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

6.10. NOISE ANALYSIS

6.10.1. Introduction

This noise analysis is divided into two types: mobile source and stationary source. Mobile source noise is analyzed because of the potential of noise generated from vehicles traveling on roadways near sensitive land uses. Included in this type of noise is construction traffic. Stationary source noise describes the sound level emanating from a property. Both mobile and stationary source noise levels were analyzed using the noise descriptor L_{eq}. L_{eq} is the continuous equivalent sound level, defined as the single sound pressure level that, if constant over the stated measurement period, would contain the same sound energy as the actual monitored sound that is fluctuating in level over the measurement period. The methodology used to prepare this analysis is presented in Section 4.10, Data Collection and Impact Methodologies, Noise.

6.10.1.1. Preliminary Noise Screening for Mobile Source Noise Analysis

As outlined in the methodologies section, and as the initial step in the mobile source noise analysis, a preliminary noise screening using passenger car equivalence (PCE) values was performed to determine whether receptors located near the identified noise-sensitive route segments would experience an increase in noise level of 3 dBA or more as a result of the additional vehicular traffic generated by the project. Existing and future anticipated traffic data for the noise-sensitive route segments in the vicinity of the proposed Croton Water Treatment Plant (Croton project) site were analyzed to determine a PCE value for each segment for the morning peak hour, the afternoon peak hour, and the lowest traffic-volume off-peak (i.e. quietest) hour for the existing condition. The preliminary noise screening was performed by comparing the existing PCEs with existing PCEs plus the addition of the future project-generated PCEs. The equation shown below was used for this comparison. Future PCEs would be from additional traffic resulting from the proposed project.

If $\dfrac{\text{Existing PCEs + Future Project-Generated PCEs}}{\text{Existing PCEs}} > 2.0$ then an impact may occur.

This comparative analysis of existing PCEs and future PCEs was used to determine whether the receptors near the identified noise-sensitive route segments would potentially experience a doubling or more of PCEs. Three decibels (dBA) is the threshold used for screening purposes since it correlates to an increase that is perceptible to human auditory sensitivity. This threshold is used as a guideline to determine whether anticipated project impacts warrant further field measurements and subsequent Traffic Noise Model (TNM) analysis. A doubling of PCEs corresponds to a noise increase of 3 dBA. CEQR has established a project-induced noise level increase threshold of 3-5 dBA at receptors. Route segments that did not experience a doubling of PCEs due to project-induced traffic, therefore, would not exceed this impact threshold.

The two time periods representing the largest increase in future PCEs resulting from the proposed operations and construction activities were used for the comparative analysis. The anticipated PCEs from normal operations for the Future With the Project year (2011) were used for the operations analysis. The anticipated construction-related peak truck traffic year (2007) was selected for the construction analysis. Following the preliminary noise screening using the comparative PCE analysis for the operations and construction years, it was determined that the route segments with sensitive receptors would not experience a doubling of PCEs and therefore would not experience a 3 dBA increase in noise level.

Tables 6.10-1 and 6.10-2, respectively, present the comparison of future PCEs to existing PCEs along route segments for project operations and construction.

6.10.2. Baseline Conditions

6.10.2.1. Existing Conditions

6.10.2.1.1. Mobile Source Noise

The roadways considered for mobile source noise analysis at the proposed plant site are those presented in Table 6.10-3 and Figure 6.10-1. The roadways considered for analysis were those local routes identified as possible transportation routes that connect the major thoroughfares to the site. Sensitive receptors along the proposed project's transportation routes were identified. Route segments that did not contain sensitive receptors along them were not considered for further noise analysis. For the site, the major thoroughfare for commercial vehicles (i.e. trucks) is the Major Deegan Expressway (I-87) to the north of the site. Commuter traffic (i.e. passenger cars) could use the Bronx River Parkway to the east, the Mosholu Parkway to the west, and the I-87. Therefore, the potential for noise impacts along those proposed project transportation routes connecting the I-87, Bronx River Parkway, and the Mosholu Parkway to the site was evaluated.

TABLE 6.10-1. COMPARISON OF EXISTING AND FUTURE TRAFFIC VOLUMES FROM OPERATIONS IN VICINITY OF MOSHOLU SITE (2011)

	Location	Period of Analysis	Time	Existing PCEs	New Passenger Car	New Trucks	New PCEs	PCE Ratio	Incremental Change in dbA	Further Analysis Required?
1	233rd Street between Jerome Avenue and Bronx River Parkway	Weekday AM Peak	7:45-8:45 AM	5733	1	1	48	1.01	0.04	No
		Weekday PM Peak	5:00-6:00 PM	4231	1	1	48	1.01	0.05	No
		Weekday Off-peak	6:00-7:00 AM	4334	1	1	48	1.01	0.05	No
		Saturday Off-peak	6:00-7:00 AM	1851	2	0	2	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	4178	2	0	2	1.00	0.00	No
2	Jerome Avenue between 233rd Street and Bainbridge Avenue	Weekday AM Peak	7:45-8:45 AM	3690	6	1	53	1.01	0.06	No
		Weekday PM Peak	5:00-6:00 PM	2882	17	1	64	1.02	0.10	No
		Weekday Off-peak	6:00-7:00 AM	1688	2	1	49	1.03	0.12	No
		Saturday Off-peak	6:00-7:00 AM	797	2	0	2	1.00	0.01	No
		Saturday Peak	2:00-3:00 PM	1705	2	0	2	1.00	0.01	No
3	Jerome Ave between Bainbridge Avenue and Gun Hill Road	Weekday AM Peak	7:45-8:45 AM	2173	8	0	8	1.00	0.02	No
		Weekday PM Peak	5:00-6:00 PM	1485	8	0	8	1.01	0.02	No
		Weekday Off-peak	6:00-7:00 AM	1052	2	0	2	1.00	0.01	No
		Saturday Off-peak	6:00-7:00 AM	1318	2	0	2	1.00	0.01	No
		Saturday Peak	2:00-3:00 PM	1122	2	0	2	1.00	0.01	No
4	Bainbridge Avenue between Jerome Avenue and East Gun Hill Road	Weekday AM Peak	7:45-8:45 AM	1421	0	0	0	1.00	0.00	No
		Weekday PM Peak	5:00-6:00 PM	1492	0	0	0	1.00	0.00	No
		Weekday Off-peak	6:00-7:00 AM	1118	0	0	0	1.00	0.00	No
		Saturday Off-peak	6:00-7:00 AM	1062	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	1228	0	0	0	1.00	0.00	No
5	West Gun Hill Road between Jerome Avenue and Mosholu Parkway	Weekday AM Peak	7:45-8:45 AM	2362	5	0	5	1.00	0.01	No
		Weekday PM Peak	5:00-6:00 PM	1516	5	0	5	1.00	0.01	No
		Weekday Off-peak	6:00-7:00 AM	1150	2	0	2	1.00	0.01	No
		Saturday Off-peak	6:00-7:00 AM	841	2	0	2	1.00	0.01	No
		Saturday Peak	2:00-3:00 PM	1315	2	0	2	1.00	0.01	No
6	East Gun Hill Road between Jerome Park Avenue and Bronx River Parkway	Weekday AM Peak	7:45-8:45 AM	2575	0	0	0	1.00	0.00	No
		Weekday PM Peak	5:00-6:00 PM	2171	0	0	0	1.00	0.00	No
		Weekday Off-peak	6:00-7:00 AM	1438	0	0	0	1.00	0.00	No
		Saturday Off-peak	6:00-7:00 AM	1114	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	2520	0	0	0	1.00	0.00	No

Notes:

New PCEs = (no. of cars + no. of trucks(47))

PCE ratio = (Existing PCEs + Project generated PCEs) / Existing PCEs

Incremental change in dBA = 10 log (PCE ratio)

Methodology to establish peak and off-peak hours existing and project-induced PCEs discussed in Data Collection and Impact Methodologies, Section 4.10, Noise

Quietest hour existing PCEs calculated from traffic data (automatic traffic recorders, vehicle classifications, and turning movement counts). ATRs and VCs were used to establish traffic volume and mix along a route segment. Where ATRs were not available, the TMC count from the peak hour for the adjacent intersection was used to establish the trip assignment for the route segment. ATR and VC data from the nearest physically similar route sement for the quietest hour was used to establish volume and mix.

Quietest hour project-induced PCEs derived by assuming deliveries constant between 7 AM and 5 PM. Route segments established in Traffic Analysis Section.

TABLE 6.10-2. COMPARISON OF EXISTING AND FUTURE TRAFFIC VOLUMES FROM CONSTRUCTION IN VICINITY OF MOSHOLU (2007)

	Location	Period of Analysis	Time	Existing PCEs	New Passenger Car	New Trucks	New PCEs	PCE Ratio	Incremental Change in dbA	Exceeds 3 dBA Threshold?
1	233rd Street between Jerome Avenue and Bronx River Parkway	Weekday AM Peak	7:45-8:45 AM	5733	15	2	109	1.02	0.08	No
		Weekday PM Peak	5:00-6:00 PM	4231	15	2	109	1.03	0.11	No
		Weekday Off-peak	6:00-7:00 AM	4334	0	2	94	1.02	0.09	No
		Saturday Off-peak	6:00-7:00 AM	1851	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	4178	0	0	0	1.00	0.00	No
2	Jerome Avenue between 233rd Street and Bainbridge Avenue	Weekday AM Peak	7:45-8:45 AM	3690	138	2	232	1.06	0.26	No
		Weekday PM Peak	5:00-6:00 PM	2882	138	2	232	1.08	0.34	No
		Weekday Off-peak	6:00-7:00 AM	1688	0	2	94	1.06	0.24	No
		Saturday Off-peak	6:00-7:00 AM	797	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	1705	0	0	0	1.00	0.00	No
3	Jerome Ave between Bainbridge Avenue and Gun Hill Road	Weekday AM Peak	7:45-8:45 AM	2173	68	2	162	1.07	0.31	No
		Weekday PM Peak	5:00-6:00 PM	1485	68	2	162	1.11	0.45	No
		Weekday Off-peak	6:00-7:00 AM	1052	0	2	94	1.09	0.37	No
		Saturday Off-peak	6:00-7:00 AM	1318	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	1122	0	0	0	1.00	0.00	No
4	Bainbridge Avenue between Jerome Avenue and East Gun Hill Road	Weekday AM Peak	7:45-8:45 AM	1421	0	0	0	1.00	0.00	No
		Weekday PM Peak	5:00-6:00 PM	1492	0	0	0	1.00	0.00	No
		Weekday Off-peak	6:00-7:00 AM	1118	0	0	0	1.00	0.00	No
		Saturday Off-peak	6:00-7:00 AM	1062	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	1228	0	0	0	1.00	0.00	No
5	West Gun Hill Road between Jerome Avenue and Mosholu Parkway	Weekday AM Peak	7:45-8:45 AM	2362	48	2	142	1.06	0.25	No
		Weekday PM Peak	5:00-6:00 PM	1516	48	2	142	1.09	0.39	No
		Weekday Off-peak	6:00-7:00 AM	1150	0	2	94	1.08	0.34	No
		Saturday Off-peak	6:00-7:00 AM	841	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	1315	0	0	0	1.00	0.00	No
6	East Gun Hill Road between Jerome Park Avenue and Bronx River Parkway	Weekday AM Peak	7:45-8:45 AM	2575	0	0	0	1.00	0.00	No
		Weekday PM Peak	5:00-6:00 PM	2171	0	0	0	1.00	0.00	No
		Weekday Off-peak	6:00-7:00 AM	1438	0	0	0	1.00	0.00	No
		Saturday Off-peak	6:00-7:00 AM	1114	0	0	0	1.00	0.00	No
		Saturday Peak	2:00-3:00 PM	2520	0	0	0	1.00	0.00	No

Notes:

New PCEs = (no. of cars + no. of trucks(47))

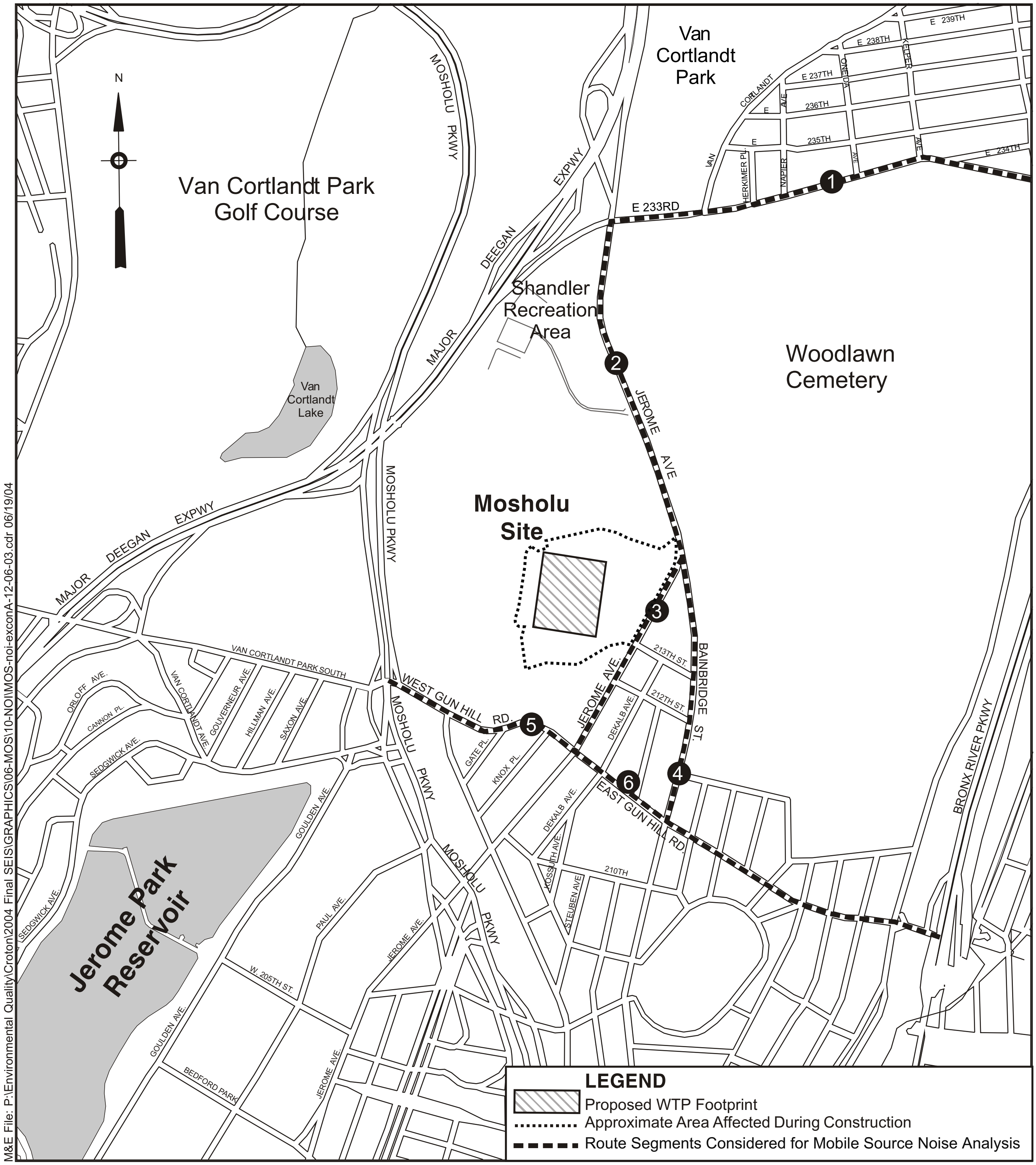
PCE ratio = (Existing PCEs + Project generated PCEs) / Existing PCEs

Incremental change in dBA = 10 log (PCE ratio)

Methodology to establish peak and off-peak hours existing and project-induced PCEs discussed in Data Collection and Impact Methodologies, Section 4.10, Noise

Quietest hour existing PCEs calculated from traffic data (automatic traffic recorders, vehicle classifications, and turning movement counts). ATRs and VCs were used to establish traffic volume and mix along a route segment. Where ATRs were not available, the TMC count from the peak hour for the adjacent intersection was used to establish the trip assignment for the route segment. ATR and VC data from the nearest physically similar route sement for the quietest hour was used to establish volume and mix.

Quietest hour project-induced PCEs derived by assuming deliveries constant between 7 AM and 5 PM. Route segments established in Traffic Analysis Section.



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NOTE: Numbers correspond to route segments listed in Table 6.10 - 3.

Mosholu Site Route Segments Mobile Source Noise Analysis

Figure 6.10-1

TABLE 6.10-3. ROUTE SEGMENTS CONSIDERED FOR MOBILE SOURCE ANALYSIS

No.	Route Segment
1	233rd Street between Jerome Avenue and Bronx River Parkway
2	Jerome Avenue between 233rd Street and Bainbridge Street
3	Jerome Avenue between Bainbridge Street and Gun Hill Road
4	Bainbridge Street between Jerome Avenue and East Gun Hill Road
5	West Gun Hill between Jerome Avenue and Mosholu Parkway
6	East Gun Hill between Jerome Avenue and Bronx River Parkway

Based on the data presented in Tables 6.10-1 and 6.10-2, none of the noise-sensitive route segments would experience a doubling of PCEs. A determination was made that noise-sensitive route segments in the vicinity of the site would not exceed the 3-5 dBA impact threshold established under CEQR.

Trucks (construction related and delivery) have the potential to contribute a far greater incremental noise increase than do passenger cars. Of particular interest, therefore, are those route segments identified as possible truck routes. A detailed analysis of anticipated truck route was performed in order to fully ascertain that noise levels would not exceed the 3-5 dBA threshold. Existing noise measurements were collected along the route segments that were identified as having sensitive receptors and that would experience project-related truck traffic. Monitoring was conducted at representative noise-sensitive receptor locations along Jerome Avenue south of 233rd Street (MGC-M1), and on 233rd Street east of Jerome Avenue (MGC-M2). Measurements were collected during the morning and afternoon peak traffic hours (7:45 - 8:45 AM and 5:00 - 6:00 PM, respectively) and during the lowest traffic volume hour (6:00 – 7:00 AM). Monitoring times were chosen to reflect anticipated construction times (7:00 AM – 6:00 PM). Traffic in the 6:00 – 7:00 AM hour also was considered to account for workers and delivery trucks traveling to the site at the beginning of each workday. Figure 6.10-2 shows the location of mobile source noise receptors MGC-M1 and MGC-M2.

Measured noise levels and TNM-calculated noise levels were compared to each other. Traffic data (including traffic volume, vehicle classification, vehicle direction, and road geometries) were collected on 233rd Street and Jerome Avenue simultaneously with noise measurements. The data gathered were input into TNM to determine if a good correlation existed between the measured existing Leq value and the TNM-calculated existing Leq value. Measured readings within three dBA of the TNM-calculated value represent a good correlation, as this increment of change in noise level is generally not perceptible to the human ear. A good correlation also indicates that vehicular traffic is the dominant noise source. Vehicular traffic was the dominant noise source at the receptor locations selected along noise-sensitive route segments. Noise levels at mobile source receptors, therefore, vary with traffic volumes.

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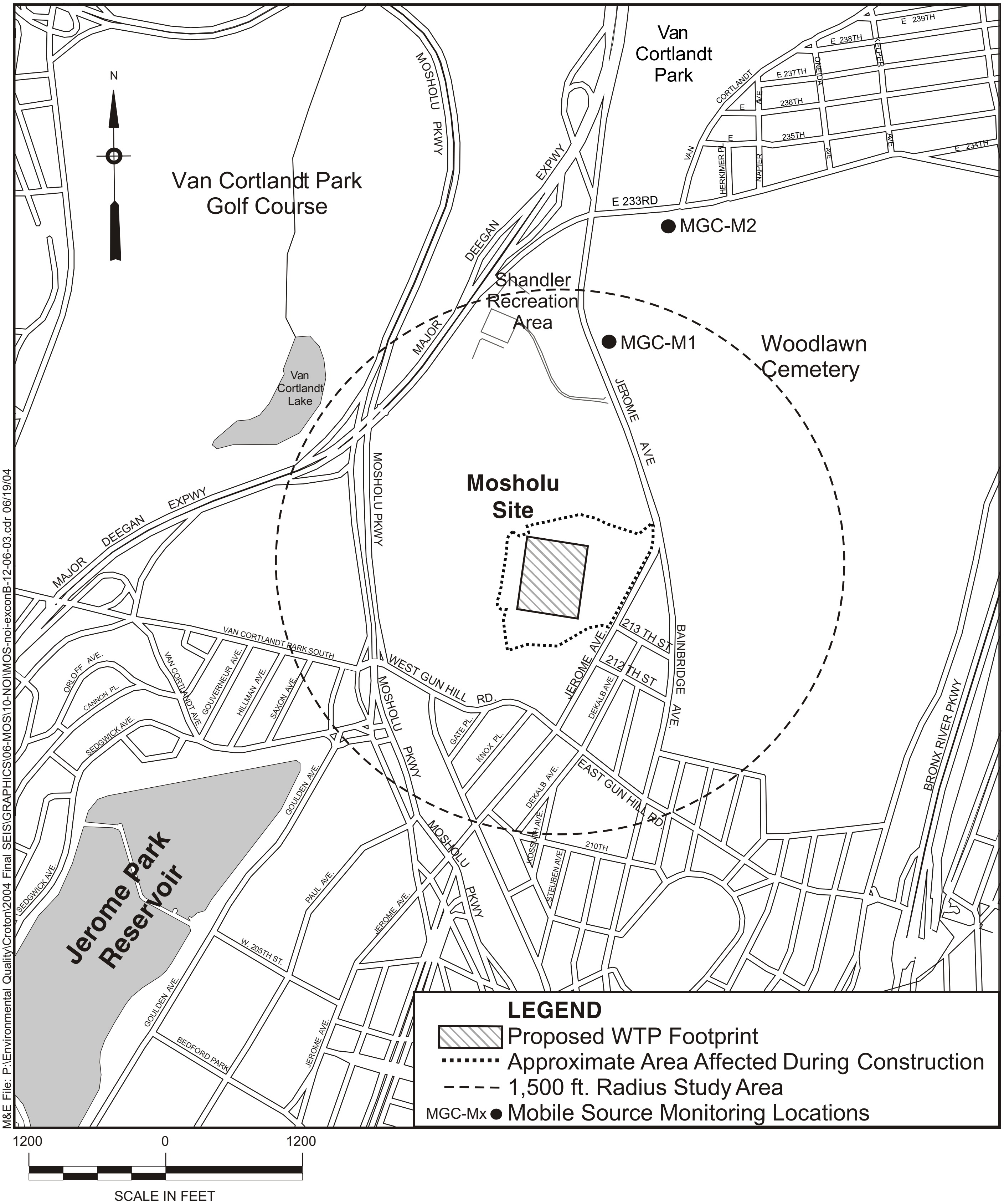


Mosholu Site
Mobile Source
Noise Monitoring Locations

Croton Water Treatment Plant

Figure 6.10-2

Table 6.10-4 compares measured Leq values and TNM-calculated Leq value. The data indicate that a good correlation exists between measured and calculated values, and that vehicle traffic represents the dominant noise source along the roadways.

TABLE 6.10-4. COMPARISON OF MEASURED AND TNM-CALCULATED Leqs ON POSSIBLE TRUCK ROUTES

Monitoring Location	Monitoring Period	Measured Leq (dBA)	TNM From Monitoring Period Data (dBA)
MGC-M1	7:45-8:45 AM (Morning Peak)	70.6	70.9
	5:00-6:00 PM (Afternoon Peak)	68.4	70.8
	6:00-7:00 AM (Off-peak)	68.7	69.8
MGC-M2	7:45-8:45 AM (Morning Peak)	72.6	74.0
	5:00-6:00 PM (Afternoon Peak)	72.4	72.5
	6:00-7:00 AM (Off-peak)	71.9	71.3

Once it was determined that a good correlation existed between the measured and TNM-calculated noise levels, the traffic data collected for 233rd Street and Jerome Avenue during the traffic count program (corresponding to the monitoring periods listed above) was entered into TNM. Table 6.10-5 presents two sets of TNM-calculated Leq values; one calculated using the traffic count program data and another calculated using data collected during the noise monitoring. The minor discrepancies between the two TNM calculated Leq values were a result of normal traffic variations over different days. The TNM values for each time period, however, were each still within 3 dBA and therefore represent a good correlation. The measured noise levels were considered a better reflection of actual noise levels experienced at the various noise receptors. The measured existing noise levels presented in Table 6.10-4 therefore served as the basis for further analysis.

TABLE 6.10-5. EXISTING CONDITIONS ON POTENTIAL TRUCK ROUTES AT MONITORING LOCATIONS USING TRAFFIC COUNT PROGRAM DATA

Monitoring Location	Monitoring Period	TNM From Monitoring Period Data (dBA)	TNM Calculated From Traffic Count Program Data (dBA)
MGC-M1	7:45-8:45 AM (Morning Peak)	70.9	71.7
	5:00-6:00 PM (Afternoon Peak)	70.8	70.9
	6:00-7:00 AM (Off-peak)	69.8	68.7
MGC-M2	7:45-8:45 AM (Morning Peak)	74.0	74.2
	5:00-6:00 PM (Afternoon Peak)	72.5	72.6
	6:00-7:00 AM (Off-peak)	71.3	73.2

6.10.1.1.1. Stationary Source Noise

Stationary source noise monitoring was performed to establish existing baseline conditions at the proposed water treatment plant site. Specifically, baseline monitoring established the existing noisiest and quietest periods throughout the day. Noise monitoring was performed at the western and southern boundaries of the proposed construction site (see Figure 6.10-3). The dominant existing noise source at these locations was from traffic in the streets surrounding the park and from the elevated subway line that runs along Jerome Avenue. The contribution of the elevated subway line that runs along Jerome Avenue was incorporated in the baseline measurements.

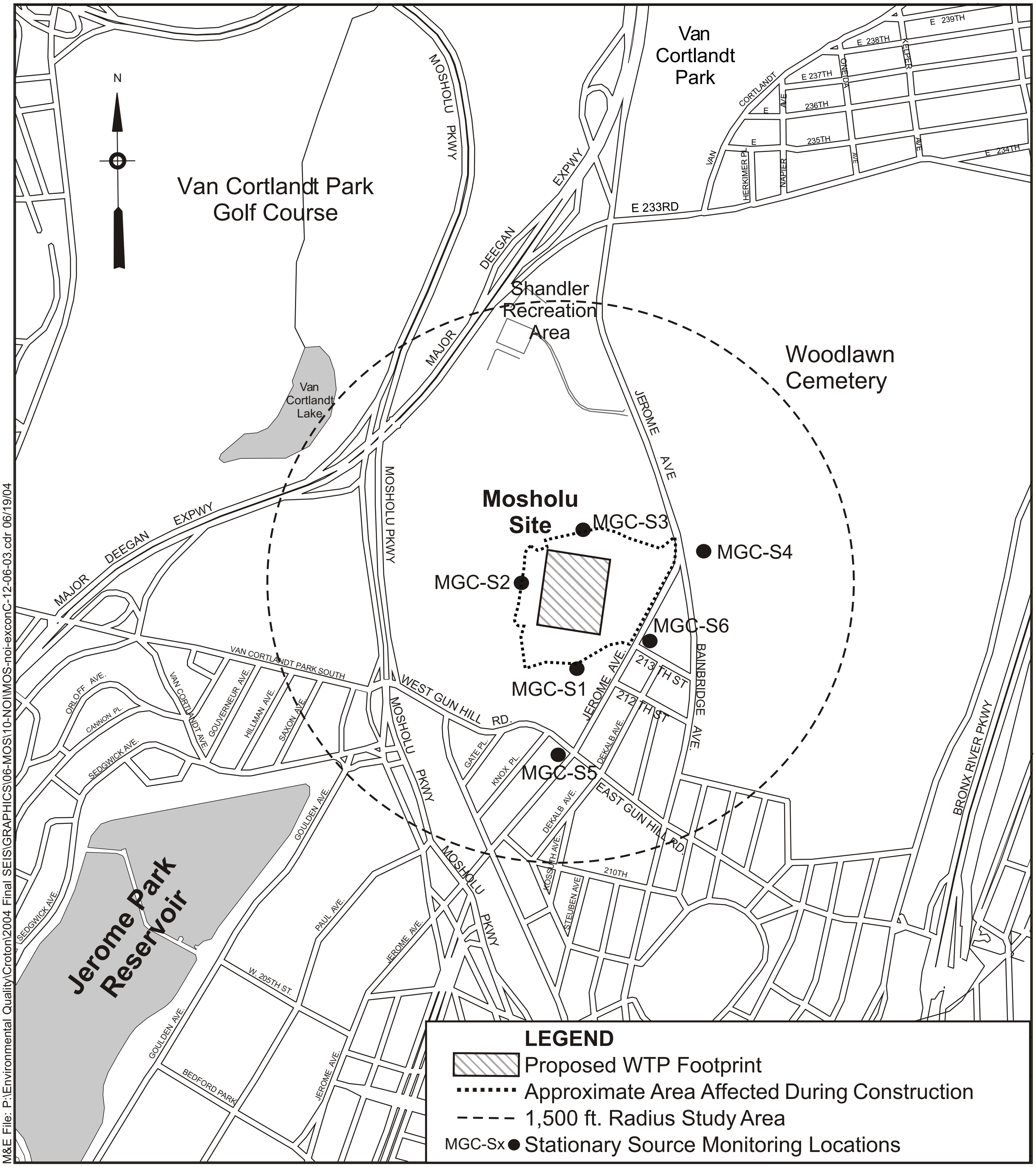
Noise level measurements were collected for 24 hours on a weekday (Tuesday through Thursday) and on a Sunday. These monitoring periods were performed to take into account both the anticipated construction and operations schedules at the proposed plant. Plant operations would be continuous (24-hours a day and seven days a week). Construction activities are anticipated to take place on Monday through Friday from 7:00 AM to 6:00 PM.

Weekday Baseline Monitoring. The 24-hour baseline noise levels measured along the south boundary of the proposed construction line (MGC-S1) on a weekday are presented in Table 6.10-6. For proposed operating hours (i.e. 24 hours), the existing noise level during the quietest period (between 2:00 AM and 3:00 AM) had a Leq of 53.0 dBA and the noisiest period (between 8:00 and 9:00 AM) had a Leq of 64.8 dBA. For proposed construction hours (between 7:00 AM and 6:00 PM) the existing noise level during the quietest period (between 10:00 AM and 11:00 AM, 12:00 and 1:00 PM, and 2:00 and 3:00 PM) had Leqs of 60.0 dBA. The noisiest period corresponding to proposed construction hours (between 8:00 and 9:00 AM) had a Leq of 64.8

TABLE 6.10-6. MEASURED BASELINE 24-HOUR NOISE LEVELS ON SOUTH BOUNDARY (MGC-S1) – WEEKDAY (Leq, dBA)

Hourly Noise Levels												
TIME	12	1	2	3	4	5	6	7	8	9	10	11
AM	56.4	54.3	**53.0**	54.1	59.1	57.8	60.4	61.1	**64.8**	61.6	**60.0**	61.8
PM	**60.0**	61.2	**60.0**	60.4	60.5	61.6	60.9	61.8	61.8	57.8	58.2	57.4

The baseline noise levels measured on the west boundary of the proposed construction line (MGC-S2) on a weekday are presented in Table 6.10-7. This location, which is located within the Mosholu Golf Course, was only measured between 6:00 AM and 7:00 PM. These hours correspond to the golf course opening hours. For proposed operating hours, the existing noise level during the quietest period (between 6:00 AM and 7:00 AM) had a Leq of 51.6 dBA and the noisiest period (between 11:00 AM and 2:00 PM) had a Leq of 55.1 dBA. For proposed construction hours (between 7:00 AM and 6:00 PM) the existing noise level during the quietest period (between 7:00 AM and 8:00 AM) had a Leq of 52.2 dBA. The noisiest period corresponding to proposed construction hours (between 11:00 AM and 2:00 PM) had a Leq of 55.1 dBA



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NOTE: S1 and S2 are also 24-hour monitoring locations.

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Mosholu Site Stationary Source Noise Monitoring Locations

Figure 6.10-3

TABLE 6.10-7. MEASURED BASELINE 13-HOUR NOISE LEVELS ON WEST BOUNDARY (MGC-S2) – WEEKDAY (Leq, dBA)

Hourly Noise Levels												
TIME	12	1	2	3	4	5	6	7	8	9	10	11
AM	na	na	na	na	na	na	**51.6**	**52.2**	52.8	53.6	53.8	**55.1**
PM	**55.1**	**55.1**	54.3	54.3	53.5	55.1	54.2	na	na	na	na	na

Sunday Baseline Monitoring. The 24-hour baseline noise levels measured on the south boundary on a Sunday are presented in Table 6.10-8. This monitoring period corresponded only with the proposed plant operating hours as construction activities would not occur on weekends. The quietest period (between 4:00 AM and 5:00 AM) had a Leq of 52.6 dBA and the noisiest period (between 6:00 PM and 7:00 PM) had a Leq of 60.9 dBA.

TABLE 6.10-8. MEASURED BASELINE 24-HOUR NOISE LEVELS ON SOUTH BOUNDARY (MGC-S1) – SUNDAY (Leq, dBA)

Hourly Noise Levels												
TIME	12	1	2	3	4	5	6	7	8	9	10	11
AM	54.8	53.2	54.8	53.1	**52.6**	55.6	56.8	**55.7**	56.6	58.0	59.0	59.9
PM	58.7	60.9	59.9	60.5	59.9	61.1	**60.9**	60.6	58.1	58.1	56.5	58.1

The baseline noise levels measured on the west boundary on a Sunday are presented in Table 6.10-9. This monitoring period corresponded only with the opening hours of the golf course and with the proposed operating hours of the plant as construction activities would not occur on weekends. The quietest period (between 10:00 AM and 11:00 AM) had a Leq of 51.9 dBA and the noisiest period (between 3:00 PM and 4:00 PM) had a Leq of 54.6 dBA.

TABLE 6.10-9. MEASURED BASELINE 13-HOUR NOISE LEVELS ON WEST BOUNDARY (MGC-S2) – SUNDAY (Leq, dBA)

Hourly Leq (dBA)												
TIME	12	1	2	3	4	5	6	7	8	9	10	11
AM	na	na	na	na	na	na	na	53.8	52.9	52.2	**51.9**	52.3
PM	52.4	53.7	53.6	**54.6**	53.6	52.2	52.8	na	na	na	na	na

Following baseline monitoring, 20-minute measurements were taken at representative sensitive receptors proximate to the site that may experience a noise impact due to construction and/or operations activities (see Figure 6.10-3 above). Measurements were taken during the quietest and noisiest periods on a weekday and Sunday as determined by the baseline monitoring

Measurements were conducted at each receptor during those hours that the receptor was sensitive to noise contributions. Residences were assumed to be occupied (and therefore sensitive to noise contributions) at all times. Table 6.10-10 presents details concerning the proximate receptors.

TABLE 6.10-10. DESCRIPTION OF NOISE SENSITIVE RECEPTORS FOR STATIONARY NOISE SOURCE ANALYSIS

Receptor Name	Description of Receptors
MGC-S1	Saturn Playground (Van Cortlandt Park)
MGC-S2	Mosholu Golf Course (west of proposed construction zone)
MGC-S3	Shandler Recreation Area (Van Cortlandt Park)
MGC-S4	Woodlawn Cemetery
MGC-S5	Residences at intersection of West Gun Hill Road and Jerome Avenue
MGC-S6	Residences at intersection of Jerome Avenue and 213th Street

Weekday Monitoring at Receptors. Noise levels from twenty-minute weekday monitoring periods at proximate receptors are presented in Table 6.10-11. The noisiest and quietest time periods described below correspond to those times as established by baseline monitoring.

TABLE 6.10-11. TWENTY-MINUTE MEASURED NOISE LEVELS AT SENSITIVE RECEPTORS – WEEKDAY[1] (Leq, dBA)

Monitoring Location	Monitoring Period	Monitoring Time	Noise Level
MGC-S1	Noisiest (daytime)	8:00 – 9:00 AM	64.8
	Quietest (daytime)	2:00 – 3:00 PM	60.0
MGC-S2	Noisiest (daytime)	11:00 AM – 2:00 PM	55.1
	Quietest (daytime)	7:00 AM – 8:00 AM	52.2
	Quietest (non-const.)	6:00 – 7:00 AM	51.6
MGC-S3	Noisiest (daytime)	8:00 – 9:00 AM	56.4
	Quietest (daytime)	2:00 – 3:00 PM	53.4
MGC-S4	Noisiest (daytime)	8:00 – 9:00 AM	64.8
	Quietest (daytime)	12:00 – 1:00 PM	59.1
MGC-S5	Quietest (evening)	3:00 – 4:00 AM	69.7
MGC-S6	Noisiest (daytime)	8:00 – 9:00 AM	66.1
	Quietest (daytime)	12:00 – 1:00 PM	65.5
	Quietest (evening)	3:00 – 4:00 AM	63.9

[1] Measurements applicable to both operations and construction times.

Sunday Monitoring at Receptors. Noise levels from twenty-minute Sunday monitoring periods at the proximate receptors are presented in Table 6.10-12. The noisiest and quietest time periods described below correspond to those times as established by baseline monitoring.

TABLE 6.10-12. TWENTY-MINUTE MEASURED NOISE LEVELS AT SENSITIVE RECEPTORS – SUNDAY[1] (Leq, dBA)

Monitoring Location	Monitoring Period	Monitoring Time	Noise Level
MGC-S1	Noisiest (daytime)	5:00 – 7:00 PM	61.1
	Quietest (daytime)	7:00 – 8:00 AM	55.7
MGC-S2	Noisiest (daytime)	3:00 – 4:00 PM	54.6
	Quietest (daytime)	10:00 – 11:00 AM	51.9
MGC-S3	Noisiest (daytime)	5:00 – 7:00 PM	57.6
	Quietest (daytime)	7:00 – 8:00 AM	52.5
MGC-S4	Noisiest (daytime)	5:00 – 7:00 PM	66.9
	Quietest (daytime)	8:00 – 9:00 AM	56.8
MGC-S5	Quietest (nighttime)	3:00 – 5:00 AM	63.2
MGC-S6	Noisiest (daytime)	5:00 – 7:00 PM	65.7
	Quietest (nighttime)	3:00 – 5:00 AM	61.6

[1] Measurements applicable to operations times only (no construction on weekends).

6.10.2.2. Future Without the Project

The Future Without the Project considerations included the anticipated year of operation (2011) for the proposed Croton project and the anticipated year of peak construction for both mobile (2007) and stationary source noise (2006).[1]

6.10.1.1.1. Mobile Source Noise

Future Without the Project mobile source noise levels for the peak construction and operation years were calculated for those noise-sensitive route segments that are anticipated to experience project-related truck traffic (233rd Street and Jerome Avenue). The peak construction-related truck traffic year (2007) and the future operation year (2011) were analyzed. For the Future Without the Project condition, the noise environment was established by evaluating future traffic patterns and planned developments in the vicinity of the plant site. A

[1] Construction trucks are the types of trucks that would generate the greatest incremental change in noise levels along noise-sensitive route segments. The year with the month that had the greatest number of construction trucks traveling the roads to and from the Mosholu site therefore was selected for the mobile source analysis. Based on engineering resource projections, the months with the highest volume of truck traffic would be December 2006 through April 2007. 2007, therefore, was selected as the peak year for construction-related mobile source analysis. The anticipated year of construction for the stationary noise source analysis was determined by analyzing noise levels at receptors based on engineering projections of monthly construction-equipment loading. The year with the greatest noise levels resulting from construction activities at the proposed site (2006) was used as the analysis year for stationary construction noise. This is discussed in greater detail in the Potential Construction Impacts section below.

traffic growth factor of 0.5 per cent per year accounted for nominal background increases over time. This growth factor was applied to the existing traffic volumes along 233rd Street and Jerome Avenue in order to calculate traffic volumes for the Future Without the Project condition.

Noise levels along the selected route segments for 2007 and 2011 were predicted with TNM using the calculated Future Without the Project traffic volumes. The incremental change between the noise levels for the TNM-calculated existing conditions and the TNM-calculated Future Without the Project conditions were then added to the measured existing condition noise levels. This noise level was representative of the noise that would be experienced at the sensitive receptors along the studied route segments for the future operation year (2011) and anticipated peak construction year (2007).

Operations Year – 2011. Table 6.10-13 compares existing noise levels to the noise levels for the Future Without the Project year corresponding to the operations year (2011) at sensitive receptor locations. For monitoring location MGC-M1 (located on Jerome Avenue), the incremental change from the existing to the future condition was 0.3 dBA for each of the monitoring periods. For monitoring location MGC-M2 (located on 233rd Street), the greatest incremental change from the existing to the future condition was 0.3 dBA for the period 7:45 am through 8:45 am.

TABLE 6.10-13. FUTURE WITHOUT THE PROJECT NOISE LEVELS AT TRUCK ROUTES FOR 2011 (Leq, dBA)

Monitoring Location	Monitoring Period	Measured Existing L_{eq}	TNM Calculated From Traffic Count Program Data (dBA)	TNM-Calculated Future Without (2011)	Incremental Change	Future Without the Project L_{eq} (2011)
MGC-M1	7:45-8:45 AM	70.6	71.7	72.0	0.3	70.9
	5:00-6:00 PM	68.4	70.9	71.2	0.3	68.7
	6:00-7:00 AM	68.7	68.7	69.0	0.3	69.0
MGC-M2	7:45-8:45 AM	72.6	74.2	74.5	0.3	72.9
	5:00-6:00 PM	72.4	72.6	72.8	0.2	72.6
	6:00-7:00 AM	71.9	73.2	73.4	0.2	72.1

Incremental Change=TNM-calculated future without minus TNM-calculated existing
Future Without the Project (2011) = Measured Existing plus Incremental change

Peak Construction Year – 2007. Table 6.10-14 compares existing noise levels to the noise levels for the Future Without the Project year corresponding to the operations year (2007) at sensitive receptor locations. For monitoring location MGC-M1 (receptor located on Jerome Avenue), the maximum incremental change from the existing to the future condition was 0.2 dBA for the monitoring period between 6:00 am through 7:00 am. For monitoring location MGC-M2 (receptor located on 233rd Street), the incremental change from the existing to the future condition was 0.2 dBA for each of the monitoring periods.

TABLE 6.10-14. FUTURE WITHOUT THE PROJECT NOISE LEVELS AT TRUCK ROUTES FOR 2007 (Leq, dBA)

Monitoring Location	Monitoring Period	Measured Existing Noise Level	TNM-Calculated Existing Noise Level	TNM-Calculated Future Without (2007)	Incremental Change	Future Without the Project Noise Level (2007)
MGC-M1	7:45-8:45 AM	70.6	71.7	71.9	0.2	70.8
	5:00-6:00 PM	68.4	70.9	71.1	0.2	68.6
	6:00-7:00 AM	68.7	68.7	69.0	0.3	69.0
MGC-M2	7:45-8:45 AM	72.6	74.2	74.4	0.2	72.8
	5:00-6:00 PM	72.4	72.6	72.8	0.2	72.6
	6:00-7:00 AM	71.9	73.2	73.4	0.2	72.1

Incremental Change=TNM-calculated future without minus TNM-calculated existing
Future Without the Project (2007) = Measured Existing plus Incremental change

6.10.2.2.1. Stationary Source Noise

The anticipated peak year of construction for the stationary noise source analysis was determined by analyzing noise levels at receptors based on monthly construction-equipment loading. This is discussed in greater detail in the Potential Construction Impacts section below. Future Without the Project noise levels at proximate receptor locations for the construction and operation phases of the proposed project were determined for the build year (2011) and the peak stationary source construction year (2006). A review of future planned developments in the vicinity of the Mosholu site for the years 2011 and 2006 revealed no new additional stationary noise sources that would be anticipated to increase the existing background noise levels at proximate receptor locations. Therefore, the future baseline noise levels at stationary source receptors located near the proposed plant for both 2011 and 2006 were not anticipated to change from existing noise levels measured during the noise monitoring program and presented in Section 6.10.2.1.2.

6.10.3. Potential Impacts

6.10.3.1. Potential Project Impacts

The anticipated year of operation for the proposed plant is 2011. Therefore, potential project-induced noise level increases were assessed by comparing the Future With the Project year (2011) noise levels to the Future Without the Project year (2011) noise levels.

The potential additional noise generated by the proposed plant during normal operations was analyzed at sensitive receptor locations in the vicinity of the water treatment plant site. As part of the mobile and stationary source analysis, future noise levels for the Future Without the Project year (2011) were projected by adding the noise contribution from equipment used during operations to the future baseline noise level.

6.10.3.1.1. Mobile Source Noise

Potential project-induced noise level increases from mobile noise sources resulting from the proposed project were assessed. The total traffic volume and vehicle mix along the noise-sensitive route segment for the future build year (2011) were established by adding future operation-induced traffic to the Future Without the Project traffic. Total noise levels from mobile sources for the year 2011 then were calculated using TNM. The incremental change between the TNM-calculated Future Without the Project and the TNM-calculated operation-induced noise levels thereby was established. This incremental change was then added to the Future Without the Project Leq presented in Table 6.10-15, and a determination was made as to whether operation-induced traffic resulted in a 3-5 dBA increase in noise levels.

Table 6.10-15 presents operation year (2011) mobile source noise levels data. The greatest incremental change from Future Without the Project to Future With the Project was predicted to be 0.2 dBA.

TABLE 6.10-15. FUTURE NOISE LEVELS AT MOBILE SOURCE RECEPTORS DURING OPERATIONS (2011) (Leq, dBA)

Monitoring Location	Monitoring Period	Future Without the Project (2011)	TNM-Calculated Future Without	TNM-Calculated Future With the Project (2011)	Incremental Change	Exceed Threshold? (Yes/No)
MGC-M1	7:45-8:45 AM	70.9	72.0	72.1	0.1	No
	5:00-6:00 PM	68.7	71.2	71.3	0.1	No
	6:00-7:00 AM	69.0	69.0	69.2	0.2	No
MGC-M2	7:45-8:45 AM	72.9	74.5	74.5	0.0	No
	5:00-6:00 PM	72.6	72.8	72.9	0.1	No
	6:00-7:00 AM	72.1	73.4	73.5	0.1	No

Future With the Project=Future Without (2011) + Incremental change

On the basis of the detailed analysis of mobile source impacts, it was concluded that the contribution of mobile source noise to the total operations-generated noise level would not result in noise level increases that exceed the 3-5 dBA used to define significance.

6.10.3.1.2. Stationary Source Noise

The Future With the Project noise levels at each of the receptors was established by adding the noise contribution from operations to the baseline noise level for the future analysis year (2011). Potential impacts from noise generated by the equipment used during normal operations at the proposed plant site were determined for the sensitive receptors identified near the water treatment plant. Figure 6.10-3 shows the location of the sensitive receptors.

Engineering drawings were used to determine the location of equipment within the plant to establish the distance between the equipment to each receptor. The proposed design of the water treatment plant at the Mosholu site would result in the main process building being underground.

Upon completion of construction activities, the water treatment plant would be approximately three to five feet below grade. Bedrock varies between seven and sixteen feet below grade. The water treatment plant process building would be underground, encased in concrete, and set in bedrock (starting at approximately 7 feet below grade). A six-inch concrete wall can typically provide 40 dBA of sound transmission loss. A four-inch rock wall can provide an additional 40 dBA of sound transmission loss. Given the design of the water treatment plant, which provides for the top of the plant to be greater than 4 inches deep, it was qualitatively determined that noise generated by equipment below ground would not be heard at above-ground receptors. A noise analysis that included operations equipment located underground therefore was not performed.

The only above-ground process-related equipment would be the truck arrivals/receiving building and the louvers that connect to the heating, ventilation, and air-conditioning (HVAC) equipment. Whereas the HVAC equipment itself would be underground, the louvers to which they would be connected would be above ground and may contribute to incremental increases in noise levels. The proposed design plans for the HVAC louvers to run along the sides of the driving range in an east-west direction. The louvers would run for approximately 300 feet on the north and south sides of the driving range. The louvers would be embedded in an ornamental rock setting that would measure sixteen feet high. The louvers themselves would be three feet off the ground, eight feet high, and would face inwards towards the driving range. The orientation of the louvers towards the driving range would minimize any operation noise experienced at the sensitive receptors, which are located away from the driving range.

The arrivals/receiving building would be located to the north of the site and would receive delivery trucks arriving at the plant. A maximum of eight trucks per day would be received at the water treatment plant. Therefore, an average of one truck per hour would be anticipated at the water treatment plant during normal daytime operations. This equates to two truck trips per hour; one as the delivery truck arrives at the water treatment plant and one as it leaves.

A noise prediction algorithm was used to calculate the noise levels resulting from the above-ground plant operations at each of the receptors. The noise algorithm[2] considered the noise levels of operations equipment and the distance from the equipment to the receptor. The algorithm is presented and discussed in greater detail in Section 4.10, Data Collection and Impact Methodologies, Noise. For the purpose of this analysis, it was assumed that the plant was running at maximum capacity, which would correspond to the maximum possible operations noise. Table 6.10-16 presents the HVAC equipment that would be connected to the louvers and therefore may contribute to a noise impact. The associated noise level and the quantity of each equipment type that would be used at the proposed plant also are presented. For each identified piece of equipment, the noise level under normal operating conditions was established from manufacturer's specifications.

[2] City of New York. October 2001. CEQR Technical Manual.

TABLE 6.10-16. OPERATIONS EQUIPMENT DATA FOR MOSHOLU SITE

Equipment Name	Number of Equipment[1]	Equipment Noise Level (dBA)[2]	Reference Distance (feet)
HVAC			
Heating and Ventilating Units	17	82	3.3
Air Conditioning	6	80	3.3
Exhaust Fans	13	78	3.3
OUTSIDE SOURCES			
Truck Chemical uploading Bay South	2	80	50
Truck Loading Bay North	2	80	50

[1] Equipment to be used in water treatment plant established from engineering drawings.
[2] Noise levels established by contacting manufacturer.

In calculating the noise levels at the respective sensitive receptors, line of sight of the louvers to the receptors was considered. For example, there would be no direct line of sight between receptors to the south of the site (MGC-S1 and MGC-S5) and the louvers on the south side of the driving range. These louvers would face to the north and would be backed by the ornamental rock setting, effectively attenuating noise received at receptors to the south. In this example, noise emanating from these louvers would not be heard at Receptors MGC-S1 and MGC-S5, and this equipment was not included in calculating noise levels at those receptors that lie to the south of the site.

Normal operations at the completed water treatment plant are not anticipated to vary much over the course of a day. Noise levels from normal operations equipment, therefore, also are not anticipated to vary. Since the proposed plant would operate continuously (24 hours a day and 7 days a week), both daytime and nighttime analyses were conducted. However, trucks are anticipated to make deliveries only during weekdays between the hours of 7:00 AM and 5:00 PM. Idling trucks and off-loading activities would represent an additional on-site noise contribution that would not be present during evenings and weekends. In order to account for this additional noise contribution, three separate possible scenarios were analyzed as described below:

- The first scenario considered normal operations with the addition of delivery trucks for the hours of 7:00 AM to 5:00 PM on weekdays. This analysis did not consider the residences to the south of the site at the intersection of Jerome Avenue and East Gun Hill (MGC-S5). Saturn Playground (MGC-S1) is located to the south of the site and between the site and MGC-S5. It was assumed that if elevated daytime noise levels from operations noise could be mitigated for MGC-S1, which is much closer to the site than MGC-S5, then the impacts also could be mitigated for MGC-S5.

- The second scenario considered normal operations for weekdays outside anticipated truck delivery hours (i.e. from 5:00 PM to 7:00 AM). The contribution of trucks to the noise level was not included in this scenario. Woodlawn Cemetery (MGC-S4) was not considered in this analysis as it closes at 5:30 PM.

- The third scenario considered normal operations for weekends. Truck deliveries are not anticipated on weekends. The contribution of trucks to the noise level was not included in this scenario.

Table 6.10-17 compares future baseline noise levels with the future anticipated operations noise levels at sensitive receptors during the noisiest and quietest weekday during truck delivery hours (between 7:00 AM – 5:00 PM). It is anticipated that receptor MCG-S3 would have the greatest incremental change in noise levels of 2.9 dBA, which is less than the threshold of human auditory sensitivity and below the 5 dBA threshold allowable in this situation (where future baseline noise levels are 53.4 dBA). It was concluded, therefore, that the contribution of stationary source noise to the total noise at sensitive receptors from normal operations during weekday truck delivery hours would not result in noise levels exceeding the 3-5 dBA threshold used to define significance.

TABLE 6.10-17. MAXIMUM NOISE LEVELS FROM OPERATIONS AT SENSITIVE RECEPTORS NEAR MOSHOLU SITE DURING WEEKDAY TRUCK DELIVERY HOURS (7:00 AM – 5:00 PM) (Leq, dBA)

Proximate Receptor	Monitoring Period	Future Without Project Noise Level (2011)	Predicted Operations Noise Level	Total Future Operations Noise Level	Incremental Change	Exceed Threshold (Yes/No)
MGC-S1	8:00-9:00 AM (Noisiest)	64.8	48.4	64.9	0.1	No
	2:00-3:00 PM (Quietest)	60.0	48.4	60.3	0.3	No
MGC-S2	11AM-2PM (Noisiest)	55.1	50.4	56.4	1.3	No
	7:00-8:00 AM (Quietest)	52.2	50.4	54.4	2.2	No
MGC-S3	8:00-9:00 AM (Noisiest)	56.4	53.1	58.1	1.7	No
	2:00-3:00 PM (Quietest)	53.4	53.1	56.3	2.9	No
MGC-S4	8:00-9:00 AM (Noisiest)	64.8	46.4	64.9	0.1	No
	12:00-1:00 PM (Quietest)	59.1	46.4	59.3	0.2	No
MGC-S6	8:00-9:00 AM (Noisiest)	66.1	50.9	66.2	0.1	No
	12:00-1:00 PM (Quietest)	65.5	50.9	65.6	0.1	No

Total Noise Level During Construction = logarithmic addition of Future Without Project and Predicted Operations Noise Levels

Table 6.10-18 compares future baseline noise levels with noise levels during future operations at each receptor during the quietest weekday non truck-delivery hours (between 5:00 PM and 7:00

AM). Woodlawn Cemetery (MGC-S4) was not considered in this analysis as it closes at 5:30 PM. The greatest incremental change experienced at any of the sensitive receptors during this time period was predicted to be 2.0 dBA. On the basis of this analysis, it was concluded that the contribution of stationary source noise to the total noise generated from normal operations and experienced at identified sensitive receptors during weekday non-truck delivery hours would not result in noise levels that exceed the 3-5 dBA threshold used to define significance.

TABLE 6.10-18. MAXIMUM NOISE LEVELS FROM OPERATIONS AT SENSITIVE RECEPTORS NEAR MOSHOLU SITE DURING WEEKDAY NON-DELIVERY HOURS (5:00 PM – 7:00 AM) (Leq, dBA)

Proximate Receptor	Monitoring Period	Future Without Project Noise Level (2011)	Predicted Operations Noise Level	Total Future Operations Noise Level	Incremental Change	Exceed Threshold? (Y/N)
MGC-S1	6:00-7:00 AM (Quietest)	60.4	45.7	60.5	0.1	No
MGC-S2	6:00-7:00 AM (Quietest)	51.6	49.2	53.6	2.0	No
MGC-S3	6:00-7:00 AM (Quietest)	52.8	42.1	53.2	0.4	No
MGC-S5	3:00-4:00 AM (Quietest)	69.7	39.8	69.7	0.0	No
MGC-S6	3:00-4:00 AM (Quietest)	63.9	49.0	64.0	0.1	No

Total Noise Level During Construction = logarithmic addition of Future Without Project and Predicted Operations Noise Levels

Table 6.10-19 compares future baseline noise levels with future noise levels during operation at each receptor during the noisiest and quietest Sunday hour. Truck deliveries are not anticipated on weekends. The largest incremental change experienced by any of the sensitive receptors would be 1.9 dBA. On the basis of this analysis, it was concluded that the contribution of stationary source noise to the total noise generated from normal operations and experienced at identified sensitive receptors during Sundays would not result in noise levels exceeding the 3-5 dBA threshold used to define significance.

TABLE 6.10-19. MAXIMUM NOISE LEVELS FROM OPERATIONS AT RECEPTORS NEAR MOSHOLU SITE ON A SUNDAY (Leq, dBA)

Proximate Receptor	Monitoring Period	Future Without Project Noise Level (2011)	Predicted Operations Noise Level	Total Future Operations Noise Level	Incremental Change	Exceed Threshold (Yes/No)
MGC-S1	5:00-7:00PM (Noisiest)	61.1	45.7	61.2	0.1	No
	7:00-8:00 AM (Quietest)	55.7	45.7	56.1	0.4	No
MGC-S2	3:00-4:00 PM (Noisiest)	54.6	49.2	55.7	1.1	No
	10-11 AM (Quietest)	51.9	49.2	53.8	1.9	No
MGC-S3	5:00-7:00 PM (Noisiest)	57.6	42.1	57.7	0.1	No
	7:00-8:00 AM (Quietest)	52.5	42.1	52.9	0.4	No
MGC-S4	5:00-7:00 (Noisiest)	66.9	41.2	66.9	0.0	No
	8:00-9:00 (Quietest)	56.8	41.2	56.9	0.1	No
MGC-S5	3:00-5:00 AM (Quietest)	63.2	39.8	63.2	0.0	No
MGC-S6	5:00-7:00 PM (Noisiest)	65.7	49.0	65.8	0.1	No
	3:00-5:00 AM (Quietest)	61.6	49.0	61.8	0.2	No

Note: Total Noise Level During Construction = logarithmic addition of Future Without Project and Predicted Operations Noise Levels

Combined Mobile and Stationary Source Noise. Woodlawn Cemetery, the residence at Jerome Avenue and Gun Hill Road, and the residence at Jerome Avenue and 213th Street each could be exposed to the combined effect of both mobile and stationary noise generated by the proposed water treatment plant. The greatest incremental change in stationary noise for any of the three operations scenarios at these three receptors would be 0.2 dBA at the residence at Jerome Avenue and 213th Street (MGC-S6) on a Sunday. Based on the PCE screen presented in Table 6.10-1, the potential incremental change in noise level for the route segment along which this receptor is located is approximately 0.2 dBA. The combined effect of these noise sources due to operations activities would not produce an increase in noise levels that would exceed the 3-5 dBA threshold used to define significance.

6.10.3.2. Potential Construction Impacts

Potential noise impacts due to construction activities were analyzed for mobile and stationary source sensitive receptors in the vicinity of the site. Peak construction noise levels were compared to noise levels for the Future Without the Project year. The year 2007 was used as the anticipated year of peak mobile source noise and 2006 was used as the peak year for stationary source noise for construction activities (see footnote on page 14). Construction activities at the water treatment plant site are scheduled to take place between May 2005 and October 2011. The work would take place between 7:00 AM and 5:00 PM on weekdays.

The water treatment plant site falls within the jurisdiction of the City. As such, standards from CEQR that govern construction noise were used to evaluate any impacts to this site. As previously discussed, CEQR states that a project-generated increase of 5 dBA or more over the baseline noise level recorded at a sensitive receptor during the daytime is may be a significant impact if the existing noise level is less than 60 dBA. If the existing noise level is 62 dBA, a 3 dBA or more incremental threshold applies. A more restrictive (3 dBA incremental) threshold applies during the nighttime.[3]

6.10.3.2.1. Mobile Source Noise

Potential noise level increases from mobile noise sources resulting from construction of the proposed water treatment plant were assessed for the analysis year (2007). The total traffic volume and vehicle mix along the noise-sensitive route segment for the future peak construction-truck year (2007) were established by adding future construction traffic to the Future Without the Project traffic. Total noise levels from mobile sources for the year 2007 then were calculated using TNM. The incremental change between the TNM-calculated Future Without the Project and the TNM-calculated construction noise levels thereby was established. This incremental change was then added to the Future Without the Project Leq presented in Table 6.10-13, and a determination was made as to whether construction-related traffic resulted in a 3-5 dBA increase in noise levels.

Table 6.10-20 presents construction peak year (2007) mobile source noise levels data. Jerome Avenue would receive a greater share of construction-related truck traffic. As such, noise levels on Jerome Avenue would increase more that those on 233rd Street. The greatest incremental change from Future Without the Project to Future With the Project was 2.5 dBA.

TABLE 6.10-20. FUTURE NOISE LEVELS AT MOBILE SOURCE RECEPTORS DURING CONSTRUCTION (2007)

Monitoring Location	Monitoring Period	Future Without the Project (2007)	TNM-Calculated Future Without	TNM-Calculated Future With the Project (2007)	Incremental Change	Exceed Threshold? (Yes/No)
MGC-M1	7:45-8:45 AM	70.	71.9	73.8	1.9	No
	5:00-6:00 PM	68.6	71.1	73.2	2.1	No
	6:00-7:00 AM	68.7	69.0	71.5	2.5	No
MGC-M2	7:45-8:45 AM	72.8	74.4	74.6	0.2	No
	5:00-6:00 PM	72.6	72.8	73.1	0.3	No
	6:00-7:00 AM	69.1	73.4	73.7	0.3	No

Incremental Change = TNM (Future with) minus TNM (Future Without)

[3] City of New York. October 2001. CEQR Technical Manual.

On the basis of the detailed analysis of mobile source impacts, it was concluded that the contribution of mobile source noise to the total construction-related noise levels would not result in a 3-5 dBA increase at noise sensitive receptors.

6.10.3.2.2. Stationary Source Noise

Potential noise impacts resulting from the use of on-site equipment during construction activities were determined for the receptors proximate to the water treatment plant site. The year 2006 was used as the analysis year as it represented the month (May 2006) with the greatest construction-induced noise level. The maximum projected monthly noise level from construction activities was added to the future baseline noise level in order to determine the potential noise impacts at the various receptors for the worst-case scenario. Analysis of potential construction-induced noise contributions took into account the variability of noise emissions over the course of the construction due to changing construction conditions. Noise levels from construction related equipment would vary over the course of the construction schedule. Construction equipment use would be intermittent and variable during a normal work day. In addition, the location of equipment would vary during a day as equipment would move between areas on the site. Finally, the precise equipment tally would vary from period to period as the phases of construction change over the entirety of the project.

A noise prediction algorithm[4] (that considered equipment noise levels, usage factors, and distances from source to receptor discussed above) was used to calculate the average noise level at a proximate receptor for a typical hour for each month of construction. The algorithm is presented and discussed in greater detail in Section 4.10, Data Collection and Impact Methodologies, Noise Analysis. A monthly breakdown of anticipated equipment for the duration of the project was obtained from engineering construction plans. Relevant equipment noise levels for construction equipment were determined from industry and governmental publications. Usage factors were used to account for the fact that construction equipment use is intermittent throughout the course of a normal work day. A random-number generator was employed to account for equipment locations being variable. Equipment that only would be used within the footprint of the proposed plant (i.e. rock drills) was restricted to this area on the site. The remaining construction equipment was randomly placed over the entire site. In this manner, distances from construction equipment to the receptors being studied were calculated for each month. Table 6.10-21 presents construction equipment, including associated noise levels and usage factors, anticipated for use over the course of construction at the water treatment plant site. Equipment noise levels (at their associated reference distances) and the usage factors are standard values established through noise studies. The reference for this study is provided at the bottom of the table. The rock drill would be the noisiest piece of equipment and has a noise level of 98 dBA at a reference distance of 50 feet.

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[4] City of New York. October 2001. CEQR Technical Manual.

TABLE 6.10-21. NOISE LEVELS AND USAGE FACTORS FOR CONSTRUCTION EQUIPMENT USED AT MOSHOLU SITE [1]

Equipment	Equipment Noise Level (dBA)	Reference Distance (feet)	Usage Factor				
			Clearing	Excavation	Foundation	Erection	Finishing
Grader	85	50	0.05				0.02
Asphaltic Paver	89	50	[3]				0.12
Aggregate Spreader[2]	89	50					0.12
Roller	74	50					0.1
Crane 100-Ton Hydraulic	83	50				0.08	0.04
Crane 250-Ton Hydraulic	88	50				0.04	0.02
Crane 50-Ton Hydraulic	83	50				0.08	0.04
Crane 70-Ton Hydraulic	83	50				0.08	0.04
Crane 90-Ton Hydraulic	83	50				0.08	0.04
Wood Chipper[2]	93	30	0.05				
Backhoe	85	50	0.04	0.16			0.04
Loader	84	50	0.16	0.16			0.04
Truck[4]	80	50	0.16	0.16			0.16
Compactor-Vibratory	82	50			0.4		0.08
Fence Post Hole Digger[2]	82	50	0.05				
Concrete Floor Finisher	76	50			0.4		0.08
Concrete Vibrator[2]	76	50			0.4		0.08
Concrete Pump	82	50			0.4		0.08
Welding Machine[2]	70	50				0.4	
Air Compressor- 600 C	81	50		1.0	0.4	0.4	0.4
Rock Drill	98	50		0.04			0.05
Rock Crusher[2]	93	50		0.04			0.05

Source:
[1] Bolt, Beranek, and Newman, Inc. December 1971. Noise from Construction Equipment and Operations, Buildings Equipment and Home Appliances.
[2] No usage factors available. Usage factors from similar equipment were applied.
[3] Blanks indicate no or very rare usage.
[4] Bolt, Beranek, and Newman, Inc. December 1971 Noise from Construction Equipment and Operations, Buildings Equipment and Home Appliances with attenuation for exhaust mufflers applied.

Figures 6.10-4 through 6.10-8 present monthly total noise levels during construction activities (as calculated by the noise prediction algorithm) at sensitive receptors for the full duration of the construction phase. The residences to the south of the site at the intersection of Jerome Avenue and East Gun Hill (MGC-S5) were not considered in this construction-noise analysis. Saturn

Playground (MGC-S1) is located to the south of the site and between the site and MGC-S5. It was assumed that if construction noise could be mitigated for MGC-S1, which is much closer to the site than MGC-S5, then the impacts also could be mitigated for MGC-S6. A reduction in noise level was factored into the noise prediction algorithm to account for equipment that would be in the excavation. The walls of the excavation would provide sound attenuation to equipment in the excavated area. As excavation and rock removal activities take place, the excavation would vary in depth from ground level to approximately 70 feet below grade. Only equipment that would be in the excavation at all times (i.e. rock drills) had noise reductions applied to them. A noise reduction of between 5 dBA and 20 dBA was factored for the rock drills depending on the depth of the excavation at any given time of construction activities.

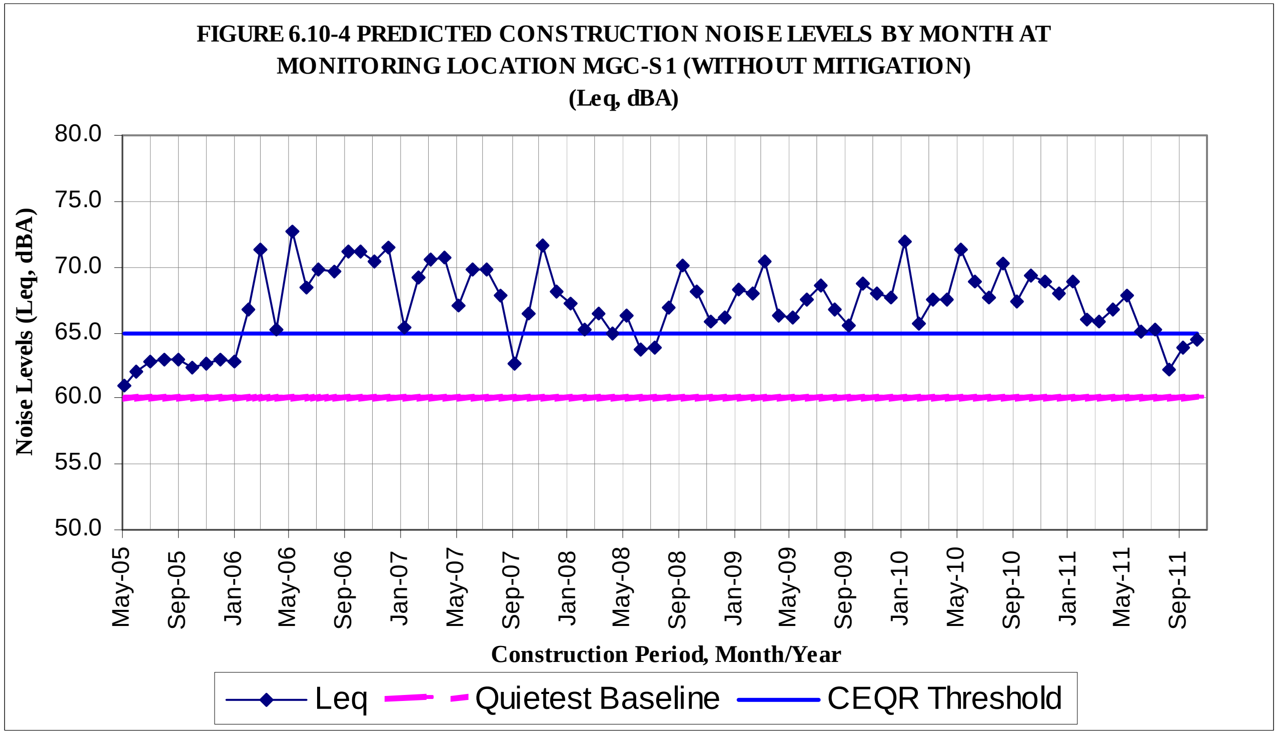


FIGURE 6.10-4 PREDICTED CONSTRUCTION NOISE LEVELS BY MONTH AT
MONITORING LOCATION MGC-S1 (WITHOUT MITIGATION)
(Leq, dBA)
Noise Levels (Leq, dBA)
80.0
75.0
70.0
65.0
60.0
55.0
50.0
May-05
Sep-05
Jan-06
May-06
Sep-06
Jan-07
May-07
Sep-07
Jan-08
May-08
Sep-08
Jan-09
May-09
Sep-09
Jan-10
May-10
Sep-10
Jan-11
May-11
Sep-11
Construction Period, Month/Year
Leq
Quietest Baseline
CEQR Threshold

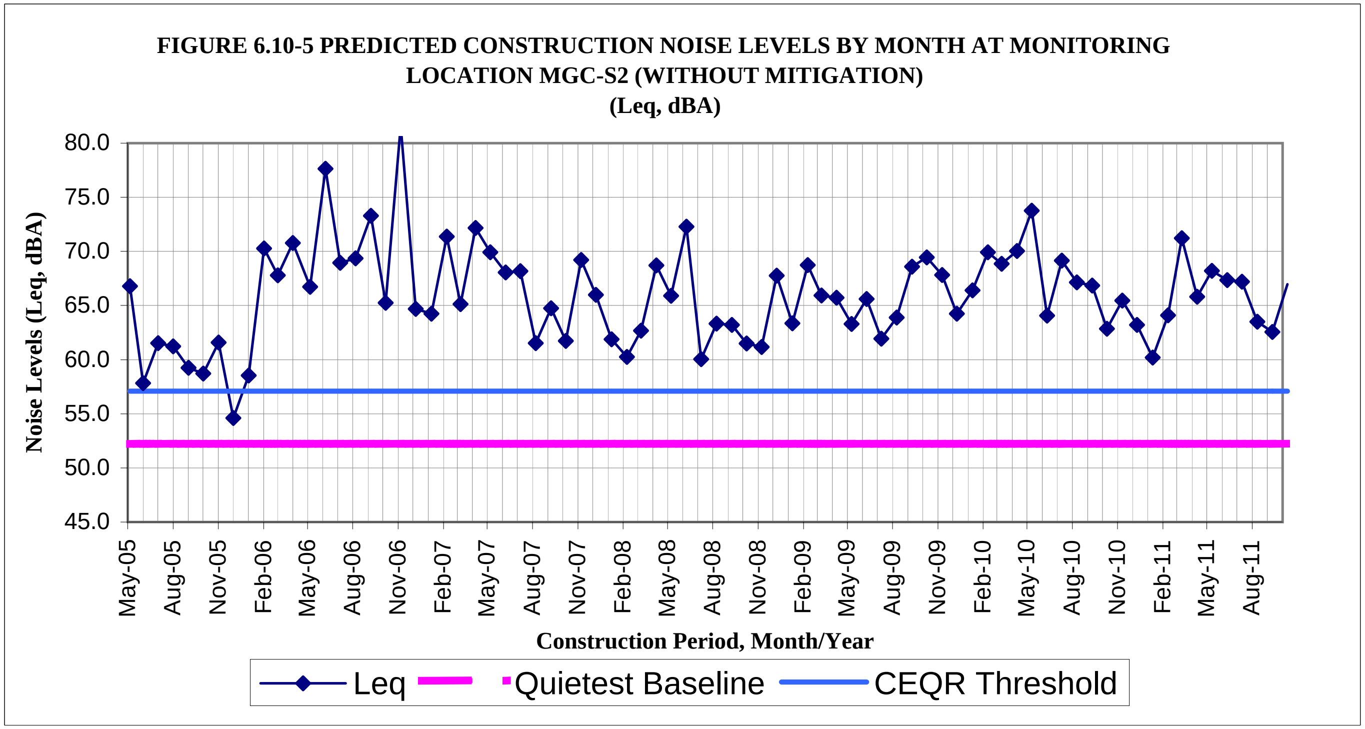
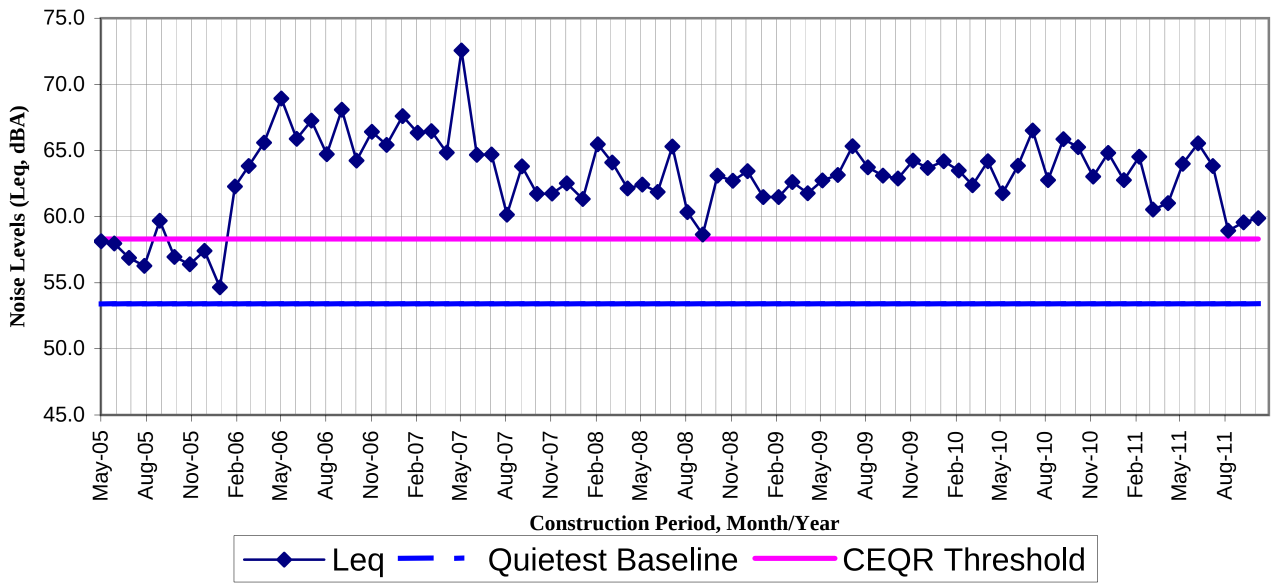


FIGURE 6.10-5 PREDICTED CONSTRUCTION NOISE LEVELS BY MONTH AT MONITORING LOCATION MGC-S2 (WITHOUT MITIGATION)
(Leq, dBA)
Noise Levels (Leq, dBA)
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09
Nov-09
Feb-10
May-10
Aug-10
Nov-10
Feb-11
May-11
Aug-11
Construction Period, Month/Year
Leq
Quietest Baseline
CEQR Threshold

FIGURE 6.10-6 PREDICTED CONSTRUCTION NOISE LEVELS BY MONTH AT MONITORING LOCATION MGC-S3 (WITHOUT MITIGATION) (Leq, dBA)



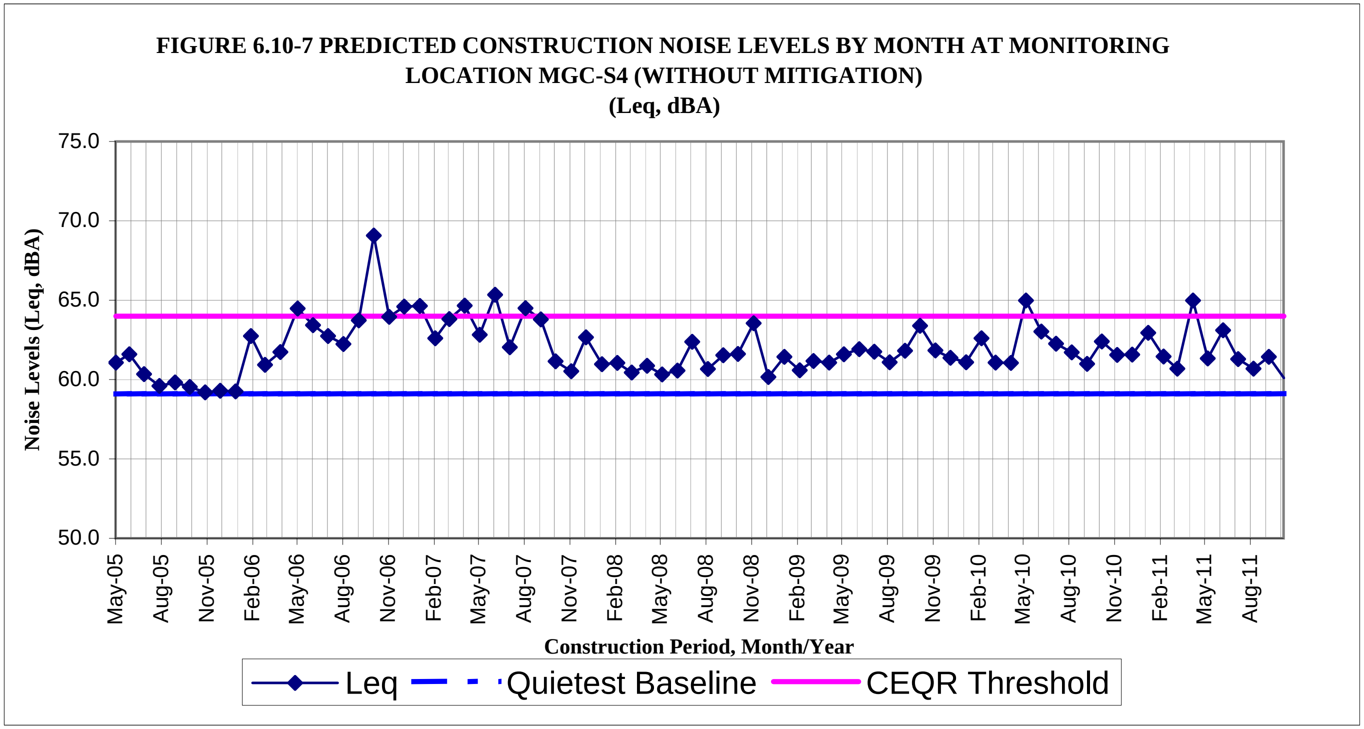
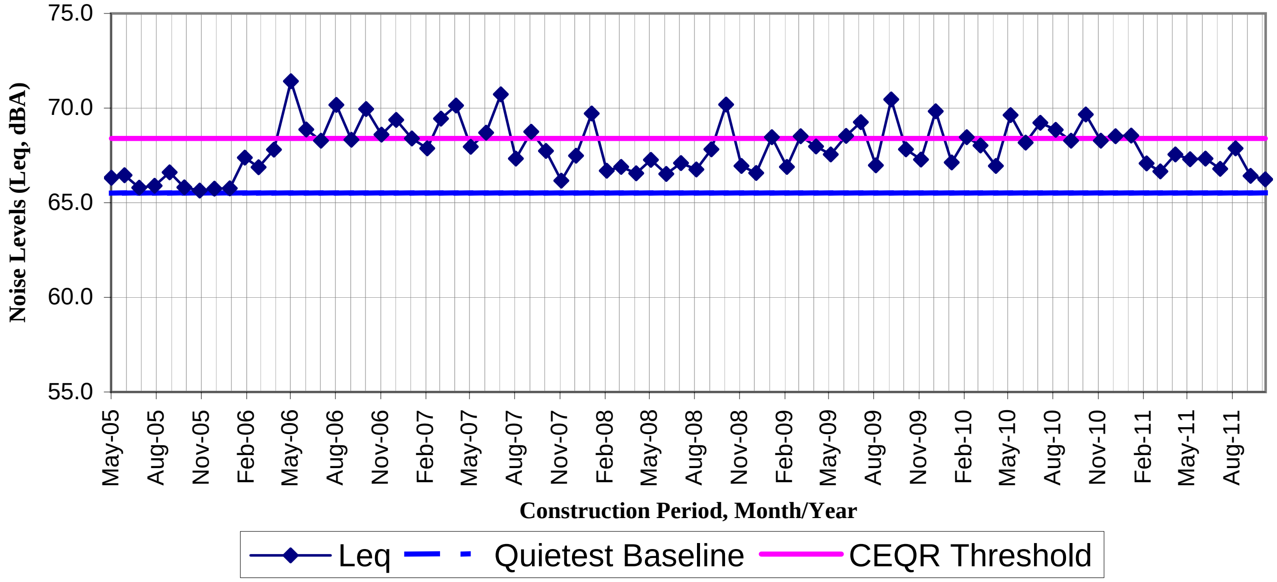


FIGURE 6.10-7 PREDICTED CONSTRUCTION NOISE LEVELS BY MONTH AT MONITORING LOCATION MGC-S4 (WITHOUT MITIGATION)
(Leq, dBA)
Noise Levels (Leq, dBA)
75.0
70.0
65.0
60.0
55.0
50.0
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09
Nov-09
Feb-10
May-10
Aug-10
Nov-10
Feb-11
May-11
Aug-11
Construction Period, Month/Year
Leq
Quietest Baseline
CEQR Threshold

FIGURE 6.10-8 PREDICTED CONSTRUCTION NOISE LEVELS BY MONTH AT MONITORING LOCATION MGC-S6 (WITHOUT MITIGATION)
(Leq, dBA)



Following the calculation of monthly noise levels during construction activities, an analysis was performed for the anticipated peak noise month during construction (2006). The analysis determined whether construction would result in noise increasing to levels that exceed the 3-5 dBA threshold for this worst-case scenario. The maximum projected noise level for the peak month at each receptor from construction activity then was added to the future baseline noise level in order to predict the greatest noise level changes. Potential noise levels were assessed only for weekdays during construction hours (7:00 AM- 6:00 PM) since no construction-related noise was anticipated outside of these hours. Table 6.10-22 presents maximum construction noise level data for the peak construction-noise year (2006).

Saturn Playground (MGC-S1). Noise levels predicted to occur as a result of the proposed project at Saturn Playground (MGC-S1) would exceed the 3-5 dBA threshold used to define significance. The largest incremental change at this receptor (located immediately to the south of the proposed site) over the Future Without the Project level would be 12.6 dBA. Predicted noise levels would exceed the acceptable threshold from approximately February 2006 until July 2011 (with the exception of several months throughout). This noise level increase would constitute a significant adverse impact that would require mitigation.

An analysis was performed to determine the total distance beyond the playground (and further to the south) that noise levels exceeding the 3-5 dBA threshold would extend. This was performed to determine the distance that these noise levels would extend and to what extent local noise-sensitive receptors would be affected. Noise levels that exceed the 3-5 dBA threshold would extend from the south of the site to a maximum distance of approximately 650 feet to the south of MGC-S1. This area would still be within Van Cortlandt Park (see Figure 6.10-9).

Mosholu Golf Course (MGC-S2). Noise levels predicted to occur as a result of the proposed project at Mosholu Golf Course (Receptor MGC-S2) would exceed the 3-5 dBA threshold used to define significance. The largest incremental change at this receptor (located immediately to the west of the proposed site) over the Future Without the Project level would be 29.4 dBA. Predicted noise levels would exceed the acceptable threshold for approximately the duration of scheduled construction activities (May 2005 – October 2011). This noise level increase would constitute a significant adverse impact that would require mitigation.

An analysis was performed to determine the total distance beyond the golf course (and further to the west) that noise levels exceeding the 3-5 dBA threshold would extend. This was performed to determine the distance that these noise levels would extend and to what extent local noise-sensitive receptors would be affected. Noise levels that exceed the 3-5 dBA threshold would extend from the west of the site to the Major Deegan Expressway, which bounds the west edge of the golf course approximately 1,200 feet to the west of the proposed construction limits. The Deegan is itself a major source of local ambient noise (see Figure 6.10-9).

Shandler Recreation Area (MGC-S3). Noise levels predicted to occur as a result of the proposed project at Shandler Recreation Area (Receptor MGC-S3) would exceed the 3-5 dBA threshold used to define significance. The largest incremental change at this receptor (located immediately to the north of the proposed site) over the Future Without the Project level would be 19.2 dBA. Predicted noise levels would exceed the acceptable threshold from approximately

TABLE 6.10-22. MAXIMUM NOISE LEVELS FROM CONSTRUCTION ACTIVITIES AT RECEPTORS NEAR MOSHOLU SITE WITHOUT MITIGATION (Leq, dBA) (2006 ANALYSIS YEAR)

Proximate Receptor	Monitor Period	Future Without Project Noise Level[1]	Predicted Construction Noise Level[2]	Total Noise Level During Construction[3]	Incremental Change[4]	CEQR Threshold[5]	Reduction Required to Reach Goal[6]	Exceed CEQR Threshold? (Y/N)
MGC-S1	8:00 – 9:00 AM (Noisiest)	64.8	72.4	73.1	8.3	67.7	5.4	Y
	2:00 – 3:00 PM (Quietest)	60.0	72.4	72.6	12.6	64.9	7.7	Y
MGC-S2	11:00AM–2:00PM (Noisiest)	55.1	81.6	81.6	26.5	60.0	21.6	Y
	7:00 – 8:00 AM (Quietest)	52.2	81.6	81.6	29.4	57.1	24.5	Y
MGC-S3	8:00 – 9:00 AM (Noisiest)	56.4	72.5	72.6	16.2	61.3	11.3	Y
	2:00 – 3:00 PM (Quietest)	53.4	72.5	72.6	19.2	58.3	14.3	Y
MGC-S4	8:00 – 9:00 AM(Noisiest)	64.8	68.6	70.1	5.3	67.7	2.4	Y
	12:00–1:00 PM (Quietest)	59.1	68.6	69.1	10.0	64.0	5.1	Y
MGC-S6	8:00–9:00 AM (Noisiest)	66.1	70.1	71.6	5.5	69.0	2.6	Y
	12:00–1:00 PM (Quietest)	65.5	70.1	71.4	5.9	68.4	3.0	Y

[1]Future Without Project Noise = measured existing

[2]Predicted Construction Noise from on-site construction equipment as experienced at receptors.

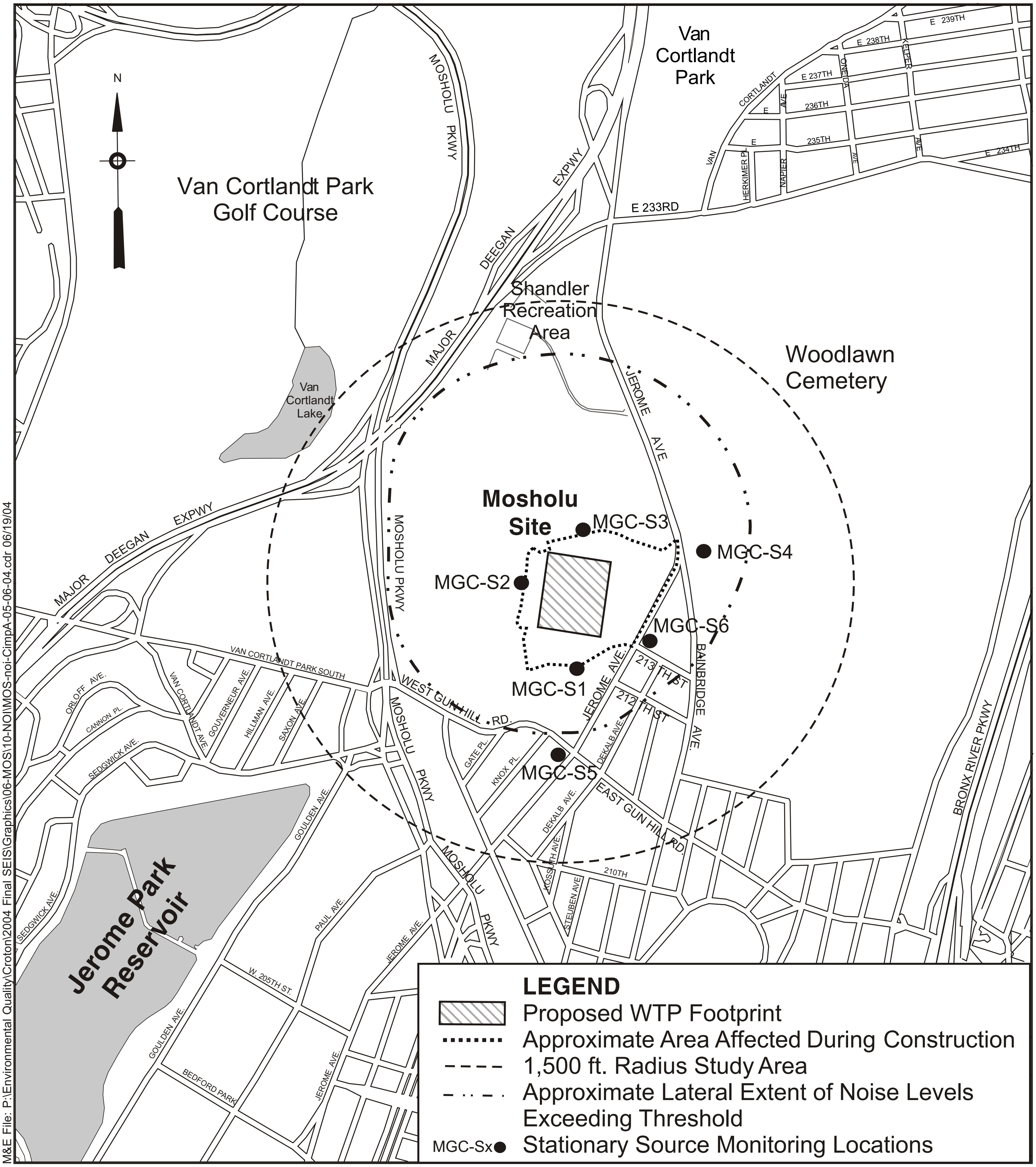
[3]Total Noise Level During Construction = logarithmic addition of Future Without the Project Noise Level and Predicted Construction Noise Level

[4]Incremental Change = Total Noise Level minus the Future Without the Project Noise Level.

[5]CEQR Threshold: The maximum allowable noise level = Future Without the Project plus maximum allowable decibels according to CEQR 3-5 dBA rule:

<60 dBA, 5 dBA increase acceptable
60-61 dBA, >=4 dBA increase acceptable
>61 dBA, >=3 dBA increase unacceptable

[6]Reduction Required to Reach Goal: The reduction needed to bring Total Noise Level below the CEQR threshold



NOTE: S1 and S2 are also 24-hour monitoring locations.

Mosholu Site Lateral Extent of Noise Levels Exceeding Threshold (Before Mitigation)

Figure 6.10-9

February 2006 until October 2011. This noise level increase would constitute a significant adverse impact that would require mitigation.

An analysis was performed to determine the total distance beyond Shandler (and further to the north) that noise levels exceeding the 3-5 dBA threshold would extend. This was performed to determine the distance that these noise levels would extend and to what extent local noise-sensitive receptors would be affected.

Noise levels that exceed the 3-5 dBA threshold would extend from the north of the site to a maximum distance of approximately 1,525 feet to the north of Shandler. This area would still be within Van Cortlandt Park (see Figure 6.10-9).

Woodlawn Cemetery (MGC-S4). Noise levels predicted to occur as a result of the proposed project at Woodlawn Cemetery (Receptor MGC-S4) would exceed the 3-5 dBA threshold used to define significance. The largest incremental change at this receptor (located to the east of the proposed site) over the Future Without the Project level would be 10.0 dBA. Predicted noise levels would exceed the acceptable threshold sporadically from approximately May 2006 until August 2007. However, due to the short duration and sporadic nature of these construction-related noise level increases, these increased noise levels would be considered temporary and not significant.

An analysis was performed to determine the total distance beyond the cemetery (and further to the east) that noise levels exceeding the 3-5 dBA threshold would extend. This was performed to determine the distance that these noise levels would extend and to what extent local noise-sensitive receptors would be affected. Noise levels that exceed the 3-5 dBA threshold would extend from the east of the site to a maximum distance of approximately 410 feet to the east of MGC-S4. This area would still be within Woodlawn Cemetery (see Figure 6.10-9).

Apartments at Jerome Avenue and 213th Street (MGC-S6). Noise levels predicted to occur as result of the proposed project at residences at the intersection of Jerome Avenue and 213th Street would exceed the 3-5 dBA threshold used to define significance. The largest incremental change at this receptor (located to the west of the proposed site) over the Future Without the Project level would be 5.9 dBA. Predicted noise levels would exceed the acceptable threshold sporadically from approximately May 2006 until January 2011. This noise level increase would constitute a significant adverse impact that would require mitigation.

An analysis was performed to determine the total distance beyond MGC-S6 (and further to the east) that noise levels exceeding the 3-5 dBA threshold would extend. This was performed to determine the distance that these noise levels would extend and to what extent local noise-sensitive receptors would be affected. Noise levels that exceed the 3-5 dBA threshold would extend from the east of the site to a maximum distance of approximately 340 feet to the east of MGC-S6. This area would still be within residences on and near 213th Street (see Figure 6.10-9).

Facilities such as residences, health care facilities, schools, libraries, and parks are considered sensitive noise receptors. If noise reduction measures were not implemented as part of the project, sensitive receptors within the area of noise levels that exceed the 3-5 dBA threshold could be exposed to these increased levels sporadically for the duration of the construction schedule (May 2005 through October 2011).

6.10.3.2.3. Combined Mobile and Stationary Source Noise.

Woodlawn Cemetery, the residence at Jerome Avenue and Gun Hill Road, and the residence at Jerome Avenue and 213th Street each could be exposed to the combined effect of both mobile and stationary noise generated by construction activities. The greatest incremental change from mobile sources is predicted to occur in 2007 and the greatest incremental change from stationary sources is predicted to occur in 2006. Although these years are different, the two peak years were combined in order to predict the worst-case scenario. This is the most conservative approach and could over-estimate combined noise levels. Based on the PCE screen presented in Table 6.10-2, the potential incremental change in mobile source noise levels due to construction activities for the route segments along which these sensitive receptors are located is less than half a decibel. Receptors at this site already would have noise levels in excess of the CEQR impact threshold used to determine significance due to contributions from stationary source noise. The contribution from mobile sources to the total noise would not appreciably change predicted noise levels. Noise mitigation measures could be required for this site and possible mitigation strategies are discussed in Section 9, Mitigation of Potential Impacts.

6.10.3.2.4. Vibration from Construction

Due to the magnitude of this project, it is possible that excavation activities may cause vibrations. Vibrations could occur due to rock blasting activities. The foundation and the shafts of the proposed water treatment plant would require rock drilling and some blasting. The elevated subway line located to the east of the site could be sensitive to vibrations. New York City Transit (NYCT) has developed guidelines for construction activity near elevated subway lines to protect the structures from any damage. These guidelines would be incorporated into all construction specifications. NYCT has been consulted specifically on the proposed activity at the Mosholu Site and has confirmed that their standard construction practices would be adequate to protect the elevated subway.

Rock Blasting. Blasting is a method of removing large quantities of rock. Modern blasting techniques incorporate delay blasting, which consists of reducing a single blast to a series of smaller blasts through the use of millisecond delays. As an example, if a total charge (W) is detonated using five delays, the effective vibration-generating charge is only one-fifth of W, but the demolition effect is the same as the total charge W fired instantaneously. This technique is an effective vibration control method. Blasting is conducted underground within the bedrock (a major noise attenuating material in itself).

Prior to the commencement of a blasting program, a preblast survey and test blasting would be conducted at the site identified for rock removal. This exercise would establish actual site conditions as they relate to the rock blasting and would aide the blasting contractor in having an appropriate blast design. The blast design would consider such factors as rock type, rock fracturing, spacing of charges, topography, type of explosives, etc. It is in this manner that potential impacts of blasting would be kept within acceptable limits.

There are four key potential impacts from blasting. Proper preblast testing and blast design would alleviate each of these issues:

- Flyrock. Flyrock is controlled through proper blast design (which in turn is a result of preblast surveying and test blasting) and the use of blast mats. Blast mats are thick mats (metal or metal-reinforced rubber) that are placed directly on top of the rock body to be blasted. A blast safety zone area also would be established. The actual extent of this area would be established by the blasting contractor on the basis of the preblast survey and test blasting. As an extra precaution, it is common practice to stop traffic traveling on roads in the immediate vicinity of the blast for the few seconds that the blast is detonated. Potentially affected roads would include Jerome Avenue and Gun Hill Road.

- Ground Vibration. Ground vibration is controlled with proper blast design. Maximum acceptable vibration is strictly controlled so as to avoid any potential damage to nearby structures.

- Airblast (noise). Airblast is usually caused by poor blast design resulting in uncovered surface detonation. It can be a cause of complaints but is unlikely to cause physical damage. Under normal conditions, noise generated by a blast is analogous to a distant rumble of thunder: it may be noticeable to the individual but would not itself be a major source of noise. On a large construction site, equipment such compressors and rock drilling would constitute the largest sources of noise. These sources would occur with regularity over the course of a work day whereas blasting would last a few seconds for two to three times a day. The instantaneous noise level itself would be attenuated due to the fact that the charges would be detonated within the rock mass, which is itself an effective noise attenuator.

- Dust. Dust would be suppressed with the use of blast mats. Blasting contractors also frequently spray water on the hauling roads to prevent dust.

Rock excavation at the Mosholu Site is currently scheduled to extend from approximately May 2006 until July 2007. During this phase of construction, there would be at least two blasting events on a designated day (one or two in the morning and possibly one or two in the afternoon) followed by several days of mucking out (removing rock debris from the excavation).

The potential areas of concern listed above each can be effectively controlled so as to produce no demonstrable public disturbance through the use of proper blast design. A certified blasting contractor would be engaged by the NYCDEP. There are strict industry standards that govern and limit acceptable noise and vibration resulting from blasting. These limits are a part of the contract specifications to which the blasting contractor would be obligated to adhere. In addition, the New York City Fire Department has Guidelines for Blasting Contractors that govern the safe operation of explosives regarding, among other things, their storage, use, and transportation. These guidelines also are included in the detailed specifications and must be adhered to by the blasting contractor.

Facilities identified as sensitive receptors would be notified prior to the commencement of blasting. Monitoring would be conducted adjacent to the receptor by specialty contractor. All complaints received would be investigated thoroughly.

Tunnel Boring Machines. Vibrations from advancing TBMs may affect sensitive electronic equipment. The tunneling subcontractor would develop a vibrations monitoring program prior to the commencement of proposed construction activities. Prior to any boring activities, the location of the bore path would be reviewed to identify any businesses, hospitals, residences, or other facilities located in the vicinity of the planned boring. Soil conditions, structural conditions of neighboring buildings, and sensitive uses would be identified. Although TBMs have been used on a number of projects within the City of New York and vibration has seldom caused any impacts during these operations, any potential impacts on people or property due to vibration would be addressed for the proposed project. The impact of the vibrations would be reduced to levels permitted by applicable local, state, and federal regulations and codes.

Based on the analyses presented above, the proposed Croton project at the Mosholu Site would have significant adverse impacts on Noise during construction. For comparison purposes, there would be adverse impacts during construction at the Eastview and Harlem River.