15

Construction

Construction activities, although temporary in nature, can sometimes result in significant adverse impacts. A project's construction activities may affect a number of technical areas analyzed for the operational period, such as air quality, noise, and traffic. This attachment assesses the potential for the proposed project to result in significant adverse impacts during construction.

15.1 Introduction

This chapter provides an assessment of the potential for construction of the Norfolk and Suffolk Buildings on Projected Development Site 1 and the small commercial addition on Projected Development Site 2 to result in significant adverse impacts during the construction period. This chapter focuses first on a discussion of construction regulations and general practices, then evaluates potential impacts from air emissions and increases in noise levels. ~~A discussion of measures to be employed to protect the remnants of the historic synagogue building during construction is also included.~~

15.2 Principal Conclusions

Governmental oversight of construction in New York City is extensive and involves a number of City, State, and Federal agencies, each with specific areas of responsibility. Construction at the Projected Development Sites would be subject to government regulations and oversight described below in Construction Regulations and General Practices and would employ the general construction practices described below. The projected developments on both sites would also comply with the requirements of the New York City Noise Control Code.

Construction of the proposed project has the potential to result in significant adverse construction traffic and noise impacts.

Historic Resources

There are no designated NYCL- or S/NR-listed historic buildings located within 90 feet of construction activities; remnants~~ other than the remains~~ of the former BHH synagogue (NYCL, S/NR) were located on the site until October 2019 when a structural collapse necessitate~~), which are being stabilized and would be incorporated into~~ the removal of the remnants~~proposed project on Projected Development Site 1~~.

Transportation

Traffic

Construction activities would generate 38 construction worker auto trips and 22 construction truck trips during the AM construction peak hour, and 38 construction worker auto trips and four construction truck trips during the PM construction peak hour. Construction trucks would be required to use the New York City Department of Transportation (NYCDOT)-designated truck routes to get to the project area and would then use local streets to access the construction sites.

Three key intersections were analyzed for potentially significant traffic impacts during the peak construction traffic hours. During the AM construction peak hour, the westbound through movement at the intersection of Delancey Street and Clinton Street would be significantly impacted and could be mitigated with a one second shift in signal. During the PM construction peak hour, the northbound approach at the intersection of Grand Street and Clinton Street would be significantly impacted and could not be mitigated.

Parking

Construction workers would generate an estimated maximum daily parking demand of 48 spaces during the peak construction quarter. This parking demand could be accommodated by the off-street parking spaces available within a quarter-mile radius.

Transit and Pedestrians

During the peak construction quarter, the proposed project would generate approximately 335 daily construction workers. It is expected that the majority of workers (80 percent) would arrive during the AM construction peak hour and depart during the PM construction peak hour, and they would generate approximately 188 construction worker trips by public transportation during each construction peak hour. The study area is well served by public transit, including the F, J, M, and Z subway lines at the Essex Street-Delancey Street station and the M9, M14A, M15, M15SBS, M21, and M22 bus routes. These trips would be distributed to the different transit options and construction activities are not expected to result in transit or pedestrian impacts.

Air Quality

The air quality analysis assumes a series of diesel emission control measures consisting of the use of diesel-powered construction equipment (engines 75-600 HP range) with Tier 4 model years, and of the retrofitting of Diesel Particulate Filters for any piece of equipment older than the Tier 4 model years.

Based on the results of the quantitative construction air quality analysis, the proposed project would not result in significant adverse impacts on air quality during construction of Projected Development Site 1.

Noise

Construction on both Projected Development Site 1 and 2 would involve standard construction activities and practices for buildings in New York City. Demolition, excavation and foundation, and superstructure phases of construction are when noisiest activities occur; at both projected development sites, demolition would not be required.

The excavation and foundation phase of both the Norfolk and Suffolk Buildings (Projected Development Site 1) would overlap and the overall duration is anticipated to be 8 months. The superstructure phases of both buildings would overlap, and the overall duration is anticipated to be 10 months. For Projected Development Site 2, the overall construction period is expected to be well under 24 months as only 4,759 gsf of floor area would be developed. Further, excavation would be limited to a small footprint. Therefore, since the overall construction period of Projected Development Site 1 would exceed 24 months and there is the potential for construction noise to exceed the screening criteria at nearby receptors, a detailed construction noise analysis of construction at Projected Development Site 1 was conducted.

Based on the analysis, construction sound levels would increase by 15 dBA or more at the north facade~~and east facades~~ of the Hong Ning building, 384 Grand Street, and the south façade of the podium building of 202 Broome Street during excavation/foundation and superstructure phases of construction, which would extend for more than 12 months, and there would be a significant adverse noise impact prior to mitigation measures.~~.~~ Construction sound levels would increase by 20 dBA (L_{eq})or more for 3 months or longer at these same locations and the east façade of the Hong Ning building and would increase by 15 dBA (L_{eq}) or more for 3 months or longer at the base building of 145 Clinton Street and the east façade of 202 Broome Street during the excavation/foundation phase prior to mitigation.~~.~~ Exterior sound levels would be up to 83~~82~~ dBA (L_{eq}) at the north and east facades of the Hong Ning building and 384 Grand Street and up to 84~~83~~ dBA (L_{eq}) at the south façade of the base building at 202 Broome Street where there will be offices.

Maximum interior sound levels would be up to 61~~57~~ dBA L_{10} at residences along the north and east facades of the Hong Ning building with air conditioning units and~~,~~ up to 81~~62~~ dBA L_{10} at residences along the north and east facades of the Hong Ning building without alternate means of ventilation, up to 66 dBA L_{10} at residences along the north façade of 384

Grand Street with air conditioning units, up to 81 dBA L_{10} at residences along the north façade of 384 Grand Street without alternative means of ventilation, and up to 57 dBA L_{10}~~,~~ ~~and up to 53 dBA~~ at 202 Broome Street. Interior noise levels would exceed the interior noise criteria of 45 dBA L_{10} for residential spaces at Hong Ning by up to 16 dBA with air conditioning units and 36 dBA in an open window condition ~~12 dBA~~ and at 384 Grand Street by up to 21 dBA with air conditioning units and 41 dBA in an open window condition.~~17 dBA.~~ Interior noise levels would exceed the interior noise criteria of 50 dBA for office uses at the base building of 202 Broome Street by up to 7~~3~~ dBA.

With the adherence to existing construction noise regulations, the implementation of a Construction Noise Mitigation Plan, as required by the New York City Noise Code, as well as the use of a 12-foot construction noise barrier, construction noise would be reduced but would still exceed the thresholds for ~~result in~~ significant adverse noise impact prior to mitigation.~~.~~ Between publication of the Draft and Final EIS, additional construction noise analysis has been~~will be~~ undertaken to further determine the precise magnitude and duration of the elevated noise level from construction. This analysis included additional source control measures on tower crane that was not included in the Draft EIS. In addition, additional mitigation measures, as feasible, to avoid potential significant adverse noise impacts have been~~will be~~ explored between the Draft and Final EIS in consultation with DCP. These mitigation measures consist of the use of enclosures around compressors and generators and acoustic shrouds around pile drivers. If these~~If no feasible and practicable~~ mitigation measures are implemented, construction noise levels would be below the threshold for ~~identified, the~~ significant adverse ~~construction~~ noise impact.

These path control measures would be used if practical and feasible. However, since their implementation is subject to potential safety risks and construction operation conditions, their use is not guaranteed. Therefore, the construction noise analysis in this chapter does not include these mitigation measures. The construction noise analysis including these mitigation measures is presented in **Chapter 17, "Mitigation"**. If these mitigation measures are not able to be implemented because they are not feasible and practicable, there would be significant adverse construction noise impact that would remain unmitigated. See **Chapter 18, "Unavoidable Adverse Impacts"**.

Vibration

The proposed project is not anticipated to result in significant adverse impacts as a result of construction vibration as most nearby buildings not on the immediate block are 60 feet or farther from proposed construction activities. At these distances, the potential for structural damage is below the thresholds. The applicant would employ means/methods that meet acceptable vibration levels as mandated by NYCDOB. ~~The remains of the BHH synagogue will be stabilized and incorporated into the proposed project. For these remains, the NYCDOB Technical Policy and Protection Notice (TPPN) #10/88 may apply, which required a monitoring program to reduce the likelihood of construction damage to adjacent New York City Landmarks and NR-listed properties within 90 feet.~~ With these required measures, no significant adverse construction-related vibration impacts are expected for this resource. Further, construction activities that could cause potential annoyance would only occur for limited periods of time at any particular location. Therefore, there would be no significant adverse impacts as a result of construction vibration.

Nearby Construction Projects

In regard to the potential for cumulative effects due to nearby construction projects, several of the projects identified during the public scoping process have been completed or are located approximately ¼-mile away or farther from the site. Therefore, the potential for cumulative effects due to construction of these projects would not occur. There are three projects located near the Projected Development sites where construction has not been completed: 180 Broome Street, 202 Broome Street, and Grand Street Guild. However, it is expected that construction at 180 Broome Street and 202 Broome Street would be concluding as construction begins at Projected Development Site 1. Construction of Grand Street Guild, if approved, is not expected to begin until the latter stages of construction at Projected Development Site 1. Therefore, it is not expected that there would be potential for cumulative impacts.

15.3 Construction Regulations and General Practices

Construction Oversight

Governmental oversight of construction in New York City is extensive and involves a number of City, State, and Federal agencies, each with specific areas of responsibility, as follows.

- The New York City Department of Buildings (DOB) has primary oversight of construction. DOB oversees compliance with the New York City Building Code to ensure that buildings are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect both workers and the general public during construction. Areas of oversight include installation and operation of equipment such as cranes and lifts, sidewalk sheds, safety netting, and scaffolding.
- The New York City Department of Environmental Protection (DEP) enforces the New York City Noise Code, reviews and approves any needed Remedial Action Plans (RAPs) and associated Construction Health and Safety Plans (CHASPs) as well as the removal of fuel tanks and abatement of hazardous materials. DEP also regulates water disposal into the sewer system and reviews and approves any rerouting of wastewater flow.
- The New York City Fire Department (FDNY) has primary oversight of compliance with the New York City Fire Code and the installation of tanks containing flammable materials.
- The New York City Department of Transportation Office of Construction Mitigation and Coordination (DOT OCMC) reviews and approves any traffic lane and sidewalk closures.
- New York City Transit (NYCT) is responsible for bus stop relocations and subsurface construction within 200 feet of a subway, if needed.
- The New York City Landmarks Preservation Commission approves studies and testing to prevent loss of archaeological resources and to prevent damage to architectural resources.
- The New York State Department of Environmental Conservation (NYSDEC) regulates disposal of hazardous materials, and construction, operation, and removal of bulk

petroleum and chemical storage tanks. NYSDEC also regulates discharge of water into rivers and streams.

- The New York State Department of Labor (DOL) licenses asbestos workers.
- The New York State Department of Transportation (NYSDOT) reviews and approves any traffic lane closures on its roadways, should any be necessary.
- The U.S. Environmental Protection Agency (EPA) has wide-ranging authority over environmental matters, including air emissions, noise, hazardous materials, and the use of poisons, however, much of its responsibility is delegated to the state level.
- The Occupational Safety and Health Administration (OSHA) sets standards for work site safety and construction equipment.

Construction Hours

New York City regulates the hours of construction work through the New York City Noise Control Code, as amended in December 2005 and effective July 1, 2007. Construction is limited to weekdays between the hours of 7:00 AM and 6:00 PM, and noise limits are set for certain specific pieces of construction equipment. The City may permit work outside of these hours to accommodate: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. The DOB issues these work permits, and for new building construction, like the projected development, approval of a noise mitigation plan from the DEP under the City's Noise Code is also required.

In New York City, construction work typically occurs on weekdays and begins at 7:00 AM, with most workers arriving between 6:00 AM and 7:00 AM. Work typically ends at 4:30 PM or 5:00 PM, with some exceptions when certain critical tasks (e.g., finishing a concrete pour for a floor deck, completing the drilling of piles, or completing the bolting of a steel frame erected that day) require that the workday be extended beyond normal work hours. Any extended workdays generally last until approximately 5:30 PM or 6:00 PM and do not include all construction workers on-site, but only those involved in the specific task requiring additional work time. For work outside of normal construction hours, work permits are obtained from DOB prior to such work commencing. The numbers of workers and pieces of equipment in operation for work outside normal hours is generally limited to those needed to complete the particular authorized task. Overall, the level of activity for any work outside of normal construction hours is less than a normal workday.

Construction Practices

Access, Deliveries and Staging Area

Access to construction sites is controlled. Work areas are fenced off, and limited access points for workers and construction-related trucks are provided. Typically, worker vehicles are not allowed into the construction area, and workers or trucks without a need to be on the site are not allowed entry. After work hours, the gates are closed and locked. Security guards may patrol the construction site after work hours and over weekends to prevent unauthorized access.

Material deliveries to the site are controlled and scheduled. To aid in adhering to the delivery schedules, as is normal for building construction in New York City, flaggers are employed at each of the construction site's access points. Flaggers are typically supplied by either the subcontractor on-site at the time or by the construction manager. The flaggers control trucks entering and exiting the project site so that they would not interfere with one another. In addition, they provide an additional traffic aid as trucks enter and exit the on-street traffic streams.

Lane and Walkway Closures

Temporary curb-lane and sidewalk closures are typical for construction projects in New York City. To manage such closures, a Maintenance and Protection of Traffic (MPT) plan is developed consistent with DOT requirements. DOT OCMC reviews and approves MPT plans, and the implementation of the closures is also coordinated with DOT OCMC. In general, construction managers for major projects on adjacent sites also coordinate their activities to avoid delays and inefficiencies.

Public Safety

A variety of measures are employed to ensure public safety during construction at sites within New York City. Examples include the use of sidewalk bridges to provide overhead protection for pedestrians passing by the construction site and the employment of flaggers to control trucks entering and exiting the construction site, to provide guidance to pedestrians, and/or to alert or slow down the traffic. Other safety measures include following DOB requirements during the installation and operation of tower cranes to ensure safe operation of the equipment and the installation of safety nettings on the sides of the project as the superstructure advances upward to prevent debris from falling to the ground. These safety measures are required as part of a Site Safety Plan reviewed and approved by DOB.

Rodent Control

Construction projects in New York City typically include provisions for a rodent (i.e., mouse and rat) control program with provisions for this formalized in construction contracts for the development. Rodent control programs are typically carried out throughout construction, beginning with surveying and baiting appropriate areas prior to construction and providing for proper site sanitation and maintenance during construction. Signage is posted, and coordination is conducted with appropriate public agencies. Only EPA- and NYSDEC-registered rodenticides are permitted, and the contractor is required to implement the rodent control program in a manner that is not hazardous to the general public, domestic animals, and non-target wildlife.

15.4 Construction Assessment

The proposed project would result in the development of two buildings on Projected Development Site 1. The Suffolk Building would be a 30-story, 310-foot-tall mixed-use building totaling approximately 374,956 gsf; the Norfolk Building would be a 16-story, approximately 165-foot-tall building totaling approximately 86,554 gsf. Construction activities would last approximately 30 months. In addition to the proposed project, a small commercial space of approximately 4,759 gsf would be developed on Projected Development Site 2.

Construction at both Projected Development Sites would be subject to the government regulations and oversight detailed above in Construction Regulations and General Practices and would employ the general construction practices described above, such as the employment of a site safety manager who will be employed at the site to oversee safety consistent with a Site Safety Plan that would be submitted to DOB for review and approval at each stage of development.

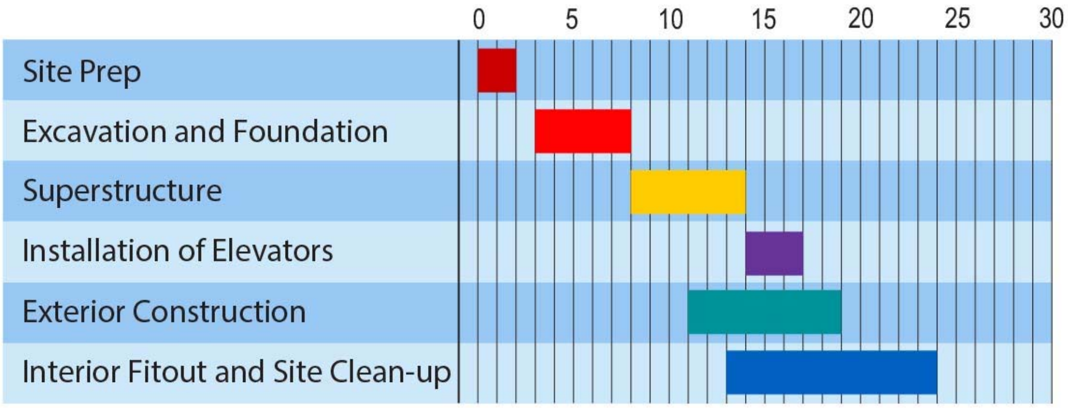
Construction Schedule

For construction of the Norfolk and Suffolk Buildings on Projected Development Site 1, the overall construction period would be approximately 30 months (2.5 years) with the Norfolk Building complete within 24 months and the Suffolk Building complete within 30 months (see **Figure 15-1**). The commercial space on Projected Development Site 2, at under 5,000 square feet, would take less than two years to complete.

For the Norfolk Building, construction would start with mobilization and site prep, which would occur over approximately 8 weeks. Following this, the main stages of construction would be as follows:

- Excavation and foundation, which would occur over approximately 26 weeks starting in month 3 and going through month 8.
- In month 8, superstructure work would commence and would continue for 24 weeks followed by installation of elevators over 16 weeks, for a total of 40 weeks (month 8 through 17).
- In month 11, overlapping with construction of the superstructure, work would commence on the building envelope and would occur over 36 weeks (month 11 through 19).
- In month 13, overlapping with construction of the building envelope, work would commence on the interior fit-out of the building (month 13 to 24).

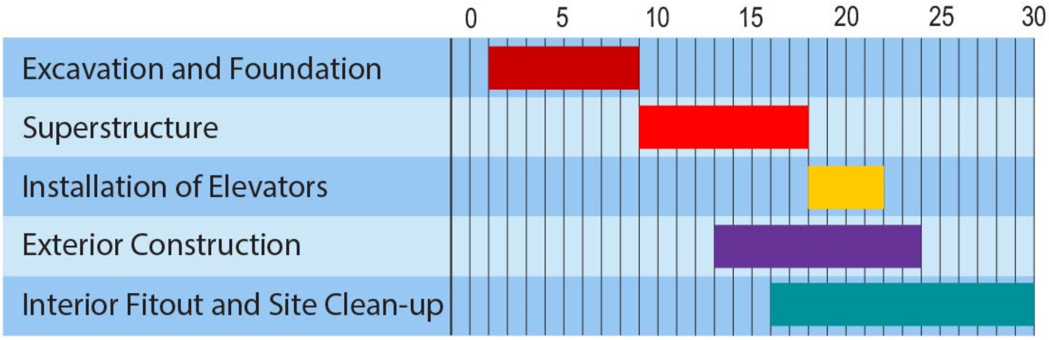
Figure 15-1 Construction Schedule (Norfolk Building)



For the Suffolk Building, construction would begin in month 1 with excavation and foundation over 40 weeks (month 1 through 9). Following this, the main stages of construction would be as follows (see **Figure 15-2**):

- In month 9, construction of the superstructure would commence and would occur over 38 weeks (month 9 through month 18) followed by installation of the elevators over 16 weeks, for a total of 54 weeks (month 9 through month 22).
- In month 13, overlapping with construction of the superstructure, work would commence on the building envelope and would occur over 48 weeks (month 13 through 24).
- In month 16, overlapping with construction of the building envelope, work would commence on the interior fit-out of the building (month 16 to 30). At completion of the Norfolk Building, construction on the Suffolk Building would be mostly interior work.

Figure 15-2 Construction Schedule (Suffolk Building)



As noted above, construction of the commercial space on Projected Development Site 2, at under 5,000 square feet, would take less than two years to complete.

The projected development on both projected development sites would comply with the requirements of the New York City Noise Control Code, which limits construction activities to weekdays between the hours of 7:00 AM and 6:00 PM (absent a permit), requires that a Construction Noise Mitigation Plan be implemented, and sets noise limits for specific pieces of construction equipment. All travel lanes would remain open during construction. The temporary closure of any portion of sidewalk element(s) would be addressed through coordination with DOT OCMC.

Historic Resources

Archaeological Resources

Construction would involve subsurface disturbance in areas of Projected Development Site 1 and Site 2 that have been identified as archaeologically sensitive by the Phase IA study. As discussed in more detail in **Chapter 6**, "**Historic Resources**," Phase IB testing, in accordance with a Work Plan to be reviewed and approved by the Landmarks Preservation Commission (LPC), will be undertaken at the projected development sites. With implementation of the Phase IB testing and continued consultation with LPC regarding the need for Phase 2 and 3 investigations, and if warranted, implementation of these investigations, there would be no significant adverse impacts on archaeological resources.

Architectural Resources

There are no designated NYCL- or S/NR-listed historic buildings located within 90 feet of construction activities; remnants~~ other than the remains~~ of the former Beth Hamedrash Hagodol synagogue (NYCL, S/NR) were located on the site until a structural collapse in October 2019 necessitated their removal.~~); these remains are being stabilized and would be incorporated into the proposed project on Projected Development Site 1.~~ As discussed in **Chapter 7**, "**Historic Resources**," artifacts salvaged from the site, including masonry detailing and ceremonial objects, are planned~~the applicant would continue~~ to be displayed in the cultural heritage center,~~work with LPC on the preservation~~ and ~~incorporation plan for the BHH synagogue remnants. Any incorporation or future removals would be subject to LPC approval. As such,~~ no significant adverse impacts to architectural resources~~this resource~~ would occur.

Transportation

Daily Workforce and Truck Deliveries

Construction of the proposed project would extend over a period of 30 months, completing by the year 2023, and would generate trips from construction workers traveling to and from the site as well as from the delivery of materials and equipment, and the removal of debris. An evaluation of construction sequencing and projections of workers and trucks was undertaken to assess potential traffic-related impacts associated with construction. Workers and truck projections were based on representative sites of similar sizes and uses from prior Environmental Impact Statement (EIS) documents and information for similar known construction projects in the City, such as the *Seward Park Mixed-Use Development Project FEIS (2012)*. **Table 15-1** shows the estimated number of workers and truck deliveries to the project site per quarter (i.e., three-month period) of each calendar year for the duration of construction activities. These represent the average number of daily workers and trucks within each quarter. The average number of workers would be about 166 per day throughout the construction period. The peak number of workers would be 335 per day in the fourth quarter of 2021. For truck trips, the average number of trucks would be 27 per day, and the peak would occur in the fourth quarter of 2021 with 46 trucks per day.

Table 15-1 Average Number of Daily Workers and Trucks by Quarter

Year	**2020**		**2021**				**2022**				**Project**	
Quarter	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**Average**	**Peak**
Workers	36	53	57	152	240	335	334	249	102	102	166	335
Trucks	19	28	26	21	35	46	43	32	12	12	27	46

Construction Worker Modal Splits

The average daily workforce and truck trip estimates in **Table 15-1** were then used to determine the peak quarter for potential traffic-related impacts during construction. These projections were further refined to account for the travel characteristics of construction workers including modal splits and vehicle occupancy rates. It is anticipated that construction workers would primarily take public transportation (approximately 70 percent) to the projected development sites, with a smaller percentage of construction workers traveling via private auto (approximately 30 percent with an average auto occupancy of 2.04).[1] Transit service within the study area includes the F, J, M, and Z subway lines, and the M9, M14A, M15, M15SBS, M21, and M22 bus routes.

Traffic

Peak Hour Construction Worker Vehicle and Truck Trips

Construction activities would be expected to occur on weekdays during the typical construction shift of 7 AM to 4:30 PM or 5 PM. Construction truck trips would typically be distributed throughout the day—depending upon the specific types of construction activities taking place—and most trucks would remain in the area for short durations. Auto trips associated with construction worker travel would typically take place during the hours before and after the daily work shift. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon or evening and each truck delivery was assumed to result in one "in" trip and one "out" trip during the same hour.

The estimated daily vehicle trips for the peak quarter of construction traffic were distributed throughout the workday based on projected arrival/departure patterns of construction workers, and the projected pattern of truck deliveries based on the types of construction activities that would occur during the fourth quarter of 2021. For construction workers, typical arrival patterns show that most arrivals (approximately 80 percent) occur during the hour of 6 to 7 AM (the hour before the beginning of a regular day shift), and the same percentage of departure trips occurs during the hour of 4 PM to 5 PM (at the end of the shift). For trucks, deliveries are usually spread throughout the day but the peak activity (approximately 25 percent) would occur during the 6 to 7 AM hour.

The estimated daily average number of construction workers and truck deliveries during the peak construction quarter, which is expected to the fourth quarter of 2021, is approximately 235 construction workers and 46 trucks per day. The peak construction hourly trip projections for the peak construction quarter are summarized in **Table 15-2**.

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[1] These are the generally accepted assumptions used in construction assessments for projects in the Manhattan core, such as the Seward Park Mixed-Use Development Project FEIS (2012) and are based on survey data collected during construction of the New York Times Building in 2006.

Table 15-2 Peak Construction Vehicle Trip Projections – Fourth Quarter of 2021

	Auto Trips		Truck Trips		Total Vehicle Trips			Total PCE Trips		
Hour	In	Out	In	Out	In	Out	Total	In	Out	Total
5 AM – 6 AM	0	0	0	0	0	0	0	0	0	0
6 AM – 7 AM	38	0	11	11	49	11	60	60	22	82
7 AM – 8 AM	10	0	4	4	14	4	18	18	8	26
8 AM – 9 AM	0	0	4	4	4	4	8	8	8	16
9 AM – 10 AM	0	0	4	4	4	4	8	8	8	16
10 AM – 11 AM	0	0	4	4	4	4	8	8	8	16
11 AM – 12 PM	0	0	4	4	4	4	8	8	8	16
12 PM – 1 PM	0	0	3	3	3	3	6	6	6	12
1 PM – 2 PM	0	0	3	3	3	3	6	6	6	12
2 PM – 3 PM	0	0	3	3	3	3	6	6	6	12
3 PM – 4 PM	0	3	3	3	3	6	9	6	9	15
4 PM – 5 PM	0	38	3	3	3	41	44	6	44	50
5 PM – 6 PM	0	7	0	0	0	7	7	0	7	7
6 PM – 7 PM	0	0	0	0	0	0	0	0	0	0
7 PM – 8 PM	0	4	0	0	0	0	0	0	0	0

The estimated number of vehicle trips generated by construction activities during the peak quarter would be 60 vehicle trips (82 passenger car equivalents [PCEs][2]) during the construction AM peak hour (6 AM to 7 AM) and 44 vehicle trips (50 PCEs) during the construction PM peak hour (4 PM to 5 PM). In comparison, upon completion, the proposed project would generate 51 vehicle trips (55 PCEs), 39 vehicle trips (43 PCEs), and 62 vehicle trips (62 PCEs) during the weekday AM, midday, and PM peak hours, respectively, as shown in **Table 15-3.**

Table 15-3 Comparison of Vehicle Trips – Construction Phase vs. With Action Conditions

	Construction Peak Hour Trips		Project Generated Peak Hour Trips		
	6 – 7 AM	4 – 5 PM	7:15 – 8:15 AM	1 – 2 PM	4:45 – 5:45 PM
Auto	38	38	47	35	62
Truck	22	6	4	4	0
Total Vehicles	60	44	51	39	62
Total PCEs	82	50	55	43	62

Construction Traffic Volumes and Levels of Service

Vehicle trips were assigned to the roadway network, and three critical study area intersections with a potential for significant impacts were selected for analysis during the 6

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[2] Since larger vehicles such as trucks typically make up a significant portion of construction traffic, a passenger car equivalent factor is applied to these vehicles to account for their size difference. Per the *CEQR Technical Manual*, it is assumed that one truck is equivalent to two passenger cars.

AM to 7 AM and 4 PM to 5 PM construction peak hours: Delancey Street at Essex Street, Delancey Street at Clinton Street, and Grand Street at Clinton Street.

Existing Conditions

Based on the Automatic Traffic Recorder (ATR) traffic volume data, background traffic volumes during the 6 AM to 7 AM construction peak hour were determined to be comparable to the AM operational peak hour (approximately 2 percent lower than the AM operational peak hour). Similarly, based on ATR and turning movement count data, background traffic volumes during the 4 PM to 5 PM construction peak hour would be was determined to also be comparable to the PM operational peak hour (approximately 2 percent lower than the PM operational peak hour). Therefore, to provide a conservative analysis, existing traffic volumes from the AM operational peak hour was used for analysis of the 6 AM to 7 AM construction peak hour and PM existing traffic volumes was used for analysis for the 4 PM to 5 PM construction peak hour.

During the existing conditions, two of the three intersections analyzed including Delancey Street at Essex Street, and Grand Street at Clinton Street operate at an overall acceptable levels of service (LOS) D or better during the AM construction peak hour, and the intersection of Delancey Street at Clinton Street operates at an overall unacceptable LOS E during the construction peak hours. During the PM construction peak hour, the intersection of Grand Street at Clinton Street operates at overall unacceptable LOS D. Of the approximately 15 individual traffic movements analyzed, four and five individual traffic movements operate at an unacceptable LOS D or worse during the AM construction peak hour and PM construction peak hour, respectively. Detailed descriptions of the existing condition traffic levels of service are provided in **Table 15-4**.

Table 15-4 Existing Traffic Levels of Service

		Weekday AM Peak Hour				Weekday PM Peak Hour			
Intersection & Approach		MVT	V/C	Control Delay[1]	LOS	MVT	V/C	Control Delay[1]	LOS
SIGNALIZED INTERSECTIONS									
Delancey St and Essex St									
Delancey St	EB	TR	0.67	19.9	B	TR	0.83	24.5	C
	WB	T	0.87	22.7	C	T	0.72	19.9	B
		R	1.00	51.1	D	R	0.85	36.6	D
Essex St	NB	LT	0.68	34.9	C	LT	0.27	23.5	C
		T	0.30	24.6	C	R	0.81	47.4	D
	SB	TR	0.48	26.0	C	TR	0.74	32.5	C
Overall Intersection[2]		-	**0.88**	**25.0**	**C**	-	**1.32**	**26.0**	**C**
Delancey St and Clinton St									
Delancey St	EB	TR	0.73	24.5	C	TR	1.02	43.7	D
	WB	T	1.05	83.5	F	T	1.05	80.7	F
		R	0.99	83.7	F	R	1.00	84.6	F
Clinton St	NB	R	0.93	40.8	D	R	0.87	30.9	C
Delancey St Service Road	WB	R	0.39	42.0	D	R	0.45	42.7	D
Overall Intersection[2]		-	**1.07**	**54.8**	**E**	-	**1.00**	**58.9**	**E**
Grand St and Clinton St									
Grand St	EB	TR	0.44	16.9	B	TR	0.34	15.1	B
	WB	LT	0.27	13.9	B	LT	0.23	13.5	B
		R	0.99	68.0	E	R	0.97	64.0	E
Clinton St	NB	LTR	0.80	43.2	D	LTR	0.92	57.4	E
Overall Intersection[2]		-	**0.92**	**40.5**	**D**	-	**0.96**	**45.3**	**D**

[1] Control delay is measured in seconds-per-vehicle
[2] Overall Intersection V/C ration is the critical lane groups' V/C ratio

Future No-Action Conditions

An annual background growth rate of 0.25 percent was assumed as per the *CEQR Technical Manual* and used to estimate the background volumes for the 2021 No-Action condition. The nine background development sites were incorporated into the No-Action condition analyses – all but one project (Grand Street Guild) is expected to be completed, and construction activities from the Grand Street Guild would overlap with the proposed project's peak construction period.

During the 2021 No-Action condition, two of the three intersections analyzed—Delancey Street at Clinton Street, and Grand Street at Clinton Street—would operate at an overall unacceptable LOS D or worse during both the AM and PM construction peak hours compared one intersection during the AM construction peak hour and two intersections during the PM construction peak hour under the existing conditions. During the AM construction peak hour, six of the approximately 16 individual traffic movements analyzed would operate at an unacceptable LOS D or worse under the 2021 No-Action conditions compared to four individual traffic movements under the existing conditions. Eight of the approximately 16 individual traffic movements analyzed, would operate at an unacceptable LOS D or worse during the PM construction peak hour under the 2021 No-Action condition compared to five individual traffic movements under the existing conditions. Detailed descriptions of the No-Action condition traffic levels of service are provided in **Table 15-5**.

Table 15-5 No-Action Traffic Levels of Service

Intersection & Approach		Weekday AM Peak Hour				Weekday PM Peak Hour			
		MVT	V/C	Control Delay[1]	LOS	MVT	V/C	Control Delay[1]	LOS
SIGNALIZED INTERSECTIONS									
Delancey St and Essex St									
Delancey St	EB	TR	0.69	20.3	C	TR	0.85	25.4	C
	WB	T	0.88	23.1	C	T	0.73	20.0	C
		R	1.20	125.2	F	R	0.96	56.3	E
Essex St	NB	LT	0.75	38.9	D	LT	0.37	25.1	C
		T	0.33	25.3	C	R	0.94	68.4	E
	SB	TR	0.57	27.8	C	TR	0.84	38.1	D
Overall Intersection[2]		**-**	**1.01**	**31.3**	**F**	**-**	**0.95**	**29.7**	**C**
Delancey St and Clinton St									
Delancey St	EB	T	0.73	24.5	C	T	1.06	60.5	E
		R	0.46	24.1	C	R	0.33	22.0	C
	WB	T	1.08	93.4	F	T	1.07	86.4	F
		R	1.03	97.4	F	R	1.03	91.2	F
Clinton St	NB	R	0.95	44.6	D	R	0.90	33.3	C
Delancey St Service Road	WB	R	0.52	52.8	D	R	0.72	70.5	E
Overall Intersection[2]		**-**	**1.10**	**64.6**	**E**	**-**	**1.02**	**68.7**	**E**
Grand St and Clinton St									
Grand St	EB	TR	0.51	18.4	B	TR	0.45	17.0	B
	WB	LT	0.35	15.0	B	LT	0.41	16.0	B
		R	1.11	104.1	E	R	1.19	136.9	F
Clinton St	NB	LTR	0.85	47.5	D	LTR	0.97	56.5	E
Overall Intersection[2]		**-**	**1.01**	**51.5**	**F**	**-**	**1.10**	**64.5**	**E**

[1] Control delay is measured in seconds-per-vehicle
[2] Overall Intersection V/C ration is the critical lane groups' V/C ratio

Future With-Action Conditions

Construction activities would generate 38 construction worker auto trips and 22 construction truck trips during the AM construction peak hour, and 38 construction worker auto trips and six construction truck trips during the PM construction peak hour. Under the 2021 With-Action with construction conditions, two of the three intersections analyzed—Delancey Street at Clinton Street and Grand Street at Clinton Street—would continue to operate at an overall unacceptable LOS D or worse during both the AM and PM construction peak hours similar to the 2021 No-Action condition. Of the approximately 16 individual traffic movements analyzed, six and eight traffic movements would continue to operate at an unacceptable LOS D or worse similar to the 2021 No-Action condition.

Of the three intersections analyzed, the construction activity would result in significant adverse traffic impacts at one intersection (at one movement) during each of the AM and PM construction peak hours. During the AM construction peak hour, the westbound through movement at the intersection of Delancey Street and Clinton Street would be significantly impacted and could be mitigated with a one second shift in signal timing from the northbound Clinton Street phase to the westbound Williamsburg Bridge/northbound Clinton Street phase. During the PM construction peak hour, the northbound approach at the intersection of Grand Street and Clinton Street would be significantly impacted and could not be mitigated.

Detailed descriptions of the Construction traffic levels of service and traffic mitigation measures are presented in **Tables 15-6 and 15-7**.

Table 15-6 Construction No-Action vs With-Action vs With-Action w/ Improvements Traffic Levels of Service Comparison – Weekday AM Peak Hour

		2023 No-Action				**2023 With-Action**				**2023 With-Action w/ Improvements**				
Intersection & Approach		**MVT**	**V/C**	**Control Delay[1]**	**LOS**	**MVT**	**V/C**	**Control Delay[1]**	**LOS**	**MVT**	**V/C**	**Control Delay**	**LOS**	
SIGNALIZED INTERSECTIONS														
Delancey St and Essex St														
Delancey St	EB	TR	0.69	20.3	C	TR	0.69	20.4	C					- Mitigation not required
	WB	T	0.88	23.1	C	T	0.89	23.2	C					
		R	1.20	125.2	F	R	1.20	125.2	F					
Essex St	NB	LT	0.75	38.9	D	LT	0.75	39.4	D					
		T	0.33	25.3	C	R	0.34	25.6	C					
	SB	TR	0.57	27.8	C	TR	0.59	28.3	C					
Overall Intersection[2]		-	**1.01**	**31.3**	**F**	-	**1.01**	**31.5**	**C**					
Delancey St and Clinton St														
Delancey St	EB	T	0.73	24.5	C	T	0.73	24.5	C	T	0.73	24.5	C	- Modify signal timing. Shift 1 sec of green time from NB phase to WB/NB phase. [NB green time shifts from 37 sec to 36 sec; WB/NB green time shifts from 5 sec to 6 sec.]
		R	0.46	24.1	C	R	0.46	24.1	C	R	0.46	24.1	C	
	WB	T	1.08	93.4	F	**T**	**1.09**	**98.6**	**F**	T	1.06	86.5	F	
		R	1.03	97.4	F	R	1.03	97.4	F	R	1.01	88.6	F	
Clinton St	NB	R	0.95	44.6	D	R	0.95	44.6	D	R	0.95	44.6	D	
Delancey St Service Road	WB	R	0.52	52.8	D	R	0.52	52.8	D	R	0.52	52.8	D	
Overall Intersection[2]		-	**1.10**	**64.6**	**E**	-	**1.10**	**66.0**	**E**	-	**1.10**	**60.7**	**E**	
Grand St and Clinton St														
Grand St	EB	TR	0.51	18.4	B	TR	0.58	20.3	C					- Mitigation not required
	WB	LT	0.35	15.0	B	LT	0.35	15.0	B					
		R	1.11	104.1	F	R	1.11	104.1	F					
Clinton St	NB	LTR	0.85	47.5	D	LTR	0.85	47.5	D					
Overall Intersection[2]		-	**1.01**	**51.5**	**F**	-	**1.01**	**51.2**	**D**					

[1] Control delay is measured in seconds-per-vehicle

[2] Overall intersection V/C is the critical lane groups' V/C status

Notes: Movement delay and overall delay cannot be calculated; exceeds the HCS software threshold

Bold denotes a significantly impacted movement

Table 15-7 Construction No-Action vs With-Action vs With-Action w/ Improvements Traffic Levels of Service Comparison – Weekday PM Peak Hour

		2023 No-Action				2023 With-Action				2023 With-Action w/ Improvements				
Intersection & Approach		MVT	V/C	Control Delay[1]	LOS	MVT	V/C	Control Delay[1]	LOS	MVT	V/C	Control Delay	LOS	**Mitigation Measures**
SIGNALIZED INTERSECTIONS														
Delancey St and Essex St														
Delancey St	EB	TR	0.85	25.4	C	TR	0.85	25.4	C					- Mitigation not required
	WB	T	0.73	20.0	C	T	0.73	20.1	C					
		R	0.96	56.3	E	R	0.96	56.3	E					
Essex St	NB	LT	0.37	25.1	C	LT	0.37	25.1	C					
		T	0.94	68.4	E	R	0.94	69.9	E					
	SB	TR	0.84	38.1	D	TR	0.84	38.1	D					
Overall Intersection[2]		-	**0.95**	**29.7**	**C**	-	**0.95**	**29.8**	**C**					
Delancey St and Clinton St														
Delancey St	EB	T	1.06	60.5	E	T	1.06	61.0	E					- Mitigation not required
		R	0.33	22.0	C	R	0.33	22.0	C					
	WB	T	1.07	86.4	F	T	1.07	86.8	F					
		R	1.03	91.2	F	R	1.03	91.2	F					
Clinton St	NB	R	0.90	33.3	C	R	0.91	35.4	D					
Delancey St Service Road	WB	R	0.72	70.5	E	R	0.72	70.5	E					
Overall Intersection[2]		-	**1.02**	**68.7**	**E**	-	**1.04**	**69.3**	**E**					
Grand St and Clinton St														
Grand St	EB	TR	0.45	17.0	B	TR	0.45	17.0	B					- Unmitigatable impact
	WB	LT	0.41	16.0	B	LT	0.41	16.0	B					
		R	1.19	136.9	F	R	1.19	136.9	F					
Clinton St	NB	LTR	0.97	66.5	E	**LTR**	**1.03**	**82.3**	**F**					
Overall Intersection[2]		-	**1.10**	**64.5**	**E**	-	**1.12**	**69.9**	**E**					

[3] Control delay is measured in seconds-per-vehicle

[4] Overall intersection V/C is the critical lane groups' V/C status

Notes: Movement delay and overall delay cannot be calculated; exceeds the HCS software threshold

Bold denotes a significantly impacted movement

Deliveries

Construction trucks would be required to use NYCDOT-designated truck routes, including the Williamsburg Bridge, Delancey Street, Allen Street, and East Houston Street. Trucks would then use local streets to access the construction sites. Trucks would service the construction sites at its designated loading zones.

Parking

Construction workers would generate an estimated maximum daily parking demand of 48 spaces during the peak construction quarter. This parking demand could be accommodated by the off-street parking spaces available within a quarter-mile radius.

Transit and Pedestrians

Based on construction survey data, it is anticipated that approximately 70 percent of construction workers would commute to the project site by public transportation. During the peak construction quarter, the proposed project would expect to generate 335 daily construction workers. It is expected that the majority of workers (80 percent) would arrive during the AM construction peak hour and depart during the PM construction peak hour, and they would generate approximately 188 construction worker trips by public transportation during each construction peak hour. The study area is well served by public transit, including the F, J, M, and Z subway lines at the Essex Street-Delancey Street station and the M9, M14A, M15, M15SBS, M21, and M22 bus routes. These trips would be distributed to the different transit options and construction activities are not expected to result in transit or pedestrian impacts.

Air Quality

Introduction

Construction impacts on air quality levels may occur because of particulate matter (fugitive dust) created by excavation, earth moving operations, emissions from on-site diesel equipment, and increased truck traffic to and from the construction site on local roadways. As discussed in the *CEQR Technical Manual,* the determination whether it is sufficient to conduct a qualitative analysis of these emissions or whether a quantitative analysis is required should take into account factors such as the location of the project site in relation to existing residential uses or other sensitive receptors, the intensity of the construction activity, and the extent to which the project incorporates commitments to appropriate emission control measures.

The most intense construction activities in terms of emissions are typically from a project’s demolition, excavation, and foundation stages since it is during these stages that the largest number of large, non-road diesel engines are employed, which combined with the fugitive dust from earth moving operations results in the highest levels of air emissions. The other stages of construction, including superstructure, exterior façades, interior finishes and site work, typically result in lower air emissions since they require fewer pieces of heavy-duty diesel equipment. Equipment used in the latter stages of construction generally has small engines, and electric tools are dispersed vertically throughout the building, resulting in very low concentration increments in adjacent areas. Additionally, the latter stages of construction do not involve soil disturbance activities and therefore result in significantly lower fugitive dust emissions. Interior finishes activities are better shielded from nearby sensitive receptors by the proposed structures themselves.

For the proposed project on Projected Development Site 1, the overall construction period for the Norfolk Building would be two years and the Suffolk Building would take an additional six months. While the most intense construction activities in terms of air pollutant emissions is anticipated to be less than two years, a detailed quantitative analysis of the potential for construction to result in air quality impacts was undertaken because of the proximity of the Hong Ning building, a sensitive receptor.

Emissions Reduction Program

As discussed above, construction activities could affect air quality because of engine emissions from on-site construction equipment and dust-generating activities. In general, much of the heavy equipment used in construction has diesel-powered engines, which produce relatively high levels of nitrogen oxides and particulate matter. Gasoline engines produce relatively high levels of carbon monoxide. Construction activities also generate fugitive dust emissions. As a result, the air pollutants analyzed for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and carbon monoxide (CO).

Since ultra-low-sulfur diesel (ULSD) would be used for all diesel engines related to construction activities under the proposed actions, sulfur oxides (SO_x) emitted from those construction activities would be negligible, and an analysis of SO_x emissions is not warranted. For more details on a description of air pollutants and standards, see **Chapter 10**, "**Air Quality**."

As stated above, construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine particulates. To ensure that the construction of the proposed project results in the lowest feasible diesel particulate (DPM) emissions, an emissions reduction program would be implemented.

The evaluation performed in this section assumes a combination of emission reduction measures that are mandated by law and are common practice in large-scale New York City construction projects, and follow the requirements included in NYC Law 77 and the NYC Air Pollution Control Code. These include the following:

- Fugitive Dust Control Plans. In compliance with the NYC Air Pollution Control Code regarding control of fugitive dust, contractors would be required to ensure that all trucks carrying loose material use water as a dust suppression measure, that wheel-washing stations be established for all trucks exiting the construction site; that trucks hauling loose material be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the site, that streets adjacent to the site be cleaned as frequently as needed by the construction contractor, and that water sprays be used for transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. These measures would be expected to reduce dust generation by more than 50 percent.

- Clean Fuel. Ultra-low sulfur diesel (ULSD) would be used exclusively for diesel engines related to construction activities under the proposed actions. This is a federal requirement since 2010, which enables the use of tailpipe reduction technologies that reduce diesel particulate matter and SO_x emissions.
- Diesel Equipment Reduction. Hoists and small equipment, such as lifts, compressors, welders, and pumps would be expected to use electric engines that operate on grid power instead of diesel power engines, to the extent practical. This is a common practice that has been achieving wider use as technology improves.
- Restrictions on Vehicle Idling. This would be required in compliance with the local law restricting unnecessary idling. On-site vehicle idle time would be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.

In addition, the evaluation assumes the following measure:

- Best Available Tailpipe Reduction Technologies for Diesel Engines. NYC Local Law 77 (which currently only applies to publicly funded City projects), requires nonroad diesel engines with a power rating of 50 horsepower (hp) or greater, and controlled truck fleets (i.e., truck fleets under long-term contract, such as concrete mixing and pumping trucks) to utilize the best available tailpipe technology for reducing DPM emissions. The use of diesel particulate filters (DPF) in Tier 3 emission standard for diesel engines~~ (model years 2006-2011 for engine sizes between 100 and 600 hp)~~[3] for construction equipment achieves the same emission reductions as a newer Tier 4 emission standard for diesel engines. Given the timeframe of the developments to be constructed under the proposed actions (2020-2022), equipment meeting the more restrictive Tier 4 standards for diesel engines ~~(model years 2011/12 and beyond~~ would be expected to be in wide use and comprise the majority of contractors' fleets. The combination of Tier 4 and Tier 3 engines with DPF would achieve DPM reductions of approximately 90 percent when compared to older uncontrolled engines. If the contractor uses~~will use~~ equipment older than the ~~model year 2011 (~~Tier 4 model years, the equipment~~emission standard) it~~ would be retrofitted with Diesel Particulate Filter.
- Source Location and Shielding. To reduce the resulting concentration increments at sensitive receptors, large emissions sources and activities such as concrete trucks, generators, and large compressors could be located away from the sensitive receptors to the extent practical. Additionally, perimeter fencing around the construction site would reduce both fugitive dust and tailpipe emissions from reaching sensitive receptors.

Overall, these emissions control measures would be expected to significantly reduce DPM emissions, and as recommended in the *CEQR Technical Manual*, all the necessary measures

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[3] See Table 2-1 of the USEPA's *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* document

would be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed.

Air Quality Analysis Methodologies

Based on a conceptual construction schedule developed by the applicant, the peak cumulative short-term $PM_{2.5}$ emissions were evaluated for Projected Development Site 1 during the 2020–2022 construction duration by phase of construction. The phase with the highest $PM_{2.5}$ emissions from Projected Development Site 1, which includes the Norfolk and Suffolk buildings, was selected as the period with the highest potential $PM_{2.5}$ effects. This analysis, called the intensity assessment, was used to identify the critical construction phase and year for the dispersion impact modeling analysis.

A dispersion analysis—considering the PM_{10}, $PM_{2.5}$, NO_x and CO emissions from on-site sources (construction equipment and fugitive dust) and off-site sources (trucks and employee vehicles) was performed to determine potential air quality effects during the peak emission construction period for the proposed buildings.

The following sections provide additional details relevant to the construction air quality analysis methodology. For a review of the applicable regulations, standards and criteria, and benchmarks for stationary and mobile source air quality analyses, refer to **Chapter 10**, "**Air Quality**."

The analysis was performed following the EPA and *CEQR Technical Manual* suggested procedures and analytical tools (as further discussed below) to determine source emission rates. The estimated emission rates were then used as input to an air quality dispersion model to determine potential impacts.

Emission Estimation Process

The construction analyses used an emission estimation method and a modeling approach previously developed for evaluating air quality impacts of construction projects in New York City in consultation with DCP. Because the level and types of construction activities would vary from month to month, the approach includes a determination of the worst-case emission period based on an estimated quarterly construction work schedule, the number of on-site construction equipment types and rated horsepower of each unit, quantities of materials to be excavated, and number of trucks arriving, working and leaving the site.

The worst-case short-term emissions (e.g., maximum daily emissions) and the maximum annual emissions (based on a 12-month rolling average) were determined based on the construction schedule activities and equipment projected to be required for the construction of Projected Development Site 1. The assessment considered four main phases of construction: excavation-foundation, cast-in-place concrete structure, general building construction, and sitework.

The specific construction information used to calculate emissions generated from the construction process of the Projected Development Site 1 buildings included, but is not limited to, the following:

- The number of units and fuel-type of construction equipment to be used;[4]
- Rated horsepower for each piece of equipment;
- Utilization rates for equipment;
- Hours of operation on-site;
- Excavation, demolition and processing rates; and
- Average distance traveled on-site by dump trucks, pickup trucks, box trucks and tractor trailers.

Engine Exhaust Emissions

Emission factors for NO_x, PM_{10}, $PM_{2.5}$, and CO from the combustion of fuel for on-site construction equipment were developed using the latest EPA MOVES2014b-NONROAD Emission Model.

The MOVES2014b-NONROAD model can generate unitary emission factors, in grams per horsepower/hour (g-hp/hr) by engine size (hp), equipment type, engine technology type, fuel type, and year of analysis. The model estimates emissions as the average emission factor by year for the county fleet sorted by the above-mentioned parameters. As an example, if New York County and the year 2020 were selected for diesel engines, the output generates emissions (g-hp/hr) for each type of equipment from 3 hp to 3,000 hp rating for each one of the model years of the County fleet going back up to 40 years. The model calculates how many pieces of equipment for each engine technology group and model year are present in the County fleet and produces the yearly average emission factor. Because the model years of the actual construction equipment to be used for the proposed developments are unknown, emission factors for the different equipment types were estimated by using the weighted average (emission factor and activity level) of the model years 2008 to 2020 to account for the use of tier 4 engines (for model years 2012 to 2020) and tier 3 engines retrofitted with DPF to achieve a 90% removal rate of DPM (for model years 2008 to 2011).

Emission rates from combustion of fuel for on-site dump trucks, pickup trucks, and other heavy trucks, such as tractor trailers, were developed using the EPA MOVES2014b Emission Model. New York City restrictions placed on idling times were applied for dump trucks and other heavy trucks. Short-term and annual emission rates were adjusted from the peak-hour emissions by applying usage factors for each equipment unit. Due to lack of data availability, usage factors similar to those used in the Greater East Midtown FEIS were applied.

Fugitive Emission Sources

Road dust (PM_{10} and $PM_{2.5}$) emissions from trucks moving inside the construction sites were calculated using equations from EPA's AP-42, Section 13.2.2 for unpaved roads. Average vehicle weights (i.e., unloaded going in and loaded going out) were used in the analysis and a reasonably conservative round-trip distance was estimated for on-site travel. Dust control measures (described previously) would provide at least a 50-percent reduction in PM_{10} and

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[4] For a more accurate representation of annual emissions, annual $PM_{2.5}$ emission rates accounted for the average of the monthly quantity of equipment used for the excavation/foundation and structural phases of construction as opposed to the peak monthly quantity of equipment used for the excavation/foundation and structural phases of construction.

$PM_{2.5}$ emissions. Also, since on-site travel speeds would be restricted to five miles per hour, on-site travel for trucks would not be a significant contributor to $PM_{2.5}$ fugitive emissions.

Particulate matter emissions could also be generated by material handling activities (i.e., transfer-loading/drop operations for debris and soil). Estimates of PM_{10} and $PM_{2.5}$ emissions from these activities were developed using EPA's AP-42 Sections 13.2.4.

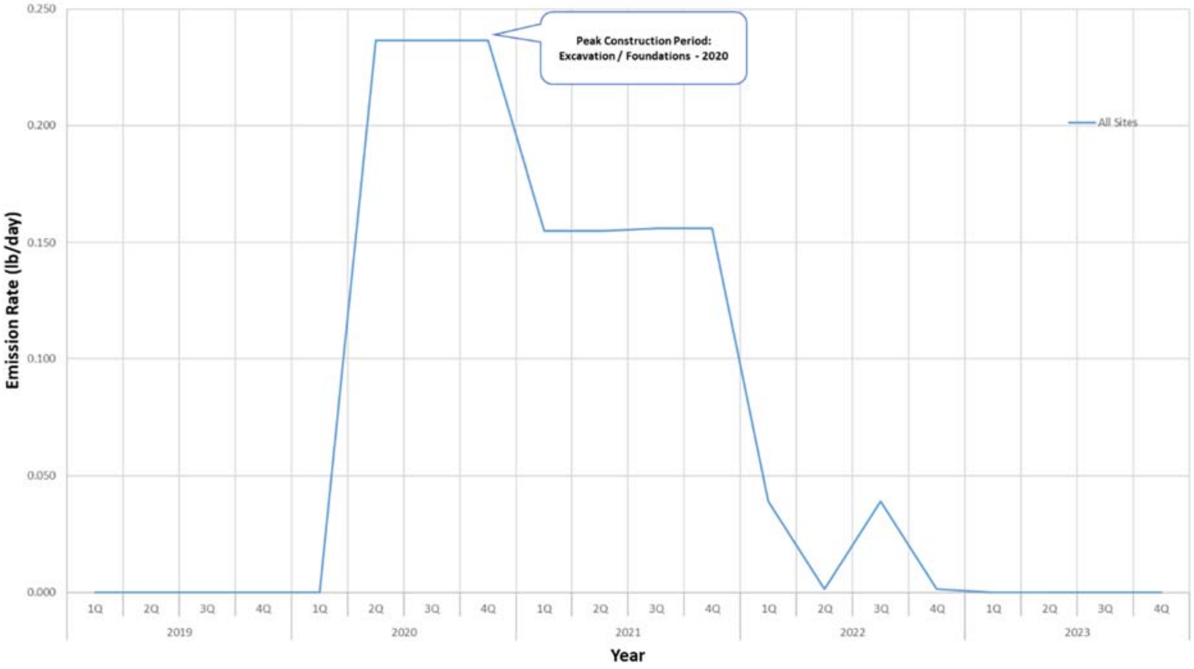
Construction Activity Emissions Intensity Assessment

Overall, construction of the proposed development on Projected Development Site 1 is expected to occur over a period of two and a half years. To determine which construction phase constitutes the worst-case period for the pollutants of concern, construction-related emissions were calculated throughout the duration of construction on a quarterly basis using peak daily emissions for $PM_{2.5}$.

$PM_{2.5}$ was selected as the worst-case pollutant because, as compared to other pollutants, $PM_{2.5}$ has the highest ratio of emissions-to-effects. Therefore, $PM_{2.5}$ was used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of other pollutants would follow $PM_{2.5}$ emissions, since most pollutant emissions are proportional to diesel engines by horsepower. Based on the resulting multiyear profiles by quarter, a worst-case period was identified for the modeling of annual and short-term averaging periods.

To determine the worst short-term emission and the worst annual emission, an emission intensity assessment (emission profiles) was conducted, and the excavations and foundations phase during Quarters 2, 3, and 4 of 2020 was identified as the worst phase when considering emissions from the construction of the Norfolk and Suffolk buildings (**Figure 15-3**).

Figure 15-3 Projected Peak Daily $PM_{2.5}$ Construction Emissions Profile



Impact Assessment

The effects of construction emissions on the surrounding environment for the relevant air pollutants were quantified using dispersion computer models. As explained in the emission intensity assessment, the impact analysis included the Norfolk and Suffolk buildings for the on-site dispersion analysis. The peak daily emissions from the construction activities during the second to the fourth quarters of 2020 excavation-foundations phase for the project construction site were used as the worst-case modeling scenario to evaluate short-term air quality impact. The average emissions from the second quarter of 2020 to the first quarter of 2021 were used as the worst-case modeling scenario to evaluate annual air quality impact.

To address the potential cumulative effects from off-site emissions related to construction trucks, Suffolk Street between Broome Street to the north and Grand Street to the south was selected for the off-site modeling analysis. This link has the highest incremental truck volumes (six trucks) based on traffic assignments, and it is located near the on-site sources of the construction site. The peak hour truck volumes, which occur during the AM peak hour, were used for this cumulative analysis.

The impact assessment results included the cumulative on-site and off-site effects of the Norfolk and Suffolk buildings.

On-Site Dispersion Modeling

Potential impacts from on-site construction equipment and off-site truck emissions were evaluated using the EPA's most current version of the AERMOD dispersion model (version 18081). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion; it also includes handling of terrain interactions.

The AERMOD model calculates pollutant concentration from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

Source Simulation

During construction, various types of construction equipment would be used throughout the site. Some of the equipment is mobile and would operate throughout the site, while some would remain stationary on-site at distinct locations during short-term periods (i.e., daily and hourly). Stationary emission sources include (but are not limited to) air compressors, cranes, and concrete pumps. Equipment such as excavators, bobcats, concrete trucks, and dump trucks would operate throughout the site.

Since the peak quarter of 2020 site emissions include excavation and foundations, all construction equipment sources were simulated as an area source for the purpose of the modeling analysis; their emissions were distributed evenly across the construction site.

Receptor Locations

AERMOD was used to predict maximum pollutant concentrations at nearby locations of likely public exposure ("sensitive receptors") such as the Hong Ning Senior Housing Building located south of Projected Development Site 1. Discrete receptors were placed along nearby sensitive receptor locations, such as residential and commercial buildings (e.g., operable windows and air intakes). These sensitive receptors were located from the first floor to the seventh floor of buildings facades in all affected directions of buildings adjacent to Projected Development Site 1.[5]

Additionally, the maximum predicted annual incremental $PM_{2.5}$ concentration was modeled using a one-kilometer grid of receptors at a height of 1.8 meters for comparison with the City's *de minimis* criteria of 0.1 $\mu g/m^3$ for annual average neighborhood-scale grid modeling.

Meteorological Data

All analyses were conducted using five consecutive years of meteorological data (2012-2016). Surface data were obtained from La Guardia Airport and upper air data were obtained from Brookhaven station, New York.

Off-Site Dispersion Modeling

The analysis of off-site mobile source impacts included the impacts of construction-phase vehicles on the roadway network. The peak hour construction truck volumes for the project construction site at Suffolk Street between Broome and Grand Streets were selected for the off-site modeling analysis. This link has the highest incremental truck volumes from the No-Action scenario, and it is located adjacent to the above-mentioned construction sites. The peak hour truck volume (AM peak hour for the excavation phase) was used for this analysis.

The same AERMOD dispersion model (version 18081) was used to estimate the increments caused by off-site construction activities. To evaluate the potential cumulative effect of the on-site and off-site emissions, this off-site analysis placed receptors at the same locations used on the AERMOD on-site dispersion analysis and modeled both source types cumulatively.

Background Concentrations

Where needed to determine potential air quality impacts from the construction of the project, background ambient air quality data for criteria pollutants (**Table 10-2** from **Chapter 10**, "**Air Quality**") were added to the predicted site concentrations. The background data represent the latest available five years of data and were obtained from a nearby NYSDEC monitoring station that best represents the area surrounding the site. The latest five-year period (2013-2017) data were used for annual average NO_2, and the latest three-year period (2015-2017) data were used for the 24-hour PM_{10} background concentration.

The 24-hour average $PM_{2.5}$ background concentration of 20.7 $\mu g/m^3$ from the latest three-year period (2015-2017) was used to establish the *de minimis* value, consistent with the guidance provided in the *2014 CEQR TM*. The annual average $PM_{2.5}$ impacts were assessed

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[5] ~~For the critical pollutant of concern, PM2.5, receptors were added to the first floor of the modelled buildings. Additional modeling analyses that include first-floor receptors will be performed for other pollutants between publication of the DEIS and the FEIS.~~

on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria thresholds, without considering the annual background.

Probable Impacts from Proposed Project Construction

This section provides a summary of the construction air quality results from the construction activities of the proposed project. The peak short-term emissions for CO, PM_{10} and $PM_{2.5}$ were predicted to occur during the last three quarters of 2020. The annual $PM_{2.5}$ and NO_2 emissions were based on the weighted average emissions for the four quarters starting in the second quarter of 2020 through the first quarter of 2021.

Table 15-8 presents the maximum predicted total concentration (including background for appropriate pollutants) due to the proposed construction activities for the proposed project, including the on-site sources (construction equipment and activities) and off-site sources (construction trucks). The concentrations from construction sources were predicted at receptors near Projected Development Site 1.

As indicated in **Table 15-8**, the maximum predicted total concentrations of 1-hour CO, 8-hour CO, annual NO_2, and 24-hour PM_{10} would not result in any concentrations that exceed the NAAQS. The maximum predicted 8-hour CO concentration is well below the City's *de minimis* criteria. The maximum predicted 24-hour and annual $PM_{2.5}$ incremental concentration (for a discrete receptor location) would not exceed the City's *de minimis* criteria of 7.2 µg/m^3 and 0.3 µg/m^3 respectively.

Table 15-8 Maximum Predicted Total Concentrations for Construction Activities

Pollutant (µg/m^3)	Averaging Period	Maximum Modeled Concentration	Background Concentration	Total Concentration	NAAQS/*De Minimis* (µg/m^3)
CO	1-Hour[1]	374~~266~~	1557	1823	40075
	8-Hour[1]	215~~114~~	1031	1145	10305
NO_2	Annual	7.14~~4.39~~	36.2	40.59	100
PM_{10}	24-Hour	11.38~~6.05~~	28	33.99	150
$PM_{2.5}$	24-Hour[2]	5.78	20.7	N/A	7.2
	Annual[3]	0.27	---	N/A	0.3
	Annual Neighborhood-Scale Grid[4]	0.01	---	0.01	0.1

Notes:

[1] CO concentrations can be converted from ppm to µg/m^3 based on 1 ppm = 1145 µg/m^3.

[2] The 24-hour $PM_{2.5}$ background concentration is used to develop the *de minimis* criteria.

[3] Annual $PM_{2.5}$ impacts with discrete receptors modeling are compared with the $PM_{2.5}$ *de minimis* criteria of 0.3 µg/m^3, without considering the annual background.

[4] Annual $PM_{2.5}$ impacts with neighborhood-scale grid receptors modeling are compared with the $PM_{2.5}$ *de minimis* criteria of 0.1 µg/m^3, without considering the annual background.

Additionally, the predicted annual incremental $PM_{2.5}$ concentration was modeled using a one-kilometer grid of receptors for comparison with the City's *de minimis* criteria of 0.1 µg/m^3 for annual average neighborhood-scale grid modeling; the analysis results found no exceedance of the threshold.

The results of this quantitative analysis indicate that the proposed project would not result in any concentrations of NO_2, PM_{10}, and CO that exceed the NAAQS. In addition, the maximum predicted incremental concentrations of $PM_{2.5}$ would not exceed the City's *de minimis* criteria. Therefore, no significant adverse air quality impacts are expected from the construction-related sources.

Noise

Construction activities have the potential to affect the noise conditions of receptors near the proposed development. Construction noise can vary widely depending on the phase of construction (e.g., demolition, land clearing and excavations, foundation, steel and concrete erection, mechanical and interior fit out) and the specific equipment and methods being used. The most significant construction noise sources at a construction site are generally the movement of trucks to and from a project site, back-up alarms, and equipment such as excavators, pile drivers, line drillers, jackhammers, and cranes. The noisiest phase of construction is typically during demolition, excavation, and foundation work. The superstructure phase of construction can also have higher noise levels associated with concrete trucks and cranes. Similar to air emissions, interior finishes typically result in lower noise emissions since they require fewer pieces of heavy-duty diesel equipment and since interior finishes activities are better shielded from nearby sensitive receptors by the proposed structures themselves.

As discussed in the *CEQR Technical Manual,* the determination whether it is sufficient to conduct a qualitative analysis of construction noise emissions or whether a quantitative analysis is warranted should take into account such factors as the location of the project site in relation to existing residential uses or other sensitive receptors, the intensity of the construction activity, and the extent to which the project incorporates commitments to appropriate noise control measures.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code. The New York City Noise Code (Section 24-228) limits noise from non-impulsive construction equipment to a maximum of 85 dBA as measured 50 feet from the source. The code also limits noise from paving breakers, such as jackhammers, to 95 dBA at a distance of 1 meter and requires that a pneumatic discharge muffler be used that provides an insertion loss of 5 dBA. Impulsive construction noise is considered unreasonable when it measures 15 dBA or above ambient noise levels at a receiving property. The New York City Noise Control Code limits construction activities to weekdays between the hours of 7:00 AM and 6:00 PM and requires that a Construction Noise Mitigation Plan be implemented. Project-specific noise control measures would be described in the Construction Noise Mitigation Plan and could include a variety of source and path controls.

As discussed in the *CEQR Technical Manual*, the determination whether it is sufficient to conduct a qualitative analysis of construction noise emissions should take into account several factors, including the extent to which the project incorporates commitments to appropriate noise control measures. The following controls to reduce noise at the source would be implemented to the extent feasible, practical and safe as required by the New York City Noise Code:

- The responsible party would self-certify that all construction tools and equipment have been maintained to not generate excessive or unnecessary noise and that the noise emissions would not exceed the levels specified in the Federal Highway Administration's Roadway Construction Noise Model User's Guide, January 2006. Additionally, the applicant has committed to lower noise emission limits for specific pieces of equipment (i.e., tower cranes). Table 15-9 shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the proposed project.
- All construction equipment would be equipped with necessary noise reduction equipment including mufflers. All equipment with internal combustion engines would be operated with the doors closed including noise-insulating materials and at the lowest engine speed allowable.
- Where feasible, practical and safe, the use of back-up alarms would be minimized and/or quieter back-up alarms would be installed in accordance with OSHA standards.
- Vehicles would not be allowed to idle more than three minutes in accordance with New York City Administrative Code §24-163.
- The contractor shall utilize a training program to inform workers on methods that can minimize construction noise.
- For impact equipment such as pile drivers and jackhammers, the quietest equipment shall be selected taking into consideration the structural and geotechnical conditions.

The following path noise controls would be implemented to the extent feasible, practical and safe as required by the New York City Noise Code:

- The DOB regulations require a perimeter barrier or "construction noise barrier" and when the site is within 200 feet of a receptor, the barrier shall be constructed in a specific manner (as described in the New York City Noise Code) to provide sufficient sound attenuation. Section 3307.7 of the New York City Building Code requires a solid ~~12-foot~~ perimeter noise barrier made out of wood or other suitable material be constructed where a new building is being constructed or a building is being demolished to grade. For the proposed project, a perimeter noise barrier of 12 feet in height would be used.
- Should noise complaints occur during construction, the contractor shall use path noise control measures such as temporary noise barriers and~~,~~ jersey barriers.~~, and/or portable noise enclosures for small equipment (jackets around equipment).~~
- In general, the quietest equipment and methods shall be used for excavators, dump trucks, cranes, auger drills and concrete saws to the extent feasible and practical.
- Additional noise mitigation measures including acoustic enclosures on compressors and generators and shrouds around pile drivers would be implemented as feasible and reasonable. However, since their implementation is subject to potential safety risks and construction operation conditions, their use is not guaranteed. Therefore, the construction noise analysis in this chapter does not include these mitigation measures. The construction noise analysis including these mitigation measures is presented in Chapter 17, "Mitigation".

As discussed in the *CEQR Technical Manual*, Chapter 19, Section 410, construction noise screening impact criteria are used to determine if there may be potential effects. The screening criteria are whether construction would increase ambient sound levels by 3 dB (L_{eq}) or more and absolute levels would exceed 65 dBA L_{eq}, or, if existing ambient sound levels are 60 dBA L_{eq} or less, whether construction would cause a 5-dB increase in noise. The significance of construction noise effects depends on the intensity of duration of construction activities. Therefore, if construction noise levels exceed the screening criteria and construction would occur for longer than 24 months, a detailed construction noise analysis is typically warranted.

The detailed construction noise analysis evaluates the specific activities, types of equipment, duration of activities, and locations of nearby sensitive receptors. Based on the results of the detailed analysis, there would be construction noise impact if construction noise exceeds the screening criteria for a prolonged period of 24 months or more. A significant adverse noise impact would also result if the maximum exterior noise level exceeds 85 dBA, as indicated in the *CEQR Technical Manual* Public Health chapter, or if noise would increase by 15 dBA or more above background ambient conditions for a prolonged period of 12 months or more, or by 20 dBA or more for a prolonged period of 3 months or more.

Overall, construction on Projected Development Sites 1 and 2 would not involve any unusual or exceptional construction activities or practices for buildings in New York City. Demolition, excavation, and foundation work are when the noisiest activities would be anticipated. Demolition of existing structures would not be necessary.~~, as Projected Development Site 1 is predominantly vacant, and certain remains of the BHH would be incorporated into the development.~~ At Projected Development Site 2, the area in which the small amount of commercial space would be constructed is vacant.

Projected Development Sites 1 and 2 are near existing residential and commercial land uses and sites that are currently under construction and may be completed prior to construction of the projected development. Based on the proximity of these noise-sensitive land uses, there is the potential for construction noise levels to exceed the screening impact criteria.

For the proposed project on Projected Development Site 1, the overall construction period would be approximately 2.5 years for the Suffolk Building, with the Norfolk Building complete within two years; however, the most intense construction activities in terms of construction noise are anticipated to occur during the excavation and foundation phase. The excavation and foundation phase is expected to last 5 months for the Norfolk Building and 8 months for the Suffolk Building. The excavation and foundation phases of both buildings would overlap, and the overall duration is anticipated to be 8 months. The superstructure phase of construction would occur for 9 months for the Suffolk Building and 6 months for the Norfolk Building. The superstructure phases of both buildings would overlap, and the overall duration is anticipated to be 10 months.

For Projected Development Site 2, the overall construction period is expected to be well under 24 months as only 4,759 gsf of floor area would be developed in a predominantly one-story structure (as opposed to the 86,711 gsf, 16-story Norfolk Building and the 375,431 gsf, 30-story Suffolk Building). Further, excavation would be limited to a small footprint of approximately 4,000 sf. Therefore, since the overall construction period and floor area for construction on Projected Development Site 2 is limited, no further analysis is warranted for this site, and the detailed analysis focuses on potential construction noise impacts from construction at Projected Development Site 1. The detailed construction noise analysis is based on typical equipment used during the excavation and foundation and superstructure phases of construction, as shown in **Table 15-9**. Construction of the superstructure would be followed by elevator, exterior, interior fit-out, and site cleanup. These construction processes generally do not require the use of large, sound-generating equipment and would not cause noise levels to exceed the screening criteria. Therefore, there would be no significant adverse noise impacts due to construction exceeding the screening criteria for 24 months or longer.

Construction noise has been evaluated for a period when excavation and foundation would occur for both buildings and for a period when superstructure would occur for both buildings**. Table 15-9** presents the type of equipment, the maximum sound level at 50 feet, the project-specific sound level at 50 feet, the utilization factors, and the number of each piece of equipment that is used during each phase of construction based on the *CEQR Technical Manual* except for the tower crane. The proposed project would mandate the quieter project-specific noise emission limits for the tower crane equipment~~.~~

Table 15-9 Estimated Sound Levels During Excavation and Foundation

Equipment	Maximum Sound Level at 50 feet (dBA, Lmax)	Project-Specific Maximum Sound Level at 50 feet (dBA, Lmax)	Utilization Factor (%)	Number of Construction Pieces of Equipment	
				Excavation and Foundation Phase	Superstructure Phase
Pickup Truck[1]	55	N/A	40	3	4
Pile Driver/Caisson Rig	95	N/A	20	3	0
Excavator/Backhoe	85	N/A	40	3	0
Tie-Back Drill Rig	84	N/A	20	2	0
Compressor	80	N/A	40	2	2
Dump Truck[1]	84	N/A	40	4	0
Generator	82	N/A	50	2	3
Concrete Mixer Truck	85	N/A	40	0	4
Concrete Pump	82	N/A	20	0	1
Tower Crane	85	80[2]	16	0	1
Hydraulic Crane	85	N/A	16	0	1

Source: VHB, 2019.

1: Since dump trucks and pickup trucks are not allowed to idle more than three minutes in accordance with New York City Administrative Code §24-163, they have been excluded from the construction noise predictions.

2: Noise levels achieved by using quieter equipment will be incorporated into a Restrictive Declaration.

The construction noise analysis also includes mobile construction vehicles, including worker vehicles and trucks, as described in the *Transportation* section above and shown in **Table 15-10**.

Table 15-10 Construction Traffic during Peak Morning Period

Roadway	Excavation and Foundation		Superstructure	
	Autos (veh/hr)	Trucks (veh/hr)	Autos (veh/hr)	Trucks (veh/hr)
Norfolk Street (Grand Street to Broome Street)	0	6	0	7
Norfolk Street (Broome Street to Delancey Street)	0	6	0	7
Suffolk Street (Grand Street to Broome Street)	0	6	0	7
Suffolk Street (Broome Street to Delancey Street)	0	6	0	7
Clinton Street (Grand Street to Broome Street)	0	0	0	0
Clinton Street (Broome Street to Delancey Street)	0	0	0	0
Broome Street (West of Norfolk)	0	0	0	0
Broome Street (Norfolk to Suffolk)	0	0	0	0
Broome Street (Suffolk to Clinton)	0	0	0	0
Grand Street EB (West of Norfolk)	4	5	20	6
Grand Street EB (Norfolk to Suffolk)	4	0	20	0
Grand Street EB (Suffolk to Clinton)	4	0	20	0
Clinton Street SB (South of Grand St)	4	0	20	0
Clinton Street NB (South of Grand St)	0	0	0	0
Grand Street WB (Clinton to Suffolk)	0	0	0	0
Grand Street WB (Suffolk to Norfolk)	0	6	0	7
Grand Street WB (West of Norfolk)	0	6	0	7
Delancey Street EB (Essex to Norfolk)	0	5	0	6
Delancey Street EB (Norfolk to Suffolk)	0	10	0	12
Delancey Street EB (Suffolk to Clinton)	0	4	0	5
Williamsburg Bridge EB	0	4	0	5
Williamsburg Bridge WB	2	4	9	5
Delancey Street WB (Clinton to Suffolk)	2	4	9	5
Delancey Street WB (Suffolk to Norfolk)	2	4	9	5
Delancey Street WB (Norfolk to Essex)	0	4	0	5

Source: VHB, 2019.

As shown in **Figure 15-4**, construction noise during the excavation and foundation phase and the superstructure phase has been evaluated at existing receptors and developments which are currently planned or under construction near Projected Development Site 1. Receptors were modeled at each floor of the buildings.

Existing ambient sound levels have been determined based on the measurement results and a CadnaA model to determine the variation in ambient sound levels at different receptor locations. Ambient noise levels were modeled based on the existing PM peak traffic volumes on the roadway network including Essex Street, Norfolk Street, Suffolk Street, Clinton Street, Delancey Street, Broome Street, and Grand Street. Traffic on Suffolk Street was assumed to be equivalent to traffic on Norfolk Street. The ambient sound level at each receptor was then determined based on the measured sound level at the closest measurement location and an adjustment based on the variation in modeled sound levels at the closest measurement location and each specific receptor location. The minimum background sound level assumed for any receptor was 62.2 dBA which is the average measured L_{90} at all sites and all time periods. Based on this analysis, the existing ambient sound levels range from 62.2 to 72.8 dBA (L_{eq}) (see **Table 15-11**).

For receptors which are farther from roadways compared to the measurement locations such as upper floor receptors, the estimated existing background sound levels were up to four decibels quieter than the measurement. At a few receptors which are closer to roadways, the estimated existing ambient background sound levels were up to one decibel louder than the measurement.

Construction noise was predicted using the CadnaA model. The construction noise predictions include the equipment described in **Table 15-9** and a 12-foot solid perimeter noise barrier that would shield stationary construction equipment within the site as well as the construction trucks accessing Projected Development Site 1. These results do not include the use of enclosures around compressors and generators or acoustic shrouds around pile drivers.

The assessment results, shown in **Table 15-11**, present the range of construction noise levels at each building (or building façade) including the results at all floors. Construction noise levels would range from the low 60’s to low 80’s dBA (L_{eq}) at all receptor locations during excavation and foundation. Exterior construction noise levels would increase by 15 dBA or more at the north and east façades of the Hong Ning Building (R2 and R3), 384 Grand Street (R4), 145 Clinton Street base building (R5), east and south façades of the 202 Broome Street base building (R14 and R15), and 62 Essex Street (R23).

Construction noise levels would range from the low 60’s to upper 70’s~~low 80’s~~ dBA (L_{eq}) at all receptor locations during superstructure construction. Superstructure construction noise levels would increase by 15 dBA or more at the north ~~and east~~ façade of the Hong Ning building (R2~~, R3~~), 384 Grand Street (R4), and the southern façade of the base building at 202 Broome Street (R15).

Figure 15-4 Construction Noise Receptor Locations

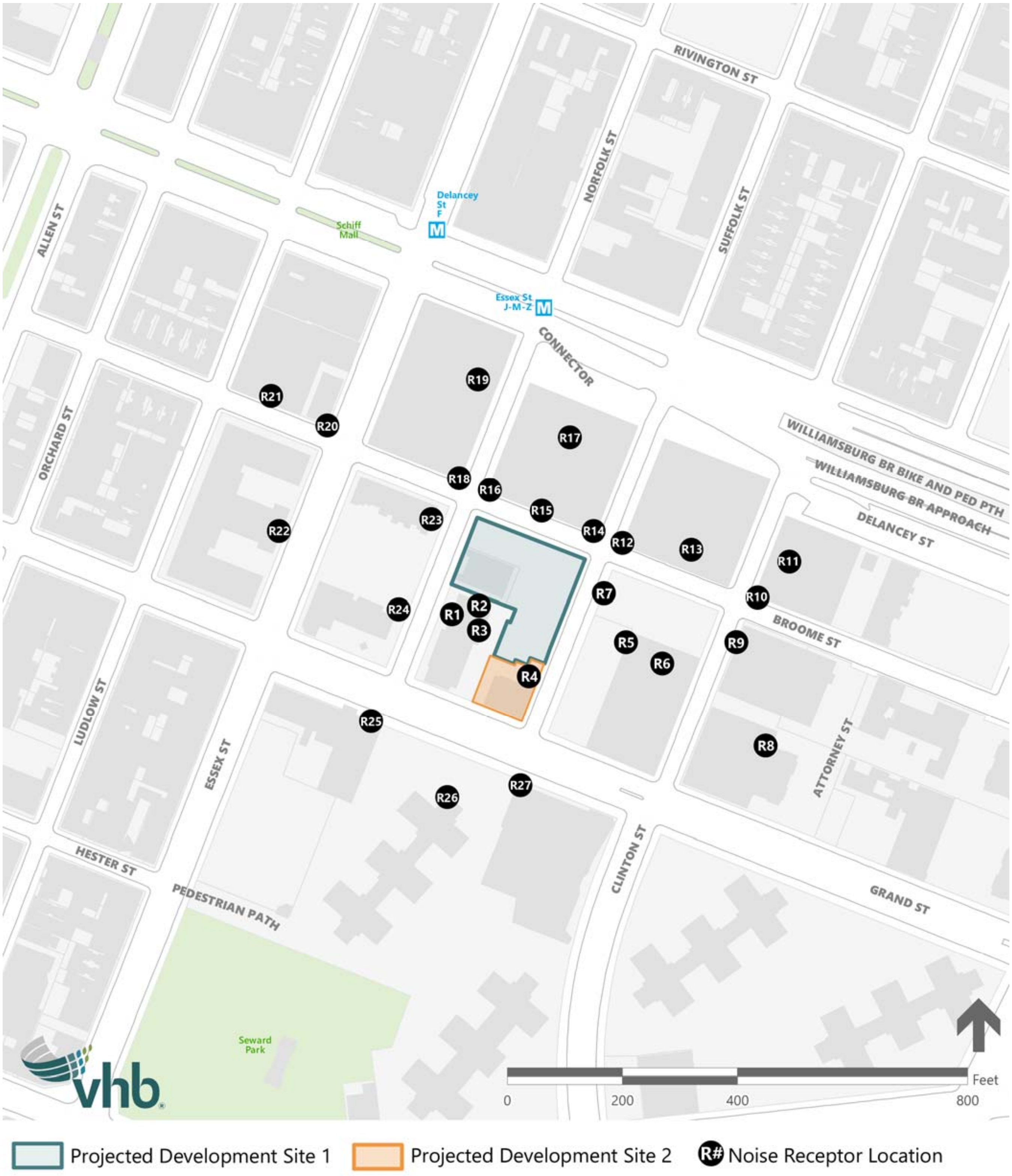

Table 15-11 Construction Sound Levels

Receptor	Location	Existing Ambient Sound Level (dBA, Leq)	Excavation		Superstructure	
			Construction Sound Level (dBA, Leq)	Increase over Existing (dBA)	Construction Sound Level (dBA, Leq)	Increase over Existing (dBA)
R1	Hong Ning - West	62.2 – 63.0	64.9 - 70.5	7.5	65.8 - 68.~~9 - 70.~~1	5.9~~7.8~~
R2	Hong Ning - North	62.2	71.5 - 83.2	**21.0**	68.3 - 78.~~1 - 80.~~2	**16.0~~17.9~~**
R3	Hong Ning –~~-~~ East	62.2	70.8 - 82.2	**20.0**	67.4 - 76.~~7 - 79.~~2	13.9**~~17.0~~**
R4	384 Grand Street	62.2	70.7 - 82.6	**20.4**	69.2 - 77.7~~8 - 79.9~~	**15.5~~17.6~~**
R5	145 Clinton Street Base Building (Under Development)	62.2	70.0 - 77.8	**15.6**	69.0~~2~~ - 73.4~~9~~	11.2~~7~~
R6	145 Clinton Street Tower Building (Under Development)	64.4 - 64.9	72.5 - 78.3	13.7	69.2~~4~~ - 73.2~~4~~	8.5~~7~~
R7	The Park at Essex Crossing	63.9	71.7	7.8	72.6~~7~~	8.7~~8~~
R8	Gill Apartments	62.2 - 63.3	63.0 - 70.6	8.1	62.7 -~~8 -~~ 66.0~~1~~	3.4~~6~~
R9	Grand Street Guild (Future Development)	66.3 - 68.8	69.2 - 77.1	10.7	69.2 -~~3 -~~ 72.0~~2~~	5.1~~3~~
R10	175 Delancey Street Base Building (Under Development)	66.2 - 67.5	68.0 - 75.2	8.6	68.0~~67.9~~ - 71.1~~3~~	4.4~~6~~
R11	175 Delancey Street Tower Building (Under Development)	66.5 - 68.8	67.9 - 77.1	10.7	67.1 –~~-~~ 72.0~~2~~	5.1~~3~~
R12	180 Broome Street Base Building (Under Development)	66.3 - 66.9	71.5 – 81.0	14.5	71.5 - 79.1~~3~~	12.6~~8~~
R13	180 Broome St Tower Building	62.2 - 65.1	66.8 - 76.4	14.1	64.7~~3~~ - 71.3~~4~~	9.0~~1~~
R14	202 Broome St - East Façade (Under Development)	66.9 - 67.5	72.1 - 82.9	**15.6**	71.9 - 79.8~~9~~	12.5~~6~~
R15	202 Broome St - South Façade	62.2 - 64.9	71.5 – 84.0	**21.5**	69.4 - 77.8~~78.2~~	**15.3~~7~~**
R16	202 Broome St - West Façade	68.7 - 69.3	72.3 – 82.0	12.9	71.8 - 77.4~~6~~	8.5~~7~~
R17	202 Broome St Tower Building	64.9 - 65.4	66.9 - 75.3	10.0	66.4~~1~~ - 71.6	6.2
R18	115 Delancey St Base Building	68.3 - 69.3	71.7 - 79.8	11.1	71.2 - 75.6~~7~~	7.0~~1~~
R19	115 Delancey St Tower Building	69.8 - 70.7	71.1 - 75.4	5.5	70.4 - 72.6~~7~~	2.6~~7~~
R20	242 Broome St Base Building (Under Development)	72.7 - 73.4	73.6 - 74.1	1.3	73.3 - 73.8	~~1.~~0.9
R21	242 Broome St Tower Building	64.5 – 69.0	65.8 - 71.9	3.0	65.5~~4~~ - 70.4	1.8~~6~~
R22	350 Grand Street	68.5 - 68.8	69.1 – 72.0	3.3	69.1~~2~~ - 70.4	1.7
R23	62 Essex Street	62.2	70.2 - 79.8	**17.5**	68.0~~67.8~~ - 76.4~~5~~	14.1~~2~~
R24	62 Essex Street Annex	62.2	64.3	2.1	65.4~~2~~	3.2~~0~~
R25	Grand Street Commercial – West Façade	62.2	63.3	1.1	64.4~~65.0~~	2.2~~8~~
R26	357 Grand Street	62.2	64.7 - 75.5	13.3	64.7 – 69.7~~65.1 - 70.5~~	7.5~~8.3~~
R27	Grand Street Commercial – East Façade	62.2	66.1	3.9	65.6~~66.7~~	3.4~~.5~~

Source: VHB, 2019.
Note: Bold values exceed 15 dBA increase

For buildings with double-glazed windows and window air conditioners, interior noise levels would be approximately 20 to 25 dBA less than exterior noise levels, and for buildings with double-glazed windows and well-sealed through-the-wall/sleeve/PTAC air conditioners interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels. For buildings with insulated glass windows and central air conditioning, interior noise levels would be approximately 30 dBA less than exterior noise levels. As exterior sound levels are expected to exceed 75 dBA, interior noise levels will likely exceed 45 dBA L_{10} during portions of construction at adjacent receptors. The 2014 *CEQR Technical Manual* defines 45 dBA L_{10} as an acceptable interior noise level limit for residential and community facility spaces, as discussed in **Chapter 13**, "**Noise**." Interior noise levels of 50 dBA L_{10} is typically considered to be an acceptable interior noise level limit for office spaces. The L_{10} metric is calculated by adding a 3-dBA adjustment factor to the calculated L_{eq} in conformance with FHWA's Roadway Construction Noise Model (RCNM) guidance.

The following summarizes the results of the construction noise assessment at the closest receptors surrounding Projected Development Site 1:

- **Hong Ning Building** – This 14-story residential building is located adjacent to Projected Development Sites 1 and 2. The western (R1), northern (R2), and eastern (R3) facades were assessed for noise impact at the windows closest to the construction sources.

  Exterior construction noise levels on the north and east facades would be up to 83 dBA Leq (during excavation and foundation and up to 78~~80~~ dBA (L_{eq}) during superstructure construction. Exterior noise levels on the west façade, which is shielded from construction noise by the building itself, would be up to 71 dBA (L_{eq}) during excavation and foundation and up to 68~~70~~ dBA (L_{eq}) during superstructure.

  Construction noise levels on the east and north façades would increase by more than 20 dBA over ambient during the excavation and foundation phase and increase by more than 15 dBA on the north façade during the superstructure phase. Therefore, prior to mitigation, there would be significant adverse noise impact at the east and north facade~~facades~~ of the Hong Ning building. Construction noise levels on the west façade, which is shielded from construction activities by the building itself, would increase up to 8 dBA during the excavation/foundation and superstructure phases and there would not be significant adverse noise impact. . Based on the limited duration and magnitude of predicted construction noise levels at this receptor, construction noise associated with the proposed actions at the west façade of Hong Ning Building would not rise to the level of significant adverse impact.

  All windows at the Hong Ning Housing have an air conditioning sleeve built in. Approximately ~~with approximately~~ 70 percent of residences use air conditioning units and 30 percent of residences do not use air conditioning units. As such, these portions of building with ~~using an~~ air conditioning unit~~. As such, the building~~ typically provides between 25 and 30 dBA window/wall attenuation. Some units do not have an alternate means of ventilation; an open window condition at these units would be expected to provide approximately 5 dBA window/wall attenuation. Interior construction noise levels would be up to 61 dBA L_{10} (58 dBA L_{eq}) at residential units along~~on~~ the north and east façades with air conditioning in this~~façade of the~~ building, which would exceed the interior noise goal of 45 dBA by up 16 dBA. Interior ~~construction~~ noise levels would be

81~~up to 45~~ dBA L_{10} (78 dBA L_{eq}) at residential units along north and east façades with an open window condition in this~~on the west façade of the~~ building, which would~~does not~~ exceed the interior noise goal of 45 dBA by up to 36 dBA.

The construction noise analysis including additional~~. Additional~~ mitigation measures (i.e., enclosures around compressors and generators and acoustic shrouds on pile drivers),~~, as feasible,~~ to avoid potential significant adverse noise impacts has been~~will be~~ explored ~~between the Draft~~ and is presented~~Final EIS~~ in Chapter 17, “Mitigation”.~~consultation with DCP.~~

- **384 Grand Street (R4)** – 384 Grand Street is an existing five-story building that directly abuts the construction area. ~~The building has window air-conditioning units.~~

  Exterior construction noise levels would be up to 83 dBA (L_{eq}) during excavation and foundation and up to 78~~80~~ dBA (L_{eq}) during superstructure construction. Construction noise levels would increase by more than 20 dBA over ambient during the excavation and foundation phase and increase by more than 15 dBA during the superstructure phase and there would be significant adverse noise impact prior to mitigation.

  The portion of the buildings which have ~~building has~~ window air conditioners ~~which~~ typically provide between 20 and 25 dBA window/wall attenuation. For portions of the building that do not have an alternate means of ventilation; an open window condition at these units would be expected to provide approximately 5 dBA window/wall attenuation. Interior construction noise levels would be up to 66 dBA L_{10} (63 dBA L_{eq}) at residential units along the north façade with air conditioning units which would exceed the interior noise goal of 45 dBA L_{10} by up to 21 dBA. Interior noise levels would be up to 81 dBA L_{10} (78 dBA L_{eq}) at residential units along the north façade with an open window condition which would exceed the interior noise goal of 45 dBA L_{10} by up to 36 dBA. The construction noise analysis including additional~~Additional~~ mitigation measures, as feasible, to avoid potential significant adverse noise impacts has been~~will be~~ explored ~~between the Draft~~ and is presented~~Final EIS~~ in Chapter 17, “Mitigation”.~~consultation with DCP.~~

- **145 Clinton Street** – This building, part of the Essex Crossing development, is located across Suffolk Street, east of the construction area. The 15-story development is composed of an eight-story commercial base building (R5) and a seven-story residential tower (R6) on the eastern side of the building.

  Exterior construction noise levels would be up to 78 dBA (L_{eq}) during excavation and foundation and up 73~~74~~ dBA (L_{eq}) during superstructure prior to mitigation.~~.~~ Construction noise levels would increase by more than 15 dBA during the excavation/foundation phase but not during the superstructure phase, and there would be no significant adverse noise impact.

  Because this is a new development, units are expected to have insulated glass windows and PTAC units, which would be expected to provide between 25 and 30 dBA window/wall attenuation. Interior construction noise levels would be up to 56 dBA L_{10} (53 dBA L_{eq}) during excavation and foundation construction. Such exceedances of 45 dBA L_{10} in interior spaces may be intrusive but would be only temporary and of limited duration.

- **The Park at Essex Crossing (R7)** – This newly-opened park constructed as part of the Essex Crossing development (The Park) is located across Suffolk Street, east of the construction area. Exterior construction noise levels would be up to 72 dBA (L_{eq}) during excavation and foundation and up to 73 dBA (L_{eq}) during superstructure. This area will be largely shielded from construction noise by the 12-foot construction fence. Receptors would experience noise level increases of less than 10 dBA during the noisiest months of construction and there would be no significant adverse noise impact.
- **180 Broome Street –** This future development is located across Norfolk Street and Broome Street, northeast of the construction area. The development, which is currently under construction, will be composed of a five-story base building with retail and office spaces (R12) and a residential tower from floors 6 to 24 (R13) on the eastern side of the building.

  Exterior construction noise levels would be up to 81 dBA (L_{eq}) during excavation and foundation and up to 79 dBA (L_{eq}) during superstructure at the base building where there will be offices and up to 76 dBA (L_{eq}) during excavation and foundation and up to 71 dBA (L_{eq}) during superstructure at the residential tower. Construction noise levels would not increase by 15 dBA or more during either excavation and foundation or superstructure phases and there would be no significant adverse noise impact.

  Because this is a new development, office spaces in the base building are expected to have insulated glass windows and central air-conditioning, which would provide approximately 30 dBA of window/wall attenuation. New residential units in the tower are expected to have insulated glass windows and PTAC units, which would provide between 25 and 30 dBA window/wall attenuation. Interior construction noise levels would be up to 54 dBA L_{10} (51 dBA L_{eq}) at the base building which would exceed the interior noise goal of 50 dBA L_{10} for office spaces. Interior construction noise levels would be up to 54 dBA L_{10} (51 dBA L_{eq}) at the residential tower building which would exceed the interior noise goal by up to 9 dBA. Such exceedances of 45 dBA L_{10} in residential interior spaces may be intrusive but would be only temporary and of limited duration.
- **202 Broome Street** (R14 – R17) – This future development is located across Broome Street, north of the construction area. The proposed development will be composed of a five-story base building (podium) with offices and retail and a residential tower from floors 6 to 13 on the northern side of the building.

  Exterior construction noise levels on the east façade (R14) of the base building would be up to 83 dBA during excavation and foundation and up to 80 dBA during superstructure. Exterior noise levels on the south façade (R15) of the base building would be up 84 dBA during excavation and foundation and up to 78 dBA during superstructure. Exterior construction noise levels on the west façade (R16) of the base building would be up to 82 dBA during excavation and foundation and up to 78 dBA during superstructure. Exterior noise levels on the residential tower (R17) would be up to 75 dBA during excavation and foundation and up to 72 dBA during superstructure.

  Prior to mitigation, construction~~Construction~~ noise levels would increase by more than 15 dBA for more than 12 months at office spaces on the south façade of the base building.~~, and there would be significant adverse noise impact.~~ At other receptors on the base building and residential tower, construction noise levels would not increase by 15 dBA or more for 12 months or more or by 20 dBA or more for 3 months or more and there would be no significant adverse noise impact.

Because this is a new development, the building is expected to have insulated glass windows with central air conditioning in the base building where there will be offices and residences in the tower are expected to have PTAC units. The base building with central air conditioning is expected to provide 30 dBA window/wall attenuation and the residential building is expected to provide 25 to 30 dBA window/wall attenuation. Prior to mitigation, interior~~Interior~~ construction noise levels would be up to 57 dBA L_{10} (54 dBA L_{eq}) inside offices of the south façade of the base building which would exceed the interior noise goal of 50 dBA L_{10} for office spaces. The construction noise analysis including additional mitigation measures (i.e., enclosures around compressors and generators and acoustic shrouds on pile drivers), to avoid potential significant adverse noise impacts has been explored and is presented in Chapter 17, “Mitigation”. While interior noise levels of other facades of the base building and~~Interior construction noise levels would be up to 53 dBA L_{10} (50 dBA L_{eq}) inside~~ residential ~~spaces in the~~ tower ~~which~~ would exceed the CEQR~~interior~~ noise exposure criteria, such~~goal of 45 dBA L_{10} for residential spaces by up to 8 dBA. Such~~ exceedances would be~~of 45 dBA L_{10} in residential interior spaces may be intrusive but would be only~~ temporary and of limited duration and would not constitute a significant adverse impact.

- **115 Delancey Street** – This building development is located across Norfolk Street and Broome Street, northwest of the construction area. The 31-story building is composed of a five-story base building (R18) and a residential tower from floors six to 26 (R19) on the northern side of the building.

  Exterior construction noise levels would be up to 80 dBA (L_{eq}) during excavation and foundation and up to 76 dBA (L_{eq}) during superstructure. Construction noise levels would increase up to 11 dBA over ambient conditions. Since construction noise would not increase by 15 dBA or more during either excavation and foundation or superstructure phases, there would be no significant adverse noise impact.

  The existing building has insulated glass windows and PTAC units which typically provide between 25 and 30 dBA window/wall attenuation. Interior construction noise levels would be up to 58 dBA L_{10} (55 dBA L_{eq}) which would exceed the interior noise goal of 45 dBA L_{10} for residential spaces by up to 13 dBA. Such exceedances of 45 dBA L_{10} in residential interior spaces may be intrusive but would be only temporary and of limited duration.

- **62 Essex Street** – This 22-story residential building is located across Norfolk Street, west of the construction area. The residential tower (R23) and building annex (R24), which are located on the same parcel, have been analyzed separately.

  Exterior construction noise levels would be up to 80 dBA (L_{eq}) during excavation and foundation and up to 77 dBA (L_{eq}) during superstructure. Construction noise levels would not increase by 15 dBA or more for 12 months or more and there would be no significant adverse noise impact.

  The existing building has insulated glass windows and window air conditioners, which typically provide between 20 and 25 dBA window/wall attenuation. Interior construction noise levels would be up to 63 dBA L_{10} (60 dBA L_{eq}) which would exceed the interior noise goal for residential spaces by up to 18 dBA. Such exceedances of 45 dBA L_{10} in residential interior spaces may be intrusive but would be only temporary and of limited duration.

Prior to mitigation, construction~~Construction~~ sound levels would increase by 20~~15~~ dBA or more at~~ four~~ receptor locations (R2, R3, R4, R15) for 3 months or longer and by 15 dBA or more at receptor locations (R2, R4, R15) for 12 months or longer during the excavation/foundation and superstructure phases, which would exceed the thresholds for ~~resulting in~~ significant adverse noise impact~~impacts~~ at these locations: Hong Ning Building~~building~~ northern and eastern facades (R2 and R3), 384 Grand Street (R4), and the 202 Broome Street southern façade of the building's commercial base (R15).~~ Construction sound levels would increase by 20 dBA or more for 3 months or longer at these same locations during the excavation phase.~~ Maximum interior construction noise levels would be up to 61 dBA L_{10} at the residences along the north and east facades of the Hong Ning building with air conditioning units, up to 81 dBA L_{10} at residences along the north and east facades of the Hong Ning Building without alternate means of ventilation, ~~and~~ up to 66 dBA L_{10} at residences along the north façade of 384 Grand Street with air conditioning units, and up to 81 dBA L10 at residences along the north façade of 384 Grand Street without alternative means of ventilation, which would exceed the residential interior noise goal of 45 dBA L_{10} by 16, 36,~~ and~~ 21 and 36 dBA, respectively. Maximum interior construction noise levels at the base building of 202 Broome Street would be up to 57 dBA L_{10} (54 dBA L_{eq})~~,~~ which would exceed the interior noise goal~~for offices~~ of 50 dBA L_{10} for commercial offices by up to 7~~3~~ dBA.

With the adherence to existing construction noise regulations and the implementation of a Construction Noise Mitigation Plan, as required by the New York City Noise Code, as well as the use of a 12-foot construction noise barrier, construction noise would be reduced but would still exceed the thresholds for ~~result in~~ significant construction noise impact prior to mitigation.~~.~~ Between publication of the Draft and Final EIS, additional construction noise analysis has been~~will be~~ undertaken to further determine the precise magnitude and duration of the elevated noise level from construction. This analysis included additional source control measures on tower crane that wasn't included in the Draft EIS. In addition, additional mitigation measures, as feasible, to avoid potential significant adverse noise impacts at the north and east facades of the Hong Ning building, 384 Grand Street, and the south façade of the commercial base building at 202 Broome Street have been~~will be~~ explored between publication of the Draft and Final EIS in consultation with DCP. These mitigation measures consist of the use of enclosures around compressors and generators and acoustic shrouds around pile drivers. If these~~If no feasible and practicable~~ mitigation measures are implemented, construction noise levels would be below the threshold for ~~identified, the~~ significant adverse ~~construction~~ noise impact. The construction noise analysis including these mitigation measures is presented in **Chapter 17, "Mitigation"**. If these mitigation measures are not able to be implemented because they are not feasible and practicable, there would be significant adverse construction noise impact that would remain unmitigated. See **Chapter 18, "Unavoidable Adverse Impact~~17, "Mitigation~~."**

Vibration

Construction activities have the potential to generate ground-borne vibration that can potentially cause structural or architectural damage or annoy people in nearby vibration-sensitive spaces, such as residences. The most substantial sources of construction vibration are equipment associated with the excavation and foundation phase, such as impact pile drivers, drill rigs, bulldozers, and jack hammers. Vehicles such as trucks typically do not exceed the thresholds for potential structural damage even for the most fragile structures susceptible to vibration.

The criteria used by LPC to evaluate potential construction vibration impacts is a peak-particle velocity (PPV) level of 0.5 inches per second or greater. For non-fragile buildings, vibration levels below 0.6 inches per second are not expected to substantially increase the risk of structural damage. **Table 15-12** presents the reference vibration levels from typical equipment at a distance of 25 feet and the distance to potential structural damage for buildings with a criterion of 0.5 inches per second and 0.6 inches per second. This table shows that impact pile driving may cause structural damage within a distance of 29 feet. Other means of setting piles include vibratory pile driving, where impact typically occurs within 11 to 13 feet, or drilling where impact typically occurs within eight feet. Other sources of vibration, such as bulldozers and jackhammers, may cause potential structural damage when in very close proximity to buildings.

The proposed project on Projected Development Site 1 would require deep foundations based on the geotechnical evaluation. Most nearby buildings not on the immediate block are 60 feet or farther from the proposed construction activities. At these distances, the potential for structural damage is below the thresholds. The primary concern for potential structural damage would be from construction of the Norfolk and Suffolk Buildings, which are within approximately 12 feet and 40 feet, respectively, of the existing Hong Ning senior housing building. The applicant would employ means/methods that meet acceptable vibration levels as mandated by NYCDOB.

Table 15-12 Vibration Levels and Distances to Potential Effects

Equipment	Vibration Level at 25 feet (PPV, in/s)	Distance to Potential Structural Damage (feet)	
		(0.5 in/s) Criterion	(0.6 in/s) Criterion
Impact Pile Driver	0.644	29	26
Vibratory Pile Driver	0.17	13	11
Drilling	0.089	8	7
Large Bulldozer	0.089	8	7
Small Bulldozer	0.003	1	1
Jackhammer	0.035	4	4

Source: Federal Transit Administration, 2018.

As noted above, there are no designated NYCL- or S/NR-listed historic buildings located within 90 feet of construction activities; remnants of the former BHH synagogue (NYCL, S/NR) were located on the site until October 2019 when a structural collapse necessitated the removal of the remnants.~~The remains of the Beth Hamedrash Hagodol synagogue will be~~

~~stabilized and incorporated into the proposed project; this building is protected through NYCDOB controls under Building Code Section BC 3309: Protection of Adjoining Property. Inspection and protection measures are provided for excavation, foundation, and overhead construction activities. For remains of the structure that are to be maintained, the NYCDOB Technical Policy and Protection Notice (TPPN) #10/88 may apply. This policy requires a monitoring program to reduce the likelihood of construction damage to adjacent New York City Landmarks and National Register-listed properties (within 90 feet). The monitoring is conducted to detect the potential for structural damage at an early stage and to take corrective action to modify construction methods and minimize potential damage. With these required measures, there would be no significant adverse construction-related vibration impacts.~~

In terms of construction vibration causing potential annoyance, the threshold for potential annoyance is 65 VdB inside buildings. Assuming a 10 VdB outdoor to indoor vibration attenuation for large masonry buildings, there is potential for human annoyance within 230 feet of impact pile driving, within 100 feet of vibratory pile driving, and within 65 feet of most other equipment, such as drilling, bulldozers, and jackhammers. These construction activities would only occur for limited periods of time at any particular location. Therefore, there would be no significant adverse impacts as a result of construction vibration.

15.5 Consideration of Nearby Construction Projects

The following assessment was undertaken in response to community concerns raised during the public scoping process about the cumulative effect of construction activities associated with various construction sites in the area, specifically, the following projects, which are shown in **Figure 15-5**:

1. 242 Broome
2. 115 Delancey (The Essex)
3. 202 Broome Street
4. 180 Broome Street
5. 175 Delancey Street
6. 145 Clinton Street (The Rollins)
7. Grand Street Guild
8. NYCHA Next Gen
9. 247 Cherry Street
10. 260 South Street
11. 259 Clinton Street

As shown in **Figure 15-5**, while some of the projects mentioned in the public comments are located in close proximity to the Projected Development sites, several are either already completed (i.e., 242 Broome Street, 115 Delancey, 175 Delancey, and 145 Clinton Street) or are located at a distance from the sites, approximately ¼-mile away or farther (i.e., 247 Cherry Street, 260 South Street, 259 Clinton Street, LaGuardia NYCHA Next Gen). Therefore, the potential for cumulative effects due to construction of these projects would not occur.

There are three projects located near the Projected Development sites where construction could overlap with construction of the Norfolk and Suffolk Buildings: 180 Broome Street, 202 Broome Street, and Grand Street Guild.

- **180 Broome Street**. Construction of 180 Broome Street began in early 2018, and as of December 2019, the superstructure is complete. Exterior work is nearing completion on the building's podium base. Overall construction is expected to be complete in early 2021.
- **202 Broome Street**. Construction of the 202 Broome Street project (which is smaller than 180 Broome Street) began in mid-2018. As of December 2019, the building was topped out and the exterior cladding was complete. Overall construction is expected to be complete in the first half of 2021.
- **Grand Street Guild**. The Grand Street Guild project requires approvals before it can commence construction; if these approvals are granted, overall construction is expected to commence in mid-2022 and be complete in late 2023.

Based on the above, the potential for construction of the Norfolk and Suffolk Buildings to overlap with other construction is minimal. As construction begins at Projected Development Site 1, it is expected that construction will be concluding at 180 Broome Street and 202 Broome Street. Construction of Grand Street Guild, if approved, is not expected to begin until the latter stages of Norfolk and Suffolk Building construction. Therefore, while construction would occur on sites near Projected Development Site 1, because of the staggered nature of the construction schedule at each site, it is not expected that there would be the potential for cumulative impacts.

Figure 15-5 Potential Construction Projects