Chapter 13: Construction

A. INTRODUCTION

As described in Chapter 1, "Project Description," the proposed project would redevelop the Armory building (the "Armory") located in the Kingsbridge Heights neighborhood of the Bronx with new development, including nine ice rinks and related program space. The project site occupies most of the block bounded by West 195th Street, Reservoir Avenue, West Kingsbridge Road, and Jerome Avenue. Construction is expected to take place over an approximately 30-month period. This chapter summarizes the preliminary construction program for the proposed project and assesses the potential for significant adverse impacts during the construction period. The city, state, and federal regulations and policies that govern construction are described, followed by the construction schedule and the types of activities likely to occur during construction. The types of construction equipment are also discussed, along with the number of workers and truck deliveries. Finally, the potential impacts from construction activity are assessed and the methods that may be employed to avoid significant adverse construction-related impacts are evaluated.

PRINCIPAL CONCLUSIONS

During certain stages construction of the proposed project would result in temporary significant adverse impacts with respect to vehicular traffic. During peak construction, the project-generated trips would be less than what would be realized upon the full build-out of the proposed project in 2018; therefore, the potential traffic impacts during peak construction would be within the envelope of impacts identified for the Build condition in Chapter 8, "Transportation." As detailed in Chapter 14, "Mitigation," measures to mitigate the operational traffic impacts were recommended for implementation. These measures would entail primarily signal timing adjustments and other operational measures, all of which could be implemented when appropriate at the discretion of the New York City Department of Transportation (DOT) to address conditions experienced during the construction phase of the proposed project.

As described below, construction of the proposed project would not result in significant adverse impacts in any other technical area. Most of the construction activities would occur inside the Armory, where the walls of the building would act as a barrier to the transport of air pollutants, and would provide acoustical shielding for nearby noise sensitive receptors. A Construction Protection Plan (CPP) would be prepared to avoid inadvertent construction-related impacts on the Armory. Since the project site is in proximity of the No. 4 train subway platform and viaduct, a reconnaissance survey of the subway structures and vibration monitoring within an "area of influence," as per New York City Transit's (NYCT) regulations, would be undertaken during construction. In regard to hazardous materials, a Remedial Action Plan (RAP) and Construction Health and Safety Plan (CHASP) also would be prepared and submitted to New York City Department of Environmental Protection (DEP) for review and approval.

B. GOVERNMENTAL COORDINATION AND OVERSIGHT

Construction oversight involves several city, state, and federal agencies. **Table 13-1** lists the primary involved agencies and their areas of responsibility. For projects in New York City, primary construction oversight lies with the New York City Department of Buildings (DOB), which ensures that construction projects meet the requirements of the New York City Building Code and that the buildings constructed are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect workers and the general public during construction. The areas of oversight include installation and operation of equipment such as cranes and lifts, sidewalk sheds, safety netting and scaffolding. DEP enforces the New York City Noise Control Code and the New York City Air Pollutant Control Code, reviews and approves any needed RAPs and CHASPs, and regulates water disposal into the sewer system, as well as removal of fuel tanks and abatement of hazardous materials. The City of New York Department of Sanitation (DSNY) has regulatory and enforcement oversight of the storage, transport, and disposal of asbestos waste. 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. DOT's Office of Construction Mitigation and Coordination (OCMC) reviews and approves any traffic lane and sidewalk closures. The New York City Landmarks Preservation Commission (LPC) approves a project's historic and cultural resources analysis, the CPP, and any monitoring measures necessary to prevent damage to historic structures, as well as any archaeological testing or monitoring that may be required.

Table 13-1
Construction Oversight in New York City

Agency	Areas of Responsibility
New York City	
Department of Buildings	Primary oversight for Building Code and site safety
Department of Environmental Protection	Noise Control Code, Air Pollutant Control Code, RAPs/CHASPs, dewatering, fuel tank removals, hazardous materials abatement
City of New York Department of Sanitation	Storage, transport, and disposal of asbestos waste
Fire Department	Compliance with Fire Code, fuel tank installations
Department of Transportation	Lane and sidewalk closures
Landmarks of Preservation Commission	Archaeological and architectural resources
New York State	
Department of Labor	Asbestos worker licensing
Department of Environmental Conservation	Hazardous materials disposal and fuel/chemical storage tanks
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials, poisons
Occupational Safety and Health Administration	Worker safety

The New York State Department of Labor (DOL) licenses asbestos workers. The New York State Department of Environmental Conservation (DEC) regulates the disposal of hazardous materials, and the construction and operation of bulk petroleum and chemical storage tanks. On the federal level, although the United States Environmental Protection Agency (EPA) has wide-ranging authority over environmental matters, including air emissions, noise, hazardous materials, and the use of poisons, much of its responsibility is delegated to the state level. The Occupational Safety and Health Administration (OSHA) sets standards for work site safety and the construction equipment.

C. CONSTRUCTION PHASING AND SCHEDULE

Construction of the proposed project is expected to begin in late 2014 and last approximately 30 months. The anticipated construction schedule is shown on **Table 13-2** and **Figure 13-1,** and reflects the sequencing of construction events as currently contemplated. Construction would proceed in several stages, some of which would overlap: environmental remediation and selective interior demolition; excavation and foundations; structural construction; infrastructure improvements; interior construction; exterior renovation and construction; and site work and finishes. These stages are described in greater detail below.

Table 13-2
Anticipated Construction Schedule

Construction Stage	Start Month	Finish Month	Approximate Duration (months)
Environmental Remediation and Selective Interior Demolition	Month 1	Month 6	6
Excavation and Foundations	Month 7	Month 12	6
Structural Construction	Month 13	Month 22	10
Infrastructure Improvements	Month 16	Month 22	7
Interior Construction	Month 17	Month 28	12
Exterior Renovation and Construction	Month 18	Month 25	8
Site Work and Finishes	Month 25	Month 30	6
Source: Kingsbridge National Ice Center Partners			

D. CONSTRUCTION DESCRIPTION

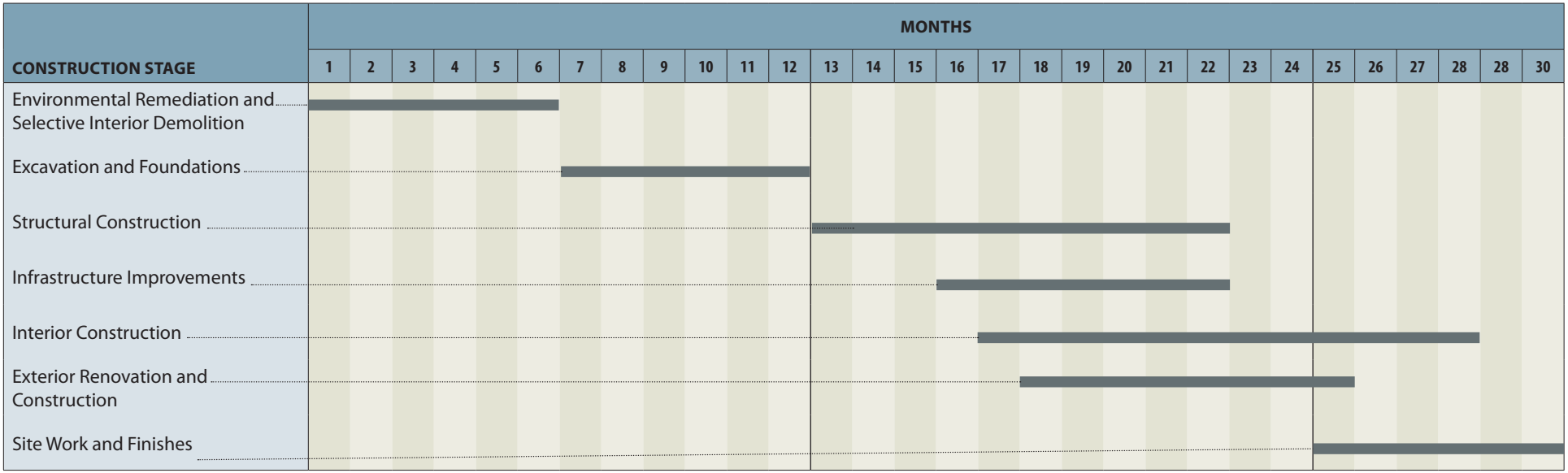
GENERAL CONSTRUCTION PRACTICES

A field representative for the proposed project would be available throughout the entire construction period to serve as a contact person for the community and local leaders, and would be available to address concerns or problems that may arise during the construction period. In addition, New York City maintains a 24-hour-a-day telephone hotline (311) so that concerns can be registered with the City.

HOURS OF WORK

Construction of the proposed project is expected to take place Monday through Friday. Certain exceptions to these schedules are discussed separately below. In accordance with New York City laws and regulations, construction work would generally begin at 7 AM on weekdays, with most workers arriving to prepare work areas between 6 AM and 7 AM. Weekday work would normally end by 3:30 PM, but it can be expected that, in order to meet the construction schedule or to complete certain critical tasks, the workday would occasionally be extended beyond these normal hours. The work could include such tasks as finishing a concrete pour for a floor deck. Any extended workday would generally last until approximately 6 PM and would not include all construction workers on-site, but only those involved in the specific task requiring additional work time.

Weekend and night work would not be scheduled regularly, but may occur occasionally to make up for weather delays or other unforeseen circumstances. Movement of certain oversized materials may occur at night to comply with DOT requirements. In such cases, appropriate work permits from DOB would be obtained. Similar to an extended workday, the numbers of workers



Anticipated Construction Schedule
Figure 13-1

and pieces of equipment in operation at such times would be limited to those needed to complete the particular task at hand. The duration of a typical weekend (Saturday) workday would be from approximately 9 AM to 5 PM.

DELIVERIES AND ACCESS

During construction of the proposed project, access to the construction site would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Security guards and traffic control agents may be posted as necessary. After work hours, the gates would be closed and locked. Security guards may patrol the site after work hours and over the weekends to prevent unauthorized access.

RODENT CONTROL

Construction contracts would include provisions for a rodent (i.e., mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During construction, the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be conducted with appropriate public agencies. Only EPA- and DEC-registered rodenticides would be permitted, and the contractor would be required to implement the rodent control program in a manner that is not hazardous to the general public, domestic animals, or non-target wildlife.

DESCRIPTION OF CONSTRUCTION ACTIVITIES

ENVIRONMENTAL REMEDIATION AND SELECTIVE INTERIOR DEMOLITION

Construction of the proposed project would begin with environmental remediation to address hazardous materials currently existing on the project site, as well as demolition of discrete interior building elements. The environmental remediation would be conducted under a RAP and CHASP that will be prepared and submitted to the DEP for review and approval. Demolition, excavation, and construction activities could disturb hazardous materials and increase pathways for human exposure. The RAP and CHASP would include procedures to identify and manage both known and unexpectedly encountered contamination, reduce the potential for exposure, and provide measures (e.g., air testing) to ensure that exposure to construction workers and the surrounding community would not occur. During this stage of construction, non-structural elements and interior partitions would be disassembled and any economically salvageable materials would be removed.

The environmental remediation and selective interior demolition stage is expected to last approximately six months.

EXCAVATION AND FOUNDATIONS

This stage of the project would primarily involve the installation of new footings below the Armory's drill hall level for a new column grid that would support the parking levels and rinks above. It also would include excavation along Reservoir Avenue and in the area between the Armory's north façade and West 195th Street and between the two existing buildings adjacent to the Amory's north facade, for construction of ramps into the proposed parking garage, and for the truck bridge that would extend across the moat adjacent to the Armory's north facade. This effort may also include shoring the Armory's existing perimeter foundations by underpinning and tiebacks and creation of space for a retention basin. Blasting is not anticipated to occur

during excavation. The excavation and foundations stage is anticipated to take approximately six months.

STRUCTURAL CONSTRUCTION

Because the proposed project involves primarily interior construction, it would involve limited site preparation. Most of the staging for site preparation would occur within the existing open areas on the project site outside of the Armory structure, particularly at the southwest corner near Reservoir Avenue. This stage would involve construction to create a new, below grade concrete slab and the structural framework for the main rinks on the drill hall level and for the upper rinks on the level above. Structural construction is anticipated to take approximately 10 months and would be concurrent with the infrastructure improvements and interior construction stages.

INFRASTRUCTURE IMPROVEMENTS

Infrastructure improvements at the site would include utility connections to existing water, sewer, electric, gas, and telecommunications lines. Infrastructure improvements would take place concurrently with the structural construction stage and would take approximately 7 months.

INTERIOR CONSTRUCTION

Near the end of the structural construction stage, work would begin on interior construction at the drill hall level and proceed up and throughout the building. This stage would include the construction of interior partitions, installation of lighting fixtures, ice rinks installation and fit-out, amenity construction, and interior finishes (flooring, painting, glass and glazing, door and hardware, etc.), and electrical, plumbing and fire protection fit-out work. Interior construction is anticipated to take approximately 12 months. The building's mechanical systems and the interior restoration/buildout of the headhouse would also take place during this stage.

EXTERIOR RENOVATION AND CONSTRUCTION

Exterior renovation and construction work would be undertaken concurrent with the interior construction work. This work would include the cleaning, repair, and restoration of the Armory's facades and roof, where needed. The non-original corrugated opaque fiberglass panels at the east and west ends of the Armory would be removed, and windows at these areas would be re-installed with translucent material. Two approximately 180-foot-long dormers with sloped roofs would be added to the vaulted portion of the roof at the building's north side, for the installation of mechanical equipment. Louvers would be installed within the dormers' window openings as well as certain window openings in the clerestory windows on the building's north elevation. Solar panels are proposed to be installed on the upper (flat) portion of the roof on the south side of the building.

The Armory's windows would be retained where possible, or replaced with historically-appropriate models. Existing building entrances at the headhouse and on the east façade would be restored; existing non-historic service entrances on the Armory's west façade would be altered to accommodate loading docks and an entrance to the parking facility. On the Armory's east façade, non-historic infill would be removed and new entries installed. A new pedestrian entrance and a new truck entrance would be created near the southern corner of the west façade. On the building's north façade, pedestrian entrances and exits would be created in addition to the

louvers noted above. At ground level, a new decking structure from West 195th Street would be created to provide access to a new vehicular entrance, loading dock, and a pedestrian entrance.

Exterior renovation and construction is expected to take approximately 8 months.

SITE WORK AND FINISHES

This stage of building construction would involve final finishing details on the building's facades, further construction of the interior improvements, and general landscaping improvements to the project site, including plantings, driveways, pavers, lighting, and exterior signage. Site work and finishes would partially overlap with the interior construction stage and is expected to take approximately 6 months.

E. CONSTRUCTION EQUIPMENT AND ACTIVITIES

Typical equipment used for interior demolition excavation, foundations, and infrastructure improvements would include excavators, bulldozers, backhoes, compaction equipment, tractors, jackhammers, and concrete pumping trucks. Other types of equipment that would be used include hoist complexes, dump trucks, loaders, concrete trucks, and backhoes. Trucks would deliver concrete and other building materials, and remove excavated material as well as demolition and construction debris. The construction equipment likely to be used during structural construction and interior construction would include compressors, cranes, hoists, bending jigs, and welding machines. During exterior renovation and construction, hoists may continue to be used. Trucks would remain in use for material supply and construction waste removal. Site work and finishes would involve the use of compressors, hand chopping tools, compactors, welding machines, generators, concrete trucks, and concrete pumps.

F. NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

For the environmental remediation and selective interior demolition stage the project would employ up to 50 workers per day. During this stage approximately 5 to 8 truck trips would be generated on a typical day. The excavation and foundations work would generate approximately 25 to 30 truck trips on a typical day, while the structural construction stage would generate approximately 20 to 30 truck trips per day. Infrastructure improvements would generate approximately 10 truck trips on a typical day. The number of workers on the project site during the, excavation and foundations, structural construction, and infrastructure improvements stages would increase gradually from approximately 50 to up to 400.

Interior construction and exterior renovation and construction would be performed concurrently and would employ up to 400 workers per day. On a typical day, approximately 20 to 25 truck trips would be generated during this stage. The site work and finishes stage would employ up 200 workers per day. This stage would generate up to 15 to 20 truck trips on a typical day.

Table 13-3 shows the estimated average daily numbers of workers and deliveries to the project site by calendar quarter for the duration of the construction period. The average number of workers would be approximately 223 per day. The peak number of workers would be 400 per day and is estimated to occur in the seventh quarter of construction. For truck trips, the average number of trucks throughout the entire construction period would be 33 per day, and the peak would also occur in the seventh quarter of construction, with 60 trucks per day.

Table 13-3
Average Number of Daily Construction Workers and Trucks by Quarter

Quarter	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Average	Peak
Workers	50	50	100	100	150	317	**400**	400	400	267	223	400
Trucks	8	20	30	30	25	50	**60**	37	42	27	33	60

Source: Spiritos Properties LLC

G. THE FUTURE WITHOUT THE PROPOSED PROJECT

Absent the proposed actions, the Kingsbridge Armory would be expected to remain in its current condition as a largely vacant building. As it would continue to be underutilized, the Armory could deteriorate and its condition could worsen.

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT

As with the development of any large site, construction of the proposed project may be disruptive to the surrounding area for periods of time. The following analyses describe potential construction impacts with respect to transportation, air quality, noise and vibration, land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, and hazardous materials.

TRANSPORTATION

The construction transportation analysis is based on a study of peak worker and truck trips, taking into account several factors, including: worker modal splits, vehicle occupancy and trip distribution; and truck passenger car equivalents ("PCEs") and arrival/departure patterns. The effects of the construction activities from the proposed project were compared to the operational impacts identified for the full build-out of the proposed project in 2018 to assess the potential transportation impacts during construction and the measures that can be implemented to mitigate these impacts. For the proposed project, the combined peak construction worker vehicle and truck trip generation would occur during the seventh quarter of construction; the greatest construction-related parking, transit, and pedestrian demand would occur from the seventh quarter to the ninth quarter of construction when the highest number of construction workers would be traveling to/from the site.

TRAFFIC

An evaluation of construction sequencing and worker/truck projections was undertaken to assess potential traffic impacts. As discussed below, peak construction traffic would be less than what would be realized upon the full build-out of the proposed project in 2018. Therefore, the anticipated impacts during the peak construction quarters would be within the envelope of significant adverse traffic impacts identified for the future with the proposed project condition in Chapter 8, "Transportation," and can be similarly addressed with the mitigation measures described in Chapter 14, "Mitigation."

Construction Trip Generation Projections

As mentioned above, the quarterly average worker and truck trip projections shown in **Table 13-3** were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and truck PCEs.

Daily Workforce and Truck Deliveries

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter were used as the basis for estimating peak hour construction trips. It is expected that construction activities would generate the highest amount of incremental daily traffic in the seventh quarter, with an estimated average of 400 workers and 98 truck deliveries per day (see **Table 13-3** above for details). These estimates of construction activities are discussed further below.

Construction Worker Modal Splits and Vehicle Occupancy

Based on the 2000 U.S. Census reverse journey-to-work (RJTW) data, commuting to work via auto for construction and excavation occupations in the study area is approximately 44 percent and average auto occupancy is 1.16 persons per vehicle. Since the study area is well served by mass transit—including the No. 4, B and D subway lines and the Bx1, Bx2, Bx3, Bx9, Bx22, Bx28, and Bx32 bus routes—it is expected that a substantial number of construction workers would use mass transit to commute to and from the project site.

Peak Hour Construction Worker Vehicle and Truck Trips

Similar to other construction projects in New York City, most of the construction activities at the project site are expected to take place from 7 AM to 3:30 PM. While construction truck trips would occur throughout the day (with more trips during the morning), and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. Construction worker trips would not be concentrated in the peak operational traffic analysis hours and would not represent a substantial increment during those operational peak traffic analysis hours. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon, whereas each truck delivery was assumed to result in two truck trips during the same hour (i.e., one "in" and one "out"). In addition, in accordance with the *CEQR Technical Manual*, the traffic analysis assumed that each truck has a PCE of 2.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each work shift (6 to 7 AM for arrival and 3 to 4 PM for departure on a normal day shift). Construction truck deliveries typically peak during the early morning (25 percent of daily total), overlapping with construction worker arrival traffic. Peak construction hourly trip projections for the seventh quarter of construction are summarized in **Table 13-4**.

Comparison of Operational and Construction Traffic

As shown in **Table 13-4**, construction activities would result in maximum combined auto and truck traffic of 181 and 133 PCEs during the 6 to 7 AM and 3 to 4 PM peak hours, respectively, during the peak quarter of construction. In comparison, the proposed project would generate approximately 301 PCEs during the weekday midday peak hour, approximately 775 PCEs during the weekday PM peak hour, approximately 778 PCEs during the Saturday midday peak hour, and approximately 877 PCEs during the Saturday PM peak hour, as shown in **Table 13-5**.

Table 13-4
Peak Construction Vehicle Trip Projections

Hour	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Seventh Quarter of Construction												
6 AM - 7 AM	121	0	121	15	15	30	136	15	151	151	30	181
7 AM - 8 AM	30	0	30	6	6	12	36	6	42	42	12	54
8 AM - 9 AM	0	0	0	6	6	12	6	6	12	12	12	24
9 AM -10 AM	0	0	0	6	6	12	6	6	12	12	12	24
10 AM -11 AM	0	0	0	6	6	12	6	6	12	12	12	24
11 AM - 12 PM	0	0	0	6	6	12	6	6	12	12	12	24
12 PM - 1 PM	0	0	0	6	6	12	6	6	12	12	12	24
1 PM - 2 PM	0	0	0	3	3	6	3	3	6	6	6	12
2 PM - 3 PM	0	8	8	3	3	6	3	11	14	6	14	20
3 PM - 4 PM	0	121	121	3	3	6	3	124	127	6	127	133
4 PM - 5 PM	0	22	22	0	0	0	0	22	22	0	22	22
Daily Total	**151**	**151**	**302**	**60**	**60**	**120**	**211**	**211**	**422**	**271**	**271**	**542**

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure). The above hourly distribution of daily trips resulted in rounding errors; hence, the daily totals (i.e., for truck trips) do not match with those shown in **Table 13-3**.

Table 13-5
Comparison of Peak Vehicle Trip Generation Between Construction and Proposed Project

Peak Construction Trips in PCEs (Seventh Quarter of Construction)				2018 Full Build-Out Incremental Operational Trips in PCEs			
Peak Period	**In**	**Out**	**Total**	**Peak Period**	**In**	**Out**	**Total**
Weekday Arrival Peak Hour (6 AM – 7 AM)	151	30	**181**	Weekday Midday Peak Hour (2 PM – 3 PM)	259	42	**301**
Weekday Departure Peak Hour (3 PM – 4 PM)	6	127	**133**	Weekday PM Peak Hour (6 PM - 7 PM)	612	163	**775**
				Saturday Midday Peak Hour (2 PM – 3 PM)	761	17	**778**
				Saturday PM Peak Hour (4:30 – 5:30 6 PM – 7 PM)	256	621	**877**

The projected construction AM peak hour traffic volumes would occur during hours outside of the typical commuter peak periods. The construction traffic increments summarized in **Tables 13-4** and **13-5** provide an indication that although there is a potential for significant adverse traffic impacts during construction, the peak hour traffic conditions would be more favorable than those identified for the full build-out of the proposed project in 2018, and can be similarly addressed with the mitigation measures described in Chapter 14, "Mitigation," for the weekday midday and evening peak hours. These measures would entail primarily signal timing adjustments and other operational measures, all of which could be implemented when appropriate at the discretion of DOT, to address actual conditions experienced during the construction phase of the proposed project.

LANE CLOSURES AND STAGING

Similar to other construction projects in New York City, curb-lane and sidewalk closures would be required adjacent to the project site, which would have dedicated gates, driveways, and/or ramps for delivery vehicle access. Traffic control agents may need to be deployed at times,

where needed, to facilitate traffic flow near the project site. During construction, long-term parking lane closures would be required along the west side of Jerome Avenue. Some portions of the western sidewalk of Jerome Avenue and the northern sidewalk of Kingsbridge Road would be narrowed temporarily during construction. No other long-term parking lane or sidewalk closures would be expected to occur on streets bordering the project site during construction. Short-term roadway closures and temporary sidewalk narrowings could occur along the west and south sides of the project site at times during infrastructure improvement work. Maintenance and Protection of Traffic (MPT) plans would be developed for any curb-lane and sidewalk closures. Approval of these plans and implementation of all sidewalk and curb-lane closures during construction would be coordinated with DOT's OCMC. In addition, if needed, traffic control agents could be deployed at times to facilitate traffic and pedestrian circulation near the project site.

PARKING

The anticipated construction activities would generate an estimated maximum daily parking demand of up to 152 spaces during the peak construction period. This parking is expected to be accommodated by the on-street spaces available within a ¼-mile radius of the project site. Therefore, the proposed project would not result in any significant adverse parking impacts during construction.

TRANSIT

Based on 2000 U.S. Census data for workers in the construction and excavation industry, it is anticipated that approximately 56 percent of the construction workers would to travel to and from the project site via transit. As discussed above, it is estimated that at the peak of construction activity, up to 400 workers could be at the project site during a given day. This would result in approximately 224 construction-related transit trips during the 6 to 7 AM and 3 to 4 PM construction peak hours, respectively. Distributed among the No. 4, B and D subway lines and the Bx1, Bx2, Bx3, Bx9, Bx22, Bx28, and Bx32 bus routes, only nominal increases in transit demand would be experienced along each of those routes and at each of the transit access locations. Therefore, these construction worker transit trips would not result in any significant adverse transit impacts during construction. Any temporary relocation of bus stops along bus routes that operate adjacent to the project site would be coordinated with DOT and NYCT to ensure that proper access is maintained during construction.

PEDESTRIANS

As summarized above, up to 400 average daily construction workers were projected during peak construction. With 80 percent of these workers arriving or departing during the construction peak hours (6 to 7 AM and 3 to 4 PM), the corresponding numbers of peak hour pedestrian trips traversing the area's sidewalks, corners, and crosswalks would be up to 320 under the construction condition. These trips are expected to have minimal effects on pedestrian operations during the construction peak hours. Considering that these pedestrian trips would primarily occur outside of peak hours and be distributed among numerous sidewalks and crosswalks in the area, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

AIR QUALITY

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generating construction activities, have the potential to affect air quality. However, in the case of KNIC construction activities would occur primarily inside an existing structure. Therefore, unlike typical ground-up construction, the majority of the construction activities would occur inside the Armory where the walls of the building would act as barriers to the transport of air pollutants to nearby areas.

In general, much of the heavy equipment used in construction has diesel-powered engines and produces relatively high levels of nitrogen oxides (NO_X) and particulate matter (PM). Gasoline engines produce relatively high levels of carbon monoxide (CO). Fugitive dust generated by construction activities (i.e., demolition, excavation, loading and unloading of transfer materials, on-site truck travel across paved or unpaved surfaces, etc.) is composed of particulate matter. Sulfur oxides (SO_x) emitted from diesel engines would be negligible since ultra-low-sulfur diesel (ULSD) fuel is readily available and would be used in all diesel engines. Therefore, the primary air pollutants of concern for construction activities include nitrogen dioxide (NO_2), CO, particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$).

The *CEQR Technical Manual* lists several factors for consideration in determining whether a quantified on-site and/or off-site construction impact assessment for air quality is appropriate. For on-site assessment, these factors include the duration and intensity of construction activities, the location of nearby sensitive receptors, and the use of emissions control measures. For off-site assessment, if a quantified transportation analysis is required, a corresponding air quality analysis for mobile sources is generally also conducted.

ON-SITE SOURCES

Duration

The quantity of air pollutants emitted during the construction period would vary over time since equipment types and activities associated with each distinct construction task would be different. While the overall construction duration for the proposed project is anticipated to be approximately 30 months, the most intense construction activities in terms of air pollutant emissions would be the demolition, excavation, and foundations tasks where a number of large non-road diesel engines (i.e., excavators and bulldozers) would be employed and when the potential to generate fugitive dusts is greatest. However, the demolition, excavation, and foundation tasks are expected to last for only a portion of the overall construction period, with each task taking approximately six months to complete. In addition, a majority of the demolition, excavation, and foundations activities would occur inside the Armory. Indoor work would substantially curtail fugitive (wind-blown) dust emissions. Furthermore, the walls of the Armory would act as a barrier to the transport of air pollutants. Although structural construction, infrastructure improvements, interior construction, exterior renovation and construction, and site work and finishes would continue after demolition, excavation, and foundations activities are complete, those efforts would result in much lower air emissions since they would require few pieces of heavy duty diesel equipment. The equipment required for these tasks would generally have small engines, resulting in very low concentration increments in adjacent areas. In addition, most of the structural construction and interior construction activities would occur inside the

Armory where the walls of the building would act as barriers to the transport of air pollutants to nearby areas.

Intensity

As discussed above in "Duration," the most intense construction activities in terms of air quality would be the demolition, excavation, and foundations tasks, where a number of large non-road diesel engines (i.e., excavators and bulldozers) would be employed and when the potential to generate fugitive dusts is greatest. Construction equipment would be expected to operate intermittently, move throughout the site, and spread across a large area that is approximately 600 feet long by 358 feet wide (i.e., the interior dimensions of the Armory). Therefore, emissions from multiple engine exhausts are not expected to be concentrated close to nearby sensitive receptors. Based on the size of the proposed project and the nature of the construction work involved, construction activities for the proposed project would not be considered out of the ordinary in terms of intensity, and in fact, emissions would be lower due to the emission control measures that would be implemented during construction of the proposed project (see "Emission Control Measures," below).

Location of Nearby Sensitive Receptors

Generally, the project site is located at some distance away from nearby sensitive uses, with the Barnhill Square open space approximately 75 feet southwest of the construction site and the nearest residential locations along the west side of Reservoir Avenue between West Kingsbridge Road and West 195th Street approximately 100 feet west of the construction site. These sensitive receptor locations are separated from the construction site by Reservoir Avenue. In addition, P.S. 86, P.S. 340, and Walton High School are located approximately 150 feet north of the construction site and are separated from the project site by West 195th Street. Based on the distance to these receptors, and the fact that Reservoir Avenue and West 195th Street would serve as buffers between them and the project site, air emissions generated by construction activities would be greatly dispersed before reaching the receptors, and would result in low concentration increments. In addition, a majority of the construction activities would occur inside the Armory where the walls of the building would act as barriers to the transport of air pollutants to nearby areas.

Emissions Control Measures

To ensure that construction of the proposed project would result in the lowest practicable diesel particulate matter (DPM) emissions, the following measures would be implemented as part of the construction program, to the extent practicable:

- *Clean Fuel*—ULSD would be used exclusively for all diesel engines throughout the construction site.
- *Idle Restriction*—In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time would also 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.
- *Utilization of Newer Equipment*—EPA's Tier 1 through 4 standards for nonroad engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC). All nonroad construction equipment would meet at least the Tier 2 emissions standard, to the extent practicable. *Best Available Tailpipe Reduction*

Technologies. 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 with the project) including but not limited to concrete mixing and pumping trucks, would utilize the best available tailpipe (BAT) technology for reducing DPM emissions, to the extent practicable. Diesel particle filters (DPFs) are the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either installed on the engine by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPF must be verified by EPA or the California Air Resources Board. Active DPFs or other technologies proven to achieve an equivalent emissions reduction may also be used.

- *Dust Control*—Fugitive dust control plans would be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the construction site. All trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the site. Water sprays would be used to ensure that materials are dampened as necessary to avoid release of dust into the air. In addition, all necessary measures would be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed.

Overall, the proposed emission reduction program is expected to reduce DPM emissions consistent with the goals of the currently best available control technologies under New York City Local Law 77, which are required only for publicly funded City projects. Accordingly, a detailed qualitative rather than quantitative air quality analysis was provided to assess the potential impacts of on-site construction activities.

OFF-SITE SOURCES

As mentioned above, a quantified construction air quality analysis for off-site mobile sources is generally conducted if a corresponding transportation analysis is required, which demonstrated above under "Transportation," is not necessary for the proposed project. The construction would not result in increases in vehicle volumes higher than those identified in the operational condition. In addition, the construction would not result in substantial moving lane or roadway closures, or traffic diversions. As discussed in Chapter 9, "Air Quality," no significant adverse impacts are predicted due to operational mobile sources. Therefore, construction of the proposed project would not result in significant adverse air quality impacts related to vehicular traffic, and further mobile-source analysis is not required.

Conclusion

Based on the information presented above and considering that the majority of the construction activities would occur inside the Armory where the walls of the building would act as barriers to the transport of air pollutants to nearby areas, the proposed project would not result in any significant adverse construction air quality impacts, and no further analysis is required.

NOISE AND VIBRATION

NOISE

Introduction

Increases in community noise levels during construction of the proposed project could result from noise from on-site equipment operation and worker vehicles and trucks traveling to and from the construction site. Noise and vibration levels at a given receptor are dependent on the type and quantity of construction equipment being operated, the equipment utilization factor (i.e., the percentage of time a piece of equipment is operating at full power), the receptor's distance from the construction site, and any shielding effects (i.e., from structures such as buildings, walls, or barriers). Noise levels caused by construction activities vary widely and depend on the stage of construction and the location of the construction activities relative to receptor locations. The most significant construction noise sources for the proposed project are expected to be the operation of impact equipment such as excavators with ram hoes and drills, as well as movements of trucks to and from the project site. However, most of the construction activities (i.e., construction equipment operation and the loading/unloading of trucks) would occur inside the Armory with the walls of the building providing acoustical shielding for nearby noise sensitive receptors.

Noise from construction activities is regulated by the New York City Noise Control Code and by EPA. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan, limits construction (absent special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM, and sets noise limits for certain pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM) and on weekends may be authorized in the following circumstances: (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) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. EPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

Construction Noise Impact Criteria

The *CEQR Technical Manual* states that significant adverse noise impacts due to construction can occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." This has been interpreted to mean that such impacts can occur only at sensitive receptors where the activity with the potential to create high noise levels (the "intensity") would occur continuously for approximately two years or longer (the "duration"). 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 impacts. Accordingly, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ increase or greater resulting from construction activities would be considered a significant adverse impact.
- If the No Action noise level is greater than 60 dBA $L_{eq(1)}$ and less than 62 dBA $L_{eq(1)}$, an overall $L_{eq(1)}$ of 65 dBA or greater would be considered a significant adverse impact.
- If the No Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR criteria as between 10 PM and 7 AM), a 3 dBA $L_{eq(1)}$ increase or greater would be considered a significant adverse impact.

Noise Analysis Fundamentals

Noise generated by construction equipment is a function of the following parameters:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;
- The distance between the equipment and the noise receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels due to construction-related traffic are a function of the following:

- The noise emission level of the vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Volume of vehicular traffic on each roadway segment;
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

Location of Nearby Sensitive Receptors

The project site occupies most of the block bounded by West 195th Street, Reservoir Avenue, Kingsbridge Road, and Jerome Avenue in the Kingsbridge Heights neighborhood of the Bronx. As discussed above in "Air Quality," the nearest sensitive receptor sites are the Barnhill Square open space across Reservoir Avenue approximately 75 feet southwest of the construction site, and , and the residential locations along the west side of Reservoir Avenue between West Kingsbridge Road and West 195th Street approximately 100 feet west of the construction site. In addition, P.S. 86, P.S. 340, and Walton High School are located approximately 150 feet north of the construction site and are separated from the project site by West 195th Street. These locations, being the nearest sensitive receptors to the project site, would have the most potential to experience noise level increases from the operation of on-site construction equipment.

Other than on-site equipment, the other potential source of noise associated with construction of the proposed project would be construction-related trucks and worker vehicles traveling to and from the project site. The main roadways that would be used by construction-related trucks and worker vehicles to travel to and from the project site would include Fordham Road/West 207th Street, Grand Concourse, Major Deegan Expressway, Kingsbridge Road, Jerome Avenue, and Reservoir Avenue. Given the high existing traffic volumes on these roadways, construction-related traffic would not have the potential to result in substantially increased traffic and thus substantially increased noise at locations along these roadways. On local streets further away from the project, the vehicles would be distributed amongst the different routes to and from the project, and the concentration of construction traffic would be low compared to the existing and No Build traffic levels on these streets. Consequently, the analysis focuses on noise receptors adjacent to the Project Site and the roadways immediately surrounding the project site, as described above.

Noise Reduction Measures

Construction under the proposed project would be required to follow the requirements of the New York City Noise Control Code for construction noise control measures. Specific noise

control measures would be described in a noise mitigation plan, as required under the New York City Noise Control Code and would include a variety of source and path controls.

In terms of source controls, the following measures would be implemented:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code and shown in **Table 13-6** would be used.
- As early in the construction period as logistics will allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welding machines (i.e., early electrification) to the extent feasible and practicable.
- Where feasible and practical, the construction site would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

Table 13-6
Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	NYCDEP & FTA Typical Noise Level at 50 feet[1]
Backhoe/Loader	80
Bulldozers	85
Compressors	58
Concrete Pumps	82
Concrete Trowel	85
Concrete Vibrator	80
Cranes	85
Concrete Trucks	85
Delivery Trucks	84
Drill Rigs	84
Dump Trucks	84
Excavator	85
Excavator with Ram Hoe	90
Generators	82
Hand Tool	59
Hoist	85
Impact Wrenches	85
Jackhammers	73
Pumps	77
Rebar Bender	80
Rollers	85
Welding Machines	73

Notes:
[1] Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction would be implemented to the extent feasible and practical:

- Where logistics allow, noisy equipment would be located away from and shielded from sensitive receptor locations.

- In addition to the walls of the Armory, noise barriers would be installed to provide shielding (e.g., the construction site would have a minimum 8-foot barrier) and, where logistics allow, truck deliveries would take place behind these barriers or inside the Armory; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be used for certain dominant noise equipment that would be located outside the Armory to the extent feasible and practical (i.e., hoists). These barriers are conservatively assumed to offer only a 10 dBA reduction in noise levels for each piece of equipment to which they are applied. The details for construction of portable noise barriers, enclosures, tents, etc. are based upon DEP Citywide Construction Noise Mitigation.

Construction Noise Analysis

The most noise-intensive construction activities (demolition, excavation, and foundations activities) for the proposed project would last for only approximately one year. In addition, the majority of construction activity (i.e., construction equipment operation and the loading/unloading of trucks) would occur inside the existing Armory, with the walls of the building providing acoustical shielding for nearby noise sensitive receptors. The analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact.

Intensity of Construction Noise

The Barnhill Square open space across Reservoir Avenue southwest of the construction site, the residential locations along the west side of Reservoir Avenue between West Kingsbridge Road and West 195th Street, and P.S. 86, P.S. 340, and Walton High School along West 195th Street north of the construction site represent the nearest sensitive receptors that are most likely to experience increased noise levels from the operation of on-site construction equipment. At the Barnhill Square open space and at the residential locations along the west side of Reservoir Avenue located approximately 75 feet southwest and 100 feet west of the construction site respectively, the walls of the Armory would provide acoustical shielding from on-site sources. Consequently, noise levels at these locations due to construction would be approximately in the mid 60s dBA or lower. Measured existing noise levels along Reservoir Avenue between West 195th Street and Kingsbridge Road were also in the mid 60s dBA. Consequently, noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria at these residential locations.

Similarly, at the school locations along West 195th Street located approximately 150 feet north of the construction site, since the walls of the Armory would provide acoustical shielding for on-site sources, noise levels at these locations due to construction would be approximately in the low 60s dBA or lower. Measured existing noise levels along Reservoir Avenue between West 195th Street and Kingsbridge Road were also in the mid 60s dBA. Consequently, noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria at these residential locations.

Duration of Construction Noise

The noisiest construction activities would include the demolition, excavation, and foundations work; this work is expected to last approximately one year (as shown in **Table 13-1**). As described above, the majority of the construction activities, including those for demolition, excavation, and foundations, would occur inside the Armory where the walls would provide acoustical shielding. The later phases of construction of the proposed project would include structural construction, infrastructure improvements, interior construction, exterior renovation and construction, and site

work and finishes. Construction equipment with higher noise levels such as drill rigs, excavators, etc. would not be used during these latter phases of construction. In addition, most of the structural construction and interior construction activities would also occur inside the Armory where the walls of the building would provide acoustical shielding to nearby noise receptors. Consequently, no exceedances of the *CEQR Technical Manual* significant noise impact criteria would be expected to occur.

Construction Noise Impacts

Noise due to construction of the proposed project is not expected to result in any significant adverse impacts at open space, residential, and school receptors southwest, west, and north of the project site or at any other nearby sensitive receptor locations.

VIBRATION

Introduction

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibratory levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the receiver building construction. Construction equipment operation causes ground vibrations which spread through the ground and decrease in strength with distance. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of the case of fragile and possibly historically significant structures or buildings and the Amory itself, generally construction activities do not reach the levels that can cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. An assessment has been prepared to quantify potential vibration impacts of construction activities on structures on the Armory and structures and residences near the project site.

Construction Vibration Criteria

For purposes of assessing potential structural or architectural damage, the determination of a significant impact is based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non-fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

Construction Vibration Analysis Results

The structure of most concern with regard to the potential for structural or architectural damage due to vibration is the Armory itself. As described in Chapter 3, “Historic and Cultural Resources,” a CPP would be prepared to avoid inadvertent construction-related impacts on the Armory and would contain measures to avoid construction-related impacts, including ground-borne vibration and accidental damage from heavy machinery, as appropriate. The CPP would be developed in consultation with LPC and implemented by a professional engineer prior to demolition or construction activities. The CPP would include a monitoring component to ensure that if vibration levels approach the 0.5 inches per second peak particle velocity (PPV) criterion,

corrective action would be taken to reduce vibration levels, thereby avoiding architectural damage and significant vibration impacts.

Since the project site is in proximity of the No. 4 train subway platform and viaduct, a reconnaissance survey of the subway structures and vibration monitoring within an "area of influence," as per NYCT's regulations, would be undertaken during construction. All such work would be coordinated with NYCT to ensure its approval of permits for the proposed construction.

Construction resulting in vibration levels greater than 65 vibration decibels (VdB) (e.g., equipment used during demolition) would be perceptible and annoying and would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time. However, as described above, the operations which would result in these perceptible vibration levels would only occur for finite periods of time at any particular location and therefore the resulting vibration levels, while perceptible and annoying, would not result in any significant adverse impacts.

OTHER TECHNICAL AREAS

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would affect land use on the project site but would not alter surrounding land uses. As is typical with large construction projects, during periods of peak construction activity there would be some disruption, predominantly noise, to the nearby area; however, since the proposed project would primarily involve the renovation of an existing building for new uses, it would not be as disruptive as new construction of a facility of comparable size. There would be construction trucks and construction workers coming to the construction site. There also would be noise, sometimes intrusive, from building construction as well as trucks and other vehicles backing, loading, and unloading. These disruptions would be temporary in nature, particularly as most construction activities would take place inside the Armory. Overall, while the construction activities would be evident to the local community, the limited duration of construction, in particular the limited intrusive periods of construction, would not result in significant or long-term adverse impacts on the local land use patterns or character of the nearby area.

SOCIOECONOMIC IMPACTS

Construction activities associated with the proposed project would not result in any significant adverse impacts on socioeconomic conditions. Construction of the proposed project would not block or restrict access to any facilities in the area or affect the operations of any nearby businesses. Lane closures are not expected to occur in front of entrances to any existing or planned retail businesses, and construction activities would not obstruct major thoroughfares used by customers or businesses. Utility service would be maintained to all businesses. Overall, construction of the proposed project would not result in any significant adverse impacts on surrounding businesses.

Construction of the proposed project would have direct benefits resulting from expenditures on labor, materials, and services, and indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the construction activities. An example of these indirect benefits would be the construction workers' purchases of food and other items from local convenience good retailers over the course of the construction period.

Construction of the proposed project would also contribute to increased tax revenues for the city and state, including those from personal income taxes.

COMMUNITY FACILITIES

While construction of the proposed project would result in temporary increases in traffic during the construction period, access to and from any facilities in the area, including P.S. 86, P.S. 340, and Walton High School, located immediately north of the project site across West 195th Street, would not be affected during the construction period. In addition, the construction site would be surrounded by construction fencing and barriers that would limit the effects of construction on nearby facilities. As discussed above in "Noise," at very limited times outdoor construction activities such as ramps construction may be perceptible and intrusive to the schools and their associated outdoor spaces and athletic fields located north of the site. However, these noise levels would not be considered "long-term" or significant according to CEQR criteria. In addition, the majority of activities (including an estimated 90 percent of loading/unloading for excavation) would occur inside the Armory where the walls would provide shielding for construction noise. Construction workers would not place any burden on public schools and would have minimal, if any, demands on libraries, child care facilities, and health care. Construction of the proposed project would not block or restrict access to any facilities in the area, and would not materially affect emergency response times significantly. The New York City Police Department (NYPD) and FDNY emergency services and response times would not be materially affected due to the geographic distribution of the police and fire facilities and their respective coverage areas.

OPEN SPACE

There are no publicly accessible open spaces within the project site, and no open space resources would be used for staging or other construction activities. The nearest open space is the Barnhill Square, which is located across Reservoir Avenue, approximately 75 feet southwest of the project site. At limited times, outdoor construction activities such as ramps construction may generate noise that could impair the enjoyment of any nearby open space users, but such noise effects would be temporary. Further, given the intervening traffic on Reservoir Avenue and the construction fences around the project site, the noise increases may not be perceptible to open space users at Barnhill Square. Construction of the proposed project would not limit access to open space resources in the vicinity of the project site. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

HISTORIC AND CULTURAL RESOURCES

Historic and cultural resources include both archaeological and architectural resources. Chapter 3, "Historic and Cultural Resources" provides a detailed assessment of potential impacts on archaeological and architectural resources. This section summarizes potential impacts during construction.

The study area for archaeological resources is the area that would be disturbed for project construction, the project site itself. As part of a separate environmental assessment of the Armory site, in a letter dated August 21, 2008, LPC determined that the project site has no archaeological significance. Therefore, no significant adverse impacts to archaeological resources would occur during the construction of the proposed project.

The proposed project would result in the renovation and reuse of the Kingsbridge Armory, thereby returning this substantially vacant facility to productive use. The reuse of the building

would involve exterior and interior alterations to the Armory and site. Because the Armory is a NYCL, the proposed alterations to the Armory are subject to LPC's review and approval and require a Certificate of Appropriateness (CofA) from LPC. LPC's determination of the appropriateness of the proposed modifications to the landmark site and the issuance of a CofA would ensure that the proposed project would not adversely impact the historic character of the Kingsbridge Armory. Because the proposed project is also seeking federal historic tax credits, the project has been designed in consultation with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). Further, as a condition for receiving these tax credits, the project would also comply with the Secretary of the Interior's Standards, as interpreted by OPRHP and the National Park Service (NPS), thereby ensuring that construction of the proposed project would not adversely affect the Kingsbridge Armory.

Further, to avoid the potential for adverse physical impacts on the Armory, such as ground-borne construction-period vibrations, falling debris, and damage from heavy machinery, a CPP would be developed in consultation with LPC and implemented prior to construction of the proposed project to avoid inadvertent construction-related damage. The CPP would comply with the procedures set forth in DOB's *Technical Policy and Procedure Notice (TPPN) #10/88*, concerning procedures for the avoidance of damage to adjacent historic structures within 90 feet of any nearby construction activity. The CPP would also follow the guidelines set forth in section 523 of the *CEQR Technical Manual*, including conforming to LPC's *New York City Landmarks Preservation Commission Guidelines for Construction Adjacent to a Historic Landmark* and *Protection Programs for Landmark Buildings*. With these measures in place, construction would not result in significant adverse impacts on the Kingsbridge Armory.

There are seven known architectural resources in the study area, but none of the resources is located within 90 feet of the project site. Therefore, the proposed project would not result in significant adverse impacts on any architectural resources in the study area.

HAZARDOUS MATERIALS

As described in Chapter 4, "Hazardous Materials," there is a potential for adverse impacts associated with excavation for new construction (e.g., for footings below the existing basement, for the new garage entrance ramp west of the building and for modifications to the entrance on the north side of the building) resulting from the known and potential presence of subsurface contamination, and with demolition/renovation, related to materials within the structures. Although these activities could increase pathways for human exposure, significant adverse impacts would be avoided by performing construction activities in accordance with the measures identified below.

A RAP and CHASP will be prepared and submitted to DEP for review and approval. The RAP includes procedures to identify and manage both known contamination (e.g., petroleum storage tanks and lead-contaminated soil in the firing ranges) and unexpectedly encountered contamination. All activities involving disturbance of existing soil would be conducted in accordance with the CHASP, which details measures to reduce the potential for exposure (e.g., dust control) as well as measures (such as air testing) to ensure that exposure to construction workers and the surrounding community would not occur.

During or prior to renovation, the following measures would be undertaken:

- All USTs and ASTs would be properly registered, if required, with DEC and the FDNY, and closed and removed in accordance with applicable regulatory requirements.

- All material that needs to be disposed of (e.g., both contaminated soil and excess fill, including demolition/renovation debris) would be properly handled and disposed of off-site in accordance with applicable regulatory requirements. Should contaminated soil and/or petroleum tanks be encountered, applicable regulatory requirements (e.g., those relating to spill reporting) would be followed to address removal of the tanks and any associated soil or groundwater contamination.
- Any remaining chemicals, including petroleum products, would be properly disposed of in accordance with applicable regulatory requirements.
- Unless there is labeling or test data which indicates that fluorescent lights are not mercury- and/or PCB-containing, disposal would be performed in accordance with applicable regulatory requirements.
- Unless the areas to be disturbed are known not to contain asbestos, they would be surveyed for asbestos, and all asbestos-containing materials (ACMs) would be removed and disposed of in accordance with applicable regulatory requirements.
- Lead-based paint would be managed in accordance with applicable regulatory requirements.
- All demolition/renovation debris would be properly handled and disposed of in accordance with all applicable federal, state and local regulations.
- Should dewatering be required during subsurface work, water would be discharged in accordance with DEP Sewer Use Regulations, if necessary, following pretreatment prior to discharge.

With the implementation of these measures, no significant adverse impacts related to hazardous materials would result from construction activities. ✷