FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CROTON WATER TREATMENT PLANT FOR THE HARLEM SITE

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7.11. AIR QUALITY

7.11.1. Introduction

This air quality section assesses the anticipated air quality impacts associated with the proposed Croton project at the Harlem River Site. The methodology and results of the air dispersion modeling performed for the mobile and stationary sources associated with the Croton water treatment plant are presented. The potential impacts from mobile and stationary sources from operating and construction activities are presented. Mobile sources included vehicular traffic on public streets and roads. Stationary sources from operation of the plant included the plant's boiler system used to supply heat and hot water and the emergency electric-generation system. The stationary sources of construction activities included exhaust from construction equipment and vehicles. Fugitive particulate (dust) sources included land clearing and excavation activities, and on-site vehicle travel associated with construction activities. The methodology, as well as the pollutants of concern, the applicable air quality standards, and the potential impact criteria are presented in the Section 4.11, Data Collection and Impact Methodologies, Air Quality.

The methodology and results of the air dispersion modeling performed for the mobile and stationary sources are presented. Dispersion modeling was utilized to assess the effects of: (1) emissions from mobile sources; (2) emissions from stationary operational sources; and (3) emissions from construction sources. Mobile source dispersion modeling analyses were conducted for Future Without the Project and Potential Project Impact scenarios. Project mobile source increments were determined by subtracting the Future Without the Project scenario from Potential Project impact scenarios (i.e., Build – No Build = Project Increments). The peak project impact year from either construction or operations was used to be conservative.

The criteria air pollutants of concern include carbon monoxide, particulate matter less than 10 micron in aerodynamic diameter, sulfur dioxide, and nitrogen dioxide. Impacts of toxic air contaminants from stationary combustion sources were also considered. Project impacts were compared to the applicable standards or guidelines to evaluate whether such predicted impacts would be considered potentially significant.

In addition to these analyses for the criteria pollutants and toxic air contaminants, an air quality analysis was performed to evaluate the potential impacts of particulate matter less than 2.5 micron in aerodynamic diameter ($PM_{2.5}$). A microscale analysis was conducted for 24-hour $PM_{2.5}$ impacts. A neighborhood analysis was conducted for annual $PM_{2.5}$ impacts.

7.11.2. Baseline Conditions

7.11.2.1. Existing Conditions

The New York State Department of Environmental Conservation (NYSDEC) monitors ambient air quality at a number of locations throughout New York State, including in Westchester County and the New York City Boroughs. Each of the NYSDEC air monitoring stations monitors one or several regulated air pollutants. The most recent year of available data from these monitoring stations is for calendar year 2002. Monitoring data from the air

monitoring stations closest to water treatment plant site were used to characterize background air quality levels of criteria air pollutants.

Figure 7.11-1 shows the locations of the ambient air quality monitoring stations.

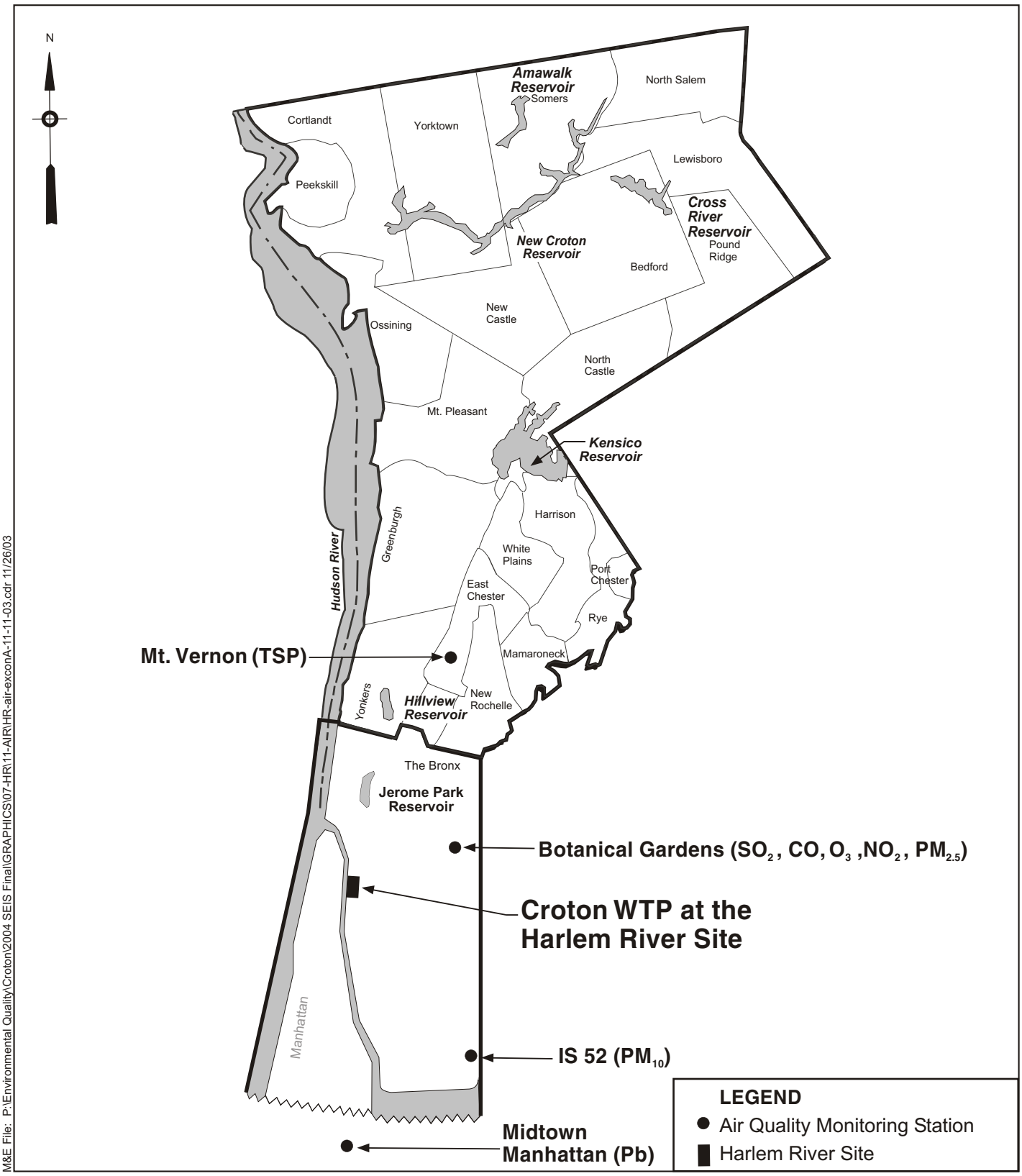
Mount Vernon, 4.5 miles to the east-northeast, is the nearest Total Suspended Particulates (TSP) ambient air monitoring station to the water treatment plant site. Ambient air TSP data for the water treatment plant site were obtained from Mount Vernon. TSP is no longer federally regulated; TSP monitoring was discontinued after 1998.

IS 52, located 3.5 miles south of the water treatment plant site, is the nearest PM_{10} ambient air monitoring station to the water treatment plant site. Data from the IS 52 station, located at 681 Kelly Street, Bronx, NY, were used as the background values for PM_{10}.

The Botanical Gardens ambient air monitoring station in the Bronx, the closest monitoring station to the water treatment plant site (1.5 to the east), conducts sulfur dioxide (SO_2), CO (carbon monoxide), ozone, nitrogen dioxide (NO_2) and particulate matter smaller than 2.5 microns ($PM_{2.5}$) monitoring.

The latest monitoring data for lead is obtained from the Midtown Manhattan ambient air monitoring station (8.5 miles to the south-southwest of the water treatment plant site). Since lead is no longer used as an additive in gasoline, the lead concentrations in ambient air have dropped to negligible. This has greatly reduced the need for ambient air monitoring for lead and monitoring of lead.

Table 7.11-1 summarizes the location of the monitoring stations, list of criteria pollutants, and year 2002 ambient air quality monitoring data representative of air quality in the vicinity of the water treatment plant site. A comparison of the monitored ambient levels in this table with the corresponding standards reveals that, with the exception of ozone, none of the Federal and State standards were exceeded. As discussed in Section 4.11, Data Collection and Impact Methodologies, Air Quality, the water treatment plant site lies within a “severe” non-attainment area for ozone (O_3). The site alternative is located in an attainment area or unclassified area with respect to the other criteria pollutants.



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Not To Scale

Harlem River Site NYSDEC Ambient Air Monitoring Stations

Croton Water Treatment Plant

Figure 7.11-1

TABLE 7.11-1. AIR QUALITY MONITORING DATA FOR YEAR 2002

Pollutant	Monitoring Station	Averaging Period[2]	Ambient Standard	Measured Concentration	
				Highest	2nd Highest
Sulfur Dioxide, µg/m^3 (ppm)	Botanical Gardens 200th Street & SE Blvd. Bronx	Annual	80 (0.03)	23 (0.009)	- -
		24 hour	365 (0.14)	112 (0.043)	97 (0.037)
		3 hour	1,300 (0.50)	154 (0.059)	146 (0.056)
Carbon Monoxide, µg/m^3 (ppm)	Botanical Gardens 200th Street & SE Blvd. Bronx	8 hour	10,000 (9.0)	3,315 (2.9)	2,400 (2.1)
		1 hour	40,000 (35)	4,915 (4.3)	4,229 (3.7)
Ozone[3], µg/m^3 (ppm)	Botanical Gardens 200th Street & SE Blvd. Bronx	1 hour	235 (0.12)	259 (0.132)	247 (0.126)
Nitrogen Dioxide, µg/m^3 (ppm)	Botanical Gardens 200th Street & SE Blvd. Bronx	Annual	100 (0.053)	53 (0.028)	- -
Lead[4] µg/m^3	Midtown Madison Avenue (47th – 48th Streets) Manhattan	3 month	1.5	0.13	0.12
Total Suspended Particulates[5] µg/m^3	Mt. Vernon 260 South Sixth Ave. Mt. Vernon, NY	Annual	75	33	- -
		24-hour	250	78	76
Inhalable Particulates, PM_{10} µg/m^3	I.S. 52 681 Kelly Street Bronx, NY	Annual	50	21	- -
		24 hour	150	91[6]	45
Respirable Particulates, $PM_{2.5}$ µg/m^3	Botanical Gardens 200th Street & SE Blvd. Bronx	Annual	15	13.5	- -
		24-hour	65	34.9	34.0

Notes:

1. Source: New York State Department of Environmental Conservation. 2002. Annual New York State Air Quality Report, Ambient Air Monitoring System. New York, NY.
2. Generally the ambient standards for averaging periods of 24 hours or less may not be exceeded more than once per year. Therefore, measured second highest concentrations are included for these averaging times.
3. The 1-hour ozone standard is not to be exceeded more than an average of one day per year based on the last three years. The 8-hour ozone standard-was not adopted until July 1997.
4. Monitoring for lead was discontinued after 1998.
5. The 24-hour NYS standard is 250 µg/m^3. TSP is no longer a federally regulated pollutant. TSP data is for 1998; monitoring was discontinued after 12/31/1998.
6. The highest value of 91µg/m^3 exceeds the second highest value by more than 100 percent and is not considered statistically representative. It is shown a reported, but it is not used in this analyses.

Abbreviations:

ppm = parts per million
µg/m^3=micrograms per cubic meter
1 ppm nitrogen dioxide = 1,880 µg/m^3
1 ppm sulfur dioxide = 2,610 µg/m^3

Background Data for Criteria Pollutants. The monitored background levels of the principal pollutants of concern for construction, mobile and stationary source air quality modeling analysis are SO_2, NO_2, CO and PM_{10}. Background air quality data is based on the most recent five years of available NYSDEC monitoring data, 1998 through 2002. The highest annual averages measured over the latest available 5-year period were used to determine the annual average background levels for CO and NO_2. For SO_2 only three years of monitoring data were available for background. Three years were used for PM_{10} and $PM_{2.5}$ background. For averaging times shorter than one year (e.g., 1-hour, 3-hour, 8-hour and 24-hour periods), the background values for three pollutants (i.e., CO, SO_2 and PM_{10}) are collected for at least three years. Table 7.11-2 summarizes the monitoring data for the water treatment plant site.

TABLE 7.11-2. SUMMARY OF THE SELECTED AMBIENT AIR MONITORING DATA FOR BACKGROUND POLLUTANT CONCENTRATION

Pollutant		Monitoring Station	1998	1999	2000	2001	2002
SO_2	3-hour	Botanical Garden	--	--	162 $\mu g/m^3$ (0.062 ppm)	**183** $\mu g/m^3$ (**0.070** ppm)	146 $\mu g/m^3$ (0.056 ppm)
	24 hours		--	--	99 $\mu g/m^3$ (0.038 ppm)	**120** $\mu g/m^3$ (**0.046** ppm)	97 $\mu g/m^3$ (0.037 ppm)
	Annual		--	--	*23 $\mu g/m^3$ (0.009 ppm)	**26** $\mu g/m^3$ (**0.010** ppm)	23 $\mu g/m^3$ (0.009 ppm)
NO_2	Annual	Botanical Garden	56 $\mu g/m^3$ (0.030 ppm)	54 $\mu g/m^3$ (0.029 ppm)	54 $\mu g/m^3$ (0.029 ppm)	**58** $\mu g/m^3$ (**0.031** ppm)	53 $\mu g/m^3$ (0.028 ppm)
CO	1-hour	Botanical Garden	5372 $\mu g/m^3$ (4.7 ppm)	6515 $\mu g/m^3$ (5.7 ppm)	**6858** $\mu g/m^3$ (**6.0** ppm)	5601 $\mu g/m^3$ (4.9 ppm)	4,229 $\mu g/m^3$ (3.7 ppm)
	8- hours		3658 $\mu g/m^3$ (3.2 ppm)	**4572** $\mu g/m^3$ (**4.0** ppm)	4001 $\mu g/m^3$ (3.5 ppm)	3,086 $\mu g/m^3$ (2.7 ppm)	2,400 $\mu g/m^3$ (2.1 ppm)
PM_{10}	24 hours	IS 52	--	22.0 $\mu g/m^3$	45.0 $\mu g/m^3$	42.0 $\mu g/m^3$	**45.0** $\mu g/m^3$
	Annual		--	16.0 $\mu g/m^3$	21.0 $\mu g/m^3$	21.0 $\mu g/m^3$	**21.0** $\mu g/m^3$

Note:
--denotes air sampling did not occur or monitoring data is not available.
Bold denotes highest value (maximum 2nd high for 1-hr, 3-hr, 8-hr, and 24-hr data) in last 5 years.
* denotes data captured is less than 75%.
Source: State of New York Department of Environmental Conservation, Air Quality Reports for Calendar Years 1998 to 2002.

7.11.2.1.1. Mobile Source Modeling Approach

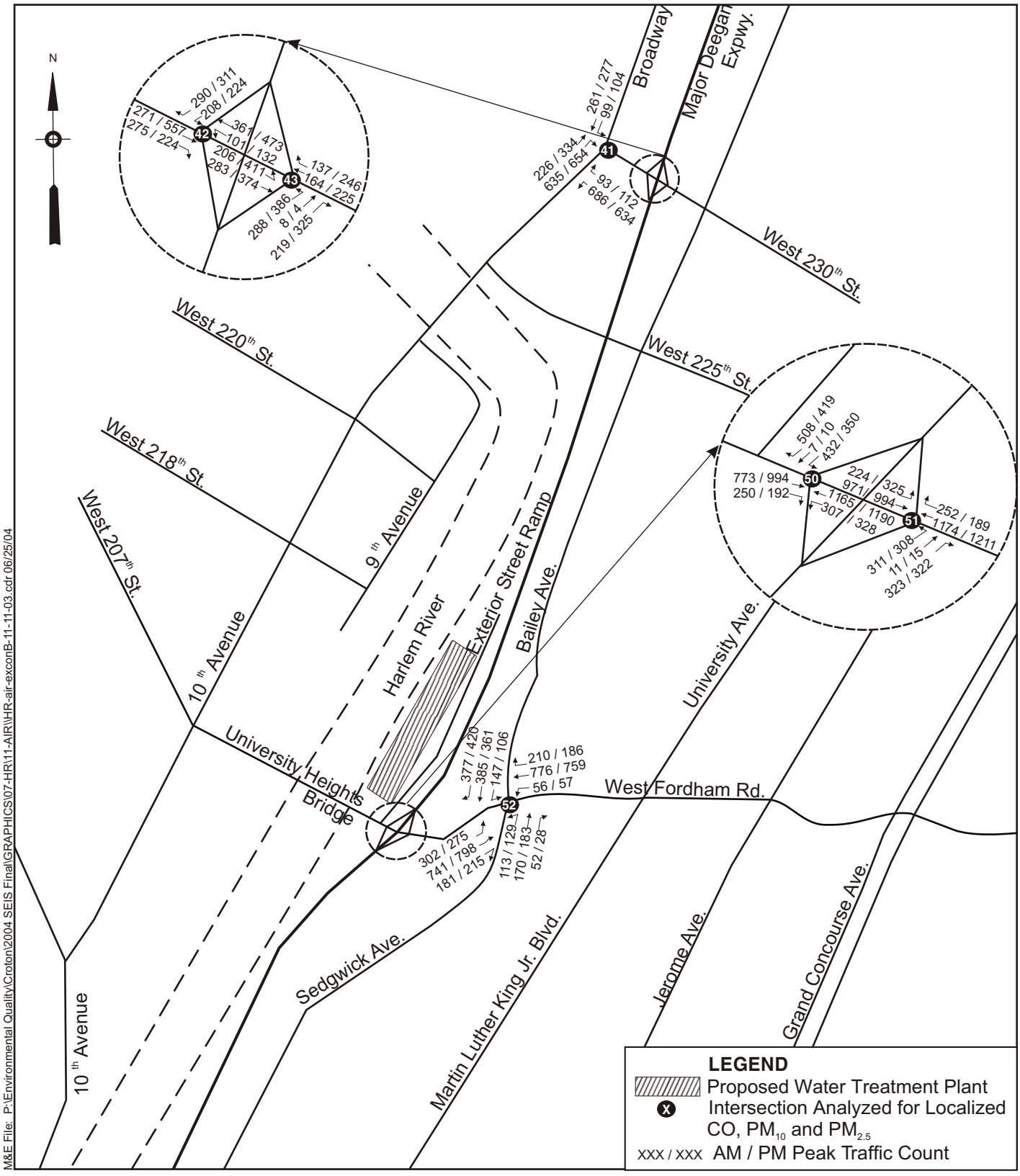
Air quality impacts from motor vehicles can have localized or microscale effects on ambient air quality for CO and $PM_{10.}$ For $PM_{2.5}$ short-term (24-hours) impacts, a microscale analysis was conducted, and for annual (long-term) impacts, a neighborhood analysis was deemed more representative. Therefore, a quantified analysis of the potential CO, PM_{10} and $PM_{2.5}$ impacts from the sources most likely to affect the communities (on-street vehicular traffic) was performed.

Traffic monitoring was conducted in 2002 to obtain information on traffic volume, delay time and vehicle classification. Data gathered from the traffic monitoring was processed using the Highway Capacity Manual methodology and HCS2000 software (Section 4.9, Data Collection and Impact Methodologies and Section 5.9, Traffic and Transportation Analysis). The intersections with the worst level of service (LOS), the highest traffic volumes and the highest number of induced traffic were considered in selecting the worst intersection for detailed dispersion modeling analysis (Figure 7.11-2). Four of the intersections considered are presented in Table 7.11-3.

A mobile source analysis of the worst intersection (No. 50/51, W. Fordham Road and I-87 NB/SB Ramps) was conducted for CO, PM_{10} and $PM_{2.5}$. All of the estimated construction generated trucks would access the site through these intersections. Impacts were modeled at this location based on the predicted traffic volumes and patterns forecast for the year 2009 construction scenario. If the worst intersection complies with the standard, and deminimus values, it was assumed the other intersections would also comply with the impact criteria.

TABLE 7.11-3. INTERSECTIONS CONSIDERED FOR HARLEM RIVER SITE

Intersection Number	Top Ranking	Intersection Name	AM Peak Hour			PM Peak Hour			Project-related Construction Traffic	
			Volume vph	Delay seconds	LOS Total	Volume vph	Delay seconds	LOS Total	Cars trips	Trucks trips
52	1	W. Fordham Road and Sedgwick Ave.	3510	45.6	D	3517	39.8	D	57	1
50 / 51	2	W. Fordham Road and I-87 SB / NB Ramps	3399 3284	163.7 28.1	F C	3418 3397	89.7 64.3	F E	197 121	5 4
42 / 43	3	W. 230th Street and I-87 SB / NB Ramps	1515 1331	62.5 19.8	E B	1921 1971	111.0 37.8	F D	20 3	-
41	4	W. 230th Street and Broadway	2000	280.3	F	2115	350.8	F	20	-



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Not To Scale

Harlem River Site Intersection Considered for Air Quality Mobile Source Analysis

Croton Water Treatment Plant

Figure 7.11-2

7.11.2.1.2. Stationary Sources

Currently there is no development at the project site.

7.11.2.1.3. Future Without the Project

The Future Without the Project mobile source analysis was conducted for the anticipated peak construction traffic year, 2009. In 2009 construction-related traffic would be anticipated to be at the maximum, and would be greater than for operations of the project or any other construction year. Therefore, Future Without Project mobile source impacts are analyzed for year 2009. For the stationary sources the construction impacts were analyzed for 2010, whereas operational stationary sources were analyzed for 2011, the planned first year of operation.

7.11.2.1.4. Mobile Sources

In the Future Without the Project, a mobile source air quality analysis was conducted for the anticipated peak year of construction activities (2009). The year 2009 was chosen because it is the period when the highest volumes of construction-related trucks and vehicles are anticipated. Maximum predicted increases in $PM_{2.5}$ concentrations during other years from construction related traffic are anticipated to be lower than those calculated for 2009. The methodology for the localized pollutant analysis at intersections is discussed in Section 4.11, Air Quality Methodology. Localized pollutant impacts from the vehicles were analyzed for the 8-hour CO concentrations, and 24-hour and annual PM_{10} concentrations.

MOBILE6.2 emission factors and projected traffic volumes for 2009 were used as inputs to the CAL3QHC and CAL3QHCR dispersion models along with the local vehicle fleet classifications from the 2002 traffic study to estimate future CO, PM_{10} and $PM_{2.5}$ pollutant levels without the project. The analysis for each pollutant involved a two-step process. First, the pollutant emission rate was determined, then the dispersion model was run using the calculated emission rate.

Carbon Monoxide. To determine motor-vehicle-generated CO concentrations adjacent to the streets near the proposed Croton project, the CAL3QHC model was applied. Maximum 1- and 8-hour CO concentrations were determined using EPA's CAL3QHC model version 2 (*User's Guide to CAL3QHC, A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, Office of Air Quality, Planning Standards, EPA, Research Triangle Park, North Carolina). CO impacts from traffic were predicted using a two step methodology. First, emission factors were calculated using data from the traffic study using the USEPA MOBILE6.2 emissions model. A dispersion model then used these emission factors to calculate downwind CO impacts.

The CAL3QHC model predicted 1-hour CO impacts from traffic. To ensure that the maximum impacts were captured, impacts were calculated for a range of meteorological conditions and wind directions. Following USEPA guidelines (Guideline for Modeling Carbon Monoxide from Roadway Intersections, EPA-454/R-92-005, 1992) the persistence factor of 0.7 was used to

convert the results from 1-hour averaging time periods to 8-hour averaging time periods, consistent with the standard.

The results of CAL3QHC dispersion modeling were added to the predicted background concentrations, and then compared to the 1-hour and 8-hour ambient air quality standard for CO. Table 7.11-4 shows the results of CO modeling for years 2009. As indicated in the table, the maximum predicted concentrations are below applicable air quality standards.

TABLE 7.11-4. PREDICTED CARBON MONOXIDE 1-HOUR AND 8-HOUR CONCENTRATIONS FOR THE FUTURE WITHOUT THE PROJECT CONDITIONS PEAK YEAR 2009 (ppm)

Intersection	Ambient AQ Background		Model Result		Total Predicted Conc.		Standard
			AM	PM	AM	PM	
Peak Traffic Year 2009							
West Fordham Road And I-87 Interchange	1-hour	5.9	4.9	4.9	10.8	10.8	35
	8-hour	2.0	3.4	3.4	5.4	5.4	9

Total Predicted Concentration = Ambient AQ Background + Model Result.

Particulate Matter (PM_{10}). PM_{10} impacts from traffic were determined using a 2-model methodology similar to that used for CO. Emission factors were calculated using data from the traffic study and the MOBILE6.2 emissions model. CAL3QHCR was then used to calculate downwind PM_{10} impacts.

MOBILE6.2 emission factors, projected 24-hour traffic volumes and five years of hourly meteorological data were used as inputs to the CAL3QHCR dispersion model to estimate impacts to the nearby intersection. Background PM_{10} concentrations from the nearest air quality monitoring station, which is IS 52, were added to the predicted impacts. Table 7.11-5 presents the PM_{10} results for 2009. The 24-hour PM_{10} standard is 150 $\mu g/m^3$ and the annual standard is 50 $\mu g/m^3$. No exceedences of the 24-hour or annual PM_{10} standards were predicted.

TABLE 7.11-5. PREDICTED PM_{10} 24-HOUR AND ANNUAL CONCENTRATIONS DURING FUTURE WITHOUT THE PROJECT CONDITIONS PEAK YEAR 2009 (µg/m^3)

Intersection	Averaging Time	Ambient AQ Background[2]	Model Result	Total Predicted Conc.[1]	Standard
Peak Traffic Year 2009					
West Fordham Road and I-87 Interchange	24-Hour	45	45	90	150
	Annual	21	17	38	50

Note:
1. Total Predicted Concentration = Ambient AQ Background + Model Result.

Fine Particulate Matter Analysis. Although USEPA currently does not offer specific guidance for modeling $PM_{2.5}$ impacts from mobile sources, the methodology described below was developed based on existing EPA approved methods for other mobile source modeling that are discussed in the *CEQR Technical Manual,* EPA documents describing the general approach to $PM_{2.5}$ regulation, EPA $PM_{2.5}$ monitoring station location guidance* and the interim guidance developed by NYCDEP and NYSDEC. The general approach is to predict the highest concentrations anticipated that would represent a neighborhood scale exposure level.

Vehicular $PM_{2.5}$ emission factors for the 2009 were derived using the MOBILE6.2 emissions model. For the microscale analysis sources, particulate emissions included running exhaust, brake and tire wear, and road dust. Only running exhaust was included for the neighborhood analysis.

The CAL3QHCR model was used to predict $PM_{2.5}$ concentrations at receptor locations. Maximum daily and annual average concentrations were calculated by the model using five years of hourly meteorological data. Receptors for the annual, neighborhood scale models were located at a distance of 15 meters (49 feet) from the roadway. The microscale analysis for 24-hour averaging periods were run with the same receptors used in the CO models.

To determine the predicted $PM_{2.5}$ increment from project mobile sources, the net differences in the predicted $PM_{2.5}$ modeled concentrations of were obtained by subtracting the model results of the Future Without the Project (2009) scenario from the results of the Proposed Construction Impacts (2009) scenario. Tables 7.11-6 presents the modeled $PM_{2.5}$ results for the Future Without the Project scenario for years 2009.

* *Guidance for Network Design and Optimum Site Exposure for $PM_{2.5}$ and PM_{10}*; EPA-454/R-99-022

TABLE 7.11-6. PREDICTED $PM_{2.5}$ 24-HOUR AND ANNUAL CONCENTRATIONS FOR THE FUTURE WITHOUT THE PROJECT CONDITIONS PEAK YEAR 2009 ($\mu g/m^3$)

Intersection	Averaging Time	Model Result
Peak Year 2009		
West Fordham Road and I-87 Interchange	24-Hour	6.40
	Annual	0.39

7.11.2.1.5. Stationary Sources

In Future Without the Project year for 2011, the concentrations of stationary source-related pollutants PM_{10}, $PM_{2.5}$, SO_2, CO and NO_2, were anticipated to remain at the same levels as determined for the existing conditions. In the Future Without the Project the peak construction year, 2009, was also assumed to remain at the same levels as determined for the existing conditions. No new air quality impacts are anticipated in the project vicinity under the Future Without the Project scenario.

In Future Without the Project for year 2011, the ambient 24-hour and annual concentrations of $PM_{2.5}$ were assumed to remain at the same levels as existing conditions. Newly promulgated diesel exhaust regulations are anticipated to reduce future ambient concentrations of fine particulate, including $PM_{2.5}$, but the effects are not quantified.

7.11.3. Potential Impacts

7.11.3.1. Potential Project Impacts

The air quality study of the proposed plant evaluated the potential project impacts from mobile, stationary source emissions. Mobile sources included the project operation induced vehicular traffic at intersections in the vicinity. Construction analysis, including air quality impacts from construction induced traffic are discussed in the construction impact section. Stationary sources included the plant's boiler system and the emergency electric-generation system.

7.11.3.1.1. Mobile Sources

The anticipated year of operation of the project is 2011. However, no significant mobile source impacts are anticipated from operation of the plant, as induced traffic volumes (17 auto trips and 4 truck trips) are lower than mobile source screening thresholds. Thus a detailed analysis of mobile source impacts was not conducted for project operation.

7.11.3.1.2. Stationary Sources

Operations at the water treatment plant site, during the year 2011, would emit regulated air pollutants. This section identifies the operations that have the potential to emit regulated air pollutants, and examines each potential stationary emission source. Stationary sources with the potential to emit regulated air pollutants include natural gas-fired boilers and emergency diesel generators. Small quantities of various chemical compounds may occasionally be exhausted from the laboratory hood. Table 7.11-7 summarizes the emission sources at the proposed plant.

TABLE 7.11-7. WATER TREATMENT PLANT EMISSION SOURCES

Source	Boilers	Emergency Generators
Fuel	Natural Gas	Diesel
Number of Units	3	2
Operating Units	2	0[1]
Rating	20.0 MMBtu/hr	2,220 hp
Stack Height	75 feet	75 feet
Stack Diameter	42 inches	12 inches
Flow Rate	27,750 acfm	10,500 acfm
Temperature	500 °F	870 °F

Notes:
1. Only one emergency generator would operate in an emergency. Under normal operating conditions, the generators will be exercised once per week.

The stationary source analysis evaluated the impacts of $PM_{2.5}$, PM_{10}, SO_2, CO and NO_x emitted by the project's combustion sources, the heating and hot water boiler system, and the emergency generators. Combustion by-products may include some regulated hazardous air pollutants (HAP) and toxic air contaminants (TAC). HAPs are regulated by USEPA Title III of the Clean Air Act Amendments of 1990. TACs are regulated by NYSDEC and include HAPs.

The emission of nitrogen compounds from combustion units are usually expressed as total nitrogen oxides or NO_x. For the project area, the ambient air ratio of NO_2 to NO_x is 0.59. This ration was used to determine NO_2 impacts from emission rates of NO_x (i.e., NO_2 is 59% of total NO_x).

As part of the stationary source analysis, the potential impact of regulated substances emitted in small concentrations from the laboratory hoods was evaluated. The potential for odors from the treatment process and residuals handling was also addressed.

Boiler System. The boiler system for the proposed project would provide heat and hot water. The system would consist of three packaged natural gas-fired firetube boilers, each rated at approximately 20 million British Thermal Units per hour (MMBtu/hr) fuel input. Two boilers were assumed operating at full capacity for up to 8,312 total hours per year, with no boilers operating during the warmer summer months, and with two boilers operating at the same time only during the coldest months. The standby boiler would operate only one hour per month for

exercise. Emission factors were obtained from manufacturer's data. Boiler emissions are shown in Table 7.11-8.

TABLE 7.11-8. 20 MMBTU/HR BOILER EMISSIONS[1]

Pollutant	Emission Factor	Emission				
		1-Hour	24-Hour	Annual	Annual	
	lb/MMBtu	Pounds	pounds	hours	pounds	tons
SO_2	1.00E-03	4.00E-02	9.60E-01	8312	166	8.31E-02
NO_2[2]	3.50E-02	1.40E+00	33.60	8312	5818	2.91
CO[3]	4.00E-02	1.60E+00	38.40	8312	6650	3.32
PM[4]	1.00E-02	4.00E-01	9.60	8312	1662	0.83
VOC	1.60E-02	6.40E-01	15.36	8312	2660	1.33

Note:

1. Emission Factors are from Cleaver Brooks Firetube Boiler, Model CB-LE, Table A3-10, CB-LE Boilers Natural Gas Emissions, 30 ppm NO_x, dry basis and corrected to 3% excess oxygen.
2. Conversion of NO_x to NO_2 is 59 percent (Newtown Creek FSEIS, 2003).
3. The CO emission factor increases to 0.11 lb/MMBtu if boiler is operated below 50% load. Boiler will operate between 50% and 100% load. 100% load was modeled.
4. All PM is assumed to be $PM_{2.5}$.

Natural gas combustion may also result in emissions of relatively small amounts of TACs. Emissions factors for TACs have been developed for various combustion sources, and are compiled in the USEPA document "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources." Tables 1.4-3 and 1.4-4, "Emission Factors from Speciated Organic Compounds from Natural Gas Combustion" and "Emission Factors for Metals from Natural Gas Combustion," respectively, provide emission factors used to estimate TACs from the Harlem River water treatment plant boilers. Annual emissions are based on all three boilers operating a total of 8,312 hours in a year. TAC emissions, based on AP-42 emission factors, are shown in Table 7.11-9.

TABLE 7.11-9. BOILER TAC EMISSIONS

Pollutant	Emission Factor	1-Hour	Annual	
	Lb/MMScf	pounds	pounds	tons
Benzene	2.10E-03	4.12E-05	3.42E-01	1.71E-04
Toluene	3.40E-03	6.67E-05	5.54E-01	2.77E-04
Xylenes	0.00	0.00E+00	0.00E+00	0.00E+00
Propylene	0.00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	7.50E-02	1.47E-03	1.22E+01	6.11E-03
Acetaldehyde	0.00	0.00E+00	0.00E+00	0.00E+00
Acrolein[1]	--	--	--	--
Naphthalene	6.10E-04	1.20E-05	9.94E-02	4.97E-05
Acenaphthylene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Acenaphthene	1.80E-06	3.53E-08	2.93E-04	1.47E-07

TABLE 7.11-9. BOILER TAC EMISSIONS

Pollutant	Emission Factor	1-Hour	Annual	
	Lb/MMScf	pounds	pounds	tons
Phenanthrene	1.70E-05	3.33E-07	2.77E-03	1.39E-06
Anthracene	2.40E-06	4.71E-08	3.91E-04	1.96E-07
Fluoranthene	3.00E-06	5.88E-08	4.89E-04	2.44E-07
Pyrene	5.00E-06	9.80E-08	8.15E-04	4.07E-07
Benzo(a)anthracene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Chrysene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Benzo(b)fluoranthene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Benzo(k)fluoranthene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Benzo(a)pyrene	1.20E-06	2.35E-08	1.96E-04	9.78E-08
Indeno(1,2,3-cd)pyrene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
Dibenz(a,h)anthracene	1.20E-06	2.35E-08	1.96E-04	9.78E-08
Benzo(g,h,i)perylene	1.20E-06	2.35E-08	1.96E-04	9.78E-08
2-Methylnaphthalene	2.40E-05	4.71E-07	3.91E-03	1.96E-06
3-Methylchloranthrene	1.80E-06	3.53E-08	2.93E-04	1.47E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	3.14E-07	2.61E-03	1.30E-06
Dichlorobenzene	1.20E-03	2.35E-05	1.96E-01	9.78E-05
Hexane	1.8	3.53E-02	2.93E+02	1.47E-01
Arsenic	2.00E-04	3.92E-06	3.26E-02	1.63E-05
Beryllium	1.20E-05	2.35E-07	1.96E-03	9.78E-07
Cadmium	1.10E-03	2.16E-05	1.79E-01	8.96E-05
Chromium	1.40E-03	2.75E-05	2.28E-01	1.14E-04
Cobalt	8.40E-05	1.65E-06	1.37E-02	6.85E-06
Manganese	3.80E-04	7.45E-06	6.19E-02	3.10E-05
Mercury	2.60E-04	5.10E-06	4.24E-02	2.12E-05
Nickel	2.10E-03	4.12E-05	3.42E-01	1.71E-04
Selenium	2.40E-05	4.71E-07	3.91E-03	1.96E-06
Lead	5.00E-04	9.80E-06	8.15E-02	4.07E-05
Butane	2.10E+00	4.12E-02	3.42E+02	1.71E-01
Pentane	2.60E+00	5.10E-02	4.24E+02	2.12E-01
Propane	1.60E+00	3.14E-02	2.61E+02	1.30E-01
Barium	4.40E-03	8.63E-05	7.17E-01	3.59E-04
Copper	8.50E-04	1.67E-05	1.39E-01	6.93E-05
Molybdenum	1.10E-03	2.16E-05	1.79E-01	8.96E-05
Vanadium	2.30E-03	4.51E-05	3.75E-01	1.87E-04
Zinc	2.90E-02	5.69E-04	4.73E+00	2.36E-03

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein cannot be quantified.
2. Natural gas heating value is 1020 Btu/scf.

Emergency Generators. Two 1500 kilowatt (KW), or 2,220 horsepower (HP) diesel fuel-fired emergency generators would provide emergency power for the water treatment plant. One would serve as the duty generator and the other would be back-up. The emergency generators would only operate in the event of a utility power failure, and for "exercising" to keep them in good working order. Each diesel generator would be exercised approximately one hour per week. Only one generator would be exercised at a time. During an emergency only one generator would be operated at a time. Fuel would be available on-site to provide emergency power from one generator for a maximum of only slightly longer than one day. Table 7.11-10 shows the estimated emissions from the generators, each operating for one hour per week, 52 weeks per year.

TABLE 7.11-10. EMERGENCY DIESEL GENERATOR EMISSIONS[1]

Pollutant	Emission Factor	Emission (per unit)			
		1-Hour	24-Hour	Annual[2]	
	gm/hp-hr	Pounds	pounds	pounds	tons
SO_2[3]	5.60E-01	2.74	5.48	285	0.14
NO_2[4]	11.5	56.28	112.57	5,853	2.93
CO	8.00E-01	3.92	7.83	407	0.20
PM_{10}[5]	0.384	1.88	3.76	195	0.10
VOC	2.40E-01	1.17	2.35	122	0.06

Note:
1. Emissions based on 1500 DFMB Onan Generator Set, Exhaust Emissions Data Sheet.
2. Assumes generator is exercised 1 hour per week.
3. Based on 0.2 percent sulfur in fuel.
4. Assumes 59 percent conversion of NO_x to NO_2 (Newtown Creek FSEIS, 2003).
5. Assumes 90 percent of diesel exhaust particulate is $PM_{2.5}$ and 96 percent is PM_{10}. The remaining 4% is PM greater than 10 micron (AP-42).

Diesel combustion may also result in emissions of relatively small amounts of TACs. Emissions factors for TACs from large diesel engines are compiled in AP-42, Tables 3.4-3 and 3.4-4, “Speciated Organic Compounds Emission Factors for Large Uncontrolled Stationary Diesel Engines” and “PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines,” respectively. These two tabulations provide the emission factors used to estimate TACs from the emergency diesel generators. Annual emissions are based on each engine generator operating one hour per week, every week of the year. TAC emissions, based on AP-42 emission factors, are shown in Table 7.11-11.

TABLE 7.11-11. EMERGENCY DIESEL GENERATOR TAC EMISSIONS

Pollutant	Emission Factor	Emissions (per unit)		
		1-Hour	Annual	
	lb/MMBtu	Pounds	pounds	tons
Benzene	7.76E-04	1.21E-02	1.25E+00	6.27E-04
Toluene	2.81E-04	4.37E-03	4.54E-01	2.27E-04
Xylenes	1.93E-04	3.00E-03	3.12E-01	1.56E-04
Propylene	2.79E-03	4.34E-02	4.51E+00	2.25E-03

TABLE 7.11-11. EMERGENCY DIESEL GENERATOR TAC EMISSIONS

Pollutant	Emission Factor	Emissions (per unit)		
		1-Hour	Annual	
	lb/MMBtu	Pounds	pounds	tons
Formaldehyde	7.89E-05	1.23E-03	1.28E-01	6.38E-05
Acetaldehyde	2.52E-05	3.92E-04	4.07E-02	2.04E-05
Naphthalene	1.30E-04	2.02E-03	2.10E-01	1.05E-04
Acenaphthylene	9.23E-06	1.43E-04	1.49E-02	7.46E-06
Acenaphthene	4.68E-06	7.27E-05	7.56E-03	3.78E-06
Phenanthrene	4.08E-05	6.34E-04	6.59E-02	3.30E-05
Anthracene	1.23E-06	1.91E-05	1.99E-03	9.94E-07
Fluoranthene	4.03E-06	6.26E-05	6.51E-03	3.26E-06
Pyrene	3.71E-06	5.77E-05	6.00E-03	3.00E-06
Benzo(a)anthracene	6.22E-07	9.67E-06	1.01E-03	5.03E-07
Chrysene	1.53E-06	2.38E-05	2.47E-03	1.24E-06
Benzo(b)fluoranthene	1.11E-06	1.72E-05	1.79E-03	8.97E-07
Benzo(k)fluoranthene	2.18E-07	3.39E-06	3.52E-04	1.76E-07
Benzo(a)pyrene	2.57E-07	3.99E-06	4.15E-04	2.08E-07
Indeno(1,2,3-cd)pyrene	4.14E-07	6.43E-06	6.69E-04	3.35E-07
Dibenz(a,h)anthracene	3.46E-07	5.38E-06	5.59E-04	2.80E-07
Benzo(g,h,l)perylene	5.56E-07	8.64E-06	8.99E-04	4.49E-07

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein cannot be quantified.

Operating Emissions Summary. Criteria pollutants are emitted from the boilers, the generators and the fuel cells at the proposed plant. Total facility emissions, shown in Table 7.11-12, are below the major source threshold.

TABLE 7.11-12. CRITERIA POLLUTANT EMISSIONS SUMMARY

Pollutant	Boilers	Generators	Total	National & State Threshold
	tons/yr	tons/yr	tons/yr	tons/yr
Sulfur Dioxide	8.31E-02	0.14	0.22	100
Oxides of Nitrogen	2.91	2.93	5.84	25
Carbon Monoxide	3.32	0.20	3.52	100
PM_{10}	0.83	0.10	0.93	100
VOC	1.33	0.06	1.39	25

Total emissions of each criteria pollutant would be less than the major source threshold for that pollutant. The proposed plant would not be classified as a major source for any criteria pollutant.

Combustion sources also emit trace quantities of HAPs and TACs. A major source of Title III HAPs is one where 10 tons of any single regulated HAP or 25 tons of total HAPs are emitted in one year. The proposed plant is not a major source for HAPs. Table 7.11-13 summarizes potentially toxic emissions from combustion sources at the proposed plant.

TABLE 7.11-13. TOTAL TOXIC AIR CONTAMINANT EMISSIONS FROM COMBUSTION SOURCES AT THE HARLEM RIVER SITE

Pollutant	1-Hour	Annual	
	pounds	pounds	tons
Benzene (HAP)	1.21E-02	1.60E+00	7.98E-04
Toluene (HAP)	4.50E-03	1.01E+00	5.04E-04
Xylenes (HAP)	3.00E-03	3.12E-01	1.56E-04
Propylene	4.34E-02	4.51E+00	2.25E-03
Formaldehyde (HAP)	4.17E-03	1.24E+01	6.18E-03
Acetaldehyde (HAP)	3.92E-04	4.07E-02	2.04E-05
Naphthalene (HAP)	2.04E-03	3.10E-01	1.55E-04
Acenaphthylene (HAP)	1.44E-04	1.52E-02	7.61E-06
Acenaphthene (HAP)	7.28E-05	7.86E-03	3.93E-06
Phenanthrene (HAP)	6.35E-04	6.87E-02	3.44E-05
Anthracene (HAP)	1.92E-05	2.38E-03	1.19E-06
Fluoranthene (HAP)	6.27E-05	7.00E-03	3.50E-06
Pyrene (HAP)	5.78E-05	6.81E-03	3.41E-06
Benz(a)anthracene (HAP)	9.74E-06	1.30E-03	6.49E-07
Chrysene (HAP)	2.38E-05	2.77E-03	1.38E-06
Benzo(b)fluoranthene (HAP)	1.73E-05	2.09E-03	1.04E-06
Benzo(k)fluoranthene (HAP)	3.46E-06	6.46E-04	3.23E-07
Benzo(a)pyrene (HAP)	4.04E-06	6.11E-04	3.05E-07
Indeno(1,2,3-cd)pyrene (HAP)	6.50E-06	9.62E-04	4.81E-07
Dibenz(a,h)anthracene (HAP)	5.42E-06	7.55E-04	3.77E-07
Benzo(g,h,l)perylene (HAP)	8.69E-06	1.09E-03	5.47E-07
2-Methylnaphthalene (HAP)	9.41E-07	3.91E-03	1.96E-06
3-Methylchloranthrene (HAP)	7.06E-08	2.93E-04	1.47E-07
7,12-Dimethylbenz(a)anthracene (HAP)	6.27E-07	2.61E-03	1.30E-06
Dichlorobenzene (HAP)	4.71E-05	1.96E-01	9.78E-05
Hexane (HAP)	7.06E-02	2.93E+02	1.47E-01
Arsenic (HAP)	7.84E-06	3.26E-02	1.63E-05
Beryllium (HAP)	4.71E-07	1.96E-03	9.78E-07
Cadmium (HAP)	4.31E-05	1.79E-01	8.96E-05
Chromium (HAP)	5.49E-05	2.28E-01	1.14E-04
Cobalt (HAP)	3.29E-06	1.37E-02	6.85E-06
Manganese (HAP)	1.49E-05	6.19E-02	3.10E-05
Mercury (HAP)	1.02E-05	4.24E-02	2.12E-05
Nickel (HAP)	8.24E-05	3.42E-01	1.71E-04
Selenium (HAP)	9.41E-07	3.91E-03	1.96E-06

TABLE 7.11-13. TOTAL TOXIC AIR CONTAMINANT EMISSIONS FROM COMBUSTION SOURCES AT THE HARLEM RIVER SITE

Pollutant	1-Hour	Annual	
	pounds	pounds	tons
Lead (HAP)	1.96E-05	8.15E-02	4.07E-05
Butane	8.24E-02	3.42E+02	1.71E-01
Pentane	1.02E-01	4.24E+02	2.12E-01
Propane	6.27E-02	2.61E+02	1.30E-01
Barium	1.73E-04	7.17E-01	3.59E-04
Copper	3.33E-05	1.39E-01	6.93E-05
Molybdenum	4.31E-05	1.79E-01	8.96E-05
Vanadium	9.02E-05	3.75E-01	1.87E-04
Zinc	1.14E-03	4.73E+00	2.36E-03
Total HAP			**1.55E-01**

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein cannot be quantified.

Criteria Pollutant ISCST3 Modeling. The potential impacts of the boiler system and emergency generators emissions were analyzed using the USEPA's Industrial Source Complex Short Term, Version 3 dated 02035 (ISCST3) model (User's Guide, USEPA, 1995d). ISCST3 is a refined computerized dispersion model that calculates impacts at receptors from multiple point, area and volume sources. ISCST3 uses historical hourly meteorological data. Meteorological data from La Guardia Airport, with upper air data from Brookhaven, for years 1997 through 2001, were used.

ISCST3 was used to predict maximum pollutant concentrations at designated receptors. Three sets of receptors were generated for the analysis; fenceline, Cartesian grid and sensitive land uses. The fenceline receptors were placed at approximately 25 meter intervals along the property boundary. The Cartesian grid receptors extend out to approximately ½ km in all directions from the site.

Locations of sensitive receptors in the vicinity of the proposed project were also included. Sensitive receptors include the on-site public open space, Fordham Landing Park, Fordham Hills Co-ops, a residence at Sedgwick Avenue and Bailey Avenue, Fordham Landing Development, and residences at 2600 Bailey Avenue. Additional elevated receptors for second floor and higher apartments were incorporated into this modeling study. Figure 7.11-3 shows the proposed plant, the boiler exhaust location, the property line and the locations of sensitive receptors.

The stack heights for boilers and generators are lower than USEPA Good Engineering Practice (GEP) guidelines. Therefore building downwash was considered. The USEPA Building Profile Input Program (BPIP) was used to calculate building cross-sections for wind directions at 10 degree intervals. The cross-sections were included in the ISCST3 model input file and the building downwash option was selected.

In accordance with procedures described in USEPA's "Guideline on Air Quality Models," the Auer procedure was used to determine Urban/Rural classification. Based on examination of USGS 7.5 minute quadrangle maps for an approximately 3 kilometer radius around the water treatment plant, Urban classification is appropriate for this site.

The background pollutant concentrations were obtained from the NYSDEC monitoring data. Background air quality data is based on the most recent five years of NYSDEC monitoring data, 1998 through 2002. Annual background values are from the year with the highest annual concentration. For averaging times shorter than one year, the background value is the highest second-high value for the five years. Where five contiguous years of recent monitoring data are not available, a minimum of three years were used. Table 7.11-2 summarizes the existing monitoring data for the water treatment plant site.

Each emergency generator was assumed to be exercised at full capacity for one hour per week. Both generators would not be exercised at the same time.

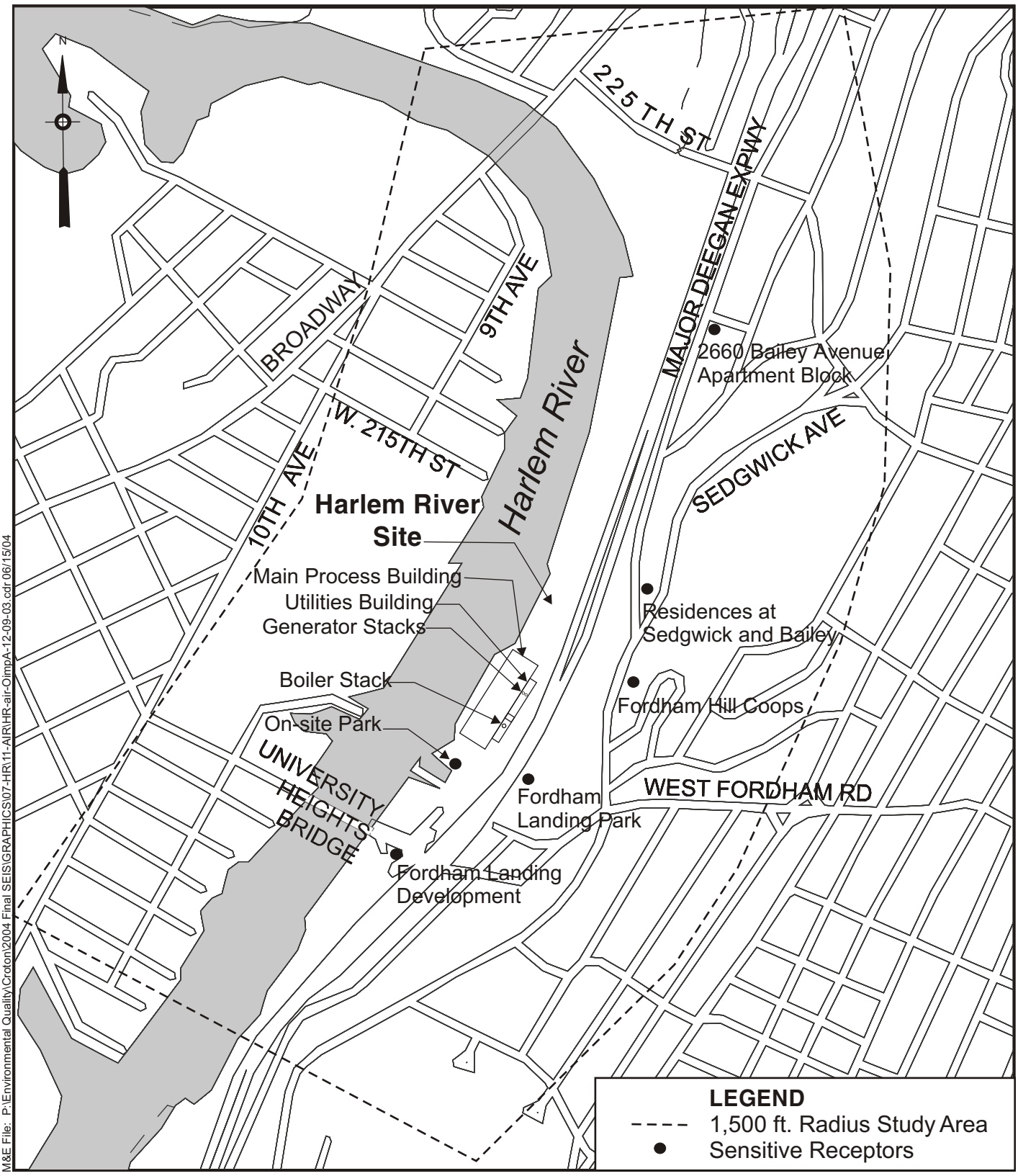
Dispersion modeling was conducted to compare concentrations of pollutants at off-site receptors with applicable ambient air quality standards. Table 7.11-14 compares the combined concentrations of each pollutant at the maximum off-site receptor with applicable standards.

TABLE 7.11-14. MODELING RESULTS FOR ALL HARLEM RIVER WATER TREATMENT PLANT CRITERIA POLLUTANT SOURCES

Pollutant	Averaging Time	All Sources	Background	Total	National[1] & State[2] Standards
		µg/m^3	µg/m^3	µg/m^3	µg/m^3
Sulfur Dioxide	3-hours	23.1	183	206.1	1300
Sulfur Dioxide	24-hours	1.6	120	121.6	365
Sulfur Dioxide	Annual	0.05	26	26.1	80
Nitrogen Dioxide	Annual	0.77	58	58.8	100
Carbon Monoxide	1-hour	183.4	6,858	7,041.4	40,000
Carbon Monoxide	8-hours	15.9	4,572	4,587.9	10,000
PM10	24-hours	2.8	45	47.8	150
PM10	Annual	0.21	21	21.2	50

Notes:
1. HOCFR 5.0
2. 6NYCRR Part 257- Air Quality Standards

Off-site concentrations from all facility sources are predicted to be in compliance with applicable ambient air quality standards. Impacts from all combustion emission sources at the water treatment plant site are not significant.



Harlem River Site
Boiler and Generator Exhaust Locations, and Sensitive Receptors

Croton Water Treatment Plant

Figure 7.11-3

Toxic Air Contaminant Modeling. Dispersion modeling was conducted to determine concentrations of TACs at off-site receptors. The potential impact TAC emissions from combustion sources was analyzed using the USEPA's ISCST3 dispersion model. The model was run to obtain 1-hour averaging time concentrations.

The same receptors used for criteria pollutant modeling were used. For the proposed plant, sensitive receptors include the on-site public open space, Fordham Landing Park, Fordham Hills Co-ops, a residence at Sedgwick Avenue and Bailey Avenue, Fordham Landing Development, and residences at 2600 Bailey Avenue.

Maximum one-hour and annual concentrations of TACs were determined from dispersion modeling. The model was run with a normalized emission rate of 1.0 grams per second. The model was run for five years of hourly meteorological data. The results from the highest year were used. The maximum emission rate for each pollutant was multiplied by the model result to obtain the 1-hour impact.

One-hour concentrations were compared with Short-term Guideline Concentrations (SGC) and annual concentrations were compared with Annual Guideline Concentrations (AGC) from the NYSDEC Department of Air Resources (DAR) document "DAR-1, AGC/SGC Tables" dated July 12, 2000. Table 7.11-15 compares the combined concentrations of each pollutant at the maximum off-site receptor with applicable guideline concentrations.

TABLE 7.11-15. COMBINED CONCENTRATIONS OF TACS FROM BOILERS AND GENERATORS

Pollutant	1-hr Impact	SGC[1]	Annual Impact	AGC[1]
	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Benzene	2.14E-01	1300	2.46E-04	0.13
Toluene	7.88E-02	37000	1.44E-04	400
Xylenes	5.29E-02	4300	5.02E-05	700
Propylene	7.64E-01	NL	7.26E-04	3000
Formaldehyde	6.29E-02	30	1.59E-03	0.06
Acetaldehyde	6.90E-03	4500	6.56E-06	0.45
Naphthalene	3.59E-02	7900	4.66E-05	3
Acenaphthylene	2.53E-03	NL	2.44E-06	0.02
Acenaphthene	1.28E-03	NL	1.26E-06	0.02
Phenanthrene	1.12E-02	NL	1.10E-05	0.02
Anthracene	3.38E-04	NL	3.70E-07	0.02
Fluoranthene	1.11E-03	NL	1.11E-06	0.02
Pyrene	1.02E-03	NL	1.07E-06	0.02
Benzo(a)anthracene	1.71E-04	NL	1.99E-07	0.02
Chrysene	4.20E-04	NL	4.36E-07	0.02
Benzo(b)fluoranthene	3.05E-04	NL	3.26E-07	0.02
Benzo(k)fluoranthene	6.07E-05	NL	9.44E-08	0.02
Benzo(a)pyrene	7.11E-05	NL	9.20E-08	0.02

TABLE 7.11-15. COMBINED CONCENTRATIONS OF TACS FROM BOILERS AND GENERATORS

Pollutant	1-hr Impact	SGC[1]	Annual Impact	AGC[1]
	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Indeno(1,2,3-cd)pyrene	1.14E-04	NL	1.45E-07	0.02
Dibenz(a,h)anthracene	9.54E-05	NL	1.15E-07	0.02
Benzo(g,h,i)perylene	1.53E-04	NL	1.70E-07	0.02
2-Methylnaphthalene	1.32E-05	NL	5.02E-07	0.02
3-Methylchloranthrene	9.92E-07	NL	3.76E-08	0.02
7,12-Dimethylbenz(a)anthracene	8.82E-06	NL	3.35E-07	0.02
Dichlorobenzene	6.61E-04	NL	2.51E-05	0.09
Hexane	9.92E-01	NL	3.76E-02	200
Arsenic	1.10E-04	NL	4.18E-06	0.00023
Beryllium	6.61E-06	1	2.51E-07	0.00042
Cadmium	6.06E-04	NL	2.30E-05	0.0005
Chromium	7.71E-04	NL	2.93E-05	1.2
Cobalt	4.63E-05	NL	1.76E-06	0.005
Manganese	2.09E-04	NL	7.95E-06	0.05
Mercury	1.43E-04	1.8	5.44E-06	0.3
Nickel	1.16E-03	6	4.39E-05	0.004
Selenium	1.32E-05	NL	5.02E-07	20
Lead	2.75E-04	NL	1.05E-05	0.75
Butane	1.16E+00	NL	4.39E-02	45000
Pentane	1.43E+00	NL	5.44E-02	4200
Propane	8.82E-01	NL	3.35E-02	110000
Barium	2.42E-03	NL	9.20E-05	1.2
Copper	4.68E-04	100	1.78E-05	0.02
Molybdenum	6.06E-04	NL	2.30E-05	12
Vanadium	1.27E-03	NL	4.81E-05	0.2
Zinc	1.60E-02	NL	6.06E-04	50

Note:
1. NL represents "Not Listed."
2. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein concentrations cannot be quantified.

Maximum 1-hour and annual concentrations of TACs are lower than the corresponding SGCs and AGCs for each pollutant. TAC and HAP impacts from combustion sources at the water treatment plant are predicted to be insignificant.

Laboratory Hoods. Limited water testing would be conducted in a small on-site laboratory. Volatile chemicals would be used under a laboratory hood exhausted through a stack on the roof. Normal laboratory operations are not anticipated to have a significant impact on

ambient air quality. Accidental spills of any consequence would not be likely to occur due to the small quantities of chemicals to be used for testing.

Sulfuric acid would be used for alkalinity testing. Each test would require approximately 25 milliliters (ml) of relatively dilute (0.02 Normal) sulfuric acid. Tests would be performed under a laboratory hood that would be exhausted through a stack on the roof at 100 cfm. If the full amount of sulfuric acid were to spill and be allowed to evaporate (not be cleaned up), and the entire volume were to evaporate within one hour, the highest 1-hour off-site concentration, based on SCREEN3 model results would be 0.006 $\mu g/m^3$. The New York State Short-term Guideline Concentration (SGC) is 120 $\mu g/m^3$. Thus, impacts from an accidental release of sulfuric acid via the laboratory hood would be lower that the State SGC and, therefore, insignificant.

Odors. The potential for odors from the treatment process and the installation of odor control technologies and design are addressed in Section 7.1, Introduction and Proposed Project Description, Residual Facilities. No specific odor-producing substances have been identified at the proposed plant as there would be no residual handling facility. The residuals from the treatment process would be transferred off-site to be dewatered at Hunts Point Water Pollution Control Plant (WPCP).

Fine Particulate Matter Analysis. Dispersion modeling was performed (for year 2011) to assess the impacts of the particulate matter emitted from the proposed project sources on ambient $PM_{2.5}$ concentrations in the defined study areas. Since the interim guidance criteria for $PM_{2.5}$ are based on incremental changes for both localized and neighborhood scale assessments, the modeling was performed to estimate maximum predicted changes in $PM_{2.5}$ concentrations that could be compared to these criteria.

Boiler System. The boiler system for the proposed project would provide heat and hot water. The system would consist of three packaged natural gas-fired firetube boilers, each rated at approximately 20 million British Thermal Units per hour (MMBtu/hr) fuel input. Up to two boilers would be operational at any one time, with the other boiler as a standby unit. Emission factors were obtained from manufacturer's data. All particulate matter (PM) emissions from the boiler, shown in Table 7.11-14, would be $PM_{2.5}$.

Emergency Generators. Two 1500-kilowatt (KW), or 2,220-horsepower (HP) diesel fuel-fired emergency generators would provide emergency power for the proposed plant. One would serve as the duty generator and the other would be back-up. The emergency generators will only operate in the event of a utility power failure, and for "exercising" to keep them in good working order. Each diesel generator would be exercised approximately one hour per week. Only one generator would be exercised at a time. During an emergency only one generator would be operated at a time. Table 7.11-16 shows the estimated $PM_{2.5}$ emissions from Harlem River generators, each operating for one hour per week, 52 weeks per year.

TABLE 7.11-16. EMERGENCY DIESEL GENERATOR EMISSIONS[1]

Pollutant	Emission Factor	Emission			
		1-Hour	24-Hour	Annual[2]	
	Gm/hp-hr	pounds	pounds	pounds	tons
$PM_{2.5}$[3]	0.36	1.76	3.52	183.24	0.09

Note:
1. Emissions based on 1500 DFMB Onan Generator Set, Exhaust Emissions Data Sheet.
2. Assumes generator is exercised 1 hour per week.
3. Assumes 90 percent of diesel exhaust particulate is $PM_{2.5}$ and 96 percent is PM_{10} (AP-42).

Summary**.** $PM_{2.5}$ would be emitted from the boilers and the generators at the proposed plant. Total facility emissions, shown in Table 7.11-17, are below the major source threshold.

TABLE 7.11-17. $PM_{2.5}$ POLLUTANT EMISSIONS SUMMARY

Pollutant	Boilers	Generators	Total
	tons/yr	tons/yr	tons/yr
$PM_{2.5}$	0.83	0.09	0.92

Dispersion modeling was conducted to compare concentrations of $PM_{2.5}$ at off-site receptors with applicable interim guideline *de minimis* concentrations. Table 7.11-18 compares the combined 24-hour and annual concentrations of $PM_{2.5}$ at the maximum off-site receptor with the interim *de minimis* guideline concentrations.

TABLE 7.11-18. MODELING RESULTS FOR ALL HARLEM RIVER WATER TREATMENT PLANT $PM_{2.5}$ POLLUTANT SOURCES

Pollutant	All Sources µg/m^3	Interim Guidance Criteria[1] µg/m^3
$PM_{2.5}$ 24-Hour	2.77	5.0
$PM_{2.5}$ Annual	0.21	0.3 / 0.1

Note:
1. The interim maximum 24-hour *de minimis* increment concentration is 5 µg/m^3 and the annual microscale *de minimis* increment concentration is 0.3 µg/m^3. The interim neighborhood scale *de minimis* increment concentration is 0.1 µg/m^3.

A significant impact would occur if maximum project impacts exceeded the *de minimis* threshold of 5.0 µg/m^3 for 24-hours or 0.3 µg/m^3 microscale annual maximum threshold, or 0.1 µg/m^3 annual neighborhood scale threshold. The maximum project 24-hour and annual impacts are below the interim *de minimis* thresholds of 5.0 and 0.3 µg/m^3, respectively. A neighborhood analysis was conducted that showed the average $PM_{2.5}$ impacts from the project, at 0.026 µg/m^3, would be lower than 0.1 µg/m^3. In reviewing the results of modeling for the neighborhood analysis it was concluded that mobile source and project stationary source impacts do not

overlap. $PM_{2.5}$ impacts from the operation of the proposed project are predicted to be insignificant.

7.11.3.2. Potential Construction Impacts

7.11.3.2.1. On-site Activities

Possible effects on local air quality during construction at the project sites include:

- Fugitive dust and other emissions from land-clearing operations and excavation,
- Air emissions from on-site construction equipment, and
- Mobile source emissions from construction workers' private vehicles and construction trucks.

The methodology described in Section 4.11, Data Collection and Impact Methodologies, Air Quality, was followed to predict the anticipated construction-related mobile source air quality impacts associated with the proposed Croton project.

The construction activities analysis for the peak construction month of November 2010 and construction year 2010, the projected period of greatest quantities of construction equipment usage, evaluated the potential impact of construction emissions in terms of the criteria pollutants (CO, SO_2, NO_2 and PM_{10}) and fine particulate ($PM_{2.5}$) emissions. Fugitive dust emissions from construction operations can occur from excavation, hauling, dumping, grading, compacting, wind erosion, and traffic over unpaved and paved surfaces. Actual quantities of emissions depend on the extent and nature of the construction activities, the type of equipment employed, the physical characteristics of the underlying soil, the speed at which the construction vehicles are operated, and the type of fugitive dust control methods employed. Most of the fugitive dust generated by construction activities consists of relatively large-size particles that are anticipated to settle within short distance from the construction site and that would not significantly affect reception nearby.

The construction resource loading and schedule were developed to estimate the number of construction trucks, workers and equipment for the entire construction period from 2005 to 2011. This analysis is for the year 2010, when the peak construction activities for the proposed Croton project are scheduled. It should be noted that the peak construction induced traffic was predicted for the year 2009 because the number of workers required for the facility interior work is anticipated to peak in year 2009.

Approximately 153,200 cubic yards (cy) of soil and rock will be removed during the construction of the Harlem River facility in an area of approximately 29,111 m^2. It is estimated that 55 percent would be removed in 2006 and the remaining 45 percent would be removed in 2009. In 2006, excavation and grading activities would be primarily for the Main Process building, the pump stations and the residuals/chemical buildings.

According to the groundwater information for the Harlem River Site, it is estimated that there is about 7 to 8 feet of material above the groundwater table. With the consideration of the capillary rise of water, it is assumed that the deep soil above the groundwater line would be sufficiently moist to suppress dust emissions when it is excavated. The soil material from the surface to a depth of 4 feet may be dry and is assumed to be susceptible to creating fugitive dust emissions during excavation. In calculating the volume of excavated soil materials, the amount of dry soil material was determined by multiplying the size of the individual building footprint areas by a depth of 4 feet. A 5-foot construction easement was added to the perimeter of the individual water treatment plant building footprint area to account for the actual surface area of the construction activities. Table 7.11-19 presents the estimated amount of dry and wet soil material to be excavated from the Harlem River Site. During the year 2009 construction period, excavation for two shafts and tunnels would remove an additional 68,940 cy of material.

TABLE 7.11-19. ESTIMATED AMOUNT OF EXCAVATED DRY AND WET SOIL (TONS)

Excavation Activities	Dry Soil	Wet Soil	Total
Main Process Building	33,266	77,621	110,887
Residual/Chemical Bldg	3,890	9,075	12,965
Administration Bldg	758	1,770	2,528
Pumping/Electrical station	4,743	11,066	15,809
Raw Water Shaft	0	6,028	6,028
Treated Water Shaft	0	6,674	6,674
Raw Water Tunnel	0	17,283	17,283
Water Tunnels Low	0	12,476	12,476
Water Tunnels High	0	74,955	74,955

Notes:
Tunnel and shaft sites contain wet soil.
1 cy of soil equals 126 lb/ft^3
Conversion of 153,200cy = 259,605 tons

Overburden and debris removal. One grader and up to four backhoes or loaders will be used to remove overburden and debris. This activity would be anticipated to last about eight months and involve the removal of approximately 153,200 cy of material. Emissions of criteria pollutants and fine particulates were based on the number of equipment hours and the USEPA's Non-road Engine and Vehicle Study and AP-42 emission factors.

Overburden and debris load-out to trucks. A maximum of 29-20 cy truck trips per day supplemented with barging were anticipated for hauling 153,200 cy of overburden off-site. Emissions of criteria pollutants and fine particulates were based on the number of tons of overburden and debris loaded into barge and AP-42 emission factors.

Rock Drilling. The Harlem River Site is mostly filled with soil material. Rock drilling and blasting will not occur at this site. However, there will be drilling and blasting activities underground during the tunnel excavation from the water treatment plant site to Jerome Park Reservoir.

The tunnel excavation is anticipated to occur during the years 2009 to 2011. All emissions from the drilling and blasting activities will be contained underground inside the tunnels.

Rock load-out to trucks. After the rock materials are drilled and blasted, the wet rock material will be lifted by cranes onto a barge to transport the rocks to the off-site rock crusher. This activity would be anticipated to last about six months during the year 2009 and involve the removal of approximately 6,400 cy of rock material.

Gravel truck unloading. Approximately 27,000 cy of gravel would be returned to the site as construction materials. Emissions of criteria pollutants and fine particulates were quantified based on the number of tons of materials removed from 20 cy trucks for use on-site. A maximum of 580 cy will be brought on-site in a single day, which would require 29-20 cy truck trips and would be supplemented with barging. Emission factors from AP-42 were applied.

Road dust. Each delivery haul truck and heavy vehicle will travel approximately 600 feet into the construction pit loaded and the same distance unloaded (roundtrip). In order to limit fugitive dust from truck travel, on-site roads would be paved, and would be maintained by hourly water flushing and sweeping. The truck route into the construction area would be paved. The AP-42 emission factor (in lb/VMT) is based on the silt loading and average vehicle weight. The silt content was assumed to be 6.9%, based on the USEPA's default value listed for a construction site. The computations of fugitive emissions were performed with loaded and unloaded weights of the delivery haul trucks. The speed will be limited to 5 mph for all on-site construction trucks. The average vehicle weight was based on the weight of delivery haul trucks (50 tons loaded/16 tons empty), rock trucks (60 tons loaded/16 tons empty), and "other" trucks (25 tons loaded/8 tons empty), assuming half of the travel distance would be with a full load and half would be with no load (empty). Water flushing and sweeping would provide a control efficiency of approximately 50%.

The Harlem River Site is limited in space. Workers will not be able to park their personal vehicles at the site. Off-site parking arrangements will need to be made for workers who chose to drive their personal vehicles. Public transportation or a shuttle bus would be used to transport workers to and from the jobsite and their vehicles.

On-site Construction Equipment. An analysis of the potential for air quality impacts from on-site construction equipment at the proposed Croton project site was performed for the peak construction year of 2010. The analyses address combustion emissions from stationary on-site equipment, such as cranes, and fugitive dust emissions from mobile equipment, such as dump trucks. A complete list of on-site equipment is provided below in Table 7.11-20.

TABLE 7.11-20. ON-SITE CONSTRUCTION EQUIPMENT FOR PEAK MONTH OF NOVEMBER 2010

Equipment Type	Quantity On-Site	Mobile or Stationary
Cranes	Ten	Stationary
Welding Machines	Four	Stationary
Concrete Vibrators	One	Stationary
Concrete Floor Finishers	One	Stationary
Trucks/Heavy Vehicles[1]	Three	Mobile

Notes:

1. Quantity on-site in any one hour for 8 hour work shift period.

Emission factors for NO_2, CO, PM_{10}, $PM_{2.5}$, and SO_2 from the combustion of fuel for on-site construction equipment (excluding delivery trucks/heavy vehicles) were developed using the Draft USEPA NONROAD Emissions Model Version 2.2d (May 2003). The model is based on source inventory data accumulated for specific categories of off road equipment. Data provided in the output files from the NONROAD model were used to derive (i.e., back-calculated from regional emission estimates) these emission factors for each type of equipment that is anticipated to be present on-site during construction activities. Emission rates of NO_2, PM and CO (SO_2 emissions were negligible) from combustion of fuel for on-site delivery trucks/heavy vehicles were developed using the MOBILE6.2 emissions model. Emission factors associated with fugitive dust emissions from mobile equipment were developed using equations presented in USEPA's AP-42 "A Compilation of Air Pollution Emission Factors."

ISCST3 Dispersion Modeling. A dispersion modeling analysis was performed to estimate ambient concentrations of air pollutants associated with emissions produced by on-site construction activities at the proposed Croton project site. The modeling analysis was conducted using the ISCST3 dispersion model and was performed in accordance with USEPA and NYCDEP guidance regarding the use of dispersion models for regulatory purposes. The predicted total concentrations of criteria pollutants have been used to demonstrate compliance with applicable impact thresholds.

The background levels were obtained from the NYSDEC monitoring data. Background air quality data is based on the most recent five years of NYSDEC monitoring data, 1998 through 2002. Annual background values are from the year with the highest annual concentration. For averaging times shorter than one year, the background value is the highest second-high value for the five years. Where five contiguous years of recent monitoring data are not available, a minimum of three years were used. Table 7.11-2 summarizes the monitoring data for the Harlem River water treatment plant. Table 7.11-21 presents the results of ISCST3 dispersion modeling for the maximum construction activities.

TABLE 7.11-21. RESULTS OF DISPERSION ANALYSIS FOR CONSTRUCTION ACTIVITIES

Pollutant	Background µg/m^3	Concentration µg/m^3	Total[1] µg/m^3	Standard µg/m^3
SO_2 3-Hour	183	1.03	183.2	1300
SO_2 24-Hour	120	0.21	120.1	365
SO_2 Annual	26	0.013	26.0	80
NO_2 Annual	58	9.6	66.2	100
CO 1-Hour[2]	6,858	765	7,623	40,000
CO 8-Hour[2]	4,572	148	4.720	10,000
PM_{10} 24-Hour	45	57.0	102	150
PM_{10} Annual	21	2.9	24	50

Notes:
1. Total is sum of concentration and background. NO_2 concentrations are based on a NO_2NO_X ratio of 0.59 or 59% NO_2.
2. Pollutant concentrations from the project sources would be low relative to the standard and have not been quantified.
3. Includes fenceline receptors.

To determine project impacts, the results of construction impacts from modeling and background (predicted impacts added to background are shown in the column titled "Total" in Table 7.11-21) were compared to the applicable ambient standards (NAAQS). A significant impact would occur if a standard would be exceeded as a result of the project. Based on modeling results, no significant impacts are predicted from construction activities.

Fine Particulate Matter Analysis. For the $PM_{2.5}$ incremental impact analysis, the maximum impacts were calculated for nearby institutional and sensitive uses for comparison with draft interim guidance criteria. The predicted maximum off-site concentrations from on-site construction sources are presented in Table 7.11-22.

TABLE 7.11-22. HARLEM RIVER FACILITY MAXIMUM PREDICTED OFFSITE CONCENTRATION-$PM_{2.5}$

Modeled Pollutant	Averaging Period	Units	Maximum Predicted Concentration		Interim Guidance
			All Receptors[1]	Sensitive Receptors	
$PM_{2.5}$	24-Hours	µg/m^3	13.1	2.86	5
	Annual (Discrete)	µg/m^3	0.77	0.28	0.3
	Annual (Neighborhood)	µg/m^3	0.076	N/A	0.1

Note:
1. Includes fenceline receptors

With respect to $PM_{2.5}$, NYCDEP is currently employing interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts from NYCDEP projects under CEQR. The interim guidance criteria for determining the potential for significant adverse impacts from $PM_{2.5}$ are as follows:

- Predicted incremental impacts of $PM_{2.5}$ greater than 5 $\mu g/m^3$ averaged over a 24-hour (daily) period at a discrete location of public access, either at ground or elevated levels (microscale analysis); or
- Predicted incremental ground-level impacts of $PM_{2.5}$ greater than 0.1 $\mu g/m^3$ on an annual average neighborhood-scale basis (i.e., the computed annual concentration averaged over receptors placed over a one kilometer by one kilometer grid, centered around the location where the maximum impact is predicted).
- In addition, NYSDEC considers incremental impacts of $PM_{2.5}$ greater than 0.3 $\mu g/m^3$ from stationary sources at any discrete ground-level or elevated locations as having potential for significant impact.

The air modeling analysis calculates the highest predicted increase in the 24-hour $PM_{2.5}$ concentrations as 13.1 $\mu g/m^3$ at the fence line and 2.86 $\mu g/m^3$ at the nearest sensitive receptor. While the highest incremental $PM_{2.5}$ concentration occurred at the fence line was higher than the interim guidance criteria for the localized 24-hour impacts (i.e., 5 $\mu g/m^3$), the maximum predicted incremental 24-hour concentration at sensitive public locations would be significantly lower. In addition, the 24-hour $PM_{2.5}$ concentration from construction for the proposed project was based on the month (November 2010) when the maximum short-term emissions would be anticipated; therefore, the actual increase in $PM_{2.5}$ concentration is anticipated to be lower than the predicted values for the rest of the construction period.

The highest predicted annual increases were 0.77 $\mu g/m^3$ at the fence line and 0.28 $\mu g/m^3$ at the nearest sensitive receptor. While the highest annual concentration was slightly higher than the NYSDEC criteria of 0.3 $\mu g/m^3$ at the fence line, the concentration at the nearest sensitive receptor would be lower than the interim guidance criteria.

On a neighborhood scale basis, the predicted incremental impact of $PM_{2.5}$ would be 0.08 $\mu g/m^3$, which is below the NYCDEP interim guidance.

Based on the above, the impact from the construction of the project on $PM_{2.5}$ was not considered significant.

7.11.3.2.2. Mobile Sources

A mobile source air quality analysis of the potential construction activities was conducted for 2009, the year of maximum anticipated construction traffic for the Harlem River Site. The methodology for the localized pollutant analysis at intersections is the same as discussed under the Methodology section. Localized pollutant impacts from the vehicles were analyzed for the 8-hour CO concentrations and for 24-hour and annual PM_{10} concentrations. The same set of receptor locations used in the analysis of the Future Without the Project scenario was used for the Project Impact scenario. The worst intersection was analyzed.

Based on the predicted construction-induced traffic for the peak year 2009, which are discussed in Section 7.9, Traffic and Transportation, traffic estimates include the construction related vehicles during the weekday morning and afternoon peak periods. The construction related

vehicle trips exceed the screening threshold and therefore dispersion modeling was performed for CO, PM_{10}, and $PM_{2.5}$.

Carbon Monoxide. The results of CAL3QHC dispersion modeling were added to the predicted background concentrations, and then compared to the 1-hour and 8-hour ambient air quality standard for CO. Table 7.11-23 shows the results of CO modeling for year 2009. As indicated in the table the maximum predicted concentrations are below the applicable Air Quality Standard.

TABLE 7.11-23. PREDICTED CARBON MONOXIDE 1-HOUR AND 8-HOUR CONCENTRATIONS DURING CONSTRUCTION WITH THE PROJECT PEAK YEAR 2009 (ppm)

Intersection	Ambient AQ Background[1]		Model Result		Total Predicted Conc.[1]		Standard
			AM	PM	AM	PM	
Peak Year 2009							
West Fordham Road and I-87 Interchange	1-hour	5.9	4.9	5.0	10.8	10.9	35
	8-hour	2.0	3.4	3.5	5.4	5.5	9

Note:
1. Total Predicted Concentration = Ambient AQ Background + Model Result.

In addition, the CEQR *de minimis* values were calculated for the 8-hour period. As indicated in Table 7.12-24 the CEQR *de minimis* values for the 8-hour period were not exceeded. Therefore, the proposed project would have no significant impacts for CO at the Harlem River Site.

TABLE 7.12-24. 8-HOUR CONCENTRATIONS AND CEQR *DE MINIMIS* VALUES PEAK YEAR 2009 (ppm)

Intersection	Averaging Period	No Build Conc.		Build Conc.[1]		Difference		*De minimis Criteria*	
		AM	PM	AM	PM	AM	PM	AM	PM
Peak Year 2009									
West Fordham Road and I-87 Interchange	8-hour	5.4	5.4	5.4	5.5	0.0	0.1	1.8	1.8

Notes:
1. Includes background.

The increment between the no-build and the build concentrations are 0.0 ppm and 0.1 ppm for the AM and PM periods, respectively. These values are below the *de minimis* criteria.

PM_{10}. For the localized PM_{10} levels, MOBILE6.2 emission factors, projected traffic volumes, and five years of hourly meteorological data were used as inputs to the CAL3QHCR

dispersion model to estimate future PM_{10} levels from traffic in the vicinity of the project. The background 24-hour and annual PM_{10} levels were added to the modeled 24-hour and annual concentrations, respectively. Table 7.11-25 presents the PM_{10} results for year 2009.

TABLE 7.11-25. PREDICTED 24-HOUR AND ANNUAL PM_{10} CONCENTRATIONS FROM CONSTRUCTION WITH THE PROJECT PEAK YEAR 2009 ($\mu g/m^3$)

Intersection	Averaging Time	Ambient AQ Background[2]	Model Result	Total Predicted Conc.[1]	Standard
Peak Year 2009					
West Fordham Road and I-87 Interchange	24-Hours	45	45	90	150
	Annual	21	17	38	50

Note:
1. Total Predicted Concentration = Ambient AQ Background + Model Result.

CAL3QHC and CAL3QHCR Model Results. The estimated CO and PM_{10} concentrations at the selected intersection for year 2009 are predicted to be below the ambient air quality standards without mitigation. Therefore, the results showed that there would be no significant mobile source impacts under the project impact scenario.

Fine Particulate Matter Analysis. For the Future With the Project (Build) scenario localized $PM_{2.5}$ levels, MOBILE6.2 emission factors, projected traffic volumes, and five years of hourly meteorological data were used as inputs to the CAL3QHCR dispersion model to estimate future $PM_{2.5}$ increments from construction traffic for the proposed project. Neighborhood receptors were added, and were located 15 meters (49 feet) from the curb.

$PM_{2.5}$ impacts from project mobile sources were obtained by subtracting the model results of the Future Without the Project (No Build) scenario from the results of the Proposed Action (Build) scenario. The interim mobile source guidance criteria are 5.0 $\mu g/m^3$ for 24-hours and 0.1 $\mu g/m^3$ for annual neighborhood scale concentrations. Tables 7.11-26 presents the $PM_{2.5}$ results for year 2009.

TABLE 7.11-26. PREDICTED 24-HOUR AND ANNUAL $PM_{2.5}$ CONCENTRATIONS DURING CONSTRUCTION WITH THE PROJECT PEAK YEAR 2009 ($\mu g/m^3$)

Intersection	Averaging Time	Build Result	No Build Result	Project Increment	Interim Criteria
Peak Year 2009					
West Fordham Road And I-87 Interchange	24-hour	6.44	6.40	0.04	5.0
	Annual	0.39	0.39	0.00	0.1

In summary, the mobile source $PM_{2.5}$ analysis determined the maximum predicted incremental impacts and compared them with the interim guidance criteria. Predicted increments were determined by subtracting the Future Without the Project scenario results from the Future With the Project scenario.

The interim guidance criteria are 5.0 µg/m^3 for 24-hours microscale and 0.1 µg/m^3 for annual neighborhood scale concentrations. The maximum predicted 24-hour $PM_{2.5}$ incremental concentrations, presented in Tables 7.11-26, are below the interim guidance criteria concentration of 5.0 µg/m^3. The annual maximum $PM_{2.5}$ increments are also predicted to be below the neighborhood interim guidance criteria concentration of 0.1 µg/m^3. No potential significant or adverse $PM_{2.5}$ impacts are predicted as a result of the construction related mobile sources.

7.11.3.2.3. Total $PM_{2.5}$ Impacts

In order to address the issue of the combined air quality impacts of the construction activities with the offsite mobile sources it was conservatively assumed that maximum impacts for both on-site and off-site sources occurred simultaneously. Concentrations of $PM_{2.5}$ from the construction activities (that was calculated adjacent to the off-street location of concern) were then combined with the concentrations due to the offsite sources. The highest predicted 24 hour concentration from the total impacts was less than those projected at the nearest sensitive use that are described above, and less than the interim guidance criteria of 5 µg/m^3.