Chapter 15: Construction

A. INTRODUCTION

As described in Chapter 1, "Project Description," the American Museum of Natural History (AMNH or the Museum) is proposing the construction of a new building, the Richard Gilder Center for Science, Education, and Innovation (the Gilder Center). The Museum is located in Theodore Roosevelt Park, which is City-owned parkland under the jurisdiction of the New York City Department of Parks and Recreation (NYC Parks). The proposed project would also include the demolition of existing buildings within the new building footprint, renovations to existing Museum space, and improvements to an adjacent public open space in Theodore Roosevelt Park. Construction of the proposed project would take place over approximately 36 months and is anticipated to be complete and operational by 2021.

The construction chapter summarizes the construction program for the proposed project and assesses the potential for significant adverse impacts during construction. The city, state, and federal regulations and policies that govern construction are described, followed by the anticipated construction schedule and the types of activities likely to occur during the construction. The types of equipment to be used during construction are discussed, along with the anticipated number of workers and truck deliveries. Based on this information, an assessment is provided of potential impacts from construction activities.

PRINCIPAL CONCLUSIONS

Construction of the proposed project—as is the case with most large construction projects—would result in temporary disruptions in the surrounding area. However, AMNH has committed to implementing a variety of measures during construction to minimize impacts to the nearby community, including:

COMMUNICATION WITH COMMUNITY

- Members of the communities would be informed of upcoming construction activities through notifications and/or newsletters. A construction working group would be established during construction of the proposed project to serve as the contact for the community and local leaders, and would be available to address concerns or problems that may arise during the construction period. There would also be an email address and 24-hour project telephone hotline established for members of the community to report concerns. In addition, New York City maintains a 24-hour telephone hotline (311) so that concerns can be registered with the city.

COMMUNITY SAFETY

- A number of measures would be employed to ensure public safety during the construction of the proposed project including the erection of a sidewalk bridge, the employment of flaggers and the installation of safety nettings;
- Maintenance and Protection of Traffic (MPT) plans would be developed to ensure the safety of pedestrian, bicyclist, and vehicle circulation near the project site during construction of the proposed project. Approval and implementation of these plans would be coordinated with the New York City Department of Transportation (DOT)'s Office of Construction Mitigation and Coordination (OCMC); and
- The existing pedestrian entrance to Theodore Roosevelt Park on West 79th Street to the west of the project site would be temporarily relocated further north to a location just north of West 80th Street so Park users would continue to have access from Columbus Avenue to pathways in other areas within the Park for circulation and passive recreation during construction.

ENVIRONMENTAL PERFORMANCE

- An emissions reduction program would be implemented during construction to minimize the effects on air quality and would include measures such as the use of dust control, ultra-low sulfur diesel (ULSD) fuel, best available tailpipe technologies, and newer and cleaner equipment;
- A New York City Department of Environmental Protection (NYCDEP)-approved Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP) would be implemented during and following project construction. and are designed to control or avoid the potential for human or environmental exposure to known or unexpectedly encountered hazardous materials during and following construction of the proposed project. The RAP and CHASP would address requirements for items such as pre-construction ACM surveys, soil stockpiling, soil disposal and transportation; dust control; contingency measures if additional petroleum storage tanks or other contamination should be unexpectedly encountered; and a minimum two foot clean fill buffer in any landscaped or uncapped areas, designed to control or avoid the potential for human or environmental exposure to known or unexpectedly encountered hazardous materials during and following construction of the proposed project;
- Construction of the proposed project would not only include noise control measures as required by the *New York City Noise Control Code*, but would include additional measures such as the use of quieter equipment (i.e., cranes, quieter generators, person lifts, landscaping excavators, and landscaping loaders), materials delivery and truck queuing within the enclosed "construction area" (the project site and the associated construction staging area) rather than on the street, additional shielding of equipment, and the installation of a partially enclosed structures to house the concrete pump and two concrete mixer trucks as they access the pump and to house concrete mixer trucks as they are washed out before leaving the site;
- A Construction Protection Plan (CPP) would be developed in coordination with the Landmarks Preservation Commission (LPC) and the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) to protect nearby historic Museum buildings; and

- All work would be performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol approved by the NYC Parks Manhattan Borough Forester, to minimize potential adverse impacts to existing trees that will remain in place during construction.

With the measures described above in place, the construction effects of the proposed project on the surrounding area would be substantially reduced. As described in detail below, construction activities associated with the proposed project would result in temporary significant adverse traffic ~~and noise~~ impacts. Additional information for key technical areas is summarized below.

TRANSPORTATION

Based on the construction trip projections, construction of the proposed project (the "With Action" condition) would result in significant adverse traffic impacts, during peak construction, at one study area intersection in the weekday PM construction peak hour—Columbus Avenue and West 81st Street. The significant adverse impact at the Columbus Avenue and West 81st Street intersection could be fully mitigated by applying temporary shifts in signal timing.

No significant adverse impacts to transit, pedestrian, or parking conditions due to construction are anticipated.

AIR QUALITY

Construction activities associated with the proposed project would not result in any significant adverse stationary or mobile source air quality impacts. To minimize the effects of the proposed project's construction activities on the surrounding community, the proposed project would implement an emissions reduction program that would include, to the extent practicable: diesel equipment reduction, the use of ULSD fuel; best available tailpipe reduction technologies; and the utilization of newer equipment. The proposed project would also adhere to *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and to *New York City Administrative Code* limitations on construction-vehicle idling time.

NOISE

Between the Draft EIS and Final EIS, AMNH modified the construction logistics plan and examined additional noise control measures to reduce the magnitude and duration of noise that would occur at nearby receptors as a result of construction of the proposed project. Changes include selection of quieter equipment, reductions in truck activity, and modification of the construction schedule. The construction schedule and task list were also updated based on additional information from the geotechnical report for the project site, indicating that rock excavation would occur over a shorter period (3 months rather than the 5 months accounted for in the DEIS), and that pile installation for support of excavation (SOE) would be necessary over a duration of approximately 3 months during substructure work. These changes are reflected in the FEIS construction noise analysis, which includes detailed noise modeling for multiple stages during the construction period.

The construction noise analysis accounts for the following noise control commitments. Construction of the proposed project would not only include noise control measures as required by the *New York City Noise Control Code*, but would include additional measures such as the use of quieter equipment (i.e., cranes, ~~quieter~~ generators, person lifts, landscaping excavators, and landscaping loaders), materials delivery and truck queuing within the enclosed construction area rather than on the street, additional shielding of equipment, and the installation of partially enclosed structures to house the concrete pump and two concrete mixer trucks as they access the pump and to house concrete mixer trucks as they are washed out before leaving the site. Notwithstanding these noise control measures, the detailed construction noise analysis identified two residential buildings (101 and 112 (118) West 79th Street) where construction of the proposed project would result in increases in noise levels that would exceed CEQR noise impact criteria and result in interior noise levels that exceed CEQR noise exposure guidance at times throughout the 36-month construction period. While the expected levels of noise are typical of New York City construction projects and would comply with all New York City Noise Control Code and New York City Department of Buildings (DOB) restrictions on construction noise, the level and duration of construction noise at these buildings would constitute a temporary significant adverse noise impact under SEQRA and CEQR. The highest levels of construction noise at these receptors would result from rock excavation using mounted impact hammers. The greatest noise level increments up to 12 dBA would occur intermittently over a period of approximately 5 months and noise level increments up to 9-11 dBA are predicted for the other 31 months of construction. However, the predicted impacts at 101 and 112 (118) West 79th Street could be fully mitigated using either receptor control measures or source control measures, as described in Chapter 17, "Mitigation." Mitigation options include receptor controls (i.e., provision of storm windows and air conditioning units at residences that do not already have air conditioning) or source controls (i.e., quieter equipment, changes to the logistics plan, alternative noise barriers or other shielding methods). Between the Draft Environmental Impact Statement (EIS) and Final EIS, further noise reduction measures to reduce or eliminate the potential for these temporary significant construction noise impacts will be considered and evaluated.

Notwithstanding these noise control measures, at times over the course of construction of the proposed project, and particularly during the most noise-intensive construction activities, noise would be readily noticeable and potentially intrusive.

At open space receptors within Theodore Roosevelt Park and nearby residential receptors, the greatest noise levels during construction were predicted to occur intermittently over the course of up to approximately 141413 months. At the nearest residential receptors to the construction work area, the greatest noise levels during construction were predicted to occur intermittently over the course of up to approximately 553 months. While the noise from construction would be noticeable at times, the duration of the highest levels of construction noise at any given area would be limited and would typically occur during weekday daytime hours, rather than during the evening and weekend peak usage periods for the Park or night-time hours when residences are most sensitive to noise. At other receptors near the project area, including school receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would not exceed typical noise levels in the general area. Furthermore, the expected levels of noise are typical of New York City construction projects and would comply with all New York City Noise Control Code and New York City Department of Buildings (DOB) restrictions on construction noise. Based on these factorsBased on the limited duration of the predicted construction noise, the moderate total noise levels during most of the construction period, and the other factors discussed above, construction noise associated with the proposed project at these receptors would not be expected to result in significant adverse impacts.

The conclusions of the construction noise analysis as described above are based on truck access and construction staging being shielded from surrounding receptors by site-perimeter barriers. In the absence of an approval for the proposed site-perimeter barrier configuration, if alternative

~~noise control measures are not identified, noise levels at surrounding receptors could be approximately 4 dBA higher during truck staging operations, which would result in unavoidable significant adverse impacts.~~

~~At other receptors near the project area, including residential, school, and hospital receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would generally not exceed typical noise levels in the general area and so would not rise to the level of a significant adverse noise impact.~~Accounting for the proposed construction and logistics plan, construction noise from the project does not represent a significant impact. Nonetheless, because receptor control measures were previously considered for 101 West 79th Street and 112 (118) West 79th Street based on the findings of the DEIS (i.e., storm windows and air conditioning units at residences that do not already have air conditioning), AMNH has committed to make an offer of these measures to residents of those two buildings.

VIBRATION

Vibration resulting from construction of the proposed project is not expected to result in exceedances of the acceptable limit specified by the New York City Department of Building (DOB) *Technical Policy and Procedure Notice (TPPN) #10/88*, including at the adjacent existing Museum buildings. Vibration monitoring would be required by the project's CPP for existing historic Museum buildings adjacent to demolition and excavation work to ensure vibration does not exceed the acceptable limit for historic structures. In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are impact pile drivers, hydraulic break rams, and drill rigs. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately ~~135~~550 feet. However, the operation of this equipment would only occur for limited periods of time at a particular location. While the vibration may be noticeable at times, it would be temporary and would consequently not rise to the level of a significant adverse impact.

OPEN SPACE

Portions of Theodore Roosevelt Park would be closed for the duration of the approximately three-year-long construction period to accommodate the construction of the proposed project. While a temporary displacement, this loss of open space would not result in a significant adverse impact. Nearby sections of the Theodore Roosevelt Park and other open space resources in the area such as Central Park would accommodate the largely passive recreation activities displaced from the affected area. The existing pedestrian entrance to Theodore Roosevelt Park on West 79th Street to the west of the project site would be temporarily relocated further north to a location just north of West 80th Street so Park users would continue to have access from Columbus Avenue to sidewalks or pathways in other areas of the park for circulation and for passive recreation during the entire construction period. Additional portions of Theodore Roosevelt Park would be closed for a shorter period while improvements are being made but when complete, the overall quality in the rebuilt portion of the Park would be enhanced, including landscaping and circulation improvements. Construction may generate noise that could impair the enjoyment of Theodore Roosevelt Park users, but such noise effects would be temporary. As described above under "Noise," construction of the proposed project would be required to follow the requirements of the *NYC Noise Control Code* and would use additional measures to minimize the effects of the proposed project's construction activities on the surrounding community, including Theodore Roosevelt Park.

B. CONSTRUCTION PHASING AND SCHEDULE

The anticipated construction schedule for the proposed project is presented in **Table 15-1** and **Figure 15-1**, and reflects the sequencing of construction events as currently planned. Construction of the proposed Gilder Center is anticipated to be complete and occupied by 2021 (a 36-month construction duration, including park restoration and enhancement). Construction would consist of the following primary construction stages, which may overlap at certain times: demolition; excavation and foundation; superstructure; shotcrete; exteriors; interiors and finishing; and site work. These construction stages are described in greater detail below under "General Construction Tasks."

Table 15-1
Anticipated Construction Schedule

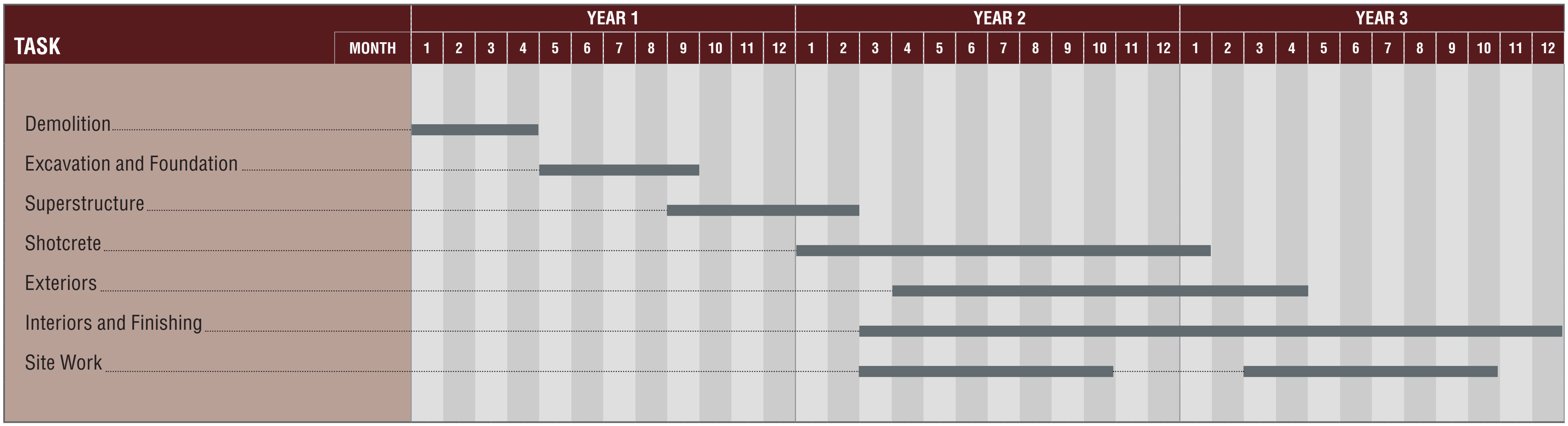
Construction Task	Approximate Start Month	Approximate Finish Month	Approximate Duration (months)
Demolition	Month 1	Month 4	4
Excavation and Foundation[1]	Month 5	Month 9	5
Superstructure	Month 9	Month 14	6
Shotcrete	Month 13	Month ~~27~~25	~~15~~13
Exteriors	Month ~~14~~16	Month ~~21~~28	~~8~~13
Interiors and Finishing	Month 15	Month 36	22
Site Work (incl. park enhancements)	Month ~~28~~15	Month ~~36~~22	~~10~~16
	Month 27	Month 34	

Source: Turner Construction, August 2016 (with revisions in July 2017)

Note: [1]Rock excavation and pile installation for support of excavation (SOE) are anticipated to occur over a duration of approximately 3 months.

C. GOVERNMENTAL COORDINATION AND OVERSIGHT

Construction oversight involves several city, state, and federal agencies. **Table 15-2** lists the primary involved agencies and their areas of responsibility. For projects in New York City, primary construction oversight lies with New York City Department of Buildings (DOB), which oversees compliance with the New York City Building Code. The areas of oversight include installation and operation of equipment such as cranes, sidewalk bridges, safety netting, and scaffolding. In addition, DOB enforces safety regulations to protect workers and the general public during construction. Construction activities within public open space (i.e., Theodore Roosevelt Park) fall under the jurisdiction of NYC Parks. The New York City Department of Environmental Protection (DEP) enforces the *New York City Noise Code*, reviews and approves any needed RAP and associated CHASP, water and sewer connections, as well as any necessary abatement of hazardous materials. 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 OCMC reviews and approves any traffic lane and sidewalk closures. The Landmarks Preservation Commission (LPC), along with the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), approves the historic and cultural resources analysis, the Construction Protection Plan (CPP), and monitoring measures established to prevent damage to historic structures.



Anticipated Construction Schedule
Figure 15-1

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

Table 15-2
Summary of Primary Agency Construction Oversight

Agency	Areas of Responsibility
New York City	
Department of Buildings	Building Code, site safety, and public protection
Department of Parks & Recreation	Activities within public open space
Department of Environmental Protection	Noise Code, RAPs/CHASPs, water and sewer connections, hazardous materials
Fire Department	Compliance with Fire Code, fuel tank installation
Department of Transportation	Lane and sidewalk closures
Landmarks Preservation Commission	Archaeological and architectural protection
New York State	
Department of Labor	Asbestos Workers
Department of Environmental Conservation	Hazardous materials and fuel/chemical storage tanks
Office of Parks, Recreation and Historic Preservation	Archaeological and architectural protection
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials, poisons (for rodent control)
Occupational Safety and Health Administration	Worker safety

D. CONSTRUCTION DESCRIPTION

GENERAL CONSTRUCTION PRACTICES

HOURS OF WORK

Construction of the proposed project would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7:00 AM and 6:00 PM on weekdays. Construction work would occur on weekdays and typically begin at 7:00 AM, with most workers arriving between 6:00 AM and 7:00 AM. Normally work would end at 3:30 PM, but it can be expected that, in order to complete certain critical tasks (i.e., finishing a concrete pour for a floor deck), the workday may occasionally be extended beyond normal work hours. Any extended workdays would generally last until approximately 6:00 PM and would not include all construction workers on-site, but only those involved in the specific task requiring additional work time.

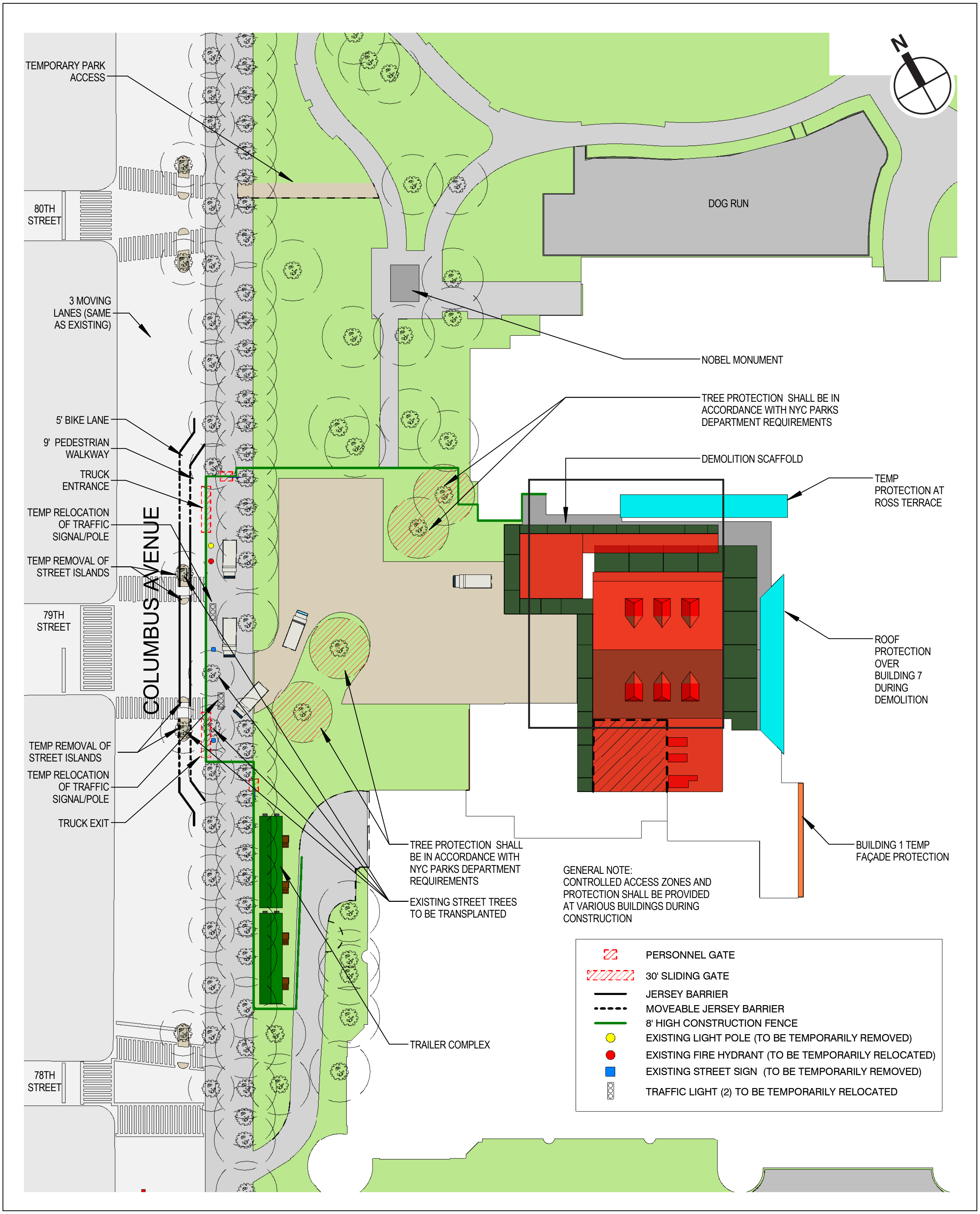
Night or weekend work may also be occasionally required for certain construction activities such as the erection of the tower crane. Appropriate work permits from DOB would be obtained for any necessary work outside of normal construction and no work outside of normal construction hours could be performed until such permits are obtained. The numbers of workers and pieces of equipment in operation for weekend work 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 weekend workday, if necessary, would typically occur from 9:00 AM to 5:00 PM.

ACCESS, DELIVERIES, AND STAGING AREAS

The preliminary construction logistics plans for the demolition, excavation/foundation, above-grade construction, and site work stages are shown in **Figures 15-2 through 15-5**. Access to the project site during construction would be fully controlled. The work areas would be fenced off, and limited access points for workers and construction-related trucks would be provided. Worker's personal vehicles would not be allowed into the "construction area" (the project site and the associated construction staging area). After work hours, the gates would be closed and locked. Based on the preliminary construction logistics plan, construction staging would primarily take place in an approximately ~~40,000-square-foot~~1.15-acre area within Theodore Roosevelt Park to the west of the project site and the adjacent sidewalk. The existing pedestrian entrance to Theodore Roosevelt Park on West 79th Street to the west of the project site would be temporarily relocated further north to a location just north of West 80th Street to provide access for the public to enter the Park. Park users would continue to have access from Columbus Avenue to pathways in other areas within the park for circulation and passive recreation. During an approximately nine-month period (Month ~~28~~15 to Month ~~36~~22), an additional ~~46,000~~0.62-acre ~~square-foot~~ area of Theodore Roosevelt Park would be closed for construction of the park improvements, including a redesigned path network and more areas for seating and gathering. As with the building construction phase, Park users would also continue to have access to pathways in other areas within the Park for circulation and passive recreation during this ~~9~~8-month period. Upon completion of construction, the portion of Theodore Roosevelt Park in front of the Gilder Center would be reopened with new landscaping and enhanced passive amenities.

Pedestrian circulation along Columbus Avenue adjacent to the construction area and bicycle circulation on Columbus Avenue would be maintained at all times during construction. Based on the preliminary construction logistics plan, there would be a pedestrian pathway on Columbus Avenue adjacent to the sidewalk curb and the bicycle lane would be shifted to the west of the pedestrian pathway and the construction area. Safety barriers would be installed as necessary to ensure the safety of the public passing through this area. **Figure 15-6** shows the preliminary section view of the east side of Columbus Avenue adjacent to the construction area during construction of the proposed project.

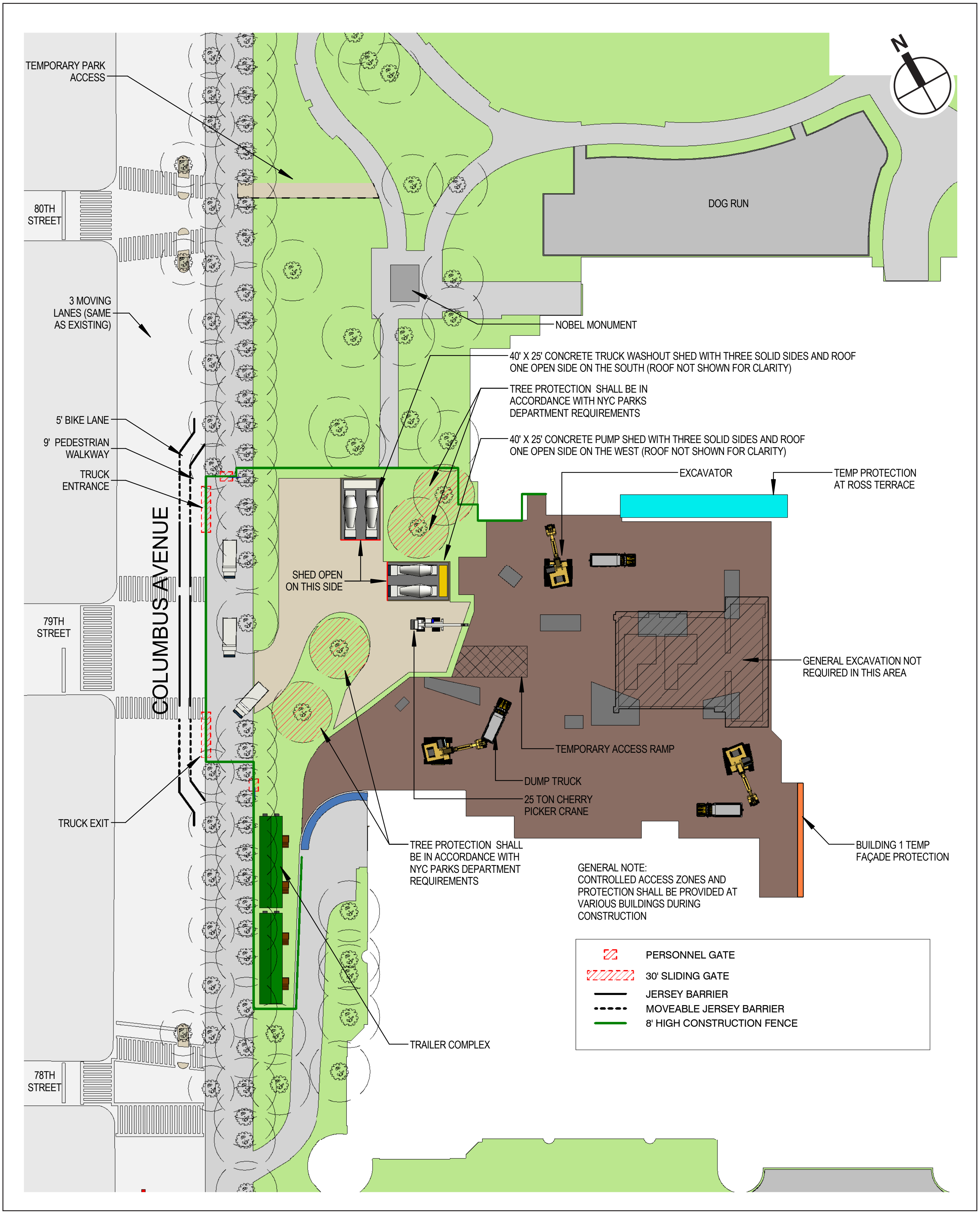
Based on the preliminary construction logistics plan, construction trucks such as dump trucks or concrete trucks are anticipated to enter the "construction area" (the project site and the associated construction staging area) via Columbus Avenue between West 79th Street and West 80th Street and exit the construction area via Columbus Avenue just south of West 79th Street. Approximately four on-street parking spaces would be temporarily eliminated to accommodate the access and egress points to/from the construction area as well as pedestrian and bicyclist circulation on Columbus Avenue adjacent to the construction area. MPT plans would be developed to ensure the safety of pedestrian, bicyclist, and vehicle circulation near the project site during construction of the proposed project as required by DOT. Measures specified in the MPT plans that are anticipated to be implemented would include but not be limited to the following: maintaining the bicycle lane on Columbus Avenue; safety signs; safety barriers; and site perimeter barriers. Approval of these plans and implementation of the closures would be coordinated with DOT's OCMC. In addition, two separate structures each enclosed on three sides and with a roof would be constructed to house the concrete pump and two concrete mixer trucks as they accesses the pump, and to house the concrete mixer trucks as they are washed out



Source: Turner

Preliminary Construction Logistics (Demolition)

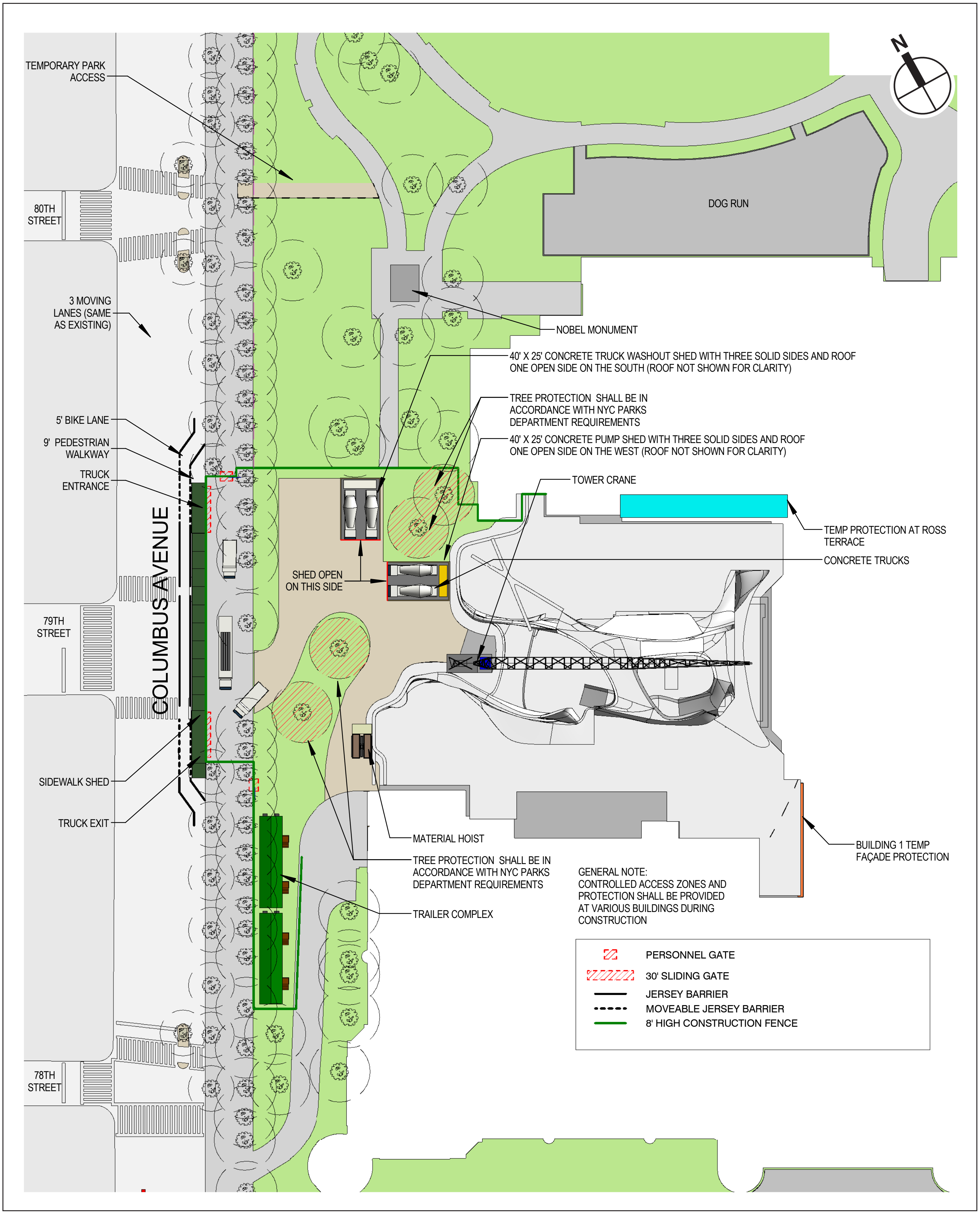
Figure 15-2



Source: Turner

Preliminary Construction Logistics (Excavation and Foundation)

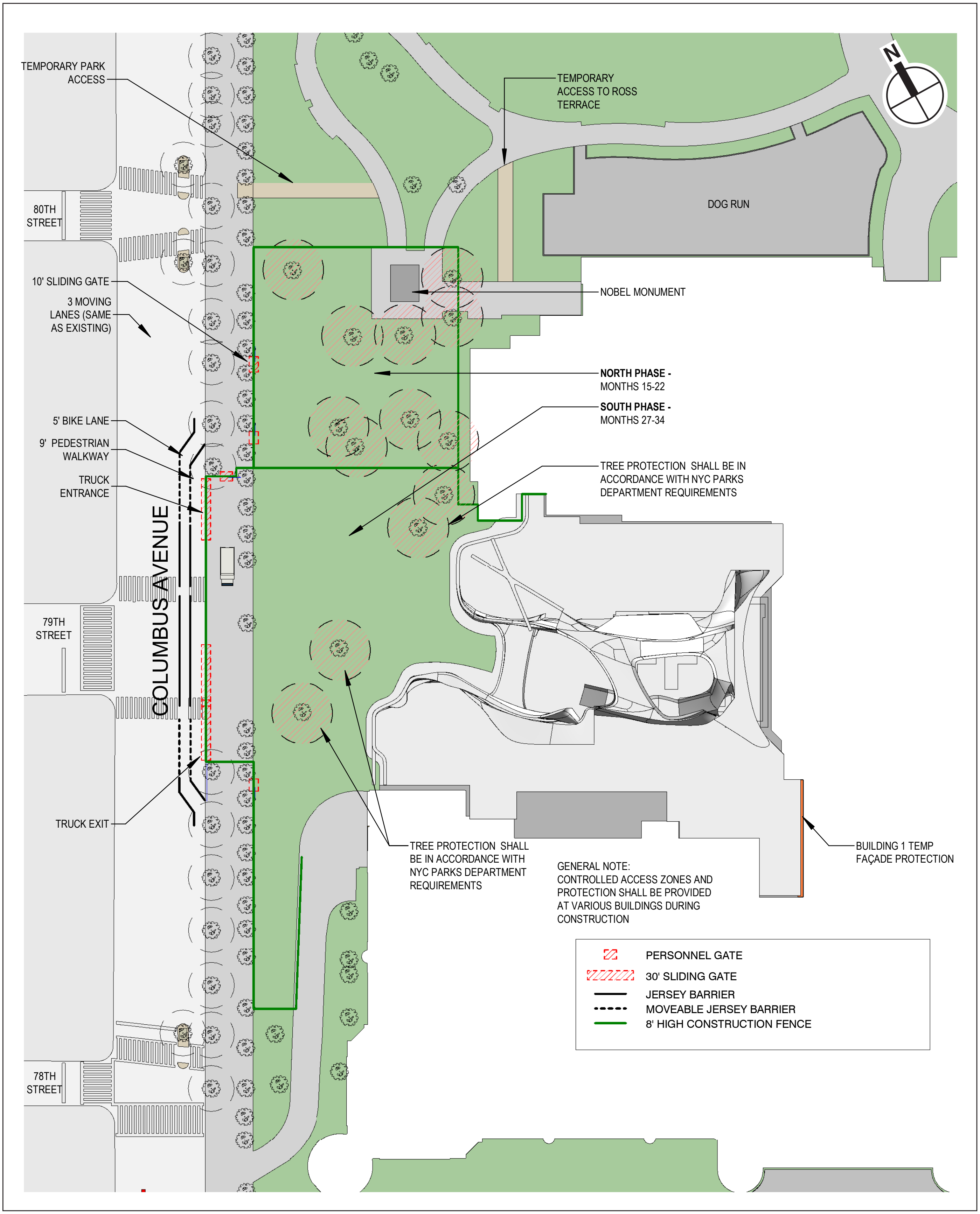
Figure 15-3



Source: Turner

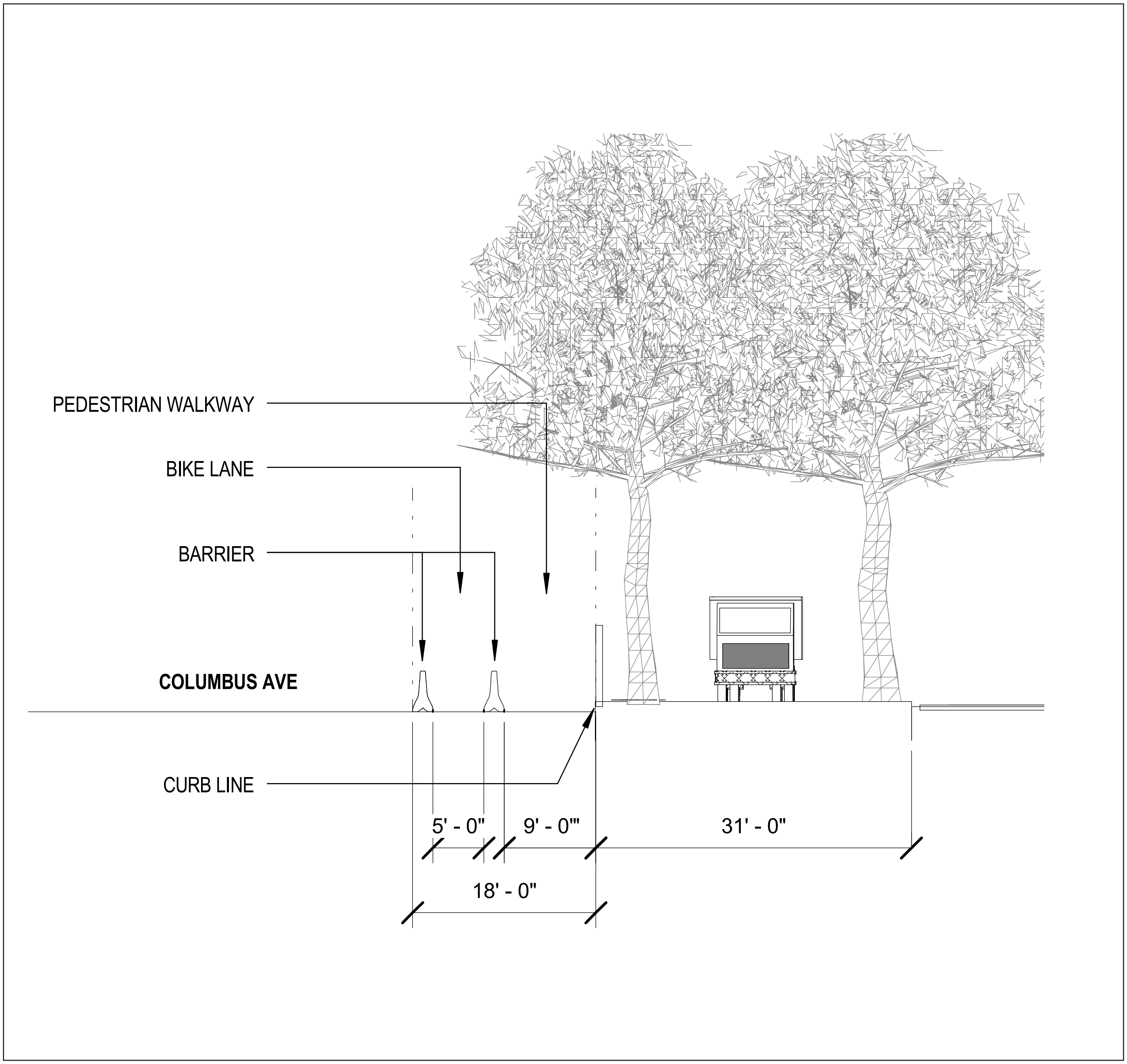
Preliminary Construction Logistics
(Above-Grade Construction)

Figure 15-4



Source: *Turner*

Preliminary Construction Logistics
(Site Work)
Figure 15-5



Source: *Turner*

Preliminary Section View

Figure 15-6

before leaving the site, respectively, to minimize noise from concrete activities on the surrounding community including Theodore Roosevelt Park.

PUBLIC SAFETY

A variety of measures would be employed to ensure public safety during the construction of the proposed project. These include a sidewalk bridge to be erected along Columbus Avenue in front of the construction area during above-grade construction activities to provide overhead protection for pedestrians passing by the construction area. Flaggers would be posted to control trucks entering and exiting the construction area and/or to provide guidance to pedestrians and bicyclists. The installation and operation of tower cranes would follow stringent DOB requirements to ensure safe operation of the equipment. Safety netting would be installed during demolition and on the sides of the proposed project as the superstructure advances upward to prevent debris from falling to the ground. In addition, roof protection would be installed on the adjacent Building 7 to the east. Safety barriers and safety signs would be installed. All DOB safety requirements would be followed and construction of the proposed building would be undertaken so as to ensure the safety of the community, the visitors to the museum, the adjacent terraces and plazas, and Theodore Roosevelt Park, and the construction workers involved in the project.

LOADING DOCK OPERATIONS

The existing service driveway on Columbus Avenue just south of West 78th Street would continue to operate during the construction of the proposed project. However, AMNH anticipates that some of the existing deliveries and refuse removal using this service driveway would be temporarily relocated to other Museum block fronts during the construction period. Based on current plans, the refuse removal for electronics recycling and scheduled food deliveries would be relocated to the Central Park West Museum front near West 79th Street with access through the existing drive under the Main Steps for the Museum~~. In addition, a~~ ; the bulk refuse container ~~would be relocated either~~ is anticipated to remain at its current location with access via the West 78th Street service driveway~~an existing concrete pad behind a gate on the Central Park West block front near the corner of West 77th Street or to an enclosure near the bowl area of the horseshoe drive on West 81st Street~~. Due to the low volumes of the relocated delivery vehicles, the resulting effect on traffic patterns for intersections surrounding the Museum is expected to be minimal.

GROWNYC

GrowNYC, a New York City-sponsored green market organization, hosts a weekly Greenmarket Farmers' Market every Sunday (9:00 AM to 5:00 PM) year-round on the sidewalk of Columbus Avenue immediately adjacent to Theodore Roosevelt Park from 77th Street to 81st Street. Based on current logistics, the existing sidewalk on the east side of Columbus Avenue adjacent to the project site would be used for construction staging and therefore the Greenmarket could not be accommodated at this stretch of the sidewalk during construction of the proposed project. NYC Parks will work with GrowNYC on the potential relocation of the 79th Street Greenmarket during construction of the proposed project. AMNH has discussed with GrowNYC and it is currently ~~proposed~~expected that the Greenmarket ~~could~~would be temporarily relocated to the north side of West 77th Street between Columbus Avenue and Central Park West and on Columbus Avenue between West 77th and West 79th Streets. Upon completion of the proposed project, the weekly Greenmarket Farmers' Market could relocate back to its current location in front of the project site.

CRAFTS ON COLUMBUS AND LOCAL STREET FAIRS

The American Arts and Crafts Alliance, Inc. hosts a bi-annual crafts fair over approximately eight weekends in April and September each year on the sidewalk of Columbus Avenue immediately adjacent to Theodore Roosevelt Park from 77th Street to 81st Street but its permit to host the craft fair at this location has been temporarily suspended from October 31, 2016 to October 30, 2019. Similar to the Greenmarket Farmers' Market, the Crafts Fair as well as other local street fairs may not be accommodated at their current Columbus Avenue location during construction of the proposed project. The Crafts Fair and other local street fairs may be temporarily suspended or a temporary alternative location could be determined after construction is underway. Upon completion of the proposed project, the bi-annual Columbus Crafts Fair and other local street fairs could relocate back to their current location in front of the project site.

THANKSGIVING PARADE

The Thanksgiving Parade (the Parade) has two main events: the balloon inflation on the eve of the Parade, and the Parade itself. The balloon inflation typically occurs on Thanksgiving eve from 3:00 PM to 10:00 PM along West 77th Street and West 81st Street between Central Park West and Columbus Avenue. These streets are closed to traffic starting at 9:30 AM on the day of the inflation. Other surrounding streets are also typically closed as the day goes on, including: West 76th Street between Columbus Avenue and Central Park West; West 77th, West 78th, West 79th, West 80th, and West 81st Streets between Columbus and Amsterdam Avenues; Central Park Traverse Road at Central Park West and West 81st Street; and Central Park West from West 59th Street to 86th Street. These streets remain closed for the duration of the Parade. AMNH will work with organizers of the Parade to ensure that construction of the proposed project would not interfere with the balloon inflation event which may include the suspension of construction activities during Thanksgiving eve if necessary.

RODENT CONTROL

Construction contracts will include provisions for a rodent 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 the appropriate public agencies. In addition, as discussed in Chapter 7, "Natural Resources," methods would be used to control the rat population in Theodore Roosevelt Park which may include the use of special garbage bins, garbage removal, and cleaning to remove food sources; ensuring proper drainage throughout the park to remove water sources; and burrow harassment measures (e.g., collapsing burrows and use of irritants) to remove shelter. Some of these active methods have already been implemented.

GENERAL CONSTRUCTION STAGES

PRE-CONSTRUCTION

Prior to the commencement of construction, the work area would be prepared for construction, including the installation of public safety measures such as barriers, netting, and signs. The construction areas would be fenced off to minimize interference between passersby and the construction work. The construction area would be cleared and access points to the construction area would be established. Portable toilets and dumpsters for trash would be brought to the site and installed. These site set-up activities would be completed within a few weeks.

The existing uses of Buildings 15 and 15A would also be relocated ~~at this time.~~prior to demolition. Trailers or other temporary structures ~~may~~ would be placed between the existing trees on the upper portion of the far western end of the Ross Terrace adjacent to Building 17 to house some relocated Museum employees.

Trees within the construction area would be removed, pruned, or protected (as described below in "Natural Resources"). Based on current plans, seven trees in the Park would be removed and one tree in the Park would be transplanted as a result of the proposed project; in addition, for construction access, four recently planted, smaller caliper trees (two on the curb and two in the bike lane traffic islands) would be temporarily moved prior to commencement of construction and replanted (or replaced) after completion of construction and trees within the construction area along the Columbus Avenue sidewalk would be protected and pruned as necessary. All work would be performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol approved by the NYC Parks Manhattan Borough Forester. A tree protection plan would be implemented during construction of the proposed project and would include measures to protect both the above- and below-ground structure of trees to remain within the construction area. Any trees that are removed and not transplanted would be replaced, consistent with NYC Parks rules and regulations, which would include the 19 trees that would be planted post-construction as part of the landscape plan for the western portion of the Park. Project-related tree work would be scheduled based on seasonal constraints.

DEMOLITION

Construction would begin with the demolition of three existing buildings, the Weston Pavilion and Buildings 15 and 15A. First, demolition scaffolds would be erected around these buildings and roof protection would be installed on the adjacent Building 7 to the east. The buildings to be demolished would be abated of any hazardous materials before the start of demolition. A New York City-certified asbestos investigator would inspect the building for asbestos-containing materials (ACM), and if present, those materials would be removed by a DOL-licensed asbestos abatement contractor prior to interior demolition. Asbestos abatement is strictly regulated by DEP, DOL, EPA, and OSHA to protect the health and safety of construction workers and nearby residents, workers, and visitors. Depending on the extent and type of ACMs (if any), these agencies would be notified of the asbestos removal project and may inspect the abatement site to ensure that work is being performed in accordance with applicable regulations. Any activities with the potential to disturb lead-based paint (LBP) would be performed in accordance with the applicable OSHA regulation (including federal OSHA regulation 29 CFR 1926.62—*Lead Exposure in Construction*). In addition, any suspected poly-chlorinated biphenyls (PCB)-containing equipment (such as fluorescent light ballasts) that would be disturbed would be evaluated prior to disturbance. Unless labeling or test data indicate the contrary, such equipment would be assumed to contain PCBs, and would be removed and disposed of at properly licensed facilities in accordance with all applicable regulatory requirements.

General demolition is the next step, beginning with removal of any economically salvageable materials which could be reused. Then the interior of the buildings are deconstructed to the floor plates and structural columns. Netting around the exterior of the building would be used to prevent falling materials. Hand tools and excavators with hoe ram attachments would mainly be used in the demolition of the existing structures and bobcats and front-end loaders would be used to load the debris into dump trucks. Demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities. The demolition stage of construction is anticipated to take approximately four months.

EXCAVATION AND FOUNDATION

First, sheeting for SOE would be installed with use of pile drivers to hold back soil around the excavation area and excavators would then be used to excavate soil. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on any portion of the project site that needs fill. As the excavation becomes deeper, a temporary ramp would be built to provide access for the dump trucks to the work site. No blasting is anticipated for the construction of the proposed project but a rock splitter and rock breaking equipment would be used to break down any rock encountered during excavation. This stage of construction would also include the construction of the proposed Gilder Center's foundation and below-grade elements. Columns and concrete walls would be built to the grade level. Concrete trucks would be used to pour the foundation and the below-grade structures. These trucks would stage within the construction area where they would pump the concrete. Excavation and foundation activities would also involve the use of caisson drill rigs, generators, compressors, and rebar benders. This stage of construction is anticipated to take approximately five months.

Below-Grade Hazardous Materials

As described in greater detail below under "Hazardous Materials," to reduce the potential for public exposure to contaminants during excavation activities, construction activities would be performed in accordance with a DEP-approved RAP and CHASP and all other applicable regulatory requirements. The RAP and CHASP would address requirements for items such as: pre-construction ACM surveys, soil stockpiling, soil disposal and transportation; dust control; contingency measures if additional petroleum storage tanks or other contamination should be unexpectedly encountered; and a minimum two foot clean fill buffer in any landscaped or uncapped areas, designed to control or avoid the potential for human or environmental exposure to known or unexpectedly encountered hazardous materials during and following construction of the proposed project. While not anticipated, as with any construction project, there could be some delay in the construction of the proposed project if hazardous materials concerns are identified.

Dewatering

Water from rain and snow collected in the excavation area during construction would be removed using a dewatering pump. If groundwater dewatering is required, it would be performed in accordance with DEP sewer use requirements.

SUPERSTRUCTURE

The superstructure for the proposed Gilder Center would include the building's framework such as beams, slabs, and columns. Construction of the interior structure, or core, of the building would include: elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom areas. An electric tower crane would first be brought onto the construction area during the superstructure task and would be used to lift structural components, façade elements, and other large materials. The tower crane would be on-site for both the superstructure and exterior façade stages of construction. Superstructure activities would also require the use of a hydraulic crane, telescoping lifts, forklifts, and a variety of trucks. In addition, temporary construction elevators (hoists) would be used for the vertical movement of workers and materials during superstructure activities. This stage of construction is anticipated to take approximately six months and would overlap with a portion of the shotcrete activities.

SHOTCRETE

During this stage of construction, shotcrete would be sprayed onto the structural elements erected during the superstructure stage of construction, to complete the structural columns/walls and the floor decks of the proposed building. The concrete mixture to be used would arrive in concrete trucks. Equipment used during shotcrete application would include telescoping lifts, generators, and concrete pumps. This stage of construction is anticipated to take approximately ~~15~~13 months and would overlap with a portion of the superstructure, exteriors, interiors and finishing, and site work activities.

EXTERIORS

The exterior façades of the proposed building would be installed during this stage of construction. The pre-assembled façade pieces would arrive on trucks and be lifted into place for attachment by the tower crane. This stage of construction is anticipated to take approximately ~~eight~~13 months and would overlap with a portion of the superstructure, shotcrete, and interiors and finishing, and site work activities.

INTERIORS AND FINISHING

Interiors and finishing activities would include the construction of interior partitions, installation of lighting fixtures, and interior finishes (e.g., flooring, painting, etc.), and mechanical and electrical work, such as the installation of elevators, and lobby finishes. In addition, existing spaces within the adjacent Museum buildings would be renovated to accommodate and make connections into the Gilder Center. Final cleanup and touchup of the Gilder Center and final building system (e.g., electrical system, fire alarm, plumbing, etc.) testing and inspections would be part of this stage of construction. Equipment used during interiors and finishing would include exterior hoists, compressors, delivery trucks, and a variety of small hand-held tools. This stage of construction is anticipated to take approximately 22 months and would overlap with a portion of the shotcrete, exteriors, and site work activities.

SITE WORK

Independent of the CEQR process, AMNH announced the formation of a community working group in February 2016 (the “Park Working Group”), to advise on the proposed redesign of the western portion of Theodore Roosevelt Park, in coordination with the proposed Gilder Center project. As discussed in detail in Chapter 1, “Project Description,” the paths and landscaping in an approximately 75,000-square-foot (1.72 acres) portion of Theodore Roosevelt Park adjacent to the project site would be modified, removed, or relocated as part of the proposed project and to provide more areas for seating and public access (see Figure 1-4 for the proposed site plan of the proposed project). It is anticipated that these changes would include:

- Path adjustments by the Nobel Monument area to improve circulation, provide more seating, and create a gathering space off of the path network.

- Enlargement of Margaret Mead Green (from approximately 26,725 square feet to approximately 27,137 square feet) by shifting a park path farther to the east, and addition of an adjacent hard scape gathering area with seating that would be away from the path network, Museum entry, and the street.
- Relocation of *The New York Times* Capsule to a location adjacent to the Rose Center entrance.
- A wider entrance from Columbus Avenue and path adjustments between Columbus Avenue and the Gilder Center entrance to accommodate greater pedestrian traffic. The paths and entrance would be designed to be accessible to children, strollers and the mobility-impaired.
- New planted islands would be created, incorporating the pin oak and English elm trees that the Museum plans to protect and conserve, and areas for respite would be provided away from the path network and Museum entry.
- New and revitalized plant beds, extending from the Nobel Monument to the service drive, would incorporate the existing oaks and Siberian elm trees. Species would be selected for native and adaptive characteristics, and would include shade- and moisture-tolerant groundcovers and shrubs, flowering understory trees, and ephemeral bulbs, providing year-round interest.
- Installation of 15 new benches, increasing the total number in this area from 23 to 38.
- Park infrastructure improvements, including upgraded fencing, and drainage and irrigation where needed.

Improvements would also be made to two lawns within the project site to increase the amount of publicly accessible open space available to park users.

During site work, soil would be brought to the site for the grassy areas and landscaping. Trees and shrubs would be planted, and benches installed. Site work would include equipment such as bobcats and loaders. This stage of construction is anticipated to take approximately ~~10~~16 months and would overlap with a portion of the shotcrete, exteriors, and interiors and finishing activities.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 15-3 shows the estimated average daily numbers of workers and deliveries for the proposed project by calendar quarter for the duration of the construction period. The average number of workers throughout the entire construction period would be approximately 133 per day. The peak number of workers by calendar quarter would be approximately ~~233~~257 per day, and would occur when shotcrete, exteriors and interiors and finishing stages of construction overlap during the ~~second~~fourth quarter of Year 2 construction. As shown in **Table 15-3**, the peak level of construction workers would not persist throughout the entire three-year construction period. During non-peak periods of construction, the number of construction workers would be less, and sometimes much less, than the ~~233~~257 workers per day estimated for the peak period.

Table 15-3
Average Number of Daily Workers and Trucks by Year and Quarter

Year	Year 1				Year 2				Year 3					
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Average	Peak
Workers	70	48	50	101	~~117~~ 96	~~**233**~~ 146	~~197~~ 244	~~199~~ **257**	~~209~~ 212	~~171~~ 179	127	~~72~~ 66	133	~~233~~ 257
Trucks	15	21	25	23	~~34~~ 27	~~33~~ 32	~~36~~ 37	~~30~~ **40**	~~**38**~~ 35	~~24~~ 28	~~18~~ 17	~~9~~ 8	26	~~38~~ 40

Source: Turner Construction.

For truck trips, the average number of trucks throughout the entire construction period would be approximately 26 per day, and the peak number of deliveries by calendar quarter would occur when shotcrete, interiors and finishing, and site work stages of construction overlap during the ~~first~~fourth quarter of Year ~~3~~2 construction, with approximately ~~38~~40 trucks per day. As shown in **Table 15-3**, the peak level of construction truck trips would not persist throughout the entire 3-year construction period. During non-peak periods of construction, the number of construction truck trips would be less, and sometimes much less, than the ~~38~~40 truck trips per day estimated for the peak period.

E. FUTURE WITHOUT THE PROPOSED PROJECT

In the No Action condition, the project site is assumed to remain substantially the same as in existing conditions. The Gilder Center would not be constructed, and the portion of Theodore Roosevelt Park in front of the Weston Pavilion would retain its current design.

F. PROBABLE IMPACTS OF THE PROPOSED PROJECT

Construction of the proposed project—as is the case with most large construction projects—would result in some temporary disruptions in the surrounding area. The following analysis describes the overall temporary effects on 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 assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities. The analysis is based on the peak worker and truck trips during construction of the proposed project, which are developed based on several factors including the percentage of construction workers traveling to/from the construction area by private autos or worker modal splits, vehicle occupancy and trip distribution, truck passenger car equivalents (PCEs), and arrival/departure patterns. For the proposed project, the combined peak-construction, worker-vehicle and truck-trip generation would occur during superstructure and exterior construction activities; the greatest construction-related parking, transit, and pedestrian demand would occur when shotcrete, exteriors, and interiors and finishing construction activities overlap during the ~~second~~fourth quarter of Year 2 construction. For analysis purposes, based on the anticipated construction start date in late 2017 and the estimated construction phasing, the peak construction traffic period is assumed to occur in ~~2018~~2019. As shown in **Table 15-3** above, the peak level of construction vehicle trips would not persist throughout the entire three-year construction period.

As discussed above, the peak level of construction workers and truck trips would not persist throughout the entire three-year construction period. For a reasonable-worst case analysis, the following sections evaluate the potential for the proposed project's construction worker and truck trips during the peak construction period to result in significant adverse impacts to traffic, parking, transit facilities, and pedestrian elements.

TRAFFIC

An evaluation of construction sequencing and worker/truck projections was undertaken to assess potential traffic impacts.

Construction Trip-Generation Projections

The average worker and truck trip projections discussed above in "Number of Construction and Materials Deliveries," 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 daily traffic during shotcrete, exteriors, and interiors and finishing activities, with a peak of approximately ~~233~~257 workers and ~~33~~40 truck deliveries per day when the shotcrete, exteriors and interiors and finishing stages of construction would overlap. These estimates of construction activities are discussed further below.

Construction Worker Modal Splits and Vehicle Occupancy

Based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is anticipated that 44 percent of construction workers would commute to the project site using private autos at an average occupancy of approximately 1.46 persons per vehicle.

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 7:00 AM to 3:30 PM. Construction workers would commute during the hours before and after the work shift. 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. For analysis purposes, each worker vehicle was assumed to arrive near the work shift start hour and depart near the work-shift end hour, whereas each truck delivery was assumed to result in two truck trips during the same hour (one "in" and one "out"). Further, 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 likely arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after each work shift (6:00 to 7:00 AM for arrival and 3:00 to 4:00 PM for departure on a regular day shift). Construction truck deliveries typically peak during the hour before each shift (25 percent), overlapping with construction worker arrival traffic. As shown in **Table 15-4**, based on these projections, the maximum construction-related traffic increments would be approximately ~~88~~88102 PCEs between 6:00 AM and 7:00 AM and ~~64~~6470 PCEs between 3:00 PM and 4:00 PM.

Table 15-4
Peak Construction Vehicle Trip Projections

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
6 AM - 7 AM	**~~56~~62**	**0**	**~~56~~62**	**~~8~~10**	**~~8~~10**	**~~16~~20**	**~~64~~72**	**~~8~~10**	**~~72~~82**	**~~72~~82**	**~~16~~20**	**~~88~~102**
7 AM - 8 AM	~~14~~15	0	~~14~~15	~~3~~4	~~3~~4	~~6~~8	~~17~~19	~~3~~4	~~20~~23	~~20~~23	~~6~~8	~~26~~31
8 AM - 9 AM	0	0	0	~~3~~4	~~3~~4	~~6~~8	~~3~~4	~~3~~4	~~6~~8	~~6~~8	~~6~~8	~~12~~16
9 AM -10 AM	0	0	0	~~3~~4	~~3~~4	~~6~~8	~~3~~4	~~3~~4	~~6~~8	~~6~~8	~~6~~8	~~12~~16
10 AM - 11 AM	0	0	0	~~3~~4	~~3~~4	~~6~~8	~~3~~4	~~3~~4	~~6~~8	~~6~~8	~~6~~8	~~12~~16
11 AM - 12 PM	0	0	0	~~3~~4	~~3~~4	~~6~~8	~~3~~4	~~3~~4	~~6~~8	~~6~~8	~~6~~8	~~12~~16
12 PM - 1 PM	0	0	0	~~3~~4	~~3~~4	~~6~~8	~~3~~4	~~3~~4	~~6~~8	~~6~~8	~~6~~8	~~12~~16
1 PM - 2 PM	0	0	0	~~3~~2	~~3~~2	~~6~~4	~~3~~2	~~3~~2	~~6~~4	~~6~~4	~~6~~4	~~12~~8
2 PM - 3 PM	0	4	4	2	2	4	2	6	8	4	8	12
3 PM - 4 PM	**0**	**~~56~~62**	**~~56~~62**	**2**	**2**	**4**	**2**	**~~58~~64**	**~~60~~66**	**4**	**~~60~~66**	**~~64~~70**
4 PM - 5 PM	0	~~10~~11	~~10~~11	0	0	0	0	~~10~~11	~~10~~11	0	~~10~~11	~~10~~11
Daily Total	~~70~~77	~~70~~77	~~140~~154	~~33~~40	~~33~~40	~~66~~80	~~103~~117	~~103~~117	~~206~~234	~~136~~157	~~136~~157	~~272~~314

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).

Since the construction-related traffic increment of ~~88~~102 PCEs between 6:00 AM and 7:00 AM and ~~64~~70 PCEs between 3:00 PM and 4:00 PM exceed the *CEQR Technical Manual's* 50 peak hour vehicle trip-ends threshold, a Level 2 screening assessment was conducted to determine the need for additional quantified traffic analyses. As shown in **Figures 15-7 and 15-8**, the construction-generated vehicle trips were distributed to various roadways near the project site. Specifically, construction worker vehicle trips were distributed to parking facilities near the project site, including to the Museum's on-site parking garage, and garages along West 82nd Street, West 83rd Street, West 79th Street, West 78th Street, and West 72nd Street. Construction truck trips were assigned to the project site via DOT-designated truck routes. As shown in **Figures 15-7 and 15-8**, these incremental construction vehicle trips, including both construction worker vehicles and construction trucks, would not result in more than 50 vehicle-trips at any intersection, which is the *CEQR Technical Manual's* threshold for a detailed analysis. However, as stated in Chapter 9,

Theodore Roosevelt Park

Building Site

0 200 FEET

Incremental Construction Vehicle Trips (2Q 2019)
Weekday AM Peak Hour
Figure 15-7

7/28/2017

Theodore Roosevelt Park

Building Site

0 200 FEET

Incremental Construction Vehicle Trips (2Q 2019)
Weekday PM Peak Hour
Figure 15-8

AMNH Gilder Center for Science, Education, and Innovation

"Transportation," in consideration of sensitive existing traffic conditions surrounding the Museum, nineeleven nearby intersections were selected for detailed analysis in the weekday construction PM period (3:00 PM to 4:00 PM).

Based on the Automatic Traffic Recorder (ATR) traffic volume data collected in October 2015, the AM construction peak hour's background traffic volumes were approximately 49 percent lower than the AM operational peak hour's traffic volumes, and the PM construction peak hour's background traffic volumes were approximately 7 percent lower than the PM operational peak hour's traffic volumes. Given the small number of construction vehicles projected to traverse the roadways surrounding the Museum and the substantially lower background traffic volumes during the early morning hours, a detailed traffic analysis was determined to be unwarranted for the AM construction peak hour of 6:00 AM to 7:00 AM. However, a detailed construction traffic analysis was conducted for the 3:00 PM to 4:00 PM construction peak hour, since background traffic levels are comparable to the PM operational peak hour.

Construction Traffic Capacity Analysis

Vehicles generated by construction activities were assigned to the street network in the PM construction peak hour, as shown in **Figure 15-7**. The same nineeleven intersections selected for the operational analysis presented in Chapter 9, "Transportation," were also analyzed for the 3:00 PM to 4:00 PM construction peak hour. These intersections are:

- Columbus Avenue and West 83rd Street;
- Columbus Avenue and West 82nd Street;
- Columbus Avenue and West 81st Street;
- Columbus Avenue and West 80th Street;
- Columbus Avenue and West 79th Street;
- Columbus Avenue and West 78th Street;
- Columbus Avenue and West 77th Street;
- Central Park West and West 81st83rd Street;
- Central Park West and West 82nd Street;
- Central Park West and West 81st Street; and
- Central Park West and West 77th Street;
- Central Park West and West 82nd Street.

The operations at these intersections were analyzed using the Highway Capacity Software (HCS+) version 5.5, which is based on the methodologies presented in the *2000 Highway Capacity Manual (HCM)*. A discussion of the analysis methodology can be found in Chapter 9, "Transportation."

Construction Peak Traffic Volumes and Conditions

Turning movement counts (TMCs) collected during the operational PM peak hour of 5:00 PM to 6:00 PM were adjusted based on ATR traffic volume data collected during the construction PM peak hour of 3:00 PM to 4:00 PM in October 2015. Additional traffic counts were collected for two intersections on West 83rd Street in June 2017. These adjustments established the baseline traffic volume for the construction PM peak hour at study area intersections.

Future without Construction of the Proposed Project

For analysis purposes, based on the anticipated construction start date in late 2017 and the estimated construction phasing, the peak construction traffic period is assumed to occur in 20182019. The background PM peak construction peak hour volumes were increased to the year 20182019 using a background growth rate of 0.25 percent per year from 2015 to 20182019, for an approximately 0.751 percent growth in overall traffic volumes. Traffic generated by all future No Build projects identified for the 2021 operational analysis year were conservatively included in the 20182019 construction No Action traffic volumes, which are shown in **Figure 15-9.** The roadway changes along the M79 bus route resulting from the introduction of the M79 Select Bus Service (SBS) in spring 2017 are also accounted for in the traffic analyses in the No Action condition.

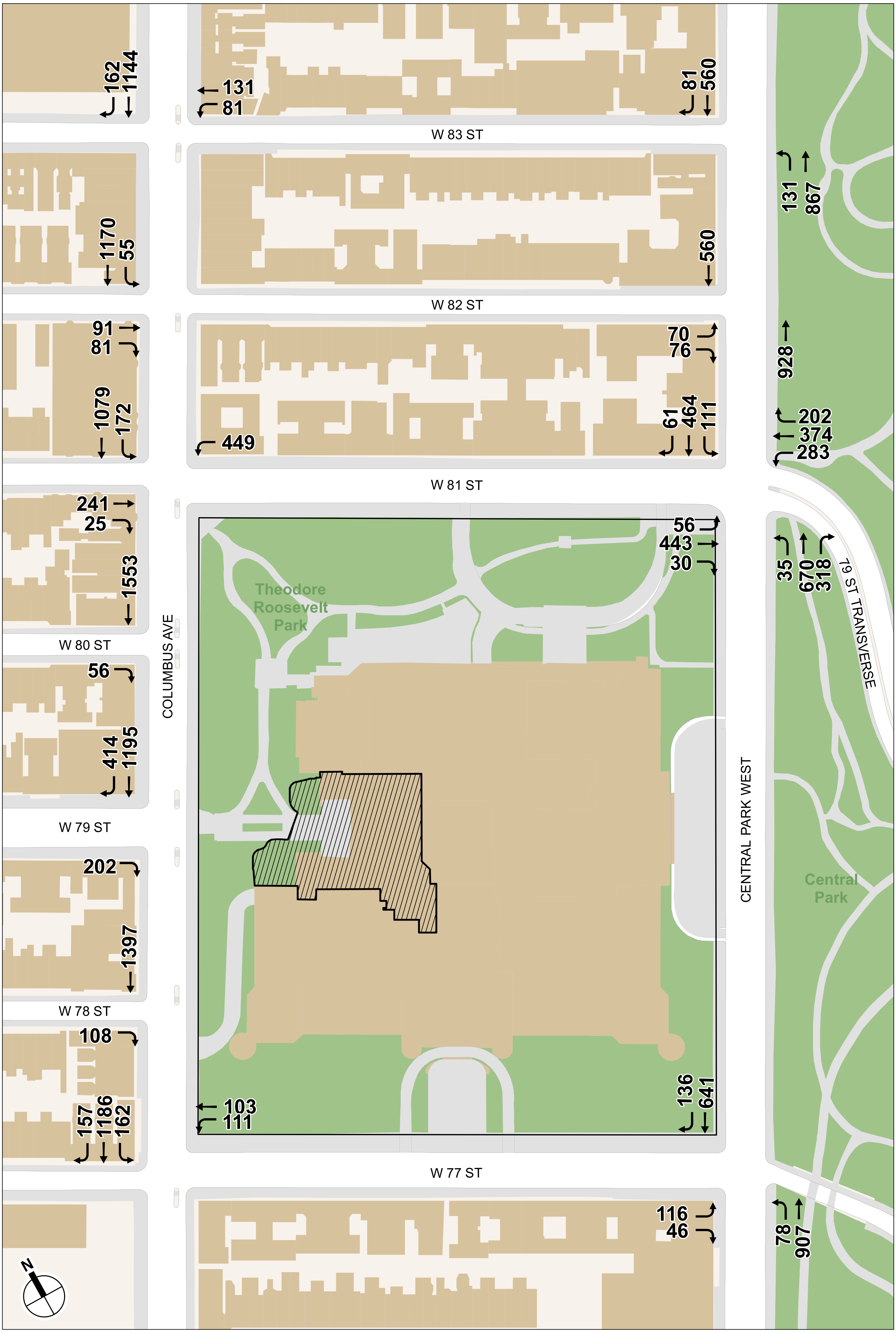
Future with Construction of the Proposed Project

According to projections presented above (see **Table 15-4)**, peak construction activities would generate 5662 autos and 4 trucks during the 3:00 PM to 4:00 PM construction peak hour. Auto trips were assigned along roadways leading to off-street parking facilities in the study area, and trucks were assigned to DOT-designated truck routes. The With Action construction traffic volumes are shown in **Figure 15-10**.

An analysis of the nine study area intersections showed that one of the nineeleven intersections would be significantly impacted during the 3:00 PM to 4:00 PM construction peak hour: Columbus Avenue and West 81st Street. The significant adverse impact could be fully mitigated by applying temporary shifts in signal timing. **Table 15-5** summarizes the capacity analysis results and mitigation recommendations for the 3:00 PM to 4:00 PM construction peak hour. A discussion of the results for the impacted intersection is provided below.

Columbus Avenue and West 81st Street

The Southbound left-turn lane at the Columbus Avenue and West 81st Street intersection would deteriorate within LOS F (from a v/c ratio of 0.96 and 90.91.9 seconds per vehicle [spv] of delay to a v/c ratio of 0.991.00 and 97.100.4 spv of delay) in the weekday PM construction peak hour, an increase in delay of more than three seconds. As shown in **Figure 15-8**, the project peak construction-generated vehicle trips for the southbound left-turn movement totaled only 56 in the weekday PM construction peak hour. These modest increases in project generated peak hour traffic are forecast to result in increases in delay that constitute significant adverse impacts, due to the already congested conditions in the No Action Condition and the application of the traffic analysis methodologies and impact criteria specified in the *CEQR Technical Manual*. However, given the very small incremental increase from the proposed project, an additional vehicle on the southbound left-turn movement every 1210 minutes, the reported change in delay is likely overstated by the traffic analysis methodology specified in the *CEQR Technical Manual*. The significant adverse impact at the southbound left turn of this intersection could be fully mitigated by a temporary shift of one second of green time from the southbound permitted phase to the southbound protected left-turn phase.

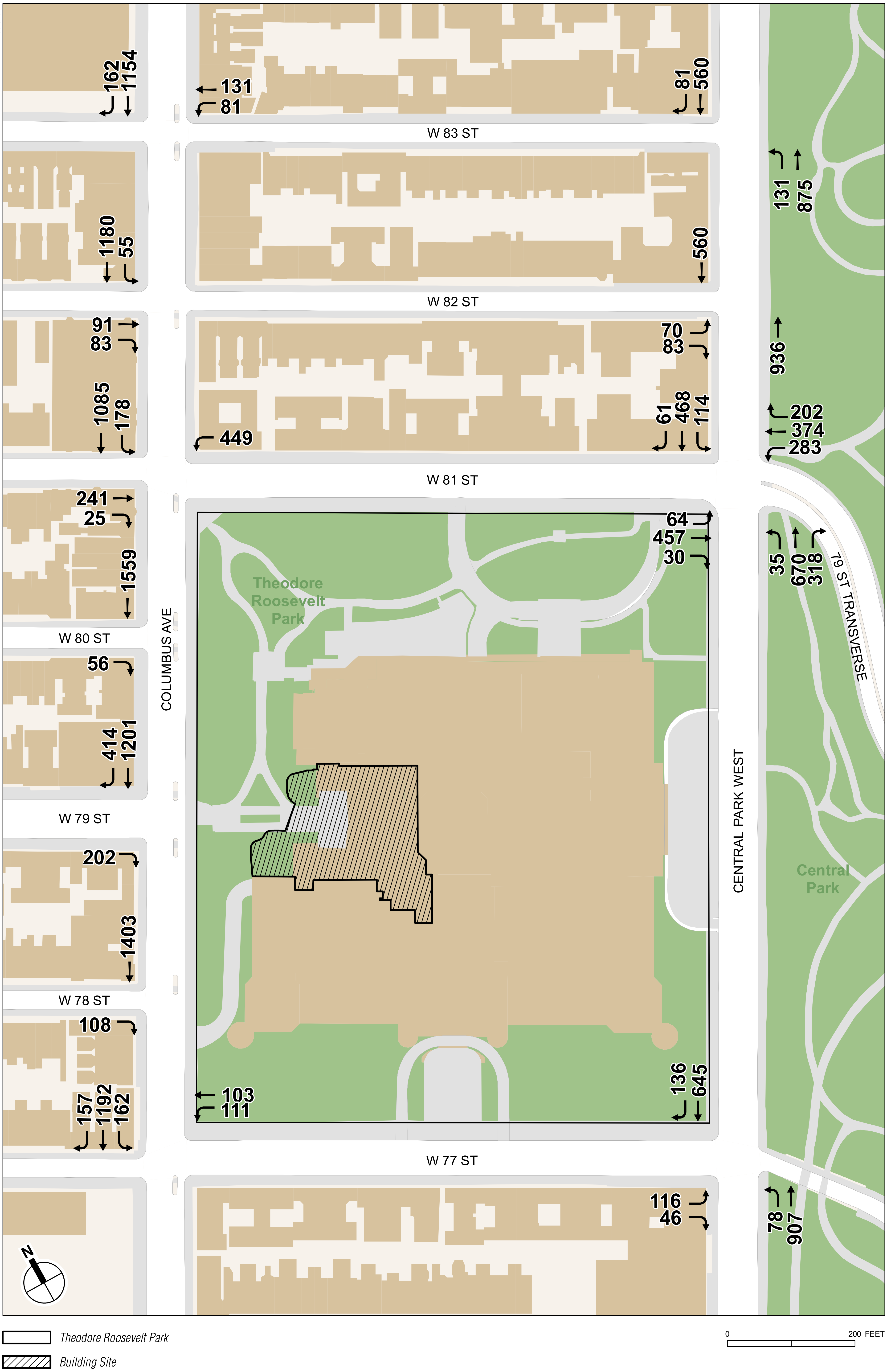


Theodore Roosevelt Park

Building Site

2Q 2019 No Action Construction Traffic Volumes
Weekday PM Peak Hour
Figure 15-9

AMNH Gilder Center for Science, Education, and Innovation



2Q 2019 With Action Construction Traffic Volumes
Weekday PM Peak Hour
Figure 15-10

~~Table 15-5~~
~~No Action, With Action, and Mitigated Conditions~~
~~Weekday PM Construction Peak Hour Traffic Level of Service~~

Intersection	Construction 2018 No Action*				Construction 2018 With Action*					Construction 2018 Mitigation*				Recommended Mitigation Measures
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS		Lane Group	v/c Ratio	Delay (sec)	LOS	
Westbound	L	1.02	82.4	F	L	1.02	82.4	F	-	L	1.02	82.4	F	
Southbound	**L**	**0.96**	**90.8**	**F**	**L**	**0.99**	**97.9**	**F**	**+**	L	0.91	79.2	E	
-	T	0.74	21.9	C	T	0.74	22.0	C	-	T	0.74	22.0	C	
-	Int.		44.8	D	Int.		45.6	D	-	Int.		43.9	D	**Recommended Mitigation Measures**
Columbus Avenue and West 80th Street														
Eastbound	R	0.17	22.1	C	R	0.17	22.1	C						No significant adverse impact
Southbound	T	0.78	13.4	B	T	0.78	13.5	B						
-	Int.		13.8	B	Int.		13.8	B	-					
Columbus Avenue and West 79th Street														
Eastbound	R	0.78	55.4	E	R	0.78	56.0	E						No significant adverse impact
Southbound	T	1.08	68.9	E	T	1.08	70.3	E	-					
-	Int.		53.4	D	Int.		54.5	D	-					
Southbound	T	0.73	12.2	B	T	0.73	12.3	B						
-	Int.		13.3	B	Int.		13.3	B	-					
Southbound	L	0.82	65.5	E	L	0.82	65.5	E						
	TR	0.75	12.9	B	TR	0.75	13.0	B						
-	Int.		20.9	C	Int.		21.0	C	-					
Eastbound	L	0.41	26.4	C	L	0.45	27.8	C						No significant adverse impact
-	T	0.91	51.9	D	T	0.94	56.5	E						
Westbound	L	1.06	101.9	F	L	1.06	101.9	F	-					
-	LT	1.05	83.7	F	LT	1.05	83.7	F	-					
Northbound	LTR	1.06	73.1	E	LTR	1.06	73.1	E	-					
Southbound	LTR	0.95	48.4	D	LTR	0.97	53.1	D						
-	Int.		67.2	E	Int.		68.7	E	-					
Eastbound	LR	0.42	25.3	C	LR	0.42	25.3	C						No significant adverse impact
Northbound	LT	0.97	40.4	D	LT	0.97	40.8	D	-					
Southbound	TR	0.63	16.3	B	TR	0.63	16.4	B	-					
-	Int.		29.3	C	Int.		29.5	C	-					
Eastbound	TR	0.34	18.0	B	TR	0.34	18.0	B						No significant adverse impact
Southbound	L	0.19	16.3	B	L	0.19	16.3	B	-					
	T	0.76	21.0	C	T	0.77	21.2	C	-					
-	Int.		20.4	C	Int.		20.6	C	-					
Central Park West and West 82nd Street														
Eastbound	LR	0.24	11.5	B	LR	0.25	11.7	B						No significant adverse impact
Northbound	T	0.99	57.1	E	T	1.00	58.6	E	-					
Southbound	T	0.64	28.2	C	T	0.64	28.2	C	-					
-	Int.		42.3	D	Int.		43.1	D	-					

~~**Notes:** L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection~~
~~*For analysis purposes, based on the anticipated construction start date in late 2017 and the estimated construction phasing, the peak construction traffic period is assumed to occur in 2018.~~

PARKING

As described above, the peak number of workers would be ~~233~~257 per day. It is anticipated that 44 percent of construction workers would commute to the project site by private autos at an average occupancy of approximately 1.46 persons per vehicle. The anticipated construction activities are therefore projected to generate a maximum parking demand of ~~70~~77 parking spaces. Based on the parking analysis presented in Chapter 9, “Transportation,” this construction parking demand is expected to be adequately accommodated by the off-street spaces and parking facilities available within a ¼-mile radius of the project site (481 available spaces during the No Action condition's weekday midday peak hour when the maximum parking demand is expected). Therefore, construction of the proposed project would not result in any parking shortfalls or the potential for any significant adverse parking impacts.

Table 15-5
No Action, With Action, and Mitigated Conditions
Weekday PM Construction Peak Hour Traffic Level of Service

Intersection	Construction 2019 No Action* Lane Group	v/c Ratio	Delay (sec)	LOS	Construction 2019 With Action* Lane Group	v/c Ratio	Delay (sec)	LOS		Construction 2019 Mitigation* Lane Group	v/c Ratio	Delay (sec)	LOS	Recommended Mitigation Measures
Columbus Avenue and West 83rd Street														
Westbound	LT	0.40	18.8	B	LT	0.40	18.8	B						No significant adverse impact
Southbound	TR	0.84	24.4	C	TR	0.85	24.6	C						
	Int.		23.5	C	Int.		23.7	C						
Columbus Avenue and West 82nd Street														
Eastbound	TR	0.34	18.0	B	TR	0.35	18.1	B						No significant adverse impact
Northbound	L	0.19	16.3	B	L	0.19	16.3	B						
Southbound	T	0.76	21.1	C	T	0.77	21.3	C						
	Int.		20.5	C	Int.		20.6	C						
Columbus Avenue and West 81st Street														
Eastbound	T	0.80	51.0	D	T	0.80	51.0	D		T	0.80	51.0	D	Temporary shift of one second of green time from southbound through phase (with permitted left turn) to southbound left-through phase (with protected left turn)
	R	0.13	28.4	C	R	0.13	28.4	C		R	0.13	28.4	C	
Westbound	L	1.02	82.9	F	L	1.02	82.9	F		L	1.02	82.9	F	
Southbound	**L**	**0.96**	**91.9**	**F**	**L**	**1.00**	**100.4**	**F**	**+**	L	0.92	81.0	F	
	T	0.74	22.0	C	T	0.74	22.1	C		T	0.74	22.1	C	
	Int.		45.1	D	Int.		46.0	D		Int.		44.2	D	
Columbus Avenue and West 80th Street														
Eastbound	R	0.17	22.1	C	R	0.17	22.1	C						No significant adverse impact
Southbound	T	0.78	13.5	B	T	0.79	13.6	B						
	Int.		13.8	B	Int.		13.9	B						
Columbus Avenue and West 79th Street														
Eastbound	R	0.78	55.4	E	R	0.78	55.4	E						No significant adverse impact
Southbound	T	1.08	70.0	E	T	1.08	71.8	E						
	R	0.47	5.4	A	R	0.47	5.4	A						
	Int.		54.2	D	Int.		55.5	E						
Columbus Avenue and West 78th Street														
Eastbound	R	0.38	26.0	C	R	0.38	26.0	C						No significant adverse impact
Southbound	T	0.73	12.3	B	T	0.73	12.3	B						
	Int.		13.3	B	Int.		13.4	B						
Columbus Avenue and West 77th Street														
Westbound	LT	0.64	37.8	D	LT	0.64	37.8	D						No significant adverse impact
Southbound	L	0.83	66.1	E	L	0.83	66.1	E						
	TR	0.75	13.0	B	TR	0.76	13.0	B						
	Int.		21.0	C	Int.		21.1	C						
Central Park West and West 83rd Street														
Northbound	LT	1.06	66.8	E	LT	1.08	69.0	E						No significant adverse impact
Southbound	TR	0.50	14.1	B	TR	0.50	14.1	B						
	Int.		45.4	D	Int.		46.8	D						
Central Park West and West 82nd Street														
Eastbound	LR	0.39	24.8	C	LR	0.41	25.2	C						No significant adverse impact
Northbound	T	0.63	16.2	B	T	0.63	16.3	B						
Southbound	T	0.41	12.8	B	T	0.41	12.8	B						
	Int.		15.9	B	Int.		16.0	B						
Central Park West and West 81st Street														
Eastbound	L	0.42	26.6	C	L	0.48	28.7	C						No significant adverse impact
	T	0.91	52.1	D	T	0.94	56.8	E						
	R	0.13	24.6	C	R	0.13	24.6	C						
Westbound	L	1.06	103.4	F	L	1.06	103.4	F						
	LT	1.06	84.4	F	LT	1.06	84.4	F						
	R	0.96	80.5	F	R	0.96	80.5	F						
Northbound	LTR	1.07	73.8	E	LTR	1.07	73.8	E						
Southbound	LTR	0.95	48.7	D	LTR	0.97	53.4	D						
	Int.		67.7	E	Int.		69.2	E						
Central Park West and West 77th Street														
Eastbound	LR	0.42	25.4	C	LR	0.42	25.4	C						No significant adverse impact
Northbound	LT	0.97	40.8	D	LT	0.97	41.4	D						
Southbound	TR	0.63	16.4	B	TR	0.63	16.4	B						
	Int.		29.5	C	Int.		29.8	C						

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, Int. = Intersection.
This table has been moved compared to the DEIS.
*For analysis purposes, based on the anticipated construction start date in late 2017 and the estimated construction phasing, the peak construction traffic period is assumed to occur in 2019.

Construction staging is expected to result in the loss of approximately four on-street parking spaces on the east curbside of Columbus Avenue between West 80th Street and West 78th Street. Parking demand displaced by this potential loss in on-street parking capacity also could be absorbed by available parking capacity elsewhere in the surrounding neighborhood. Under the With Action Condition, the incremental parking demand generated by the proposed project's construction activities was also not assumed to utilize any of these on-street parking spaces. Therefore, the loss of this parking would not affect the project's impact assessment.

Under the No Action Condition, the M79 SBS route ~~will be implemented~~is accounted for, resulting in curb lane and parking changes along West 81st Street in the study area. The implementation of the SBS could result in the loss of approximately 16 to 18 on-street parking spaces on the south curbside of West 81st Street between Amsterdam Avenue and Columbus Avenue. In addition, in conjunction with the SBS implementation there would be increased weekday parking for school buses along northbound Central Park West that would result in the loss of approximately 24 spaces from 9 AM to 2 PM. Parking demand displaced by these reductions in on-street parking capacity also could be absorbed by available parking capacity elsewhere in the surrounding neighborhood. Under the With Action Condition, the incremental parking demand generated by the proposed project's construction activities was also not assumed to utilize any of these on-street parking spaces. Therefore, the loss of this parking would not affect the project's impact assessment. Even with the displacement of these on-street parking spaces, the proposed project's peak construction activities under the With Action Condition would not result in the potential for a parking shortfall or a significant adverse parking impact.

TRANSIT

It is anticipated that approximately 54 percent of construction workers would commute to the project site via transit. The study area is well served by several mass transit options, including three subway lines (No.1, B, and C) and six bus routes (M7, M10, M11, M79). During the peak-construction period when ~~233~~257 average daily construction workers would be on site, approximately ~~126~~139 would travel by transit. With 80 percent of these workers arriving or departing during the construction peak hours, the estimated number of peak-hour transit trips would be ~~101~~111, which is well below the *CEQR Technical Manual* 200-transit-trip analysis threshold warranting further assessment. Therefore, construction of the proposed project would not result in any significant adverse transit impacts.

PEDESTRIANS

As summarized above, ~~233~~257 average daily construction workers are projected in the 7:00 AM to 4:00 PM shift during peak construction. With 80 percent of these workers arriving or departing during the construction peak hours (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM), the corresponding numbers of peak-hour pedestrian trips traversing the area's sidewalks, corners, and crosswalks would be ~~186. This number is below the *CEQR Technical Manual* 200-~~206. These project-generated pedestrian~~-trip analysis threshold for detailed analysis. Therefore,~~ trips during peak construction ~~of~~would be less than would be realized with the proposed project in 2021. In addition, since the comparatively lower construction worker pedestrian trips would occur earlier than the typical commuter peak hours, when background pedestrian levels are lower, construction conditions with the proposed project would not result in any significant adverse ~~pedestrian~~ impacts. A summary of potential changes in pedestrian circulation patterns and expected conditions during the peak construction period is summarized below.

79TH STREET GREENMARKET

During construction of the proposed project, it is expected that the 79th Street Greenmarket, which currently operates on Sundays on the east side of Columbus Avenue between West 77th Street and West 81st Street, would shift its operations south of the construction area. It would likely maintain some of its operations along the east side of Columbus Avenue south of West 78th Street and also make use of the north side of West 77th Street between Columbus Avenue and Central Park West. The shift in Greenmarket operations is not expected to alter the general pedestrian directional approach paths surrounding the Museum; Sunday peak hour conditions at the pedestrian elements along the west side of Columbus Avenue analyzed in Chapter 9, "Transportation," would likewise be similar.

Regarding pedestrian conditions along West 77th Street, a similar pedestrian diversion to that described for the west side of Columbus Avenue in Chapter 9, "Transportation," could occur along the south side of West 77th Street between Columbus Avenue and Central Park West, where there would likely be temporary increases in pedestrian levels due to diverted pedestrians from the north sidewalk. Conditions on the south sidewalk of West 77th Street are nonetheless expected to remain favorable because West 77th Street between Columbus Avenue and Central Park West is not a high activity corridor and background pedestrian levels are generally lower than those on Columbus Avenue, a commercial corridor.

CLOSURE OF WESTON PAVILION

During construction of the proposed project, the Weston Pavilion on Columbus Avenue would be unavailable as an access for Museum visitors. The closure of this entry point is not expected to have a major effect on how pedestrians directionally approach the Museum, as they would continue to use the same paths to arrive at the Museum's superblock. But it would yield changes in how pedestrians access Museum entry points, as they divert to different entries and exits. Most of the trips originating from the south would likely divert to Central Park West south of the main entrance, while trips from the north and west would divert to the West 81st Street entrance.

As shown in Chapter 9, "Transportation," the sidewalks and corners adjacent to the Museum's superblock that were included for analysis would operate at favorable conditions (LOS A or B) in the 2021 No Action and With Action conditions. These conditions are prevalent along frontages of the Museum superblock where pedestrians would be diverted; these sidewalks are substantially wider than those along neighboring blocks and can accommodate peak hour pedestrian volumes greater than would be diverted from the Weston Pavilion entrance without experiencing congested pedestrian flows.

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. In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM) emissions. Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of carbon monoxide (CO). Since EPA mandates the use of ultra-low sulfur diesel (ULSD) fuel for all highway and non-road diesel engines, sulfur oxides (SO_x) emitted from the proposed project's construction activities would be negligible. Therefore, the four primary air pollutants of concern for construction activities are nitrogen dioxide (NO_2), particles with an aerodynamic diameter of less than or equal to 10 micrometers

(PM_{10}), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO.

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. These factors include the duration and intensity of construction activities, the location of nearby sensitive receptors, the use of emission control measures, and project generated construction-related vehicle trips.

DURATION AND INTENSITY OF CONSTRUCTION ACTIVITIES

Construction of the proposed project, as is the case with any large construction project, would be disruptive to the surrounding area. While the overall construction for the proposed project is anticipated to take approximately 36 months, the duration for the most intense construction activities in terms of air pollutant emissions (demolition, excavation, and foundation activities where the largest number of large non-road diesel engines such as excavators, rock splitters, and caisson drills would be employed) is anticipated to be 9 months. Construction sources would move around the project site over the construction period such that the air pollutant concentration increments due to construction of the proposed project would not persist in any single location.

The other stages of construction, including superstructure, exteriors, interiors and finishing, and site-work would result in much lower air emissions since they would require few pieces of heavy duty diesel equipment. A list of the non-road construction equipment that would likely be operated during the construction of the proposed project is provided **Appendix C**, along with the equipment engine type, estimated engine size, and quantity for each type of equipment. Most of the equipment required for the latter stages of construction would have small engines and be dispersed vertically throughout the building, resulting in low pollutant concentration increments in adjacent areas. The tower crane employed during construction would be powered by an electric engine; unlike diesel and gasoline powered engines, electric engines do not generate any air pollutant emissions. With the exception of site work, the latter stages of construction would not involve soil disturbance activities and therefore would result in lower dust emissions. Most of the interior and finishing activities would occur within an enclosed building where the work would be shielded from nearby sensitive receptors.

Based on the nature of the construction work for the proposed building, construction activities would not be considered out of the ordinary in terms of intensity; the construction activity levels associated with the proposed project are typical of building construction in New York City that would require demolition, excavation and foundation construction. Overall, emissions associated with the construction of the proposed project would likely be lower than a typical project due to the emission control measures implemented during construction (see “Emission Control Measures,” below).

LOCATION OF NEARBY SENSITIVE RECEPTORS

The area surrounding the project site contains a mix of uses—including parks, residential buildings, and various commercial uses—and includes varied building forms. The nearest receptors are Theodore Roosevelt Park and the Museum itself. Generally, the project site is located at some distance away from residential uses; the nearest residence is the 101 West 79th Condominium Residences, approximately 175 feet west of the project site and approximately 80 feet west of the construction area; such distances between the construction sources and the receptors would result in increased dispersion of pollutants. The construction site perimeter barriers would serve as a buffer between the emission sources and this sensitive residential receptor location. Although the Museum itself and users of the Theodore Roosevelt Park are immediately adjacent to the proposed construction activities, construction sources would move throughout the site over the construction period which would minimize the impact to any one location of Theodore Roosevelt Park and the Museum. In addition, emissions associated with the construction of the proposed project would be lower than a typical construction project due to the emission control measures implemented during construction (see "Emission Control Measures," below). Therefore, potential concentration increments from on-site construction sources at such locations would be reduced.

EMISSION CONTROL MEASURES

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include dust suppression measures and idling restrictions:

- *Dust Control.* To minimize fugitive dust emissions from construction activities, a fugitive dust control plan including a robust watering program would be required as part of contract specifications. For example, all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the project site; and water sprays would be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air. Loose materials would be watered, stabilized with a chemical suppressing agent, or covered. All measures required by the portion of the *New York City Air Pollution Control Code* regulating construction-related dust emissions would be implemented.
- *Idling Restriction.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time will 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 are otherwise required for the proper operation of the engine.

Construction of the proposed project would be subject to New York City Local Law 77, which requires the use of ULSD fuel and Best Available Technology (BAT) for equipment at the time of construction.[1]

- *Clean Fuel.* ULSD[2] fuel will be used exclusively for all diesel engines throughout the project site.

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[1] New York City Administrative Code § 24-163.3, adopted December 22, 2003, also known as Local Law 77, requires that any diesel-powered non-road engine with a power output of 50 hp or greater shall be powered by ULSD, and utilize the BAT for reducing the emission of pollutants, primarily particulate matter and secondarily nitrogen oxides. This requirement applies to all city-owned non-road diesel vehicles and engines and any privately owned diesel vehicles and engines used on construction projects funded by the City.

[2] EPA required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and non-road engines and equipment, including construction equipment. As of 2015, the diesel fuel produced by all large refiners, small refiners, and importers must be ULSD fuel. Sulfur levels in non-road diesel fuel are limited to a maximum of 15 parts per million.

- *Best Available Tailpipe Reduction Technologies*. Non-road 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 technology (BAT) for reducing DPM emissions. Diesel particulate filters (DPFs) have been identified as being 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 by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board (CARB). Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.

In addition, the proposed project would implement the following measures to the extent practicable to further reduce air pollutant emissions during construction:

- *Diesel Equipment Reduction*. Electrically powered equipment would be preferred over diesel-powered and gasoline-powered versions of that equipment to the extent practicable. Equipment that would use the grid power in lieu of diesel engines includes, but may not be limited to, hoists, the tower crane that would be employed during construction, and small equipment such as welders.
- Utilization of Newer Equipment. EPA's Tier 1 through 4 standards for nonroad diesel engines regulate the emission of criteria pollutants from new engines, including PM, CO, NOx, and hydrocarbons. All diesel-powered nonroad construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3[3] emissions standard. All diesel-powered engines in the project rated less than 50 hp would meet at least the Tier 2 emissions standard.

Overall, this emissions control program is expected to significantly reduce air pollutant emissions during construction of the proposed project

OFF-SITE SOURCES

Construction worker commuting trips and construction truck deliveries would generally occur during off-peak hours. In addition, when distributed over the transportation network, the construction trip increments would not concentrate at any single location. Construction generated traffic increments would also not exceed the *CEQR Technical Manual* CO screening threshold of 170 peak hour trips at intersections in the area, or the fine particulate matter ($PM_{2.5}$) emissions screening thresholds discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manua*l. Therefore, further mobile-source analysis is not required.

[3] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment manufactured in 2000 through 2008. In 2004, the EPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the EPA criteria pollutants, including PM, hydrocarbons (HC), NO_x and carbon monoxide (CO. Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

CONCLUSIONS

Based on the analyses provided and implementation of the emissions reduction program described above, construction of the proposed project would not result in any significant adverse construction air quality impacts, and no further analysis is required.

NOISE

INTRODUCTION

Potential impacts on community noise levels during construction of the proposed project could result from noise due to construction equipment operation and from noise due to construction vehicles and delivery vehicles traveling to and from the site. Noise and vibration levels at a given location are dependent on the kind and number of pieces of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Noise levels caused by construction activities would vary widely, depending on the stage of construction and the location of the construction relative to receptor locations as described below. The most noise-intensive construction activities would not occur every day throughout the months that they occur and do not occur during every hour on days that they occur. During hours when the loudest pieces of construction equipment are not in use, receptors would experience lower construction noise levels. Construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction. The most substantial construction noise sources are expected to be impact equipment such as jackhammers, excavators with hydraulic break rams, and paving breakers, as well as the movements of trucks.

Construction noise is regulated by the requirements of the *New York City Noise Control Code* (also known as Chapter 24 of the *Administrative Code of the City of New York*, or Local Law 113) and the DEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation (also known as Chapter 28). These requirements mandate that specific construction equipment and motor vehicles meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction materials be handled and transported in such a manner as not to create unnecessary noise. As described above, for weekend and after hour work, permits would be required to be obtained, as specified in the *New York City Noise Control Code*. As required under the *New York City Noise Control Code*, a site-specific noise mitigation plan for the proposed project would be developed and implemented that may include source controls, path controls, and receiver controls.

CONSTRUCTION NOISE IMPACT CRITERIA

Chapter 22, Section 100 of the *CEQR Technical Manual* breaks construction duration into "short-term" and "long-term" and states that construction noise is not likely to require analysis unless it "affects a sensitive receptor over a long period of time." Consequently, the construction noise analysis considers both the potential for construction of a project to create high noise levels (the "intensity"), and whether construction noise would occur for an extended period of time (the "duration") in evaluating potential construction noise effects.

~~Chapter 19, Section 421 of the *CEQR Technical Manual*~~Chapter 19, Section 410 of the *CEQR Technical Manual* identifies operational noise impact criteria of 3-5 dBA over the No Action noise level. These criteria serve as a screening-level threshold for potential construction noise impacts. If construction of the project would not result in any exceedances of these criteria at a given receptor, then that receptor would not have the potential to experience a construction noise impact. However, if construction of the proposed project would result in exceedances of these noise impact criteria, then further consideration of the intensity and duration of construction noise would be warranted at that receptor. states that the impact criteria for vehicular sources, using conditions without the proposed project, or the "No Action" noise level as the baseline, should be used for assessing construction effects. As recommended in Chapter 19, Section 410 of the *CEQR Technical Manual*, 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 $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- 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 being between 10PM and 7AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.

NOISE ANALYSIS FUNDAMENTALS

As stated above, construction activities for the proposed project would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the roadways to and from the project site. The effect of each of these noise sources was evaluated. The results presented below show the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicle operation) on noise levels at nearby noise receptor locations.

Noise from the operation of construction equipment at a specific receptor location near a construction site is generally calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of the following:

- 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 piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.
- Similarly, noise levels due to construction-related traffic are a function of the following:
- The noise emission levels of the type of 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.

CONSTRUCTION NOISE MODELING

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment) and transportation sources (e.g., roads, highways, railroad lines, busways, waterways, airports). The model takes into account the reference sound pressure levels of the noise sources at 50 feet, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. The CadnaA model is a state-of-the-art tool for noise analysis and is approved for construction noise level prediction by the *CEQR Technical Manual*.

Geographic input data to be used with the CadnaA model includes CAD drawings defining planned site work areas, adjacent building footprints and heights, locations of streets, and locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics of each piece of construction equipment were input to the model. Reflections and shielding by barriers and project elements erected on the construction site and shielding from adjacent buildings were also accounted for in the model. The model produces A-weighted $L_{eq(1)}$ noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

NOISE ANALYSIS METHODOLOGY

The construction noise methodology involved the following process:

1. Select analysis hours for cumulative on-site equipment and construction truck noise analysis. The 7 AM hour was selected as the analysis hour because this would be the hour when the highest number of truck trips to and from the construction site would overlap with on-site equipment operation.
2. Select receptor locations for cumulative on-site equipment and construction truck noise analysis. Selected receptors were representative of open space, residential, or other noise-sensitive uses potentially affected by the construction of the proposed project during operation of on-site construction equipment and/or along routes taken to and from the project site by construction trucks.
3. Establish existing noise levels at selected receptors. Noise levels were measured at several at-grade locations, and calculated for the other noise receptor locations included in the analysis. **Figure 15-11** shows the construction noise measurement locations. Existing noise levels at noise receptors other than the selected noise measurement locations were established using the CadnaA model along with existing-condition traffic information.
4. Establish worst-case noise analysis periods under the projected construction phasing schedule. The worst-case noise analysis periods are the periods during the construction schedule that are expected to have the greatest potential to result in construction noise effect. These periods were determined based on number and type of equipment operating on site, and the amount of construction-related vehicular traffic expected to occur according to the construction schedule and logistics. At least one analysis period was selected per year of

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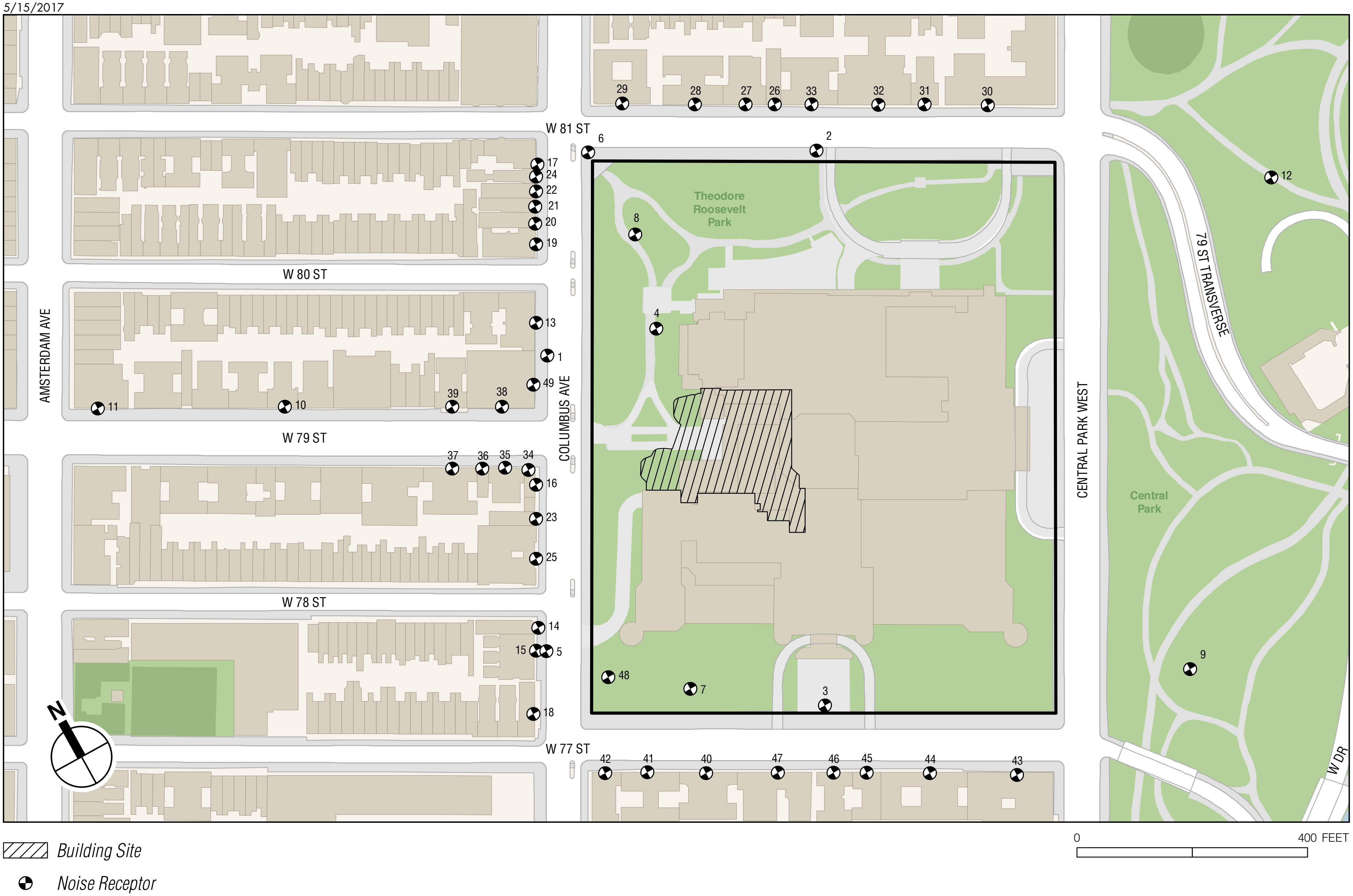

AMNH Gilder Center for Science, Education, and Innovation

Noise Receptor Locations
Figure 15-11

construction. ~~Six~~Seven analysis periods throughout the construction schedule were selected. Because the analysis is based on worst-case periods, it does not capture the ~~natural~~full variability of construction noise at each receptor. The level of noise produced by construction fluctuates throughout the days and months of the construction period, while the construction noise analysis is based on the worst-case time periods only, which is conservative.

5. Calculate construction noise levels for each analysis period at each receptor location. Given the on-site equipment and construction truck trips that are expected during each of the analysis periods, and the location of the equipment, which was based on construction logistics diagrams and construction truck and worker vehicle trip assignments, a CadnaA model file for each analysis period was created. All model files included each of the construction noise sources during the analysis period and hour, calculation points representing multiple locations on various façades and floors of the associated receptors previously identified, as well as the noise control measures that would be used on the site, as described below.
6. Determine total noise levels and noise level increments during construction. For each analysis period and each noise receptor, the calculated level of construction noise was logarithmically added to the existing noise level to determine the cumulative total noise level. The existing noise level at each receptor was then arithmetically subtracted from the cumulative noise level in each analysis period to determine the noise level increments.
7. Establish construction noise duration. For each receptor, the noise level increments in each analysis period were examined to determine the duration during construction that the receptor would experience substantially elevated noise levels.
8. Compare noise level increments with operational impact criteria as set forth in Chapter 19, Section ~~421~~ 410 of the *CEQR Technical Manual*. At each receptor where exceedances of this screening threshold were predicted, based on the magnitude and duration of predicted noise level increases due to construction, a determination of whether the proposed project would have the potential to result in significant adverse construction noise effects was made.

NOISE REDUCTION MEASURES

Construction of the proposed project would be required to follow the requirements of the *NYC Noise Control Code* (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) for construction noise control measures. Specific noise control measures would be incorporated in noise mitigation plan(s) required under the *NYC Noise Code* as is called for in Chapter 22, "Construction," of the *CEQR Technical Manual*. These measures could include a variety of source and path controls.

Between the Draft EIS and Final EIS, AMNH modified the construction logistics plan and examined and evaluated additional noise control measures to reduce the magnitude and duration of noise that would occur at nearby receptors as a result of construction of the proposed project. These measures included selections of quieter equipment, including person lifts, landscaping excavators, and landscaping loaders. Additionally, the construction logistics during façade construction and interior-fit out were refined such that up to 2 delivery trucks (i.e., one tractor trailer and one box truck) would typically be unloaded at a time, rather than 4 as was accounted for in the Draft EIS. These changes are reflected in the Final EIS construction noise analysis described below, which includes detailed noise modeling for multiple stages during the construction period.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures would be implemented in accordance with the *NYC Noise Code*:

- Equipment that meets the sound level standards specified in Subchapter 5 of the *NYC Noise Control Code* and Table 22-1 of the *CEQR Technical Manual* would be utilized from the start of construction. Additionally, for construction of the proposed project, AMNH has committed to lower noise emission limits for specific pieces of equipment (i.e., cranes, generators, person lifts, landscaping excavators, and landscaping loaders). **Table 15-6** shows the noise levels for typical construction equipment and the mandated ~~noise levels for the equipment that would be used for construction of the proposed project, including a quieter~~ project-specific ~~limit for cranes~~noise emission limits for select types of equipment.
- As early in the construction period as logistics would allow (likely by the start of the superstructure phase of construction pending service provisions from Con Edison), diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification) to the extent feasible and practicable.
- Where feasible and practicable, 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 Title 24, Chapter 1, Subchapter 7, Section 24-163 of the *NYC Administrative Code*.

Contractors and subcontractors would be required to properly maintain their equipment and mufflers. 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 practicable:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations.
- Site perimeter barriers constructed from plywood or other comparable materials would be installed around the construction site at a height of at least 8 feet, which would provide shielding for noise;
- A structure enclosed on three sides and with a roof would be constructed to house the concrete pump and two concrete mixer trucks as they access the pump;
- A structure enclosed on three sides and with a roof would be constructed to house concrete mixer trucks as they are washed out before leaving the site; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be employed for certain dominant noise equipment to the extent feasible and practical based on the results of the construction noise calculations. The details to construct portable noise barriers, enclosures, tents, etc. are shown in DEP's "Rules for Citywide Construction Noise Mitigation."[4]

[4] As found at: http://www.nyc.gov/html/dep/pdf/noise_constr_rule.pdf

Table 15-6
Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	DEP Typical Noise Level at 50 feet[1]
Auger Drill Rig	85
Backhoe	80
Bar Bender	80
Cherry Picker	75[2]
Compactor (ground)	80
Compressor (air, less than or equal to 350 cfm)	53
Compressor (air, greater than 350 cfm)	80
Concrete Mixer Truck	85
Concrete Pump Truck	82
Concrete Saw	90
Crane	75[2]
Dozer	85
Drill Rig Truck	84
Dump Truck	84
Dumpster/Rubbish Removal	78
Excavator	85
Excavator (landscaping)	70[2]
Flat Bed Truck	84
Front End Loader	80
~~Generator~~Front End Loader (landscaping)	~~82~~65[2]
Generator ~~(< 25 KVA, VMS signs)~~	~~70~~72[2]
Gradall	85
Hydraulic Break Ram	90
Hoist	75
Impact Pile Driver	95
Jackhammer	85
Man Lift[3]	~~85~~75[2]
Paver	85
Pickup Truck	55
Pneumatic Tools	85
Pumps	77
Rock Drill	85
Roller	85
Slurry Plant	78
Soil Mix Drill Rig	80
Tractor	84
Vacuum Street Sweeper	80
Welder / Torch	73

Source: [1] "Rules for Citywide Construction Noise Mitigation," Chapter 28, DEP, 2007 and Table 22-1 of the *CEQR Technical Manual*.
[2] Project-specific commitment to quieter equipment
[3] Referred to as person lifts in this EIS

NOISE RECEPTOR SITES

Within the study area, 57 receptor locations (i.e., sites 1 to 57) were selected to represent buildings or noise-sensitive open space locations close to the project site for the construction noise analysis. These receptors were either located adjacent to planned areas of activity or streets where construction trucks would pass. At some buildings, multiple building façades were analyzed. At high-rise buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. The receptor sites selected for detailed analysis are representative locations where maximum project effects due to construction noise would be expected. At-grade noise measurements were conducted at sites 1 through 6 to determine existing noise levels in the study area.

Figure 15-11 shows the locations of the 57 noise receptor sites, and **Table 15-7** lists the six noise measurement sites and the 57 noise receptor sites as well as the associated land use at each site.

NOISE MEASUREMENT RESULTS

Equipment Used During Noise Survey

Measurements were performed using Brüel & Kjær Sound Level Meters (SLM) Type 2270, 2260, and Type 2250, Brüel & Kjær ½ inch microphones Type 4189, and a Brüel & Kjær Sound Level Calibrator Type 4231. The Brüel & Kjær SLMs are Type 1 instruments according to ANSI Standard S1.4-1983 (R2006). The SLMs have laboratory calibration dates within one year of the date of the measurements, as is standard practice. The microphones were mounted at a height of approximately 5 to 6 feet above the ground, away from any large reflecting surfaces that could affect the sound level measurements. The SLMs were calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. Measurements at the location were made on the A-scale (dBA). The data were digitally recorded by the SLM and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

Noise Survey Results

The baseline noise levels at each of the noise survey locations are shown in **Table 15-8**. Full noise survey results are shown in **Appendix C**. At all noise measurement locations, the dominant existing noise source was vehicular traffic on the adjacent roadways.

Table 15-7
Noise Receptor Locations

Receptor Number	Location	Land Use
1[1]	Columbus Avenue between West 79th Street and West 80 Street	Residential
2[1]	West 81st Street between Central Park West and Columbus Avenue	Open Space
3[1]	West 77th Street between Central Park West and Columbus Avenue	Open Space
4[1]	Theodore Roosevelt Park, adjacent to the northwestern façade of Museum	Open Space
5[1]	Columbus Avenue between West 77th Street and West 78th Street	Residential
6[1]	Columbus Avenue at West 81st Street	Open Space
7	Theodore Roosevelt Park Southwest	Open Space
8	Theodore Roosevelt Park Northwest	Open Space
9	Central Park (South)	Open Space
10	145 West 79th Street	Residential
11	401 Amsterdam Avenue	Residential
12	Central Park (North)	Open Space
13	100 West 80th Street	Residential
14	376 Columbus Avenue (Columbus Avenue façade)	Residential
15	370 Columbus Avenue	Residential
16	392 Columbus Avenue	Residential
17	100 West 81st Street	Residential
18	101 West 77th Street	Residential
19	418 Columbus Avenue	Residential
20	424 Columbus Avenue	Residential
21	426 Columbus Avenue	Residential
22	428 Columbus Avenue	Residential
23	386 Columbus Avenue	Residential
24	430 Columbus Avenue	Residential
25	101 West 78th Street (78th Street façade)	Residential
26	33 West 81st Street	Residential
27	35 West 81st Street	Residential
28	45 West 81st Street	Residential
29	51 West 81st Street	Residential
30	211 Central Park West	Residential
31	11 West 81st Street	Residential
32	15 West 81st Street	Residential
33	25 West 81st Street	Residential
34	392 Columbus Avenue (79th Street façade)	Residential
35	102 West 79th Street	Residential
36	110 West 79th Street	Residential
37	112 (118) West 79th Street	Residential
38	101 West 79th Street (79th Street façade)	Residential
39	117 West 79th Street	Residential
40	44 West 77th Street	Residential
41	52 West 77th Street	Residential
42	66 West 77th Street	Residential
43	170 Central Park West	Residential
44	6 West 77th Street	Residential
45	20 West 77th Street	Residential
46	22 West 77th Street	Residential
47	40 West 77th Street	Residential
48	Theodore Roosevelt Park Southwest	Open Space
49	101 West 79th Street (Columbus Avenue side)	Residential
50	121 West 81st St.	Residential
51	145 West 81st St.	Residential
52	136 West 80th St.	Residential
53	104 West 80th St.	Residential
54	109 West 78th St.	Residential
55	143 West 78th St.	Residential
56	100 West 77th St. (William J. O'Shea Campus East)	School
57	100 West 77th St. (William J. O'Shea Campus West)	School

Notes: ~~[1]At~~[1] At-grade noise level measurement location.

Table 15-8
Noise Survey Results in dBA

	Measurement Location	L_{EQ}
1	Columbus Avenue between West 79th Street and West 80 Street	73.3
2	West 81st Street between Central Park West and Columbus Avenue	63.8
3	West 77th Street between Central Park West and Columbus Avenue	63.5
4	South of Theodore Roosevelt Park, adjacent to western façade of Museum	62.2
5	Columbus Avenue between West 77th Street and West 78th Street	73.7
6	Columbus Avenue at West 81st Street	69.1

In terms of CEQR noise exposure guidelines (shown in Table 12-3 in Chapter 12, “Noise”), during the morning analysis hour, existing noise levels at site 4 are in the “clearly acceptable” category, existing noise levels at sites 2 and 3 are in the “marginally acceptable” category, and existing noise levels at sites 1, 5, and 6 are in the “marginally unacceptable” category.

CONSTRUCTION NOISE ANALYSIS RESULTS

Between the Draft EIS and Final EIS, AMNH modified the construction logistics plan and examined and evaluated additional noise control measures to reduce the magnitude and duration of noise that would occur at nearby receptors as a result of construction of the proposed project. These measures included selections of quieter equipment, including person lifts, landscaping excavators, and landscaping loaders. Additionally, the construction logistics during façade construction and interior-fit out were refined such that up to 2 delivery trucks (i.e., one tractor trailer and one box truck) would typically be unloaded at a time, rather than 4 as was accounted for in the DEIS. The construction schedule was also updated based on additional information from the geotechnical report for the project site, indicating that rock excavation would occur over a shorter period (3 months rather than the 5 months accounted for in the DEIS), and that pile installation for SOE would be necessary over a duration of approximately 3 months during substructure.

Using the methodology described above, and considering the noise abatement measures ~~from path controls~~ specified above, cumulative noise analyses were performed to determine maximum 1-hour equivalent ($L_{eq(1)}$) noise levels that would be expected during each of the ~~six~~seven months of the construction period selected for analysis. This resulted in a predicted range of peak hourly construction noise levels throughout the construction period.

Construction of the proposed project is predicted to at times result in noise level increases at open space areas in Theodore Roosevelt Park close to the construction area, and at noise sensitive uses in buildings immediately west of Columbus Avenue. Areas within Theodore Roosevelt Park that remain open and active during construction immediately adjacent to construction work areas would experience the highest levels of construction noise (during the times construction is ongoing immediately adjacent), whereas receptors in buildings further west of the project site would experience less noise because of the greater distance from the on-site construction equipment. The results of the detailed construction noise analysis are summarized in **Table 15-9**.

Table 15-9
Construction Noise Analysis Results in dBA

Receptor	Location	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}[1]	
		Min	Max	Min	Max	Min	Max
1	Columbus Avenue between West 79th Street and West 80 Street	73.3	73.3	73.6	75.~~9~~2	0.3	~~2.6~~1.9
2	West 81st Street between Central Park West and Columbus Avenue	63.8	63.8	~~63.9~~ 64.1	66.~~6~~1	0.~~1~~3	2.~~8~~4
3	West 77th Street between Central Park West and Columbus Avenue	63.5	63.5	63.6	63.~~7~~6	0.1	0.~~2~~1
4	South of Theodore Roosevelt Park, adjacent to western façade of Museum	62.2	62.2	~~63.0~~ 64.6	71.~~6~~5	~~0.8~~ 2.5	9.~~4~~3
5	Columbus Avenue between West 77th Street and West 78th Street	73.7	73.7	73.8	74.5	0.2	0.8
6	Columbus Avenue at West 81st Street	69.1	69.1	69.4	70.~~8~~5	0.3	1.~~8~~5
7	Theodore Roosevelt Park Northwest	59.7	59.7	60.0	60.~~3~~9	0.3	~~0.6~~ 1.2
8	Theodore Roosevelt Park South	63.4	63.4	63.~~7~~8	~~69.7~~ 68.4	0.~~3~~4	~~6.3~~ 5.0
9	Central Park (South)	58.6	58.6	58.6	58.6	0.0	0.~~1~~0
10	145 West 79th Street	58.6	61.9	61.6	~~67.2~~ 65.4	0.~~3~~2	6.8~~.6~~
11	401 Amsterdam Avenue	58.6	61.7	~~60.1~~ 59.9	~~64.2~~ 62.3	0.1	3.5~~.6~~
12	Central Park (North)	58.6	58.6	58.6	58.8	0.0	0.3
13	410 Columbus Avenue	65.6	69.8	69.2	~~74.5~~ 75.3	0.3	8.~~3~~6
14	376 Columbus Avenue (Columbus Avenue façade)	69.5	71.1	70.~~2~~3	73.~~1~~5	0.~~3~~2	~~3.3~~ 4.0
15	370 Columbus Avenue	69.8	70.9	70.~~3~~2	~~72.7~~ 73.2	0.~~3~~2	~~2.7~~ 3.4
16	392 Columbus Avenue	72.7	73.7	73.~~9~~4	~~78.4~~ 77.7	0.~~9~~4	~~5.6~~ 4.9
17	100 West 81st Street	63.9	66.1	65.6	68.~~9~~3	0.4	~~5~~4.1
18	101 West 77th Street	70.0	71.0	70.~~2~~3	~~71.9~~ 72.6	0.2	~~1~~2.6
19	418 Columbus Avenue	66.6	70.0	69.2	~~72.3~~ 71.7	0.~~2~~3	~~5.2~~ 4.8
20	424 Columbus Avenue	69.2	70.0	69.4	71.~~6~~2	0.2	1.~~9~~3
21	426 Columbus Avenue	69.2	70.0	69.4	71.~~5~~1	0.2	1.~~8~~2
22	428 Columbus Avenue	68.2	70.1	69.~~1~~2	71.~~5~~6	0.2	3.~~0~~1
23	386 Columbus Avenue	69.1	73.6	73.~~2~~1	77.~~7~~0	0.~~5~~3	6.~~8~~3
24	430 Columbus Avenue	68.7	70.3	69.~~3~~4	71.6	0.2	2.~~6~~3
25	101 West 78th Street (78th Street façade)	71.3	73.7	~~73.1~~ 72.7	~~76.1~~ 75.5	0.~~2~~1	~~4.5~~ 3.2
26	33 West 81st Street	58.6	59.8	~~58.9~~ 59.8	65.~~7~~3	0.~~2~~4	~~7.1~~ 6.4

Table 15-9 (cont'd)
Construction Noise Analysis Results in dBA

Receptor	Location	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}[1]	
		Min	Max	Min	Max	Min	Max
27	35 West 81st Street	58.6	59.9	59.~~0~~8	~~66.1~~ 65.6	0.~~2~~4	~~7.3~~ 6.9
28	45 West 81st Street	58.6	60.2	59.~~2~~7	66.~~6~~1	0.~~2~~3	~~8.0~~ 7.6
29	51 West 81st Street	60.3	64.8	63.~~7~~4	67.~~3~~0	0.2	6.~~4~~5
30	211 Central Park West	58.6	59.2	58.6	~~64.4~~ 63.1	0.1	~~5.6~~ 4.3
31	11 West 81st Street	58.6	59.2	58.~~7~~9	~~65.6~~ 64.5	0.1	~~6~~5.9
32	15 West 81st Street	58.6	59.4	~~58.8~~ 59.3	~~66.1~~ 65.6	0.~~2~~4	7.~~5~~0
33	25 West 81st Street	58.6	59.6	59.~~0~~4	64.9	0.~~2~~5	6.~~3~~4
34	392 Columbus Avenue (79th Street façade)	66.5	67.3	~~69.3~~ 68.0	77.~~4~~0	~~2.8~~ 1.4	10.~~9~~5
35	102 West 79th Street	63.9	65.4	~~66.3~~ 65.6	~~75.0~~ 74.6	~~2.4~~ 1.7	~~10.0~~ 9.8
36	110 West 79th Street	62.7	64.0	~~65.0~~ 64.4	~~73.9~~ 72.8	~~2.2~~ 1.7	~~10.1~~ 9.0
37	112 (118) West 79th Street	60.4	62.8	~~64.0~~ 63.6	~~72~~ 74.6	1.~~9~~5	~~11.6~~ 13.9
38	101 West 79th Street (79th Street façade)	59.2	65.0	65.~~7~~0	75.~~0~~2	~~2.0~~ 1.4	~~12.3~~ 11.7
39	117 West 79th Street	62.1	62.8	63.~~7~~3	~~72.3~~ 70.2	1.~~6~~2	~~10.0~~ 7.9
40	44 West 77th Street	59.4	63.4	59.8	63.~~8~~7	0.1	~~4.4~~ 3.1
41	52 West 77th Street	61.2	64.0	~~62.1~~ 61.9	~~64~~ 66.6	0.~~2~~3	~~3.0~~ 4.2
42	66 West 77th Street	67.3	69.3	67.8	70.~~0~~6	0.~~2~~1	2.~~2~~9
43	170 Central Park West	63.6	66.6	63.6	66.6	0.0	0.~~3~~2
44	6 West 77th Street	61.5	66.2	61.6	66.2	0.0	~~4.0~~ 3.6
45	20 West 77th Street	61.6	66.3	61.8	66.3	0.0	~~4.4~~ 3.9
46	22 West 77th Street	63.9	66.4	63.9	66.4	0.0	0.2
47	40 West 77th Street	62.1	66.5	62.3	66.~~6~~5	0.0	2.~~9~~1
48	Theodore Roosevelt Park Southwest	67.0	67.0	67.~~7~~5	~~69~~ 71.8	0.~~7~~5	~~2~~4.8
49	101 West 79th Street (Columbus Ave. Side)	61.4	70.1	~~68.3~~ 66.9	~~76.4~~ 78.2	0.5	10.~~2~~5
50	121 West 81st Street	58.6	58.6	58.6	~~59.0~~ 58.9	0.1	0.4
51	145 West 81st Street	58.6	58.6	58.6	58.7	0.0	0.1
52	136 West 80th Street	61.3	62.7	61.3	62.8	0.0	0.1
53	104 West 80th Street	62.1	63.1	62.4	64.2	0.1	1.~~3~~7
54	109 West 78th Street	66.2	67.0	66.3	67.~~2~~1	0.0	0.~~2~~1
55	143 West 78th Street	65.6	66.4	65.7	66.5	0.0	0.~~1~~0
56	100 West 77th St. (William J. O'Shea Campus East)	59.0	60.5	59.1	~~61.1~~ 60.9	0.1	0.~~6~~4
57	100 West 77th St. (William J. O'Shea Campus West)	58.6	58.6	58.6	~~59.0~~ 58.8	0.0	0.~~4~~2

Note: [1]Noise level increments were calculated individually for each floor and façade of each building, so the maximum increment shown in each row may not correspond to the difference between the maximum Total L_{eq} and minimum Existing L_{eq}, as those two noise levels may not represent the same exact location on the a given building.

The maximum predicted noise levels shown in **Table 15-9** would occur during the most noise-intensive activities of construction, which typically do not occur every day throughout the months that they occur and do not occur during every hour on days that they occur. During hours when the loudest pieces of construction equipment (e.g., pile driver, hydraulic break ram) are not in use, receptors would experience lower construction noise levels. As described below, construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction.

Open Space Receptors in Theodore Roosevelt Park

At open space receptors in Theodore Roosevelt Park – Receptors 2, 3, 4, 6, 7, 8, and 48 - the existing noise levels range from the low 60s to low 70s dBA, depending on proximity to the adjacent roadways (i.e., Columbus Avenue, West 77th Street, and West 81st Street). These receptors are located in the Park north, west, and south of the existing Museum complex.

Construction of the proposed project is predicted to produce noise levels at most of these receptors in the mid 60s to mid 70s dBA, resulting in noise level increases of up to approximately ~~6~~5 dBA during the most noise-intensive stages of construction. However, at Receptor 4, which represents the area of Theodore Roosevelt Park immediately north of and closest to the construction work area, approximately between West 79th Street and West 80th Street, construction of the proposed project is predicted to result in noise levels up to the mid 70s dBA and noise level increases up to approximately 9 dBA.

~~6 dBA during the most noise-intensive stages of construction.~~The predicted noise level increases at these open space locations would be noticeable and would exceed ~~CEQR impact criteria~~initial construction noise screening threshold, and the total noise levels would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas already exceed CEQR recommended values under the existing condition). However, the total noise levels would be in the range considered typical for Manhattan, and for the surrounding area. Many New York City parks and open space areas, including Theodore Roosevelt Park, located near heavily trafficked roadways and/or near construction sites experience comparable, and sometimes higher, noise levels.

With respect to duration, at Receptor 4, the greatest noise level increases are predicted to occur during the approximately 3-month overlap of SOE sheeting installation with rock excavation and during the superstructure stage of construction before the building's exterior façade is constructed and shielding the Park from on-site construction activity. The total expected duration of ~~this period~~these periods is approximately ~~14~~13 non-consecutive months. Throughout the remainder of construction, noise levels in this area of the Park would be lower and would be comparable to existing noise levels in other areas of Theodore Roosevelt Park~~ immediately adjacent to roadways, although they would still exceed the CEQR impact criteria~~. At the remaining of these receptors, noise level increases ~~exceeding the CEQR impact criteria~~ are predicted to occur for up to two consecutive years of construction and would be within the typical range for open space areas in Manhattan throughout the construction period.

As described above, construction noise levels at these receptors were predicted to be in the mid 60s to mid 70s dBA with noise level increases up to approximately ~~6~~5 dBA with the exception of ~~a 14-month period~~13 non-consecutive months during substructure and superstructure activities at the portion of the park nearest the construction work area, where noise levels would be in the mid 70s with noise level increments up to approximately 9 dBA. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of open space would be limited. The construction noise predictions focus on the area of open space closest to the construction area. At other open space areas farther from construction work areas, noise levels would be lower. Based on these factors, construction noise associated with the proposed project at these receptors would not be expected to result in a significant adverse impact.

Residential Receptors along Columbus Avenue at West 79th Street

At residences located along Columbus Avenue from West 79th Street to West 80th Street west of the project site—Receptors 16, 34, 38, and 49—the existing noise levels range from the high 50s to low 70s dBA depending on proximity to Columbus Avenue and height above-grade (i.e., floor for high-rise buildings). These receptors represent 392 Columbus Avenue and 101 West 79th Street.

Construction of the proposed project is predicted to produce noise levels at most of these receptors in the high 60s to high mid 70s dBA, resulting in noise level increases of up to approximately 1112 dBA during the most noise-intensive stages of construction. The expected levels of noise are typical of New York City construction projects in residential areas and also would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels at these receptors would at times during the construction period be in the "clearly unacceptable" range during the most noise-intensive period of construction, and in the "marginally unacceptable" range throughout the remainder of construction.

However, at one of the residential receptors along West 79th Street directly west of the project work area (receptor 38, which represents 101 West 79th Street), construction of proposed project would produce noise levels in the high 70s dBA with noise level increases of up to approximately 12 dBA. While these noise level increases would be noticeable, noise levels in the high 70s dBA are typical for areas along heavily trafficked avenues such as Columbus Avenue and Amsterdam Avenue. Noise levels in the mid 70s are typical for areas near heavily trafficked roadways in New York City.

During the 36 months of construction, the construction activity that would produce the highest noise levels would be the overlap of SOE sheeting installation with rock excavation using mounted impact hammers during the 5, which would occur over the course of approximately 3 months ofduring substructure work. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period. Construction noise levels occurring during activities other than rock excavation would still result in perceptible noise level increasesminor exceedances of CEQR impact criteria at some times, including noise level increments up to approximately 10 dBA for up to 5 additional months and noise level increments up to approximately 8 dBA for the remainder of construction, but would be substantially lower than the maximum levels during rock excavation. For the majority of the construction period, noise levels at this receptor would be perceptibly lower than those predicted in the DEIS. –Furthermore, construction noise associated with the proposed project would typically occur during daytime hours when residences are less sensitive to noise.

Based on the prediction of construction noise levels up to the high 70s dBA with construction noise level increments up to approximately 12 dBA and a duration of maximum construction noise up to approximately 53 months, and noise level increments up to approximately 9-1110 dBA for up to 5 additional months, and increments up to approximately 8 dBA over the course of the other 3133 months of the construction period, construction noise associated with the proposed project at 101 West 79th Street and 392 Columbus Avenue (i.e., receptors 16, 34, 38, and 49) would not have the potential to result in a significant adverse construction noise impact. However, the predicted construction noise impacts at 101 West 79th Street could be fully

~~mitigated using either receptor control measures or source control measures, as described in Chapter 17, "Mitigation."~~

~~Based on field observations, 392 Columbus Avenue (receptors 16 and 34) appears to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 30 dBA window wall attenuation. Consequently, interior noise levels during construction in this area would be in the mid 40s dBA, up to approximately 5 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.~~

As presented above, construction noise from the proposed project does not represent a significant impact. Nonetheless, because receptor control measures were previously considered for 101 West 79th Street (i.e., storm windows and air conditioning units at residences that do not already have air conditioning) based on the findings of the DEIS, AMNH has committed to make an offer of these measures to residents of that building (see Chapter 17, "Mitigation"). ~~Based on the magnitude of noise level increases and the predicted interior noise levels, which would exceed the acceptable range according to CEQR noise exposure guidance by no more than 5 dBA even during the most noise-intensive periods of construction, as well as the limited duration of construction noise at these receptors, construction noise at these receptors, (i.e., Receptors 16 and 34 392 Columbus Avenue) would not rise to the level of a significant adverse impact.~~

Residential Receptors along Columbus Avenue from West 77th Street to West 78th Street and West 80th Street to West 81st Street

At residences located along Columbus Avenue from West 77th Street to West 79th Street and West 80th Street to West 81st Street west of the project site—Receptors 13 through 15, and 17 through 25—the existing noise levels range from the mid 60s to mid 70s dBA depending on proximity to Columbus Avenue, proximity to West 77th Street, and height above-grade (i.e., floor for high-rise buildings).

Construction of the proposed project is predicted to produce noise levels at ~~most of~~ these receptors in the high 60s to ~~mid~~high 70s dBA, resulting in noise level increases of up to approximately ~~8~~9 dBA during the most noise-intensive stages of construction. The expected levels of noise would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels throughout construction at these receptors would be in the "marginally unacceptable" range. The predicted noise level increases would be noticeable, but would be in the range considered typical for Manhattan and for this area in general.

~~At Receptors 13 and 23, which represent 100 West 80th Street and 386 Columbus Avenue, repsectively, project rock excavation using mounted impact hammers would produce noise levels in the mid 70s dBA, which would result in noise level increases up to approximately 8 dBA. While these noise level increases would be noticeable, noise levels in the mid 70s are not atypical for this area at locations along heavily trafficked avenues such as Columbus Avenue and Amsterdam Avenue.~~

During the 36 months of construction, the activity that would produce the highest noise levels at these receptors would be the overlap of SOE sheeting installation with rock excavation using mounted impact hammers ~~during the 5~~, which would occur over the course of approximately 3 months ~~of~~during substructure work. Consequently, the maximum noise levels would not persist throughout the construction period. Construction noise levels occurring during activities other than rock excavation would still result in ~~minor exceedances of CEQR impact criteria at some times~~perceptible noise level increases, including noise level increments up to approximately 6 dBA during demolition and other substructure work (~~4~~6 months) and approximately ~~7~~4 dBA during concrete operations, façade construction, and landscaping (~~23~~27 months), but would be lower than the maximum levels during rock excavation. Furthermore, construction noise associated with the proposed project would typically occur during daytime hours when residences are less sensitive to noise.

~~Based on field observations, 100 West 80th Street appears to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 25 dBA window wall attenuation. Consequently, interior noise levels during construction at this receptor during the most noise-intensive construction activity would be in the low 50s dBA, up to approximately 8 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. Based on field observations, 386 Columbus Avenue appears to have insulated glass windows and an alternative means of ventilation (i.e., central air conditioning), which would be expected to provide approximately 30 dBA window wall attenuation. Consequently, interior noise levels during construction at this receptor during the most noise-intensive construction activity would be in the high 40s dBA, up to approximately 3 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines. However, these predicted maximum noise levels would occur intermittently over the course of construction, during peak noise-intensive activities of each construction phase. During hours and days of each phase when peak equipment (e.g., hydraulic hammer, concrete mixer truck) would not be in use, noise levels at this receptor would be lower. Furthermore, the exceedances of the recommended interior noise level threshold at these receptors would occur during daytime, and construction noise would not regularly occur during the night time hours when residential uses are typically most sensitive to noise.~~

Based on the magnitude of noise level increases and the predicted ~~interior~~total noise levels, which would ~~exceed~~be in the ~~acceptable~~“marginally unacceptable” range~~ according to CEQR noise exposure guidance by no more than 8 dBA or 3 dBA even~~ during the most noise-intensive periods of construction, as well as the limited duration of construction noise at these receptors, construction noise at these receptors~~, (i.e., Receptors 13 and 23 – 100 West 80th Street and 386 Columbus Avenue)~~ would not rise to the level of a significant adverse impact.

~~At the remaining residential buildings along Columbus Avenue west of the project area – Receptors 14 through 22, 24, 25 and 34 – construction of the proposed project is predicted to produce noise levels in the low 60s to mid 70s resulting in noise level increases of up to approximately 5 dBA. The predicted noise level increases would be noticeable, but would be in the range considered typical for Manhattan and for this area in general.~~

~~Furthermore, standard building façade construction with insulated glass windows would be expected to provide approximately 30 dBA window/wall attenuation, so for those buildings with standard façade construction and an alternate means of ventilation allowing for the maintenance of a closed-window condition, interior noise levels during most of the construction would be less than 45 dBA, which is considered acceptable for these types of noise-sensitive uses according to CEQR noise exposure guidance.~~

~~However, at these receptors, noise level increases exceeding the CEQR impact criteria are predicted to occur for approximately two years of construction. At these receptors, the construction activity that would produce the highest noise levels would be concrete operations.~~

Concrete operations would occur on the site for approximately 15 months. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period. Construction noise levels that would occur during activities other than concrete operations would still result in minor exceedances of CEQR impact criteria at some times, including noise level increments up to approximately 4 dBA, but would be substantially lower than the maximum levels during concrete operations. Based on the magnitude of noise level increases and the predicted interior noise levels, which would be within the acceptable range according to CEQR noise exposure guidance for much of the construction period (excepting the 15-month maximum noise period) as described above, as well as the limited duration of construction noise at these receptors, construction noise at these receptors would not result in a significant adverse impact.

Residential Receptors along West 81st Street East of Columbus Avenue

At residences located along West 81st Street East of Columbus Avenue and north of the project work area—Receptors 26 through 33—the existing noise levels range from the low to high 60s dBA depending on proximity to Columbus Avenue, proximity to West 81st Street, and height above-grade (i.e., floor for high-rise buildings).

Construction of the proposed project is predicted to produce noise levels at these receptors in the low to high 60s dBA, resulting in noise level increases of up to approximately 8 dBA during the most noise-intensive stages of construction. While the predicted noise level increases at these residential locations would be noticeable, the total noise levels would be in the range considered typical for Manhattan and for this area in general and also would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels throughout construction at these receptors would be in the "marginally acceptable" range.

With respect to duration, at these receptors noise level increases exceeding the CEQR impact criteria are predicted to occur for up to two12 consecutive yearsmonths of construction. At these receptors, the construction equipment that would produce the highest noise levels would be the concrete mixer trucks entering the site and the operation of their mixers. Even though concrete mixer trucks would be shielded by the on-site sheds for concrete trucks and concrete pump, noise from concrete mixer operations would not be completely eliminated. The on-site sheds are open towards either the south or west. Furthermore, concrete operations include the use of other equipment located away and thus less shielded by these barriers, including forklifts, generators, hoists, compressors, and lifts. Concrete operations overlap of SOE sheeting installation with rock excavation using mounted impact hammers, which would occur onover the site forcourse of approximately 153 months during substructure work. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period. Construction noise levels occurring during activities other than concretesubstructure operations would still result in minor exceedances of CEQR impact criteria at some timesperceptible noise level increases at some receptors, including noise level increments up to approximately 65 dBA during substructure work (8 months),superstructure and landscaping work prior to the proposed new building façade being installed and acting as a barrier to shield construction equipment (up to approximately 7 dBA during landscaping and interior fit-out (98 months) but would be substantially lower than the maximum levels during concrete operations.

As described above, predicted construction noise levels at these receptors were predicted to be in the low to high 60s dBA with noise level increases up to approximately 8 dBA. Noise levels at all of these locations would experience marginally acceptable noise levels throughout construction. Based on these factors, construction noise associated with the proposed project at these receptors would not rise to the level of a significant adverse impact.

Residential Receptors along West 77th Street East of Columbus Avenue

At residences located along West 77th Street East of Columbus Avenue and south of the project work area—Receptors 40 through 47—the existing noise levels range from the low 60s dBA to low 70s dBA depending on proximity to Columbus Avenue, proximity to West 77th Street, and height above-grade (i.e., floor for high-rise buildings).

Construction of the proposed project is predicted to produce noise levels at these receptors in the low 60s to low 70s dBA, resulting in noise level increases of up to approximately 4 dBA during the most noise-intensive stages of construction. While the predicted noise level increases at these residential locations would be noticeable at times, the total noise levels would be in the range considered typical for Manhattan and for this area in general and also would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels throughout construction at these receptors would be in the "marginally acceptable" range, except at receptor 42, which represents 66 West 77th Street where existing noise levels are in the "marginally unacceptable" range and would remain in that range throughout construction.

With respect to duration, at these receptors noise level increases exceeding the initial construction noise screening threshold ~~CEQR impact criteria~~ are predicted to occur only during the overlap of ~~substructure work~~SOE sheeting installation with ~~concrete operations~~rock excavation using mounted impact hammers, which would ~~last up to~~occur over the course of approximately ~~one month~~3 months during substructure work. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period.

As described above, predicted construction noise levels at these receptors were predicted to be in the low 60s to low 70s dBA with noise level increases during construction up to approximately 4 dBA, with noise level increments exceeding the initial construction noise screening threshold ~~CEQR noise impact~~ for up to approximately ~~one month~~3 months. Based on these factors, construction noise associated with the proposed project at these receptors would not rise to the level of a significant adverse impact.

Residential Receptors along West 79th Street Immediately West of Columbus Avenue

At residences located along West 79th Street immediately west of Columbus Avenue west of the project area—Receptors 35 through 37 and 39—the existing noise levels range from the low to high 60s dBA depending on height above-grade (i.e., floor for high-rise buildings).

Construction of the proposed project is predicted to produce noise levels at most of these receptors in the low 60s to mid 70s dBA with noise level increases up to approximately 10 dBA during the most noise-intensive stages of construction. The expected levels of noise are typical of New York City construction projects in residential areas and also would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels throughout construction at these receptors would be in the "marginally unacceptable" range

However, at one of the residential receptors along West 79th Street (receptor 37, which represents 112 (118) West 79th Street), construction of the proposed project would produce noise levels in the mid 70s dBA with noise level increases of up to approximately ~~12~~14 dBA.

While these noise level increases would be noticeable, noise levels in the mid 70s dBA are typical for areas in close proximity of heavily trafficked avenues such as Columbus Avenue and Amsterdam Avenue.

During the 36 months of construction, the construction activity that would produce the highest noise levels would be overlap of SOE sheeting installation with rock excavation using mounted impact hammers during the 5, which would occur over the 5course of approximately 3 months ofduring substructure work. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period. Construction noise levels occurring during activities other than rock excavationsubstructure would still result in exceedancesperceptible noise level increases of CEQR impact criteria at some times, including noise level increments up to approximately 108 dBA, but would be lower than the maximum levels during substructure. For the majority of the construction period, noise levels at this receptor would be perceptibly lower than those predicted in the DEIS. Furthermore, construction noise associated with the proposed project would typically occur during daytime hours when residences are less sensitive to noise rock excavation.

Based on the prediction of construction noise levels up to the mid 70s dBA with construction noise level increments up to approximately 1214 dBA and a duration of maximum construction noise up to approximately 53 months and noise level increments up to approximately 9-118 dBA for the other 3133 months of the construction period, construction noise associated with the proposed project at 112 (118) West 79th Street would not have the potential to result in a significant adverse construction noise impact. However, the predicted construction noise impacts at Nonetheless, because receptor control measures were previously considered for 112 (118) West 79th Street could be fully mitigated using either receptor control measures or source control(i.e., storm windows and air conditioning units at residences that do not already have air conditioning) based on the findings of the DEIS, AMNH has committed to make an offer of these measures, as described in to residents of that building (see Chapter 17, “Mitigation”).

Based on field observations, the other receptors (receptors 35, 36 and 39) appear to have insulated glass windows and an alternative means of ventilation (i.e., air conditioning), which would be expected to provide approximately 25 dBA window/wall attenuation or up to 30 dBA window/wall attenuation for locations with central air conditioning rather than window air conditioner units. Assuming the lower level of 25 dBA window/wall attenuation, interior noise levels during construction in this area would be in the low 50s dBA, up to approximately 8 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines during the most noise-intensive construction activities. Outside of the substructure phase of construction, interior noise levels at these receptors would be in the mid 40s dBA, up to approximately 3 dBA higher than the threshold recommended for residential use. The exceedances of CEQR Technical Manual noise impact criteria and interior noise level guidelines at these receptors would happen intermittently throughout the 36-month construction period, but would occur only during construction hours, which would typically be weekday daytime hours rather than night-time hours when residences are typically most sensitive to noise.

At the other receptors (receptors 35, 36 and 39), construction noise levels occurring during activities other substructure would also result in exceedances of the initial construction noise screening threshold at some times, including noise level increments up to approximately 6 dBA, but would be lower than the maximum levels during substructure. Based on the prediction of construction noise levels up to the mid 70s dBA with construction noise level increments up to approximately 12 dBA with CEQR impact criteria exceedances occurring intermittently over the

~~course of approximately 36 months for brief periods by limited amounts only at the receptors that do not have central air conditioning allowing for the maintenance of a closed window condition, construction noise would be expected to be audible and noticeable and at times potentially intrusive. Consequently~~10 dBA and a duration of maximum construction noise up to approximately 3 months and noise level increments up to approximately 6 dBA for the other 33 months of the construction period, construction noise associated with the proposed project at 102, 110, and 117 West 79th Street (i.e., receptors 35, 36, and 39) would not rise to the level of a significant adverse impact.

Residential Receptors along West 79th Street Mid-Block West of Columbus Avenue

At residences located along West 79th Street mid-block west of Columbus Avenue—Receptors 10 and 11—the existing noise levels range from the low to mid 60s dBA depending on proximity to Columbus Avenue and height above-grade (i.e., floor for high-rise buildings).

Construction of the proposed project is predicted to produce noise levels at these receptors in the low to high 60s dBA, resulting in noise level increases of up to approximately ~~9~~6 dBA during the most noise-intensive stages of construction. While the predicted noise level increases at these residential locations would be noticeable at times, the total noise levels would be in the range considered typical for Manhattan and for this area in general and also would comply with all New York City Noise Control Code and New York City Department of Buildings restrictions on construction noise. According to *CEQR Technical Manual* noise exposure criteria, noise levels throughout construction at these receptors would be in the "marginally acceptable" range.

During the 36 months of construction, the construction ~~activity~~activities that would produce the highest noise levels would be ~~rock excavation using mounted impact hammers during the 5 months of~~ demolition and substructure work lasting a total of approximately 9 months. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period. Furthermore, construction noise associated with the proposed project would typically occur during daytime hours when residences are less sensitive to noise. Construction noise levels occurring during activities other than ~~rock excavation~~ demolition and substructure would ~~still~~not result in ~~minor~~ exceedances of the initial construction noise screening threshold~~CEQR impact criteria at some times, including noise level increments up to approximately 6 dBA, but would be substantially lower than the maximum levels during substructure work~~.

Based on the magnitude of noise level increases and the total noise levels, which would be within the marginally acceptable range according to CEQR noise exposure guidance throughout the construction period as described above, as well as the limited duration of construction noise at these receptors, construction noise at these receptors would not result in a significant adverse impact.

Residential Receptors along West 77th, 78th, 80th, and 81st Streets West of Columbus Avenue

At residences located along West 77th, 78th, 80th, and 81st Streets west of Columbus Avenue located west of the project site—Receptors 50 through 57—the existing noise levels are in the low 60s to low 70s dBA. Construction of the proposed project is predicted to produce noise levels at these receptors in the low 40s to high 50s dBA, resulting in increases less than 2 dBA. Increases in this range would be considered imperceptible and not significant~~ according to CEQR noise impact criteria~~.

Open Space Receptors in Central Park

At open space receptors in Central Park—Receptors 9 and 12—the existing noise levels are in the low 60s dBA. These receptors are located in Central Park east of the project site.

Construction of the proposed project is predicted to produce noise levels at these receptors in the high 30s to mid 40s dBA from construction only, resulting in increases less than 1 dBA to the total noise level. Increases in this range would be considered imperceptible and not significant ~~according to CEQR noise impact criteria~~.

CONSTRUCTION NOISE WITHIN THE MUSEUM

Construction of the proposed project would also have the potential to result in noise within the Museum itself. The primary source of noise associated with construction of the proposed project reaching the Museum would be structure-borne noise, primarily during demolition activities. The level of structure-borne noise that would reach the Museum, including both exhibit areas and staff areas, during demolition would vary widely depending on the specific work areas and methods as well as the structural details of the portion of the building to be demolished. While this noise has the potential to be noticeable and even intrusive, demolition is expected to last for only approximately four months. During later stages of construction, when the potential for structure-borne noise reaching the Museum is greatly diminished, the Museum would experience substantially less construction noise. Exhibit spaces and staff areas that do not have windows directly facing the project site would be separated from airborne construction noise by masonry walls, which would provide at least 40 dBA attenuation. Since, during the later phases of construction, there would not be any equipment in use that generates noise levels greater than 85 dBA, interior noise levels would not exceed the acceptable 45 dBA threshold during these later phases. Exhibit spaces and staff areas that do have windows directly facing the project site would have the potential to experience up to approximately 10 dBA more construction noise as it is expected that the windows would remain closed since the museum has an alternate means of ventilation (i.e., air conditioning), which would provide approximately 30 dBA attenuation. It is expected that during most of the construction period after demolition, when noise transmission to the museum would be airborne rather than structure borne, noise levels at the Museum would not exceed the 45 dBA $L_{10(1)}$ threshold considered acceptable for museum use according to *CEQR Technical Manual* noise exposure guidelines. To the extent practicable, the Museum's scheduling and programming will be adjusted to avoid use of the locations experiencing the greatest levels of interior construction noise while the most noise-intensive construction activities are occurring. This would minimize the noise exposure to Museum users in those areas of the Museum that would be subject to the most construction noise.

~~*CONSTRUCTION LOGISTICS AND NOISE BARRIERS*~~

~~The construction noise analysis is based on a preliminary construction logistics plan, which includes a site perimeter barrier and equipment entry/egress/staging/operating areas, as shown in **Figures 15-2 through 15-5**. While the plan has been preliminarily reviewed by DOT, final approval is required from DOT and NYC Parks, including for the proposed barrier configuration and use of the sidewalk along Columbus Avenue for truck access and materials delivery within the construction area. The conclusions of the construction noise analysis as described above are based on truck access and construction staging being shielded from surrounding receptors by perimeter barriers. In the absence of an approval for the proposed site perimeter barrier configuration, if alternative noise control measures are not identified, noise levels at surrounding~~

receptors could be approximately 4 dBA higher during truck staging operations, which would result in unavoidable significant adverse impacts.

CONCLUSIONS

Between the Draft EIS and Final EIS, AMNH modified the construction logistics plan and examined and evaluated additional noise control measures to reduce the magnitude and duration of noise that would occur at nearby receptors as a result of construction of the proposed project. Changes included selection of quieter equipment, reductions in truck activity, and modification of the construction schedule. The construction schedule was also updated based on additional information from the geotechnical report for the project site, indicating that rock excavation would occur over a shorter period (3 months rather than the 5 months accounted for in the DEIS), and that pile installation for SOE would be necessary over a duration of approximately 3 months during substructure work.At open space receptors within Theodore Roosevelt Park and nearby residential receptors, the greatest noise levels during construction were predicted to occur intermittently over the course of up to approximately 14 months.

As described above, construction of the proposed project would not only include noise control measures as required by the *New York City Noise Control Code*, but would include additional measures such as the use of quieter equipment (i.e., cranes, quieter generators, person lifts, landscaping excavators, and landscaping loaders), materials delivery and truck queuing within the enclosed construction area rather than on the street, additional shielding of equipment, and the installation of partially enclosed structures to house the concrete pump and two concrete mixer trucks as they access the pump and to house concrete mixer trucks as they are washed out before leaving the site.

Construction noise levels associated with the project were determined based on a detailed noise modeling analysis for multiple stages during the construction period. The projections of construction noise accounted for the noise control commitments included in the proposed project. Notwithstanding these noise control measures, the detailed construction noise analysis identified two residential buildings (101 and 112 ([118)] West 79th Street) where construction of the proposed project would result in increases in noise levels that would exceed CEQR noise impact criteria and result in interior noise levels that exceed CEQR noise exposure guidance at times throughout the 36-month construction period. While

Notwithstanding these noise control measures, at times over the course of construction of the proposed project, and particularly during the most noise-intensive construction activities such as the 3 months of overlap between SOE sheeting installation and rock excavation using mounted impact hammers, noise would be readily noticeable and potentially intrusive. At open space receptors within Theodore Roosevelt Park, the greatest noise levels during construction were predicted to occur intermittently over the course of up to approximately 13 months. While the noise from construction would be noticeable at times, the duration of the highest levels of construction noise at any given area would be limited and would typically occur during weekday daytime hours, rather than during the evening or night-time hours when residences are most sensitive to noise. At other receptors near the project area, including school receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would generally not exceed typical noise levels in the general area. Furthermore, the expected levels of noise are typical of New York City construction projects and would comply with all New York City Noise Control Code and New York City Department of Buildings (DOB) restrictions on construction noise. Based on the limited duration of the predicted construction noise, the moderate total noise levels during most of the construction period, the moderate total noise levels during most of the construction period, and the other factors discussed above, the predicted levels of construction noise would not rise to the level of a significant adverse impact., the level and duration of construction noise at these buildings would constitute a temporary significant adverse noise impact under SEQRA and CEQR. The highest levels of construction noise at these receptors would result from rock excavation using mounted impact hammers. The greatest noise levels would occur intermittently over a period of approximately 5 months. However, the predicted impacts at 101 and 112 (118) West 79th Street could be fully mitigated using either receptor control measures or source control measures, as described in Chapter 17, "Mitigation." Mitigation options include receptor controls (i.e., provision of storm windows and air conditioning units at residences that do not already have air conditioning) or source controls (i.e., quieter equipment, changes to the logistics plan, alternative noise barriers or other shielding methods). Between the Draft Environmental Impact Statement (EIS) and Final EIS, further noise reduction measures to reduce or eliminate the potential for these temporary significant construction noise impacts will be considered and evaluated

The conclusions of the construction noise analysis as described above are based on truck access and construction staging being shielded from surrounding receptors by site-perimeter barriers. In the absence of an approval for the proposed site-perimeter barrier configuration, if alternative noise control measures are not identified, noise levels at surrounding receptors could be approximately 4 dBA higher during truck staging operations, which would result in unavoidable significant adverse impacts. At other receptors near the project site, including open space, residential, school, and hospital receptors, noise resulting from construction of the proposed project may at times be noticeable, but would be temporary and would generally not exceed typical noise levels in the general area and so would not rise to the level of a significant adverse noise impact.

VIBRATION

INTRODUCTION

Construction activities have the potential to result in vibration levels that may result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. Vibratory levels at a receiver are a function of the source strength (which 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, construction activities generally 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 and residences near the project site.

CONSTRUCTION VIBRATION CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant impact was based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second as specified in the DOB *TPPN #10/88* as described in Chapter 22, "Construction" of the *CEQR Technical Manual*. 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.

ANALYSIS METHODOLOGY

Table 15-10 shows vibration source levels for typical construction equipment.

The source vibration levels shown in **Table 15-10** were projected to nearby receptors to estimate the levels of construction vibration that would occur in the study area.

Table 15-10
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Impact Pile Driver	1.518	112
Hydraulic Break Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

~~The source vibration levels shown in **Table 15-12** were projected to nearby receptors to estimate the levels of construction vibration that would occur in the study area.~~

Construction Vibration Analysis Results

The buildings of most concern with regard to the potential for structural or architectural damage due to vibration are the existing historic Museum buildings surrounding the project site. Aside from during demolition activities, based on the equipment to be used (e.g., pile drivers, excavators, cranes, loaders, etc.), PPV would not exceed the most stringent 0.5 in/sec threshold at the receptor location mentioned above. However, during demolition activities, the use of hydraulic break rams would have the potential to result in vibration levels greater than 0.5 in/sec when operating less than 8 feet from the existing museum buildings. It is expected that smaller scale equipment would be used for demolition work in areas within 10 feet of existing historic Museum buildings as necessary to avoid vibration levels greater than 0.5 in/sec. Furthermore, a vibration monitoring program for the existing historic Museum buildings would be required by DOB regulations and be specified in the project's CPP to ensure that vibration does not consistently exceed the acceptable 0.5 in/sec threshold value as a result of construction. Given the distance, historic resources in the study area surrounding Theodore Roosevelt Park would not be adversely affected by construction activities. Therefore, construction of the proposed project would not result in significant adverse vibration impacts on historic buildings in the vicinity of the construction site.

In terms of potential vibration levels that would be perceptible and annoying to occupants of nearby buildings, the equipment that would have the most potential for producing levels which exceed the 65 VdB limit would be impact pile drivers, hydraulic break rams, and drill rigs associated with demolition, excavation and foundation construction. These pieces of equipment would not produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at grade-level receptors within approximately ~~135~~550 feet. While vibration resulting from demolition, excavation and foundation construction may be perceptible and potentially intrusive, it would be of limited duration as these pieces of equipment would not operate on site for more than approximately nine months, during which time they would operate intermittently. Furthermore, vibration levels would be lower at floors above the grade level (reducing by approximately 2 dB per floor). As such, the predicted levels of vibration would not be considered significant. In no case are significant adverse impacts from vibrations expected to occur.

OTHER TECHNICAL AREAS

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would affect land use on the construction area, but would not affect land use conditions and patterns outside of Theodore Roosevelt Park. As is typical with construction projects, during periods of peak activity there would be some disruption to the nearby area. There would be construction trucks and construction workers coming to the area as well as trucks and other vehicles backing up, loading, and unloading. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as construction activities would take place within the construction area including the sidewalk on Columbus Avenue adjacent to the project site. In addition, throughout the construction period, measures would be implemented to control noise, vibration, and dust on the construction area, including the erection of construction site perimeter barriers. The barriers would reduce potentially undesirable views of construction site and buffer noise emitted from construction activities. Barriers also would be used to protect the safety of pedestrians and bicyclists.

Overall, while construction activities at the project site would be evident to the local community, the limited duration and temporary nature of construction would not result in any significant or long-term adverse impacts on local land use patterns or the character of the nearby area.

SOCIOECONOMIC CONDITIONS

Construction activities would not block or restrict access to any facilities in the area. However, as discussed above, construction of the proposed project would result in the temporary relocation of the 79th Street Greenmarket and the temporary suspension and/or relocation of the Columbus Crafts Fair. Based on current plans, the 79th Street Greenmarket could be temporarily relocated to the north side of West 77th Street between Columbus Avenue and Central Park West and/or on Columbus Avenue between West 77th and West 79th Streets. Upon completion of the proposed project, the weekly Greenmarket Farmers' Market and the bi-annual Crafts Fair would be expected to be relocated back to their current location. Construction of the proposed project would not markedly affect the operations of any other nearby businesses such as those on the west side of Columbus Avenue across the project site, or obstruct major thoroughfares used by customers or businesses. Construction would create 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 activity. Construction also would contribute to increased tax revenues for the city and state, including those from personal income taxes. Construction activities associated with the proposed project would not result in any significant adverse impacts on socioeconomic conditions.

COMMUNITY FACILIITIES

No community facilities (i.e., public or publicly funded schools, libraries, child care centers, health care facilities, and fire and police stations) would be directly affected by construction activities. The construction area would be surrounded by construction barriers that would limit the effects of construction on nearby facilities. Measures outlined in the MPT Plan would ensure that lane closures and sidewalk closures are kept to a minimum and that adequate pedestrian access is maintained. 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 facilities. New York City Police Department (NYPD), and FDNY emergency services and response times would not be materially affected by construction due to the geographic distribution of the police and fire facilities and their respective coverage areas.

OPEN SPACE

This section assesses the availability and adequacy of open space resources during project construction, including consideration of the potential direct and indirect effects. The assessment of direct effects includes estimates of the extent and timing of open space displacement during construction and consideration of construction-related noise and air pollutant emissions on the quality of the open spaces resources. The indirect assessment applies the methodologies of Chapter 3, "Open Space," to determine how open space ratios for the residential (½-mile) study areas could change over the course of the 36-month construction period.

Analysis Assumptions

The analysis considers conditions during the construction period when there would be a displacement of existing open spaces. ~~For the proposed project, the analysis~~ There are two conditions for analysis ~~are analyzed in two periods~~ (see **Table 15-11**): Month 1 to Month ~~27~~14 and Month 23 to Month 36, a duration of 27 months when Theodore Roosevelt Park immediately west of the project site would be used for construction staging (see **Figure 15-2**); and Month ~~28~~15 to Month ~~36~~22, a duration of ~~9~~8 months when Theodore Roosevelt Park ~~adjacent to~~immediately west of the project site would be used for construction staging and the portion of the park immediately north of the project site would be under construction for improvements associated with the proposed project (see **Figure 15-5**~~3-3 in Chapter 3, "Open Space"~~). During the duration of the 3-year construction, access to Theodore Roosevelt Park from Columbus Avenue near West 79th would be temporarily relocated to the north between West 79th and West 80th Street (see **Figure 15-2)**.

Table 15-11
Construction Open Space Analysis Years (Quantitative Assessment)

Analysis Condition[1]	Temporarily Displaced Open Space Acreage[2] (Theodore Roosevelt Park)
Construction Month 1 to Month 27 - 14 and Month 23 to Month 36; 27 months duration	0.921.15
Construction Month 2815 to Month 22;36 89 months duration	1.9977

Note:
[1] Site work is anticipated to occur over two planting seasons
[2] Approximate acreage
Sources: Turner Construction and AMNH.

The residential population within ½-mile of the proposed project is estimated to be 82,618 (which includes the projected No Action population in 2020); and the projected Saturday Museum attendance and utilization would be 23,166 persons in 2020. Thus the analysis conservatively assumes a total of 105,784 potential open space users on a Saturday in 2020.

Direct Effects Analysis

The following section identifies public and private open space resources that would be displaced by construction of the proposed project, and characterizes other potential direct effects—such as potential air quality, noise, and other safety concerns—on existing open spaces.

Portions of Theodore Roosevelt Park would be closed to the public for the duration of the 3-year construction period in order to accommodate the construction of the proposed project. As shown in **Table 15-6**, the portion of Theodore Roosevelt Park that would be temporarily closed from Month 1 to Month 2714 and Month 23 to Month 36 would be approximately 0.921.15 acres (including the areas for construction staging and the existing open space within the project site as well as the approximately 2,000 sf area at the western end of Ross Terrace where construction trailers would be placed for the duration of construction). The portion of Theodore Roosevelt Park that would be temporarily closed from Month 2815 to Month 3622 would be approximately 1.9977 acres (including the areas for the Theodore Roosevelt Park landscape improvement and the existing open space within the project site as well as the area at the Ross Terrace where construction trailers would be placed for the duration of construction). As part of construction startup work, barriers would be placed along the perimeter of the construction area and public safety measures would be installed to separate the construction areas from the usable spaces within Theodore Roosevelt Park. The existing pedestrian entrance to Theodore Roosevelt Park on West 79th Street to the west of the project site would be temporarily relocated further north to a location just north of West 80th Street so Park users would continue to have access from Columbus Avenue to sidewalks or pathways in other areas of the park for circulation and for passive recreation during the entire construction period. During demolition and above-grade construction, safety netting and sidewalk bridges would also be installed.

As described above under "Air Quality," the proposed project would implement an emissions reduction program to minimize the effects of the proposed project's construction activities on the surrounding community, including the adjacent Theodore Roosevelt Park. The proposed project would also adhere to *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and to *New York City Administrative Code* limitations on construction-vehicle idling time. Therefore, construction activities associated with the proposed project would not result in any significant adverse air quality impacts on nearby open spaces.

As described above under "Noise," construction of the proposed project would be required to follow the requirements of the *NYC Noise Control Code* and would use additional measures to minimize the effects of the proposed project's construction activities on the surrounding community, including the adjacent Theodore Roosevelt Park. While the noise from construction would be noticeable at times, the duration of the highest level of construction noise at any given area of Theodore Roosevelt Park would be limited. The construction noise predictions focus on the area of open space closest to the "construction area" (the project site and the associated construction staging area). At other open space areas farther from construction work areas, noise levels would be lower. Furthermore, since construction would ~~generally~~predominantly occur during weekday daytime hours, with evenings and weekend work occurring only occasionally and the latter typically consisting of ~~deliveries~~specific tasks and catch-up work rather than the most noise-intensive construction activities, construction noise would ~~usually~~ not affect use of the open space during the late afternoon, evening, and weekend ~~peak usage~~ periods, outside of the occasional off-hours work. The number of workers and pieces of equipment in operation for evening and weekend work would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any evening or weekend work would be less than a normal workday.

Based on these factors, construction noise associated with the proposed project at these receptors would not be expected to result in a significant adverse impact at these receptors.

Indirect Effects Analysis

The total, active and passive open space ratios for the ~~27~~28-month analysis condition, where ~~0.92~~1.15 acres of Theodore Roosevelt Park would be closed, would be: 2.86 acres/person, 0.55 acres active open space/person, and 2.31 acres passive open space/person. The total and passive open space ratios would exceed the City's recommended planning goals for open space of 2.5 total acres/person and 0.5 passive acres/person. The active open space ratio would be below the City's planning goal of 2.0 acres/person,

The total, active and passive open space ratios for the ~~nine~~8-month analysis condition, where 1.~~99~~1.77 acres of Theodore Roosevelt Park would be closed, would be: 2.~~85~~86 total acres/person, 0.55 active acres/person, and 2.30 passive acres/person; as noted above, the total and passive ratios would exceed the City's planning goals and the active ratio would be below the City's planning goal.

Table 15-12
Open Space Ratios During Periods of Construction

Ratio	DCP Guideline	Existing Ratio[1]	No Action Ratio[2]	With Action Ratio	Percent Change (With Action to No Action)
Residential & Museum Population—~~July 2017~~Month 1 to ~~June 2020~~Month 14 and Month 23 to Month 36 Analysis Condition					
Total Open Space	2.5	2.90	2.87	2.86	~~-0.30%~~ -0.38%
Active Open Space	0.5	0.56	0.55	0.55	0.00%
Passive Open Space	2.0	2.34	2.32	2.31	~~-0.38%~~ -0.47%
Residential & Museum Population—~~September 2019~~ Month 15 to ~~June 2020~~ Month 22 Analysis Condition					
Total Open Space	2.5	2.90	2.87	~~2.85~~ 2.86	~~-0.65%~~ -0.58%
Active Open Space	0.5	0.56	0.55	0.55	0.00%
Passive Open Space	2.0	2.34	~~2.31~~ 2.32	2.30	~~-0.81%~~ -0.73%

Notes:
1. For Existing Condition analysis assumptions and methodology refer to Chapter 3, "Open Space."
2. For No Action Condition analysis assumptions and methodology refer to Chapter 3, "Open Space."

According to the *CEQR Technical Manual*, in areas that are well served by open space, a reduction of open space ratios greater than 5 percent may be considered significant, as it may result in overburdening existing facilities or further exacerbating a deficiency in open space. Given that construction of the proposed project would not reduce the active open space ratio by 5 percent, the temporary reduction during the construction period would not be considered a significant adverse impact (see **Table 15-12**). Nearby sections of the Theodore Roosevelt Park and other resources in the area such as Central Park would accommodate the largely passive recreation activities displaced from the affected area. As discussed above, the existing pedestrian entrance to Theodore Roosevelt Park on West 79th Street to the west of the project site would be temporarily relocated further north to a location just north of West 80th Street so Park users would continue to have access from Columbus Avenue to sidewalks or pathways in other areas of the park during the entire construction period. Upon completion of construction activities, the proposed project would provide landscaping modifications and improvements such that park users would continue to have access to areas for gathering, play, and respite, as well as pathways for Museum entry and traversing the Theodore Roosevelt Park. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

HISTORIC AND CULTURAL RESOURCES

A detailed assessment of potential impacts on historic and cultural resources is described in Chapter 5, "Historic and Cultural Resources." Construction of the proposed project, including excavation activities, would not adversely impact archaeological resources, as LPC and OPRHP have determined that the project site does not possess archaeological significance.

Demolition of buildings in the project site, followed by site preparation and construction of the Gilder Center, could potentially result in inadvertent damage to nearby historic Museum buildings if adequate precautions are not taken. Therefore, a CPP would be developed in coordination with LPC and OPRHP to protect nearby historic Museum buildings. Given the distance, historic resources in the study area surrounding Theodore Roosevelt Park would not be adversely affected by construction activities.

NATURAL RESOURCES

As discussed in detail in Chapter 7, “Natural Resources,” construction of the proposed project would result in disturbance of “mowed lawn with trees,” “urban structure exterior habitat,” and “paved road/path communities”[5] that provide limited habitat to wildlife species common to urban areas. While the loss of this habitat may displace individual wildlife to other suitable nearby habitat, the displacement of some individuals of common urban species would not result in a significant adverse impact.

Construction of the proposed project would result in approximately 1.~~99~~77 acres of disturbance to vegetated ecological communities. In addition, seven trees in the Park would be removed and one tree in the Park would be transplanted as a result of the proposed project; in addition, for construction access, four recently planted, smaller caliper trees (two on the sidewalk and two in the bike lane traffic islands) would be temporarily moved prior to commencement of construction and replanted (or replaced) after completion of construction and trees within the construction area along the Columbus Avenue sidewalk would be protected and pruned as necessary. All work would be performed in compliance with Local Law 3 of 2010 and the NYC Parks Tree Protection Protocol approved by the NYC Parks Manhattan Borough Forester, to minimize potential adverse impacts. A tree protection plan would be implemented during construction of the proposed project and would include measures to protect both the above- and below-ground structure of trees to remain within the construction area. Any trees that are removed and not transplanted would be replaced, consistent with NYC Parks rules and regulations, which would include the 19 trees that would be planted post-construction as part of the landscape plan for the western portion of the Park. Therefore, the construction of the proposed project would not result in significant adverse impacts to vegetation and ecological communities.

Three planted willow oak would be removed during construction of the new building, however these individuals are not part of a natural population and do not constitute one of the “five or fewer sites or very few remaining individuals” of this species in New York State as is intended by the New York Natural Heritage Program (NYNHP) “S1” rank. Therefore the removal of these trees would not be considered a significant adverse impact to protected willow oak populations.

Terrestrial wildlife habitat within the study area is presently limited to a mowed lawn with trees, urban structure exterior, and paved road/path communities in a highly urbanized setting. Disturbance from construction activities would be temporary. Any individuals (i.e., bird species and mammals) that may be displaced from the site during project construction would be expected to move to alternative habitat. As discussed above, construction contracts will include provisions for a rodent control program. Construction activities would not eliminate any high quality or valuable habitat for wildlife, and therefore, would not adversely affect wildlife within the area.

HAZARDOUS MATERIALS

Construction of the proposed project would involve demolition and limited interior disturbance of site buildings, and subsurface disturbance. A detailed assessment of the potential risks related

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[5] Definitions of these natural resource communities are provided in Chapter 7, “Natural Resources.”

to the construction of the proposed project with respect to any hazardous materials is described in Chapter 108, "Hazardous Materials." The proposed project would have no known risks with respect to hazardous materials that cannot be controlled through the use of the measures described below.

The findings of the Phase II investigation revealed environmental conditions that are similar in type and extent of contaminants to many urban sites, including throughout Manhattan. Typical of most substantial construction, the construction activities required for the proposed project could increase the risk of exposure to the contamination identified in the Phase II investigation associated primarily with the handling of historic fill material. However, these potential exposure pathways would be eliminated, mitigated, and/or monitored by performing such activities in accordance with the measures prescribed in the RAP and CHASP. These measures are also consistent with those that are used to effectively protect human health and the environment at many sites, including sites where contamination types and magnitudes are greater than those identified at the project site. These measures would be implemented prior to, during, and following construction of the proposed project to control or avoid the potential for adverse human or environmental exposure to known or unexpectedly encountered hazardous materials.

As part of the environmental review process for the proposed project and based on the findings of the *Phase I Environmental Site Assessment* (ESA) prepared by AKRF, dated November 2016, a Subsurface (Phase II) Investigation was performed in accordance with the NYCDEP-approved work plan to assess subsurface conditions at the project site.

The Phase II investigation included the collection of soil, groundwater, and soil vapor samples for laboratory analysis, the results of which would be used to establish construction and post-construction measures to be implemented as part of the proposed project. The measures, including pre-construction ACM surveys; soil stockpiling, soil disposal and transportation measures; dust control; contingency measures if additional petroleum storage tanks or other contamination should be unexpectedly encountered; and a minimum two foot clean fill buffer in any landscaped or uncapped areas, would be documented in a NYCDEP-approved RAP and associated CHASP, which would be implemented during project construction.

With these measures, construction of the proposed project would not result in any significant adverse impacts related to hazardous materials.

G. BULL MOOSE DOG RUN RECONSTRUTION BY NYC PARKS

Independent of the proposed Gilder Center project, NYC Parks is developing plans to reconstruct and upgrade the approximately 0.29 acre Bull Moose Dog Run, on the 81st Street side of Theodore Roosevelt Park to address deterioration, drainage deficiencies, and other issues. Based on preliminary plans, the Dog Run project would reconfigure the layout of the dog run, provide ADA accessible seating areas, protect existing mature trees, and upgrade the drainage system. The Dog Run could be closed for approximately 12 months for this work. Unlike typical ground-up construction, the Dog Run project would not involve superstructure or other building construction activities or extensive demolition and excavation, which are typically the most likely to result in environmental impacts. However, since construction of the Dog Run project has the potential to overlap with construction of the proposed Gilder Center project, this section examines whether the Dog Run project and the overlapping of activities would result in cumulative significant adverse construction impacts not identified above. Construction of the

Dog Run project would not result in any alterations to the construction activities and logistics or construction schedule for the proposed Gilder Center project. The construction managers for adjacent construction sites would be expected to coordinate to avoid any delays and inefficiencies.

TRANSPORTATION

The duration of transportation-related effects from the Dog Run would be temporary, approximately 12 months. Further, given the scale and character of the Dog Run project, the level of construction worker and truck trips would be relatively minimal. Generally, approximately four to eight workers and operation of a Bobcat or truck could be expected on-site at any one time for this type of park feature reconstruction. Construction vehicles would be expected to consist of equipment such as a Bobcat, and dump trucks and delivery trucks that would be employed during demolition and removal and for material deliveries. The Dog Run project would not affect the proposed Gilder Center project's program or design, and would not result in any changes to the anticipated peak construction worker and truck trips associated with the proposed project or alter the construction-related transportation conclusions presented above in "Transportation."

AIR QUALITY

Because the Dog Run project would not involve extensive demolition and excavation, it would not involve use of large non-road diesel engines such as rock splitters and caisson drills, which are typically the most likely to result in impacts to air quality. Further, the potential emissions from construction at nearby sensitive receptor locations during any period of concurrent construction would be diminished by dispersion, due to the distance between the proposed Gilder Center project and the Dog Run project. Therefore, the cumulative air quality effects of concurrent construction of the proposed project and the Dog Run project are expected to be minimal.

NOISE

Unlike typical ground-up construction, the Dog Run project would not involve superstructure or other building construction activities or extensive demolition and excavation, which are typically the most noise-intensive construction activities. Furthermore, the location of the Dog Run along the north edge of the Museum building shields it from the receptors that would experience most of the construction noise associated with the proposed project. Based on the noise levels projected at the residences along West 81st Street east of Columbus Avenue during park improvement site work, noise from Dog Run construction combined with construction of the proposed Gilder Center project may result in noticeable levels of noise compared to the existing noise levels, but would not constitute a significant adverse impact. Therefore, the cumulative noise effects of concurrent construction of the proposed project and the additional No Build project are not expected to be substantial and would not result in significant adverse construction noise impacts.

OPEN SPACE

As presented above in "Open Space," the reduction in the open space ratios associated with the construction of the proposed project would be well below the 5 percent threshold that is considered significant in accordance with the *CEQR Technical Manual*. Even with the concurrent temporary closure of the Dog Run during construction, there would still not be a reduction in any open space ratio of over 5 percent. Nearby sections of the Theodore Roosevelt Park and other resources in the area such as Central Park would accommodate the largely passive recreation activities displaced from the proposed project; it is assumed dog owners could use other resources in the area during the Dog Run reconstruction (e.g., Central Park and Riverside Park).

OTHER TECHNICAL AREAS

The Dog Run project would reconstruct an existing park use in the same location and footprint. Therefore, the Dog Run project would not have the potential to result in any significant adverse cumulative construction impacts in combination with the proposed Gilder Center project related to land use and neighborhood character, socioeconomic conditions, community facilities, historic and cultural resources, and natural resources. With respect to hazardous materials, given their physical separation, the Dog Run project is not expected to have any effect on site conditions or health and safety procedures at the Gilder Center site. In addition, AMNH and NYC Parks would comply with all applicable laws and regulations related to hazardous materials for the Gilder Center and Dog Run projects, respectively. Therefore, the Dog Run project would not cause any significant cumulative impacts in these analysis areas.

CONCLUSION

Given the relatively short duration and small area of the Dog Run project, as well as the limited nature of the expected construction activities, the addition of the Dog Run project to the No Action condition for the Gilder Center construction analysis is not expected to result in significant adverse cumulative impacts. ✷