and the ferry. Therefore, the potential for significant adverse air quality impacts near ferry landings from the full development of the Proposed Project cannot be determined at this time and will need to be analyzed in future environmental reviews.

EPA emissions standards for marine engines that will be phased in through 2017 would significantly reduce emissions from newly manufactured and remanufactured ferry engines. EPA estimates 90 percent PM reductions and 80 percent NO_x reductions from Tier 4 engines meeting these standards, compared with engines meeting the current Tier 2 standards. The potential for local impacts would, therefore, also be affected by the ferries selected to serve the full development of the Proposed Project and the timing—whether the boats are new or remanufactured. Many ferries in the New York City area have been retrofitted, rebuilt, and/or replaced in recent years resulting in significant emissions reduction. These efforts are the result of various separate initiatives undertaken by agencies and as public/private partnerships with ferry operators.

Should the potential for significant adverse impacts near ferry landings be identified, there are a number of measures that can be taken, either as part of the Proposed Project or as mitigation that would reduce either the emissions or the concentrations such that significant adverse impacts would not occur. These could include:

- Emissions Mitigation—There are many options for reducing emissions from ferries. These include retrofits such as add-on tailpipe emission reduction technology, exhaust gas recirculation, and more; engine upgrades and rebuild; and engine replacement (or selection of ferries already replaced or retrofitted for service).
- Design Measures—The concentrations downwind from a source, such as a ferry, are influenced by the distance between the source and the receptor, as well as other topographic features and meteorological factors. The detailed design of ferry landings, including the location of both the ferry landing and the adjacent uses (possibly accounting for predominant wind directions), the length of the pier, and other design features can be adjusted to reduce the concentrations at sensitive locations.

With the incorporation of appropriate mitigation or project design measures, significant adverse air quality impacts from ferries can be avoided. The need for such measures and the specific requirements will be determined at such time when detailed design and trip information is known and will be analyzed in future environmental reviews.

STATIONARY SOURCES

HEAT AND HOT WATER SYSTEM SCREENING ANALYSIS

As discussed, the Shell structure, which would be constructed in the Later Phase-Park and Public Spaces would include a small natural gas boiler (up to 140 MBH) for radiant floor heating. The pollutant of concern from the use of natural gas is NO_x, therefore emission rate of NO_x was calculated using EPA's *Compilations of Air Pollutant Emission Factors AP-42*.[1] Based on Figure

[1] EPA, Compilations of Air Pollutant Emission Factors AP-42, Chapter 1.3, Fuel Oil Combustion, May 2010.

17-9 of the *CEQR Technical Manual* the allowable emission rate at the minimum screening distance of 33 feet is more than three times greater than the calculated emission rate of 0.0017 grams per second (g/s) for the Shell boiler. Therefore, the Shell boiler emissions would not have the potential for a significant adverse impact on air quality.

The proposed uses, building floor areas, heights, locations relative to other buildings or expected fuel type to be used for the Later Phases-Island Redevelopment are not known. Therefore, a specific screening level analysis is not possible. However, with planning it is possible to design buildings and heat and hot water systems such as to preclude the potential for significant adverse impacts. In general, the larger a building, and the more intense its energy use for heating, the farther away the exhaust stack for heat and hot water systems needs to be from taller buildings to avoid impacts. Recent New York City regulations require the use of No. 2 fuel oil or natural gas in new boilers, and a 2010 state law will result in a significant reduction of the sulfur content in No. 2 fuel oil by 2012. With the reduction of the sulfur content, emissions of SO_2 as well as particulate matter from No. 2 fuel oil would decrease. With these regulations, avoiding the potential for significant adverse impacts from heat and hot water system emissions will become easier. Buildings designed for maximum energy efficiency and efficient heating systems will also help. Nonetheless, it is possible that future environmental review would reveal the need for additional measures to preclude the potential for significant adverse impacts on air quality. Measures most typically implemented are summarized below.

- Increasing the exhaust stack height—Emissions from heat and hot water system exhaust have the potential to impact uses at a similar or greater height. Where feasible, raising the height of the exhaust stacks by a few feet can eliminate the potential for significant adverse impacts in cases where the potential for impacts on a building of a similar or marginally greater height is predicted.
- Locating the exhaust stack away from sensitive uses—The closer an emissions source is to a sensitive use (operable windows, balconies, air intake vents), the greater its potential to impact air quality. Therefore, locating heat and hot water system exhaust stacks as far as possible from sensitive uses can eliminate the potential for significant adverse impacts on air quality. For example, for a residential building with floor area of 150,000 gsf, a 100-foot distance from the exhaust stack to the nearest taller use of concern would be sufficient to preclude the potential for significant adverse impacts, assuming the use of natural gas. In general, locating the exhaust stacks far enough away from sensitive uses is feasible, especially when planned for in the early stages of development design.
- Restricting operable window and air intake locations—When measures that reduce the heat and hot water system emissions or their effect on nearby buildings are found to be impractical or insufficient to eliminate the potential for significant adverse impacts on air quality, design measures can be implemented at the potentially impacted locations. Specifically, windows facing the emission exhaust of concern can be made unopenable and air intakes could be designed to face away from the emissions source.

Overall, while it is not possible to draw conclusions regarding specific components of the Later Phases-Island Redevelopment, it is unlikely that the heat and hot water systems needed for the full development of the Proposed Project would result in unavoidable impacts on air quality that would be considered adverse and significant.

CHEMICAL SPILL ANALYSIS

It is not known at this time whether the Later Phases-Island Redevelopment would include a public school with instruction laboratories or whether the redevelopment would include university, or research laboratories. University and research laboratories would require the use of a wider range of chemicals, likely to be more toxic than chemicals used in the science instruction at public schools. The design, locations, and heights of buildings that would potentially house the laboratories have not been determined. Therefore, a quantified assessment of the potential effects on air quality from an accidental chemical spill in a proposed laboratory in the Later Phases-Island Redevelopment is not possible. Nonetheless, based on detailed analyses that were conducted for numerous public school, university, medical, and research institution projects, it is possible to conclude that significant impacts from accidental chemical spills can be avoided through building design, engineering, and operational controls. Typically, the lab exhaust systems alone dilute the concentrations of chemicals spilled in a laboratory fume hood by a factor of approximately 1,000. For most chemicals, fume hood systems, and building designs, the dilution within the stack is sufficient to preclude the potential for significant adverse impacts from recirculation of the chemical within the building. In most cases, the dispersion of a spilled toxic chemical is unlikely to impact nearby buildings. When potential significant impacts are predicted, a variety of measures can be implemented to avoid those impacts, as outlined below.

- Optimizing the fume hood exhaust design—If an initial fume hood design results in predicted impacts on air quality, the exhaust systems could be designed to achieve a greater dilution and greater exhaust velocity, which would generally reduce the potential for impacts at most locations.
- Restricting of the fume hood exhaust location—The closer the fume hood exhausts are to sensitive uses, the greater their potential for significant adverse impacts on air quality. Therefore, locating the fume hood exhausts away from sensitive uses can preclude the potential for significant impacts. Typically, a distance of 70 to 100 feet is more than sufficient to avoid the potential for impacts, even when highly toxic chemicals are used.
- Restricting the amounts of chemicals used—The amount of a toxic chemical emitted in the event of an accidental spill can be reduced by working only with the amount of chemical needed and not storing large containers of toxic chemicals within the laboratory fume hoods. When needed, the maximum storage amounts for specific highly toxic chemicals can be restricted to avoid the potential for significant adverse impacts on air quality.
- Restricting operable window and air intake locations—When measures that reduce the fume hood emissions or their effect on nearby buildings are found to be impractical or insufficient to eliminate the potential for significant adverse impacts on air quality, design measures can be implemented at the potentially impacted locations. Specifically, windows facing the fume hood exhausts can be made unopenable and air intakes could be designed to face away from the emission source.

With the available options to avoid the potential for impacts from laboratory fume hoods on air quality, the laboratories that may be built as part of the Later Phases-Island Redevelopment would not be expected to have the potential for significant adverse impact on air quality. However, once the development program is defined and designed, a detailed analysis, as part of the future CEQR review, will be required for each building housing laboratories where toxic chemicals would be used to demonstrate that the planned fume hood exhaust and building design are sufficient to avoid significant adverse impacts on air quality. ✷