Chapter 20: Construction Impacts

A. INTRODUCTION

This chapter summarizes the conceptual construction plan for the anticipated development associated with the reasonable worst-case development scenario (RWCDS) for the proposed actions, and considers the potential for adverse impacts during construction. The conceptual construction phasing and schedule for the RWCDS is described, followed by the types of activities likely to occur during construction. An assessment of potential impacts of construction activity and the methods that may be employed to avoid, minimize, or mitigate the potential for significant adverse construction impacts is then presented.

PRINCIPAL CONCLUSIONS

LAND USE

Construction activities would affect land use on the project sites but would not alter surrounding land uses. Certain types of construction activities would be intrusive to the adjacent residences and open space; however, all construction staging activities for the proposed actions would occur within the project sites or within portions of sidewalks, curbs, and travel lanes of public streets immediately adjacent to the project sites or within the sites themselves. Additionally, access to surrounding land uses would be maintained throughout the construction period, and adherence to the provisions of the New York City Building Code and other applicable regulations would reduce the potential adverse effects of construction activities on land use patterns and neighborhood character. Moreover, although the project anticipates a 9-year construction schedule, the level of activity would vary and move throughout the project sites, and no one area would experience the effects of the project’s construction activities for the full 9-year duration.

SOCIOECONOMIC CONDITIONS

Construction would create major direct benefits resulting from expenditures on labor, materials, and services, as well as substantial indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity. Construction would also contribute to increased tax revenues for the City and State, including those from personal income taxes. Construction of the RWCDS would not affect the access to and therefore the viability of any business. It is not expected that construction activities would cause the failure of any business thereby affecting neighborhood character. Overall, there would be no significant adverse impacts on socioeconomic conditions due to construction.

COMMUNITY FACILITIES

It is not expected that construction activities on the Site A or on Site B would adversely affect the school that would be constructed as part of the proposed actions because the duration of construction on the adjacent parcel (Parcel C) would be limited to approximately 1 year after the school would open. Construction activities during this 1 year would include approximately 6 months of exterior work with the rest of the work consisting of interior (and therefore less intrusive) work. Furthermore, it is not anticipated that there would be conflicts between school pick-ups/drop-offs and construction vehicles, particularly as construction activities move southward on Parcels D, E, F, and G on Site A.

OPEN SPACE

Construction activities would not occur within any open spaces, and no open spaces would be used as staging areas. While construction activities on the north portion of Parcel A of Site A could be disruptive to Gantry Plaza State Park, the noisiest activities would be limited to approximately 1 year. Therefore, no significant adverse open space impacts from construction activities would occur on Gantry Plaza State Park.

The waterfront park and other publicly accessible open spaces to be constructed on Site A would be developed in conjunction with development on each of the parcels. As open space areas are completed and as construction continues in adjacent areas, there would be some disruption (e.g., noise) to the newly completed open spaces. However, the level of construction activity would vary and move throughout the project sites, and no immediate area would experience the effects of the project's construction for the full construction duration. Therefore, there would not be adverse impacts on the open spaces to be constructed as part of the proposed actions.

HISTORIC RESOURCES

Construction of the RWCDS would not result in significant adverse impacts on either archaeological or architectural resources.

HAZARDOUS MATERIALS

With the measures outlined in Chapter 10, "Hazardous Materials," there would be no construction-period impacts from the proposed actions.

NATURAL RESOURCES AND WATER QUALITY

With the measures outlined in Chapter 11, "Natural Resources and Water Quality," there would be no construction-period impacts from the proposed actions.

TRAFFIC

The construction of the proposed actions would generate the highest amount of construction traffic in the second and third quarters of 2012. However, the total number of vehicle trips generated during construction would still be approximately 45 percent and 11 percent lower than the total number of vehicle trips generated by the completed proposed actions during the AM and midday peak hours, respectively. Nonetheless, because existing and No Build traffic conditions at some study area intersections through which construction-related traffic would also travel would operate at unacceptable levels during commuter peak hours, it is possible that significant adverse traffic impacts could occur at some of these locations during construction, possibly at lower magnitudes than the operational impacts identified. Where impacts during construction may occur, measures recommended to mitigate impacts of the proposed actions could be implemented early to aid in alleviating congested traffic conditions. However, where unmitigatable operational impacts are identified, there is also the potential for such impacts to occur during construction.

PARKING

Construction vehicle parking would be accommodated within the project sites.

TRANSIT

Distributed among the various transit services in the area during non-commuter hours, the nominal amount of transit trips generated would not result in any significant adverse transit impacts.

PEDESTRIANS

For the same reasons discussed above for transit, the construction activities would not result in any significant adverse pedestrian impacts. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided and coordinated with the New York City Department of Transportation (NYCDOT).

AIR QUALITY

During construction of the RWCDS, air pollutants would be emitted from off-site mobile sources (i.e., worker vehicles and trucks on public roadways) and on-site non-road construction equipment and trucks. In addition, fugitive dust could be suspended in air by construction activities. Total long-term emissions from on-site construction equipment and trucks for the proposed actions are expected to be comparable to the construction emissions estimated for some recent large development projects, including Columbia University's Proposed Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development FEIS and the Atlantic Yards Arena and Redevelopment FEIS, for which significant construction air quality impacts were not predicted.

While it is possible that the construction activities may exceed certain thresholds used for assessing the potential for significant adverse air quality impacts, any exceedance would be limited in extent, duration, and severity. The project sites are large, and with the exception of the northern portion (Parcels A and B of Site A), the project sites are well removed from any existing sensitive receptor. In addition, the construction schedule was developed such that by the time buildings on a parcel are ready for occupancy, the construction of the neighboring parcels would be past the construction phases that are of most concern to air quality. Construction activities associated with the proposed actions would not result in significant adverse air quality impacts from stationary and non-road sources. Based on the construction traffic volumes during the peak construction period and the expected use of diesel particulate filters (DPF) in concrete trucks, which would constitute a large portion of the construction trucks, significant adverse impacts on air quality from on-road construction sources would not be expected.

NOISE

While construction activities would be noisy and intrusive to the nearest sensitive receptors surrounding the project sites (Gantry Plaza State Park, the Avalon Riverview, and the PowerHouse) and to the residential and school buildings to be constructed, the noisiest activities (foundations) would take place for limited periods of time (less then 18 consecutive months), and the level of construction activity would vary and move throughout the site, and no immediate area would experience the effects of the project's construction for the full construction duration. Therefore, no significant adverse noise impacts are expected to occur. While it is possible that construction activities may result in noise impacts on the open spaces to be constructed as part of the proposed actions, they would not be considered significant adverse impacts.

B. OVERVIEW OF CONSTRUCTION ACTIVITIES

At this point in the development of the proposed actions, no specific proposal exists for development on Site B. As described in Chapter 1, "Project Description," this EIS analyzes the RWCDS anticipated for new development on Sites A and B as a result of the proposed actions. This chapter therefore considers a construction schedule, phasing, and activities that can reasonably be expected for the RWCDS.

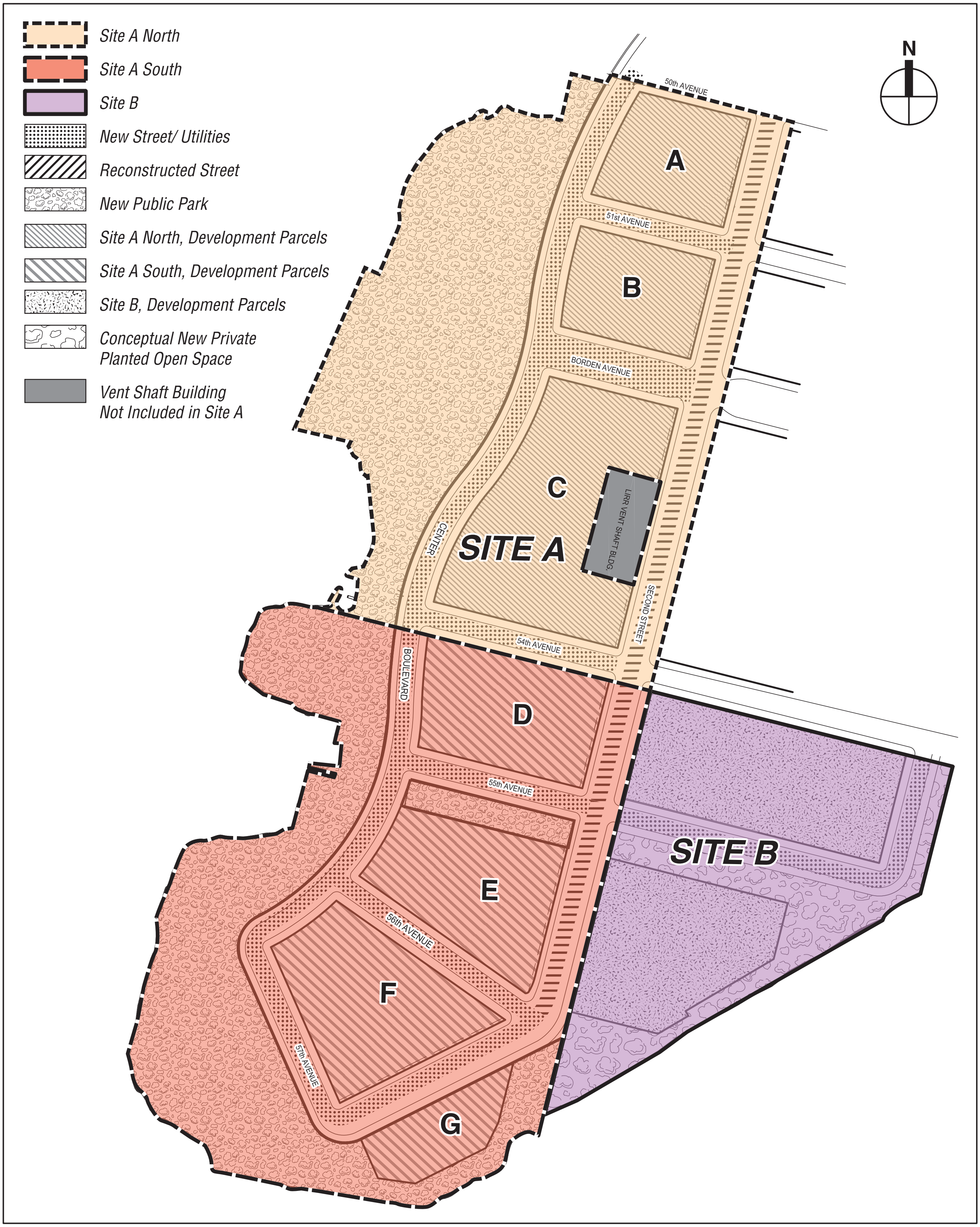
Construction of the various components of the RWCDS conceptual development plan would occur over a number of years, with construction activities and intensities varying, depending on what components of the overall development are under way at any given time. Site preparation activities on Site A are anticipated to begin in early 2009, with construction activities to begin in mid-2009, and with complete build-out of the development parcels and associated parkland assumed to be completed by late 2017. Site B construction would fall within this timeframe, with construction anticipated to begin in the spring of 2010, and continuing through early-summer 2015.

The development of Site A is anticipated to be generally undertaken in two sections: Site A North (i.e., Site A from 50th Avenue to 54th Avenue) and Site A South (Site A from 54th Avenue to Newtown Creek). Within those two sections, buildings would be constructed generally from north to south. Development of Site B would occur as a separate activity. The City of New York, through various City entities and agencies, would be responsible for the construction of infrastructure, roads, the school, and parkland. Development of Site B, which is under private ownership, would be by a separate developer. The locations of the various development parcels and other project components are shown on **Figure 20-1**. A more detailed description of the proposed actions' general construction practices (including those associated with deliveries and access, hours of work, sidewalk and lane closures, staging and laydown, and construction parking), construction methods, and a conceptual schedule of anticipated construction activities, is provided in the discussion below.

GENERAL CONSTRUCTION PRACTICES

Certain practices would be observed throughout the construction of the RWCDS on Site A. For each parcel's development, the construction manager for each building would designate a contact person for community relations throughout the construction period. This person would serve as the contact for the community to voice concerns about construction activities, and would be available to meet with the community to resolve concerns or problems. It is likely that similar practices to those described below for Site A would also be observed during construction on Site B.

The following describes typical construction practices in New York City. In certain instances, practices employed at the individual construction sites may vary from those described below.



Conceptual Plan - Proposed Development Parcels and Project Elements

Figure 20-1

DELIVERIES AND ACCESS

Access to the construction sites would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Typically, worker vehicles would not be allowed into the construction area, although during the construction of the first several parcels on Site A, workers may be allowed to park on the southern portions of the site that are not yet under construction. Worker parking for construction on Site B would likely be on the streets in the area. Security guards and flaggers would be posted, and all persons and trucks would have to pass through security points. Workers or trucks without a need to be on-site would not be allowed entry. After work hours, the gates would be closed and locked. Unauthorized access would be prevented after work hours and during weekends.

Material deliveries to the sites would be controlled and scheduled. Unscheduled or haphazard deliveries would be minimized.

HOURS OF WORK

Construction activities for the various RWCDS buildings and facilities would take place in accordance with New York City laws and regulations, which allow construction activities to take place between 7 AM and 6 PM. Construction work would begin at 7 AM on weekdays, with most workers arriving between 6 AM and 7 AM. Typically, work would end at 3:30 PM, but could be extended until 6 PM for such tasks as finishing a concrete pour for a pad, or completing the bolting of a steel frame erected that day. Extended workday activities would not include all construction workers on site, but only those involved in the specific task. Extended workdays would occur during foundation and superstructure tasks, and limited extended workdays could occur during other tasks over the course of construction, but would likely be minimized.

At limited times over the course of constructing a building, weekend work could be required. Weekend work requires a permit from the New York City Department of Buildings (NYCDOB) and, in certain instances, approval of a noise mitigation plan from the New York City Department of Environmental Protection (NYCDEP) under the City’s Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1, 2007, limits construction (other than special circumstances as described below) to weekdays between the hours of 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM and on weekends) may be permitted only to accommodate: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. In such cases, the numbers of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. If it were to become necessary, the typical weekend workday would be on Saturday, beginning with worker arrival and site preparation at 7 AM, and ending with site cleanup at 5 PM.

A few tasks may have to be completed without interruption, and the work can extend past 6 PM. In certain situations, concrete must be poured continuously to form one structure without joints. This type of concrete pour is usually associated with foundations and structural slabs at grade, which would require a minimum of 12 hours or more to complete, depending on the size of the area being poured.

SIDEWALK AND LANE CLOSURES

No lane closures are expected on existing streets leading to the project sites (i.e., 50th, 51st, 54th, and Borden Avenues). As part of the proposed actions, 2nd Street would be reconstructed south of 50th Avenue. It is anticipated that this would be accomplished ahead of construction on the Site A and Site B parcels. Along 2nd Street, some sidewalks may have protective sheds or pedestrian access may be within barriers when construction is taking place next to the sidewalk. In addition, it is expected that in certain locations temporary access ways for trucks and worker vehicles into the construction sites would cross sidewalks.

As part of the proposed actions, a new street system would be constructed on Site A. Partial street closures and total sidewalk closures along one side of the new streets would be required for various periods of time.

Once construction activity of buildings is under way on Site A, it is assumed that the vacant land on adjacent parcels could be used for staging when it is available. However, since nearby buildings on Site A would most likely be under construction simultaneously, limited adjacent area would be available for this purpose. While some storage in the earlier stages of construction may be able to be accommodated on the southern portions of Site A, as construction progresses from north to south, storage would need to take place along one side of the new streets surrounding the development parcels.

The construction cranes for hoisting materials would likely be in the new or reconstructed streets or on unconstructed parcels. In addition, construction materials, such as pre-cast concrete pieces, would likely be stored on trailers located on the streets or on unconstructed parcels. The use of the streets for construction would cause lane and sidewalk closures for several months to over a year, while some lanes and sidewalks would be closed only intermittently to allow for certain construction activities. It is likely that curb lanes would be closed continuously during construction on a parcel. This work would be coordinated with and approved by the appropriate governmental agencies. Again, since construction is anticipated to occur from north to south, and the majority of the street system serving the sites would be new, the streets being used for storage and staging would be adjacent to or south of parcels under construction. It is not envisioned that closures of new or reconstructed streets adjacent to parcels where construction had been completed would be needed for the construction of subsequent parcels.

STAGING AND LAYDOWN AREAS

Because of the density of the finished buildings, laydown areas would likely be on the curb lane of the new or reconstructed local streets bordering the various development parcels. It is not expected that through streets would be used for material laydown. Materials that are needed during the day are usually delivered early that day. These materials, such as reinforcing bars and prefabricated pieces, are stored until needed. In certain cases, several days of construction materials would be stored.

CONSTRUCTION WORKER PARKING

It is expected that the construction workers would park on the local streets next to the active construction site and would not park in the extended neighborhood. Because of the size of Sites A and B, sufficient on-site or street parking is expected to be available on the new streets on Site A, the reconstructed 2nd Street, or on existing local streets.

CONSTRUCTION METHODS

Different construction techniques would be used on the various components of the project. The mixed-use retail and residential buildings (many of which would include some ground-floor retail space, as well as multi-level parking structures) would utilize conventional construction techniques. For each of the Site A and Site B development parcels, the building sites would be prepared, piles driven, the foundation built, and then the building erected. The skeleton or core of the building would be built, and then the exterior or shell installed as the cores rise to 6 to 8 stories. The buildings would involve extensive interior finishing for the walls, floors and appliances. In addition, as discussed below, the project would also involve construction of parks, new roadways, and public utilities. The construction methods are described in more detail below.

GENERAL SITE PREPARATION

The first step would be to prepare the sites for construction. This would involve site cleanup, demolition, remediation, and grading. The activities associated with these general site preparation steps are outlined below.

Site Cleanup

- Installation of site perimeter security fence;
- Removal of all residual metal, loose junk, debris, furniture, and garbage;
- Inventory and removal of all remaining small containers, drums and loose items requiring special disposal including, but not limited, to: paints, pesticides, chemicals, strippers, thinners, oils, petroleum containers, mercury containers, etc.;
- As necessary, particularly on Site B, inventory and restaging of any remaining 55-gallon drums and large containers of liquid and solid waste in centralized drum storage area for consolidation, testing, classification, and disposal;
- Inventory and sampling of all structures for asbestos remediation design preparation;
- Inventory, sampling, and removal of all light ballast equipment for disposal;
- Pumping out, cleaning, removing, and disposing of all above-ground tanks;
- Pumping out, cleaning, excavating, removing, and closure sampling of all known underground storage tanks; and
- Asbestos remediation in existing structures on Sites A and B.

Demolition and Remediation

- Demolition of buildings above ground, segregating materials for disposal/recycling;
- Breaking up and removing concrete floor slabs for recycling/disposal;
- Breaking up and removing asphalt road and parking lot surfaces for recycling/disposal;
- Removal of the upper one to two feet of material where surficial contamination is prevalent and obvious, and stockpiling, sampling, and classification of the material for disposal;
- Opening the ground in areas of drywells, floor drains, discharge points, and any newly identified underground storage tanks (USTs) in locations where surficial contamination has either been removed or has not been noted; and

- Groundwater removal and/or treatment in all areas where existing product and heavy groundwater contamination exists, pumping to oil/water separators and holding tanks, sampling, monitoring and operating to closure.

Grading

- Grading and filling in development area, including areas for new streets, parks, and buildings;
- Forming and pouring of grade beams;
- Grading of roadways and side slopes of roads;
- Additional filling of areas for sidewalks, as necessary; and
- Redistribution of excavated fill material to other areas.

The sites would be prepared using a 25 to 30 ton excavator for large earth-moving and a small mini-excavator for finishing the excavation. Because of the soil conditions, the leveled site would probably be compacted with vibrators to minimize settlement. One of the steps that would occur during this stage of construction activities would be to drive the piles that would support the utilities. A variety of other equipment would be used for the demolition and remediation activities. Somewhere between approximately 75 to 250 workers would be "on-site" during these tasks, depending on which stage of site preparation activity is underway, and at which site.

INFRASTRUCTURE

Following the initial site preparation, utilities would be installed and then streets would be built. To install underground utilities, a trench is dug, usually about 4 to 10 feet below the ground surface. Because much of Sites A and B consist of unconsolidated fill, short piles would be driven and pile caps installed to support the main water, sewer, gas, and some electrical and telecommunication lines to prevent differential settling, which could damage the utility lines and cause unevenness at the street level. The area around the pile caps would be filled with sand or gravel. Lengths of pipe or conduit would be laid and connected together, and the pipes would be tested in sections and then as a complete system. All new underground utilities would be connected to existing utilities in the surrounding streets. These activities would be undertaken in a manner that would minimize any disruptions to service in the area.

Because the RWCDS involves the reconstruction of 2nd Street south of 50th Avenue, as well as the construction of new public streets on Site A, it is expected that all underground utilities including water, sewer, gas, electric, and telecommunications service would be installed concurrently. Providing the level of energy service required by the development envisioned under the proposed actions would require new electrical transmission and distribution lines as well as telecommunication (telephone, cable, and fiber optic) lines. The water, gas, and sewer lines would likely be placed directly onto the pile caps. For the electric and telecommunication lines, ducts would be laid on pile caps where necessary, and then the lines would be installed in the openings in the ducts. After all the various utility lines are placed on the pile caps and the necessary ancillary items, such as manholes for access and fire hydrants, are installed, the trench would be backfilled with compacted soil. If the removed soil is suitable, it would be reused; if not, clean soil would be brought in.

Trenches in the existing streets would not be left open during non-working times, but would either be filled and patched or covered with steel plates.

This work typically involves backhoes to excavate the trench and place the backfill, and cranes to lift the utility lines into place. Flatbed delivery trucks are used to transport the lines and pipes to the site. Dump trucks are used to bring the bedding material and clean fill, if needed, to the work site. Asphalt trucks and rollers are needed to patch the street.

While 2nd Street already exists and utility lines have already been installed in this street bed, it is possible that some of these utilities may need to be rehabilitated or replaced. This work typically involves the use of jackhammers and pavement cutters to open the street, in addition to the backhoes, cranes, and other equipment described above. All other streets within Site A would need to have the utilities installed either from the new utility lines running in the new street beds or from 2nd Street. In addition, the lateral lines to the new buildings would have to be installed.

ROADS

Construction of the roadways on a portion of the site would start after the infrastructure and utilities have been placed in the street bed in that area. The roads are graded, and then typically three to four layers of material are laid down to form the roadway. First a subbase is placed and compacted, followed by the base layer, a binder layer, and finally the top layer of asphalt, which forms the new streets' wearing surface. On streets where light traffic is expected, the base layer may be omitted. At the same time, the curbs and sidewalks would be installed. Foundations for lights and traffic control devices would also be installed. The final work would be striping the streets and crosswalks.

Construction of the roads would involve graders, bulldozers, and compactors for the first three layers. The asphalt would need a paving machine and rollers to compact the asphalt. The materials would be brought to the site by trucks and immediately placed by the graders and bulldozers. The roller/compactor would be used after each layer has been placed. The asphalt would be brought by trucks and placed into the paving machine for spreading and compacting. The road work uses large mechanical equipment.

Construction of the sidewalks and installation of the curbs and roadside appurtenances is more labor intensive than the road construction. Forms are placed by hand to shape the curb, sidewalk and foundations for the street appurtenances. After reinforcing mesh is laid, concrete is poured from concrete trucks.

PARKS

During construction of the parks open spaces, clean top soil would be imported for installation of the grassy areas and landscaping. Concrete sidewalks would be poured, and street furniture, such as benches and tables, would be installed. Concrete trucks would be needed to bring concrete for the sidewalks. The top soil would involve dump trucks bringing the soil and hand spreading. Trees and shrubs would be planted. For the active recreation areas, the ground surfaces would be installed, followed by the appropriate amenities (e.g., basketball hoops, volleyball nets, etc.). The majority of this work would be done by hand. As discussed in more detail below, it is envisioned that the park construction would generally accompany the construction of the Site A parcels, starting on the northern end of Site A, and progressing southward, as the parcels are developed.

PUBLIC AND RESIDENTIAL BUILDINGS

The buildings on Sites A and B would be built of masonry and/or steel reinforced concrete. The first step would be to drive the piles that support the buildings. Pile caps would be formed and concrete poured to build the foundations for the various buildings. The pile driving and foundations would employ about 75 construction workers at any given building. A pile driver and generator would be used. To construct the shell of a building, two methods are likely to be used. The traditional method is block walls for multi-story residential buildings and schools. This type of construction requires about 200 masons and laborers per day at any given building to build the walls, floors, and roof. A rough terrain fork lift would be used to move the masonry around the building site and into position for the masons. Mortar mixers would also be used. In addition, for the taller components of the buildings on the various parcels, construction of building cores and shells would include installation of steel beams and columns and roof construction. These activities would require the use of cranes, compressors, material hoists, on-site reinforcing bar bending jigs, welding equipment, and a variety of hand-held tools. The second method is to use large pre-cast concrete planks brought to the development parcel on tractor trailers. The pre-cast elements would be lifted by large cranes from the bed of the tractor trailers and secured into place. This method of construction could also involve similar steel work as described above for the taller building components and would require the same number workers per building, about 200 per day. At this point in the construction, electric service may be provided, and generators would no longer be needed. The interior fit-out of the buildings is the most labor-intensive part of constructing the buildings, with about 300 workers per building on-site each day. Interior finishing involves electrical installation; heating, ventilation and air conditioning; sheet-rocking; and painting. Mostly small hand tools are used for interior finishing, but a high number of deliveries for materials, such as sheet rock, ceiling tiles, flooring and interior electrical, mechanical and plumbing fixtures are required. Approximately 25 to 60 delivery trucks would arrive at and leave each development parcel each working day in connection with this task, for any given building.

It is expected that almost all work would be done during normal construction hours of 7 AM to 4 PM, five days a week. On occasion, some extended shift work to 6 PM may be required to complete a particular task. Weekend and night work is not expected.

RETAIL

For retail components of project buildings, the primary difference would be that retail space typically has larger open spaces with long spans between walls and higher ceilings. The site preparation, excavation, pile driving, foundation, and exterior walls (shell) work would be the same as described above under the conventional residential construction. The additional work would involve the placement of steel columns to provide roof support. The interior work would be simpler because fewer interior rooms are provided with less framing, dry wall, and finishing work. The activities described above include the construction of the retail space assumed in the conceptual plan for the various RWCDS parcels, as the retail space envisioned would be in the ground floor of several of the residential buildings, rather than in stand-alone structures.

CONCEPTUAL CONSTRUCTION PHASING AND SCHEDULE

The anticipated construction activities can be divided into three general categories, site preparation, construction of open space, and above-grade building construction. It is envisioned that construction of the RWCDS development would generally proceed from north to south on

Site A, with development on Site B conservatively assumed to begin in spring 2010, and overlapping with some of the more intensive construction activities on Site A.

SITE PREPARATION

The construction activities related to site preparation include site cleanup, demolition, remediation, grading, and installation of new infrastructure (utilities and roadways). Site preparation activities are anticipated to begin in early 2009, with construction activities to begin in mid-2009 on the northern portion of Site A; in spring 2010 on Site B; and at the beginning of 2012 on the southern portion of Site A.

Site Cleanup

Site cleanup would be expected to occur in three general areas, beginning in 2009 for Site A North, early-2012 for Site A South, and spring-2010 for Site B. For each of these areas, it is anticipated that these activities would last for approximately three to six months.

Demolition and Remediation

This stage of construction activities would be expected to run concurrently with the site cleanup activities outlined above, starting in mid-2009 on Site A North, and following a similar schedule as described above for Site A South and Site B. For each of these areas, it is anticipated that these activities would last for approximately six to nine months.

Grading and Infrastructure Piling

As with the other site preparation activities described previously, the site grading and infrastructure piling placement activities would begin at Site A North, which would be anticipated to begin in the fall of 2010. At each of the three main construction areas, these activities would be expected to continue for approximately six months.

Installation of Infrastructure

Utility and roadway paving work would also be anticipated to start in the fall of 2010 at Site A North. These activities are estimated to continue for a period of approximately nine months on both Site A North and Site A South, and for about six months on Site B. The activities associated with this stage would include installation of utility connections to all building sites, piping placement on piles where required; employment of Best Management Practices (BMP) for stormwater retention and holding areas to main roadway system; and paving of new roadways.

OPEN SPACE AREAS AND OTHER SURFACES

Construction of hard surfaces and planted park areas would be accomplished in stages, with the Site A park development generally anticipated to be completed moving from north to south, as each of the Site A parcels is developed. Each incremental stage of park construction would be anticipated to last for about one year, with the first portion of the Site A North park beginning in the winter of 2010, and the last part of the Site A South park being completed in mid-2017. Any remaining park areas requiring fill would be completed, and park utilities would also be installed during these stages. The construction of the various sections of the Site A waterfront park would take 9 to 12 months, and are anticipated to only involve weekday work.

ABOVE-GRADE BUILDING CONSTRUCTION

Building construction would begin after all site preparation (cleanup, remediation, grading, and utility installation) is completed. Structural piling would be installed in areas of building footprints. The buildings on Site A, Parcels A through G, would be expected to be constructed starting in the beginning of 2010 at Parcel A, with the remaining buildings starting construction one at a time at intervals between 9 and 15 months apart. All of the buildings on Site A North parcels (Parcels A–C) would be completed by late 2014. The school on Site A, Parcel B would be anticipated to begin construction in spring 2011 and be completed by spring 2013. The Site A South buildings would begin in late-2012 and would be expected to be completed by the end of 2017. Construction of the Site B buildings would be expected to begin in mid-2011 and be completed by mid-2015. **Figure 20-2** illustrates the conceptual construction sequence for the parcels on Sites A and B.

Typical construction stages for a predominantly residential building do not vary greatly, mainly depending on overall size, with the buildings assumed in the RWCDS having construction durations of between 18 and 30 months. Building construction would generally involve three phases: foundations, core and shell construction, and fit-out and finishing. The various building structure and interior finishing stages would overlap one another, as the upper parts of the structure would be under construction while finishing of the lower floors would be completed.

Foundation

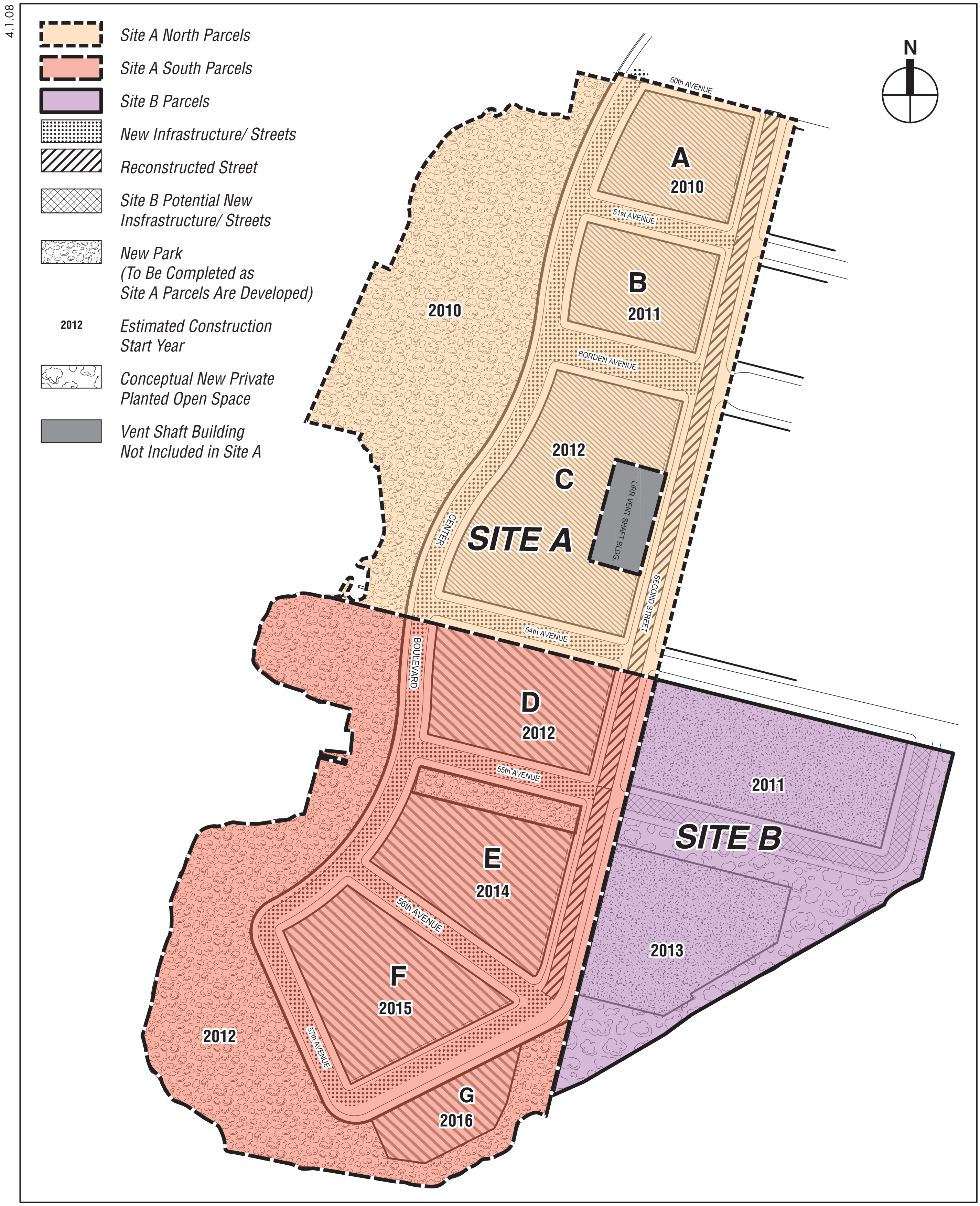
Construction of the building foundations on each development parcel would generally last approximately six months. During this period, piles would be driven, as necessary, to support the buildings. Passive and/or active venting systems would be installed in the porous fill beneath building foundations and vapor barriers would be installed in the building footprints. Pile caps would be formed and concrete poured to build the foundations for the buildings. Equipment on-site during this phase would include pile drivers, concrete mixers and pumps, and potentially generators. Approximately 50 to 75 workers would be on-site each day.

Core and Shell

In general, core and shell construction of a residential building would last approximately 12 to 18 months, depending on the size of the building. Construction of the core and shell of the building would include construction of the building’s framework (installation of beams and columns), floor decks, façade (exterior walls and cladding), and roof construction. These activities would require the use of the tower crane, compressors, personnel and material hoists, concrete pumps, on-site reinforcing bar bending jigs, welding equipment, and a variety of hand-held tools, in addition to the delivery trucks that would bring construction materials to the site. Each day, between 100 and 300 workers would be required during these stages of construction for each building.

Interior Fit-out and Finishing

This stage would include the construction of interior partitions, installation of lighting fixtures, and interior finishes (flooring, painting, etc.), and mechanical and electrical work, such as the installation of elevators. Mechanical and other interior work would overlap for about 6 months with the tower building core and shell construction, and would be expected to last for between 9 and 12 months. This activity would employ the greatest number of construction workers: up to about 300 per building during the active periods, and up to about 400 to 500 workers could be on-site during periods of maximum activity. Equipment used during interior construction would



Conceptual Construction Sequence
Figure 20-2

include exterior hoists, pneumatic equipment, delivery trucks, and a variety of small hand-held tools. However, this stage of construction is the quietest and does not generate fugitive dust.

OVERALL CONCEPTUAL SCHEDULE AND ESTIMATED CONSTRUCTION WORKER AND TRUCK INTENSITIES

Figure 20-3 presents a conceptual schedule of construction for the RWCDS development plan, by Site and Parcel, indicating the estimated start and end dates for each general construction activity (infrastructure, buildings, park space), the proposed uses that would be constructed, and when these activities would be expected to overlap.

Table 20-1 presents the peak number of construction workers and delivery trucks expected for each quarter during the construction of the project.

Table 20-1
Daily Numbers of Construction Workers and Delivery Trucks

Year	2009				2010				2011			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	0	0	100	250	275	600	625	975	525	575	750	550
Trucks	0	0	45	80	70	140	130	155	65	110	130	115
Year	2012				2013				2014			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	1350	1425	1450	1125	1325	1250	1100	1350	1225	1200	1425	825
Trucks	240	195	160	185	190	193	168	143	141	148	161	111
Year	2015				2016				2017			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	700	825	600	725	425	400	525	600	725	725	400	300
Trucks	58	93	85	103	78	33	68	85	100	100	30	25

Period	Overall RWCDS	
	Peak	Average
Workers	1450	801
Trucks	240	116

Notes: The number of construction workers and delivery trucks represents the highest number over a several week period and may not reflect the absolute peak day.

1st Quarter: January-March; 2nd Quarter: April-June; 3rd Quarter: July-September; 4th Quarter: October-December.

Estimates have assumed construction work would occur weekdays during regular allowable construction hours for most activities, with some selected activities (e.g., concrete pouring) requiring extended shifts involving approximately 20 percent of the daily workers.

The number of workers and truck deliveries would peak during 2012 with up to 1,450 workers per day and 240 trucks per day. This occurs between the first and third quarters of 2012, based on the projected schedule. These numbers represents the highest number of workers and deliveries sustained over a several week period and may not reflect the single highest day.

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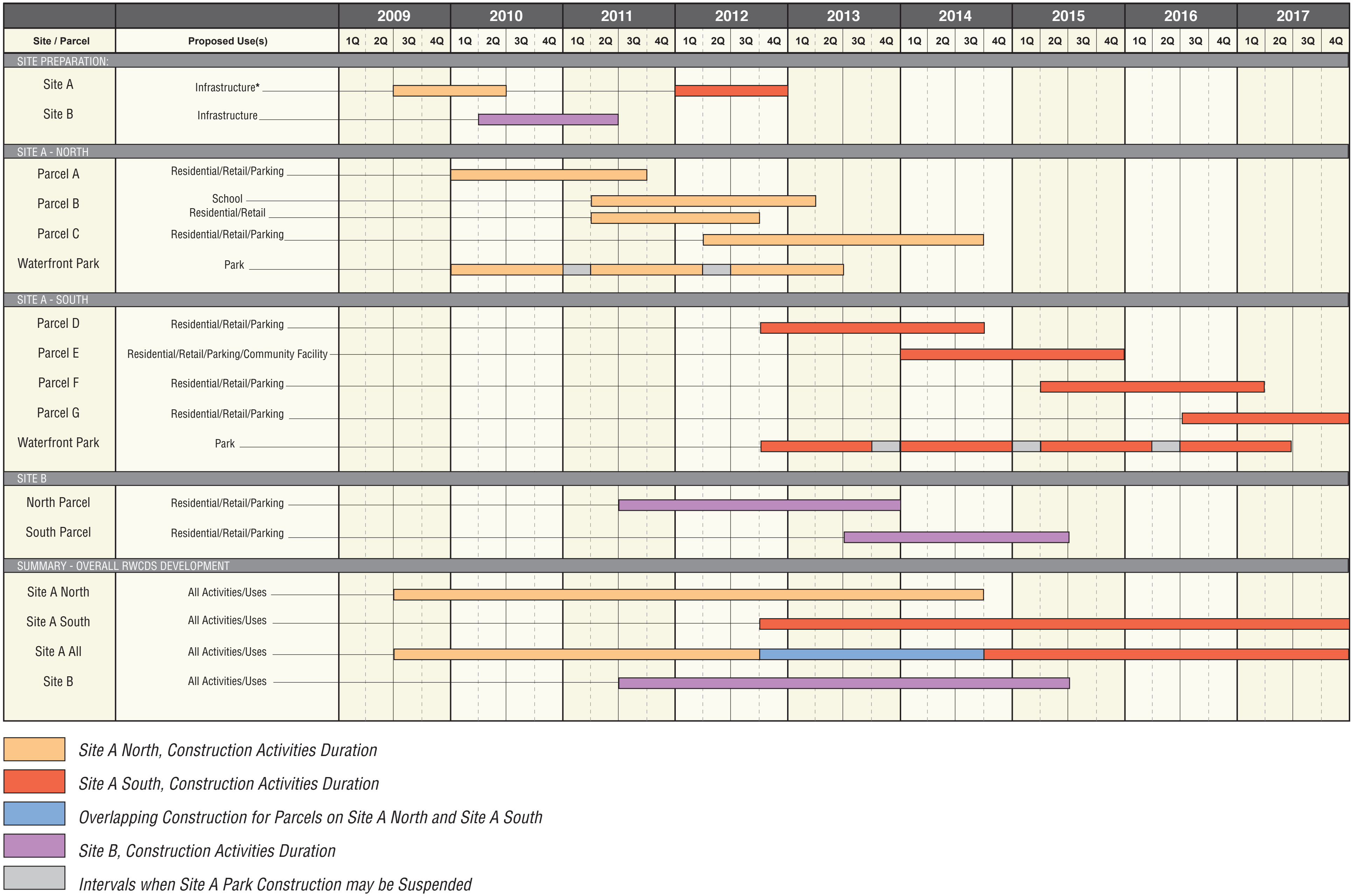

** = Includes site cleanup, demolition, remediation, grading, utilities, and street construction.*

RWCDS Conceptual Construction Schedule

Figure 20-3

C. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

LAND USE AND NEIGHBORHOOD CHARACTER

Potential impacts on land use and neighborhood character during construction of the proposed actions could occur as a consequence of disruptive and noticeable increases in traffic, noise, and air quality emissions or if community activities are disrupted.

Land uses in the area immediately surrounding the project sites include Gantry Plaza State Park and the Avalon Riverview residential building to the north of Site A across 50th Avenue and the PowerHouse, which is the residential conversion of the former Pennsylvania Railroad Power House at 2nd Street and 51st Avenue. There is one commercial use at Borden Avenue and 2nd Street (a restaurant), and the remaining land uses in the area immediately surrounding the project sites are transportation and industrial uses.

Construction activities would affect land use on the project sites but would not alter surrounding land uses. Certain types of construction activities would be noisy and intrusive to the adjacent residences and open space—particularly the early stages of building construction on the various parcels, i.e., pile driving and foundation work. However, as discussed in more detail below (see "Noise"), in general, the noisiest construction activities adjacent to any one sensitive receptor would take place for a limited period of time (less than 18 consecutive months), and no significant adverse noise impacts are expected. During construction, air pollutants would be emitted from off-site mobile sources (i.e., worker vehicles and trucks on public roadways) and on-site non-road construction equipment and trucks. As discussed below (see "Air Quality"), significant adverse air quality impacts are not expected.

Construction staging activities for the proposed actions would occur within the parcels on Sites A and B or within portions of the new sidewalks and curbs of the new street system on the project sites. Access to surrounding land uses would be maintained throughout the construction period, and adherence to the provisions of the New York City Building Code and other applicable regulations would reduce the potential adverse effects of construction activities on land use patterns and neighborhood character. Moreover, although the project anticipates a 9-year construction schedule, the level of activity would vary and move throughout the project sites, and no one area would experience the effects of the project's construction activities for the full 9-year duration.

Within the neighborhood surrounding the project sites, there are likely to be temporary and localized construction impacts on noise as a result of construction activity, operation of heavy equipment on-site, and construction workers traveling to and from the site, and trucks delivering materials to and removing construction waste from the site. Generally, the intensity of the off-site impact decreases with the distance from the site.

In sum, combined construction effects at the project sites are not expected to result in potential significant adverse impacts to land use and neighborhood character.

SOCIOECONOMIC CONDITIONS

Construction would create major direct benefits resulting from expenditures on labor, materials, and services, as well as substantial indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity.

Construction would also contribute to increased tax revenues for the City and State, including those from personal income taxes.

Construction of the RWCDS would not affect the access to and therefore the viability of any business. It is not expected that construction activities would cause the failure of any business thereby affecting neighborhood character.

Overall, there would be no significant adverse impacts on socioeconomic conditions due to construction.

COMMUNITY FACILITIES

There are currently no community facilities located within the project sites nor within the area immediately surrounding the project sites. Upon completion of construction at Parcel B of Site A, there would be a school on this parcel. It is not expected that construction activities on the remainder of Site A or on Site B would adversely affect the school significantly because the duration of construction on Parcel C (adjacent to Parcel B) would be limited to approximately 1 year after the school would open. Construction activities during this 1 year would include approximately 6 months of exterior work with the rest of the work consisting of interior (and therefore less intrusive) work.

A school pick-up/drop-off area would be provided along the north curb of westbound Borden Avenue at its intersection with 2nd Street. It is not anticipated that there would be conflicts between school pick-ups/drop-offs and construction vehicles, particularly as construction activities move southward on Parcels D, E, F, and G on Site A. Material delivery and other trucks associated with construction on Parcel C would be made on 54th Avenue and/or Center Boulevard to increase the distance between the construction vehicles and the school.

Therefore, construction of the RWCDS would not have a significant adverse impact on community facilities.

OPEN SPACE

Construction activities would not occur within any open spaces, and no open spaces would be used as staging areas. Construction activities on the north portion of Parcel A of Site A could be disruptive to Gantry Plaza State Park. However, construction activities in this area would be temporary with between 3 and 6 months of activity for site cleanup, demolition, remediation, grading, and utility and street construction and another 21 months for construction of the residential, retail, and parking uses on Parcel A. Construction activities would be visible from Gantry Plaza State Park, and could be noisy at times (see “Noise,” below); however, the noisiest activities (site preparation, which includes site cleanup and demolition, and the construction of piles and foundations) would be limited to approximately 1 year. Therefore, no significant adverse open space impacts from construction activities would occur on Gantry Plaza State Park.

The waterfront park and 54th Avenue parkland to be constructed on Site A would be developed in conjunction with development on each of the parcels. As open space areas are completed and as construction continues in adjacent areas, there would be some disruption (e.g., noise) to the newly completed open spaces. However, the level of construction activity would vary and move throughout the project sites, and no immediate area would experience the effects of the project’s construction for the full construction duration. Therefore, there would not be adverse impacts on the open spaces to be constructed as part of the proposed actions.

HISTORIC RESOURCES

In comments dated September 24, 2007, the New York City Landmarks Preservation Commission (NYCLPC) determined that the project sites are not sensitive for archaeological resources; therefore, construction of the RWCDS on the project sites would not result in significant adverse impacts on archaeological resources. As there are no architectural resources within 90 feet of the project sites, no construction-related impacts on architectural resources are expected to occur. Overall, construction of the RWCDS would not result in significant adverse impacts on historic resources.

HAZARDOUS MATERIALS

As discussed in Chapter 10, "Hazardous Materials," in areas to be excavated or disturbed under the proposed actions, there is the potential to encounter lead-based paint and/or asbestos-containing building materials as well as contaminated materials. These contaminated materials are principally associated with the presence of underground and aboveground petroleum storage tanks, records of a portion of the site being used as a regulated solid waste transfer facility (concrete recycling); records of petroleum spills on the project sites and adjacent sites, and historical site usage for auto repair and maintenance. The greatest potential for exposure to any constituent of concern would be during demolition and construction, especially those activities related to excavation, storage, transport, and disposal of potentially contaminated soil and fill materials. Preventative measures and remediation efforts that would be implemented to avoid any significant adverse impacts are described in Chapter 10, "Hazardous Materials."

NATURAL RESOURCES AND WATER QUALITY

Construction activities for the proposed actions would have the potential to affect natural resources and water quality. Specifically, construction activities—demolition of existing structures, debris removal, excavation activities for site grading, foundation work and placement of utilities, and placement of clean fill within the project sites—would have the potential to affect water quality of the East River and Newtown Creek because of stormwater runoff during land-disturbing activities that would occur in upland areas. In addition, construction of two new stormwater outfalls has the potential to result in some loss of tidal wetlands. In-water construction activities, including the stormwater outfall construction and the reconstruction of bulkhead or riprap areas, would have the potential to result in sediment disturbance and resulting increases in suspended sediment. In addition, these activities would have the potential to result in the loss of benthic habitat and benthic macroinvertebrates associated with these areas that are unable to move from the area of activity. Construction activities could also result in the loss of some habitat, thereby potentially adversely affecting some individual birds and other wildlife currently using the limited wildlife habitat within Site A should these individuals be unable to find suitable available habitats nearby.

Measures that would be implemented to avoid any significant adverse impacts are described in Chapter 11, "Natural Resources and Water Quality."

TRAFFIC AND PARKING

Construction activity would extend from 2009 to 2017 and would generate construction worker and truck traffic. Because of the lengthy duration of these activities, an evaluation of construction sequencing and worker/truck projections was undertaken to assess potential traffic-related impacts. As described below, the projected construction activities would yield less total traffic than projected for the proposed actions. However, significant adverse traffic impacts could still occur at some of the study area locations during construction, similar to the operational impacts identified in Chapter 16, "Traffic and Parking." Therefore, a detailed traffic construction analysis will be undertaken between publication of the Draft and Final EIS, and the conclusions of this analysis will be presented in the FEIS.

CONSTRUCTION TRAFFIC PROJECTIONS

Average daily construction worker and truck activities by quarter were projected for the full nine years of construction. These projections were further refined to account for worker modal splits and vehicle occupancy, and arrival and departure distribution.

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 quarters were used as the basis for estimating peak hour construction trips. Based on a schedule of commencing construction in the beginning of 2009, the combined construction worker and truck traffic peak would occur in the second and third quarters of 2012. The daily average numbers of construction workers and truck deliveries during these two construction peak quarters were estimated at 1,450 workers and 181 truck deliveries per day. These estimates of construction activities are further discussed below.

Construction Worker Modal Splits

According to the U.S. Census reverse journey-to-work (RJTW) data, commuting to work via auto for construction and excavation occupations in the study area is approximately 60 percent, with an average auto occupancy rate of 1.19. However, as discussed with NYCDOT for a more conservative analysis, a 70 percent auto usage was used to project the numbers of vehicle trips generated by future construction workers.

Peak Hour Construction Worker Vehicle and Truck Trips

Site activities would mostly take place during the typical construction shift of 7 AM to 3 PM. However, some construction tasks would extend to 5 PM, requiring a portion of the construction workforce to remain for this extended shift.

While construction truck trips would be made throughout the day (with more trips made during the early morning), and most trucks would remain in the area for short durations, construction worker travel would typically take place during the hours before and after the work shift. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon or early evening, whereas each truck delivery was assumed to result in two truck trips during the same hour (one "in" and one "out").

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each shift (6-7 AM for arrival and 3-4 PM for departure on a normal day shift or 5-6 PM for days with extended shifts). For construction trucks, deliveries would occur throughout the day when the construction site is active. Construction truck deliveries typically peak during the hour before the regular day shift (25 percent of regular shift and 20 percent of extended shift), overlapping with construction worker arrival traffic. Based on these assumptions, peak hour construction traffic was estimated for the entire construction period. The peak construction hourly trip projections averaged for the second and third quarters of 2012 are summarized in **Table 20-2**.

Table 20-2
Peak Construction Trip Projections 2012

Hour	Construction Workers				Construction Truck Trips		Total Vehicle-Trips		
	Worker-Trips		Auto-Trips						
	In	Out	In	Out	In	Out	In	Out	Total
6 AM - 7 AM	1,150	0	676	0	44	44	720	44	764
7 AM - 8 AM	288	0	170	0	18	18	188	18	206
8 AM - 9 AM	0	0	0	0	18	18	18	18	36
9 AM - 10 AM	0	0	0	0	18	18	18	18	36
10 AM - 11 AM	0	0	0	0	17	17	17	17	34
11- AM -12 PM	0	0	0	0	17	17	17	17	34
12 PM - 1 PM	0	0	0	0	17	17	17	17	34
1 PM - 2 PM	0	0	0	0	17	17	17	17	34
2 PM - 3 PM	0	136	0	80	10	10	10	90	100
3 PM - 4 PM	0	1,088	0	640	1	1	1	641	642
4 PM - 5 PM	0	144	0	85	1	1	1	86	87
5 PM - 6 PM	0	62	0	36	0	0	0	36	36
6 PM-7 PM	0	8	0	5	0	0	0	5	5
Day Total	**1,438**	**1,438**	**846**	**846**	**178**	**178**	**1,024**	**1,024**	**2,048**

Notes: Hourly construction worker and truck trips were derived from projected estimates of 1,438 workers and 178 trucks making two daily trips each (arrival and departure) after averaging the second and third quarters of 2012. Numbers of construction worker vehicles were calculated with a 70 percent auto split with vehicle occupancy of 1.19.

TRAFFIC

As discussed above and shown in **Table 20-3**, construction activities would result in maximum combined auto and truck traffic of 764, 642, and 36 vehicle trips during the 6-7 AM, 3-4 PM, and 5-6 PM peak hours, respectively, averaged for the second and third quarters of 2012. In comparison, the proposed actions would generate 1,378, 719, and 1,269 vehicle trips during typical weekday AM (7:45-8:45 AM), midday (1-2 PM), and PM (4:45-5:45 PM) peak hours, respectively, as shown in **Table 20-3**.

Since the maximum total vehicle trips generated by construction activities would be lower than total vehicle trips generated by the proposed actions, traffic operating conditions resulting from construction activities in the traffic study area are expected to be better than the 2017 Build condition presented in Chapter 16, "Traffic and Parking." Based on the ATR data, the 6-7 AM and 3-4 PM background traffic volumes are not substantially different than the 7:45–8:45 AM and 4:45–5:45 PM commuter peak hour traffic volumes. Since existing and No Build traffic conditions at some of the study area intersections through which construction-related traffic would also travel were determined to operate at unacceptable levels during commuter peak hours, it is possible that significant adverse traffic impacts could occur at some or many of these locations during construction. In order to alleviate construction traffic impacts, measures recommended to mitigate impacts associated with the proposed actions could be implemented early. However, there is a potential for unmitigatable impacts to occur during construction at locations where unmitigatable operational impacts are identified as part of the proposed actions.

Table 20-3
Comparison of Vehicle Trips—Construction and Operational

Construction (Average of Second and Third Quarters 2012)				Operational (2017 Proposed Actions)			
Weekday Peak Period	In	Out	Total	Weekday Peak Period	In	Out	Total
6-7 AM Arrival Peak Hour	720	44	764	7:45 - 8:45 AM Peak Hour	456	922	1,378
3-4 PM Regular Departure Peak Hour	1	641	642	1-2 PM Midday Peak Hour	359	360	719
5-6 PM Extended Departure Peak Hour	0	36	36	4:45 - 5:45 PM Peak Hour	824	445	1,269

DELIVERIES

Construction trucks would be required to use NYCDOT-designated truck routes, including the Long Island Expressway, Jackson Avenue/Northern Boulevard, Queens Boulevard/ Thomson Avenue, 21st Street, 11th Street/Pulaski Bridge, Vernon Boulevard, the Queensboro Bridge (QBB) and the Queens-Midtown Tunnel (QMT). Trucks would then use local streets to access the construction sites. Potential truck routings should avoid streets with narrow widths or streets requiring difficult turning maneuvers to the extent possible.

CURB LANE CLOSURES AND STAGING

The majority of the roadways within the project site do not exist today, and would have either just been constructed, or would be under construction in 2012. Because the street system is likely to be completed in stages ahead of the construction of the individual development parcels, it was assumed that all of the new streets on Site A north of 54th Avenue would be completed by mid-2010, and that construction of the new streets on Site A south of 54th Avenue would not begin until 2012. Completion of the street system for the southern portion of Site A (below 54th Avenue) has been estimated to be completed by the end of 2012. Since there would be very little development completed and occupied by 2012 (only Parcel A on Site A is anticipated to be completed by late 2011, other parcels would be under construction or not yet started in 2012), there would be very few pedestrians surrounding the construction areas. Curb lane closures within and adjacent to the construction area should not affect traffic operations, parking capacities and/or pedestrian safety. Staging areas would be required from the start of foundation work until cranes and hoists are completely removed at the completion of the core and shell stage. Because the majority of construction activities would be accommodated on-site, construction trucks would be staged primarily within the development parcels, or on newly completed streets adjacent to or south of active construction sites.

Maintenance and protection of traffic plans would be developed for any curb lane and sidewalk closures. Approval of these plans and implementation of all temporary sidewalk and curb lane closures during construction would be coordinated with NYCDOT's Office of Construction Mitigation and Coordination (OCMC).

PARKING

The construction activities would generate a maximum daily parking demand of 580 spaces for the average of the second and third quarters in 2012. Parking would be accommodated within the project sites.

As proposed buildings are constructed and occupied, temporary imbalances in terms of parking supply and demand may occur because new parking would not be provided proportionally to the number of units in each building on Site A.

TRANSIT AND PEDESTRIANS

As described below, the project construction activities are not expected to result in significant adverse transit and pedestrian impacts.

TRANSIT

With approximately 70 percent of the construction workers predicted to commute via auto, the remaining 30 percent would travel to and from the project sites via transit. Based on the peak 2012 projections discussed above and summarized in **Table 20-3**, there would be approximately 345, 325, and 20 construction-related transit trips during the 6-7 AM, 3-4 PM, and 5-6 PM hours, respectively. The transit trip demand during the morning and afternoon construction shoulder peak hours would range from 40 to 85 trips. Distributed among the No. 7 subway, and Q103 and B61 bus routes near the project site, only nominal increases in transit demand would be experienced along each of those routes and at each of the transit access locations during hours within and outside of the typical commuter peak periods. Hence, no further evaluation of nearby transit services is required, and there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. Any temporary relocation of bus stops along bus routes that operate adjacent to the project sites would be coordinated with NYCDOT and NYCT to ensure proper access is maintained.

PEDESTRIANS

For the same reasons discussed above, with respect to transit operations, a detailed pedestrian analysis to address the projected demand from the travel of construction workers to and from the District is also not warranted. Considering that these pedestrian trips would primarily occur outside of peak hours and be distributed among numerous sidewalks and crosswalks in the area, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with NYCDOT requirements.

AIR QUALITY

During construction of the RWCDS, air pollutants would be emitted from off-site mobile sources (i.e., worker vehicles and trucks on public roadways) and on-site non-road construction equipment and trucks. Most construction engines are diesel-powered, and produce relatively high levels of nitrogen oxides (NO_X) and particulate matter (PM). Although diesel engines emit much lower levels of carbon monoxide (CO) than gasoline engines, the stationary nature of construction emissions could lead to elevated CO concentrations, and impacts on traffic could increase mobile source-related emissions of CO as well. Therefore, the pollutants of concern for the construction period are NO_2, CO, particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), and particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$). Ultra-low-sulfur diesel (ULSD) is now easily available and can be used in almost any diesel engine, and is required for trucks under federal fuel regulations. Construction engines and trucks using ULSD would emit negligible quantities of sulfur oxides (SO_x, which includes sulfur dioxide, SO_2).

In addition, fugitive dust can be suspended in air by construction activities such as site cleanup and preparation, excavation, and transferring and loading soil or loose material. Fugitive dust can also be re-suspended by construction vehicles traveling on unpaved surfaces and from wind erosion of stockpiled materials. Fugitive dust is mostly larger than the $PM_{2.5}$ size range, and would fall in the PM_{10} range or larger. At this time, a concrete batching plant is not expected to be needed onsite, and thus, fugitive dust from this activity is not anticipated.

Non-road engines to be used on site would include equipment such as excavators, bulldozers, generators, and concrete pumps. In addition to emissions originating from trucks as they arrive and depart, concrete trucks would be required to run their engines continuously during concrete pours in order to keep the concrete mix in motion.

Several measures would be included in the construction contract documents to generally reduce emissions, and specifically to substantially reduce diesel particulate matter (DPM) emissions from construction engines. With the exception of concrete trucks, truck-idling would be restricted to three minutes. The construction contracts would specify the requirement for the following emission reduction measures:

- Using electric engines where practicable and ensuring the distribution of power connections throughout the construction area as needed. Equipment that would use grid power instead of diesel engines would include, but may not be limited to, material hoists, welders, water pumps and compressors. This would also eliminate the need for continuous use of generators on-site, and reduce the need for small generators that would normally be needed for construction equipment. Forklifts would be either electric powered or use natural gas to the extent possible.
- Using ultra low sulfur diesel (ULSD) exclusively for all diesel powered engines; this would enable the use of tailpipe reduction technologies and would directly reduce DPM and SO_X emissions.
- Using Best Available Tailpipe Reduction Technologies: Nonroad diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract, such as concrete mixing and pumping trucks) would utilize the best available tailpipe technology for reducing DPM emissions. Diesel particle filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. The construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would to the extent practicable utilize DPFs, either original equipment manufacturer (OEM) or retrofit technology, including active or passive DPFs.[1]

[1] There are two types of DPFs currently in use: passive and active. Most DPFs currently in use are the “passive” type, which means that the heat from the exhaust is used to regenerate (burn off) the PM to eliminate the buildup of PM in the filter. Some engines do not maintain temperatures high enough for passive regeneration. In such cases, “active” DPFs can be used (i.e., DPFs that are heated either by an electrical connection from the engine, by plugging in during periods of inactivity, or by removal of the filter for external regeneration).

The use of DPFs would result in emission reductions of DPM of at least 90 percent (when compared with normal private construction practices), as verified by a study of actual reductions of $PM_{2.5}$ emissions from comparable engines used at a New York City construction site. The use of diesel oxidation catalyst (DOC) would be allowed in lieu of DPF only in cases where a DPF would not function properly with a specific engine or can not be installed on a specific engine for safety reasons, and where an alternative engine type with DPF cannot be used for a necessary construction task.

- Using non-road engines certified by EPA as Tier 2 or higher exclusively (engines with higher 'Tier' certification generally have lower emissions).

In addition, in order to reduce the resulting concentration increments at sensitive locations, large emissions sources and activities, such as concrete trucks and pumps, would be located away from residential buildings, playing fields and the proposed school, to the extent practicable with special attention given to any sources within 50 feet of such locations. This measure would further reduce potential concentration increments from on-site sources at such locations by increasing the distance between the emission sources and the sensitive locations, resulting in enhanced dispersion of pollutants.

In addition, strict dust control measures would be implemented to ensure that dust emissions from construction activity are limited to the extent practicable. Measures would include:

- Washing off trucks and excavation equipment prior to exiting the site with water;
- Washing the areas surrounding the site (sidewalks, streets, etc.) at the end of every work day with water;
- Wetting unpaved truck routes within the site as needed or, in cases where a route would remain in the same place for an extended duration, stabilizing, covering with gravel, or temporarily paving the route to avoid the resuspension of dust;
- Equipping all trucks hauling loose material with tight fitting tailgates and covering the load prior to leaving the site;
- Using closed chutes leading to covered bins for material drops during demolition;
- Enforcing an on-site vehicular speed limit of 5 mph;
- Using water sprays for all excavation, demolition, and transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air; and
- Wetting or covering loose materials, or stabilizing them with a biodegradable suppressing agent.

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

Total long-term emissions from on-site construction equipment and trucks for the proposed actions are expected to be comparable to the construction emissions estimated for some recent large development projects, for which significant construction air quality impacts were not predicted.[1] For example, the Columbia University project proposed a similar state-of-the-art emissions reduction program for construction of the proposed campus in Manhattan and detailed dispersion analyses from that projected construction concluded that there would be no

[1] *FEIS for the Proposed Manhattanville In West Harlem Rezoning And Academic Mixed-Use Development*, CPC–DCP, November 16, 2007; *Atlantic Yards Arena and Redevelopment Project FEIS*, ESDC, November 15, 2006.

significant adverse impacts on air quality during construction. Similarly, the detailed impact assessment for the Atlantic Yards Arena, a large construction project proposed in Brooklyn,[1] which would also include a similar robust emissions reduction program, concluded that there would be no significant adverse impacts on air quality during construction. In both cases, sensitive receptors immediately adjacent to the construction sites were analyzed.

Under New York State Environmental Quality Review Act (SEQRA) and New York City Environmental Quality Review (CEQR) regulations, the determination of the significance of impacts is based on an assessment of the predicted intensity, duration, geographic extent, and the number of people who would be affected by the predicted impacts. Guidelines for assessing potential impacts from NO_X, CO, and $PM_{2.5}$ are discussed in Chapter 18, "Air Quality." While it is possible that the construction activities may exceed certain thresholds used for assessing the potential for significant adverse air quality impacts, any exceedance would be limited in extent, duration, and severity. The project sites are large, and with the exception of the northern portion (Parcels A and B of Site A), the project sites are well removed from any existing sensitive receptor.

As explained previously, construction of the northern portion of Site A would be constructed first, and would proceed toward the south. Construction on any one parcel would last 18 to 24 months, except for Parcel C of Site A and the northern parcel of Site B which are expected to take up to 30 months to complete. These time periods include all construction—piles/foundation, building shell and core, exteriors, interiors, and finishing. The most emission intensive construction phases, considering the emission controls that would be implemented, would generally be the site cleanup and foundation phases, which would not last more than a year at any one parcel. The construction schedule was developed such that by the time buildings on a parcel are ready for occupancy, the construction of the neighboring parcels would be past the construction phases that are of most concern to air quality.

Particulate emissions ($PM_{2.5}$) from on-road construction trucks and worker vehicles were conservatively estimated for the peak hour construction period (in 2012) and were found to be comparable, but somewhat higher than the mobile source $PM_{2.5}$ emissions that could be attributed to the proposed actions in the 2017 build year during the peak hour. However, PM2.5 concentrations are determined over a 24-hour and annual period, and averaged over these periods, emissions of PM2.5 due to construction vehicles would be lower than for the build condition. This is because construction vehicles would be generally limited to operations between 7 AM and 6 PM. During other periods, there would essentially no traffic due to construction-related activities. In addition, no construction worker trips are expected between 8 AM and 2 PM. Furthermore, it is expected that many of the construction trucks would be concrete trucks that would be equipped with DPFs, which would effectively reduce particulate emissions by up to 90 percent. Moreover, the construction traffic volumes peak in the early morning and mid-afternoon hours, and would be very low throughout the rest of the day.

The results of the $PM_{2.5}$ mobile source analysis for the 2017 Build year determined that the maximum incremental increase in $PM_{2.5}$ concentrations would be well below the updated interim guidance criteria. On this basis, it is likely that future maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments with the proposed actions during the construction phases would not result in any significant adverse impacts at intersections in the study area.

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[1] *Atlantic Yards Arena and Redevelopment Project FEIS*, ESDC, November 15, 2006.

Based on the information presented above, construction activities associated with the proposed actions would not result in significant adverse air quality impacts from stationary and non-road sources. Based on the construction traffic volumes during the peak construction period and the expected use of diesel particulate filters (DPF) in concrete trucks, which would constitute a large portion of the construction trucks, significant adverse impacts on air quality from on-road construction sources would not be expected.

NOISE

Impacts on community noise levels during construction can result from noise from construction equipment operation, and from construction vehicles and delivery vehicles traveling to and from the site. Noise and vibration levels at a given location are dependent on the type and quantity of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Typical noise levels of construction equipment are shown in **Table 20-4**. Noise levels caused by construction activities would vary widely, depending on the phase of construction and the location of the construction activities relative to noise sensitive receptor locations. Noise sensitive receptors in the vicinity of the project sites include Gantry Plaza State Park and the Avalon Riverview building to the north of Site A across 50th Avenue and the PowerHouse, currently under construction to the east of Site A at 51st Avenue and 2nd Street. In addition, as buildings are constructed and occupied on the project sites, these buildings (both the residences and the proposed school) would be noise sensitive receptors.

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), the NYCDEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), and EPA's noise emission standards. These local and federal 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. If weekend or after hour work is necessary, permits would be required to be obtained, as specified in the New York City Noise Control Code. Permit authorization for weekend or after hour construction work may be granted for the following circumstances—emergency work, cases of public safety, City construction projects, construction activities with minimal impact, and for a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts and/or financial considerations.

The *CEQR Technical Manual* states that significant adverse noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." In general, this has been interpreted to mean that such impacts would occur only at noise sensitive receptors where high noise levels would occur for two or more consecutive years. In addition, the *CEQR Technical Manual* states that impact criteria for vehicular sources, using existing noise levels as the baseline, should be used for assessing construction impacts. See Chapter 19, "Noise," for an explanation of noise measurement and sound levels. The criteria are as follows:

> If the existing noise levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resulting proposed action condition

noise level with the proposed action would have to be equal to or less than 65 dBA. If the existing 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 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the existing noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

A wide variety of measures can be used to minimize construction noise and reduce potential noise impacts. As part of the New York City Noise Control Code, a noise mitigation plan is to be developed and implemented that would include required source controls, path controls, and receptor controls. During each phase of construction on Site A, measures would be implemented to reduce construction noise and vibration levels to the lowest practicable limits and to within the limits required by applicable codes and regulations, such as the New York City Noise Control Code. During periods of extensive excavation activity, measures would be taken to ensure that no structural damage to adjacent structures would occur.

In terms of source controls (i.e., reducing noise emission levels at the source or during the most noise sensitive time periods), the following measures for construction on Site A would be implemented:

Table 20-4
Typical Noise Emission Levels for Construction Equipment

Equipment Item	Noise Level at 50 ft. (dBA)
Air compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer, Drills	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration (FTA), May 2006.

- Requiring contractors to utilize equipment that meets the noise emission level standards for construction equipment (specified in Subchapter 5 of the New York City Noise Control Code and in §28-109 of the NYCDEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation) from the start of construction activities and, when feasible and practicable, use a wide range of equipment, including construction trucks, that produce lower noise levels than typical construction equipment.
- Requiring, where feasible and practicable, that contractors use construction procedures and equipment (such as generators, concrete trucks, delivery trucks, and trailers) quieter than that required by the New York City Noise Control Code and in §28-109 of the NYCDEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation.
- Requiring that as early in the construction period as feasible and practicable, diesel-powered equipment be replaced with electrical-powered equipment, such as electric scissor lifts and electric articulating forklifts (i.e., early electrification).
- Requiring that all contractors and subcontractors properly maintain their equipment and have the appropriate manufacturer's noise reduction devices, including, but not limited to, a quality muffler that is free of rust, holes, and exhaust leaks installed.

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

As required by the New York City Noise Control Code, noise barriers (a minimum height of 8 feet) would be provided around the perimeter of each construction site. Additional noise barriers, beyond what is required in both Local Law 113 and Chapter 28, could be utilized to provide shielding if noise complaints are received. Truck deliveries would take place behind these noise barriers where feasible and practicable.

Noisy equipment, such as generators, cranes, trailers, concrete pumps, concrete trucks, and dump trucks, could be located away from and shielded from noise sensitive receptor locations. For example, delivery and dump trucks, as well as many construction equipment operations, would operate behind noise barriers. When possible, delivery trucks and other construction vehicles would use 2nd Street, Borden Avenue, and Center Boulevard to access and egress the site, where ambient noise levels are expected to be louder, as opposed to 57th, 56th, 55th, 54th, 51st and 50th Avenues where ambient noise levels are expected to be lower.

While increases exceeding the CEQR impact criteria for less than two consecutive years may be noisy and intrusive, they are not considered to be significant adverse noise impacts. Construction activities on the north portion of Parcel A of Site A could be disruptive to Gantry Plaza State Park, the Avalon Riverview, and the PowerHouse, but the noisiest activities would take place for a limited period of time (less than 18 consecutive months). Construction activities in this area would be temporary with between 3 and 6 months of activity for site cleanup, demolition, remediation, grading, and utility and street construction and another 21 months (with the noisiest activities taking place for a limited period of time [less than 18 consecutive months]) for construction of the residential, retail, and parking uses on Parcel A. While this would be longer than two years, the noisiest activities (foundations) would be limited to 6 months, and the final 6 months of construction would be interior work and therefore much quieter. Noise from construction activities on Parcel A and Parcel B of Site A could affect the PowerHouse. It is anticipated that the total length of construction on both Parcels A and B of Site A would be 39 months, but the noisiest activities would take place for a limited period of time (less than 18 consecutive months). While this is longer than two years, noise levels during this time would vary widely depending on the construction activity, with foundation work (the noisiest component) on Parcel A lasting 6 months (beginning in 2010) and foundation work on Parcel B lasting 12 months (beginning in 2011 for both the school building and the residential building). The Avalon Riverview and PowerHouse have, or will have, double-glazed windows and alternative ventilation (i.e., air conditioning) that would reduce interior noise levels compared with exterior noise levels and may result in interior noise levels of 45 dBA $L_{10(1)}$ or less for residential. When pile diving activities are occurring, interior noise levels at noise sensitive locations, in close proximity and with a direct line-of-sight to the pile driving activities, may exceed 45 dBA $L_{10(1)}$, but this would be expected to occur for a relatively short time. In addition, little night work is expected (if the required permits for night work are authorized), and any exceedances of the CEQR criteria at noise sensitive locations would occur during the day. Therefore, no long-term, significant adverse noise impacts on the adjacent noise sensitive receptors are expected from construction activities.

It is assumed that the school to be constructed on Parcel B would be occupied in the fall following the completion of its construction. Therefore, occupancy of the school would overlap with construction on Parcel C for approximately 1 year but the noisiest activities would take place for a limited period of time (less than 18 consecutive months). During this time, exterior work would be underway for approximately 6 months, with interior work (which results in lower noise levels) during the remainder of the time. Material delivery and other trucks associated with construction on Parcel C would be made on 54th Avenue and/or Center Boulevard to increase the distance between the construction vehicles and the school. The school would have double-glazed windows and alternative ventilation that would reduce interior noise levels compared with exterior noise levels and would be expected to result in interior noise levels of 45 dBA $L_{10(1)}$ or less for school uses. Therefore, no long-term, significant adverse noise impacts on the school to be constructed on Parcel B of Site A are expected from construction activities.

The waterfront park and other publicly accessible open spaces to be constructed on Site A would be developed in conjunction with development on each of the parcels. As open space areas are completed and as construction continues in adjacent areas, there would be some disruption (e.g., noise) to the newly completed open spaces. Construction activities may be noisy and intrusive to users of the newly constructed open spaces. The level of construction activity would vary and move throughout the site, and no immediate area would experience the effects of the project's construction for the full construction duration. While it is possible that construction activities may result in noise impacts on the open spaces to be constructed as part of the proposed actions, they would not be considered significant adverse impacts.

As buildings are constructed and occupied on Site A and Site B, these buildings would become noise sensitive receptors. While the construction period would be 9 years in total, the level of noisy and intrusive activity would vary and move throughout the project sites, and no one area would experience the effects of the project's construction activities for the full 9-year duration. Construction adjacent to each of the new buildings would last between 6 and 18 consecutive months, depending on the location, and would typically consist of a short period of shell and core construction (3 months), some exterior work (6 to 9 months), and interior work (9 months to 1 year), but the noisiest adjacent activities for each of the new buildings would take place for a limited period of time (less than 18 consecutive months). Therefore, no long-term, significant adverse noise impacts on the buildings to be constructed as part of the proposed actions are expected from construction activities. ✷