Chapter 20: CONSTRUCTION

20.1 Introduction

As described throughout the other chapters comprising this EIS, and as detailed in Chapter 1, "Project Description," the proposed action includes the development of approximately 1,169 units of residential development and up to approximately 122,500 square feet ("sf") of commercial space on the project site. The technical analyses provided in the previous chapters of this EIS disclose the potential for environmental impacts associated with the "occupied" or "completed" conditions, generally in the 2028 analysis year, when the proposed action would be complete.

This chapter considers environmental effects that would be associated specifically with construction activities (including site preparation, installation of foundations, masonry work) that would occur while the project site is under construction. Generally speaking, depending on context and the specific construction activities, construction activities can cause noticeable effects associated with traffic conditions, hazardous materials, archaeological resources, the integrity of historic resources, community noise patterns, and/or air quality conditions. The effects of some construction activities could include the physical alteration of properties, such as may result indirectly from construction activity vibration effects; however, many construction-period effects are temporary, lasting only as long as the duration of a particular construction activity, which may be much less than the overall construction period.

As stated in the *CEQR Technical Manual*, determination of the significance of construction impacts and need for mitigation measures is generally based on the duration and magnitude of the impacts. According to the *CEQR Technical Manual*, construction duration may be referred to as being "short-term" (less than two years) and "long-term" (two or more years). As described in Chapter 1, "Project Description," construction of the proposed action would be undertaken in five phases, with each phase expected to last up to approximately 36 months; the first phase would commence in 2017, and the final phase would be complete in 2028. Each phase would entail the construction of up to two connected buildings, up to 95 feet in height, containing both housing units and commercial space.

This chapter provides an overview of the construction process that would facilitate the development of the proposed buildings on the project site as part of the proposed action, as well as assessment of the potential effects that may be expected with the proposed construction-period activities. The construction process is explained first for a typical phase, and then for the typical overlap in activities that would occur as one phase is nearing completion and the subsequent phase begins; and finally, the

potential "worst-case" construction-period scenario is explained, as it represents the most intensive combination of construction activities that would be expected to occur at any one time. This worst-case construction-period scenario is assumed, for analysis purposes, to occur during the latter part of the proposed action when ambient traffic conditions would be highest, resulting in a conservative characterization of this scenario. As explained in the respective analyses, this conservative characterization for noise conditions, for example, is then applied to the nearest sensitive receptors on the project site and in the vicinity; in this way, the ongoing occupancy of buildings is considered.

20.2 Principal Conclusions

The proposed action would not result in significant adverse construction-related impacts to traffic, transit, pedestrians, parking, or vibration. However, construction activities associated with the proposed action could result in significant adverse impacts related to noise at neighboring Gateway Estates buildings, though these would be temporary and would be limited through use of best practices. Potential significant adverse impacts to interior noise levels in Parcel B project buildings that would be occupied during construction of other buildings on Parcel B would be avoided by a requirement in the Restrictive Declaration that such buildings use double-glazed windows and have an alternate source of ventilation.

The effects of construction noise on sensitive receptors would vary depending on the location of the noise source. Further, during most of the construction period for each phase, noise levels would decrease significantly following the completion of pile driving activities, which would occur for up to approximately 12 weeks at the beginning of each of the three phases constructed while Parcel B is partially occupied.

Noise control measures that would partially mitigate significant adverse construction noise impacts, and which the developer would be required in the Restrictive Declaration to implement or consider are described below. The Restrictive Declaration would require contract specifications requiring (1) contractors to comply with all the requirements and regulations of the New York City Noise Code and United States Environmental Protection Agency ("USEPA") noise emission standards for construction equipment; (2) devices and activities which are subject to the provisions of the New York City Noise Code to be operated, conducted, constructed or manufactured without causing a violation of the code; (3) all work to be conducted in compliance with the regulations set forth in the code that control noise levels due to construction work. These New York City Noise Code requirements, which were assumed to be implemented and therefore included as part of the construction noise analysis, mandate that:

- Certain classifications of construction equipment and motor vehicles meet specified noise emissions standards;

- Except under exceptional circumstances, construction activities be limited to weekdays between the hours of 7:00 AM and 6:00 PM; and
- A construction noise mitigation plan shall be developed and implemented in accordance with the New York City Noise Code (specifically, as it refers to the citywide construction noise mitigation rules as described in Title 15, Chapter 28 of the NYC Administrative Code). Some examples of these rules include:
    - Contractors and subcontractors are required to properly maintain their equipment and mufflers;
    - The quietest pile driving method shall be selected that allows work to be performed based on structural, geotechnical and pile friction requirements and ground conditions.
    - Construction of perimeter noise barriers when receptors are within 200 feet of the construction site. Barriers can be made from noise curtain material, plywood or other similar materials. Barriers can reduce noise by up to 10 dB when positioned closely to a noise producing activity.

While there are additional requirements in the New York City Noise Code that would also effectively reduce noise from construction activities, their impact could not be quantitatively modeled as part of the construction noise analysis. These additional requirements are:

- Limits on engine idling in accordance with NYC Administrative Code 24-163;
- Dump trucks shall be equipped with thick rubber bed liners;
- Minimal use of backup alarm devices and when necessary, use of only approved back up devices; and
- That construction material be handled and transported in such a manner as to not create unnecessary noise.

Other mitigation measures and strategies that could reduce noise levels further include:

- Design considerations and project layout approaches, including measures such as construction of temporary noise barriers, placing construction equipment as far as practicable from noise sensitive receptors, constructing walled enclosures/sheds around especially noisy activities, such as pavement breaking, and sequencing operations to combine especially noisy equipment;
- Perimeter noise barriers constructed to the maximum height of 15 feet allowed by the New York City Noise Code;
- Alternative construction methods, such as using special low noise emission level equipment; and

- Use of noise enclosures or noise insulation fabric on compressors, generators, etc;

In addition, the Restrictive Declaration would require the incorporation of construction specifications in the form of control measures to minimize potential construction-related air quality effects, which are described in greater detail in this chapter, and summarized as follows:

- To the extent practicable, all non-road construction equipment utilized for the proposed action would meet at least the USEPA's Tier 2 emissions standard, and construction equipment meeting Tier 3 and/or Tier 4 emissions standards would be used where conforming equipment is widely available, and the use of such equipment is practicable.

- To the extent practicable, non-road diesel engines with a power rating of 50 horsepower ("hp") or greater would utilize the best available technology ("BAT") technology for reducing diesel particulate matter ("DPM") emissions;

- Adherence to NYC Local Law 77 (2003) Administrative Code §24-163.3, which requires the use of Ultra Low Sulfur Diesel Fuel ("ULSD") for reducing emissions, particularly DPM and SO_x, from non-road engines and equipment;

- Limit unnecessary idling times on diesel powered engines to three minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete mixing trucks);

- By June 2018, New York City Department of Environmental Protection ("NYCDEP") will promulgate rules setting forth that the "best available retrofit technology" is to be used by heavy duty on road vehicles. These rules would apply to construction vehicles at the time NYCDEP implements these rules; and

- Reduce dust related to the construction site through adherence to NYCDEP dust-related requirements found in the Title 15 RCNY Chapter 13, "Rules Pertaining to the Prevention of the Emission of Dust from Construction Related Activities."

With such control measures in place, the results of the 8-hour carbon monoxide ("CO") analysis indicate that the CO concentrations resulting from on-site construction activities would be negligible. For particulate matter less than 2.5 microns in diameter ("$PM_{2.5}$"), the maximum short-term and long-term ambient impact concentrations would be below the National Ambient Air Quality Standards ("NAAQS") and the NYC *de minimis* criteria. Predicted concentrations of particulate matter less than 10 microns in diameter ("PM_{10}") and nitrogen dioxide ("NO_2") would be below the NAAQS criteria levels. Therefore, the proposed action would not result in any exceedances of the NAAQS or the NYC *de minimis* criteria during the construction period.

In summary, significant adverse impacts related to noise would occur during certain times of construction activity and with use of certain equipment. With the use of double-glazed windows and provision of alternate ventilation in Parcel B buildings to be occupied during ongoing construction activities, and with the implementation of noise mitigation measures (per the Restrictive Declaration) to reduce noise levels during construction activities, the potential for significant adverse impacts related to noise would be reduced, though not entirely eliminated; there would remain the likely potential for temporary significant adverse construction-period noise impacts on neighboring residential buildings at Gateway Estates. As discussed in Chapter 24, "Unavoidable Adverse Impacts," to the extent that mitigation measures proposed as part of the proposed action may not be effective at fully mitigating the construction-period noise impacts, then the proposed action may result in unavoidable adverse impacts related to noise that would be of limited duration but significant in magnitude.

20.3 General Construction Practices

GOVERNMENTAL COORDINATION AND OVERSIGHT

The following describes governmental construction oversight agencies and typical construction practices in New York City.

Table 20-1: Construction Oversight in New York City

Agency	Areas of Responsibility
New York City	
Department of Buildings ("NYCDOB")	Primary oversight for Building Code and site safety
Department of Environmental Protection ("NYCDEP")	Noise, dewatering
Fire Department ("FDNY")	Compliance with Fire Code, tank operation
Department of Transportation ("NYCDOT")	Lane and sidewalk closures
New York State	
Department of Labor ("NYSDOL")	Asbestos workers
Department of Environmental Conservation ("NYSDEC")	Hazardous materials, tanks
United States	
Environmental Protection Agency ("USEPA")	Air emissions, noise, hazardous materials
Occupational Safety and Health Administration ("OSHA")	Worker safety

Source: STV Incorporated, 2016.

The governmental oversight is extensive and involves a number of city, state, and federal agencies. Table 20-1, "Construction Oversight in New York City," shows the main agencies involved in construction oversight and the agencies' areas of responsibilities. The primary responsibilities lie with New York City agencies. NYCDOB has the primary responsibility for ensuring that construction meets the requirements

of the Building Code and that buildings are structurally, electrically, and mechanically safe. In addition, NYCDOB enforces safety regulations to protect both the workers and the public. The areas of responsibility include installation and operation of equipment, such as cranes and lifts, sidewalk sheds, safety netting and scaffolding. NYCDEP enforces the Noise Code as well as Title 15 RCNY Chapter 13, "Rules Pertaining to the Prevention of the Emission of Dust from Construction Related Activities," and regulates water disposal into the sewer system. FDNY has primary oversight for compliance with the Fire Code and for the installation of tanks containing flammable materials. NYCDOT reviews and approves any traffic lane and sidewalk closures. NYSDEC regulates the disposal of hazardous materials, and construction, operation, and removal of bulk petroleum and chemical storage tanks. NYSDOL licenses asbestos workers. On the federal level, USEPA has wide ranging authority over environmental matters, including air emissions, noise, and hazardous materials. Much of the responsibility is delegated to the state level. OSHA sets standards for work site safety and the construction equipment.

DELIVERIES AND ACCESS

The work areas on the project site would be fenced off, and limited access points for workers and trucks would be provided. Security guards and flaggers would be posted, and all persons and trucks would have to pass through security points. Workers or trucks without a need to be on the site would not be allowed entry. After work hours, the gates would be closed and locked. Security guards would patrol the construction site after work hours and over the weekends to prevent unauthorized access.

Material deliveries to the site would be controlled and scheduled to the degree feasible. To aid in adhering to the delivery schedules, as is normal for building construction in New York City, flaggers may be employed at access points. The flaggers would be supplied by the construction subcontractor on-site at that time or by the construction manager. The flaggers would control trucks entering and exiting the site so that they would not interfere with one another or with on-street traffic streams.

HOURS OF WORK

Construction activities for the buildings would generally take place Monday through Friday. In accordance with city laws and regulations, construction work would generally begin at 7:00 AM on weekdays, with some workers arriving to prepare work areas between 6:00 AM and 7:00 AM. Normally, work would end at 3:30 PM, but it can be expected that to meet the construction schedule or as needed for specific tasks that must be completed at one time, the workday could be extended as late as 6:00 PM without requiring authorization from NYCDOB. The work could include such tasks as completing the driving of piles, finishing a concrete pour, or completing the bolting of a steel frame erected that day. The extended workday would not include all construction workers on-site, but just those involved in the specific task requiring additional work time. Limited extended workdays may occur on weekdays over the course of construction.

At limited times over the course of construction, weekend work may be required to make up for weather delays or other unforeseen circumstances. In such cases, appropriate work permits from NYCDOB would be obtained. The numbers of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would begin with worker arrival and site preparation at 7:00 AM, and ending with site cleanup at 5:00 PM.

Some tasks may have to be continuous, and the work could extend to more than a typical 8-hour day. For example, in certain situations, concrete must be poured continuously to form one structure without joints. This type of concrete pour is usually associated with foundations and structural slabs at grade, which could require a minimum of 12 hours or more to complete; any work that must be conducted at night would obtain the necessary NYCDOB permits.

SIDEWALK AND LANE CLOSURES

During the course of construction, traffic lanes and sidewalks may be closed or protected for varying periods of time. Portions of the sidewalks adjacent to the project site may be intermittently or continuously closed to allow for certain construction activities. This work would be coordinated with and approved by NYCDOT. No rerouting of traffic is anticipated and moving lanes of traffic are expected to be available at all times. It is anticipated that the portions of the sidewalks adjacent to the project site may also be closed to accommodate heavy loading areas for at least several months of the construction period. Pedestrians would be rerouted to a sectioned-off and protected portion of the street or to the other side of the street, if required – NYCDOT would be consulted to determine the appropriate protective measures for ensuring pedestrian safety surrounding the development site.

20.4 Construction Schedule and Activities

CONSTRUCTION SEQUENCING

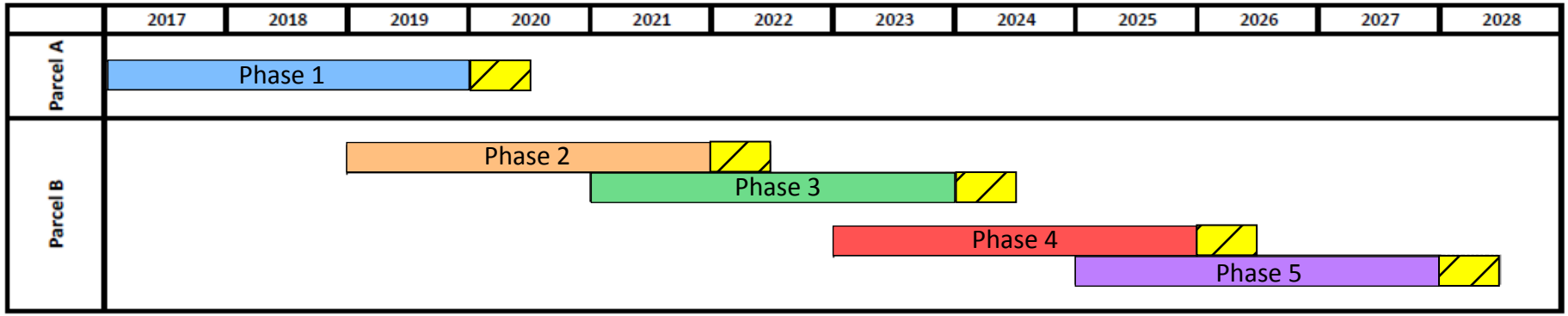
Construction would be undertaken in five phases; the first phase would commence in 2017, and the final phase would be complete in 2028. Phase 1 would entail the total completion of Parcel A, with Phase 2 through Phase 5 pertaining to the development of Parcel B. Table 20-2, “Project Phases,” describes the amount of residential, commercial, and parking area, in square feet, that would be developed with each phase of construction, as well as the corresponding approximate construction period duration for each of the five phases.

Table 20-2: Project Phases

Project Phase	Construction Period	Residential Area (sf)	Commercial Area (sf)	Parking Area (sf)	Total Area per Phase (sf)
1	January 2017 –June 2020	286,297	44,756	84,542	415,595
2	January 2019 – June 2022	204,500	21,145	34,944	260,556
3	January 2021 – June 2024	132,000	14,920	0	146,920
4	January 2023 – June 2026	139,460	14,920	51,141	205,521
5	January 2025 – June 2028	210,530	9,719	0	220,249
	Total	**972,787**	**105,460**	**170,594**	**1,248,841**

Source: The Arker Companies, 2015.

Figure 20-1, "Project Phases – Years," illustrates the temporal overlap of phases, and Figure 20-2, "Project Phases – Site Plan," illustrates the physical relationships of each phase according to location on the project site.



Source: The Arker Companies, 2016.

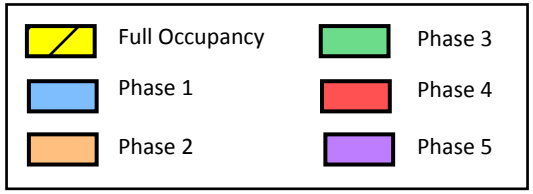
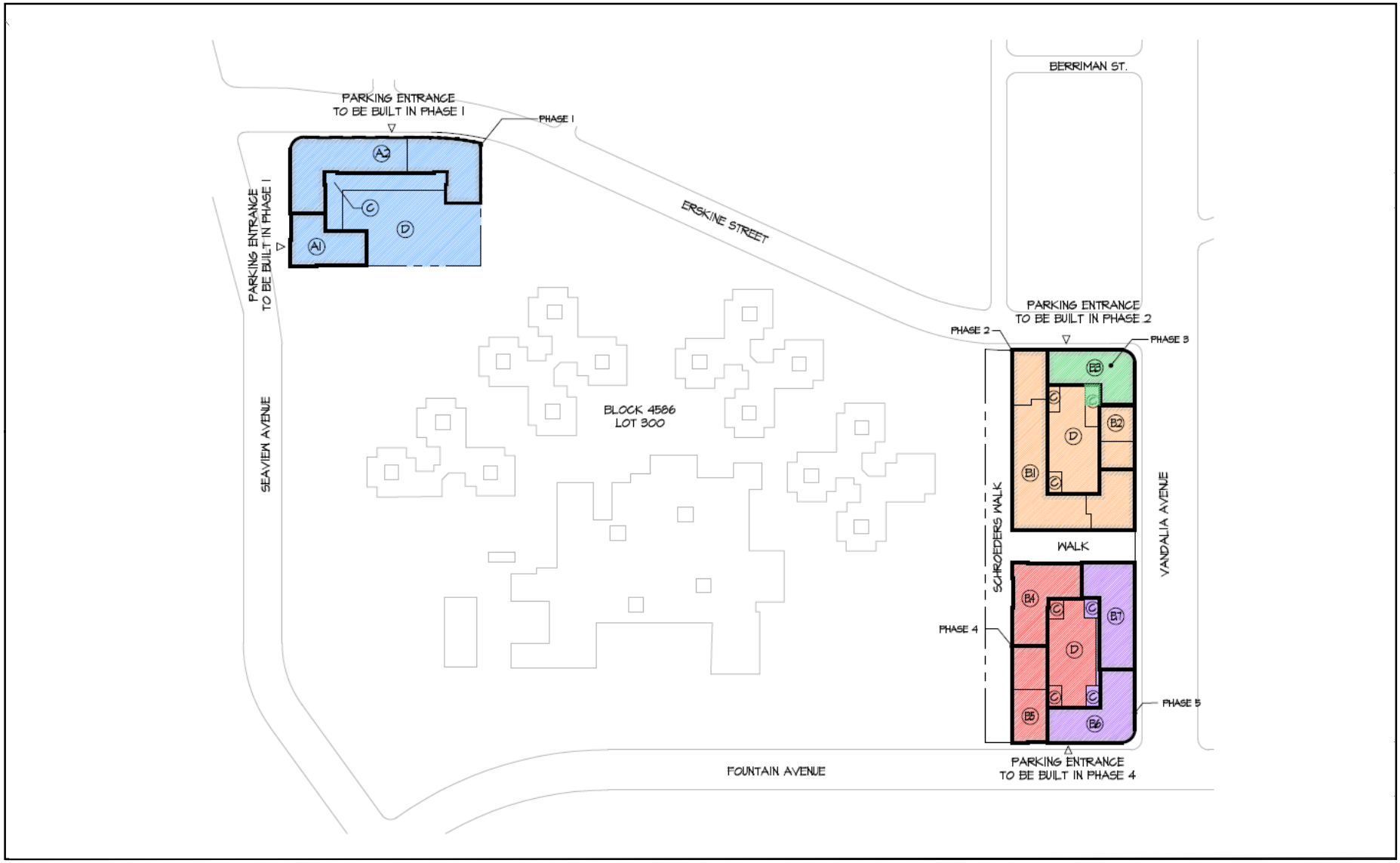


Figure 20-1

PROJECT PHASES - YEARS

Fountain Avenue Land Use Improvement and Residential Project

NEW YORK STATE OF OPPORTUNITY. Empire State Development



Source: The Arker Companies, 2016.

A.1	6 Story - 65' High	B.2	9 Story - 95' High	B.5	7 Story - 75' High	C	Private Open Space
A.2	9 Story - 95' High	B.3	9 Story - 95' High	B.6	9 Story - 95' High	D	Parking
B.1	7 Story - 75' High	B.4	5 Story - 50' High	B.7	7 Story - 75' High	△	Parking Entrance
	Phase 1		Phase 2		Phase 4		
			Phase 3		Phase 5		

Figure 20-2

PROJECT PHASES - SITE PLAN

Fountain Avenue Land Use
Improvement and Residential Project

NEW YORK STATE OF OPPORTUNITY. Empire State Development

TYPICAL CONSTRUCTION ACTIVITIES FOR EACH PROJECT PHASE

Construction activities and intensities and durations would likely vary somewhat within each of the five phases, though generally be similar among all phases. Each phase would entail five basic groups of construction activities, from "Site Preparation" through "Windows and Interiors" finishing and final on-site review ("punch-list" review), as shown in Table 20-3, "Typical Construction Tasks and Sequencing per Phase," and described following:

- **Site Preparation** (Months 1-6) would occur first for each phase and would be undertaken independently for each phase. During this phase the site would be prepared for construction and foundation piles would be driven. Typical equipment used for these activities would include one pile driving rig, one Bauer drill rig, and one payloader. The equipment would operate for approximately 8 hours a day and require approximately 8 workers to be on-site at a given time.

- **Foundation and Construction** (Months 7-12) would include excavation and backfilling, as well as the pouring of concrete and installation of masonry block and precast plank structure. The excavation and backfilling would involve the use of two excavators, one payloader, and one skid steer. The concrete work would involve one excavator operating for 8 hours per day, one skid steer operating for 4 hours per day, and one line or boom pump operating for 8 hours a day during one day per week. There would be approximately 25 workers on-site per day during concrete work. Masonry block and precast plank structure work would involve the use of one lull for 8 hours per day, one mortar mixer for 8 hours per day, one Bobcat for 8 hours per day, and one hydraulic crane for 8 hours per day for approximately 2 days out of every 10. There would be approximately 35 workers on site per day during this task.

- **Masonry Façade and Roofing** (Months 13-18) would include the finishing of facades and both masonry block and precast plank structure. In addition, the building roofing would be installed in this phase, as would building elevators, some interior finishes, and Mechanical, Electrical, and Plumbing Services ("MEPS"). Utility company services would begin. This work would involve the use of one lull for 8 hours per day, one mortar mixer for 8 hours per day, one Bobcat for 8 hours per day, and one hydraulic crane for 8 hours per day during approximately 2 days out of every 10. There would be approximately 35 workers on-site per day during this task. Work on the masonry façade would involve the use of one lull for 8 hours per day and one mortar mixer for 8 hours per day; this task would require approximately 25 workers per day. The roofing process would involve approximately 15 workers on-site per day. The remaining three tasks would not involve any construction equipment, but would result in additional workers on the project site during construction. Elevator work would require an additional 6 workers per day, and interior finishes and MEPS would require up to approximately 50 workers per day.

- **Windows and Interiors** (Months 19-24) would entail the application of all remaining building components, including doors, windows, and storefronts, and installation of all interior fixtures and finishes. The end of the roofing process would also occur during this period, which would involve 15 workers on site per day. The Builders Pavement Plan ("BPP"), and asphalt work would be completed, and a Temporary Certificate of Occupancy ("TCO") would be secured. Up to approximately 6 workers would be on-site per day.
- **"Punch-List Activities"** would be undertaken throughout the remainder of the construction period, attending to final building details to ensure the buildings are ready for occupancy and all systems function as necessary.

Table 20-3: Typical Construction Tasks and Sequencing per Phase

Construction Task	Durations	Equipment	Hours/Day for Equipment Use	Numbers of Employees
Site Preparation				
Site Cut, Driven Piles	80 days	Pile Driving Rig (1)	8	8
		Bauer Drill Rig (1)	8	
		Payloader(1)	8	
Excavation, Backfilling	60 days	Excavator (2)	6-8	8
		Payloader (1)	6-8	
		Skid Steer (1)	6-8	
Foundation and Construction				
Concrete	80 days	Excavator (1)	8	25
		Skid Steer (1)	4	
		Line or Boom Pump (1)	8 (1 day per week)	
Masonry Block & PreCast Plank Structure	110	Lull (1)	8	35
		Mortar Mixer (1)	8	
		Bobcat (1)	8	
		Hydraulic Crane (1)	8 (2 days of every 10 days)	
Masonry Façade and Roofing				
Masonry Facade	120	Lull (1)	8	25
		Mortar Mixer (1)	8	
Roofing	100	*no equipment*		15
Windows and Interiors				
Elevator Work	60	*no equipment*		6
Doors, Windows, Storefront	60			6
Interior Finishes & MEPS – Floor-By-Floor	120			35-50
Common Area Flooring	40			
Lobby Work/ Misc. Finishes/ Community Area Build Out	60			
"Punch-List"				
Utility Company Serivces	40	*no equipment*		6
Fire Sprinkler Testing	20			
Fire Alarm Testing	20			
On- and Off-Site CIP Work, BPP, Asphalt Work	20			
Punch List, Sign Offs, Inspections	40			
TCO	20			

Source: The Arker Companies, 2015.

PROJECT PHASE TEMPORAL "OVERLAP"

As shown on Figure 20-1, "Project Phases – Years," and Figure 20-2, "Project Phases – Site Plan," there would be temporal overlap of construction activities of up to approximately 80 days during which time one project phase would be nearing completion ("punch-list" activities) and the subsequent phase (site preparation) would be beginning.

This "overlap" would be most apparent on Parcel B where phases 2 through 5 would result in adjacent construction; the Phase 3 building would be constructed adjacent to the Phase 2 buildings, and the Phase 5 buildings would be constructed adjacent to the Phase 4 buildings.

It is noted that construction phases 4 and 5 would occur when phase 2 would be occupied; however, as shown on Figure 20-2, "Project Phases – Site Plan," these construction activities would be separated from the occupied Phase 2 buildings by Schroeders Walk (a distance of approximately 60 feet). By comparison, the Phase 2 building would not be occupied while construction of the Phase 3 building would be underway, nor would the Phase 4 building be occupied when adjacent site preparation is underway for Phase 5.

The largest number of workers present on the project site on any day during this particular period of temporal overlap would be a total of approximately 29 workers on the project site. The equipment would be that required for the early work of the Site Preparation phase described previously, and would include one pile driving rig, one Bauer drill rig, and one payloader, all of which would be operational for 8 hours per day.

WORST CASE CONSTRUCTION SCENARIO

Given that there may be some variation of activities within a particular phase, particular attention is given to Phase 5. Depending on project financing, it is possible that the construction tasks within a phase may vary, with the construction and masonry activities following the completion of the foundation, occurring at a faster pace, with some construction activities occurring concurrently when they may otherwise be managed sequentially. The increased intensity of construction activities would be expected between the first and last 6 months of a project phase (i.e., after Site Preparation and before the final "punch-list" activities are undertaken). It is noted, however, that the schedule for financing assumed for the proposed action overall means that project phases would not occur sooner than otherwise described herein; even if a particular phase were constructed with greater intensity and completed sooner, the subsequent phase would not begin sooner, given project financing constraints and schedules. Therefore, were each phase completed in less time, there likely would be less temporal overlap between two phases.

In order to assess the potential for increased construction-period activity, per a reasonable worst-case scenario, such a period of intensified activity is assumed for analysis purposes to occur during Phase 5.

Were such an increased intensity of construction activities during any one phase to occur, it is noted that Phase 5 would represent the greatest long-term "background growth" in traffic, nearly equivalent to the full occupancy analysis year of 2028. Therefore, the analysis of increased construction intensity is most conservatively represented during Phase 5.

20.5 Construction Analyses

TRANSPORTATION

The construction of the proposed action, from 2017 to 2028, would result in some surface disruptions and generate construction worker and truck traffic. As described below, the projected construction activities are not expected to result in significant adverse traffic, parking, transit, or pedestrian impacts.

Traffic

The daily number of construction workers and truck activities by construction stage are projected for the full duration of the project construction. The peak number of construction workers at the site would occur during the "Interior Finishes and MEPs" stage when up to 50 workers would be on site per day.

U.S. Census data indicate that 86 percent of construction workers commute to project sites in Brooklyn via auto with an average auto-occupancy of 1.23[1]. Applying these factors to the 50 workers during the peak personnel stage would generate 35 auto trips (35 vehicle trips arriving at the start of the work day and 35 trips departing at the end of the work day). During the peak personnel stage, up to three truck material deliveries are expected per day, which is equivalent to a total of six passenger car equivalent ("PCE") trips[2].

In total, the construction peak hour would generate up to 41 vehicle trips (presented as PCEs) if all workers and trucks were conservatively assumed to arrive and depart the site during the peak hour. This total is less than the 50 vehicle trip threshold that would require detailed traffic analysis as per the *CEQR Technical Manual*. Furthermore, the typical peak hours for the arrival and departure of construction workers are 6-7 AM and 3-4 PM, which occur prior to the weekday roadway AM and PM peak travel hours, when traffic volumes on the adjacent roadway network are lower. Therefore, the weekday construction activities of the proposed action would not have the potential to result in significant adverse traffic impacts on the days when the construction site has the most workers.

[1] The *Gateway Estates II FEIS* notes that according to U.S. Census reverse journey-to-work data, commuting to work via auto in New York City is more prevalent among construction and excavation personnel than for workers in most other occupations.
[2] Each truck is considered to be equivalent to two passenger cars as per the *CEQR Technical Manual*.

The maximum number of daily truck trips to/from the construction site would be 20 trucks, which would occur during the stages when soils are removed from the site and when concrete is being delivered on concrete pour days. These truck trips to/from the site would likely be distributed over the course of the work day (typically between 6 AM and 4 PM); consequently, no more than 25 percent of the trips (5 truck trips) would occur during the peak hour, which is equivalent to 10 PCE trips. During these stages, up to 25 construction workers would be at the site, which is equivalent to 18 vehicle trips during the AM and PM peak construction worker arrival and departure hours. In total, the construction peak hour would generate 38 vehicle trips, conservatively assuming 18 worker vehicle trips and 10 truck arrival and departure trips (presented as PCEs) occurring during the same hour. This total is less than the 50 vehicle trip threshold that would require detailed traffic analysis as per the *CEQR Technical Manual*; therefore, the weekday construction activities of the proposed action would not have the potential to result in significant adverse traffic impacts on the days when the construction site has the most truck deliveries.

Temporary curb lane and sidewalk closures may occur adjacent to the construction sites, similar to other construction projects in New York City, and these construction sites would be expected to have dedicated gates, driveways, and/or ramps for access by trucks making deliveries. Truck movements would be spread throughout the day and would generally occur between 6 AM and 4 PM, depending on the stage of construction. No rerouting of traffic is anticipated during construction activities and all moving lanes on streets are expected to be available to traffic at all times. Flaggers are also expected to be present during construction to manage the access and movement of trucks. Detailed Maintenance and Protection of Traffic ("MPT") plans for each construction site would be submitted for approval to NYCDOT's Office of Construction, Mitigation, and Coordination.

Linden and Fountain avenues are NYCDOT-designated local truck routes; therefore, truck material deliveries are anticipated to arrive and depart the construction site along these two routes.

Transit

Bus service would be maintained within and near the project site during construction, and it is unlikely that bus stops would need to be temporarily relocated. Construction activities associated with the proposed action are expected to result in few (approximately 14 percent of workers) new subway or bus trips from construction workers accessing the project site. Therefore, no further evaluation of nearby transit services is required, and there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips.

Pedestrians

Construction activities associated with the proposed action are expected to result in few, if any, new pedestrian trips from construction workers accessing the project site. Therefore, a detailed pedestrian analysis to address the projected demand from the travel of construction workers to and from the

project site is not warranted. During construction, where temporary sidewalk closures may be required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with NYCDOT requirements.

Parking

Construction workers would be expected to park on the local streets next to the construction site and would not park in the existing retail parking lots at Gateway Center. On the peak construction activity days, a parking demand for up to 35 spaces is anticipated and could be accommodated by the sufficient on-street parking supply available on the local streets as discussed in Chapter 14, "Transportation," even if curbside spaces adjacent to the property are not available due to construction activities. Therefore, the proposed action would not result in significant adverse impacts on public parking during the construction period.

AIR QUALITY

Construction activities associated with the proposed action could result in engine exhaust and fugitive dust emissions that can have substantial temporary impacts on local air quality. Construction emissions from vehicular exhaust would result from the movement and operation of construction-related vehicles and equipment. Emissions would be generated by both off-site and on-site activities. Off-site emission producing activities include construction work crews traveling to and from the work site and on-road emissions from delivery trucks. On-site emission producing activities include the operation of off-road construction machinery and vehicles. For the proposed action, sources would include stationary machinery such as auger drill rigs, and generators in addition to mobile non-road vehicles used within the construction areas such as a hydraulic cranes, backhoes or front loaders. Because the majority of the equipment would utilize diesel fuel, pollutants of interest with respect to construction exhaust emissions would include: CO, PM_{10}, $PM_{2.5}$ and NO_2. While sulfur dioxide ("SO_2") is a pollutant that is also of concern, because USEPA now restricts diesel fuel usage to ULSD, emissions of SO_2 would be negligible.

Emissions from fugitive dust are also of concern. Fugitive dust is made up of airborne particulate matter, generally of a relatively large particle size. Construction-related fugitive dust would be generated by earth-moving vehicles operating around construction areas. For the proposed action, emissions would be primarily related to particulate matter being re-suspended ("kicked up") by vehicle movement over unpaved roads and other surfaces, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from areas of exposed soils. Pollutants of concern with respect to fugitive dust include PM_{10} and $PM_{2.5}$.

Project Specifications to Minimize Pollutant Emissions

The Restrictive Declaration governing the proposed action would require the incorporation of construction specifications in the form of control measures to minimize potential construction-related air quality effects.

These measures would include:

- EPA's Tier 1 through 4 standards for non-road diesel powered engines regulate the emission of criteria pollutants from new engines, including PM, CO and NO_x. Each of the four tiers phases in more stringent requirements (by engine horsepower rating) over several years. To the extent practicable, all non-road construction equipment utilized for the proposed action would meet at least the Tier 2 emissions standard, and construction equipment meeting Tier 3 and/or Tier 4 emissions standards would be used where conforming equipment is widely available, and the use of such equipment is practicable.

- To the extent practicable, non-road diesel engines with a power rating of 50 hp or greater would utilize the BAT for reducing DPM emissions. Diesel particle filters ("DPF") have been identified as being the tailpipe technology currently proven to have the highest PM reduction capability. These technologies would either be preinstalled on the engine by the original equipment manufacturer ("OEM") or retrofitted with a DPF verified by USEPA or the California Air Resources Board, and may include active DPFs if necessary; or other technology proven to reduce DPM by at least 90 percent.

- Adherence to NYC Local Law 77 (2003) Administrative Code §24-163.3, which requires the use of ULSD for reducing emissions, particularly DPM and SO_x, from non-road engines and equipment.

- Limit unnecessary idling times on diesel powered engines to three minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete mixing trucks).

- By June 2018, NYCDEP will promulgate rules requiring that the "best available retrofit technology" is to be used by the heavy duty on road vehicles. These rules would apply to all construction vehicles in use after NYCDEP implements them, and is relevant to the proposed action as the construction period is projected to continue into 2028.

- Reduce dust related to the construction site through adherence to NYCDEP dust-related requirements found in the Title 15 RCNY Chapter 13, "Rules Pertaining to the Prevention of the Emission of Dust From Construction Related Activities," which is authorized by § 24-146. These requirements include, among other things:

    - Spraying of a suppressing agent on dust piles (non-hazardous, biodegradable);

- Containment of fugitive dust;
- Cover spoil piles and prohibit materials handling activity during high winds; and
- Maintenance of equipment (i.e, the setting up of wheel wash stations).

Methodology

To determine the peak construction period (and thus when the greatest pollutant level would be expected), emissions were considered for the entire construction period on an annual basis. Construction for the proposed action is currently estimated to begin in 2017 and would last an estimated 11 years. From the 11 years of construction, four were selected as representative of the varying yearly emissions potential for the proposed action. The selection of these four years was based on: the preliminary construction schedule for the full build out of the proposed action; the similarity in construction methods and schedule for each of the two proposed parcels; and the fact that Parcel A would not have any material impact on any nearby sensitive receptors. These four critical assessment years include 2018, 2019, 2020 and 2027. Due to the sequential nature of the construction schedule and the similar manner in which the construction phases would overlap one another, six of the remaining seven construction years would have similar emissions potential to one of the four selected construction years. The remaining year, 2017, represents construction at Parcel A, which would be located on the far southwest portion of the project site, near commercial buildings that do not contain any sensitive residential receptors. The construction site for Parcel B would be proximate to several off-site residences, and during Phase 4 and 5 construction, adjacent to occupied buildings on the project site.

To determine the worst-case construction year for evaluation, estimated annual emissions of $PM_{2.5}$ are calculated for each of the four years of construction identified above. Only $PM_{2.5}$ is selected for determining the worst-case construction year, because the ratio of predicted $PM_{2.5}$ incremental concentrations to impact criteria due to construction activities is higher than for other pollutants; the overall emissions of $PM_{2.5}$ correlate well to when most construction activity occurs. In addition, emission patterns for PM_{10} and NO_2 follow those related to $PM_{2.5}$ emissions, since their emission rates are closely related to the sizes of diesel engines. While CO emissions may have a somewhat different pattern, they generally would also be highest during periods when the most construction activity would occur.

Table 20-4, "Annual $PM_{2.5}$ Air Emissions Resulting from Construction," shows the results of the emissions analysis. The values represent the estimated annual emissions of $PM_{2.5}$ for the four representative construction years. As shown, the estimated worst-case air emissions would occur during the 2027 construction year. Emissions generated during the remaining three representative years of construction would be noticeably less.

Table 20-4: Annual $PM_{2.5}$ Air Emissions Resulting from Construction

Pollutant	2018 Emissions (Tons)	2019 Emissions (Tons)	2020 Emissions (Tons)	2027 Emissions (Tons)
Particulate Matter (PM2.5)	0.050	0.055	0.051	**0.067**

Notes:
1 Truck idling and operational emissions within the work area and nearby vicinity are included.
2 Fugitive dust emissions related to roadway travel were assumed to be negligible within the construction areas due to low vehicle speeds.

Source: STV Incorporated, 2016.

For each of pollutant of concern ($PM_{2.5}$, PM_{10}, CO and NO_2), an ambient stationary source air quality analysis is conducted to calculate concentrations resulting from construction activity during the 2027 peak construction year. Several air quality models are utilized in the analyses, including the USEPA-developed NONROAD2008 & MOVES2014 emissions models; and the AP-42: Compilation of Air Pollutant Emission Factors. The AERMOD (EPA-454/B-03-001) dispersion model was also utilized to determine pollutant concentrations at nearby sensitive receptors.

Construction equipment associated with the proposed action would include excavators, concrete trucks, hydraulic cranes, rubber tire backhoes and loaders, drill rigs, dump trucks, and pumps. The analysis is performed with the use of control measures, such as those described above. For all pollutants evaluated, the predicted concentrations are evaluated in terms of their adherence to the USEPA NAAQS and any NYC *de minimis* criteria thresholds.

Important issues related to the analyses include:

- Sensitive neighborhood receptors are initially identified for the analysis. These include sidewalk locations which represent the nearest receptors to the construction areas and nearby residences across Vandalia Avenue and Erskine Street which are associated with the Gateway Estates development. In addition, because the building associated with Phase 2 of the project would be occupied during the 2027 construction year (Phase 5), the impact of construction emissions on the adjacent "project" receptors are also considered for potential elevated open windows or intake vents.
- Emissions rates are calculated for both the exhaust from the operation of on-site construction vehicles and the re-entrained dust resulting from excavation and load out activities. Key factors and assumptions related to the calculation of emission rates include: the proposed construction schedule shown in Table 20-3, "Typical Construction Tasks and Sequencing per Phase;" 8 hours per day / 5 days per week work period; typical engine hp for each type of equipment; number of days of operation per stage; number of hours used per day; the use of 15 parts per million ("ppm") ULSD fuel; three minute idling time for trucks loading and unloading,; fugitive dust emissions from roadways assumed to be negligible within the construction areas (since vehicle

speeds would be less than 5mph); and dust calculations based on the maximum amount of material excavated for each stage.

- Pursuant to the *CEQR Technical Manual*, the number of on-street vehicles generated due to the construction of the proposed action would not trigger the need for detailed air quality intersection analyses.
- Average peak daily dump truck and concrete truck trips occurring within the 2027 construction year are utilized for the analysis.
- The construction activity period resulting in the maximum emissions during the 2027 construction year is utilized for the analysis.
- Emission rates are calculated to determine both short and long term concentrations for the studied pollutants at the selected receptor locations.
- The most recent five year period (2010 to 2014) of available representative hourly meteorological data from John F. Kennedy International Airport ("JFK") is used in the analysis

Peak Construction Year Impacts

An ambient air analysis is conducted to calculate the maximum ambient air impact concentrations resulting from the construction activities, with the results presented in Table 20-5, "Highest Predicted $PM_{2.5}$ and PM_{10} Incremental Concentrations," and Table 20-6, "Highest Predicted NO_2 Concentrations." The analyses assume the application of construction emission reduction requirements, as listed above.

Table 20-5: Highest Predicted $PM_{2.5}$ and PM_{10} Concentrations

Pollutant	Time Period	NAAQS ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Predicted Concentration ($\mu g/m^3$)	NYC De Minimis Criteria [2] ($\mu g/m^3$)
$PM_{2.5}$	24-hour	35.0	-	2.1 [1]	7.5
	Annual	15.0	-	0.2 [1]	0.3
PM_{10}	24-hour	150	32	32.2	NA

Notes:
[1] Represents incremental concentrations.
[2] As per CEQR, $PM_{2.5}$ 24-hour average *de minimis* criteria defined as the level not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 $\mu g/m^3$

Source: STV Incorporated, 2016.

Table 20-6: Highest Predicted NO_2 Concentrations

Pollutant	Time Period	Background Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Predicted Concentration ($\mu g/m^3$)
NO_2	Annual	21.62	100	39.2

Source: STV Incorporated, 2016.

The results of the 8-hour CO analysis indicate that the CO concentration resulting from on-site construction activities would be negligible. For $PM_{2.5}$, the maximum short-term and long-term ambient impact concentrations would be below the NAAQS and the NYC *de minimis* criteria. Predicted concentrations of PM_{10} and NO_2 would be below the NAAQS criteria levels.

NOISE AND VIBRATION

Potential effects of the proposed action's construction noise and vibration activities on the surrounding community are evaluated in accordance with guidelines contained within the *CEQR Technical Manual* and a review of preliminary construction schedules and plans. The CEQR guidance incorporates methodology from Federal Transit Administration ("FTA") and Federal Highway Administration ("FHWA") for impact determination.

Construction-related activities related to the proposed action would bring noise and vibration in close proximity to both on- and off-site sensitive receptors. The noise analyses discussed below consider noise emissions generated by construction equipment, the amount of time the equipment is in use, and the distance between the equipment and potential receptors nearby. The primary concern with construction vibration, as defined by FTA, is building damage and human annoyance. While equipment used in construction, such as pile drilling rigs, does not generate significant area wide vibration, it can result in significant vibration issues for structures in close proximity. For both noise and vibration, the effects of construction are studied for off-site receptors, such as the nearby residences associated with the Gateway Estates development. Buildings associated with the proposed action are also considered as receptors since the preliminary construction phasing plans would expose some occupied residential portions of the project buildings to close proximity construction noise and vibration.

Guidelines and Criteria

Noise Guidelines

CEQR construction guidelines state that a noise assessment may be qualitative or quantitative depending upon the scale and scope of a construction project. For qualitative assessments, the project usually lasts for a short period of time (less than two years) or employs equipment that would not create a significant amount of noise. For projects which would be much longer in duration and employ noisier

equipment, such as the proposed action, a quantitative analysis may be more appropriate. For a quantitative analysis, either a general or a detailed assessment is provided as appropriate.

The proposed action would be located in NYC and have an approximate 11-year construction period that would employ the use of equipment that is on the higher end of the noise energy spectrum. In addition, residential receptors, which are typically the most sensitive to noise, are located in close proximity to construction areas. As a result, a detailed quantitative assessment methodology of one-hour equivalent noise level ("L_{eq}") is considered to be the most appropriate for assessing the proposed action construction noise. Predicted noise levels are compared to existing noise levels to determine impact significance as per the *CEQR Technical Manual*.

The *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No Action noise level as the baseline, should be used for assessing construction noise impacts. For the assessment of the proposed action, the existing noise level is used conservatively in place of the No Action noise level. As recommended in the *CEQR Technical Manual*, increases in daytime noise levels as a result of a proposed action are not considered significant unless the resulting exterior noise levels exceed 65 dBA. Where the existing exterior noise levels exceed 65 dBA, a 3 dBA increase from the existing conditions is considered a significant adverse impact.

Vibration Guidelines

Ordinarily, potential impacts related to construction vibration would be for a finite duration. However, for the proposed action, the preliminary schedule indicates that pile driving activities for each phase of the proposed action would occur for approximately three months. Therefore, the primary concern regarding construction vibration would be related to both the potential damage to buildings and human annoyance. The damage criteria are based on the peak particle velocity ("PPV") levels for different types of construction equipment. For structural damage, FTA identifies criteria for five categories of buildings which could be potentially affected, including fragile and historic structures. No fragile or historic buildings have been identified within 90 feet of the construction zones. The buildings that would be adjacent to the construction activities (those of the proposed action) would be made of reinforced concrete. For these buildings, the FTA criteria consider that damage would occur at a vibration level of 0.50 inches per second ("ips"), which is equivalent to 102 vibration decibels ("VdB"). The damage threshold for NYCDOB is also 0.50 ips. For the assessment of human annoyance, the FTA vibration criteria of 78 VdB was used.

Methodology

Noise

For the proposed action, construction activity is expected to occur over an 11 year period. However, the proposed action would be constructed in several phases, limiting the duration of construction activities occurring at any one location. For the purposes of the proposed action, the worst case construction task

in terms of noise is selected based on four critical assessment years, which include 2018, 2019, 2020 and 2027. The process used to determine these critical years is described in the air quality section of this construction impacts chapter. Because pile driving is identified as one of the loudest construction activities, the worst case construction task within any of the critical years is identified as the "Site Cut, Driven Piles" construction task, as previously shown in Table 20-3, "Typical Construction Tasks and Sequencing per Phase." This construction task represents the period of construction when the peak quantity of equipment usage, above and beyond pile driving, would occur.

Based on the preliminary construction phasing schedule previously shown in Table 20-2, "Project Phases," the worst case phases, in terms of their potential to impact sensitive on-site receptors, would be phases 4 and 5. During the initial "Site Cut, Driven Piles" construction task for these two phases, buildings associated with Phase 2 construction would be fully occupied and located directly across Schroeders Walk from the phases 4 and 5 construction sites. In addition to potential noise impacts to on-site receptors, construction related to phases 2, 3 and 5 is representative of the worst-case construction scenarios for the off-site residential receptor locations on Vandalia Avenue. Likewise, construction related to phases 2 and 3 is representative of the worst-case construction scenario for the off-site residential receptor locations on Erskine Street.

For the representative construction phases described above, the noise from the combination of the anticipated pieces of equipment operating during the "Site Cut, Driven Piles" construction task is calculated from the addition of their noise level values using the Roadway Construction Noise Model ("RCNM"). RCNM is the FHWA model for detailed construction noise analysis, and it is appropriate for use during project development and construction phases. In general, the model accounts for the noise emission of each particular piece of equipment, the number of pieces of equipment on the site, a usage factor which accounts for the fraction of time the equipment is being used, source-receptor distance, and shielding in calculating a maximum one-hour L_{eq} at the nearest noise-sensitive receptors. Typical construction equipment noise emissions and acoustical usage factors are shown in Table 20-7, "Typical Noise Emission Levels for Construction Equipment." The noise emission levels for construction equipment are measured at a reference distance of 50 feet (15.2 meters). Based on standard noise fundamentals, these noise emissions typically decrease in energy with increasing distance.

Noise from mobile source off-site construction vehicles is not included in the project construction noise assessment. The construction of the proposed action would not result in street closures and traffic diversions. Furthermore, the projected number of construction vehicles generated during any one hour would not be significant with respect to noise, as there would be no doubling of traffic volumes or PCEs on any of the affected roadways. As a result, noise levels from off-site mobile source construction vehicles would not be perceptible.

Vibration

Potential vibration from the construction of the proposed action is assessed based on FTA guidelines for quantitative construction vibration and by reviewing project construction plans and schedules. The construction information utilized in assessing vibration included construction activities and equipment types. Typical vibration emission levels from construction equipment and stationary sources are utilized for the evaluation of potential effects on receiver locations in the study area. Pile driving is assumed to be the worst vibration causing construction activity; therefore the "Site Cut, Driven Piles" construction task is analyzed as a worst-case condition.

Potential impacts related to building damage are assessed for on-site project buildings, assuming that pile driving activities were located as close as 20 feet to an adjacent project building. Potential impacts related to building damage are assessed for off-site residential receptors on Vandalia Avenue and Erskine Street located approximately 89 and 250 feet away, respectively, assuming that the pile driving activities would be conducted at the nearest edge of the nearest project building under construction.

Table 20-7: Typical Noise Emission Levels for Construction Equipment

Equipment Description	Usage Factor (%)	L_{max} @ 50 Feet
All Other Equipment > 5 HP	50	85
Auger Drill Rig	20	85
Backhoe	40	80
Bar Bender	20	80
Blasting	N/A	94
Chain Saw	20	85
Clam Shovel (dropping)	20	93
Compactor (ground)	20	80
Concrete Mixer Truck	40	85
Concrete Pump Truck	20	82
Concrete Saw	20	90
Crane	16	85
Dozer	40	85
Drill Rig Truck	20	84
Drum Mixer	50	80
Dump Truck	40	84
Dumpster / Rubbish Removal	20	78
Excavator	40	85
Flat Bed Truck	40	84
Front End Loader	40	80
Generator	50	82
Gradall	40	85
Grader	40	85
Hydra Break Ram	10	90
Impact Pile Driver	20	95
Jackhammer	20	73
Man Lift	20	85
Paver	50	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pumps	50	77
Refrigerator Unit	100	82
Rivet Buster / Chipping Gun	20	85
Rock Drill	20	85
Roller	20	85
Sand Blasting	20	85
Scraper	40	85
Shears (on Backhoe)	40	85
Slurry Plant	100	78
Slurry Trenching Machine	50	82
Soil Mix Drill Rig	50	80
Tractor	40	84
Vacuum Excavator (Vac-truck)	40	85
Vibratory Concrete Mixer	20	80
Vibratory Pile Driver	20	95

Source: Local Law 113 and the New York City Department of Environmental Protection Notice of Adoption of Rules for Citywide Construction Noise Mitigation: Chapter §28-109, Appendix

Construction Analysis

Noise

Noise calculations are conducted for the worst-case phase and task of the proposed action. As a result, all calculations take into account the construction equipment and activity utilized during the "Site Cut, Driven Piles" construction task. The major noise-generating activity involved in construction during the "Site Cut, Driven Piles" construction task would be pile driving. It is anticipated that the other construction equipment operating during this task would include a Bauer drill rig, a frontend loader and on-site dump trucks. One-hour L_{eq} noise levels are predicted for on-site and off-site locations at three representative noise receptors surrounding the proposed action construction zone. The results, which assume the use of perimeter noise barriers that are required by the New York City Noise Code, are presented in Table 20-8, "One-Hour Construction Noise Levels."

Table 20-8: One-Hour Construction Noise Levels [1]

Receptor Description	Distance from Nearest Edge of Construction Site (ft)	Existing 1-Hour Leq Noise Level (dB)	Predicted Exterior Construction 1-Hour Leq Noise Level (dB)	Total Exterior Noise (dBA)	Change in Exterior Noise Level (dB)	Window Attenuation at Receptor (dB)	Construction Noise Exceeds CEQR Exterior Noise Criteria?
Erskine Street Residences	150	66.0	81.6	**81.7**	+15.7	30 [3]	Yes
Vandalia Avenue Residences	109	67.2	79.0	**79.3**	+12.1	25 [3]	Yes
Proposed Action - Phase 2 Building [2]	60	67.2	84.2	**84.3**	+17.1	40 [4]	Yes

[1] Results take into consideration 10dB of noise attenuation for perimeter noise barriers surrounding construction equipment and zones. Noise barriers must break the line of site between the noise source and the receptor, and therefore would be effective for receptors located within 200 feet and a maximum of 20 feet above grade level.
[2] The existing noise level for Vandalia Avenue was used for the proposed action - Phase 2 building since it is directly adjacent to Vandalia Avenue.
[3] *Gateway Estates II Final Environmental Impact Statement ("FEIS")* – 2009
[4] Assumes the use of double glazed windows for all proposed action buildings, as would be required in the Restrictive Declaration to avoid significant adverse noise impacts during non-construction occupancy (see Chapter 17, "Noise").

Source: STV Incorporated, 2016.

The results from Table 20-8, "One Hour Construction Noise Levels," indicate that exterior noise levels related to proposed action construction activities would exceed the CEQR criteria for all of the studied receptor locations at the exteriors of the buildings. Exceedances of the criteria would result from high noise emissions levels related to pile driving and other equipment and the close proximity of the studied receptors to construction activities. However, the buildings at all three of the studied receptor locations would incorporate window attenuation. This is important since the 65 dBA criteria threshold is based on an acceptable interior noise level of 45dBA. The interior noise level of 45 dBA assumes that a receiver incorporates typical construction techniques (including the use of single glazed windows) that would

provide a minimum of approximately 20 dBA of noise attenuation from outdoor to indoor areas. For the receptors associated with the Gateway Estates development, the assumed window attenuation (as described in the *Gateway Estates II FEIS*) would not be sufficient to reduce interior noise levels below the 45dBA level. As noted in Table 20-8, typical attenuation values for standard double gazed windows are 40 dB. For the Phase 2 building receptor related to the proposed action, construction of such buildings with double-glazed windows, which would also achieve the levels of attenuation identified in Chapter 17, "Noise," would eliminate the potential for significant adverse interior noise impacts, as this level of window attenuation would reduce interior noise levels for Phase 2 buildings below the 45 dBA threshold. The use of double glazed windows and provision of an alternate source of ventilation would be required in the Restrictive Declaration for the proposed action (project site). As a result, while significant adverse impacts would occur for the off-site receptor locations on Vandalia Avenue and Erskine Street, the proposed action Phase 2 buildings would not experience any significant adverse impacts from construction noise.

While significant adverse impacts are predicted for off-site receptors, the main sources of construction noise (pile driving) would migrate throughout the construction areas, such that the effects of construction noise on any particular sensitive receiver would change depending on the location of the noise source and the height of the receiver. Once pile driving activities are completed, noise levels from other construction activities and equipment, such as excavators or dump trucks, may occasionally still result in an exceedance of noise criteria levels; however, it is anticipated that overall construction noise levels would decrease significantly.

Noise Control Measures and Potential Mitigation

Noise control measures that would partially mitigate significant adverse construction noise impacts, and which the developer would be required in the Restrictive Declaration to implement or consider are described below. Substantial noise level reductions (up to 15 dBA) associated with construction not related to pile driving would be expected with the proposed measures. It should be noted that several constraints, such as the use of pile driving during construction, the close proximity of construction activities and limited spaces between buildings and the construction area, would significantly limit the practicability of and the potential benefits from some measures depending on the construction activity being undertaken.

The Restrictive Declaration would require contract specifications requiring (1) contractors to comply with all the requirements and regulations of the New York City Noise Code and USEPA noise emission standards for construction equipment; (2) devices and activities which are subject to the provisions of the New York City Noise Code to be operated, conducted, constructed or manufactured without causing a violation of the code; (3) all work to be conducted in compliance with the regulations set forth in the code that control noise levels due to construction work. These New York City Noise Code requirements, compliance with which was assumed to be included as part of the construction noise analysis, mandate that:

- Certain classifications of construction equipment and motor vehicles meet specified noise emissions standards;
- Except under exceptional circumstances, construction activities shall be limited to weekdays between the hours of 7:00 AM and 6:00 PM; and
- A construction noise mitigation plan shall be developed and implemented in accordance with the New York City Noise Code (specifically, as it refers to the citywide construction noise mitigation rules as described in Title 15, Chapter 28 of the NYC Administrative Code). Some examples of these rules include:
    - Contractors and subcontractors are required to properly maintain their equipment and mufflers;
    - The quietest pile driving method shall be selected that allows work to be performed based on structural, geotechnical and pile friction requirements and ground conditions. Noise path controls shall be utilized as indicated in the rules requirements;
    - Construction of a perimeter noise barrier when receptors are within 200 feet of the construction site. Barriers can be made from noise curtain material, plywood or other similar materials. Barriers can reduce noise by up to 10 dB when positioned closely to a noise producing activity.

While there are additional requirements in the New York City Noise Code that would also be implemented and would effectively reduce noise from construction activities, their impact could not be quantitatively modeled as part of the construction noise analysis. These additional requirements are:

- Limits on engine idling in accordance with NYC Administrative Code 24-163;
- Dump trucks shall be equipped with thick rubber bed liners;
- Minimal use of backup alarm devices and when necessary, use of only approved back up devices; and
- Construction material must be handled and transported in such a manner as to not create unnecessary noise.

Other mitigation measures and strategies that could reduce noise levels further include:

- Design considerations and project layout approaches, including measures such as construction of temporary noise barriers, placing construction equipment as far as practicable from noise sensitive receptors, constructing walled enclosures/sheds around especially noisy activities, such as pavement breaking, and sequencing operations to combine especially noisy equipment;

- Perimeter noise barriers constructed to the maximum height of 15 feet allowed by the NYC Noise Code;
- Alternative construction methods, such as using special low noise emission level equipment; and
- Use of noise enclosures or noise insulation fabric on compressors, generators, etc.

Vibration

An examination of the vibration criteria for structural damage indicates that construction activities (in particular, pile driving) related to the proposed action could result in significant adverse impacts at some sensitive receptors. At off-site residential receptors on Vandalia Avenue and Erskine Street, buildings would be located far enough from pile driving activities that vibration-causing activities would not result in any potential building damage. At on-site building receptors related to the proposed action, it was assumed that the distance between the nearest project building and the adjacent pile driving activities would be approximately 20 feet. This analysis of vibration levels related to pile driving near project buildings indicated that vibration levels could reach as high as 0.9 ips, which would be above the NYCDOB threshold of 0.5 ips for potential building structure damage. Any pile driving occurring closer than 20 feet to a building could reach even higher vibration levels. While pile driving activities may occur within close proximity to the proposed action buildings, a structural engineer would evaluate the potential for building damage to the project site's development prior to pile-driving activities and apply vibration control measures as required, such that vibration levels would not result in in any project site building damage. These vibration control measures may include, *inter alia*, the following:

- Where possible and practicable, auger piles would be used in place of impact pile drivers. In addition, pre-drilling a hole for a pile could be used to place the pile at or near its ultimate depth, thereby substantially reducing the number of vibration causing impacts;
- The contractor could conduct vibration monitoring during highly disruptive construction activities, such as pile driving and drilling; and
- The duration of vibration impacts could be minimized.

Finally, no historic or fragile structures have been identified in the vicinity of the proposed action, and thus no vibration impacts on such structures would occur. As a result, no significant adverse impacts with regard to vibration-induced structural damage would result at any location from construction associated with the proposed action.

Although the *CEQR Technical Manual* does not suggest construction-related vibration criteria with respect to human annoyance, FTA guidance does provide annoyance criteria limits. Based on the FTA criteria, an assessment was conducted for the same three receptor locations studied for the construction noise analysis. For all three receptor locations, it is projected that the annoyance criteria level of 78 VdB would be surpassed during the pile driving segments of construction only. The occupied

Phase 2 buildings would experience the highest vibration level of 93 VdB, since they would be located nearest to pile driving activities. However, given that the occurrence of vibration would be limited in duration to the period of pile-driving activity associated with each construction phase, and would not affect the same receptors in each instance (so that total exceedances of the annoyance criteria would occur for no more than a 12 week period during the construction of the proposed action at any one receptor location). The vibration effects, though surpassing FTA annoyance levels, would not result in a significant adverse impact on residents occupying the project site or surrounding areas. Therefore, the proposed action would not result in any significant adverse impacts with regard to vibration.

OTHER TECHNICAL AREAS

Per the guidance of the *CEQR Technical Manual*, a construction assessment for potential effects to open space, socioeconomic conditions, community facilities, land use and public policy, neighborhood character, and infrastructure is recommended if construction activities would be more than two years.

As described previously, the proposed action would be constructed over a period beginning 2017 and completing 2028, in five phases, each lasting up to three years. It is expected that the project site would provide ample room for construction staging, and as described previously with regard to construction-period traffic conditions, detailed MPT plans for each construction site would be submitted for approval to NYCDOT's Office of Construction, Mitigation, and Coordination. Further, although temporary curb lane and sidewalk closures may occur adjacent to the construction sites, similar to other construction projects in New York City, these construction sites would be expected to have dedicated gates, driveways, and/or ramps for access by trucks making deliveries. Truck movements would be spread throughout the day and would generally occur between 6 AM and 4 PM, depending on the stage of construction. No rerouting of traffic is anticipated during construction activities and all moving lanes on streets are expected to be available to traffic at all times. Flaggers are also expected to be present during construction to manage the access and movement of trucks. Therefore, with these measures in place, no direct effects to surrounding land uses, or community facilities or services, would result during the proposed construction on the project site.

Historic and Cultural Resources

Per the guidance of the *CEQR Technical Manual*, a construction assessment for potential effects to historic and cultural resources is not warranted unless the project involves construction within 400 feet of a historic resource. As described in Chapter 7, "Historic and Cultural Resources," there are no historic architectural resources within 400 feet of the project site, and per consultation with New York State Office of Parks, Recreation and Historic Preservation ("NYSOPRHP"), no significant adverse impacts would be expected with the below-grade construction activities on the project site.

Hazardous Materials

Per the guidance of the *CEQR Technical Manual*, a construction assessment is not needed for hazardous materials unless the construction activities would disturb a site, or be located adjacent to a site containing hazardous materials, and the conclusions of Chapter 10, "Hazardous Materials," may be relied upon in making this determination. As discussed in Chapter 10, the two Environmental Site Assessments ("ESAs") (Phase I ESA and Phase II ESA, included in Appendix F) have revealed the potential for low-level, on-site subsurface contamination, primarily associated with the historic landfill of the project site. Analyses conducted as part of these ESAs indicate the low-level presence of petroleum hydrocarbons in the soils and semi-volatile organic compounds and metals in the groundwater. In addition, low concentrations of methane gas were identified originating from the decomposition of buried organic matter in the fill material over the underlying peat bog soil. Based on the results of the Phase II ESA, there are no recommendations for additional testing or remedial action, and no significant adverse impacts related to hazardous materials would be expected to occur with the proposed action. Project documents, such as the Restrictive Declaration prepared as part of the proposed action, would require a Construction Health and Safety Plan ("CHASP") to be approved by Empire State Development ("ESD") to prevent human exposure (worker and public) to any unidentified or potential on-site contamination. Elements of the CHASP could include the following:

- A project contact list, describing responsibilities;
- A description of hazardous environmental conditions that may be encountered on-site or may be exposed during construction, such as buried material, historic fill, and methane gas, as well as methods to address these hazardous environmental conditions during construction; and,
- General guidelines to be enforced by the construction manager regarding worksite safety.

Further, a likely stipulation to be included within the CHASP would be that any exported urban fill soils and landfill materials would be handled and disposed of in accordance with NYSDEC guidelines and recommendations. Once the proposed project plans are finalized, an *in situ* characterization would be performed for on-site soil to facilitate procurement of excavation bids and identification of appropriate soil disposal facilities.

Natural Resources

Per the guidance of the *CEQR Technical Manual*, a construction assessment for potential effects to natural resources is not warranted unless the project involves construction that would disturb a site or be located adjacent to a site containing natural resources. As described in Chapter 9, "Natural Resources," there are no natural resources on the project site and none within the physical area of construction activities.

The project site, which is located approximately ½-mile north of the Jamaica Bay shoreline, is located within the Jamaica Bay Watershed. As demonstrated in the completed Jamaica Bay Watershed Protection Plan Project Tracking Form, included as Appendix G, the proposed action would not result in significant adverse impacts to the Jamaica Bay Watershed, nor would the proposed action result in significant adverse impacts to the associated water quality and aquatic biota, either during construction or during operation. No surface water body is located on or adjacent to the project site. The nearest wetlands are approximately 600 feet southeast of Parcel B within Spring Creek Park, across Fountain Avenue.

No Significant Natural Communities are identified on or immediately adjacent to the project site, though "Low Salt Marsh" (one type of Significant Natural Community) is present within several locations approximately 2,000 feet southeast of the site, along the Old Mill Creek shoreline adjacent to Jamaica Bay. One Significant Coastal Fish and Wildlife Habitat ("SCFWH") is located in the vicinity of the project site, comprising much of Old Mill Creek, as well as its tributaries, Spring Creek and Ralph Creek, to the northeast, and the wetlands surrounding them, approximating the delineation of the "Forever Wild" Spring Creek Park Preserve, discussed in Chapter 9, "Natural Resources." Given the distance from the nearest natural resources, and given that construction activities would be undertaken in accordance with NYCDOB regulations, the proposed action would not result in any significant adverse impact to natural resources during construction.