USTA

Billie Jean King National Tennis Center Strategic Vision

Draft Environmental Impact Statement

CEQR No.:
12DPR005Q

ULURP No.:
130155PPQ

Lead Agency
New York City Department of Parks and Recreation

Lead Agency Contact
Joshua Laird

Project Applicants
New York City Department of Parks and Recreation
USTA National Tennis Center Incorporated

Prepared By
AKRF, Inc.

January 2013

USTA Billie Jean King National Tennis Center Strategic Vision
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

Project Location:	Queens, New York Flushing Meadows Corona Park Joint Interest Area of Community Districts 3, 4, 6, 7, 8 and 9
CEQR No.	12DPR005Q
Type of Action:	Type I
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Lead Agency:	New York City Department of Parks and Recreation
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Project Applicants:	New York City Department of Parks and Recreation USTA National Tennis Center Incorporated
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Acceptance Date:	January 3, 2013

The DEIS is available for review on the website of the New York City Department of Parks and Recreation: http://nyc.gov/parks/NTC-Project

A public hearing on this Draft Environmental Impact Statement (DEIS) will be held at a date to be announced. Advance notice will be advertised stating the time and place of the hearing. Written comments on the DEIS are requested and will be received and considered by the Lead Agency until the 10th calendar day following the close of the public hearing.

Table of Contents

Appendices

List of Tables

List of Figures

✷

A. PROJECT IDENTIFICATION

The City of New York Department of Parks and Recreation (DPR), in coordination with USTA National Tennis Center, Incorporated (USTA)[1], is seeking a number of discretionary actions in connection with proposed improvements and an expansion to the facilities at the USTA Billie Jean King National Tennis Center (NTC), located in Flushing Meadows Corona Park in Queens (see **Figure S-1**). These improvements collectively are known as the NTC Strategic Vision (the proposed project). The NTC is located on a portion of Queens Block 2018, Lot 1, on park land leased by DPR to USTA. The leased site is bounded to the north by the railway tracks of the LIRR's Port Washington line; United Nations Avenue North to the south; the Passerelle Building (connects LIRR's Mets-Willets Point station to the Metropolitan Transportation Authority [MTA]'s 7 train station, and Citi Field, the New York Mets baseball stadium) and Path of the Americas to the east[2]; and Grand Central Parkway to the west.[3]

The 42-acre NTC is one of the world's largest public recreational tennis facilities. For 11 months of the year, its facilities are open to the public for indoor and outdoor tennis; USTA maintains the facilities year-round. The NTC is also host to the US Open, one of the sport's four Grand Slam championship tennis tournaments. The event is staged during a two-week period around the beginning of September, is attended by approximately 700,000 spectators, and is broadcast worldwide.

The proposed project would improve the NTC site plan, circulation, visitor amenities, and landscaping, and would include construction of two new stadiums to replace the existing Louis Armstrong Stadium (Stadium 2) in the same location, and Grandstand Stadium (Stadium 3) in a new location at the southwest corner of the NTC site, as well as possible improvements to Arthur Ashe Stadium (Stadium 1). The proposed project would also include modifications to tournament courts and ancillary buildings, the construction of two new parking garages, the relocation of a connector road, and pedestrian enhancements. To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease. Just to the south of the NTC, the relocated connector road and new sidewalks would be built on an approximately 0.3-acre area. Improvements to park features in Flushing Meadows Corona Park would also be provided, as described in greater detail below. If approved, the proposed project is expected to be completed by 2019.

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[1] USTA Billie Jean King National Tennis Center Incorporated, an affiliate of the United States Tennis Association, Incorporated, operates the USTA Billie Jean King National Tennis Center.

[2] The NTC lease also covers 11 tennis courts located to the east of the Passerelle Building that are not affected by the proposed project.

[3] The roads within the NTC site are not included in the lease.

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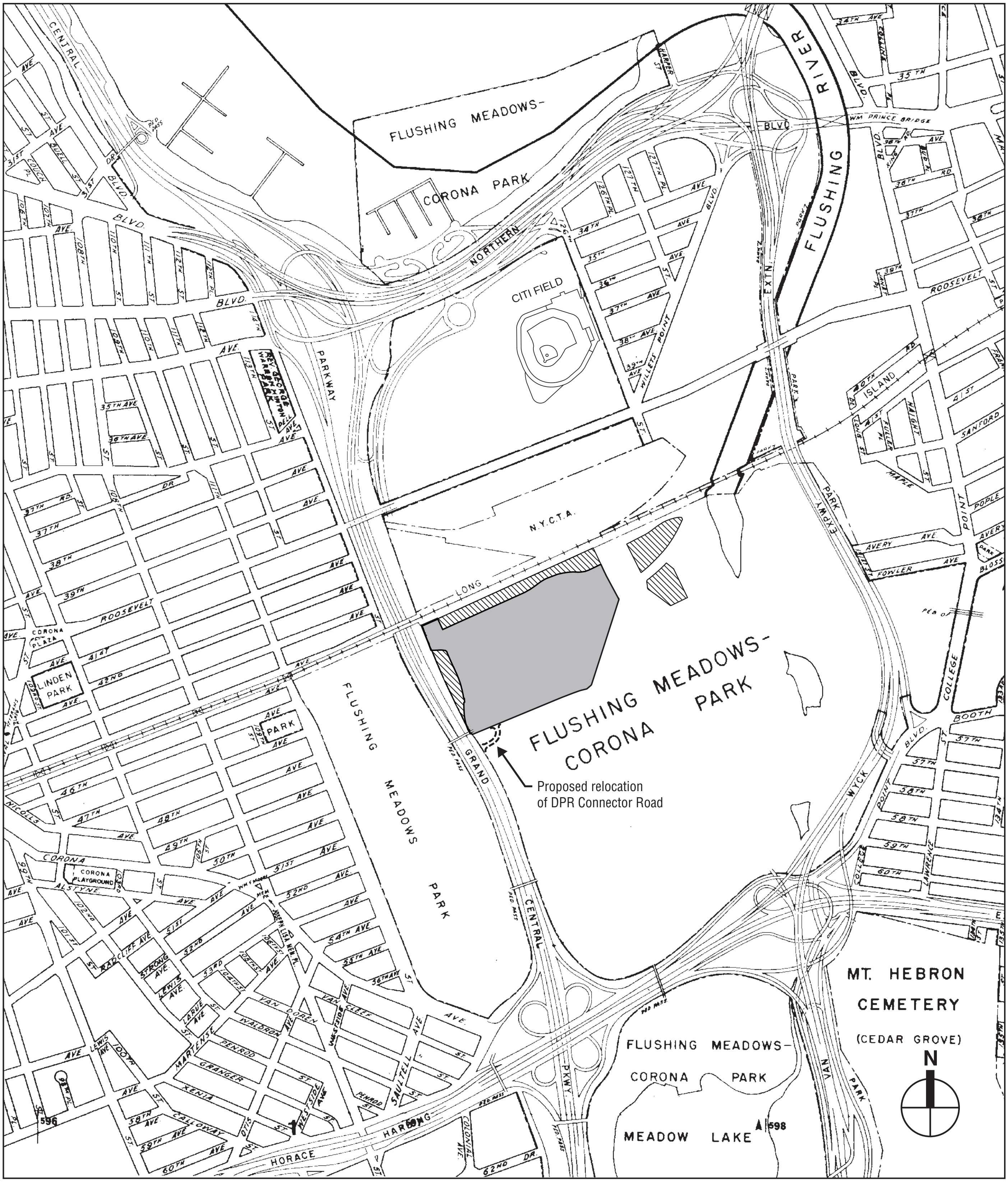

Project Site

NTC Leased Premises Land not Affected by the Proposed Project

0 1000 2000 FEET
SCALE

Note: Roads within the NTC site are not included in the lease

Project Location
Figure S-1

In the early stages of the development of the project, DPR issued a predictive determination that the project may have a significant impact on the environment, requiring that an Environmental Impact Statement (EIS) be prepared. This Draft EIS (DEIS), in conformance with the final scope dated December 27, 2012, has been prepared to describe the proposed project, present the proposed framework for the EIS analysis, and assess the potential for project impacts. The 2012 *City Environmental Quality Review* (CEQR) *Technical Manual* serves as a guide on the methodologies and impact criteria for evaluating the project's potential effects on the various environmental areas of analysis.

B. PURPOSE AND NEED

The purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. It would result in a much needed improvement to the visitor experience and provide substantial long-term economic benefits to Queens, New York City, and the region.

BACKGROUND

The US Open, which dates back to 1881, moved to its current site in Flushing Meadows Corona Park in 1978, making its facilities available to the public 11 months of the year. In 1993, the NTC site expanded from 21.6 acres to approximately 42.2 acres to allow for the construction of a new 23,500-seat stadium (Arthur Ashe Stadium), completed in 1997. The 1993 expansion required alienation of park land following review by the City through its Uniform Land Use Review Procedure (ULURP). The tennis center was renamed the USTA Billie Jean King National Tennis Center in 2006. Today, the NTC is one of the largest public tennis facilities in the world. The US Open attracts over 700,000 spectators annually and generates substantial economic benefits in New York City.

The nearly 900-acre Flushing Meadows Corona Park—Queens' largest public park—was created for the 1939-1940 World's Fair. It offers a variety of event-oriented recreational activities, as well as lawns, fields, and playgrounds for active and passive recreation. Portions of this park (but not the NTC) have been improved with funds from the Federal Land and Water Conservation Fund (LWCF) Act, and much of the park, including the NTC, is subject to LWCF requirements. The health, welfare and recreational public purposes of the NTC have been recognized by the New York State Legislature and the New York City Council in the State legislation and City Administrative Code provisions that govern the NTC lease, as well as by the U.S. Department of the Interior, National Park Service (NPS), which determined in 1993 that the expansion and renovation of the NTC is consistent with the LWCF grant-in-aid manual requirements governing Flushing Meadows Corona Park.

The USTA and the affiliated United States Tennis Association promote and develop tennis in the community through a wide range of programs. More than 100,000 participants of all ages, the majority of whom are from the local Queens community, participate in hundreds of community tennis programs at the NTC each year. The NTC is home court for more than 70 New York City high schools and colleges and a number of diverse organizations seeking a place to play tennis or host tournaments. USTA offers court rentals to the public at rates calculated under USTA's lease with the City. The grounds of the NTC are also open 11 months of the year to visitors of Flushing Meadows Corona Park, free of charge. Approximately $1 million is spent each year for other United States Tennis Association tennis programs in New York City as well, including grants for free tennis programs, free equipment, court refurbishments, and scholarships, all supported by revenues from the US Open.

Through its flagship event, the US Open, USTA has significant world-wide reach and economic impact on the City of New York. Approximately 42 percent of US Open patrons come from outside the New York metro area, including 14 percent from outside the US. During the US Open, attendees, players, media, sponsors and staff generate substantial demand for the City's hotel and hospitality industry. The US Open also creates 6,000 seasonal jobs, a large percentage of which go to residents of Queens and Brooklyn. On television and through the media, the US Open's reach is global. It attracts 85 million US TV viewers and is seen in 188 countries, with more than 41,000 hours of coverage.

CURRENT PROJECT SITE CONDITIONS

Two of the NTC site's three stadiums—Louis Armstrong Stadium and Grandstand Stadium—are approaching 50 years of age and nearing the end of their useful lives. Notable deficiencies include: constricted circulation; inadequate restrooms; prone to flooding; and infrastructure issues, as the stadiums were designed for the 1964-1965 World's Fair.

PROJECT GOALS AND OBJECTIVES

The goals of the project include the following:

- Replace and upgrade aging, out-of-date infrastructure and facilities that have reached the end of their useful lives.
- Expand public plazas and promenades and improve functionality of public spaces and open areas within the NTC.
- Improve circulation, comfort and safety for visitors and players.
- Activate underutilized spaces within the NTC site.
- Increase the capacity of the NTC site to allow for more daytime attendance at the US Open.
- Enhance economic benefits of the US Open in Queens, New York City, and the region.
- Increase availability of on-site parking.
- Improve the reliability of the NTC site for the US Open during inclement weather.
- Increase player visibility during US Open practice and early tournament play.
- Increase efficiency and sustainability of infrastructure and landscaping.
- Develop a consistent design experience for sponsor partners.
- Enhance food service and retail offerings during the US Open.
- Develop a consistent visual theme and signage for food service.

Within the framework of these goals, the proposed project would: minimize expansion beyond NTC lease boundaries; maintain or improve public availability of courts; improve the NTC's context within the park; and maintain opportunities for public programming throughout the year. Without the expansion of the NTC attributable to the disposition of 0.94 acres of City property, the NTC Strategic Vision would not be implemented and the project goals would not be met.

The proposed site improvements and other components of the NTC Strategic Vision are intended to collectively further these key objectives, addressing serious deficiencies in the three existing stadiums and making the NTC more comfortable and friendly to the public, fans, sponsors and players, and recreational users, year-round.

The proposed project would also enable the USTA to accommodate an extra 10,000 daily spectators during the US Open. It is expected that the proposed project would increase attendance at the US Open by approximately 100,000 new visitors, positively affecting not only the revenues from the US Open but the local hospitality market as well. It would also create jobs during construction and upon completion.

C. PROJECT DESCRIPTION

The NTC and the US Open are important recreational and economic assets to Queens, New York City, and the region. The NTC Strategic Vision reflects the need to maintain and enhance NTC facilities, to ensure its continuing contribution to the local community and the City.

OVERVIEW

The NTC Strategic Vision would result in a number of physical improvements and alterations to the facility's plan. Overall, the proposed project would add 0.94 acres to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26 acres of previously alienated park land that is currently not included in the lease. **Figure S-1** shows the approximately 37.48-acre[1] project site and the additional areas of the 42-acre NTC site located in Flushing Meadows Corona Park in Queens; **Figure S-2** and **Figure S-3** show the alienated and leased boundaries of the NTC and the additional 0.94 acres provided for as part of the proposed project; **Figure S-4** shows the current site plan for the NTC; and **Figure S-5** shows the proposed future site plan under the proposed project. The major project elements are summarized in **Table S-1**, and more detailed descriptions of the project elements, including new stadiums, tournament courts, ancillary buildings, parking and transportation modifications, and pedestrian enhancements, are provided below.

[1] The full NTC is 42.2 acres. The 37.48-acre project site includes: the 35.3-acre portion of the NTC site bounded by Meridian Road, United Nations Avenue North, and Path of the Americas; the 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94-acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3-acre relocated connector road area, which would remain under City ownership and control.

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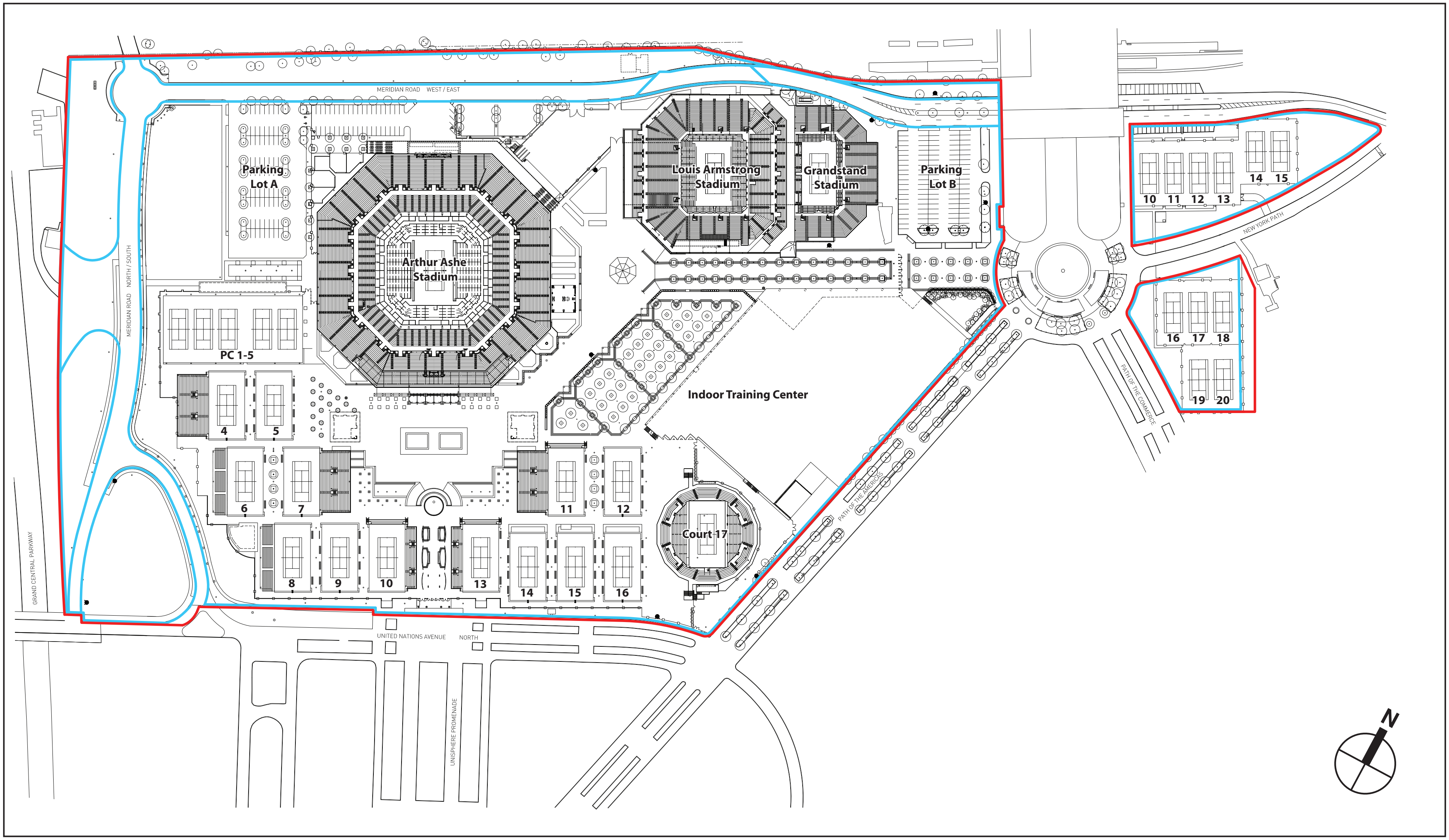


NOT TO SCALE

Current Limit of Alienated Lands

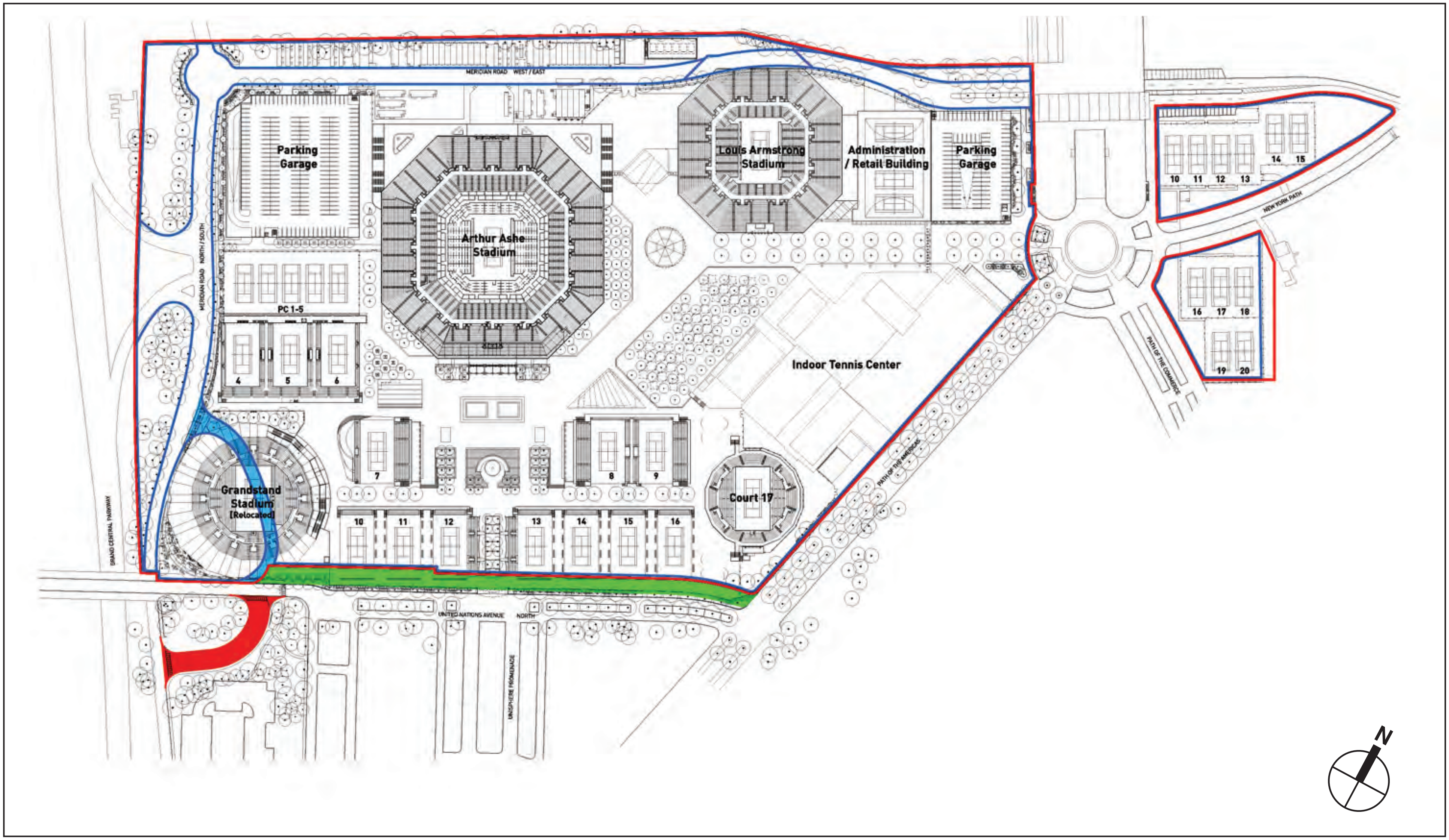
Current Limit of NTC Lease

•NOTE: Roads within NTC Site are not included in lease

Existing Lease Boundary and Alienation Boundary of NTC Site

Figure S-2

1.3.13



NOTE: FOR ILLUSTRATIVE PURPOSES ONLY

NOT TO SCALE

Proposed Park Road Relocation (Approx. 0.3 Acres) (not part of NTC Lease)

Current Limit of Alienated Lands

Current Limit of NTC Lease

Previously Alienated Land to be Added to NTC Lease (0.26 Acres)

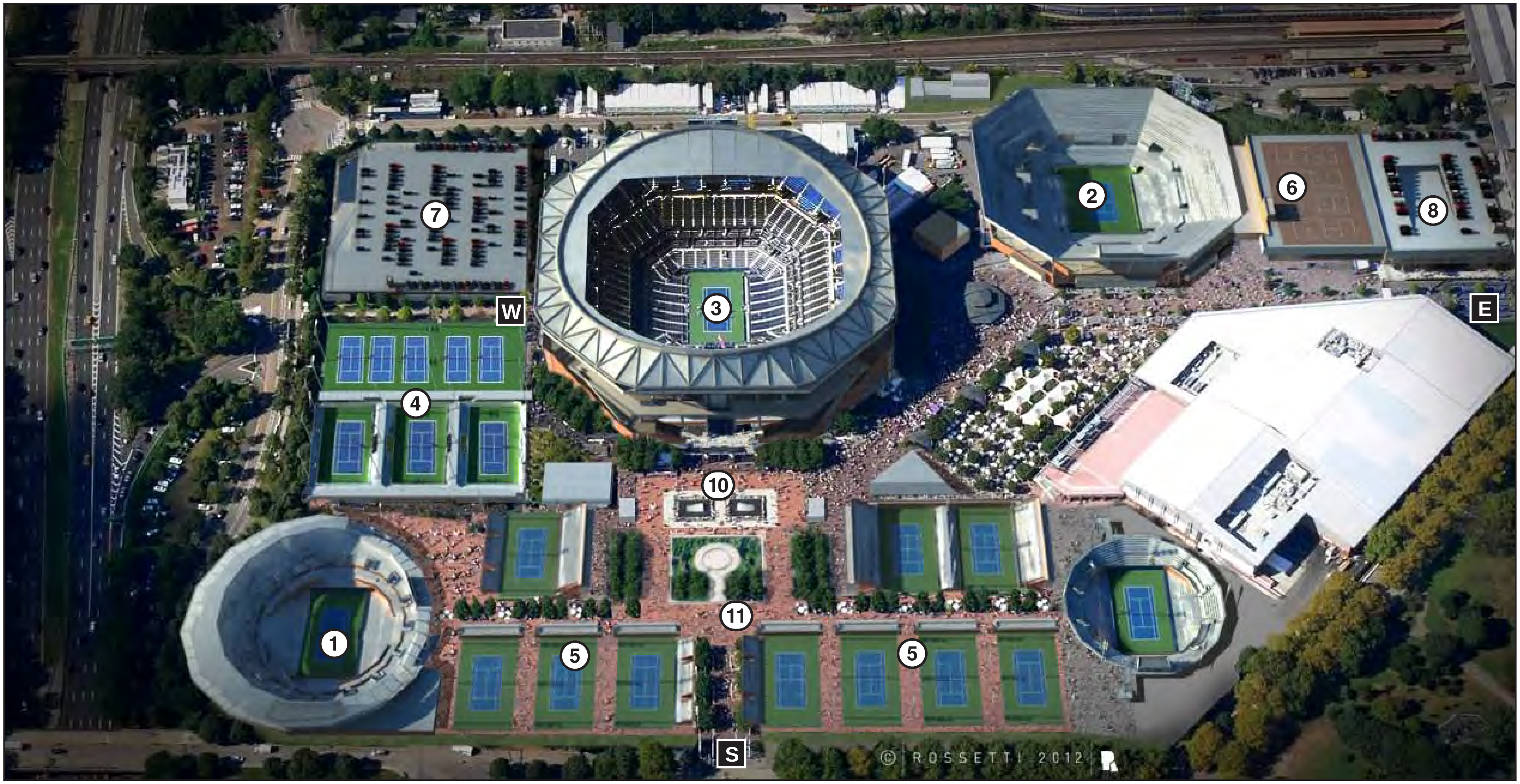
Land to be Alienated and Added to NTC Lease (up to 0.68 Acres)

Proposed Lease Boundary and Alienation Boundary of NTC Site

Figure S-3

1 *Grandstand Stadium*
2 *Louis Armstrong Stadium*
3 *Arthur Ashe Stadium*
4 *Northwest Tournament Courts*
5 *Southerly Tournament Courts*
6 *Retail and Sponsorship Building (See Figure 1-5)*
7 *Parking Lot A*
8 *Parking Lot B*
9 *Existing Connector Road*
10 *Arthur Ashe Concourse*
11 *Walkway (See Figure 1-5)*
E *East Gate*
S *South Gate*
W *West Gate*

Existing Site Plan
Figure S-4



1 *Stadium 3*
2 *Stadium 2*
3 *Arthur Ashe Stadium*
4 *Northwest Tournament Courts*
5 *Southerly Tournament Courts*
6 *Retail and Sponsorship Building*
7 *Parking Lot A*
8 *Parking Lot B*
9 *Relocated Connector Road (See Figure 6)*
10 *Arthur Ashe Concourse*
11 *Walkway*
E *East Gate*
S *South Gate*
W *West Gate*

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY
DETAIL ALONG SOUTHERN BOUNDARY NOT SHOWN;
PLEASE REFER TO FIGURE 3-2 FOR THIS INFORMATION

Proposed Site Plan
Figure S-5

Table S-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
Stadium Improvements and New Construction		
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
Tournament Court Modifications		
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
Ancillary Building Construction		
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium (Stadium 3)
Parking and Transportation Improvements		
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270 space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
Pedestrian Enhancements		
10	Arthur Ashe Concourse	Expand existing concourse by 11,000 square feet
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See **Figure S-4** for the location of these elements under existing conditions. See **Figure S-5** for their proposed future location.
Source: USTA

STADIUM IMPROVEMENTS AND NEW CONSTRUCTION

GRANDSTAND STADIUM (STADIUM 3)

The current 6,000-seat Grandstand Stadium is located adjacent to Louis Armstrong Stadium, on its east façade. Grandstand Stadium was built for the 1964-1965 World's Fair Singer Bowl, and is at the end of its useful life. The proposed project would replace the existing Grandstand Stadium with a new up to 55-foot tall, 8,000-seat stadium in the southwest corner of the site. The replacement stadium would include a two-story (one story above grade), approximately 31,000-gross square foot (gsf), structure for administrative and operational uses, such as locker rooms, restroom facilities, and first aid facilities. Most of the area in which the stadium would be located is within the boundaries of USTA's lease with DPR. However, a small portion of the new stadium site would be located on the western end of the 0.68 acres of park land that would be alienated as shown on **Figure S-3**. In addition, the area of the City-owned park connector road between United Nations Avenue North and Meridian Road, which runs through the leased area in which the new stadium would be located, would be added to the area covered by the lease, increasing the area subject to the lease by approximately 11,449-sf (0.26 acres) as shown on **Figure S-3**.

LOUIS ARMSTRONG STADIUM (STADIUM 2)

Louis Armstrong Stadium (Stadium 2), located in the northeast corner of the site, is a 10,500-seat facility. As with Grandstand Stadium, it was built for the 1964-1965 World's Fair Singer Bowl and is at the end of its useful life. After demolition of the existing stadium, a new 15,000-seat stadium would be built on the same site, in an up to 80-foot tall facility. Similar to the existing facility, the new stadium would include approximately 80,000-gsf of enclosed space for concession, retail, broadcasting, and administrative uses, as well as expanded rest room, first aid, and guest services facilities.

Since the replacement of Louis Armstrong Stadium would take more than one year to complete, the demolition process would be scheduled so that a temporary replacement stadium could be built for the US Open, on the same site. Construction of the new stadium would continue after the US Open and take-down of the temporary structure.

ARTHUR ASHE STADIUM (STADIUM 1)

Arthur Ashe Stadium (Stadium 1), located in the north center portion of the site, is an approximately 23,500 seat facility. USTA continues to explore possible methods of covering Arthur Ashe Stadium in the event of rain during the US Open, and is analyzing possible engineering solutions for a canopy system that would attach along the upper edge of the stadium. USTA is also considering the addition of approximately 90,000-gsf of administrative and operational support space on the north side of the stadium, underneath the existing seating platform and above an area currently used for loading and temporary facilities (including broadcast facilities), along with a reconfiguration of administrative and operational space within the existing stadium building. The existing loading area would remain in the same location, underneath the new structure. Improvements could also be made to the existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium, as described below.

TOURNAMENT COURT MODIFICATIONS

NORTHWEST TOURNAMENT COURTS

Currently, the northwest courts include five practice courts and two tournament courts, with bleacher seats. The proposed project would replace these courts and bleachers with five new practice courts and three new tournament courts. There would also be a new elevated viewing platform constructed between the practice and tournament courts.

SOUTHERLY TOURNAMENT COURTS

Currently, there is a row of seven tournament courts on the southern portion of the site. Under the proposed project, four of these courts would be relocated approximately 50 feet to the south, and three of these courts would be relocated approximately 30 feet to the south. New bleacher seating areas would be provided for some of the tournament courts. To allow for the court relocation and pedestrian circulation around these courts, the new NTC boundary line under the lease would move 25 to 38 feet south to abut the reconfigured United Nations Avenue North and planted area. This would increase the area subject to the lease by approximately 29,534-sf (0.68-

acres) as shown on **Figure S-3**. On the northern side of the relocated courts, a new walkway would be constructed, as described below.

ANCILLARY BUILDING CONSTRUCTION

PROPOSED ADMINISTRATIVE AND RETAIL BUILDING

Adjacent to the new Stadium 2, at approximately the same location as the existing Grandstand Stadium, a new 2-story, approximately 80,000-gsf building, would be built. This building would include approximately 48,300-gsf of space for administrative and storage uses for the NTC, as well as approximately 31,700-gsf of retail storage and merchandise space, much of which would be used as retail space during the US Open. Four courts that were temporarily in use at Lot A would be replaced with four permanent enclosed courts on the roof of the proposed administrative and retail building. These courts would be made available to the public on the same basis as the other courts managed by USTA.

PARKING AND TRANSPORTATION IMPROVEMENTS

TWO NEW PARKING GARAGES AND RELOCATED TRANSPORTATION CENTER

Currently, there is an approximately 100-space surface parking lot in the northeast corner of the site (Lot B), and a 200-space parking lot in the northwest corner of the site (Lot A) that additionally contains a transportation center used for staff and facilities for handling player and sponsor transportation and credentials and media credentials, as well as sponsor ticketing and lounge space. Under the proposed project, Lot B would be replaced with an approximately 270-space, 3-level parking garage, and Lot A and the transportation center would be replaced with an approximately 423-space, 2-level parking garage and 6,500 square foot (sf) transportation center.relocated connector road

The connector road displaced by the relocation of Grandstand Stadium (Stadium 3) would be relocated to an approximately 0.3-acre area south of United Nations Avenue North near the Queens Museum of Art parking lot, as shown on **Figure S-6**. New approximately five-to-six-foot wide pedestrian walkways would also be created; possible locations for these pedestrian walkways are shown on **Figure S-6**. As part of the proposed project, the small portion of Meridian Road below the overpass would be widened to connect to an existing bicycle lane.

PEDESTRIAN ENHANCEMENTS

ARTHUR ASHE CONCOURSE

The existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium (Stadium 1) would be expanded by approximately 11,000-sf, to improve circulation and amenities. Potential façade improvements could also be implemented.

PROPOSED WALKWAY

As described above, four of the southerly tournament courts would be relocated approximately 50 feet to the south and three of the southerly tournament courts would be relocated approximately 30 feet to the south. On the northern side of the relocated courts, a new walkway would be constructed, connecting the proposed relocated Grandstand Stadium (Stadium 3) with the NTC entrance at the South Gate, the South Plaza, and Court 17 on the southeast corner of the

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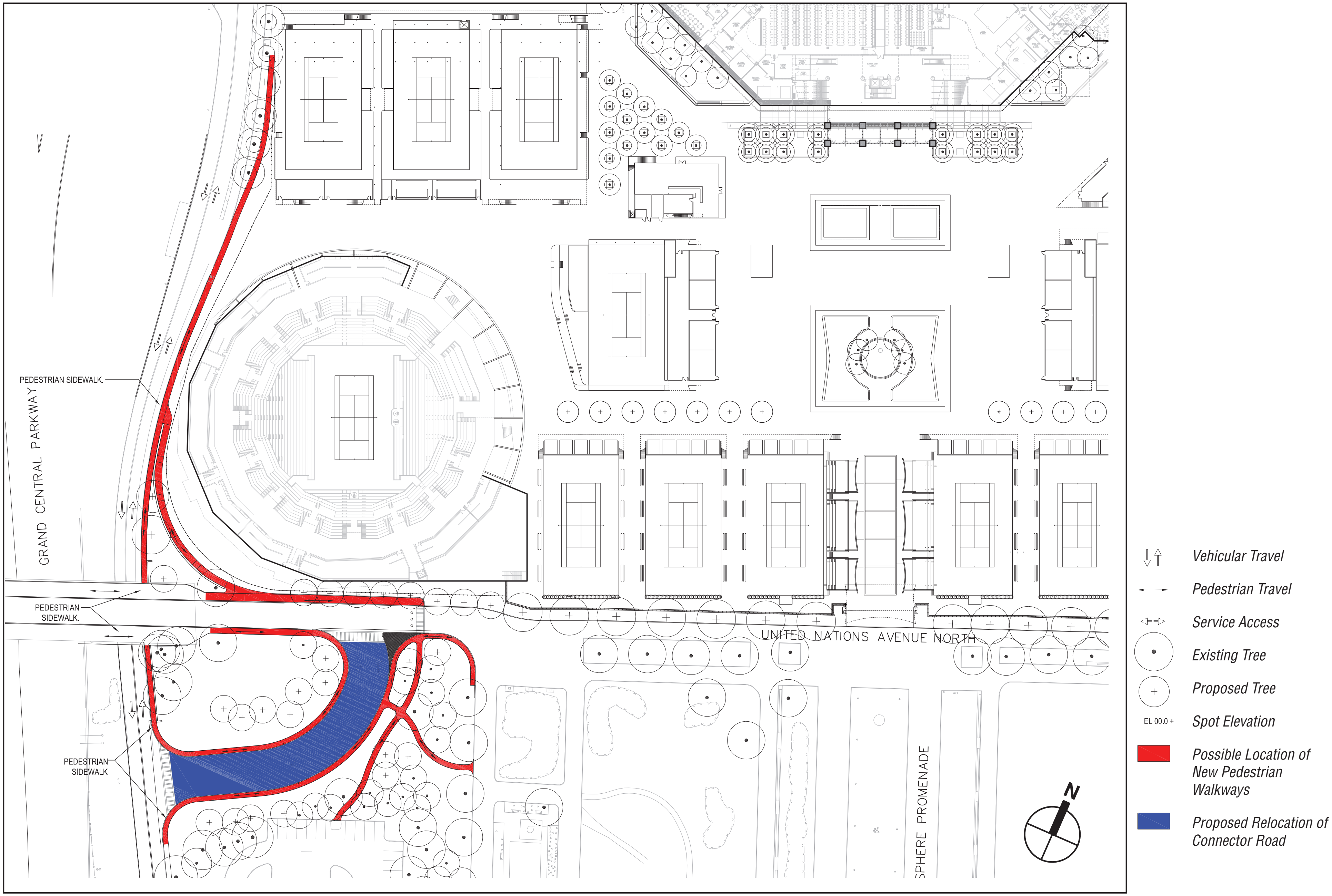


NOTE: FOR ILLUSTRATIVE PURPOSES ONLY

Connector Road Relocation Plan

Figure S-6

site. The proposed walkway would improve circulation within the site and include new plantings that would enhance the pedestrian experience. The area to be added to the NTC lease is described below.

AREAS TO BE ADDED TO NTC SITE

As noted above, the proposed project would require 0.94 acres of land to be added to the NTC site, including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease. The approximately 0.3-acre area that would be affected by the relocated connector road would not be added to the NTC.

The 0.26-acre portion of previously alienated land consists of the existing connector roadway between Meridian Road and United Nations Avenue North. The roadway is mapped park land that was alienated for the 1993 expansion, and contains sidewalks but no other park features.

The 0.68-acre strip that would be alienated is located north of United Nations Avenue North, and south of the existing NTC fence line, as shown in **Figure S-3**. This area is currently a mix of landscaped and paved areas, including one lane of the three-lane United Nations Avenue North. The lane that would be eliminated is lightly used for walking, running, or bicycling, as well as by DPR vehicles and to service the NTC during the US Open. The landscaped portion includes a triangular median area near the connector road, a median adjacent to the northernmost lane of United Nations Avenue North, and a narrow strip of lawn adjacent to the current NTC fence line. The landscaping includes trees in some areas, but no other notable park features, such as play equipment, benches, or statues. The impacts of alienating this area and adding it to the NTC site are analyzed in Chapter 3, “Open Space and Recreational Resources,” including an estimate of the number of park users that would be affected.

TREE LOSS AND REPLACEMENT

Construction of the proposed project would require removal of trees both outside the existing fence line, including United Nations Avenue North and the proposed location of the connector road south of United Nations Avenue North, and inside the NTC site, including in the vicinity of the practice courts, parking lot A, northwest corner of Arthur Ashe Stadium, west side of parking lot B, west side of the Grandstand Stadium, proposed Grandstand Stadium relocation site, and a small number in the Food Village. Tree replanting and replacement would comply with DPR’s applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations.

PARK IMPROVEMENT PROJECTS

In addition to the improvement of the NTC, which would require the alienation of 0.68 acres of park land, certain additional improvements would be undertaken for the benefit of the general public within Flushing Meadows Corona Park.

A range of possible park improvement projects has been developed by DPR as part of project planning. Some examples of possible projects include: conversion of two soccer fields from natural to synthetic turf; reconstruction of one existing synthetic turf soccer field; the development of a new comfort station at Jurassic Playground; vehicular, pedestrian, landscape, and drainage upgrades to an area in the northeast corner of Meadow Lake Drive; and the development of new picnic and barbecue areas and improvements to pathways around Meadow Lake. The approximate locations of these possible park improvements are indicated on **Figure S-7**.

The City would not seek replacement park land for the area to be included in the lease because: the land would remain mapped park land (the alienation legislation would authorize the inclusion of park land within the lease); the leased area would remain publicly accessible in the same way the rest of the NTC is publicly accessible; and improvements and upgrades to existing sport fields and infrastructure within Flushing Meadows Corona Park would result in a more meaningful degree of public benefit than an in-kind replacement.

The final selection of park improvement projects would be determined by DPR.

In addition to the capital projects referred to above, and independent of the NTC Strategic Vision, DPR is contemplating other capital projects within Flushing Meadows Corona Park, including various field improvements, undertaking a study to determine the condition of the Porpoise Bridge over the Flushing River (including repair of the bridge's tide gates, in order to improve drainage flow that affects existing park facilities), and exploring a possible Major League Soccer (MLS) stadium.

ADDITIONAL NTC STRATEGIC VISION ELEMENTS

In addition to the physical improvements, the proposed project would allow for an increase in spectator attendance at daytime sessions of the US Open. Specifically, the attendance cap set forth in the NTC lease would increase from 35,000 spectators to 45,000 on days when Citi Field is in use, and from 40,000 spectators to 50,000 on days when Citi Field is not in use. There would be no change in attendance for evening sessions.

The proposed project would also include various lighting, infrastructure, and utility improvements, as well as improvements to landscaping, paving, and drainage within the NTC site, with sustainability features.

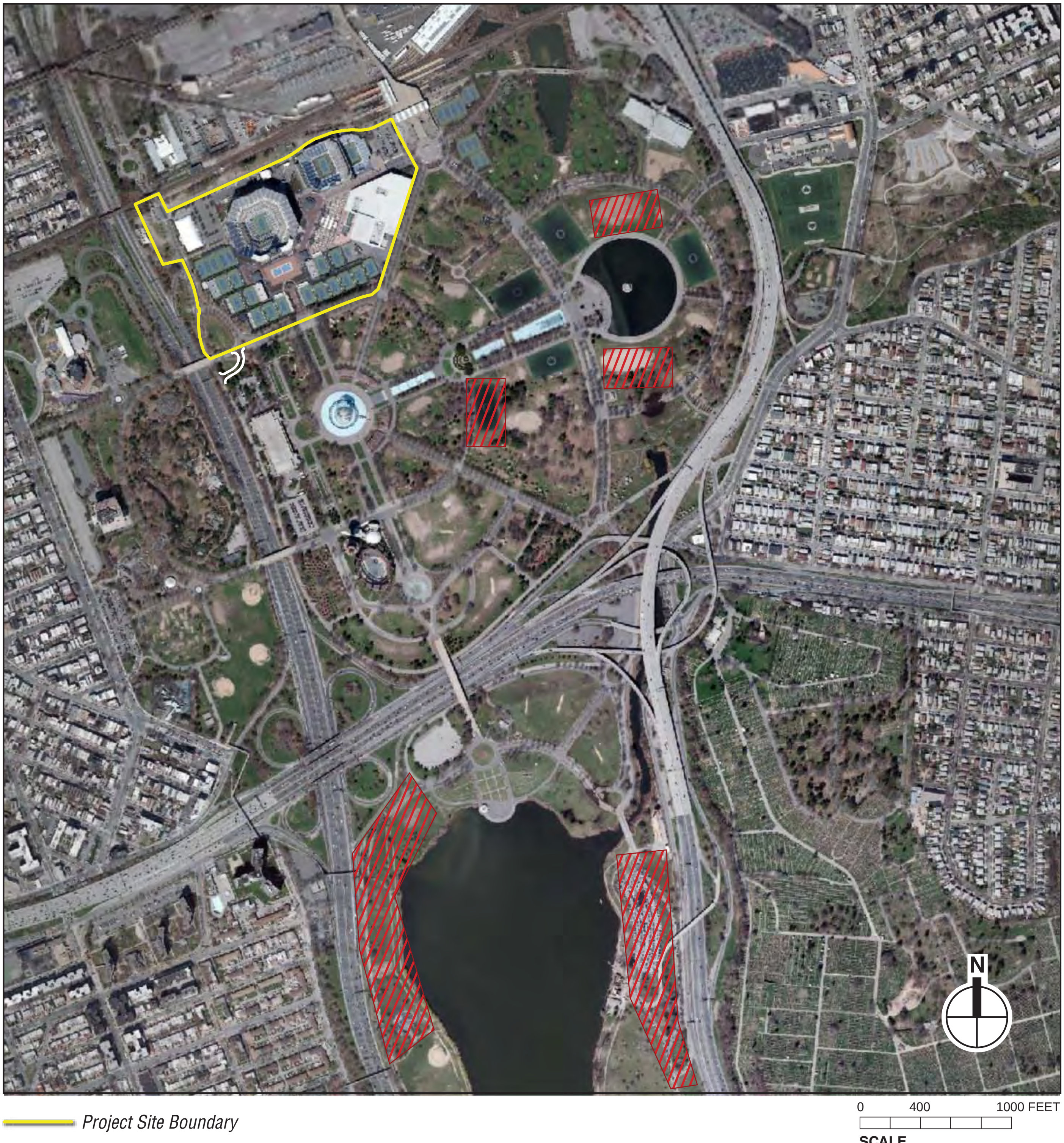
PROJECT CONSTRUCTION TIMELINE

Components of the proposed project would be constructed beginning towards the end of 2013, with overall completion by approximately 2019. By 2014, the relocation of the connector road, construction of Parking Garage A, and replacement of the northwest tournament courts would be expected to be complete, with the anticipated completion of Stadium 3 and the southerly tournament courts following in 2015. By 2016, the canopy over Arthur Ashe Stadium (Stadium 1), construction of the administrative and retail building, and construction of Parking Garage B, would be expected to be complete. The park improvement projects would also be expected to be built by 2016. Stadium 2 would be expected to be complete by 2017, and the addition to Arthur Ashe Stadium is anticipated to be complete by 2019.

D. PROPOSED ACTIONS

UNIFORM LAND USE REVIEW PROCEDURE:

Development of the proposed project would require disposition of 0.68 acres of City property to USTA by long-term lease for the relocation of the fence and playing courts and a small portion of the Grandstand Stadium along the site's southern boundary; this lease is subject to approvals pursuant to the Uniform Land Use Review Procedure (ULURP).



Project Site Boundary

Approximate Area of Potential Park Improvement Projects

Park Improvement Projects
Figure S-7

LEGISLATION

The disposition by long-term lease of the 0.68-acre southern boundary area would require a home rule request from the City Council to the State Legislature, and New York State legislation to authorize the alienation of that site. Following that disposition, this area would remain mapped park land. As described above, it is expected that improvements in other portions of Flushing Meadows Corona Park would be provided in connection with the alienation of 0.68 acres of park land.

OTHER APPROVALS:

Development of the proposed project would also require the following discretionary approvals:

- Amendment of existing lease between DPR and USTA;
- DPR approval under the existing lease for alterations to the site;
- DPR approval for roadway alterations and improvements in Flushing Meadows Corona Park; and
- Coastal Zone consistency determination by DPR and the New York City Planning Commission (CPC).

The proposed project would require design approvals from the New York City Public Design Commission, and a determination by NPS as to whether any approval is required in connection with LWCF Act program requirements due to previously funded improvements to Flushing Meadows Corona Park.

E. ON-GOING CAPITAL PROJECTS AT NTC

As part of USTA's on-going management of capital projects at the NTC, a range of improvements are typically made to the NTC between US Open periods. These projects are not part of the NTC Strategic Vision and would proceed regardless of the status of the NTC Strategic Vision. Therefore, within the framework of the EIS, these projects will be considered part of the background condition in which the NTC Strategic Vision project would be built. The program of ongoing projects includes repairs, upgrades, and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease boundaries. Some of the current projects in this category that are anticipated include: site-wide upgrades to video technology; replacement of canopies at primary entryways and departure points; relocation of ticket office, with associated improvements to queuing; renovation of a retail building; upgrades to food service and retail service locations; and relocation and upgrade of a substation, cooling tower and chiller plant within the leased area north of Meridian Road.

F. ENVIRONMENTAL REVIEW

Various approvals associated with development of the proposed project would require environmental review under CEQR. DPR is the CEQR lead agency and the ULURP applicant, and the CPC and City Council are involved agencies in the CEQR process.

The lead agency has determined that the proposed project may result in one or more significant adverse environmental impacts and thus requires preparation of an EIS. The EIS has been prepared in accordance with the 2012 *CEQR Technical Manual* guidelines, which set forth methodologies and guidelines for environmental impact assessment consistent with the State Environmental Quality Review Act (SEQRA).

For all technical analysis in the EIS, the assessment includes a description of existing conditions, an assessment of conditions in the future without the proposed project for the year that the proposed project would be completed, and an assessment of conditions for the same year with the completion of the action in the future with the proposed project. Identification and evaluation of impacts of the proposed project are based on the change from the future without the proposed project (No-Action condition) to the future with the proposed project (With Action condition). 2019 is the future analysis year that the proposed project is expected to be completed, including park improvement projects.

G. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE, ZONING, AND PUBLIC POLICY

No significant adverse impacts on land use, zoning, or public policy are anticipated in the With Action condition on the project site or within the study area.

The proposed project would result in modest changes in the land uses located on the project site. The locations of the various uses would be reconfigured and there would be a net increase in stadium space, retail and operational uses, and parking facilities. While the proposed project would result in an overall increase in the bulk of development on the site, these incremental increases in height and bulk would be modest relative to the overall facility. In addition, visual improvements along the proposed NTC fence line would minimize the prominence of the new structures. To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26 acres of previously alienated park land (a connector roadway) that is outside the current lease. The change in use and alienation of this park land would not be considered a significant adverse land use impact, due to the replacement roadway that would be provided, the minimal number of users that would be affected, the relatively small area affected, and the park improvements that would be implemented. The replacement connector road and pedestrian walkways would not adversely affect access to the park.

The proposed project would provide new, modern recreational facilities that would be open to the public for 11 months of the year. As the types of uses would be the same as currently exist in the project site and in the study area, they would continue to be compatible with surrounding open space, transportation, and residential uses. The additional 10,000 daily spectators anticipated during the US Open as a result of the proposed project would not have any significant adverse impacts on Flushing Meadows Corona Park given their concentration within the NTC and the temporary nature of the two-week event. While the proposed project would result in the alienation of small areas of park land, visual improvements would be implemented along the proposed NTC fence line that would improve the NTC’s context with the park, and improvements would be provided elsewhere in Flushing Meadows Corona Park. Therefore, the proposed project would not result in any significant adverse impacts within the study area.

OPEN SPACE AND RECREATIONAL RESOURCES

Overall, the proposed project would not result in any significant adverse impacts to open space resources. The proposed project would result in improvements to landscaping, circulation, and amenities at the NTC that would be provided for the US Open and the public. The proposed project would affect areas outside of the current NTC fence line, including the landscaped teardrop area, where the new Stadium 3 would be constructed. The areas outside of the current NTC fence line that would be directly affected by the proposed project are lightly used, primarily for walking, running, and bicycling on the perimeter paths. Displacement or relocation of this activity would not be expected to have a notable effect on park users or create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to nearby sidewalks or pathways in adjacent areas of the park for walking, running, and bicycling, and replacement walkways would be provided under the proposed project. Nearby sections of the park could accommodate the passive recreation activities that may be displaced from these areas. The 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the nearly 900-acre Flushing Meadows Corona Park. Construction of the proposed project would also require removal of approximately 422 trees both outside the existing fence line and inside the NTC site. Tree replacement would be conducted in conformance with DPR requirements. In conjunction with 0.94-acre expansion of the NTC site, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. These potentially include: the renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades.

SHADOWS

The proposed project would not result in any significant adverse shadows impacts. The proposed project could result in new shadows on several small areas containing sunlight-sensitive features adjacent to the project site within Flushing Meadows Corona Park. All but one of the affected areas contain a mix of paved road or walkways, grass and mature trees, but no other user amenities, and are lightly used, primarily for walking, running, and bicycling on the perimeter paths. These areas are therefore only minimally sensitive to effects of incremental shadows. Further, the areas west and south of the project site would continue to receive direct sun for more than six hours throughout the spring, summer and fall, since there are virtually no structures to the south or west. The final area that could be affected by project-generated shadow, the portion of the circular plaza to the east of the project site, would receive between approximately five minutes and an hour and 50 minutes of incremental shadow in the spring, summer, and fall. Only a small portion of this plaza would be affected by the new shadow, and even this small area would receive direct sun for most of the remaining day in those seasons due to the lack of structures to the south and east. Overall, the proposed project’s incremental shadows would not be substantial enough to significantly impact Flushing Meadows Corona Park or its users.

HISTORIC AND CULTURAL RESOURCES

The proposed project would not have any significant adverse physical, contextual, or visual impacts on the architectural resources within the study area, and would not have any significant adverse impacts on archaeological resources.

ARCHAEOLOGICAL RESOURCES

In comment letters dated May 4, 2012 and September 7 and 10, 2012, the New York City Landmarks Preservation Commission (LPC) determined that the project site and the potential sites of the park improvement projects do not have archaeological significance. Therefore, the proposed project would not result in any significant adverse impacts related to archaeological resources.

ARCHITECTURAL RESOURCES

While the proposed project would result in numerous changes to the project site, there are no architectural resources within the boundaries of the project site; therefore, none would be affected by the proposed project. The proposed project would also affect areas at the NTC's perimeter and result in the relocation of a connector roadway. However, the existing connector roadway and the other affected landscaped and paved areas are not significant elements of Flushing Meadows Corona Park's original Beaux Arts plan. Therefore, Flushing Meadow Corona Park's original plan elements would not be significantly adversely affected by the proposed project.

The proposed project would result in construction activities within 90 feet of two architectural resources: the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with applicable LPC and New York City Department of Buildings (DOB) guidelines, including the preparation of a Construction Protection Plan (CPP) prior to construction activities that would be submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project.

In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. It is not expected that any of the park improvement projects would affect any historic resources within the park. However, if improvement projects are planned near historic resources, measures would be undertaken to prevent inadvertent construction-related impacts to such resources, including compliance with LPC and DOB guidelines, as described above.

Due to these factors, the proposed project would not result in any significant adverse impacts related to architectural resources.

URBAN DESIGN AND VISUAL RESOURCES

The proposed project would not have any significant adverse impacts related to urban design or visual resources. Instead, the proposed project would substantially improve the circulation, landscaping, and visitor amenities within the NTC site, and thus would enhance the pedestrian experience within the project site. The height of several structures—and the total bulk of structures—on the NTC site would increase in the future with the proposed project; the most notable elements would include: two new parking garages that would be built on existing surface parking lots in the northeast and northwest corners of the site, along Meridian Road; and the relocated Grandstand Stadium (Stadium 3) that would be built in the southwest corner of the site. These incremental increases in height and bulk would be modest relative to the existing facilities, and would not be inconsistent with the surrounding park land context. The NTC is already highly visible in this section of the park, and the trees and other landscaping to be provided along the site's perimeter, including adjacent to Stadium 3 along United Nations Avenue North and adjacent to Parking Garage B and the Passerelle Building, would serve to moderate the visual presence of the new site elements from most locations. The proposed project would not alter the visual character of the surrounding area, except to make certain sections of the NTC site more prominent in directly adjacent views. With the exception of the modest change to park land acreage, the elimination of one lane of the three-lane United Nations Avenue North, and the relocated connector roadway, the proposed project would not result in any changes to natural features, open spaces, or streets in the study area.

Therefore, the proposed project would be consistent with the existing urban design characteristics of the study area and would not result in any significant adverse impact related to urban design and visual resources.

NATURAL RESOURCES

The proposed project would not result in any significant adverse natural resources impacts.

Most project components would entail redevelopment of existing facilities, relocation of facilities, or construction of new facilities in previously developed areas within the NTC. The relocation of Grandstand Stadium (Stadium 3), a connector road, and the relocation of the southern NTC fence line 25 to 38 feet to the south are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southern section of the NTC, which is outside of any floodplain and would not increase local flood risk. Construction would require the disturbance of ecological communities present on-site and removal of trees that from both outside the existing fence line and various locations inside the NTC site. Tree replanting and replacement within the NTC and elsewhere within the park would comply with DPR’s applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations. The proposed project would not significantly alter the ecological communities of the region, as similar ecological communities would be created as a result of the landscaping plans, after the proposed development has taken place. Because the wildlife community in the study area is composed of disturbance-tolerant, synanthropic species and levels of human disturbance are already high, noise generated during construction and operation of the proposed project would not be expected to displace or otherwise negatively affect wildlife. No federally or state-listed endangered wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Six state-listed endangered willow oak trees located within the NTC in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center would be displaced as a result of the proposed project. However, if deemed feasible, these trees may be relocated to another area of the NTC or onto adjacent DPR property. Willow oak is commonly planted in New York City and is listed on the DPR-approved tree planting list for sidewalk and rights-of-way (ROW). Therefore, the removal and/or transplanting of willow oaks within and/or adjacent the NTC as part of the proposed project would not result in a significant adverse impact to naturally occurring and naturalized willow oak populations within the region.

HAZARDOUS MATERIALS

The proposed project is not expected to result in any significant adverse impacts related to hazardous materials.

The Phase I Environmental Site Assessment (ESA) identified potential sources of contamination, including: historical on-site marshland potentially associated with methane emissions; filling of the project site and nearby land with a mixture of ash, refuse, street sweepings, and soil and rock removed during subway construction in Brooklyn; and a historical on-site underground storage tank (UST). Soil and groundwater testing on and in the vicinity of the project site in 1991-1992 identified somewhat elevated concentrations of certain semivolatile organic compounds (SVOCs), metals and total petroleum hydrocarbons (TPH) in soil samples, which are typical for fill materials containing ash. The detected volatile organic compound (VOC) concentrations met or were only slightly above New York State Department of Environmental Conservation (NYSDEC) Part 375 Soil Cleanup Objectives for Unrestricted Use (USCOs) for soils and met NYSDEC Class GA Standards (drinking water standards) for groundwater, and also appeared to be attributable to fill materials rather than a spill.

Based on the above findings, to reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a Subsurface (Phase II) Investigation Work Plan to determine whether past or present, on or off-site activities have affected subsurface conditions, would be prepared and submitted to the New York City Department of Environmental Protection (NYCDEP) for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP), to be implemented during project construction, would be prepared and submitted to NYCDEP for review and approval. The RAP would address requirements for items such as soil stockpiling, soil disposal and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The CHASP would identify potential hazards that may be encountered during construction and specify appropriate health and safety measures to be undertaken to ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment (such as personal protective equipment, dust control, air monitoring, and emergency response procedures).

Lead-based paint, asbestos-containing materials (ACM) and PCB-containing electrical equipment, hydraulic equipment and fluorescent lighting fixtures may be present (primarily within the older structures) at the project site. During and following demolition and renovation associated with the proposed project, regulatory requirements pertaining to ACM, lead-based paint and Polychlorinated Biphenyls (PCBs) and chemical use and storage would be followed.

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

WATER AND SEWER INFRASTRUCTURE

Overall, the proposed project would not result in any significant adverse impacts on the City's water supply, wastewater treatment, or stormwater conveyance infrastructure. The proposed project would result in an increased demand for water supply and an increase in sanitary sewage generation. These increases, however, would be minimal and would not significantly impact existing infrastructure. Stormwater runoff discharge in the With Action condition would be similar to runoff under the No-Action condition. As there is a stormwater outfall available to project site, through which stormwater runoff is directly discharged into the Flushing River, the City's stormwater conveyance infrastructure would not be affected. The proposed project would include stormwater Best Management Practices (BMPs), including a combination of landscaped areas, pervious pavement, and leaching systems.

TRANSPORTATION

The proposed project would result in a significant adverse transportation impact during the peak periods of the US Open, which would be effectively managed by the traffic management program currently in place.

The proposed increase in attendance of 10,000 persons for the daytime session would result in a projected peak period increase of approximately 2,030 transit trips and 954 vehicle trips. The peak period transit trips would consist of approximately 1,540 subway trips, 455 LIRR trips, and 35 MTA New York City Transit bus trips. The peak period vehicle trips are estimated to consist of 452 auto trips, 498 taxi trips (or 249 roundtrips), and four charter bus trips.

When distributed over the transportation network, the projected trip increments would result in significant adverse traffic impacts, including increased levels of congestion and delays, though temporary in nature and only during the event's peak periods. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would be able to effectively manage the increased level of traffic operations and project-related significant adverse impacts on traffic. This is primarily due to the distribution of trips over the large transportation network, the proximity and direct access to the local highway network from the project site, the capacity of the Mets-Willets Point subway station, and the special event management program implemented by the New York City Police Department (NYPD), especially along College Point Boulevard. There are no significant impacts to transit, pedestrian, or safety conditions.

Though the projected increase in vehicle trips exiting the US Open at the conclusion of the daytime session is anticipated to lengthen the travel time for departing patrons, these delays would largely be confined within Flushing Meadows Corona Park and to a segment of the Long Island Expressway (LIE).

With the additional site-generated traffic, the roadway network is anticipated to continue to experience congested levels of service and delays during event conditions. Due to the traffic management program, however, conditions typically observed when intersection operations become saturated (queues extending beyond storage capacity, blocked turning movements, aggressive driver behavior, etc.) would be managed in the field. Field observations conducted during the US Open validate that the traffic management program and TEAs are able to effectively manage traffic flow during event peak periods.

These findings take into consideration the frequency of the event, the duration of the event's peak period, the infrequency of conflict dates with Mets games, direct connectivity to the area highways, and the special event traffic management provided by the New York City Police Department including TEAs.

AIR QUALITY

The proposed project would not result in any significant air quality impacts.

The maximum predicted pollutant concentrations and concentration increments from mobile sources with the proposed project would be below the corresponding guidance thresholds and ambient air quality standards. The project's accessory parking facilities would also not result in any significant adverse air quality impacts. Thus, the proposed project would not have significant adverse impacts from mobile source emissions.

Based on a stationary source screening analysis, there would be no potential significant adverse air quality impacts from pollutant emissions associated with the proposed project's heat and hot water systems.

GREENHOUSE GAS EMISSIONS

The proposed project would not result in any significant adverse impacts related to greenhouse gas (GHG) emissions. The proposed project's design includes many features aimed at reducing energy consumption and GHG emissions, and would be consistent with the City's citywide GHG reduction goal.

NOISE

The proposed project would not result in any significant adverse noise impacts. The proposed project would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e., it would not result in a doubling of Noise Passenger Car Equivalents [Noise PCEs], which would be necessary to cause a 3 dBA increase in noise levels). Nor would the proposed changes to the NTC's boundaries, including the relocated Grandstand Stadium (Stadium 3), or new parking garages, have the potential to result in a significant noise impacts at any nearby sensitive receptors. With and without the project, noise levels in Flushing Meadows Corona Park adjacent to the project site would be expected to exceed the 55 dBA $L_{10(1)}$ guideline value recommended in the *CEQR Technical Manual* for open spaces. However, these conditions would be less than or comparable to noise levels in other parks and open spaces throughout New York City, and would not be perceptibly increased under the proposed project. Therefore, they would not constitute a significant noise impact.

PUBLIC HEALTH

The proposed project would not result in significant unmitigated adverse impacts in any of the technical areas related to public health: air quality, water quality, hazardous materials, or noise. Therefore, an assessment of potential impacts on public health is not necessary, and the proposed project would not result in any significant adverse impacts on public health.

NEIGHBORHOOD CHARACTER

The proposed project would not result in any significant adverse impacts on neighborhood character. The project site and study area are defined in part by the open space and recreational resources of Flushing Meadows Corona Park, large-scale event uses, and major transportation uses. The proposed project would not affect this essential character, but rather would provide improvements to the existing NTC, as well as park land improvements elsewhere in the park for the benefit of the public. With the exception of transportation, the proposed project would not result in any significant adverse impacts on any of the technical areas that could impact neighborhood character (including land use, socioeconomic conditions, open space, historic and cultural resources, urban design, visual resources, shadows, and noise). However the significant adverse transportation impact would only occur during the peak periods of the US Open, and would be effectively managed by the traffic management program currently in place. Therefore, this impact would not adversely affect neighborhood character. In addition, the proposed project would not be expected to result in a combination of moderate effects to several elements that could cumulatively impact neighborhood character. Overall, the proposed project would not substantially change the character of the neighborhood.

CONSTRUCTION IMPACTS

The proposed project would not result in any significant adverse construction impacts. The proposed project would result in localized, temporary disruptions due to construction activity, as is the case with any substantial construction project. However, based on an analysis of the types of construction activities and their intensity, the location of sensitive receptors that could be affected by the proposed project's construction, and the overall construction duration, these disruptions would not be considered significant adverse impacts.

TRANSPORTATION

No significant adverse transportation impacts would be expected due to construction of the proposed project.

The proposed project would result in 192 more construction vehicle trips (passenger car equivalents [PCEs]) during the peak construction period. When distributed over the transportation network, the construction trip increments at any single location, particularly on local streets, would be minimal. In addition, these trip increments would primarily occur outside of the typical commuter peak hours (8–9 AM and 5–6 PM). Therefore, the traffic increase due to construction activities for the proposed project is not expected to result in any significant adverse traffic impacts.

The proposed project would result in an estimated 114 construction-related transit trips which is fewer than the *CEQR Technical Manual* analysis threshold of 200 trips. Therefore, there would not be any potential for any significant adverse transit impacts during construction. In addition, 305 pedestrian trips would be expected during the peak hour. Because these pedestrian trips would primarily occur outside of the typical commuter peak hours and would originate from several nearby transit services and Parking Lot S they would be distributed among numerous sidewalks and crosswalks in the area. Furthermore, all of the subway person trips generated by the construction of the proposed project would connect directly from the station to the project site via the Passerelle ramp without utilizing any of the pedestrian facilities—sidewalks, corner reservoirs, and crosswalks—from the local street network. Therefore, no pedestrian elements are expected to incur 200 or more incremental pedestrian trips (the *CEQR Technical Manual* analysis threshold) resulting from the construction of the proposed project.

AIR QUALITY

Construction of the proposed project would not result in any significant adverse air quality impacts. With the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, there are very few sensitive receptors near the project site. However, the most intense construction activities (excavation and foundation work) in proximity to the Passerelle Building in terms of air pollutant emissions would be much less than two years. In addition, construction activities associated with the construction of Parking Garage B would not be considered out of the ordinary in terms of intensity and, in fact, emissions would be lower due to the emission control measures that would be implemented during construction of the proposed project. The park areas immediately adjacent to the current NTC fence line but within the proposed lease boundaries are lightly used, primarily for walking and jogging activities on the perimeter paths. Furthermore, the Passerelle ramp that connects the Long Island Rail Road (LIRR)'s Met's Willets Point station to the Metropolitan Transportation Authority (MTA)'s 7 train station is also primarily for transient use, and pedestrians passing through to access public transportation would not be expected to be present for extended durations. The nearest residences are located more than 500 feet away from the project site and are separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. Moreover, an emissions control program would be implemented to minimize potential construction-period effects on air quality. To ensure that the construction of the proposed project would result in the lowest practicable diesel particulate matter (DPM) emissions, the project would implement an emissions reduction program for all construction activities, including diesel equipment reduction; clean fuel; best available tailpipe reduction technologies; utilization of newer equipment; dust control; and restrictions on vehicle idling. Therefore, construction of the proposed project would not result in any significant adverse air quality impacts.

NOISE AND VIBRATION

Noise

Noise associated with the proposed project's construction activities would not result in any significant adverse impacts. Any potentially intrusive noise levels generated by construction activities would be of limited duration. The proposed project does not involve extensive excavation, foundation, or superstructure construction activities, which often generate the highest noise levels. The noisiest construction activity associated with the proposed project—pile driving—would be of limited duration compared to the overall project timeline.

As in the existing and future without the proposed project conditions, noise levels at Flushing Meadows Corona Park during construction of the proposed project are expected to be above the CEQR 55 dBA $L_{10(1)}$ guideline for open spaces requiring serenity and quiet. The 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet; however, due to the level of activity present at most open space areas and parks throughout New York City (except for areas far away from traffic and other typical urban activities), this relatively low noise level is often not achieved. Consequently, noise levels during construction at Flushing Meadows Corona Park, while exceeding the 55 dBA $L_{10(1)}$ CEQR guideline value, would not constitute a significant noise impact. Therefore, based on these factors, no significant adverse noise impacts would be expected at any sensitive receptor locations from the proposed construction activities.

Vibration

The proposed project is not expected to result in significant adverse construction impacts with respect to vibration. To avoid architectural damage, a Construction Protection Plan (CPP) would be developed to protect two known architectural resources— the Freedom of the Human Spirit sculpture and the Passerelle Building— with a lateral distance of 90 feet from the proposed construction activities. Construction activities would take place over a period of four years with discrete project elements lasting two years or less, except for the possible construction of the canopy over the center court of Arthur Ashe Stadium (Stadium 1). Therefore, these vibration levels are not expected to occur at any location of frequent and prolonged human use.

OTHER TECHNICAL AREAS

Open Space

The proposed project's construction activities would take place within the proposed NTC leased premises, except for the relocated connector road and park improvement projects; no additional areas of Flushing Meadows Corona Park are anticipated to be used for staging for construction activities associated with the NTC. In order to minimize the effects of construction-related closures on the public, to the extent practicable, court construction would take place during the winter months when these courts are not actively used and are replaced by more activity in indoor courts. Areas that are outside of the current NTC fence line but within the proposed lease boundaries that would be directly affected by the construction of the proposed project are lightly used, primarily for walking and jogging activities on the perimeter paths. The replacement connector road and sidewalks would be built prior to the closure of the existing connector road, and commencement of construction activities for the new Stadium 3. Therefore, vehicle and pedestrian circulation, as well as park activities, would be maintained at all times. Construction activities associated with the proposed project would not be expected to create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to sidewalks or pathways in other areas of the park during the entire construction period. Dust control measures would be implemented to ensure compliance with the New York City Air Pollution Control Code. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

Historic and Cultural Resources

The proposed project would result in construction activities within 90 feet of the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with LPC’s *Guidelines for Construction Adjacent to a Historic Landmark* as well as the guidelines set forth in section 523 of the *CEQR Technical Manual* and the procedures set forth in DOB’s *Technical Policy and Procedure Notice* (TPPN) #10/88. This includes the preparation of a CPP prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project. Therefore, the proposed project would not result in any significant adverse construction-related impacts to historic and cultural resources.

Hazardous Materials

The proposed project would involve subsurface disturbance for the proposed NTC improvements and expansion, as well as demolition of or alterations to some existing structures. Soil that would be disturbed by the proposed project includes historical fill materials known to contain ash, which have somewhat elevated concentrations of certain metals and semivolatile organic compounds (SVOCs). In addition, on-site structures may contain hazardous materials such as asbestos-containing materials (ACM), polychlorinated biphenyls (PCBs), and/or lead-based paint.

To reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a Subsurface (Phase II) Investigation Work Plan would be prepared and submitted to NYCDEP for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP), to be implemented during project construction, would be prepared and submitted to NYCDEP for review and approval. During and following demolition and renovation associated with the proposed project, regulatory requirements pertaining to ACM, lead-based paint, PCBs, chemical use, and storage would be followed. With these above-described measures, the proposed project would not result in any significant adverse impacts related to hazardous materials.

Natural Resources

Construction of the proposed project would not be expected to have adverse impacts to groundwater quality or result in human or environmental exposure to contaminants. The relocation of Grandstand Stadium (Stadium 3), the southern fence line, and a connector road are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southern section of the NTC, which is outside of any floodplain and would not increase local flood risk. Construction would require the disturbance of ecological communities present on-site and the relocation or removal of approximately 422 trees. Tree replanting and replacement within the NTC and elsewhere within the park would comply with DPR's applicable rules and regulations. Due to the highly urban nature of the terrestrial ecological communities present on the site, the loss of some of these communities as a result of the proposed project would not result in a significant adverse impact on ecological communities of the region. Some wildlife would be displaced from the site during project construction, but would be expected to relocate elsewhere in Flushing Meadows Corona Park and the surrounding neighborhoods. No federally or state-listed wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Therefore, construction of the proposed project would not result in a significant adverse impact to federally- or state-listed wildlife of the region.

ALTERNATIVES

The analysis considers five alternatives, beginning with the No-Action Alternative, which describes the conditions that would exist if the proposed project was not implemented. The second alternative is the Alternative Without Additional Park Land, in which 0.94 acres of park land is not added to the NTC site. The third alternative is the Alternative Without New Park Land Alienation, in which 0.26 acres of previously alienated park land is added to the NTC site, but no new alienation is undertaken. The fourth alternative is the Alternative With Greater Expansion, in which additional park land beyond the 0.94 acres anticipated with the proposed project is added to the NTC. The fifth alternative is the Alternative With Modified Parking Plan, in which one or both of the proposed parking garages are not built.

NO-ACTION ALTERNATIVE

Consideration of the No-Action Alternative is mandated by both CEQR and is intended to provide the lead and involved agencies with an assessment of the expected environmental impacts of no action on their part. Because the No-Action Alternative would not result in an increase in attendance, the significant adverse transportation impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place. Under the No-Action Alternative, existing land use conditions on the project site would not change, except for minor improvements to the project site that would result from USTA's ongoing management of capital projects. The NTC would continue to be constrained by existing site plan deficiencies, such as congested circulation, and structural challenges, as Grandstand Stadium and Louis Armstrong Stadium have reached the end of their useful lives. The deterioration of these stadiums would threaten the ability of the NTC to host the US Open and function as a world class facility. The No-Action Alternative would not result in the removal of 422 trees within and outside of the current NTC fence line, including 6 state-listed endangered willow oak trees located within the NTC in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center.

ALTERNATIVE WITHOUT ADDITIONAL PARK LAND

The Alternative Without Additional Park Land would not result in any significant adverse impacts. Under the Alternative Without Additional Park Land, improvements would be implemented at the NTC without the additional 0.94 acres of park land, including 0.68 acres of park land that would be alienated and 0.26 acres of previously alienated park land. Two of the NTC site's existing three stadiums—Louis Armstrong Stadium and Grandstand Stadium—are approaching 50 years of age and have reached the end of their useful lives, as the stadiums were designed as temporary structures for the 1964-1965 World's Fair. The continued deterioration of these stadiums would threaten the ability of the NTC to host the US Open and function as a world class facility. Absent the proposed expansion of the project site, these facilities would need to be rebuilt in place. The new stadiums would continue to be constrained by an inefficient site plan, and the opportunity to improve pedestrian circulation would be lost.

Rebuilding these stadiums in place would mean that the site plan as proposed could not be achieved. Compared to the proposed project, the following objectives would not be achieved:

- **Expand public plazas and promenades and improve functionality of public spaces and open areas within the NTC.** Without an expansion of the site, new public spaces and walkways could not be provided and site circulation would continue to be congested. Therefore, this objective would not be achieved.
- **Improve circulation, comfort, and safety for visitors and players.** Without the provision of new public spaces and walkways, site circulation would continue to be congested. Existing public spaces could be improved only to a lesser extent. Therefore, this objective would not be achieved.
- **Activate underutilized spaces within the NTC site.** The alternative would maintain the current congested conditions in the northern portion of the site, thereby not achieving a dispersal of patrons.
- **Increase the capacity of the NTC site to allow for more daytime attendance at the US Open.** Without an expansion of the site, new facilities and circulation improvements could not be provided. Thus, additional daytime attendees could not be accommodated. Therefore, this objective would not be achieved.
- **Enhance economic benefits of the US Open in Queens, New York City, and the region.** As this alternative would not allow for an increase in daytime attendance at the US Open, there would not be an increase in economic benefits to Queens, New York City, and the region, compared to the proposed project. In addition, the enhancement of the competitive status of the US Open, with respect to the four Grand Slam events, would not be achieved.

In addition, the opportunity to improve the NTC's context within Flushing Meadows Corona Park would be lost. As the daytime capacity of the NTC for the US Open could not be increased, there would not be improved economic benefits to the City. The competitive position of the NTC would decline in relative terms due to improvements at competing and peer facilities. Because the Alternative Without Additional Park Land would not result in an increase in attendance, the significant adverse transportation impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place. The Alternative Without Additional Park Land would not result in the removal of 422 trees within and outside of the current NTC fence line, including

6 state-listed endangered willow oak trees located within the NTC in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center.

ALTERNATIVE WITHOUT NEW PARK LAND ALIENATION

The Alternative Without New Park Land Alienation would not result in any significant adverse impacts. Under this alternative, the reduced expansion of the NTC would be insufficient to accommodate a stadium in the southwest corner of the site and consequently, Grandstand Stadium and Louis Armstrong Stadium would need to be rebuilt in their present locations. Specifically, 0.26-acres of previously alienated park land could be added to the NTC site, but no new park land alienation would take place and the 0.68 acres of park land that would be alienated under the proposed project would not be affected (see **Figure S-3** for the locations of these areas).

This alternative would not allow for the proposed project's improved site plan in which the relocated Grandstand Stadium would be built in the southwest corner of the site. It would not be feasible to limit the location of the relocated Grandstand Stadium to the existing lease boundaries, as doing so would impact existing adjacent tennis courts and would not allow sufficient space for pedestrian circulation to access the new stadium.

In addition, the existing configuration of the NTC limits access to the southwest area, due to intervening tennis courts and the lack of walkways with the capacity to handle crowds during the US Open. During the US Open, the area of greatest patron concentration is the confined area adjacent to the current cluster of stadiums in the northern portion of the site. Accommodating a stadium in the southwest corner of the site would require improvements in circulation so that crowds can safely and comfortably access that area. Under the proposed project, the locations of tennis courts would be reconfigured to allow for such access. A new approximately 45-foot wide walkway would be provided on the north side of the relocated southerly tournament courts, and a diagonal access route would be available from the relocated Grandstand Stadium to Arthur Ashe Stadium. Absent the alienation of 0.68 acres of park land, the reconfiguration of tennis courts could not take place, and the new, wider walkways could not be provided.

Thus, the southwest corner of the site would not be a feasible location for a stadium, due to physical constraints and insufficient pedestrian circulation. Consequently under this alternative, Louis Armstrong Stadium and Grandstand Stadium would need to be rebuilt in their current location, even with the addition of the 0.26 acres of previously alienated park land to the NTC.

Therefore, the Alternative Without New Park Land Alienation would result in the same development program as the Alternative Without Additional Park Land. Under either alternative, Louis Armstrong Stadium and Grandstand Stadium would be rebuilt in place, and the proposed increase in the US Open attendance cap could not be achieved. The new stadiums would continue to be constrained by an inefficient site plan, and the opportunity to improve pedestrian circulation would be lost. The competitive position of the NTC would decline in relative terms due to improvements at competing and peer facilities. Because the Alternative Without New Park Land Alienation would not result in an increase in attendance, the significant adverse transportation impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place.

ALTERNATIVE WITH GREATER EXPANSION

Like the proposed project, the Alternative With Greater Expansion would result in significant adverse transportation impacts during the peak periods of the US Open, which would be effectively managed by the traffic management program currently in place. Under the Alternative With Greater Expansion, the proposed project would be developed with a larger expansion of the site plan than is contemplated under the proposed project. This expansion would require additional alienation of park land, compared to the 0.68 acres that would be alienated under the proposed project. With additional park land, the NTC could provide an enhanced pedestrian experience with broader walkways and additional landscaped areas and public spaces.

Currently, pedestrian circulation is congested in the NTC during the peak periods of the US Open. Addressing these conditions is a project objective in order to achieve an improved visitor experience that would strengthen the competitive position of the USTA compared to peer and competing events. Under the proposed project, a new 45-foot wide pedestrian walkway would be provided, which could be increased up to 60-feet wide under the Alternative With Greater Expansion. Other walkways and public spaces could also be enlarged, resulting in a more visitor- and player-friendly venue than could otherwise be achieved.

While this alternative would achieve most of the objectives of the proposed project (such as improving public spaces and circulation) it would fail to meet the proposed project's intention to minimize expansion beyond current NTC lease boundaries. The Alternative With Greater Expansion would likely result in the removal of a greater number of trees within and outside of the current NTC fence line than the proposed project. Alienation of a substantial amount of park land in Flushing Meadows Corona Park would not be consistent with the objectives and objectives of the proposed project.

ALTERNATIVE WITH MODIFIED PARKING PLAN

Like the proposed project, the Alternative With Modified Parking Plan would result in significant adverse transportation impacts during the peak periods of the US Open, which would be effectively managed by the traffic management program currently in place.. Under the Alternative With Modified Parking Plan, one or both of the proposed parking garages would not be constructed as part of the proposed project. The area proposed as the site of the parking garages would instead remain in use as surface parking. The rest of the project elements would be implemented, including new stadium and ancillary building construction, an expansion of the NTC lease by 0.94 acres, the relocation of a connector road in a 0.3-acre area, and a 10,000 person increase in the US Open attendance cap.

Without one or both of the proposed parking garages, the proposed project's stated objective of increasing the availability of on-site parking would not be met, or would be met to a lesser extent. In addition, the objective of improving circulation, comfort and safety for visitors and players would be met to a lesser extent, as there would not be increased parking in close proximity to NTC facilities. Providing enhanced parking in close proximity to the site is an objective of the proposed project, and is important to sustaining the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. Without the proposed parking garages, that improvement would not be achieved.

MITIGATION

With the exception of transportation, the technical analysis determined that there would not be significant adverse environmental impacts associated with the proposed project.

The transportation analysis determined the projected trip increments would result in significant adverse traffic impacts including increased levels of congestion and delays. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would effectively manage the increased level of traffic. Therefore, due to the infrequency and duration of the event, and the ability of the traffic management program and TEAs to adequately manage traffic flow and safety of all street users during the US Open, no mitigation measures beyond the continuous traffic management provided by the TEAs would be necessary.

Overall, none of the analyses performed for this DEIS identified the need for mitigation measures.

GROWTH INDUCING ASPECTS OF THE PROPOSED PROJECT

The proposed project would not induce significant new growth in the surrounding area. While the proposed project would result in increased activity on the project site, the increased activity would be substantially associated with the US Open, which is limited to a 2-week period. The study area is primarily comprised of Flushing Meadows Corona Park, where no development can take place without discretionary approvals that would require further review. The North Corona portion of the study area is fully developed, and the level of development is controlled by zoning. As such, the proposed project would not “induce” new growth in the study area. The proposed project and related actions are specific to the project site only.

In addition, the proposed project would not include the introduction of new infrastructure or an expansion of infrastructure capacity that would result in indirect development.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed project would result in commitments of land resources and materials, which are weighed against the benefits of the proposed project. The purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. It would result in much needed improvements to the visitor experience and provide substantial long-term economic benefits to Queens, New York City, and the region. The proposed project would enable the USTA to accommodate an extra 10,000 daily spectators during the US Open. It is expected that the proposed project would increase attendance at the US Open by up to approximately 100,000 new visitors, positively affecting not only the revenues from the US Open but the local hospitality market as well. It would also create jobs during construction and upon completion.

In addition, the proposed project would result in the expansion of the NTC, an existing use. The proposed project has been designed with the intention of minimizing the amount of park land that would be added to the project site. As discussed in Chapter 3, “Open Space and Recreational Resources,” the 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the nearly 900-acre Flushing Meadows Corona Park, and the affected areas are lightly used. ✷

A. PROJECT IDENTIFICATION

The City of New York Department of Parks and Recreation (DPR), in coordination with USTA National Tennis Center, Incorporated (USTA)[1], is seeking a number of discretionary actions in connection with proposed improvements and an expansion to the facilities at the USTA Billie Jean King National Tennis Center (NTC), located in Flushing Meadows Corona Park in Queens (see **Figure 1-1**). These improvements collectively are known as the NTC Strategic Vision (the proposed project). The NTC is located on a portion of Queens Block 2018, Lot 1, on park land leased by DPR to USTA. The leased site is bounded to the north by the railway tracks of the Long Island Rail Road (LIRR)'s Port Washington line; United Nations Avenue North to the south; the Passerelle Building (connects LIRR's Mets-Willets Point station to the Metropolitan Transportation Authority (MTA)'s 7 train station, and Citi Field, the New York Mets baseball stadium) and Path of the Americas to the east[2]; and Grand Central Parkway to the west.[3]

The 42-acre NTC is one of the world's largest public recreational tennis facilities. For 11 months of the year, its facilities are open to the public for indoor and outdoor tennis; USTA maintains the facilities year-round. The NTC is also host to the US Open, one of the sport's four Grand Slam championship tennis tournaments. The event is staged during a two-week period around the beginning of September, is attended by approximately 700,000 spectators, and is broadcast worldwide.

The proposed project would improve the NTC site plan, circulation, visitor amenities, and landscaping, and would include construction of two new stadiums to replace the existing Louis Armstrong Stadium (Stadium 2) in the same location, and Grandstand Stadium (Stadium 3), in a new location at the southwest corner of the NTC site, as well as possible improvements to Arthur Ashe Stadium (Stadium 1). The proposed project would also include modifications to tournament courts and ancillary buildings, the construction of two new parking garages, the relocation of a connector road, and pedestrian enhancements. To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease. Just to the south of the NTC, the relocated connector road and new sidewalks would be built on an approximately 0.3-acre area. Improvements to park features in Flushing Meadows Corona Park would also be provided, as described in greater detail below. If approved, the proposed project is expected to be completed by 2019.

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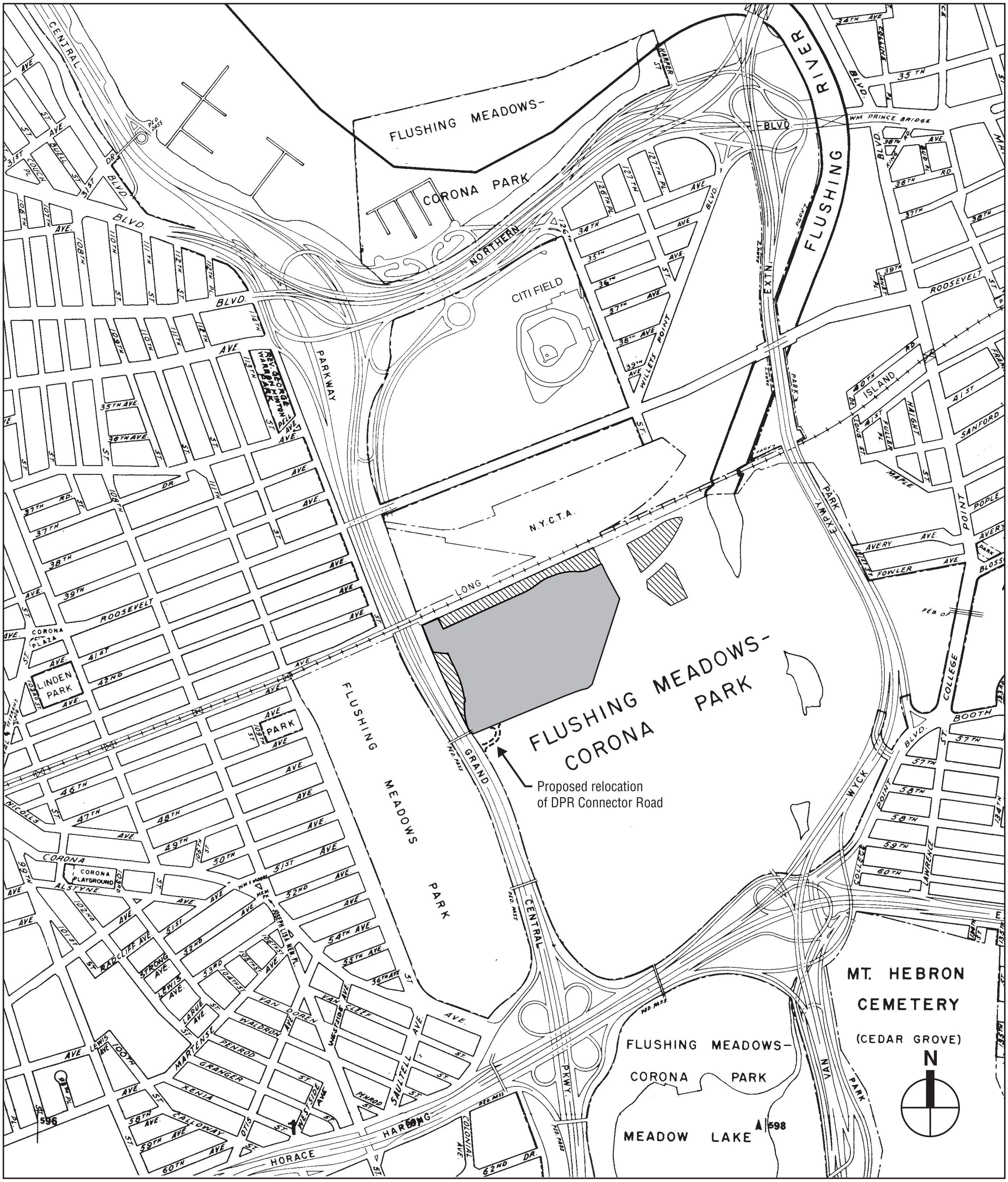
[1] USTA Billie Jean King National Tennis Center Incorporated, an affiliate of the United States Tennis Association, Incorporated, operates the USTA Billie Jean King National Tennis Center.

[2] The NTC lease also covers 11 tennis courts located to the east of the Passerelle Building that are not affected by the proposed project.

[3] The roads within the NTC site are not included in the lease.



Project Site

NTC Leased Premises Land not Affected by the Proposed Project

Note: Roads within the NTC site are not included in the lease

Project Location

Figure 1-1

In the early stages of the development of the project, DPR issued a predictive determination that the project may have a significant impact on the environment, requiring that an Environmental Impact Statement (EIS) be prepared. This Draft EIS (DEIS), in conformance with the final scope dated December 27, 2012, has been prepared to describe the proposed project, present the proposed framework for the EIS analysis, and assess the potential for project impacts. The 2012 *City Environmental Quality Review* (CEQR) *Technical Manual* serves as a guide on the methodologies and impact criteria for evaluating the project's potential effects on the various environmental areas of analysis.

B. PURPOSE AND NEED

The purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. It would result in a much needed improvement to the visitor experience and provide substantial long-term economic benefits to Queens, New York City, and the region.

BACKGROUND

The US Open, which dates back to 1881, moved to its current site in Flushing Meadows Corona Park in 1978, making its facilities available to the public 11 months of the year. In 1993, the NTC site expanded from 21.6 acres to approximately 42.2 acres to allow for the construction of a new 23,500-seat stadium (Arthur Ashe Stadium), completed in 1997. The 1993 expansion required alienation of park land following review by the City through its Uniform Land Use Review Procedure (ULURP). The tennis center was renamed the USTA Billie Jean King National Tennis Center in 2006. Today, the NTC is one of the largest public tennis facilities in the world. The US Open attracts over 700,000 spectators annually and generates substantial economic benefits in New York City.

The nearly 900-acre Flushing Meadows Corona Park—Queens' largest public park—was created for the 1939-1940 World's Fair. It offers a variety of event-oriented recreational activities, as well as lawns, fields, and playgrounds for active and passive recreation. Portions of this park (but not the NTC) have been improved with funds from the Federal Land and Water Conservation Fund (LWCF) Act, and much of the park, including the NTC, is subject to LWCF requirements. The health, welfare and recreational public purposes of the NTC have been recognized by the New York State Legislature and the New York City Council in the State legislation and City Administrative Code provisions that govern the NTC lease, as well as by the U.S. Department of the Interior, National Park Service (NPS), which determined in 1993 that the expansion and renovation of the NTC is consistent with the LWCF grant-in-aid manual requirements governing Flushing Meadows Corona Park.

The USTA and the affiliated United States Tennis Association promote and develop tennis in the community through a wide range of programs. More than 100,000 participants of all ages, the majority of whom are from the local Queens community, participate in hundreds of community tennis programs at the NTC each year. The NTC is home court for more than 70 New York City high schools and colleges and a number of diverse organizations seeking a place to play tennis or host tournaments. USTA offers court rentals to the public at rates calculated under USTA's lease with the City. The grounds of the NTC are also open 11 months of the year to visitors of Flushing Meadows Corona Park, free of charge. Approximately $1 million is spent each year for other United States Tennis Association tennis programs in New York City as well, including grants for free tennis programs, free equipment, court refurbishments, and scholarships, all supported by revenues from the US Open.

Through its flagship event, the US Open, USTA has significant world-wide reach and economic impact on the City of New York. Approximately 42 percent of US Open patrons come from outside the New York metro area, including 14 percent from outside the US. During the US Open, attendees, players, media, sponsors and staff generate substantial demand for the City's hotel and hospitality industry. The US Open also creates 6,000 seasonal jobs, a large percentage of which go to residents of Queens and Brooklyn. On television and through the media, the US Open's reach is global. It attracts 85 million US TV viewers and is seen in 188 countries, with more than 41,000 hours of coverage.

CURRENT PROJECT SITE CONDITIONS

Two of the NTC site's three stadiums—Louis Armstrong Stadium and Grandstand Stadium—are approaching 50 years of age and nearing the end of their useful lives. Notable deficiencies include: constricted circulation; inadequate restrooms; prone to flooding; and infrastructure issues, as the stadiums were designed for the 1964-1965 World's Fair.

PROJECT GOALS AND OBJECTIVES

The goals of the project include the following:

- Replace and upgrade aging, out-of-date infrastructure and facilities that have reached the end of their useful lives.
- Expand public plazas and promenades and improve functionality of public spaces and open areas within the NTC.
- Improve circulation, comfort and safety for visitors and players.
- Activate underutilized spaces within the NTC site.
- Increase the capacity of the NTC site to allow for more daytime attendance at the US Open.
- Enhance economic benefits of the US Open in Queens, New York City, and the region.
- Increase availability of on-site parking.
- Improve the reliability of the NTC site for the US Open during inclement weather.
- Increase player visibility during US Open practice and early tournament play.
- Increase efficiency and sustainability of infrastructure and landscaping.
- Develop a consistent design experience for sponsor partners.
- Enhance food service and retail offerings during the US Open.
- Develop a consistent visual theme and signage for food service.

Within the framework of these goals, the proposed project would: minimize expansion beyond NTC lease boundaries; maintain or improve public availability of courts; improve the NTC's context within the park; and maintain opportunities for public programming throughout the year. Without the expansion of the NTC attributable to the disposition of 0.94 acres of City property, the NTC Strategic Vision would not be implemented and the project goals would not be met.

The proposed site improvements and other components of the NTC Strategic Vision are intended to collectively further these key objectives, addressing serious deficiencies in the three existing stadiums and making the NTC more comfortable and friendly to the public, fans, sponsors and players, and recreational users, year-round.

The proposed project would also enable the USTA to accommodate an extra 10,000 daily spectators during the US Open. It is expected that the proposed project would increase attendance at the US Open by up to approximately 100,000 new visitors, positively affecting not only the revenues from the US Open but the local hospitality market as well. It would also create jobs during construction and upon completion.

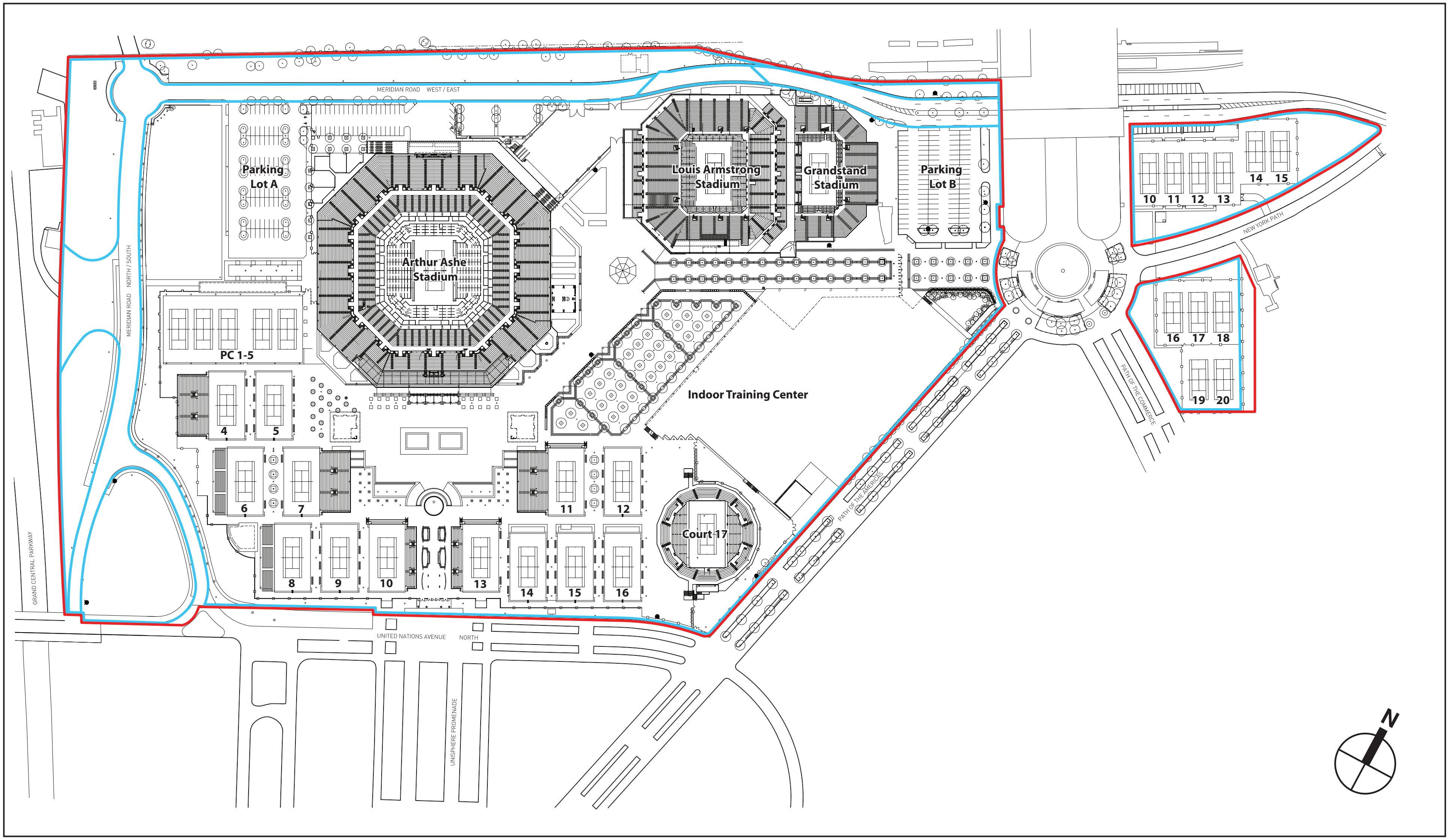
C. PROJECT DESCRIPTION

The NTC and the US Open are important recreational and economic assets to Queens, New York City, and the region. The NTC Strategic Vision reflects the need to maintain and enhance NTC facilities, to ensure its continuing contribution to the local community and the City.

OVERVIEW

The NTC Strategic Vision would result in a number of physical improvements and alterations to the facility's plan. Overall, the proposed project would add 0.94 acres to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26 acres of previously alienated park land that is currently not included in the lease. **Figure 1-1** shows the approximately 37.48-acre[1] project site and the additional areas of the 42-acre NTC site located in Flushing Meadows Corona Park in Queens; **Figure 1-2** and **Figure 1-3** show the alienated and leased boundaries of the NTC and the additional 0.94 acres provided for as part of the proposed project; **Figure 1-4** shows the current site plan for the NTC; and **Figure 1-5** shows the proposed future site plan under the proposed project. The major project elements are summarized in **Table 1-1**, and more detailed descriptions of the project elements, including new stadiums, tournament courts, ancillary buildings, parking and transportation modifications, and pedestrian enhancements, are provided below.

[1] The full NTC is 42.2 acres. The 37.48-acre project site includes: the 35.3-acre portion of the NTC site bounded by Meridian Road, United Nations Avenue North, and Path of the Americas; the 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94-acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3-acre relocated connector road area, which would remain under City ownership and control.



NOT TO SCALE

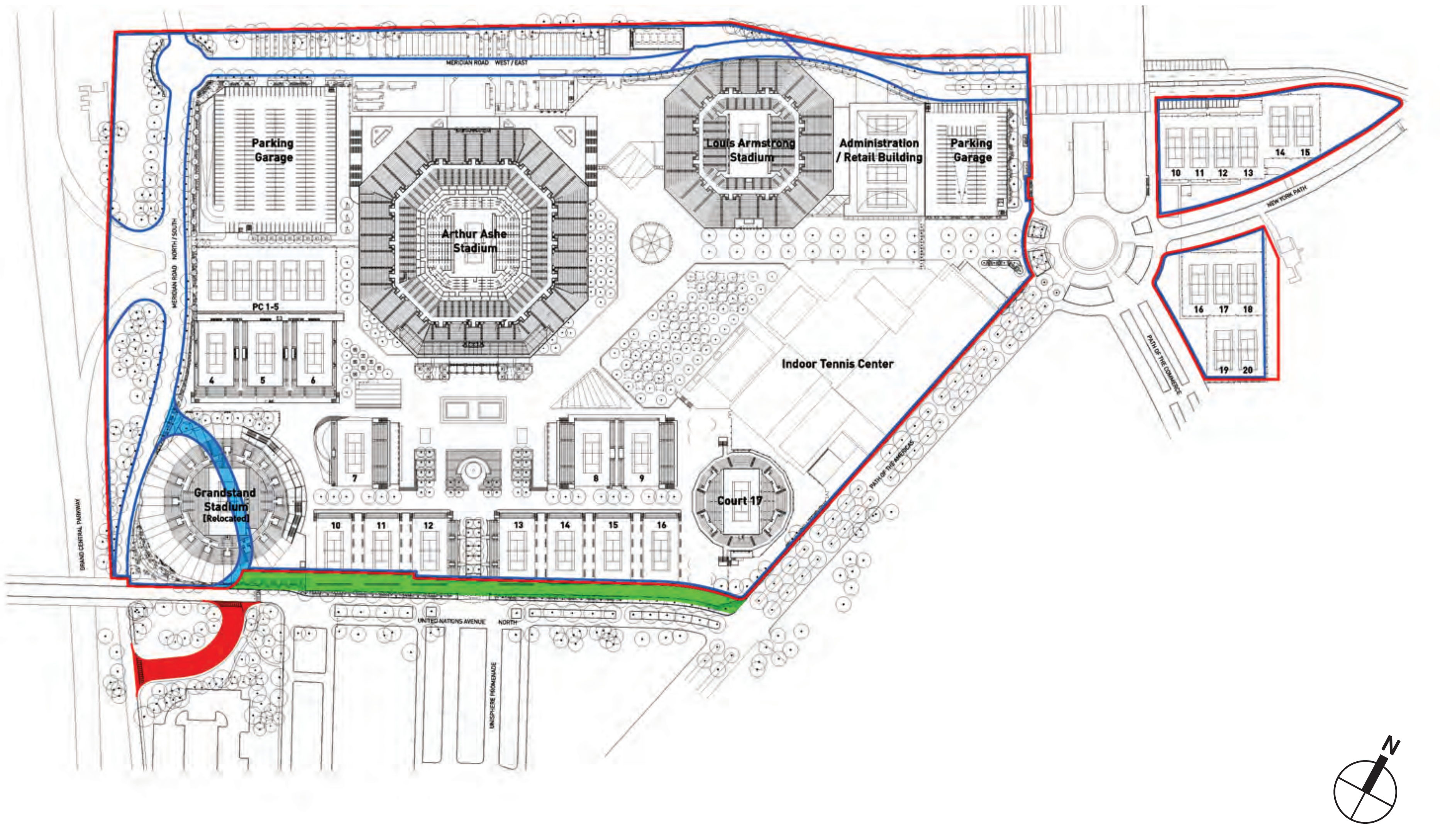
Current Limit of Alienated Lands

Current Limit of NTC Lease

•NOTE: Roads within NTC Site are not included in lease

Existing Lease Boundary and Alienation Boundary of NTC Site

Figure 1-2



NOTE: FOR ILLUSTRATIVE PURPOSES ONLY

NOT TO SCALE

Proposed Park Road Relocation (Approx. 0.3 Acres) (not part of NTC Lease)

Current Limit of Alienated Lands

Current Limit of NTC Lease

Previously Alienated Land to be Added to NTC Lease (0.26 Acres)

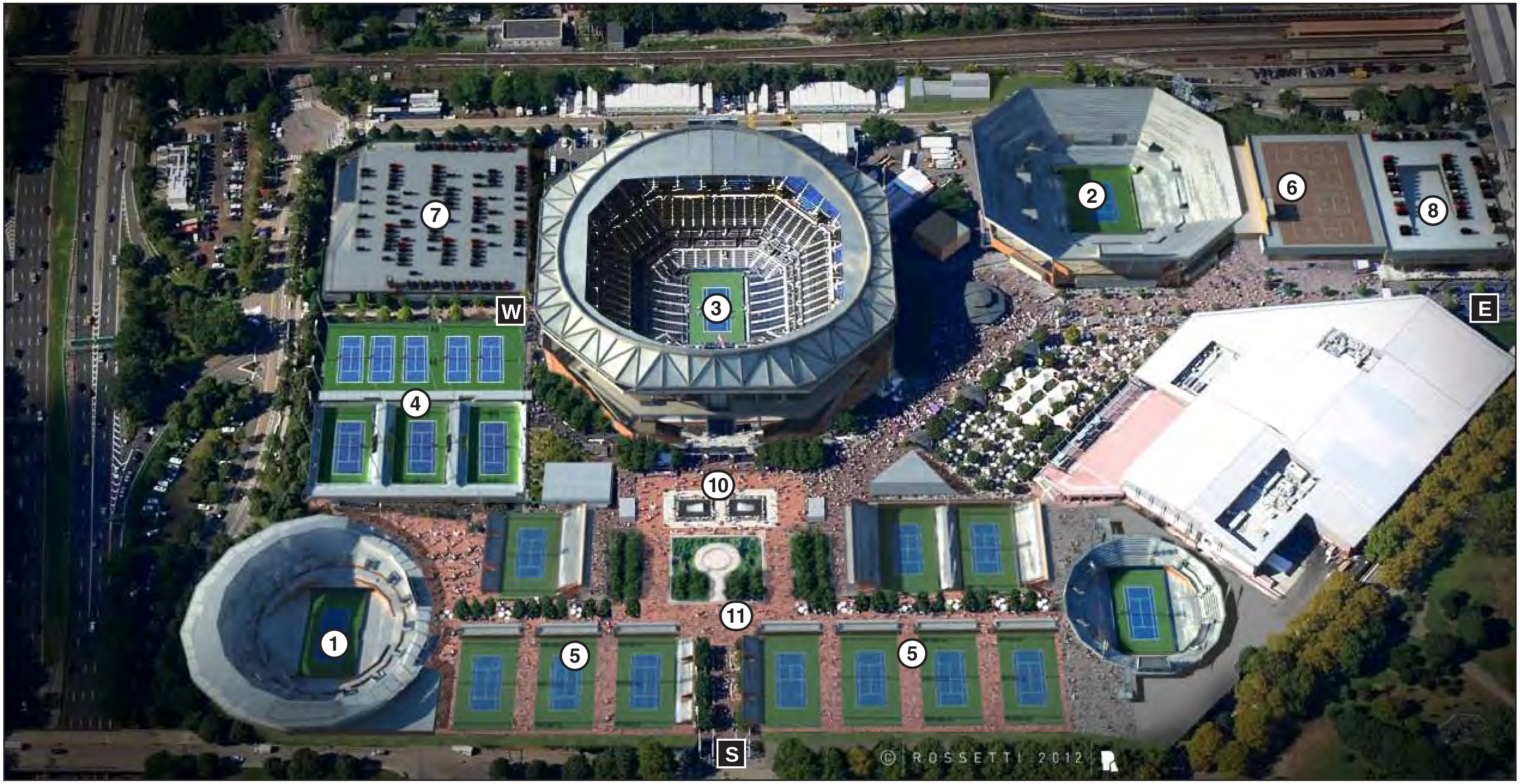
Land to be Alienated and Added to NTC Lease (up to 0.68 Acres)

Proposed Lease Boundary and Alienation Boundary of NTC Site

Figure 1-3

1 *Grandstand Stadium*
2 *Louis Armstrong Stadium*
3 *Arthur Ashe Stadium*
4 *Northwest Tournament Courts*
5 *Southerly Tournament Courts*
6 *Retail and Sponsorship Building (See Figure 1-5)*
7 *Parking Lot A*
8 *Parking Lot B*
9 *Existing Connector Road*
10 *Arthur Ashe Concourse*
11 *Walkway (See Figure 1-5)*
E *East Gate*
S *South Gate*
W *West Gate*

Existing Site Plan
Figure 1-4



1	*Stadium 3*	**7**	*Parking Lot A*	**E**	*East Gate*
2	*Stadium 2*	**8**	*Parking Lot B*	**S**	*South Gate*
3	*Arthur Ashe Stadium*	**9**	*Relocated Connector Road (See Figure 6)*	**W**	*West Gate*
4	*Northwest Tournament Courts*	**10**	*Arthur Ashe Concourse*		
5	*Southerly Tournament Courts*	**11**	*Walkway*		
6	*Retail and Sponsorship Building*				

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY
DETAIL ALONG SOUTHERN BOUNDARY NOT SHOWN;
PLEASE REFER TO FIGURE 3-2 FOR THIS INFORMATION

Proposed Site Plan
Figure 1-5

Table 1-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
Stadium Improvements and New Construction		
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
Tournament Court Modifications		
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
Ancillary Building Construction		
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium (Stadium 3)
Parking and Transportation Improvements		
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
Pedestrian Enhancements		
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See **Figure 1-4** for the location of these elements under existing conditions. See **Figure 1-5** for their proposed future location.
Source: USTA

STADIUM IMPROVEMENTS AND NEW CONSTRUCTION

GRANDSTAND STADIUM (STADIUM 3)

The current 6,000-seat Grandstand Stadium is located adjacent to Louis Armstrong Stadium, on its east façade. Grandstand Stadium was built for the 1964-1965 World's Fair Singer Bowl, and is at the end of its useful life. The proposed project would replace the existing Grandstand Stadium with a new up to 55-foot tall, 8,000-seat stadium in the southwest corner of the site. The replacement stadium would include a two-story (one story above grade), approximately 31,000-gross square foot (gsf), structure for administrative and operational uses, such as locker rooms, restroom facilities, and first aid facilities. Most of the area in which the stadium would be located is within the boundaries of USTA's lease with DPR. However, a small portion of the new stadium site would be located on the western end of the 0.68 acres of park land that would be alienated as shown on **Figure 1-3**. In addition, the area of the City-owned park connector road between United Nations Avenue North and Meridian Road, which runs through the leased area in which the new stadium would be located, would be added to the area covered by the lease, increasing the area subject to the lease by approximately 11,449-sf (0.26 acres) as shown on **Figure 1-3**.

LOUIS ARMSTRONG STADIUM (STADIUM 2)

Louis Armstrong Stadium (Stadium 2), located in the northeast corner of the site, is a 10,500-seat facility. As with Grandstand Stadium, it was built for the 1964-1965 World's Fair Singer Bowl and is at the end of its useful life. After demolition of the existing stadium, a new 15,000-seat stadium would be built on the same site, in an up to 80-foot tall facility. Similar to the existing facility, the new stadium would include approximately 80,000-gsf of enclosed space for concession, retail, broadcasting, and administrative uses, as well as expanded rest room, first aid, and guest services facilities.

Since the replacement of Louis Armstrong Stadium would take more than one year to complete, the demolition process would be scheduled so that a temporary replacement stadium could be built for the US Open, on the same site. Construction of the new stadium would continue after the US Open and take-down of the temporary structure.

ARTHUR ASHE STADIUM (STADIUM 1)

Arthur Ashe Stadium (Stadium 1), located in the north center portion of the site, is an approximately 23,500 seat facility. USTA continues to explore possible methods of covering Arthur Ashe Stadium in the event of rain during the US Open, and is analyzing possible engineering solutions for a canopy system that would attach along the upper edge of the stadium. USTA is also considering the addition of approximately 90,000-gsf of administrative and operational support space on the north side of the stadium, underneath the existing seating platform and above an area currently used for loading and temporary facilities (including broadcast facilities), along with a reconfiguration of administrative and operational space within the existing stadium building. The existing loading area would remain in the same location, underneath the new structure. Improvements could also be made to the existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium, as described below.

TOURNAMENT COURT MODIFICATIONS

NORTHWEST TOURNAMENT COURTS

Currently, the northwest courts include five practice courts and two tournament courts, with bleacher seats. The proposed project would replace these courts and bleachers with five new practice courts and three new tournament courts. There would also be a new elevated viewing platform constructed between the practice and tournament courts.

SOUTHERLY TOURNAMENT COURTS

Currently, there is a row of seven tournament courts on the southern portion of the site. Under the proposed project, four of these courts would be relocated approximately 50 feet to the south, and three of these courts would be relocated approximately 30 feet to the south. New bleacher seating areas would be provided for some of the tournament courts. To allow for the court relocation and pedestrian circulation around these courts, the new NTC boundary line under the lease would move 25 to 38 feet south to abut the reconfigured United Nations Avenue North and planted area. This would increase the area subject to the lease by approximately 29,534-sf (0.68-

acres) as shown on **Figure 1-3**. On the northern side of the relocated courts, a new walkway would be constructed, as described below.

ANCILLARY BUILDING CONSTRUCTION

PROPOSED ADMINISTRATIVE AND RETAIL BUILDING

Adjacent to the new Stadium 2, at approximately the same location as the existing Grandstand Stadium, a new 2-story, approximately 80,000-gsf building, would be built. This building would include approximately 48,300-gsf of space for administrative and storage uses for the NTC, as well as approximately 31,700-gsf of retail storage and merchandise space, much of which would be used as retail space during the US Open. Four courts that were temporarily in use at Lot A would be replaced with four permanent enclosed courts on the roof of the proposed administrative and retail building. These courts would be made available to the public on the same basis as the other courts managed by USTA.

PARKING AND TRANSPORTATION IMPROVEMENTS

TWO NEW PARKING GARAGES AND RELOCATED TRANSPORTATION CENTER

Currently, there is an approximately 100-space surface parking lot in the northeast corner of the site (Lot B), and a 200-space parking lot in the northwest corner of the site (Lot A) that additionally contains a transportation center used for staff and facilities for handling player and sponsor transportation and credentials and media credentials, as well as sponsor ticketing and lounge space. Under the proposed project, Lot B would be replaced with an approximately 270-space, 3-level parking garage, and Lot A and the transportation center would be replaced with an approximately 423-space, 2-level parking garage and 6,500 square foot (sf) transportation center.

RELOCATED CONNECTOR ROAD

The connector road displaced by the relocation of Grandstand Stadium (Stadium 3) would be relocated to an approximately 0.3-acre area south of United Nations Avenue North near the Queens Museum of Art parking lot, as shown on **Figure 1-6**. New approximately five-to-six-foot wide pedestrian walkways would also be created; possible locations for these pedestrian walkways are shown on **Figure 1-6**. As part of the proposed project, the small portion of Meridian Road below the overpass would be widened to connect to an existing bicycle lane.

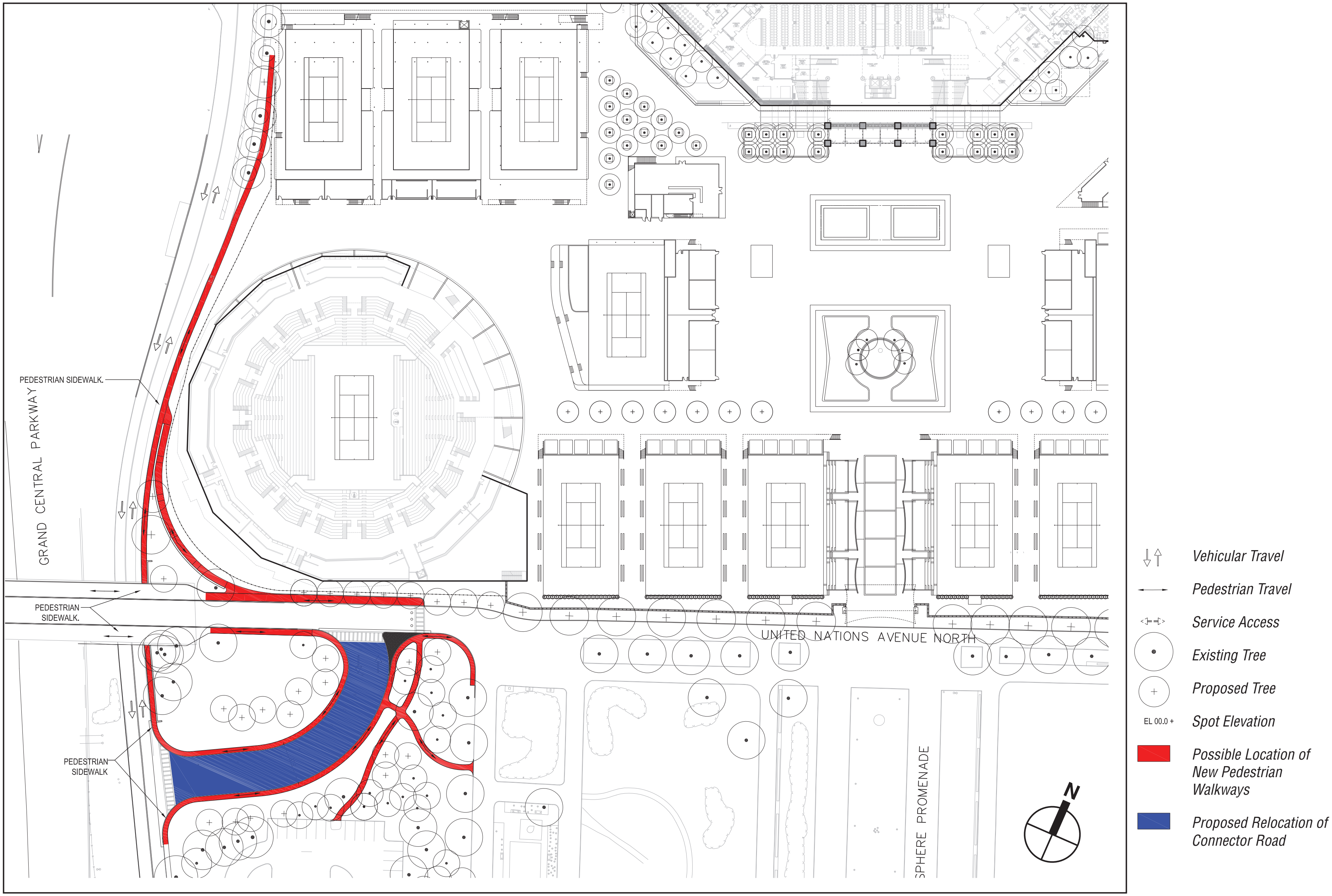
PEDESTRIAN ENHANCEMENTS

ARTHUR ASHE CONCOURSE

The existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium (Stadium 1) would be expanded by approximately 11,000-sf, to improve circulation and amenities. Potential façade improvements could also be implemented.

PROPOSED WALKWAY

As described above, four of the southerly tournament courts would be relocated approximately 50 feet to the south and three of the southerly tournament courts would be relocated approximately 30 feet to the south. On the northern side of the relocated courts, a new walkway



NOTE: FOR ILLUSTRATIVE PURPOSES ONLY

Connector Road Relocation Plan

Figure 1-6

would be constructed, connecting the proposed relocated Grandstand Stadium (Stadium 3) with the NTC entrance at the South Gate, the South Plaza, and Court 17 on the southeast corner of the site. The proposed walkway would improve circulation within the site and include new plantings that would enhance the pedestrian experience. The area to be added to the NTC lease is described below.

AREAS TO BE ADDED TO NTC SITE

As noted above, the proposed project would require 0.94 acres of land to be added to the NTC site, including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease. The approximately 0.3-acre area that would be affected by the relocated connector road would not be added to the NTC.

The 0.26-acre portion of previously alienated land consists of the existing connector roadway between Meridian Road and United Nations Avenue North. The roadway is mapped park land that was alienated for the 1993 expansion, and contains sidewalks but no other park features.

The 0.68-acre area that would be alienated is located north of United Nations Avenue North, and south of the existing NTC fence line, as shown in **Figure 1-3**. This area is currently a mix of landscaped and paved areas, including one lane of the three-lane United Nations Avenue North. The lane that would be eliminated is lightly used for walking, running, or bicycling, as well as by DPR vehicles and to service the NTC during the US Open. The landscaped portion includes a triangular median area near the connector road, a median adjacent to the northernmost lane of United Nations Avenue North, and a narrow strip of lawn adjacent to the current NTC fence line. The landscaping includes trees in some areas, but no other notable park features, such as play equipment, benches, or statues. The impacts of alienating this area and adding it to the NTC site are analyzed in Chapter 3, “Open Space and Recreational Resources,” including an estimate of the number of park users that would be affected.

TREE LOSS AND REPLACEMENT

Construction of the proposed project would require removal of trees both outside the existing fence line, including United Nations Avenue North and the proposed location of the connector road south of United Nations Avenue North, and inside the NTC site, including in the vicinity of the practice courts, parking lot A, northwest corner of Arthur Ashe Stadium, west side of parking lot B, west side of the Grandstand Stadium, proposed Grandstand Stadium relocation site, and a small number in the Food Village. Tree replanting and replacement would comply with DPR’s applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations.

PARK IMPROVEMENT PROJECTS

In addition to the improvement of the NTC, which would require the alienation of 0.68 acres of park land, certain additional improvements would be undertaken for the benefit of the general public within Flushing Meadows Corona Park.

A range of possible park improvement projects was developed by DPR as part of project planning. Some examples of possible projects include: conversion of two soccer fields from natural to synthetic turf; reconstruction of one existing synthetic turf soccer field; the development of a new comfort station at Jurassic Playground; vehicular, pedestrian, landscape, and drainage upgrades to an area in the northeast corner of Meadow Lake Drive; and the development of new picnic and barbecue areas and improvements to pathways around Meadow Lake. The approximate locations of these possible park improvements are indicated on **Figure 1-7**.

The City would not seek replacement park land for the area to be included in the lease because: the land would remain mapped park land (the alienation legislation would authorize the inclusion of park land within the lease); the leased area would remain publicly accessible in the same way the rest of the NTC is publicly accessible; and improvements and upgrades to existing sport fields and infrastructure within Flushing Meadows Corona Park would result in a more meaningful degree of public benefit than an in-kind replacement.

The final selection of park improvement projects would be determined by DPR.

In addition to the capital projects referred to above, and independent of the NTC Strategic Vision, DPR is contemplating other capital projects within Flushing Meadows Corona Park, including various field improvements, undertaking a study to determine the condition of the Porpoise Bridge over the Flushing River (including repair of the bridge's tide gates, in order to improve drainage flow that affects existing park facilities), and exploring a possible Major League Soccer (MLS) stadium.

ADDITIONAL STRATEGIC VISION ELEMENTS

In addition to the physical improvements, the proposed project would allow for an increase in spectator attendance at daytime sessions of the US Open. Specifically, the attendance cap set forth in the NTC lease would increase from 35,000 spectators to 45,000 on days when Citi Field is in use, and would increase from 40,000 spectators to 50,000 on days when Citi Field is not in use. There would be no change in attendance for the evening session.

The proposed project would also include various lighting, infrastructure and utility improvements, as well as improvements to landscaping, paving and drainage within the NTC site, with sustainability features.

PROJECT CONSTRUCTION TIMELINE

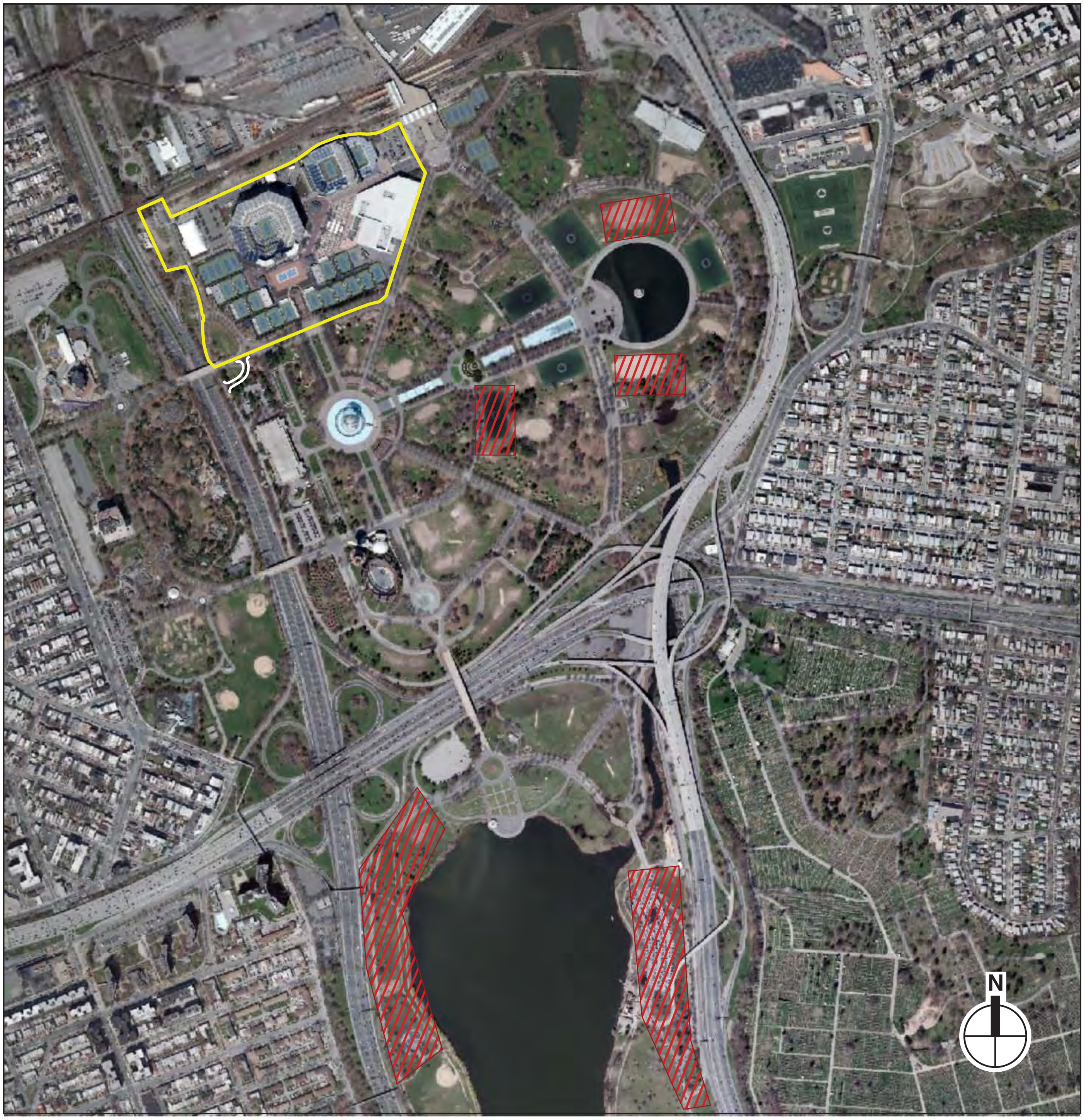
Components of the proposed project would be constructed beginning towards the end of 2013, with overall completion by approximately 2019. By 2014, the relocation of the connector road, construction of Parking Garage A, and replacement of the northwest tournament courts would be expected to be complete, with the anticipated completion of Stadium 3 and the southerly tournament courts following in 2015. By 2016, the canopy over Arthur Ashe Stadium (Stadium 1), construction of the administrative and retail building, and construction of Parking Garage B, would be expected to be complete. The park improvement projects would also be expected to be built by 2016. Stadium 2 would be expected to be complete by 2017, and the addition to Arthur Ashe Stadium is anticipated to be complete by 2019.

D. PROPOSED ACTIONS

UNIFORM LAND USE REVIEW PROCEDURE

Development of the proposed project would require disposition of 0.68 acres of City property to USTA by long-term lease for the relocation of the fence and playing courts and a small portion

12.26.12



Project Site Boundary

Approximate Area of Potential Park Improvement Projects

0 400 1000 FEET

SCALE

Park Improvement Projects

Figure 1-7

of the Grandstand Stadium along the site's southern boundary; this lease is subject to approvals pursuant to the Uniform Land Use Review Procedure (ULURP).

LEGISLATION

The disposition by long-term lease of the 0.68-acre southern boundary area would require a home rule request from the City Council to the State Legislature, and New York State legislation to authorize the alienation of that site. Following that disposition, this area would remain mapped park land. As described above, it is expected that improvements in other portions of Flushing Meadows Corona Park would be provided in connection with the alienation of 0.68 acres of park land.

OTHER APPROVALS

Development of the proposed project would also require the following discretionary approvals:

- Amendment of existing lease between DPR and USTA;
- DPR approval under the existing lease for alterations to the site;
- DPR approval for roadway alterations and improvements in Flushing Meadows Corona Park; and
- Coastal Zone consistency determination by DPR and the New York City Planning Commission (CPC).

The proposed project would require design approvals from the New York City Public Design Commission, and a determination by NPS as to whether any approval is required in connection with LWCF Act program requirements due to previously funded improvements to Flushing Meadows Corona Park.

E. ON-GOING CAPITAL PROJECTS AT NTC

As part of USTA's on-going management of capital projects at the NTC, a range of improvements are typically made to the NTC between US Open periods. These projects are not part of the NTC Strategic Vision and would proceed regardless of the status of the NTC Strategic Vision. Therefore, within the framework of the EIS, these projects will be considered part of the background condition in which the NTC Strategic Vision project would be built. The program of ongoing projects includes repairs, upgrades, and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease boundaries. Some of the current projects that are anticipated in this category include: site-wide upgrades to video technology; replacement of canopies at primary entryways and departure points; relocation of ticket office, with associated improvements to queuing; renovation of a retail building; upgrades to food service and retail service locations; and relocation and upgrade of a substation, cooling tower and chiller plant within the leased area north of Meridian Road.

F. ENVIRONMENTAL REVIEW

Various approvals associated with development of the proposed project would require environmental review under CEQR. DPR is the CEQR lead agency and the ULURP applicant, and the City Planning Commission and City Council are involved agencies in the CEQR process.

UNIFORM LAND USE REVIEW PROCEDURE (ULURP)

Development of the proposed project would require disposition of 0.68 acres of City property to USTA by long-term lease for the relocation of the fence and playing courts and a small portion of the Grandstand Stadium along the site's southern boundary; this lease is subject to approvals pursuant to ULURP.

The City's ULURP, mandated by Sections 197-c and 197-d of the City Charter, is a process specifically designed to allow public review of the proposed actions at four levels: Community Board, Borough President, CPC, and City Council. The procedure sets time limits for review at each stage to ensure a maximum total review period of approximately seven months. The process begins with certification by CPC that the ULURP application is complete.

The application is then referred to Queens Community Boards 3, 4, 6, 7, and 8, which have up to 60 days to review and discuss the proposal, hold a public hearing, and adopt a resolution regarding the proposed project. Once this is complete, the Queens Borough President has up to 30 days to review the project. CPC then has up to 60 days for review of the application, during which time a public hearing is held. Following the hearing, CPC may approve or disapprove the application. The required public hearing for the DEIS (see below) may be held jointly with the CPC ULURP hearing. Comments made at the DEIS public hearing are incorporated into a Final Environmental Impact Statement (FEIS); the FEIS must be completed at least 10 days before the CPC action.

CPC forwards the application to the City Council, which has 50 days in which to consider the proposed project. Following the Council's vote, the Mayor may approve or veto the proposed actions. The City Council may override the mayoral veto. Once ULURP is complete, DPR may take action on the proposed project.

CITY ENVIRONMENTAL QUALITY REVIEW

Responding to the State Environmental Quality Review Act (SEQRA) and its implementing regulations, New York City has established rules for its environmental review process, CEQR. The environmental review provides a means for decision-makers to systematically consider environmental effects along with other aspects of project planning and design, to evaluate reasonable alternatives, and to identify and, when practicable, mitigate significant adverse environmental effects. Most recently revised in 2012, CEQR rules guide environmental review through the following steps:

- **Establishing a Lead Agency**. Under CEQR, the "lead agency" is the public entity responsible for conducting the environmental review. Usually, the lead agency is also the entity primarily responsible for carrying out, funding, or approving the proposed project. DPR is the CEQR lead agency for the proposed project, and CPC and City Council must also make discretionary decisions under this CEQR process.
- **Determination of Significance**. The lead agency's first charge is to determine whether the proposed project might have a significant impact on the environment. To do so, DPR prepared an Environmental Assessment Statement (EAS). Based on the information contained in the EAS, DPR determined that the project might result in significant adverse environment impacts and issued a *Positive Declaration* on June 20, 2012.
- **Scoping**. Along with its issuance of a Positive Declaration, DPR issued a draft Scope of Work for the EIS on June 20, 2012. This draft scope was widely distributed to concerned

citizens, public agencies, and other interested groups. “Scoping,” or creating the scope of work, is the process of focusing the environmental impact analyses on the key issues that are to be studied. A public scoping meeting was held for the proposed project on July 23, 2012, and additional comments were accepted until August 3, 2012. Modifications to the draft Scope of Work for the proposed project’s DEIS were made as a result of public and interested agency input during the scoping process. A Final Public Scoping Document for the project (dated December 27, 2012), which reflected comments made on the draft scope and responses to those comments, was prepared and issued.

- **Draft Environmental Impact Statement**. In accordance with the Final Public Scoping Document, A DEIS was prepared. After reviewing the DEIS and determining that the document has fully disclosed the project program, its potential environmental impacts, and recommended mitigation, the DPR issued a Notice of Completion January 3, 2013. Having been certified as complete, the DEIS has been circulated for public review.
- **Public Review**. Publication of the DEIS and issuance of the Notice of Completion signal the start of the public review period. During this time, which extends for a minimum of 30 days, the public has the opportunity to review and comment on the DEIS either in writing or at a public hearing convened for the purpose of receiving such comments. Where the CEQR process is coordinated with another City process that requires a public hearing, such as ULURP, the hearings may be held jointly. In any event, the lead agency must publish a notice of the hearing at least 14 days before it takes place and must accept written comments for at least 10 days following the close of the hearing. All substantive comments received at the hearing or during the comment period become part of the CEQR record and are summarized and responded to in the FEIS.
- **Final Environmental Impact Statement**. After the close of the public comment period for the DEIS, DPR will prepare an FEIS. This document will include a summary restatement of each substantive comment made about the DEIS and a response to each comment. Once DPR has determined that the FEIS is complete, it will issue a Notice of Completion and circulate the FEIS.
- **Findings**. To demonstrate that the responsible public decision-makers have taken a hard look at the environmental consequences of a proposed project, any agency taking a discretionary action regarding a project must adopt a formal set of written findings. These findings would reflect their conclusions about the significant adverse environmental impacts of the proposed project, potential alternatives, potential mitigation measures and, as appropriate, the balancing of social and economic considerations with the impacts. The findings may not be adopted until 10 days after the Notice of Completion has been issued for the FEIS. Once findings are adopted, the lead and involved agencies may take their actions (or take “no action”).

G. FRAMEWORK FOR ANALYSIS

SCOPE OF ENVIRONMENTAL ANALYSIS

As set forth in the Positive Declaration, the lead agency has determined that the proposed project may result in one or more significant adverse environmental impacts and thus requires preparation of an EIS. The EIS has been prepared in accordance with the guidelines set forth in the 2012 *CEQR Technical Manual*, which sets forth methodologies and guidelines for environmental impact assessment consistent with SEQRA.

For all technical analysis in the EIS, the assessment includes a description of existing conditions, an assessment of conditions in the future without the proposed project for the year that the proposed project would be completed, and an assessment of conditions for the same year with the completion of the action in the future with the proposed project. Identification and evaluation of impacts of the proposed project are based on the change from the future without the proposed project (No-Action condition) to the future with the proposed project (With Action condition).

ANALYSIS YEAR

An EIS analyzes the effects of a proposed action on its environmental setting. Since a proposed action, if approved, would take place in the future, the action's environmental setting is not the current environment but the environment as it would exist at project completion, in the future. Therefore, future conditions must be projected. This prediction is made for a particular year, generally known as the "analysis year" or the "Build year," which is the year when the action would be substantially operational.

As previously described, 2019 is the year that the proposed project is expected to be completed, including park improvement projects.

DEFINITION OF STUDY AREAS

For each technical area in which impacts may occur, a study area is defined for analysis. This is the geographic area likely to be affected by the proposed project for a given technical area, or the area in which impacts of that type could occur. Appropriate study areas differ depending on the type of impact being analyzed. It is anticipated that the direct principal effects of the proposed project would occur within the project study areas. The methods and study areas for addressing impacts are discussed in the individual technical analysis sections.

DEFINING BASELINE CONDITIONS

EXISTING CONDITIONS

For each technical area being assessed in the EIS, the current conditions must first be described. The assessment of existing conditions establishes a baseline, not against which the project is measured, but from which future conditions can be projected. The prediction of future conditions begins with an assessment of existing conditions because these can be measured and observed. Studies of existing conditions are generally selected for the reasonable worst-case conditions. In the case of the proposed project, while considering year-round operations, where appropriate the analyses will focus on US Open event conditions, when activity at the NTC is greatest.

DEFINITION OF FUTURE WITHOUT THE PROPOSED PROJECT

The "future without the proposed project," or "No-Action condition," describes a baseline condition, which is evaluated and compared to the incremental changes due to the proposed project. The No-Action condition is assessed for the same 2019 analysis year as the proposed project.

The No-Action condition uses existing conditions as a baseline and adds to it changes known or expected to be in place by 2019. For many technical areas, the No-Action condition incorporates known development projects that are likely to be built by the analysis years. This includes development currently under construction or which can be reasonably anticipated due to the current level of planning and public approvals. These would include certain projects that will be built on the NTC site independent of the proposed project, as part of the NTC's management of ongoing capital projects, as described above, and nearby substantial projects in Flushing Meadows Corona Park and the surrounding neighborhood. The No-Action analyses for some technical areas, such as traffic, use a background growth factor to account for a general increase expected in the future. Such growth factors may also be used in the absence of known development projects. The No-Action analyses must also consider other future changes that will affect the environmental setting. These could include technology changes, such as advances in vehicle pollution control and roadway improvements, changes to applicable City policies, or changes in public policy related to operation of the existing facilities.

IDENTIFYING SIGNIFICANT ADVERSE ENVIRONMENTAL IMPACTS

Identification of significant adverse environmental impacts is based on the comparison of future conditions without and with the proposed project. In certain technical areas (e.g., traffic, air quality, and noise) this comparison can be quantified and the severity of impact rated in accordance with the *CEQR Technical Manual*. In other technical areas, (e.g., neighborhood character) the analysis is more qualitative. The methodology for each technical analysis is presented at the start of each technical chapter.

MITIGATION

CEQR requires that any significant adverse impacts identified in the EIS be minimized or avoided to the fullest extent practicable, given costs and other factors. In the DEIS, options for mitigation can be presented for public review and discussion, without the lead agency having selected one for implementation. Where no mitigation is available, the EIS must disclose the potential for unmitigatible significant adverse impacts.

With the exception of transportation, the technical analysis determined that there would not be significant adverse environmental impacts associated with the proposed project.

The transportation analysis determined the projected trip increments would result in significant adverse traffic impacts including increased levels of congestion and delays. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would effectively manage the increased level of traffic. Therefore, due to the infrequency and duration of the event, and the ability of the traffic management program and TEAs to adequately manage traffic flow and safety of all street users during the US Open, no mitigation measures beyond the continuous traffic management provided by the TEAs would be necessary.

Overall, none of the analyses performed for this DEIS identified the need for mitigation measures. ✷

Chapter 2: Land Use, Zoning, and Public Policy

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a land use analysis evaluates the uses and development trends in the area that may be affected by a proposed action, and determines whether that proposed action is compatible with those conditions or may affect them. The analysis also considers the action's compliance with, and effect on, the area's zoning and other applicable public policies.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This chapter considers the proposed project's potential impacts on land use, zoning, and public land use policies. This chapter provides an assessment of existing and future conditions with and without the proposed project for the project site and a study area surrounding the site, which are described in detail below.

PRINCIPAL CONCLUSIONS

As described in detail in this chapter, no significant adverse impacts on land use, zoning, or public policy are anticipated in the With-Action condition on the project site or within the study area.

The proposed project would result in modest changes in the land uses located on the project site. The locations of the various uses would be reconfigured and there would be a net increase in stadium space, retail and operational uses, and parking facilities. While the proposed project would result in an overall increase in the bulk of development on the site, these incremental increases in height and bulk would be modest relative to the overall facility. In addition, visual improvements along the proposed NTC fence line would minimize the prominence of the new structures. To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26 acres of previously alienated park land (a connector roadway) that is outside the current lease. The change in use and alienation of this park land would not be considered a significant adverse land use impact, due to the replacement roadway that would be provided, the minimal number of users that would be affected, the relatively small area affected, and the park improvements that would be implemented. The replacement connector road and pedestrian walkways would not adversely affect access to the park.

The proposed project would provide new, modern recreational facilities that would be open to the public for 11 months of the year. As the types of uses would be the same as currently exist in the project site and in the study area, they would continue to be compatible with surrounding open space, transportation, and residential uses. The additional 10,000 daily spectators anticipated during the US Open as a result of the proposed project would not have any significant adverse impacts on Flushing Meadows Corona Park given their concentration within the NTC and the temporary nature of the two-week event. While the proposed project would result in the alienation of small areas of park land, visual improvements would be implemented along the proposed NTC fence line that would improve the NTC's context with the park, and improvements would be provided elsewhere in Flushing Meadows Corona Park. Therefore, the proposed project would not result in any significant adverse impacts within the study area.

B. METHODOLOGY

According to the *CEQR Technical Manual*, a preliminary land use assessment, which includes a basic description of existing and future land uses and public policy, should be provided for all projects that would affect land use or public policy on a site, regardless of the project's anticipated effects. If the preliminary assessment cannot succinctly describe land use conditions in the study area, or if a detailed assessment is required in the technical analyses of socioeconomic conditions, neighborhood character, traffic and transportation, air quality, noise, infrastructure, or hazardous materials, a detailed land use assessment is appropriate. A detailed assessment involves a more thorough analysis of existing land uses within the project site boundaries and the broader study area in light of changes proposed with the project. The proposed project would alter the project site, change land uses in a small portion of Flushing Meadows Corona Park, and would require discretionary actions related to the disposition of City property and the lease between USTA[1] and the New York City Department of Parks and Recreation (DPR). The proposed project also requires detailed assessments of numerous technical areas, such as traffic and transportation. Therefore, a detailed land use analysis has been prepared that describes existing and anticipated future conditions for the 2019 analysis year, assesses the nature of any changes on these conditions that would be created by the proposed project, and identifies those changes, if any, that could be significant or adverse.

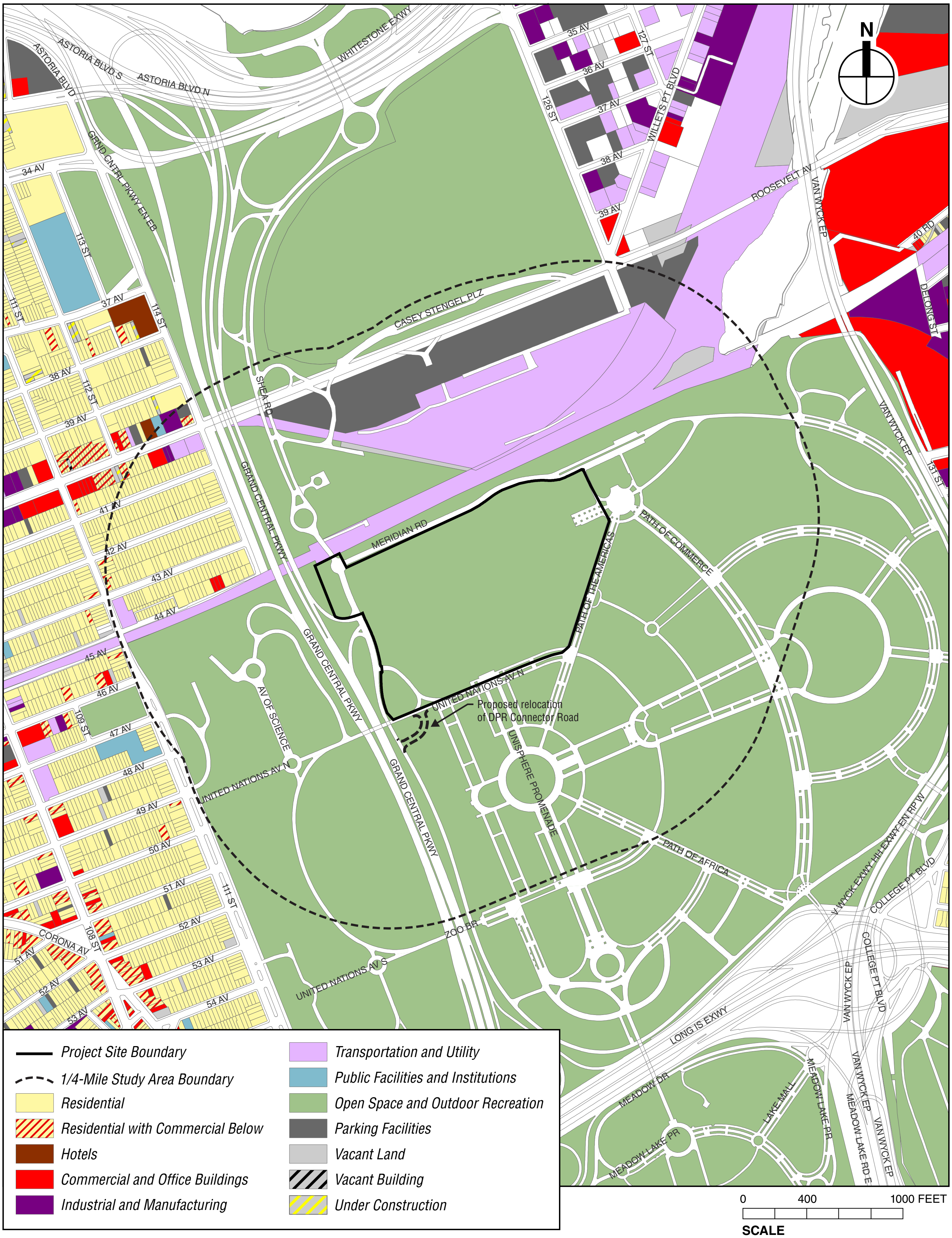
The study area for this analysis of land use, zoning, and public policy encompasses the area within a ¼-mile of the project site, because this is the area in which the proposed project could reasonably be expected to generate significant adverse impacts. The ¼-mile study area roughly extends from: just north of Roosevelt Avenue to the north; just south of the Unisphere to the south; Industry Pond and the Flushing River to the east; and 111th Street to the west (see **Figure 2-1**). Sources for this analysis include DPR, USTA, the New York City Department of City Planning (DCP), and the Metropolitan Transportation Authority (MTA).

C. DEVELOPMENT HISTORY

STUDY AREA

Flushing Meadows Corona Park was built under the direction of Robert Moses as the grounds of the New York World's Fairs in 1939-1940 and 1964-1965. The park, which is located on the former site of an ash dump, is bounded by several major thoroughfares: the Whitestone Expressway to the north; the Van Wyck Expressway to the east; and the Grand Central Parkway to the west. Many of the structures in Flushing Meadows Corona Park are remnants of the two World's Fairs. The World's Fair Ice Rink and the Queens Museum of Art were built for the 1939-1940 fair; the Unisphere, the Fountain of the Planets, the New York Hall of Science, the Wildlife Center, the New York State Pavilion, and Terrace on the Park (which was originally built as the Port Authority Heliport), were built for the1964-1965 fair. Shea Stadium, which has

[1] USTA National Tennis Center Incorporated, an affiliate of the United States Tennis Association Incorporated, operates the USTA Billie Jean King National Tennis Center (NTC).



Land Use
Figure 2-1

since been demolished and replaced by Citi Field, was also built in 1964, but was not part of the main fairgrounds. In between the two World's Fairs, the park was underutilized and largely closed to the public. In 1967, the fairgrounds officially became a public City park under the jurisdiction of DPR.

A comprehensive multi-year capital improvement program began in 1987 to upgrade the park's infrastructure. To date, the Queens Wildlife Center, the Queens Museum of Art, Theatre in the Park, three dinosaur-themed playgrounds, and four new highway entrances have been reconstructed. Independently of this capital program, Shea Stadium was demolished in 2009 and replaced by Citi Field.

Portions of the park (but not the NTC) have been improved with funds from the Federal Land and Water Conservation Fund (LWCF) Act, and much of the park, including the NTC, is subject to LWCF requirements. The health, welfare and recreational public purposes of the NTC have been recognized by the New York State Legislature and the New York City Council in the State legislation and City Administrative Code provisions that govern the NTC lease, as well as by the U.S. Department of the Interior, National Park Service (NPS), which determined in 1993 that the expansion and renovation of the NTC is consistent with the LWCF grant-in-aid manual requirements governing Flushing Meadows Corona Park.

PROJECT SITE

The US Open, which dates back to 1881, moved from the West Side Tennis Club in Forest Hills to its current site in Flushing Meadows Corona Park in 1978, making its facilities available to the public year-round. In 1993, the NTC site expanded from 21.6 acres to approximately 42.2 acres to allow for the construction of a new 23,500-seat stadium (Arthur Ashe Stadium), completed in 1997. The 1993 expansion required alienation of park land following review by the City through its Uniform Land Use Review Procedure (ULURP). The facility was renamed the USTA Billie Jean King National Tennis Center in 2006. Today, the NTC is one of the largest public tennis facilities in the world.

D. EXISTING CONDITIONS

Existing land use conditions, patterns, and trends are described below for the project site and the study area. This is followed by a discussion of zoning and public policy for these areas.

LAND USE

PROJECT SITE

As shown on **Figure 2-1**, the project site includes the 37.48-acre portion of the 42-acre NTC site bounded to the north and west by Meridian Road, to the east by the Passarelle Building, and to the south by United Nations Avenue North.[1] Meridian Road provides vehicular access to the NTC site, but is not included in the NTC lease. Areas of the NTC that are not encompassed by the project site include: 11 tennis courts located to the east of the Passarelle Building; the area

[1] The full NTC is 42.2 acres. The 37.48-acre project site includes: the 35.3-acre portion of the NTC site bounded by Meridian Road, United Nations Avenue North, and Path of the Americas; 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94-acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3 acre relocated connector road area, which would remain under City ownership and control.

north of Meridian Road and south of the railway tracks of Long Island Rail Road (LIRR)'s Port Washington line; and the area west of Meridian Road and east of Grand Central Parkway.

NTC Facilities

Tennis facilities on the project site include three stadiums (Arthur Ashe Stadium, Louis Armstrong Stadium, and Grandstand Stadium), a micro-stadium with 3,000 seats (Court 17), and tennis courts. Arthur Ashe Stadium (Stadium 1), containing approximately 23,500 seats, is the largest facility on the project site. The stadium was completed in 1997 and is the primary venue for the US Open. Louis Armstrong Stadium (Stadium 2) is a 10,500 seat facility that was built for the 1964-1965 World's Fair Singer Bowl and was the primary venue for the US Open prior to the construction of Arthur Ashe Stadium. Grandstand Stadium (Stadium 3), the smallest of the three stadiums on the site, contains 6,000 seats. It was also built for the 1964-1965 World's Fair Singer Bowl.

The project site also includes ancillary buildings, including: the Indoor Training Center, a 245,000-gross square foot (gsf) multi-purpose tennis pavilion, which includes indoor courts; restroom facilities; kiosks for retail, food and beverage, and informational uses during the US Open; and temporary trailers for broadcast use during the US Open. First aid, box office, and other operational support uses are primarily housed in administrative space that is contained in the three stadium structures, as well as some temporary trailers during the US Open.

The site also includes landscaped areas and pedestrian plazas, including South Plaza and the Food Village. South Plaza serves as the focal point of the site during the US Open and contains two fountains, seating, and retail/informational kiosks. East of South Plaza is the Food Village, which contains tables and seating, and kiosks for food sales during the US Open. Trees, landscaping, and seating are found throughout the site.

Non-US Open Operations

For 11 months of the year, these facilities are open to the public for indoor and outdoor tennis. The USTA promotes and develops tennis in the community through a wide range of programs. More than 100,000 participants of all ages, the majority of whom are from the local Queens community, participate in hundreds of community tennis programs at the NTC each year. The NTC is home court for more than 70 New York City high schools and colleges and a number of diverse organizations seeking a place to play tennis or host tournaments. USTA offers court rentals to the public at rates calculated under USTA's lease with the City.

Other tournaments held at the NTC include: the Men's and Women's College Tennis Invitational; the Jana Hunsaker Memorial Eastern Wheelchair Championship; the Men's and Women's National Open Indoor Championship; and numerous tournaments for juniors, adults and seniors, as well as New York Junior Tennis League and New York City Parks Foundation programs.

The NTC also conducts community tennis programs, including: QuickStart Tennis for children 10 and under; Jr. Team Tennis for youth match play; League Tennis for competitive, level-of-play competition; and an official Cardio Tennis site for on-court fitness. The USTA undertakes player development initiatives at the NTC, including the Invitational Competition Training Center for ranked players, player development programs for top-ranking juniors residing in the Northeast, and a year-round USTA Tournament Training Program for ranked juniors. In addition, the NTC hosts events for coaches training and education, including professional certification training courses, and professional developmental workshops.

US Open

The US Open tennis tournament—the USTA's flagship event—is hosted at the NTC during a two-week period around the beginning of September. One of the sport's four Grand Slam championship tennis tournaments, the US Open is attended by approximately 700,000 spectators and is broadcast worldwide. During the US Open, temporary retail, first aid, and other operational uses are introduced to the site. The Indoor Training Center is used as a hospitality center during the US Open, and includes a store, tennis museum, merchandise warehouse, and other activities for visitors**.**

STUDY AREA

As shown in **Figure 2-1**, the ¼-mile study area surrounding the NTC is dominated by Flushing Meadows Corona Park, and also contains a portion of the predominantly residential neighborhood of North Corona, as well as major transportation and parking uses.

Flushing Meadows Corona Park

Flushing Meadows Corona Park is a recreational and cultural destination for Queens residents and visitors from throughout the New York metropolitan area. The park covers nearly 900 acres and is under the jurisdiction of DPR, as discussed above under "Development History."

Within the park, to the north of the NTC across Roosevelt Avenue and the MTA Corona Rail Yard, is Citi Field, the baseball stadium for the New York Mets, which opened in 2009 and contains 42,000 seats. Until 2009, the Mets played in Shea Stadium, which was located directly west of Citi Field in what is now the parking lot for that stadium; Shea Stadium was demolished upon completion of Citi Field.

East of the NTC, Flushing Meadows Corona Park contains a pitch and putt golf center, and a large area available for passive and active recreation, with trees, pathways, and sitting areas. South of the NTC is the core of the former fairgrounds, which includes a series of classical promenades, planted with mature trees centered on the Unisphere. In the area to the west of the Unisphere is the Queens Museum of Art. The western portion of the study area includes several park facilities including the Queens Zoo, New York Hall of Science, and Terrace in the Park. There are three DPR facilities in close proximity to the NTC, including the Olmsted Center, the Passerelle Building, and the Allied Building. Other facilities within the park that are outside of the ¼-mile study area include an ice rink and natatorium facility, and a recreation center.

In addition to the various cultural institutions, sporting events, and recreational activities in the park, Flushing Meadows Corona Park is host to numerous festivals and gatherings throughout the year, attracting hundreds of thousands of visitors. Many ethnic groups hold daylong events, such as Cinco-de-Mayo and Junta Hispana. Other well-known festivals held in the park include the Hong Kong Dragon Boat Festival.

North Corona

The northwest corner of the study area includes a small section of North Corona, a predominantly residential neighborhood with some supporting commercial and light industrial uses. Residential uses in this area include a variety of low-scale housing types, including detached, semi-detached and attached houses, and small apartment buildings of up to three stories. This portion of the study area also contains several neighborhood retail uses, such as grocery stores and delis, which are primarily located along Roosevelt Avenue. There are also some automotive businesses on Roosevelt Avenue and elsewhere in this portion of the study area, including gas stations, car washes, and vehicle repair shops.

Transportation Uses

The MTA's 7 subway line services the study area by elevated subway above Roosevelt Avenue. The Mets-Willets Point Station serves Citi Field and the NTC, and the LIRR also has a stop in Flushing Meadows Corona Park that services Citi Field on game days and the NTC during the US Open. The LIRR station and Mets-Willets Point Station are both connected to Citi Field to the north, and to Flushing Meadows Corona Park and the NTC to the south, via the Passerelle Building, which includes a pedestrian bridge spanning Roosevelt Avenue and the LIRR yards.

The area north of the NTC contains the MTA Corona Rail Yard. The Corona Rail Yard is used for storage and maintenance of the 7 line subway trains, and is approximately 23 acres in size. The study area also contains a portion of the Grand Central Parkway, a major thoroughfare for Queens that connects the NTC to LaGuardia Airport, located about 1.5 miles to the northwest of the study area.

ZONING

PROJECT SITE

Zoning designations do not apply to City-owned land mapped as park land on the City Map. As the project site is entirely within Flushing Meadows Corona Park, it is therefore not subject to zoning.

STUDY AREA

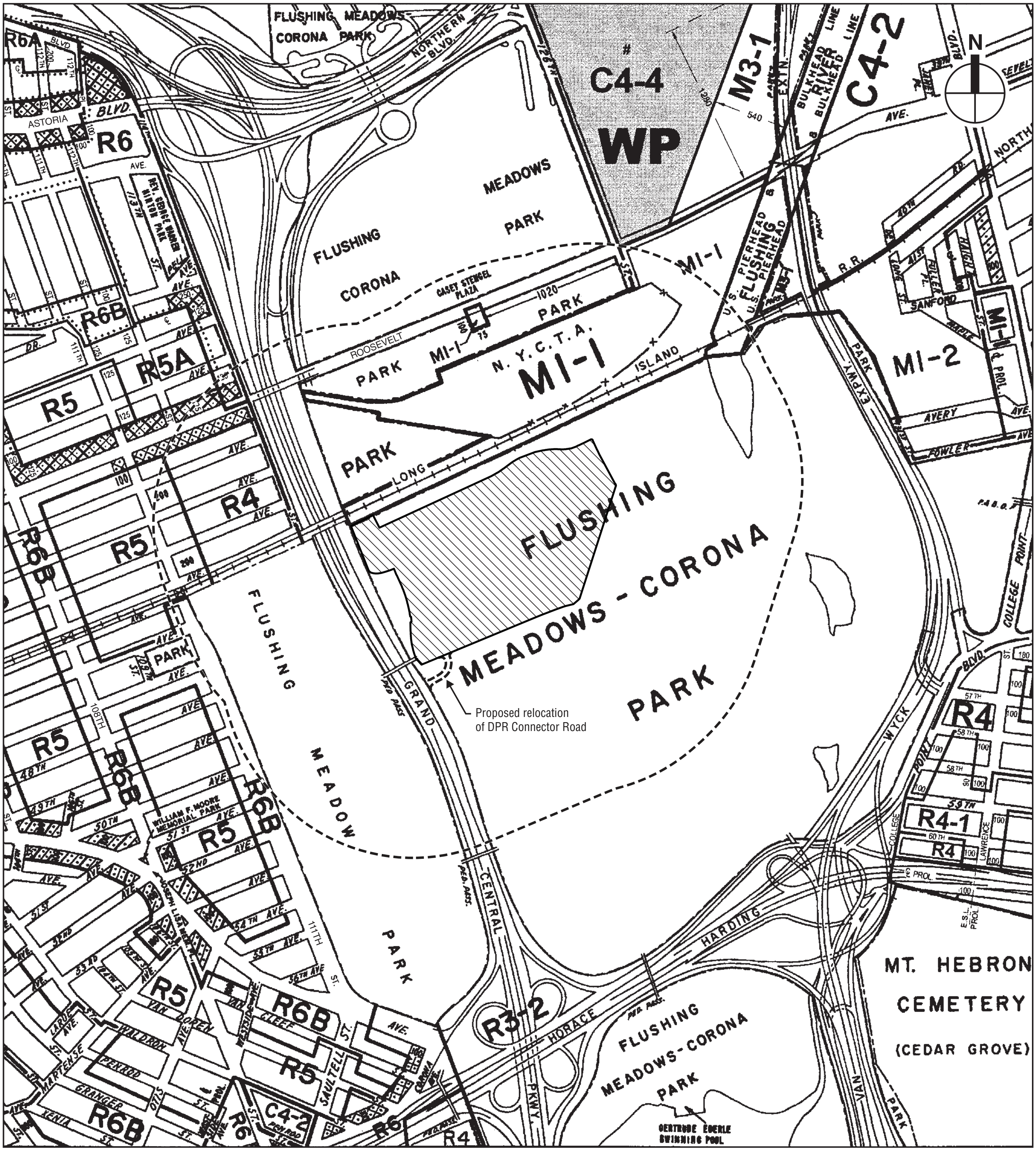
As shown on **Figure 2-2**, outside of Flushing Meadows Corona Park, the study area includes R3-2, R4, R5, R6 and R6B residential zoning districts; C2-2 and C2-4 commercial overlay districts; and M1-1 and M3-1 manufacturing districts. **Table 2-1** lists the zoning districts in the study area.

Table 2-1
Zoning Districts in the Study Area

Zoning District	Maximum FAR[1]	Uses/Zone Type
R4	0.75 residential (0.9 with attic bonus) 2.00 community facility[3]	General residence district, low-density housing.
R5	1.25 residential 2.00 community facility[3]	General residence district, transition between lower- and higher-density housing.
R6	2.43 residential[4] 4.80 community facility	General residence district, medium-density housing.
R6B	2.00 residential 2.00 community facility	Contextual row house district, medium-density housing.
C2-2 overlay	1 (in R1 to R5), 2 (in R6 to R10) commercial, follows bulk residential and community facility regulations of mapped residential district.	Local shopping and services.
C2-4 overlay	1 (in R1 to R5), 2 (in R6 to R10) commercial, follows bulk residential and community facility regulations of mapped residential district.	Local shopping and services.
M1-1	1.0 commercial or manufacturing 2.4 community facility[5]	Light manufacturing and most commercial uses, strict manufacturing performance standards; residential uses not permitted.

Notes:
1. FAR is a measure of density establishing the amount of development allowed in proportion to the base lot area. For example, a lot of 10,000 sf with an FAR of 1 has an allowable building area of 10,000 sf. The same lot with an FAR of 10 has an allowable building area of 100,000 sf.
2. Up to 1.60 for deep front yard/wide side yards.
3. Up to 2.40 for deep front yard/wide side yards.
4. May be higher under Quality Housing Program.
5. Only community facilities in Use Group 4 permitted.

Source: *New York City Zoning Resolution*.



Project Site Boundary

1/4-Mile Study Area Boundary

Zoning District Boundary

C2-2 Overlay

C2-3 Overlay

C2-4 Overlay

Willets Point Special-Purpose District

0 400 1000 FEET
SCALE

Zoning
Figure 2-2

R4 districts allow a variety of housing types, including attached, detached, and semi-detached houses, as well as small apartment buildings. The maximum floor area ratio (FAR) is 0.75, which can be increased to 0.9 with an attic bonus. In the study area, there is an R4 zone located in the northwest corner of the study area, south of Roosevelt Avenue and east of 111th Street.

R5 districts allow a variety of housing at a higher density than permitted in R3-2 or R4 districts. The maximum FAR is 1.25, which typically produces three-story and four-story attached houses and small apartment buildings. These districts often provide a transition from between lower-density and high-density neighborhoods. In the study area, block faces in North Corona along the west side of 111th Street are in an R5 district.

R6 districts are found in built-up, medium-density areas, and the character of these districts can vary based on the bulk regulations that are followed. Residential development in R6 districts using height factor regulations result in tall buildings set back from the street and surrounded by open space and on-site parking. Under height factor regulations, R6 districts permit an FAR range from 0.78 to 2.43, depending on the amount of open space provided. In the study area, lots on the northwest corner of Roosevelt Avenue and 114th Street are in an R6 district.

R6-B districts are traditional rowhouse districts that are mapped to preserve the scale and historical streetscape of neighborhoods that contain four-story attached buildings developed during the 19th century. The maximum FAR is 2.0. In the study area, lots on the southwest corner of Roosevelt Avenue and 114th Street are in an R6-B district.

While the North Corona section of the study area is primarily residential in character, there is also a limited amount of commercial zoning. C2-2 and C2-4 zones are commercial overlay designations that are mapped within residential districts. They are mapped along streets that serve local retail needs, and are characterized by uses such as grocery stores, convenience stores, restaurants, laundromats, beauty parlors, funeral homes and repair services. The maximum FAR for commercial use in these zones is 1.0 in R1 through R5 districts, and 2.0 in R6 through R10 districts. The maximum residential FAR is governed by the underlying residence zoning district. Within the study area, overlay zones are mapped along Roosevelt Avenue west of 114th Street: a C2-2 overlay zone on the south side of the street, and a C2-4 zone along the north side of the street.

A portion of the study area north of the project site is mapped with manufacturing zoning districts. M1-1 manufacturing districts typically include light industrial uses that are subject to strict performance standards. These districts often serve as buffers between heavier manufacturing districts and adjacent commercial or residential districts. Uses commonly found in M1-1 districts include woodworking shops, repair shops, and wholesale service and storage facilities. In the study area, there is an M1-1 district directly north of the project site, encompassing the MTA’s Corona Rail Yard.

PUBLIC POLICY

FLUSHING MEADOWS CORONA PARK STRATEGIC FRAMEWORK PLAN

The Flushing Meadows Corona Park Strategic Framework Plan, prepared in 2007, proposes a series of changes and updates to the park with the goal of increasing its functionality and sustainability.

The plan is organized around the concept of remaking Flushing Meadows Corona Park into “the park of the future,” reclaiming the forward-looking heritage of the 1939-1940 and 1964-1965 World’s Fairs for which the park was built. The plan includes three broad goals:

- Re-envision the World's Fair Core, including restoration of landmark structures, daylighting of the Flushing River, and creation of more green space, topography, and a new festival gathering space;
- Reconfigure and restore lakes in the park, to improve their utility as natural and recreational resources, create a more diverse ecology, and add additional parkland; and
- Reconnect the park to the neighborhood and city by creating better access and more logical activity corridors within the park, as well as improving accessibility from surrounding neighborhoods and rationalizing parking for visitors from farther afield. This proposal also includes the establishment of a bike-sharing system with the park.

Further objectives of the plan include reducing runoff, energy use, and impervious coverage in the park; establishing the park as a center for cultural activities; and finding better uses for underutilized structures such as the New York State Pavilion.

WATERFRONT REVITALIZATION PROGRAM

As shown on **Figure 2-3**, the project area and portions of the study area are within the City's designated Coastal Zone. Therefore, an assessment of the consistency of the proposed project with the City's Waterfront Revitalization Program (WRP) is warranted. This assessment is provided below under Section G, "Waterfront Revitalization Program."

E. FUTURE WITHOUT THE PROPOSED PROJECT

LAND USE

PROJECT SITE

As part of USTA's on-going management of capital projects program at the NTC, a range of capital improvements are expected to be made to the NTC between US Open periods. These projects are not part of the NTC Strategic Vision and would proceed regardless of the status of the proposed project. The capital projects program includes repairs, upgrades and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease boundaries.

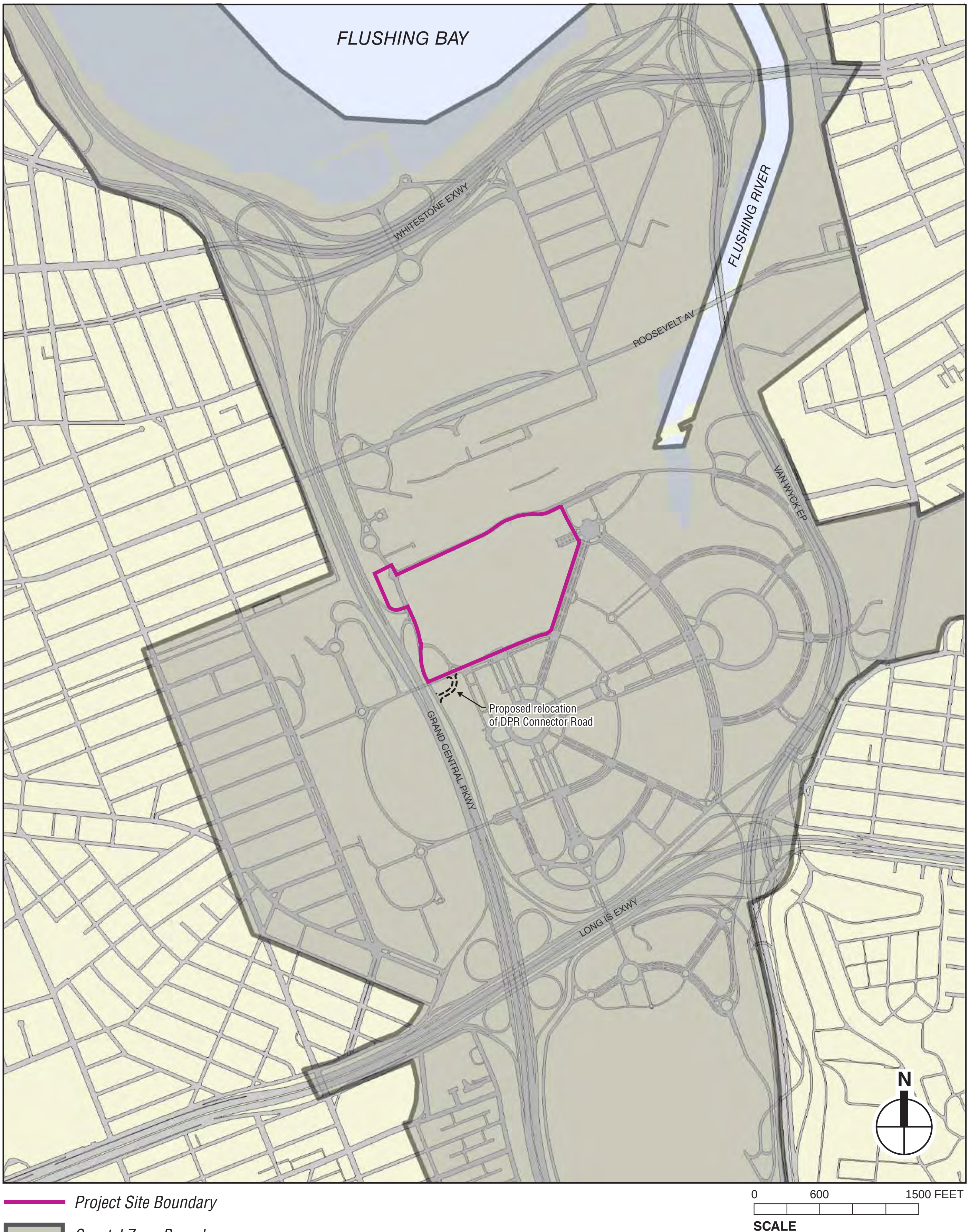
Some of the current projects in this category that are anticipated include: site-wide upgrades to video technology; replacement of canopies at primary entryways and departure points; relocation of ticket office, with associated improvements to queuing; renovation of a retail building; upgrades to food service and retail service locations; relocation and upgrade of a substation, cooling tower and chiller plant within the leased area north of Meridian Road.

STUDY AREA

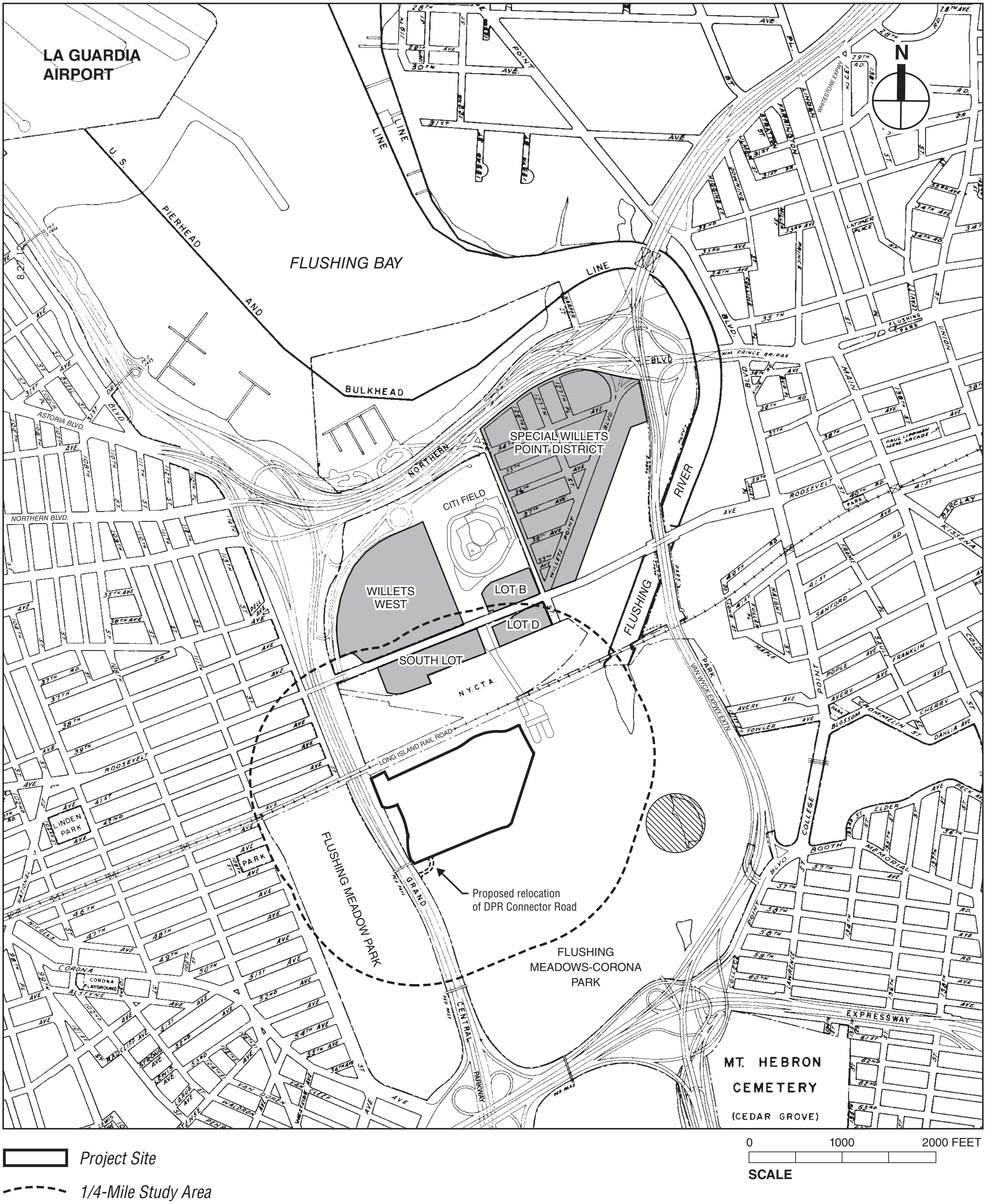
There are two notable No-Action condition development projects that are planned or proposed within or adjacent to the ¼-mile land use study area, as well as a series of capital improvements in Flushing Meadows Corona Park that will be undertaken by DPR.

New Soccer Stadium

The City is currently in discussions with a private entity for a lease covering the construction and operation of a new stadium for professional soccer purposes in an approximately 13-acre area within the northern portion of Flushing Meadows Corona Park south of Roosevelt Avenue and eastward of the NTC (see **Figure 2-4**). As currently contemplated, a 25,000 capacity stadium with the ability to be expanded to 35,000 seats would be constructed on the present site



Coastal Zone
Figure 2-3



0 1000 2000 FEET

SCALE

Project Site

1/4-Mile Study Area

Willets Point Redevelopment

Approximate Location of Proposed Major League Soccer Stadium

Background Development Projects in the No-Action Condition

Figure 2-4

of the Fountain of the Planets and land surrounding the fountain. In addition to the fountain, the stadium would eliminate from public use four existing soccer fields, a basketball court, landscaped areas, and pathways. All affected recreational facilities would be replaced within the northeastern portion of Flushing Meadows Corona Park. Trees affected would be subject to New York City regulations as per Chapter 5 of Title 56 of the Rules of the City of New York, which establishes rules for valuing trees proposed for removal and the appropriate number of replacement trees. Both New York State alienation legislation and LWCF Act considerations will require the provision of replacement park land. Although the project requires City, State, and federal approvals, the project is being considered as part of the No-Action condition for the proposed project, as it is currently under consideration by the City.

DPR Capital Projects

Elsewhere in Flushing Meadows Corona Park, ongoing capital improvement projects are being carried out by DPR to provide for up to date recreational facilities. These include renovation of four soccer fields and creation of volleyball courts. In addition, the City is undertaking a study to determine the condition of the Porpoise Bridge over the Flushing River, including repair of the bridge's tide gates, in order to improve drainage flow that affects existing park facilities.

Willets Point Development

Within and just outside of the ¼-mile study area to the northeast, a major mixed use development proposal for the Willets Point Urban Renewal Area is expected to be under development by 2019. By 2018, Phase 1A of the Willets Point Redevelopment is expected to result in the construction of the following components:

- Within the Special Willets Point District (an area bounded by 126th Street, Flushing Creek, and Northern Boulevard), a 200-room hotel, approximately 30,000-gsf of retail uses, and approximately 2,500 surface parking spaces, to replace those being displaced from the parking field west of Citi Field stadium. These replacement parking spaces are expected to be moved by 2028 to new structured parking facilities on the south side of Roosevelt Avenue, and replaced by a mixed-use development containing commercial office, residential, community facility, public school, hotel, retail, and open space uses. Full build-out of the District is anticipated by 2032;
- A 1.4 million-gsf entertainment and retail center, known as Willets West, on the existing surface parking lot west-adjacent to Citi Field. The Willets West development will include a 2,900-space parking facility, including 400 spaces as replacement parking to be used by the Mets; and
- A parking facility on the westernmost surface parking lot on the south side of Roosevelt Avenue (South Lot), to provide replacement for Mets parking spaces being displaced from the Willets West development area. Collectively, the number of Mets parking spaces on the south side of Roosevelt Avenue (South Lot and Lot D) will increase from 1,795 to 2,888 by 2018. By 2018, the incremental increase in parking related to this project will be 2,580 spaces, comprised of: 2,500 new accessory spaces for the Willets West development; and 80 new accessory spaces for the hotel to be developed within the District.

Additional development is anticipated to occur on Lot B, located in the northwest corner of Roosevelt Avenue and 126th Street, after the 2019 analysis year.

ZONING

There is one zoning change in the study area that is expected to be in effect by 2019. The Willets Point Development will require the issuance of a special permit, pursuant to Zoning Resolution Section 124-60, to allow surface parking/open and enclosed privately-operated recreation uses for Phase 1A within the Special Willets Point District. No other zoning actions are currently contemplated for the Willets Point redevelopment, and the location currently under consideration for the MLS stadium project is within Flushing Meadows Corona Park, which is not subject to zoning.

PUBLIC POLICY

No changes affecting public policy on the project site or in the study area are anticipated in the 2019 No-Action condition.

F. FUTURE WITH THE PROPOSED PROJECT

This section describes the land use, zoning, and public policy conditions that would result from the completion of the proposed project in 2019 (With Action condition). This section evaluates the potential for the proposed project to result in significant adverse land use, zoning, and public policy impacts, compared to the No-Action condition described above, with the incremental changes to land use, zoning, and public policy that would result from the completion of the proposed project.

LAND USE

PROJECT SITE

The proposed project would result in modest changes in the land uses located on the project site. The locations of the various uses would be reconfigured and there would be a net increase in stadium space, retail and operational uses, and parking facilities. As described in Chapter 1, “Project Description,” and summarized in **Table 2-2**, the proposed project would improve the NTC site plan, circulation, visitor amenities, and landscaping, and would include construction of two new stadiums to replace the existing Louis Armstrong Stadium (Stadium 2) in the same location, and Grandstand Stadium (Stadium 3), in a new location at the southwest corner of the NTC site, as well as possible improvements to Arthur Ashe Stadium (Stadium 1). The proposed project would also include modifications to tournament courts and ancillary buildings, the construction of two new parking garages, the relocation of a connector road, and pedestrian enhancements. To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease. Outside of the NTC, the relocated connector road would be built on an approximately 0.3-acre area.

Table 2-2
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
Stadium Improvements and New Construction		
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
Tournament Court Modifications		
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
Ancillary Building Construction		
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium (Stadium 3)
Parking and Transportation Improvements		
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
Pedestrian Enhancements		
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
Source: USTA

While the configuration of uses on the NTC site would change as a result of the proposed project, the types of uses present on the site would be unaltered. The project site would continue to contain facilities related to public recreational use and the US Open, including stadiums, tournament courts, and practice courts, as well as ancillary facilities including administrative and operational offices, retail uses, and parking. These primarily recreational uses are compatible with surrounding uses, including Citi Field and the various recreational amenities contained in Flushing Meadows Corona Park. Therefore, the proposed project would be consistent with and supportive of the existing land use conditions on the project site. The additional 10,000 daily spectators anticipated during the US Open as a result of the proposed project would not have any significant adverse impacts on the Flushing Meadows Corona Park given their concentration within the NTC and the temporary nature of the two-week event.

While 0.94-acres of surrounding park land from Flushing Meadows Corona Park would be added to the NTC site, these areas would remain as park land and would be utilized for recreational uses that are considered compatible with surrounding park uses. The 0.26-acre area of previously-alienated park land that would be added to the lease is currently occupied by a paved connector roadway, which would be relocated. The approximately 0.3-acre landscaped area that would be affected by the relocated connector road contains mature trees and a dirt pathway that provides a shortcut from United Nations Avenue North to Avenue of the States.

The relocated connector road would link Meridian Road to United Nations Avenue North, and maintain access to the viaduct over the Grand Central Parkway. The replacement connector road and sidewalks would ensure that vehicular and pedestrian access to the park would not be adversely affected by this component of the proposed project.

The 0.68-acre area that would be alienated is a narrow area of park land located south of the current southern boundary of the NTC, and includes landscaped areas and the northernmost lane of three-lane United Nations Avenue North. The lane that would be eliminated is lightly used for walking, running, or bicycling, as well as primarily by DPR vehicles and to service the NTC during the US Open. The landscaped areas that would be alienated include a triangular median area near the connector road, a median adjacent to the northernmost lane of United Nations Avenue North, and a narrow strip of lawn adjacent to the current NTC fence line. The landscaping includes trees in some areas, but no other notable park features, such as play equipment, benches, or statues. As analyzed in Chapter 3, “Open Space and Recreational Facilities,” the change in use and alienation of this park land would not be considered a significant adverse open space impact, due to the small number of users that would be affected, the relatively small area affected, and the park improvement measures that would be provided (which are discussed below).

The proposed project would result in an overall increase in the bulk of development on the site; however, the incremental increases in height and bulk would be modest relative the existing facilities. As shown in **Table 2-2**, the two new stadiums that would be constructed, Stadium 2 and Stadium 3, would contain 15,000 seats and 8,000 seats, respectively. Compared to the existing 10,500-seat Louis Armstrong Stadium and 6,000-seat Grandstand Stadium, the new facilities would be 4,500 seats and 2,000 seats larger than the stadiums they are replacing. The proposed 80,000-gsf retail and sponsorship building would be a new structure on the site that would represent an increase in square footage dedicated to such uses. In addition, the two proposed parking garages would be built in areas that are currently occupied by parking lots. All of these proposed buildings would be substantially smaller, and less prominent, than the 23,500-seat Arthur Ashe Stadium, to which they are all closely situated. They would also be built within an existing recreational campus that contains a variety of building types and heights. The proposed Stadium 3 represents the largest change in height and bulk, as it would be an up to 55-foot tall building constructed on the site of a former connector road and lawn, and would be adjacent to the surrounding park land in Flushing Meadows Corona Park. However, the NTC is already highly visible in this section of the park. As described in Chapter 6, “Urban Design and Visual Resources,” and in **Figure 6-18**, trees and other landscaping would be provided along the new perimeter of the site that would minimize the prominence of the proposed Stadium 3 and parking garages, and the proposed project’s visual changes on the project site would not be considered a significant adverse impact. Therefore, the incremental increase in the bulk of development on the project site as a result of the proposed project would not be considered a significant adverse land use impact.

STUDY AREA

The relocation and expansion of existing land uses within the project site would not result in a significant adverse impact on adjacent land uses. The proposed project would not affect land use conditions outside of the project site, except for the areas of Flushing Meadows Corona Park that are adjacent to the property that would be added to the NTC site, and the locations that would be subject to the proposed park improvement projects.

The connector road in the southwest corner of the project site, which would be removed and added to the NTC site to accommodate the new Stadium 3, would be replaced by a new roadway south of United Nations Avenue North and north of the Queens Museum of Art parking lot (the alignment of the replacement connector road is shown on **Figure 1-6**). The landscaped area that would be affected by the relocated connector road contains mature trees and a dirt pathway that provides a shortcut from United Nations Avenue North to Avenue of the States. As with the existing connector road, the relocated roadway would link Meridian Road to United Nations Avenue North, and maintain access to the viaduct over the Grand Central Parkway. The replacement connector road and sidewalks would ensure that access to the park would not be adversely affected by this component of the proposed project. Moreover, new trees and other landscaping would be provided outside the proposed NTC fence line, in order to improve the NTC's context within the park (see Chapter 6, "Urban Design and Visual Resources").

The alienation of 0.68-acres of park land, including paved and landscaped areas, would not adversely affect Flushing Meadows Corona Park. During the non-US Open period, the alienated area would be open to the public for recreational use, as with the existing NTC. As analyzed in Chapter 3, "Open Space and Recreational Resources," this small portion of the park is lightly utilized and does not contain notable park features, such as play equipment, seating, or statues. The vehicular lane that would be eliminated is lightly used for walking, running, or bicycling as well as by DPR vehicles and to service the NTC during the US Open; as two lanes of United Nations Avenue North would remain in service, the elimination of this lane would not adversely affect access and circulation within the park. New pedestrian walkways would be provided to replace those displaced by the proposed project. The landscaped areas that would be alienated (including a triangular median area near the connector road, a median adjacent to the northernmost lane of United Nations Avenue North, and a narrow strip of lawn adjacent to the current NTC fence line) are lightly utilized, due in part to their location adjacent to the NTC fence line, away from the more prominent features of the park. Therefore, the alienation of these small areas would be of minimal effect. In addition, as noted above, new trees and/or landscaping would be provided along the proposed NTC fence line that would improve the NTC's context within Flushing Meadows Corona Park.

In addition to the improvement of the NTC, which would require the alienation 0.68 acres of park land, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. As described in Chapter 1, "Project Description," these potentially include: the renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades.

Overall, with the proposed project, the NTC would continue to provide modern recreational facilities that would be open to the public for 11 months of the year. As the types of uses would be the same as currently exist in the project site and in the study area, they would continue to be compatible with surrounding open space, transportation, and residential uses. While the proposed project would result in the alienation of small areas of lightly utilized park land, visual improvements would be implemented along the proposed NTC fence line that would improve the NTC's context with the park, and park improvement projects would be provided. Therefore, the proposed project would not result in any significant adverse land use impacts within the study area.

ZONING

The proposed project would not affect zoning on the project site or study area. The project site is not subject to zoning and the proposed project would not include any actions that would change zoning in the study area.

PUBLIC POLICY

FLUSHING MEADOWS CORONA PARK STRATEGIC FRAMEWORK PLAN

The proposed project would be compatible with the goals set forth in the Flushing Meadows Corona Park Strategic Framework Plan. The proposed project would attract more visitors to the park both during the US Open, and for recreational use during the rest of the year. Moreover, the proposed improvements to the NTC site would help to maintain the viability of current community programming and resources.

The park improvement projects that would be implemented under the proposed project would potentially include: the renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades. These improvements would also be beneficial to park users, and would therefore be supportive of this policy.

G. WATERFRONT REVITALIZATION PROGRAM

The WRP is the City’s principal coastal zone management tool. As originally adopted in 1982 and revised in 1999, it establishes the City’s policies for development and use of the waterfront. All proposed actions subject to CEQR, ULURP, or other local, state, or federal agency discretionary actions that are situated within New York City’s designated Coastal Zone Boundary must be reviewed and assessed for their consistency with the WRP.

The project site is located within the City’s designated Coastal Zone Boundary. Therefore, in accordance with the guidelines of the *CEQR Technical Manual*, a preliminary evaluation of the proposed project’s consistency with WRP policies was undertaken (see **Appendix A** for the WRP Coastal Assessment Form [CAF]). As determined by the CAF, the proposed project requires detailed assessment for several WRP policies, as described below.

CONSISTENCY OF PROPOSED PROJECT WITH THE WATERFRONT REVITALIZATION PROGRAM POLICIES

New York City’s WRP includes 10 principal policies designed to maximize the benefits derived from economic development, environmental preservation, and public use of the waterfront, while minimizing the conflicts among those objectives. For each policy and sub-policy question that was answered “yes” in the CAF, this analysis includes a discussion of the policy’s applicability to the proposed project and the proposed projects’ consistency with the respective policy.

Policy 1: Support and facilitate commercial and residential development in areas well-suited to such development.

Policy 1.1: Encourage commercial and residential redevelopment in appropriate coastal zone areas.

The proposed project would not result in redevelopment, but would reconfigure existing uses on the site, and increase the amount of space dedicated to stadium, retail/administrative, and parking uses. Overall, the proposed project would be consistent with this policy.

Policy 6: Minimize loss of life, structures and natural resources caused by flooding and erosion.

Policy 6.1: Minimize losses from flooding and erosion by employing non-structural and structural management measures appropriate to the condition and use of the property to be protected and the surrounding area.

Although the project site is within the City's designated coastal zone, it is not a waterfront site, and is not normally subject to flooding and erosion (i.e., except in the case of extraordinary weather events). Structures constructed as part of the proposed project would incorporate the most recent building code requirements available at the time of construction pertaining to sea level rise projections and construction within areas at risk from coastal flooding in the future special flood hazard areas, and consider any prudent guidance and information available, minimizing the potential for losses from flooding. The new Stadium 2 and a portion of the proposed transportation building are the only structures that would be built within the 100 year flood zone as part of the proposed project. All critical infrastructure would be built above the 100 year flood zone line for these structures, and the portions of these structures that would be built below this elevation will be designed to withstand damage due to flooding. Therefore, the proposed project would be consistent with this policy.

Policy 7: Minimize environmental degradation from solid waste and hazardous substances.

Policy 7.1: Manage solid waste material, hazardous wastes, toxic pollutants, and substances hazardous to the environment to protect public health, control pollution, and prevemt degradation of coastal ecosystems.

Flushing Meadows Corona Park's historical use as an "ash dump" is well documented, and prior projects at the NTC and in the vicinity have encountered and sampled these materials, which can contain elevated levels of metals, semivolatile organic compounds and methane gas. The need for additional testing and remediation or other special measures required during excavation associated with the proposed project is analyzed in Chapter 8, "Hazardous Materials." As discussed in Chapter 8, to reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a Subsurface (Phase II) Investigation Work Plan to determine whether past or present, on or off-site activities have affected subsurface conditions, would be prepared and submitted to the New York City Department of Environmental Protection (NYCDEP) for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP), to be implemented during project construction, would be prepared and submitted to NYCDEP for review and approval. With the implementation of these measures, the proposed project would be consistent with this policy.

Policy 8: Provide public access to and along New York City's coastal waters.

Policy 8.5: Preserve the public interest in and use of lands and waters held in public trust by the state and city.

The project site is situated on alienated park land that is under the jurisdiction of DPR. The proposed project would add 0.94 acres of additional park land to the project site. 0.68 acres of this additional land would be alienated and added to the site, while 0.26 acres of this land has been previously alienated. The park land added to the site would remain park land and would remain City property. Park land improvements would be made in Flushing Meadows Corona Park. Moreover, the NTC site is open to the public 11 months of the year, and provides substantial recreational benefits to the community. Therefore, the public interest in the project site would be preserved, and the proposed project would be consistent with this policy.

Policy 10: Protect, preserve, and enhance resources significant to the historical, archaeological, and cultural legacy of the New York City coastal area.

Policy 10.1: Retain and preserve designated historic resources and enhance resources significant to the coastal culture of New York City.

There are no designated historic resources on the project site. As discussed in Chapter 5, "Historic and Cultural Resources," there are designated historic resources near the project site, including one within 90 feet of anticipated construction activities: the Freedom of the Human Spirit sculpture. The proposed project would avoid potential inadvertent construction-related impacts to this resource during project demolition and construction activities through comply with the New York City Landmarks Preservation Commission (LPC)'s Guidelines for Construction Adjacent to a Historic Landmark as well as the guidelines set forth in section 523 of the *CEQR Technical Manual* and the procedures set forth in DOB's TPPN #10/88. The proposed project would not have any significant adverse direct or contextual effects on the other designated historic resources in the surrounding area. There are no resources significant to the coastal culture of New York City in close proximity to the project site. Therefore, with the implementation of the measures described above, the proposed project would be consistent with this policy.

COMPREHENSIVE WATERFRONT PLAN

In March 2011, the New York City Department of City Planning (DCP) released *Vision 2020: New York City Comprehensive Waterfront Plan*. The plan articulates eight goals for New York City's waterfront, strategies to achieve each goal, and complements those strategies with the New York City Waterfront Action Agenda, a set of projects chosen for their ability to catalyze investment in the waterfront. None of the projects in the New York City Waterfront Action Agenda is related to, or would be affected by, the proposed project.

The compatibility of the proposed project with each goal is analyzed below:

- **Expand public access to the waterfront and waterways on public and private property for all New Yorkers and visitors alike.**

  As the project site is not located on the waterfront, this goal is not applicable to the proposed project.

- **Enliven the waterfront with a range of attractive uses integrated with adjacent upland communities.**

The proposed project is not located on the waterfront, but would result in improvements to a major recreational resource, the NTC, in an adjacent upland community. As described in Chapter 1, “Project Description,” the purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility.

- **Support economic development activity on the working waterfront.**

  The project site is located in Flushing Meadows Corona Park, and is not situated on the working waterfront. However, one of the goals of the proposed project is to provide substantial economic benefits to the City of New York. The proposed project would increase attendance at the US Open by up to approximately 100,000 new visitors, positively affecting not only the revenues from the US Open but the local hospitality market as well. It also would create jobs during construction and upon completion.

- **Improve water quality through measures that benefit natural habitats, support public recreation, and enhance waterfront and upland communities.**

  The proposed project would include sustainability measures that would reduce storm water runoff, such as the potential use of pervious pavers. The potential effects of the proposed project on water quality are discussed in Chapter 9, “Water and Sewer Infrastructure” and the potential effects of the proposed project on natural habitats are discussed in Chapter 7, “Natural Resources.”

- **Restore degraded natural waterfront areas, and protect wetlands and shorefront habitats.**

  This goal is not applicable to the proposed project.

- **Enhance the public experience of the waterways that surround New York—our Blue Network.**

  This goal is not applicable to the proposed project.

- **Improve governmental regulation, coordination, and oversight of the waterfront and waterways.**

  This goal is not applicable to the proposed project.

- **Identify and pursue strategies to increase the City’s resilience to climate change and sea level rise.**

  Structures constructed as part of the proposed project would incorporate the most recent building code requirements available at the time of construction pertaining to sea level rise projections and construction within areas at risk from coastal flooding in the future special flood hazard areas, and consider any prudent guidance and information available, minimizing the potential for losses from flooding. The new Stadium 2 and a portion of the proposed transportation building are the only structures that would be built within the 100 year flood zone as part of the proposed project. All critical infrastructure would be built above the 100 year flood zone line for these structures, and the portions of these structures that would be built below this elevation will be designed to withstand damage due to flooding. ✷

Chapter 3: Open Space and Recreational Resources

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, open space is defined as publicly accessible, publicly or privately owned land that operates or is available for leisure, play, or sport, or serves to protect or enhance the natural environment. According to the *CEQR Technical Manual*, an open space assessment should be conducted if a project would have a direct effect on open space, such as eliminating or altering a public open space, or an indirect effect, such as when new population overburdens available open space.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." The proposed project is not expected to introduce a substantial new resident and worker population to the study area that would create new demands for open space. However, the proposed project would result in notable improvements to the NTC site, which is located within Flushing Meadows Corona Park, a major nearly 900-acre open space resource under the jurisdiction of the New York City Department of Parks and Recreation (DPR). To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land (a connector roadway) that is outside the current lease. Outside of the NTC, an approximately 0.3-acre area would be affected by the relocation of the connector roadway. Accordingly, this chapter considers the proposed project's potential impacts on open space resources.

PRINCIPAL CONCLUSIONS

Overall, the proposed project would not result in any significant adverse impacts to open space resources. The proposed project would result in improvements to landscaping, circulation, and amenities at the NTC that would be provided for the US Open and the public. The proposed project would affect areas outside of the current NTC fence line, including the landscaped teardrop area, where the new Stadium 3 would be constructed. The areas outside of the current NTC fence line that would be directly affected by the proposed project are lightly used, primarily for walking, running, and bicycling on the perimeter paths. Displacement or relocation of this activity would not be expected to have a notable affect on park users or create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to nearby sidewalks or pathways in other adjacent areas of the park for walking, running, and bicycling, and replacement walkways would be provided under the proposed project. Nearby sections of the park could accommodate the passive recreation activities that may be displaced from these areas. The 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the nearly 900-acre Flushing Meadows Corona Park. Construction of the proposed project would also require removal of 422 trees both outside the existing fence line and inside the NTC site. Tree replacement would be conducted in conformance with DPR requirements. In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. These potentially include: the renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades.

B. METHODOLOGY

According to the *CEQR Technical Manual,* a direct effect on an open space would occur if a project would cause the physical loss of public open space; change the use of an open space so that it no longer serves the same user population; limit public access to an open space; or cause increased noise or air pollutant emissions, odors, or shadows that would affect its usefulness, whether on a permanent or temporary basis. The proposed project would add 0.94 acres of park land to the NTC, which would permanently change the use of this space, and limit public access to it during the approximately two-week US Open period. Outside of the NTC, an approximately 0.3-acre area would be affected by the relocation of a connector roadway.

Accordingly, this chapter identifies the areas of Flushing Meadows Corona Park that would be directly affected by the proposed project, and describes their characteristics, features, and context within the park. Field surveys were conducted in 2010 and 2012 to determine the number of park users that could be affected by the proposed project, and to characterize the existing use of this park land. Surveys were undertaken during ten site visits, which were scheduled to not coincide with the US Open event. During each visit, the areas of park land that would be affected by the proposed project were surveyed in approximately 10 minute intervals at various times and dates ranging between July and September 2010 (five visits on eight separate days). Two additional site visits were conducted in 2012 to update and confirm the findings of the 2010 survey. The 2012 visits occurred on June 26 and June 30, utilizing the same methodology as the 2010 survey, including counting the number of users at five times of the day and noting the conditions of the space.

After characterizing existing conditions, this chapter describes anticipated future conditions for the 2019 analysis year without the proposed project (No-Action condition), in order to establish the analytic baseline against which the probable impacts associated with the proposed project are assessed. The assessment of future conditions with the proposed project (With Action condition) accounts for the anticipated park improvement projects that would be provided in Flushing Meadows Corona Park in connection with the proposed project.

C. BACKGROUND

Portions of Flushing Meadows Corona Park (but not the NTC) have been improved with funds from the Federal Land and Water Conservation Fund (LWCF) Act, and much of the park, including the NTC, is subject to LWCF requirements. The health, welfare and recreational public purposes of the NTC have been recognized by the New York State Legislature and the New York City Council in the State legislation and City Administrative Code provisions that govern the NTC lease, as well as by the U.S. Department of the Interior, National Park Service (NPS), which determined in 1993 that the expansion and renovation of the NTC is consistent with the LWCF grant-in-aid manual requirements governing Flushing Meadows Corona Park.

According to the *CEQR Technical Manual*, government-owned park land and open space (that has been dedicated as such) is invested with a “public trust” that prevents it from being converted to non-park land uses without State legislative authorization. Thus, when a project involves certain changes in use of dedicated City-owned park land or open space, the City must obtain the authorization of the New York State Legislature and Governor to alienate the park land or open space. This authorization takes the form of a park land alienation bill. In general, before it will pass such a bill, the State Legislature requires the City Council to pass a "home rule resolution," requesting state authorization of the change of use. The proposed project would require a home rule resolution by the City Council and the authorization of the New York State Legislature and Governor.

The proposed project would also require a determination by U.S. Department of the Interior, National Park Service as to whether any approval is required in connection with Land and Water Conservation Fund Act program requirements due to previously funded improvements to Flushing Meadows Corona Park.

D. DIRECT OPEN SPACE IMPACTS ANALYSIS

EXISTING CONDITIONS

The NTC site is located within Flushing Meadows Corona Park, a nearly 900-acre park under DPR jurisdiction that is bounded by the Whitestone Expressway to the north, the Van Wyck Expressway to the east, and the Grand Central Parkway to the west. As noted in Chapter 2, "Land Use, Zoning, and Public Policy," the park was built on marshlands that were used as an ash dump that later became the grounds of the New York World's Fairs in 1939-1940 and 1964-1965. The park is a recreational and cultural destination for Queens residents and visitors from throughout the New York metropolitan area.

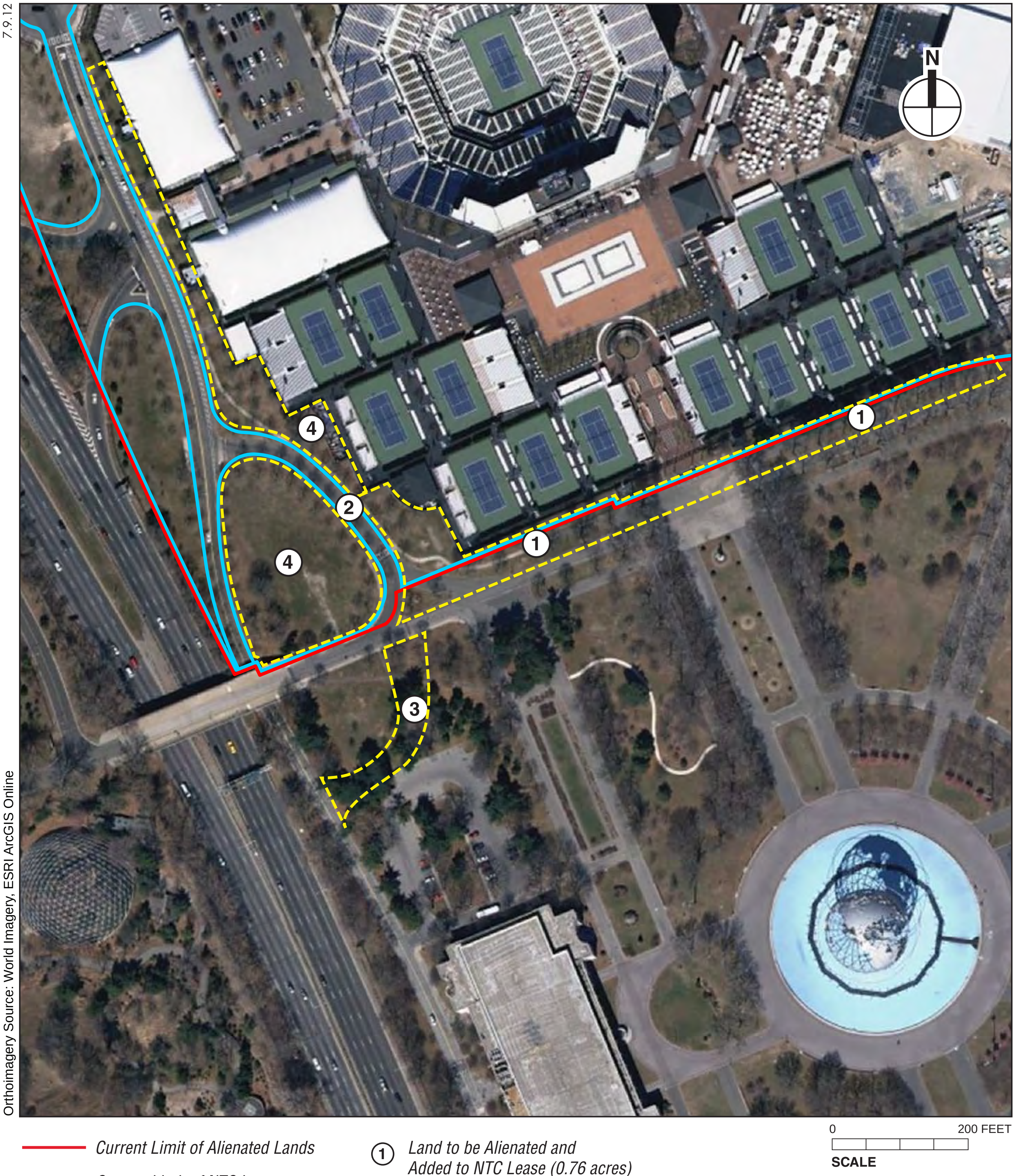
The project site includes the 37.48-acre portion of the 42-acre NTC site bounded to the north and west by Meridian Road, to the east by the Passerelle Building, and to the south by United Nations Avenue North.[1] The project site contains three stadiums (Arthur Ashe Stadium, Louis Armstrong Stadium, and Grandstand Stadium), one micro-stadium (Court 17), tennis courts, and ancillary buildings including retail kiosks, restrooms, the Indoor Training Center, and temporary broadcast trailers during the US Open.

As shown on **Figure 3-1**[2], the proposed project would directly affect the following portions of park land on and adjacent to the NTC site:

1. A 0.68-acre area would be alienated, which is located north of United Nations Avenue North, and south of the existing NTC fence line, as shown in **Figure 3-1**. This area is currently a mix of landscaped and paved areas, including one lane of the three-lane United Nations Avenue North. The lane that would be eliminated is lightly used, primarily by DPR vehicles and to service the NTC during the US Open. The landscaped portion includes a triangular median area near the connector road, a median adjacent to the northernmost lane of United Nations Avenue North, and a narrow strip of lawn adjacent to the current NTC

[1] The full NTC is 42.2 acres. The 37.48-acre project site includes: the 35.3-acre portion of the NTC site bounded by Meridian Road, United Nations Avenue North, and Path of the Americas; the 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94-acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3-acre relocated connector road area, which would remain under City ownership and control.

[2] Note: **Figure 3-1** is the most recent publicly-accessible aerial photograph (2010). The aerial does not reflect more recent site plan changes to the NTC, which are shown on Figure 1-4.



Directly Affected Open Space

Figure 3-1

fence line. The landscaping includes 17 trees and park light fixtures, but no other park features, such as play equipment, benches, or statues.

2. A 0.26-acre portion of previously alienated land that consists solely of the connector roadway between Meridian Road and United Nations Avenue North. The roadway is mapped park land that was alienated for the 1993 expansion, and contains a pedestrian pathway on the east side of the connector road. This area would be added to the NTC lease as part of the proposed project.
3. The relocation of the connector roadway south of United Nations Avenue would directly affect an approximately 0.3-acre area of park land where the replacement roadway would be built. This grassy area contains mature trees and a dirt pathway but no other park features.
4. NTC land that is currently outside of the NTC fence line on the east and west sides of the connector road. This land includes: the 1.21-acre "teardrop" area bounded by the connector roadway, Meridian Road, and United Nations Avenue North; land on the west side of the NTC site adjacent to the northwest courts and the new parking garage; and land on the east side of the connector road that is west of the current NTC fence line (see **Figure 3-1**). While these areas have been previously alienated, and are already included in the NTC lease, they are outside of the NTC fence line, and are utilized by visitors to Flushing Meadows Corona Park. The landscaping includes trees circling the grass area and park light fixtures. Although the area is used for parking during the US Open, as well as occasionally by visitors for such uses as pick-up games and sledding, no other park recreation features, such as play equipment, benches, or statues are located in the "teardrop" area.

OPEN SPACE USER SURVEY

The areas that would be directly affected by the proposed project typically have low levels of utilization. The NTC land that is currently outside of the fence line was surveyed in 2010, as discussed above under "Methodology." During the 50 observations that were made in 2010 and 2012 over ten days, a total of 231 park visitors were recorded.

In 2010, visitors were recorded on 22 out of 40 surveys in the area adjacent to the connector road, along the existing NTC fence line. A total of 59 visitors were recorded in groups ranging from 1 to 9 people, although most groups were around 1 to 4 people in size. No visitors were recorded during the other 18 surveys of this area. The "teardrop" area was very lightly used, with activity on only 10 out of 40 surveys. A total of 17 visitors were recorded in groups of 1 to 3 people. No users were recorded during the other 30 observations of this area. No visitors were observed in the triangular area at the intersection of the connector road and United Nations Avenue North (that is part of the 0.68-acre area that would be alienated) during any of the 40 surveys. The most common activities were running, walking, or bicycling along the connector road sidewalk.

Conditions in the other areas outside of the current NTC fence line that would be directly affected by the proposed project are substantially similar to those that were surveyed in 2010, as described above. The 2012 surveys confirmed that these areas are lightly used, primarily for activity such as walking, running, or bicycling.

FUTURE WITHOUT THE PROPOSED PROJECT

PROJECT SITE

No notable changes are expected to the portions of Flushing Meadows Corona Park that would be directly affected by the proposed project, in the No-Action condition. The NTC's ongoing management of capital projects would result in minor alterations to the project site, as described in Chapter 2, "Land Use, Zoning, and Public Policy."

STUDY AREA

Outside of the project site, there are three No-Action condition development projects that are planned or proposed within or adjacent to the ¼-mile land use study area. Within Flushing Meadows Corona Park, there is a proposal to construct a new stadium for professional soccer purposes in an approximately 13-acre area (see Figure 2-4). This project would eliminate a fountain, four existing soccer fields, one basketball court, landscaped areas, and pathways from public use. All displaced facilities would be replaced within the northeastern portion of the park, and tree replacement would occur as per City regulations.

Also within Flushing Meadows Corona Park, a series of improvements will be implemented as part of DPR's ongoing capital projects program. Overall, four soccer fields are anticipated to be improved, new volleyball courts are expected to be created, and DPR has identified repair and resurfacing of Porpoise Bridge, including repair of its tide gates, as a priority project.

Within and just outside of the ¼-mile study area to the northeast, a major mixed use development proposal for the Willets Point Urban Renewal Area is expected to be under development by 2019.

Phase 1a of the Willets Point development project would result in a new commercial development known as Willets West on the existing surface parking lots to the west of Citi Field by 2018. To replace these spaces, 2,725 parking spaces would be provided in the Special Willets Point District area, to the east of Citi Field. Upon completion of the Willets West development, 400 parking spaces for Citi Field use would be provided in this location. South of Roosevelt Avenue, structured parking containing 2,863 spaces would be built for Citi Field use on South Lot and Lot D, which currently provide 1,795 spaces, resulting in an increase of 1,068 spaces. Phase 1b of the Willets Point development project would result in the removal of the 2,725 parking spaces in the Special Willets Point District area, which would be replaced by additional spaces in South Lot and Lot D, which would then provide 2,725 spaces.

FUTURE WITH THE PROPOSED PROJECT

As described in greater detail in Chapter 1, "Project Description," the proposed project would result in the following changes to the directly affected areas:

- The 0.68-acre strip would be alienated and added to the NTC site. The current NTC fence line would move 25 to 38 feet to the south, to abut the middle lane of the existing three-lane United Nations Avenue North. The northern lane and the landscaped areas would accommodate the relocated southerly tournament courts (see Chapter 1, "Project Description"). The proposed fence line would include approximately 34 trees and other landscaping that would improve the visual interface of the NTC with Flushing Meadows Corona Park (see **Figure 3-2** and Chapter 6, "Urban Design and Visual Resources"). This area would be open to the public during the non-US Open season.

Existing Tree to Remain

Existing Tree in New Location

New Tree

Land to be Alienated and Added to NTC Lease

0 200 400 FEET
SCALE

Proposed Southern Boundary Plan
Figure 3-2

- The previously-alienated 0.26-acre area containing the connector roadway would be added to the NTC lease. Stadium 3, the relocated Grandstand Stadium, would be constructed partially on this location. As with the rest of the NTC site, it would be open to the public for 11 months of the year, during the non-US Open period.
- The approximately 0.3-acre area south of United Nations Avenue North would accommodate the relocated connector road. The road would provide access between Meridian Road and United Nations Avenue North, to replace the connector road that would be displaced. New pedestrian walkways would be included. This component of the proposed project would not require park land alienation, and the area would remain mapped park land under the jurisdiction of the City. The 0.3-acre area would not be added to the NTC lease and would remain under the City's ownership and control.
- The previously-alienated land that is currently included in the NTC lease and is outside of the NTC fence line on the east and west sides of the connector road, including the "teardrop" area, would be redeveloped with Stadium 3. The NTC fence line would be moved to encompass this area, except for a small area within the leased premises of the NTC, where the fence line would not reach the road to allow for a sidewalk and landscaping outside the fence line (see **Figure 3-2**). New trees and other landscaping would be provided along the proposed fence line, which would improve the visual interface between the NTC and Flushing Meadows Corona Park. In addition, the area east of Meridian Road and west of the existing NTC fence line, adjacent to the new parking garage and northwest courts, would be included within the new fence line. New landscaping would be provided along this portion of the proposed fence line.
- Improvements to landscaping, circulation, and amenities at the NTC would be provided for the US Open and the public. Such improvements would include a new pedestrian walkway connecting the proposed Stadium 3 with the NTC entrance at the South Gate, the South Plaza and Court 17 on the southeast corner of the site. The proposed walkway would improve circulation within the site, and include new plantings and seating that would enhance the pedestrian realm. The existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium (Stadium 1) would be expanded by approximately 11,000 square feet, to improve circulation and amenities. Landscaping improvements would also be provided throughout the NTC site.

As noted above under "Existing Conditions," the areas outside of the current NTC fence line that would be directly affected are lightly used, primarily for walking, running, and bicycling on the sidewalk and the dirt pathway. Displacement or relocation of this activity would not be expected to have a notable affect on park users or create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to nearby sidewalks or pathways in other adjacent areas of the park for walking, running, and bicycling, and replacement walkways would be provided under the proposed project. Nearby sections of the park could accommodate the passive recreation activities that may be displaced from the surveyed areas. The 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the overall nearly 900-acre Flushing Meadows Corona Park.

As described in Chapter 7, "Natural Resources," construction of the proposed project would also require removal of trees both outside the existing fence line and inside the NTC site. Tree replanting and replacement would comply with DPR's applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations.

Within the NTC, the proposed project would replace four temporary tennis courts in Lot A with four permanent courts on the roof of the proposed administrative and retail building. Thus, there would be a net increase of four permanent courts in the With Action condition. These courts would be made available to the public on the same basis as the other courts managed by USTA. Overall, the proposed project would maintain or improve public availability of courts at the NTC.

The proposed construction of two new parking garages in place of the currently surface lots will provide for additional parking spaces to satisfy the existing and future daily demand experienced for year-round operations at the NTC. During non-event conditions, the garages would serve the every day needs of the NTC, including for visitors and park users.

The additional 10,000 daily spectators anticipated during the US Open as a result of the proposed project would not have any significant adverse impacts on Flushing Meadows Corona Park given their concentration within the NTC and the temporary nature of the two-week event. Due to these factors, the proposed project would not result in any significant adverse impacts to open space resources.

PARK IMPROVEMENT PROJECTS

In addition to the improvement of the NTC, which would require the alienation of 0.68 acres of park land, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. A range of possible park improvement projects has been developed by DPR as part of project planning. Some examples of possible projects include: conversion of two soccer fields from natural to synthetic turf; reconstruction of one existing synthetic turf soccer field; the development of a new comfort station at Jurassic Playground; vehicular, pedestrian, landscape, and drainage upgrades to an area in the northeast corner of Meadow Lake Drive; and the development of new picnic and barbecue areas and improvements to pathways around Meadow Lake (see Figure 1-7).

The City would not seek replacement park land for the area to be included in the lease because the land would remain mapped park land (the alienation legislation would authorize the inclusion of park land within the lease); the leased area would remain publicly accessible in the same way the rest of the NTC is publicly accessible; and improvements and upgrades to existing sport fields and infrastructure within Flushing Meadows Corona Park would result in a more meaningful degree of public benefit than an in-kind replacement.

Should the Major League Soccer (MLS) stadium project proceed, the park improvements associated with the USTA project would be selected in coordination with the park facilities to be replaced or improved as part of the MLS project.

The final selection of park improvement projects would be determined by DPR. ✷

Within the NTC, the proposed project would replace four temporary tennis courts in Lot A with four permanent courts on the roof of the proposed administrative and retail building. Thus, there would be a net increase of four permanent courts in the With Action condition. These courts would be made available to the public on the same basis as the other courts managed by USTA. Overall, the proposed project would maintain or improve public availability of courts at the NTC.

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The final selection of park improvement projects would be determined by DPR. ✷

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a shadows assessment is required if the project would result in structures (or additions to existing structures) of 50 feet or more, or if the project site is located adjacent to, or across the street from, a sunlight-sensitive resource. Publicly-accessible open spaces, sunlight-dependent features of historic resources, and natural resources are all potentially sunlight-sensitive resources.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." The proposed project would result in several new structures or additions to existing structures; only one would be greater than 50 feet in height, but the project site is located within Flushing Meadows Corona Park, and is adjacent to park land. Therefore, a preliminary shadows assessment was required. This chapter considers whether the proposed project could result in new shadows on any sunlight-sensitive resources, and assesses the potential effects of any such new shadows.

PRINCIPAL CONCLUSIONS

The proposed project would not result in any significant adverse shadows impacts. The proposed project could result in new shadows on several small areas containing sunlight-sensitive features adjacent to the project site within Flushing Meadows Corona Park. All but one of the affected areas contain a mix of paved road or walkways, grass and mature trees, but no other user amenities, and, as noted in Chapter 3, "Open Space and Recreational Resources," are lightly used, primarily for walking, running, and bicycling on the perimeter paths. These areas are therefore only minimally sensitive to effects of incremental shadows. Further, the areas west and south of the project site would continue to receive direct sun for more than six hours throughout the spring, summer and fall, since there are virtually no structures to the south or west. The final area that could be affected by project-generated shadow, the portion of the circular plaza to the east of the project site, would receive between approximately five minutes and an hour and 50 minutes of incremental shadow in the spring, summer, and fall. Only a small portion of this plaza would be affected by the new shadow, and even this small area would receive direct sun for most of the remaining day in those seasons due to the lack of structures to the south and east. Overall, the proposed project's incremental shadows would not be substantial enough to significantly impact Flushing Meadows Corona Park or its users.

B. DEFINITIONS AND METHODOLOGY

This analysis has been prepared in accordance with New York City Environmental Quality Review (CEQR) procedures and follows the guidelines of the 2012 *CEQR Technical Manual*.

DEFINITIONS

Incremental shadow is the additional, or new, shadow that a structure resulting from a proposed project would cast on a sunlight-sensitive resource.

Sunlight-sensitive resources are those resources that depend on sunlight or for which direct sunlight is necessary to maintain the resource's usability or architectural integrity. Such resources generally include:

- *Public open space* (e.g., parks, beaches, playgrounds, plazas, schoolyards, greenways, landscaped medians with seating). Planted areas within unused portions of roadbeds that are part of the Greenstreets program are also considered sunlight-sensitive resources;
- *Features of architectural resources that depend on sunlight for their enjoyment by the public.* Only the sunlight-sensitive features need be considered, as opposed to the entire resource. Such sunlight-sensitive features might include: design elements that depend on the contrast between light and dark (e.g., recessed balconies, arcades, deep window reveals); elaborate, highly carved ornamentation; stained glass windows; historic landscapes and scenic landmarks; and features for which the effect of direct sunlight is described as playing a significant role in the structure's importance as a historic landmark; and
- *Natural resources* where the introduction of shadows could alter the resource's condition or microclimate. Such resources could include surface water bodies, wetlands, or designated resources such as coastal fish and wildlife habitats.

Non-sunlight-sensitive resources include, for the purposes of CEQR:

- *City streets and sidewalks* (except Greenstreets);
- *Private open space* (e.g., front and back yards, stoops, vacant lots, and any private, non-publicly-accessible open space); and
- *Project-generated open space* cannot experience a significant adverse shadow impact from the project, according to CEQR, because without the project the open space would not exist. However, a qualitative discussion of shadows on the project-generated open space may be included in the analysis.

A significant adverse shadow impact occurs when the incremental shadow added by a proposed project falls on a sunlight-sensitive resource and substantially reduces or completely eliminates direct sunlight, thereby significantly altering the public's use of the resource or threatening the viability of vegetation or other resources. Each case must be considered on its own merits based on the extent and duration of new shadow and an analysis of the resource's sensitivity to reduced sunlight.

METHODOLOGY

Following the guidelines of the *CEQR Technical Manual*, a preliminary screening assessment must first be conducted to ascertain whether shadow from the proposed project could reach any sunlight-sensitive resources at any time of year. The preliminary screening assessment consists of three tiers of analysis. The first tier determines a simple radius around the proposed project that represents the longest shadow that could be cast. If there are sunlight-sensitive resources within this radius, the analysis proceeds to the second tier, which reduces the area that could be affected by project-generated shadow by accounting for the fact that shadows can never be cast between a certain range of angles south of the project site due to the path of the sun through the sky at the latitude of New York City.

If the second tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a third tier of screening analysis further refines the area that could be reached by project-generated shadow by looking at specific representative days in each season and determining the maximum extent of shadow over the course of each representative day.

If the third tier of analysis does not eliminate the possibility of new shadows on sunlight-sensitive resources, a detailed shadow analysis is required to determine the extent and duration of the incremental shadow resulting from the project, taking into account existing buildings and their shadows. The detailed analysis provides the data needed to assess the shadow impacts. The effects of the new shadows on the sunlight-sensitive resources are described, and their degree of significance is considered. The results of the analysis and assessment are documented with graphics, a table of incremental shadow durations, and narrative text.

C. PRELIMINARY SCREENING ASSESSMENT

The proposed project would result in a number of new structures and additions to existing structures. One new stadium and two parking garages would be built at locations where no structures currently exist. In addition, the existing Louis Armstrong and Grandstand Stadiums would be demolished and replaced by a stadium of similar height and a retail and administrative building of lower height, respectively. Arthur Ashe stadium would remain, and an approximately 57-foot high expansion would be added to the base on the north side of the stadium. As noted in Chapter 1, "Project Description," USTA is analyzing possible engineering solutions for a canopy system that would attach along the upper edge of the stadium. Therefore, for the purposes of this analysis, a roof canopy structure is conservatively assumed to be added to the top of the stadium, increasing the stadium's total height by potentially as much as 22 feet. In the west side of the site, existing courts would be reconfigured and a viewing platform and canopy added. In the center and southern portions of the site, courts and seating structures would be reconfigured. Only two of the new structures would be over 50 feet in incremental height: the relocated Grandstand Stadium, and the north expansion to Arthur Ashe Stadium. All six structures are adjacent to the perimeter of the site and all were assessed for potential shadow effects. **Table 4-1** lists the six proposed structures and their maximum heights (please refer to Chapter 1, "Project Description," Figure 1-5 for locations of map numbers).

A base map was developed using Geographic Information Systems (GIS)[1] showing the proposed project plan and the surrounding parkland and street layout (see **Figure 4-1**). In coordination with the information regarding open space, historic, and natural resources presented in other sections of this Draft Environmental Impact Statement (DEIS), potentially sunlight-sensitive resources were identified and shown on the map.

[1] Software: Esri ArcGIS 10; Data: New York City Department of Information Technology and Telecommunications (DoITT) and other City agencies, and AKRF site visits.

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Project site boundary

Proposed new structures for analysis (see Table 4-1 for number key)

Perimeter representing longest shadow from each structure

Publicly-accessible open space

Base Map and Tier 1 Assessment

Figure 4-1

Table 4-1
Proposed New Structures or Additions

Map No.[1]	Name	Description	Incremental height in feet[2]
1	Grandstand Stadium (Stadium 3)	New stadium in southwest corner of NTC site	55’
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing stadium and replacement with new stadium of similar height in place	+14’[3]
3	Arthur Ashe Stadium expansion (Stadium 1)	Addition on north side of stadium base	57’
3	Arthur Ashe Stadium roof canopy	Canopy above center court	+22’[4]
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, viewing platform, and canopy above platform	40’ (canopy)
5	Southerly tournament courts	Reconfiguration of existing courts	—
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium	40’
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.	30’
8	New Parking Garage B	Construction of new 270-space, 3-level garage	40’

Notes:
[1] See Figure 1-5 for the location of these elements in the proposed site plan.
[2] Heights represent conservative “envelopes” for the final design rather than current anticipated design.
[3] 80’ is the total height of the new stadium. 14’ is the incremental height compared to the existing stadium.
[4] 160’ is the total height with the roof canopy. 22’ is the incremental height compared to the existing maximum roof height.
Source: USTA and Rossetti

TIER 1 SCREENING ASSESSMENT

For the Tier 1 assessment, the longest shadow that the proposed structures could cast is calculated, and using this length as the radius, a perimeter is drawn around each proposed structure. Anything outside this perimeter, which represents the longest possible shadow, could never be affected by project-generated shadow, while any sunlight-sensitive resources inside the perimeter need additional assessment.

As noted in Table 4-1, in order to ensure a conservative analysis, design envelopes up to 13’ taller than the current anticipated designs were used throughout the shadow analysis.

According to the *CEQR Technical Manual*, the longest shadow that a structure can cast at the latitude of New York City occurs on December 21, the winter solstice, at the start of the analysis day at 8:51 AM, and is equal to 4.3 times the height of the structure.

Therefore, at a maximum height of 60 feet, the proposed new Louis Armstrong Stadium (Stadium 2) could cast a shadow up to 344 feet in length (80 x 4.3). The relocated Grandstand Stadium (Stadium 3), at a height of 55 feet, could cast a shadow up to 236.5 feet. The two 40-foot proposed buildings in the northeast area of the site could each cast shadows of up to 172 feet. The 30-foot parking garage could cast a shadow of up to 129 feet and the 40-foot-high viewing platform canopy could cast a shadow of up to 172 feet in length. The addition on the north side of Arthur Ashe Stadium could cast a shadow up to 245 feet and the proposed canopy above the center court could cast a shadow reaching 688 feet away. Using these lengths, perimeters were drawn around the structures (see **Figure 4-1**).

TIER 1 ASSESSMENT RESULTS

As shown in Figure 4-1, the longest shadow study areas associated with the seven structures for analysis intersected with areas containing trees and grass beyond the adjacent Meridian Road to the west and north, and to the south beyond United Nations Avenue. In addition, a portion of the circular plaza northeast of the project site was located in the longest shadow study area. The analysis therefore proceeded to Tier 2.

TIER 2 SCREENING ASSESSMENT

Because of the path that the sun travels across the sky in the northern hemisphere, no shadow can be cast in a triangular area south of any given structure. In New York City, this area lies between -108 and +108 degrees from true north.

Figure 4-2 illustrates the remaining longest shadow study area for each of the seven proposed structures being analyzed, with the triangular area south of each proposed structure removed from consideration. The remaining longest shadow study area to the north, east and west represents the area that could potentially experience new project-generated shadow.

TIER 2 ASSESSMENT RESULTS

The longest shadow study area associated with the proposed relocated Grandstand Stadium (Stadium 3), in the southwest area of the site, includes small portions of adjacent park land area. To the west of the proposed Grandstand Stadium (Stadium 3), there is a landscaped area between Meridian Road and Grand Central Parkway containing grass and mature trees (see **Figures 4-2** and **4-3**) that could receive project-generated shadow. This shadow would occur in the morning, because this area is to the west of the proposed structure. At other times of day, this area would receive direct sun because there are no other structures to the south or west. This area contains no seating or other park user amenities.

To the southeast of the proposed relocated Grandstand Stadium (Stadium 3), there is an area containing a mix of paved road and walkways, grass and mature trees south of United Nations Avenue North (see **Figures 4-2** and **4-4**), a small portion of which could be reached by project-generated shadow. This area does not contain any seating or other park user amenities. Project-generated shadow could potentially reach this area in the late afternoon of the late spring and summer analysis days only, since it is to the southeast. The potentially affected area would likely receive direct sunlight throughout the mornings and much of the afternoons due to the lack of other structures to the south and east. It should also be noted that the proposed Grandstand Stadium (Stadium 3) was conservatively analyzed as a design envelope of 55 feet, but in its current anticipated design it would be 43 feet high on the west side, and would slope down to a shorter height on the east side.

West of the proposed Parking Garage A and the northwesterly tournament courts, there is a large landscaped area between Meridian Road and Grand Central Parkway; this area of grass and mature trees contains no amenities for park users but does contain mechanical equipment and a

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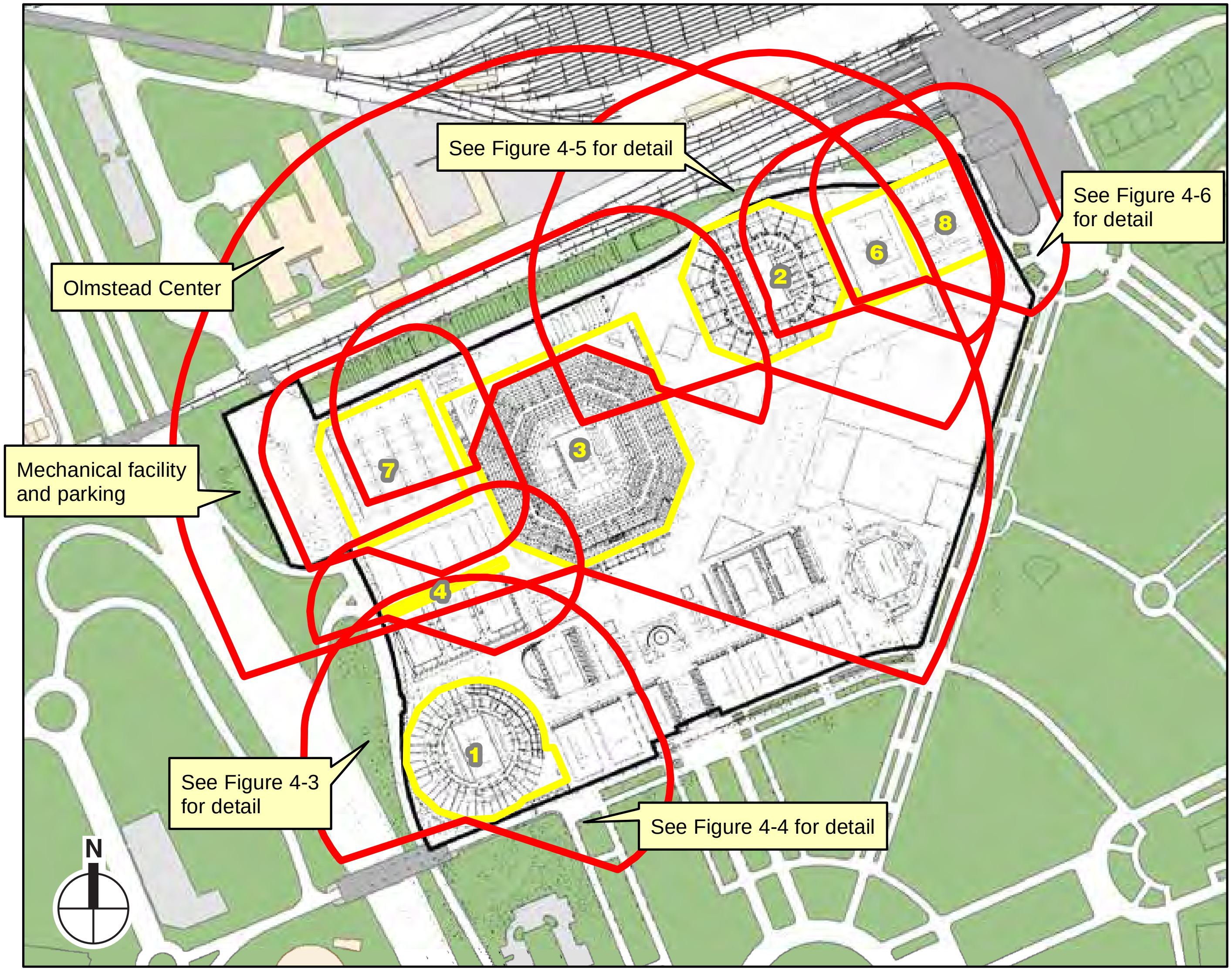


Project site boundary

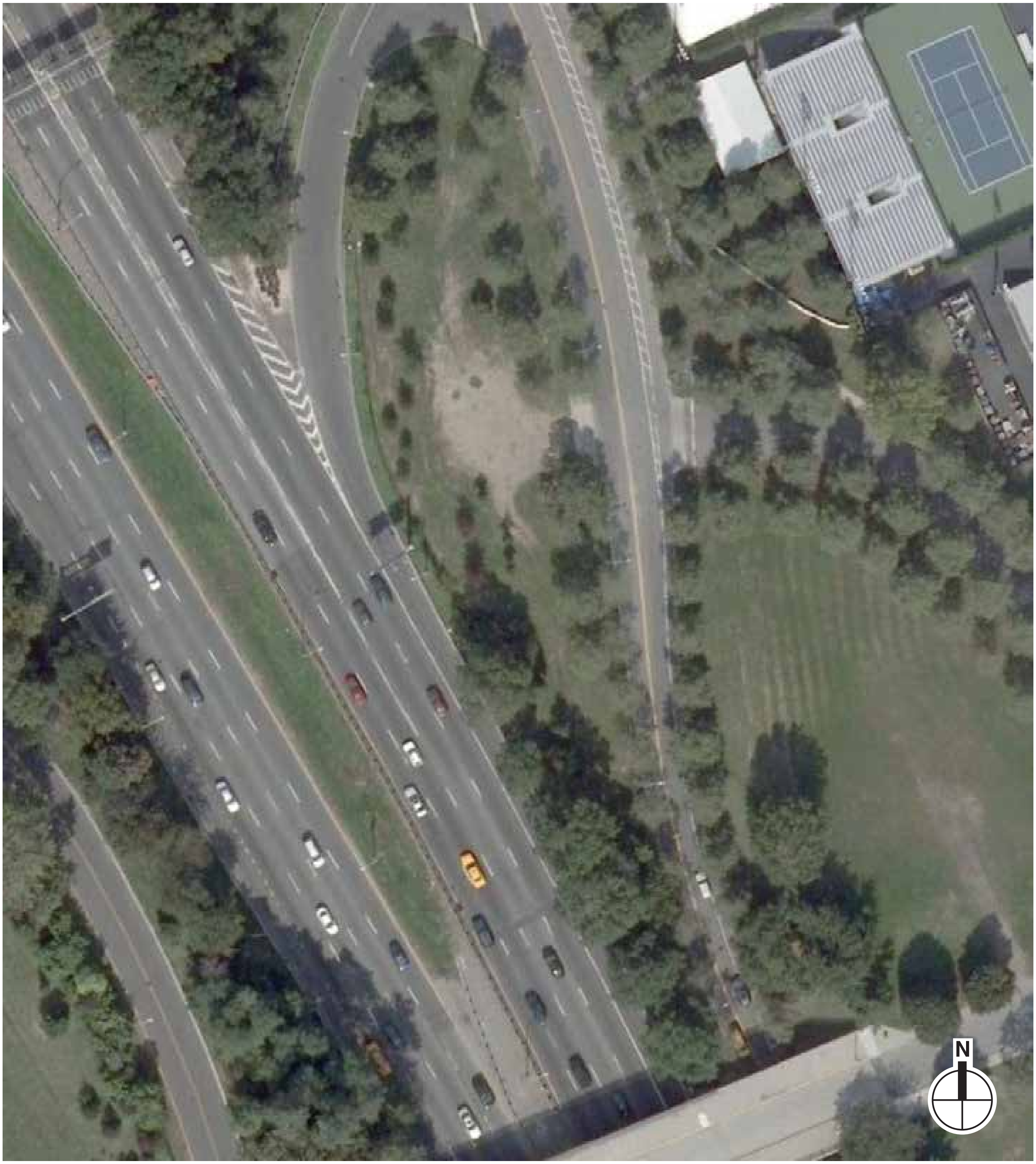
Proposed new structures for analysis (see Table 4-1 for number key)

Tier 2: Remaining longest shadow study area

Publicly-accessible open space (outside project site boundary)

Tier 2 Assessment

Figure 4-2



Median West of Proposed Stadium 3 - detail

Figure 4-3

Area Southeast of Proposed Stadium 3 - detail

Figure 4-4

parking area. It is therefore only minimally sensitive to any new shadows it might receive from the proposed parking garage, the viewing platform and canopy, or the Arthur Ashe roof canopy.

North of the project site, there is a strip containing some grass and trees between Meridian Road and the rail yards (see **Figures 4-2** and **4-5**) that is located within the longest shadow study area for the proposed parking garage A, the Arthur Ashe stadium additions, the reconstructed Louis Armstrong Stadium (Stadium 2), and the two proposed buildings in the northeast area of the project site. This strip or median is difficult to access and does not have any park user amenities. Portions of it are sometimes used for trailers and for parking, including during the US Open. In the No-Action condition, a portion of the central portion of this strip will be occupied by a cooling tower and chiller plant, leaving grass and trees only on smaller portions in the west and east sections of the strip, by 2019.

Shadow from the Arthur Ashe Stadium (Stadium 1) additions could potentially reach farther north beyond the railroad tracks to the landscaped areas surrounding the Olmsted Center, a DPR administrative facility.

East of the project site, a portion of the circular plaza at the base of the Passerelle Building (the one-story buildings that also functions as a ramp and bridge to the adjacent Metropolitan Transportation Authority [MTA] and Long Island Rail Road [LIRR] stations) is located within the longest shadow study area of the proposed parking garage in the northeast corner of the project site. The potentially affected area of this plaza includes two fenced areas of trees and landscaping, and benches (see **Figures 4-2 and 4-6**). This area could potentially receive project-generated shadow in the late afternoons of late spring and summer days, since it is southeast of the proposed garage. No structures are located south or east of this area, so it likely would receive direct sunlight during mornings and much of the afternoons of these days.

Since the Tier 2 Assessment could not eliminate the possibility of new shadows on the sunlight-sensitive areas described above, the next tier of analysis was conducted.

TIER 3 SCREENING ASSESSMENT

The direction and length of shadows vary throughout the course of the day and also differ depending on the season. In order to determine whether project-generated shadow could fall on a sunlight-sensitive resource, three-dimensional (3D) computer mapping software[1] is used in the Tier 3 assessment to calculate and display the proposed project's shadows on individual representative days of the year. A computer model was developed containing three-dimensional representations of the elements in the base map used in the preceding assessments, the topographic information of the study area, and a reasonable worst-case three-dimensional representation of the proposed project.

REPRESENTATIVE DAYS FOR ANALYSIS

Following the guidance of the *CEQR Technical Manual*, shadows on the summer solstice (June 21), winter solstice (December 21) and spring and fall equinoxes (March 21 and September 21, which are approximately the same in terms of shadow patterns) are modeled, to represent the range of shadows over the course of the year. An additional representative day during the

[1] MicroStation V8i (SELECTSeries 3)

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Medians North of Project Site - detail

Figure 4-5

Plaza East of Project Site - Looking North
Figure 4-6

growing season is also modeled, generally the day halfway between the summer solstice and the equinoxes (i.e., May 6 or August 6), which have approximately the same shadow patterns.

TIMEFRAME WINDOW OF ANALYSIS

The shadow assessment considers shadows occurring between one and a half hours after sunrise and one and a half hours before sunset. At times earlier or later than this timeframe window of analysis, the sun is down near the horizon and the sun's rays reach the Earth at very tangential angles, diminishing the amount of solar energy and producing shadows that are very long, move fast, and generally blend with shadows from existing structures until the sun reaches the horizon and sets. Consequently, shadows occurring outside the timeframe window of analysis are not considered significant under *CEQR*, and their assessment is not required.

TIER 3 SCREENING ASSESSMENT RESULTS

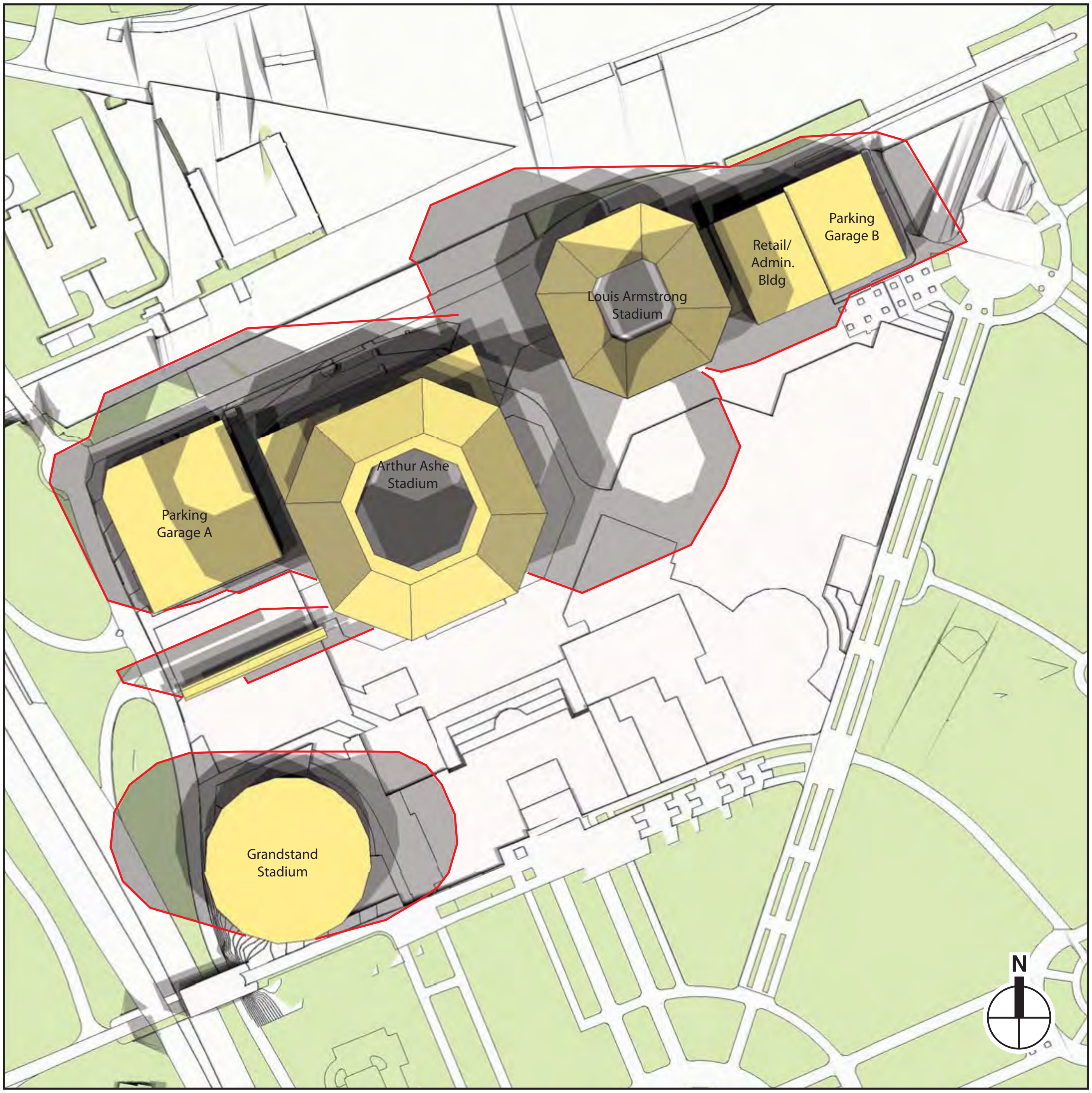
Figures 4-7 through 4-10 show the range of shadows from the proposed structures for analysis over the course of the March 21/September 21, May 6/August 6, June 21 and December 21 analysis periods. Only the proposed structures or additions and the shadows they cast are included in the Tier 3 analysis. The existing buildings and portions of buildings, and the shadows they cast, are not included, in order to determine the potential reach of new shadows.

Shadow from the relocated Grandstand Stadium (Stadium 3) could reach portions of the landscaped area between Meridian Road and Grand Central Parkway containing grass and mature trees on all four analysis days. Shadow from the relocated Grandstand Stadium (Stadium 3) would reach a small area containing grass and trees to its southeast beyond United Nations Avenue in the afternoons of the May 6/August 6 and June 21 analysis days, but would only reach a portion of the sidewalk on the March 21/September 21 analysis day. In the northwesterly tournament courts area, shadow from the proposed viewing platform's canopy would reach very small portions of the landscaped area to its west in the spring, summer and fall seasons. Shadow from proposed Parking Garage A would similarly reach small areas of the landscaped area to its west in the spring, summer and fall, and the strip to its north in the fall, winter and spring. Shadow from the proposed roof canopy would reach portions of the strip to its north in the fall, winter and spring, areas with grass and trees in the Olmsted Center and its parking lot further north in the winter, and, early in the June 21 morning, the landscaped area west of Parking Garage A. Shadow from the rebuilt Louis Armstrong Stadium (Stadium 2) would reach portions of the strip to the north containing grass and trees between Meridian Road and the rail yards on all four analysis days, although on June 21 the shadow would be minimal. Shadow from the proposed administrative and retail building and Parking Garage B would reach a portion of this strip on the March 21/September 21 and December 21 analysis day only. Shadow from Parking Garage B could reach a portion of the circular plaza at the base of the Passerelle Building, east of the site, on the spring, summer, and fall analysis days but not the December 21 analysis day.

In order to determine the extent and duration of project-generated incremental shadow, further analysis was conducted.

D. DETAILED SHADOW ANALYSIS

The purpose of the detailed analysis is to determine the extent and duration of incremental shadows on sunlight-sensitive resources and to assess their effects. A 3D computer model of the baseline condition was developed, containing the relevant existing buildings. The future



Proposed Structures for Analysis

Publicly-Accessible Open Space

Total Potentially Affected Area on March 21/September 21

0 200 500 FEET
SCALE

Shadows were rendered at five individual times (7:36 AM, 9:30 AM, 12:00 PM, 2:30 PM, and 4:29 PM) and superimposed.
Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - March 21/September 21

Figure 4-7

Proposed Structures for Analysis

Publicly-Accessible Open Space

Total Potentially Affected Area on May 6/August 6

0 200 500 FEET

SCALE

Shadows were rendered at five individual times (6:27 AM, 9:00 AM, 12:00 PM, 3:00 PM, and 5:18 PM) and superimposed.
Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - May 6/August 6

Figure 4-8

Proposed Structures for Analysis

Publicly-Accessible Open Space

Total Potentially Affected Area on June 21

Shadows were rendered at five individual times (5:57 AM, 9:00 AM, 12:00 PM, 3:00 PM, and 6:01 PM) and superimposed.
Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

Tier 3 Assessment - June 21

Figure 4-9

1.2.13

Proposed Structures for Analysis

Publicly-Accessible Open Space

Total Potentially Affected Area on December 21

0 200 500 FEET

SCALE

Shadows were rendered at five individual times (8:51 AM, 10:30 AM, 12:00 PM, 1:30 PM, and 2:53 PM) and superimposed.

Tier 3 Assessment - December 21

Figure 4-10

condition with the proposed buildings and its shadows was compared to the baseline shadows to determine the incremental shadows that would result with the proposed project. **Figure 4-11** shows views of the future With Action and the future No-Action computer models. **Table 4-2** shows the duration of incremental shadow on each resource of concern. **Figures 4-12 through 4-17** show relevant instants in time on the analysis days when incremental shadow would occur, with the incremental shadow highlighted in red.

Table 4-2
Incremental Shadow Durations

Analysis day and timeframe window	March 21 / Sept. 21 7:36 AM-4:29 PM	May 6 / August 6 6:27 AM-5:18 PM	June 21 5:57 AM-6:01 PM	December 21 8:51 AM-2:53 PM
OPEN SPACES				
Area west of relocated Stadium 3	7:36 AM–9:45AM Total: 2 hr 9 min	6:27 AM–9:15 AM Total: 2 hr 48 min	5:57 AM–9:15 AM Total: 3 hr 18 min	8:51 AM–10:15 AM Total: 1 hr 24 min
Area west of Parking Garage A	7:36 AM–7:45 AM Total: 9 min	6:27 AM–7:00 AM Total: 33 min	5:57 AM–6:45 AM Total: 48 min	—
Area north of Parking Garage A	7:36 AM–8:15 AM Total: 39 min	—	—	8:51 AM–11:00 AM Total: 2 hr 9 min
Olmsted Center	—	—	—	8:51 AM–10:00 AM Total: 1 hr 9 min
Area north of Stadium 2 and Parking Garage B	7:36 AM–3:15 PM Total: 7 hr 39 min	6:27 AM–11:30 AM Total: 5 hr 3 min	6:15 AM–10:45 AM Total: 4 hr 30 min	8:51 AM–2:53 PM Total: 6 hr 2 min
Landscaping and benches in circular plaza east of project site	4:25 PM–4:29 PM Total: 4 min	3:55 PM–5:18 PM Total: 1 hr 23 min	4:10 PM–6:01 PM Total: 1 hr 51 min	—
Grass/trees southeast of relocated Stadium 3	—	4:45 PM–5:18 PM Total: 33 min	4:45 PM–6:01 PM Total: 1 hr 16 min	—

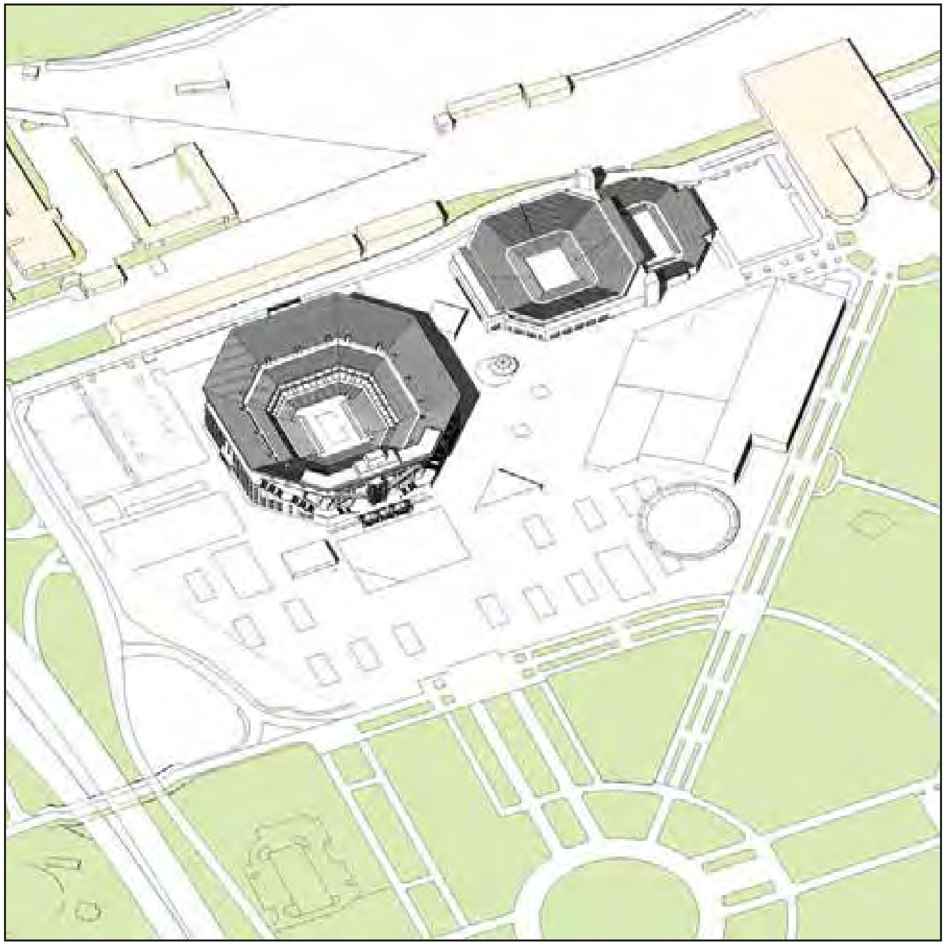
Notes: Table indicates entry and exit times and total duration of incremental shadow for each sunlight-sensitive resource. Daylight saving time is not used.

Shadow analyses were performed for each of the representative days and analysis periods indicated in the Tier 3 assessment.

E. CONCLUSIONS

The analysis showed that incremental shadows would fall on a portion of the landscaped area west of the relocated Stadium 3 early in the mornings, ranging in duration from about an hour and a half in winter to three and a quarter hours on the summer solstice.

Incremental shadow would also fall on the landscaped area west of the proposed Parking Garage A, which contains mechanical equipment and a parking lot, in the spring, summer and fall, only lasting between about 10 minutes to 48 minutes depending on the season.



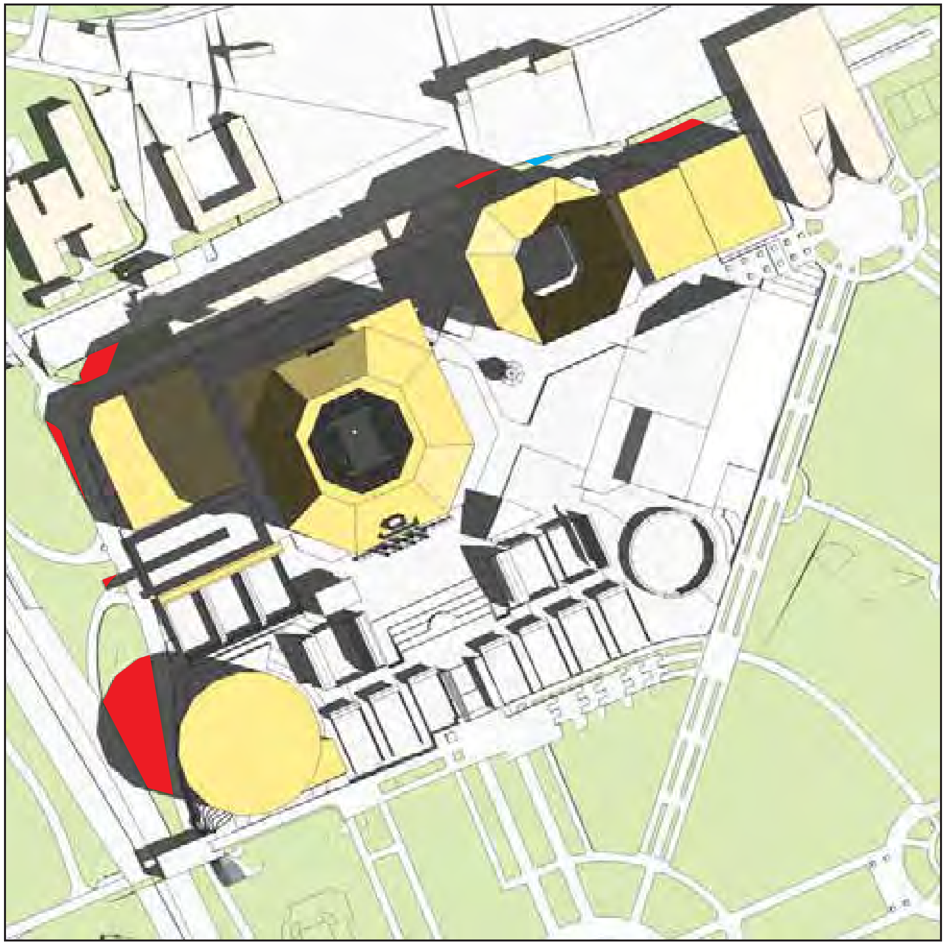
No Action

With Action

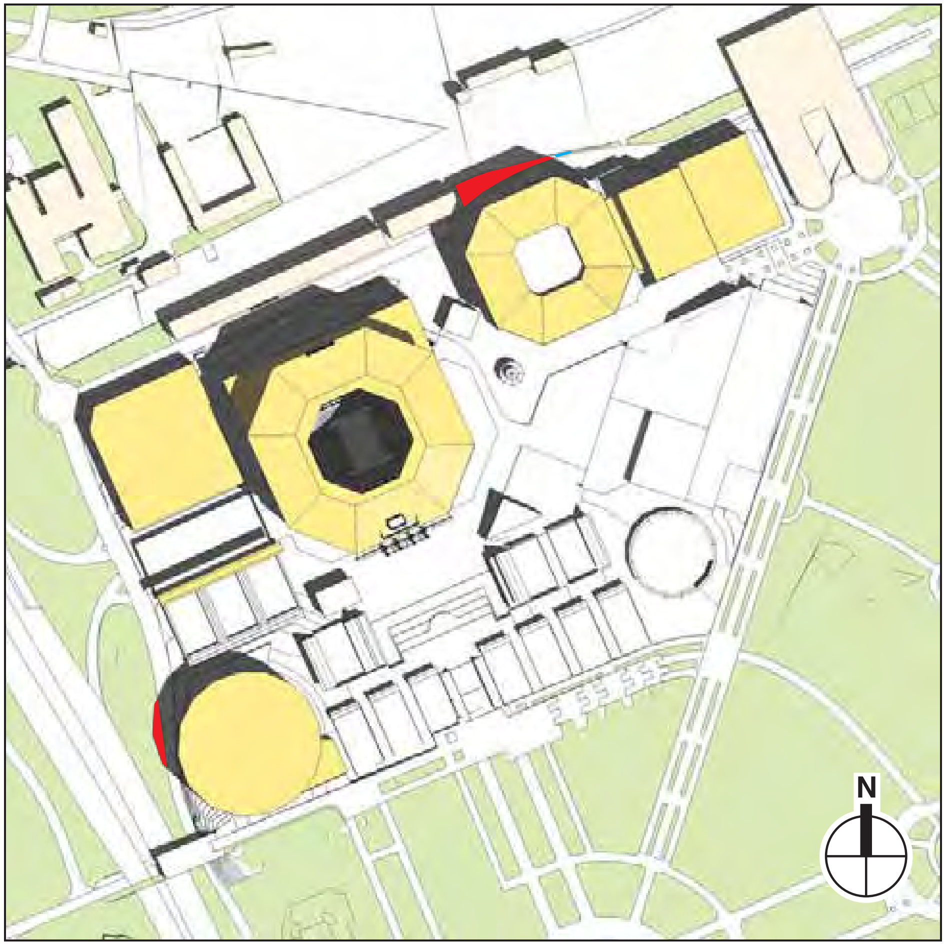
Proposed Structures for Analysis

Publicly-Accessible Open Space

Three-Dimensional Computer Models for Detailed Analysis - View North
Figure 4-11



7:36 AM



9:30 AM

Proposed Structures for Analysis

Publicly-Accessible Open Space

Incremental Shadow on Sunlight-Sensitive Resource

Reduced Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

March 21/Sept. 21
Figure 4-12

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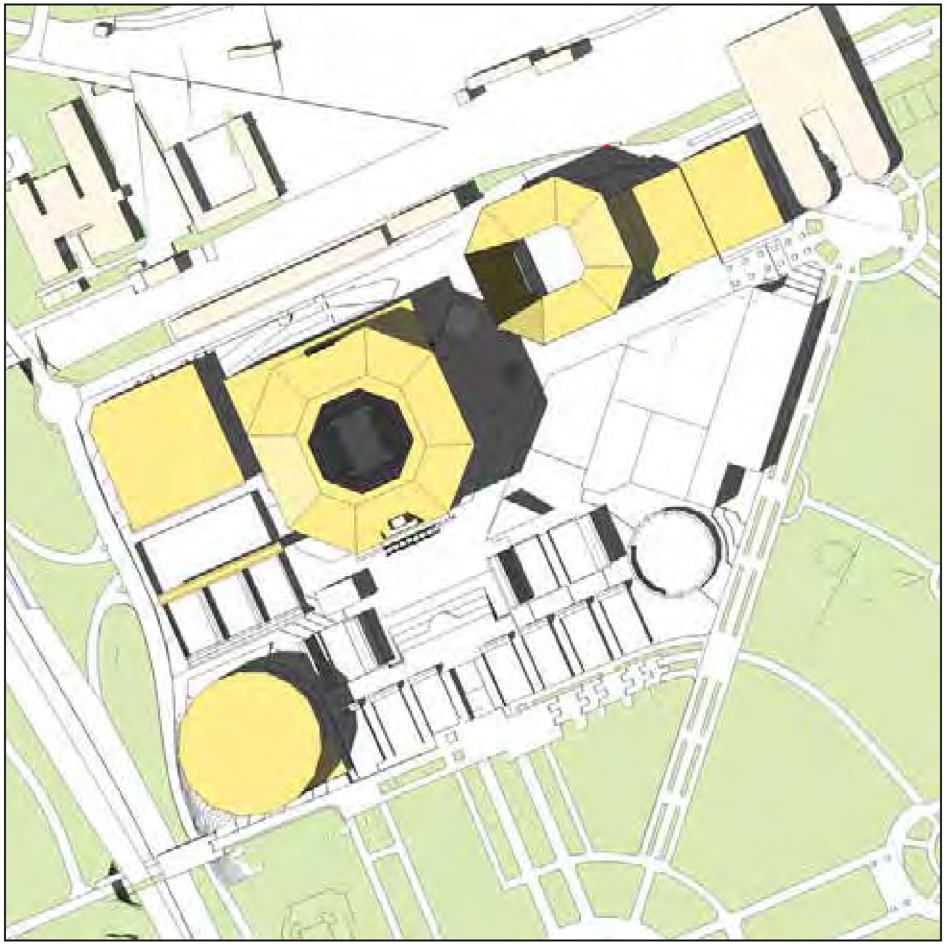
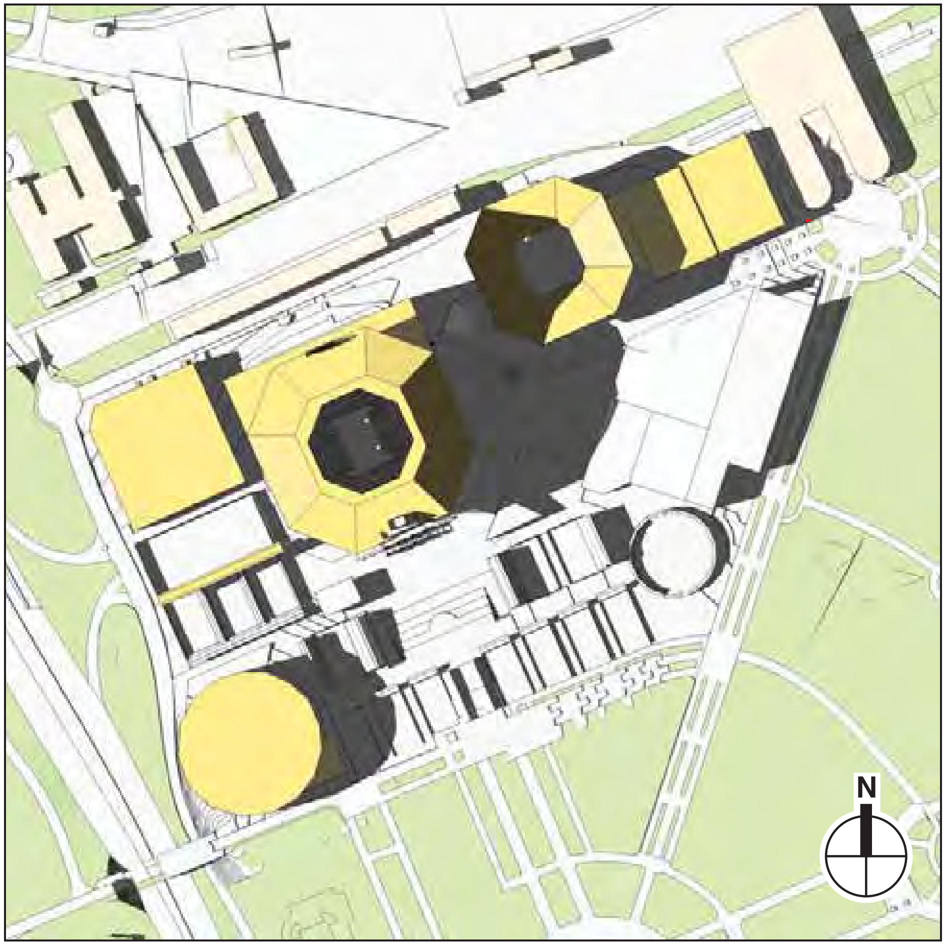


3:15 PM



4:29 PM

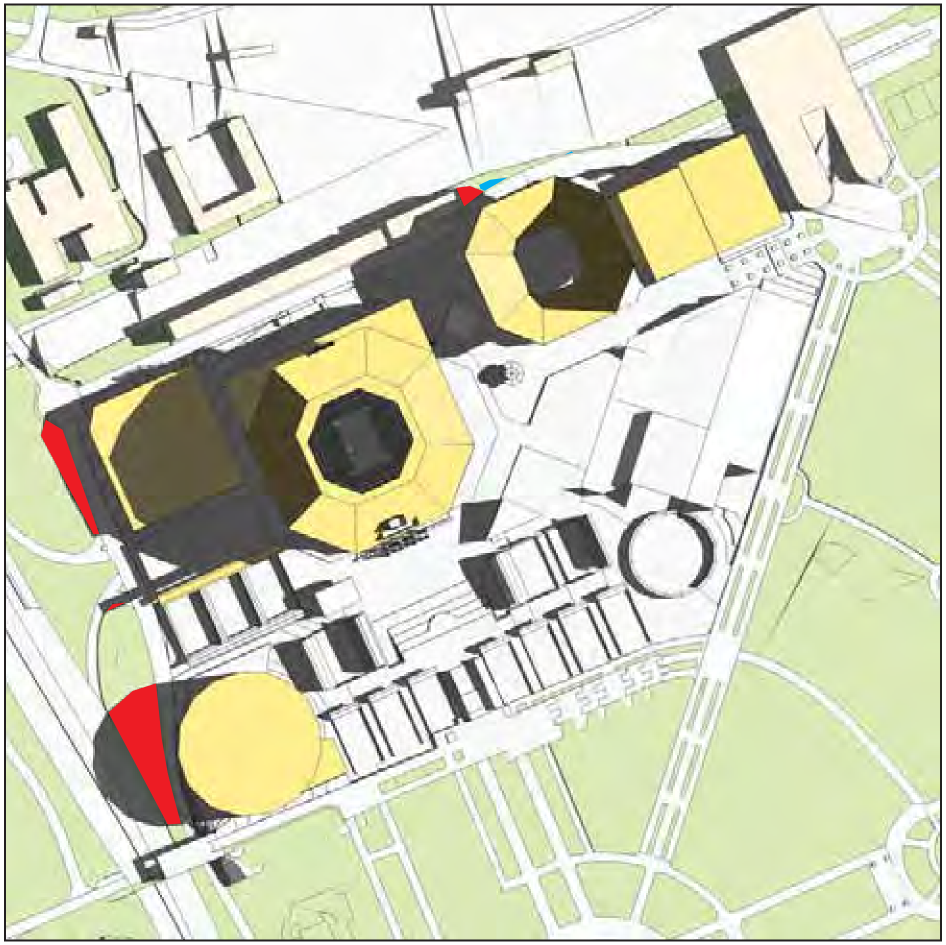
Proposed Structures for Analysis

Publicly-Accessible Open Space

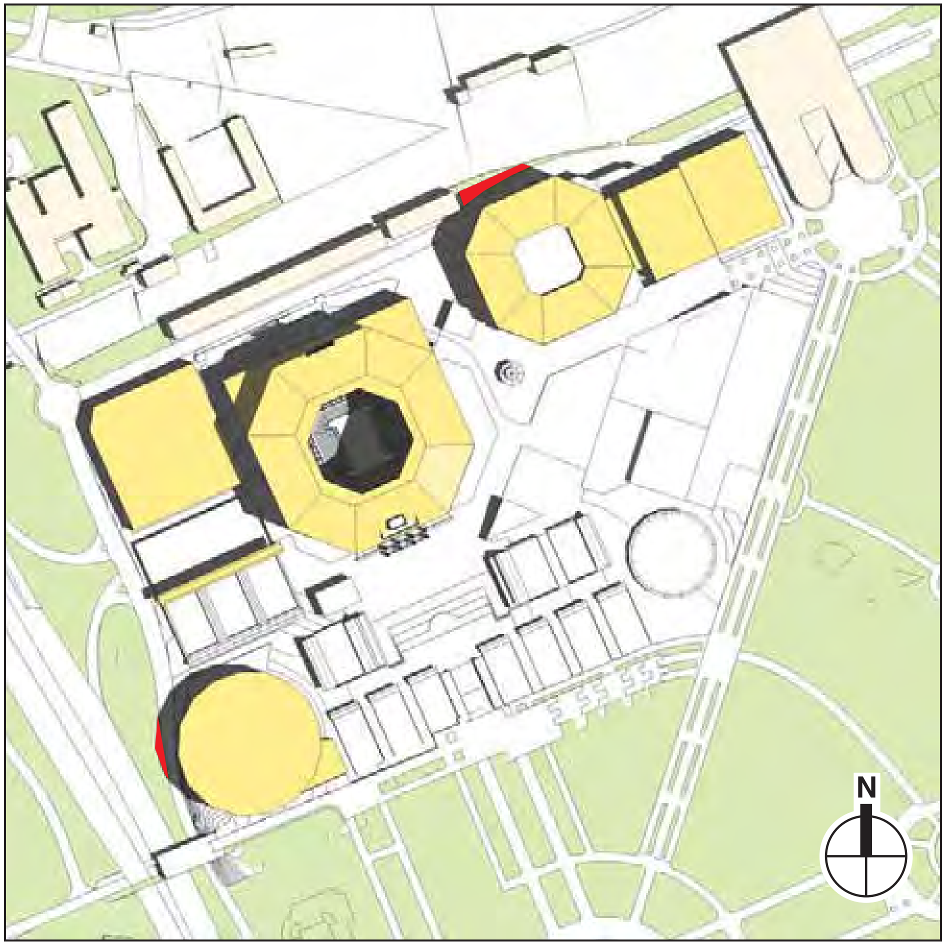
Incremental Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

March 21/Sept. 21
Figure 4-13



6:27 AM



9:00 AM

Proposed Structures for Analysis

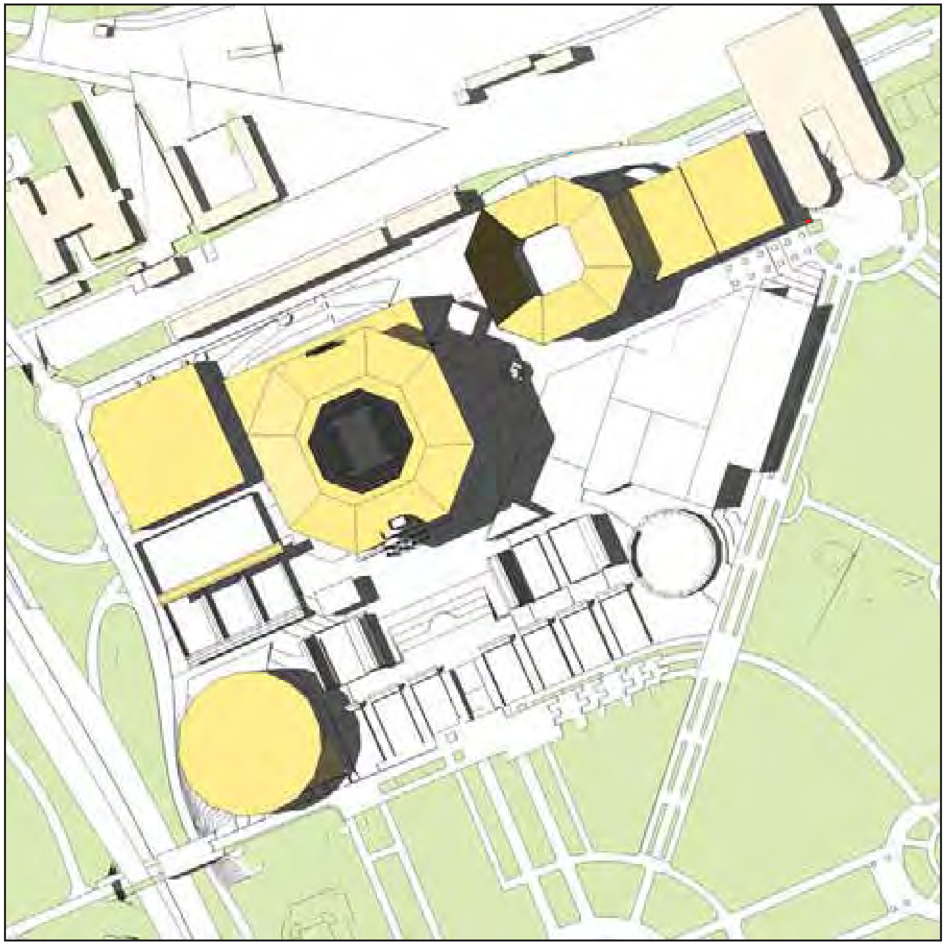
Publicly-Accessible Open Space

Incremental Shadow on Sunlight-Sensitive Resource

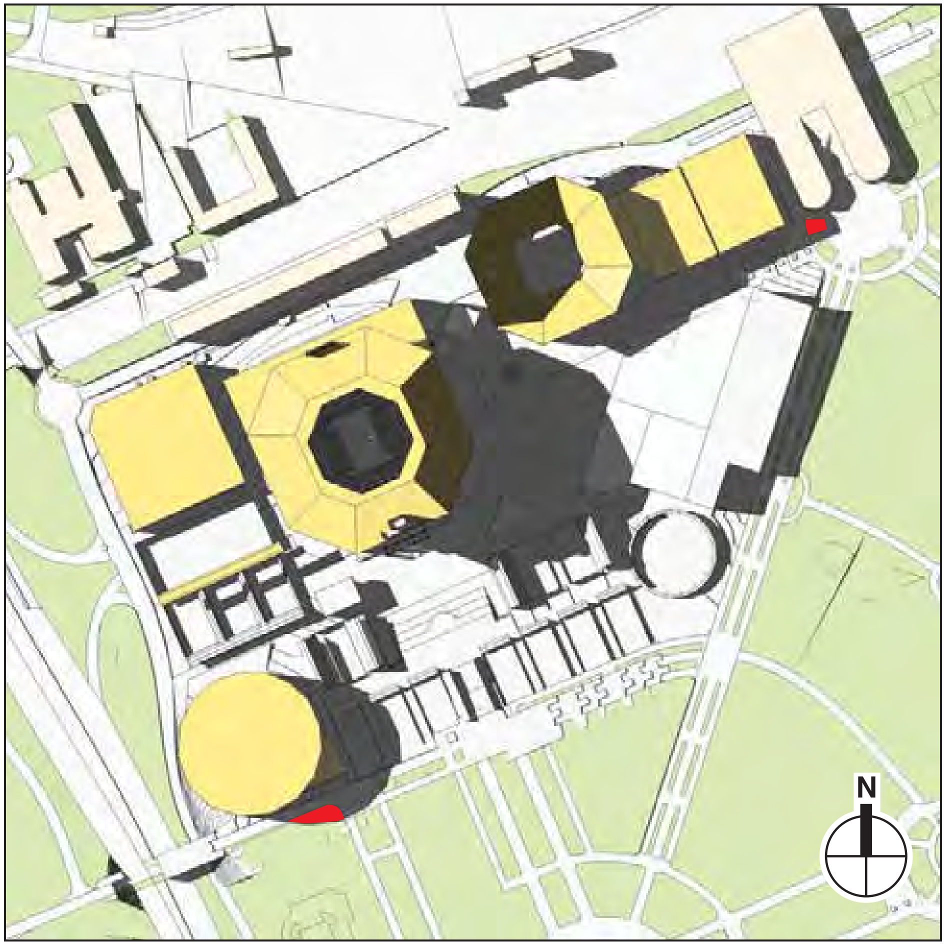
Reduced Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

May 6/August 6
Figure 4-14



4:00 PM



5:18 PM

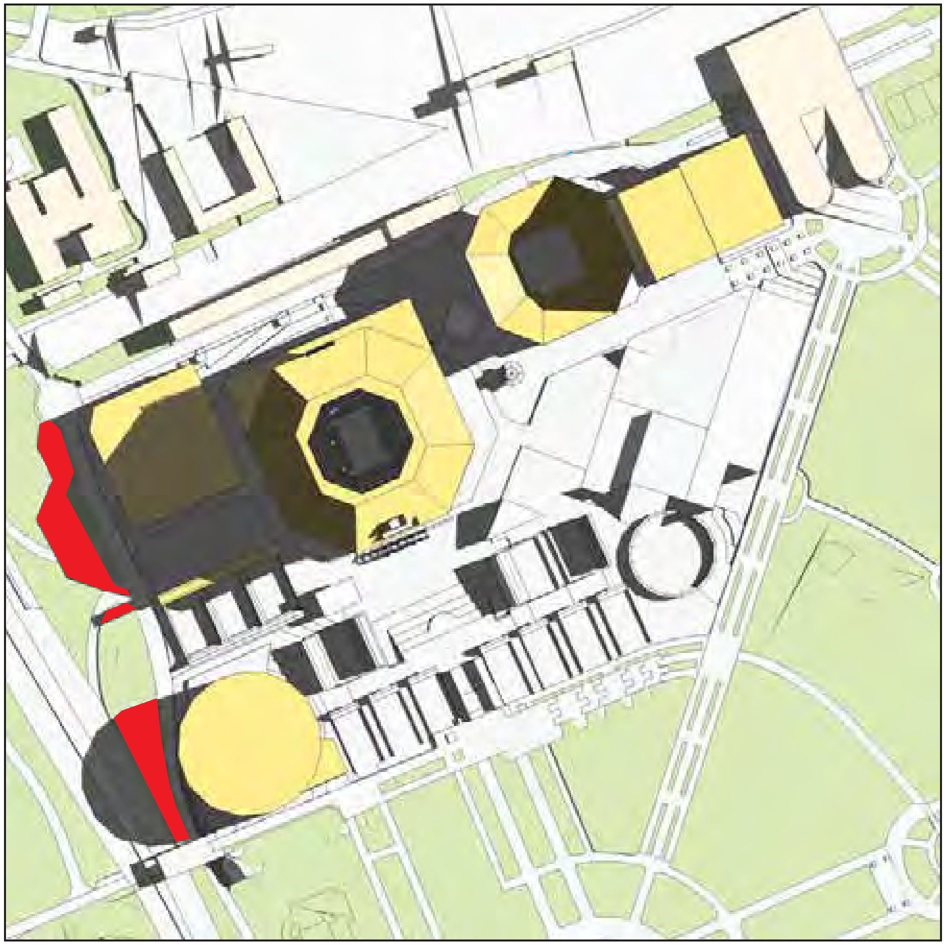
Proposed Structures for Analysis

Publicly-Accessible Open Space

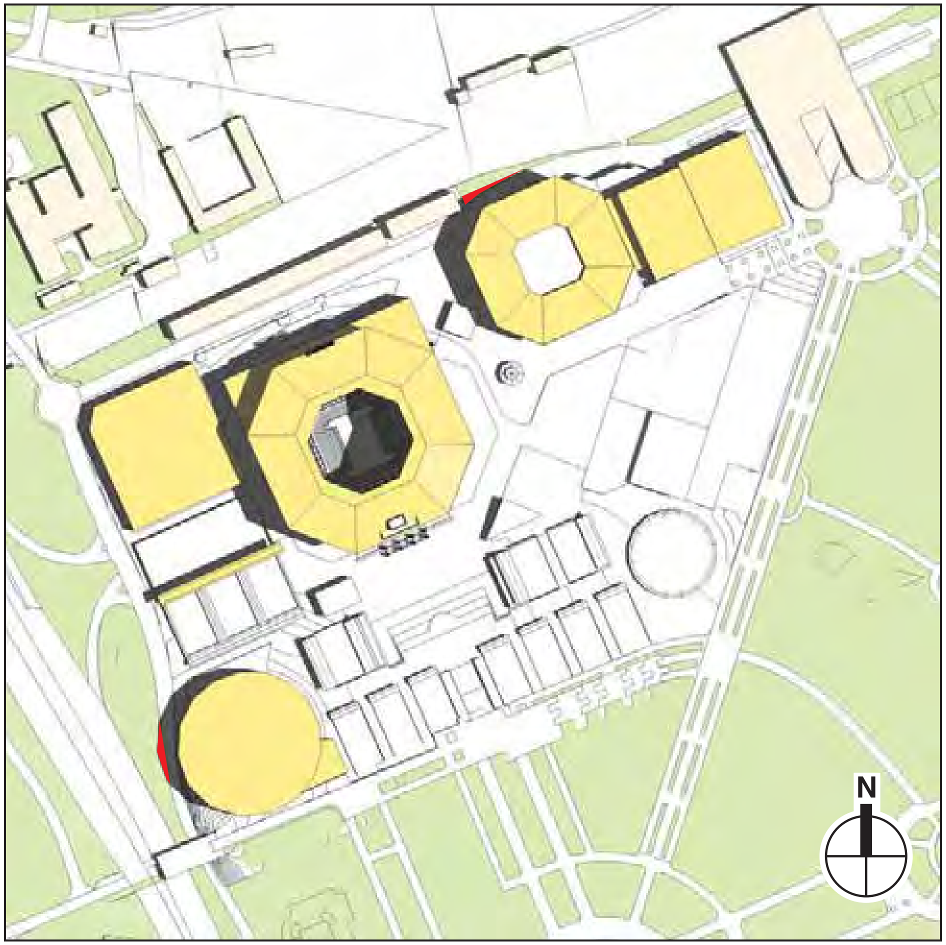
Incremental Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

May 6/August 6
Figure 4-15



5:57 AM



9:00 AM

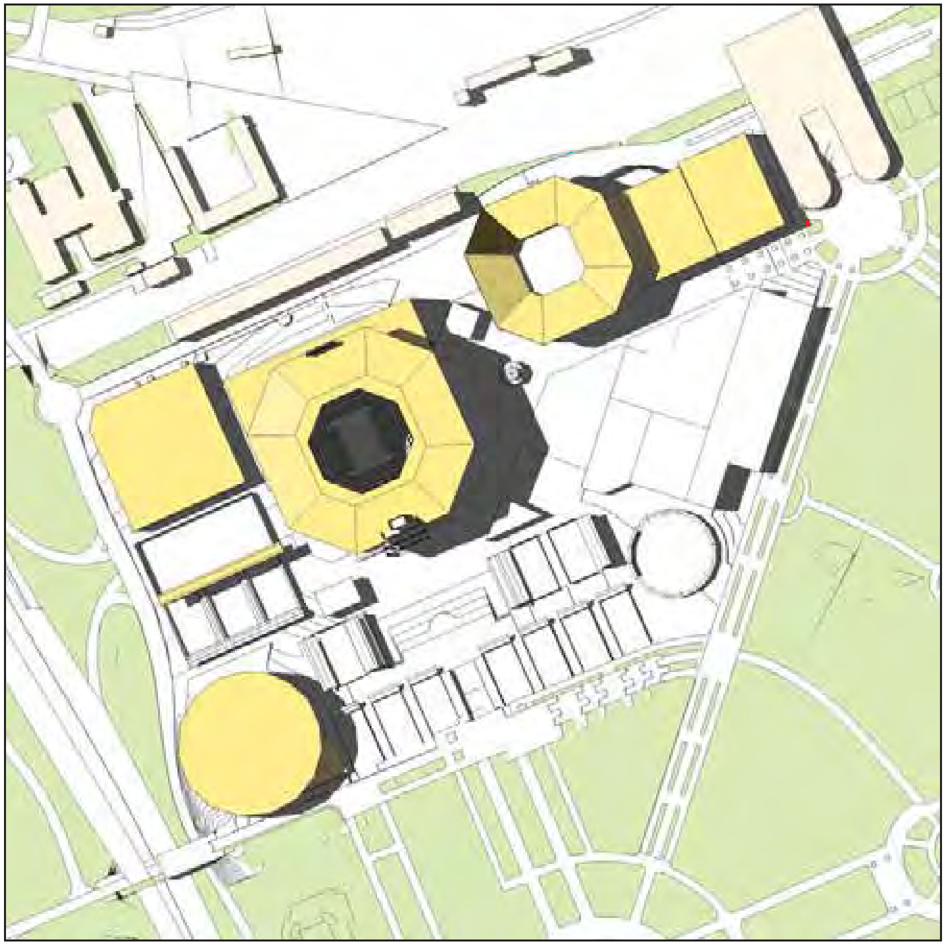
Proposed Structures for Analysis

Publicly-Accessible Open Space

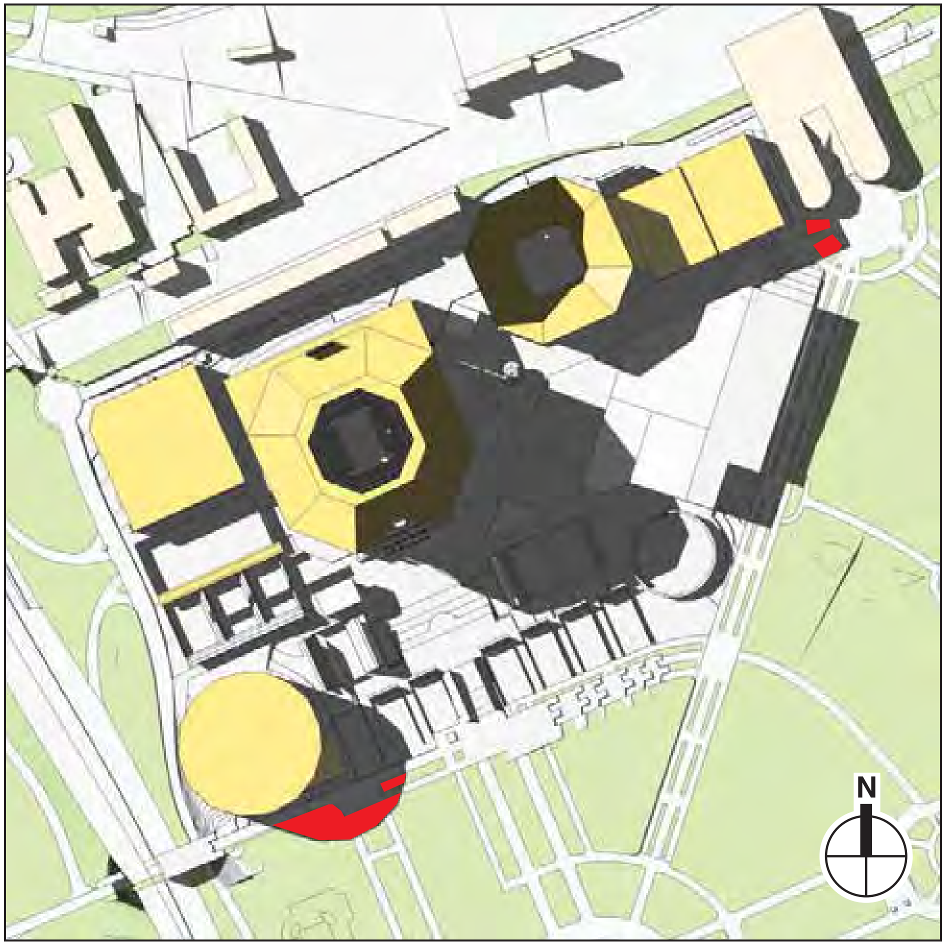
Incremental Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

June 21
Figure 4-16



4:15 PM



6:01 PM

Proposed Structures for Analysis

Publicly-Accessible Open Space

Incremental Shadow on Sunlight-Sensitive Resource

Daylight Savings Time was not used, per *CEQR Technical Manual* guidelines.

June 21
Figure 4-17

Incremental shadow would also fall on small portions of the strip north of the project site for up to two hours and nine minutes north of Parking Garage A, and between four and a half to seven and three quarters hours north of Stadium 2 and Parking Garage B.

The relocated Stadium 3 would also cast a new shadow to its southeast onto a small area of grass and trees in the late afternoons of the late spring and summer, ranging from a half-hour on May 6/August 6 to an hour and a quarter on the summer solstice.

These areas contain a mix of paved road or walkways, grass and mature trees, but no other user amenities, and, as noted in Chapter 3, “Open Space and Recreational Resources,” are lightly used, primarily for walking, running, and bicycling on the perimeter paths. The assessment concluded that these areas are therefore only minimally sensitive to effects of incremental shadows. Further, the areas west of the project site would continue to receive direct sun for more than six hours throughout the spring, summer and fall, since there are virtually no structures to the south or west.

The other area that could be affected by project-generated shadow, the portion of the circular plaza to the east of the project site, would receive between a few minutes and an hour and 50 minutes of incremental shadow in the spring, summer, and fall. Only a very small portion of this plaza would be affected by the new shadow, and even this small area would receive direct sun for most of the remaining day in those seasons due to the lack of structures to the south and east.

The analysis concluded that the proposed project could result in new shadows on several small areas containing sunlight-sensitive features adjacent to the project site within Flushing Meadows Corona Park. However, all but one of the areas are lightly used, primarily for activity on the perimeter paths. The assessment concluded that the new shadows would not significantly impact the park or its users. ✷

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a historic and cultural resources assessment is required if there is the potential to affect either archaeological or architectural resources. The *CEQR Technical Manual* identifies historic resources as districts, buildings, structures, sites, and objects of historical, aesthetic, cultural, and archaeological importance.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This chapter considers the potential of the proposed project to affect historic and cultural resources on the project site and in the surrounding area, and provides an assessment of existing and future conditions with and without the proposed project for the project site and a study area surrounding the site.

PRINCIPAL CONCLUSIONS

As described in detail below, this analysis finds that the proposed project would not have any significant adverse physical, contextual, or visual impacts on the architectural resources within the study area, and would not have any significant adverse impacts on archaeological resources.

ARCHAEOLOGICAL RESOURCES

In a comment letter dated May 4, 2012, LPC determined that the project site and the potential sites of the park improvement projects do not have archaeological significance (see **Appendix B**, "Historic and Cultural Resources"). Therefore, the proposed project would not result in any significant adverse impacts related to archaeological resources.

ARCHITECTURAL RESOURCES

While the proposed project would result in numerous changes to the project site, there are no architectural resources within the boundaries of the project site; therefore, none would be affected by the proposed project. The proposed project would also affect areas at the NTC's perimeter and result in the relocation of a connector roadway. However, the existing connector roadway and the other affected landscaped and paved areas are not significant elements of Flushing Meadows Corona Park's original Beaux Arts plan. Therefore, Flushing Meadow Corona Park's original plan elements would not be significantly adversely affected by the proposed project.

The proposed project would result in construction activities within 90 feet of two architectural resources: the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with applicable New York City Landmarks Preservation Commission (LPC) and New York City Department of Buildings (DOB) guidelines, including the preparation of a Construction Protection Plan (CPP) that would be prepared prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project.

In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. It is not expected that any of the park improvement projects would affect any historic resources within the park. However, if improvement projects are planned near historic resources, measures would be undertaken to prevent inadvertent construction-related impacts to such resources, including compliance with LPC and DOB guidelines, as described above.

B. METHODOLOGY

This analysis has been prepared in accordance with New York City Environmental Quality Review (CEQR) procedures and follows the guidelines of the 2012 *CEQR Technical Manual*.

ARCHITECTURAL RESOURCES

Study areas for architectural resources are determined based on an area of potential effect for construction-period impacts, such as ground-borne vibrations, and on the area of potential effect for visual or contextual effects, which is usually a larger area. The study area for visual or contextual effects of the proposed project has been defined as the project site and the area within 400 feet of the project site's boundaries (see **Figure 5-1**[1]). This study area encompasses the area of potential effect for construction-period impacts, which as described in more detail below is defined as the area within 90 feet of construction activities. This study area is consistent with *CEQR Technical Manual* methodology to assess an action's potential impacts on architectural resources, which sets forth that the size of the study area should be directly related to the anticipated extent of the action's impacts.

To assess the potential impacts of the proposed project, an inventory of architectural resources in the study area was compiled. In accordance with CEQR guidelines, the inventory includes all officially recognized architectural resources. These resources ("known architectural resources") are defined as National Historic Landmarks (NHLs); properties or districts listed on the State and National Registers of Historic Places (S/NR), or determined to be eligible for such listing; New York City Landmarks (NYCLs) and Historic Districts (NYCHDs); and properties that have been considered for designation ("heard") by the New York City Landmarks Preservation Commission (LPC) at a public hearing, calendared for consideration at such a hearing ("pending" NYCLs), or found by LPC to appear eligible for designation.

In addition to identifying known architectural resources, an evaluation of the study area was undertaken to identify any "potential architectural resources"; that is, other structures in the study area that could warrant recognition as architectural resources (properties that could be eligible for S/NR listing or NYCL designation). Properties were evaluated based on a site visit by an architectural historian, as well as a review of the survey conducted as part of the 1993 *USTA National Tennis Center Project FEIS*. Identification of potential architectural resources was based on criteria for listing on the National Register as found in the Code of Federal Regulations, Title 36, part 60, and the LPC criteria for NYCL/NYCHD designation.

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[1] Note: **Figure 5-1** is the most recent publicly-accessible aerial photograph (2010). The aerial does not reflect more recent site plan changes to the NTC, which are shown on Figure 1-4.

0 400 1000 FEET
SCALE

Project Site Boundary

Study Area Boundary (400-Foot Perimeter)

Photograph View Direction and Reference Number

Historic and Cultural Resources
Reference Map
Figure 5-1

Once the architectural resources in the study area were identified, the proposed project was assessed for its potential to have direct, physical impacts and/or indirect visual or contextual impacts on architectural resources. Direct impacts include demolition of a resource, and alterations to a resource that cause it to become a different visual entity. A resource could also be physically damaged from adjacent construction, either from vibration (i.e., from construction blasting or pile driving), or from falling objects, subsidence, collapse, or damage from construction machinery. Adjacent construction is defined as any construction activity that would occur within 90 feet of an architectural resource, as defined in the New York City Department of Buildings' (DOB) *Technical Policy and Procedure Notice (TPPN) #10/88*.[1]

Indirect impacts are contextual or visual impacts that could result from project construction or operation. As described in the *CEQR Technical Manual*, indirect impacts could result from blocking significant public views of a resource; isolating a resource from its setting or relationship to the streetscape; altering the setting of a resource; introducing incompatible visual, audible, or atmospheric elements to a resource's setting; or introducing shadows over a historic landscape or an architectural resource with sun-sensitive features that contribute to that resource's significance (e.g., a church with stained-glass windows).

The setting of each architectural resource, including its visual prominence and significance in publicly accessible views, whether it has sun-sensitive features, and its visual and architectural relationship to other architectural resources, was taken into consideration for this analysis.

ARCHAEOLOGICAL RESOURCES

The study area for archaeological resources is defined as the area where subsurface disturbance would occur, the project site itself. In a comment letter dated May 4, 2012, LPC determined that the project site does not have archaeological significance (see **Appendix B**, "Historic and Cultural Resources"). Therefore, this assessment focuses on architectural resources only.

C. EXISTING CONDITIONS

PROJECT SITE

The 37.48-acre project site includes: the 35.3-acre portion of the NTC site bounded to the north and west by Meridian Road, to the east by the Passarelle Building, and to the south by United Nations Avenue North, within Flushing Meadows Corona Park in Queens; the 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94 acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3 acre relocated connector road area, which would remain under DPR ownership and control. The NTC site contains three stadiums (Arthur Ashe Stadium, Louis Armstrong Stadium, and Grandstand Stadium), one micro-stadium (Court 17), tennis courts, and ancillary buildings including retail kiosks, restrooms, the Indoor Training Center, and temporary broadcast trailers during the US Open. The remaining portions of the project site are: the 0.94 acres that would be added to the NTC site along its southern and western boundaries, which currently consist of the connector roadway between Meridian Road and United Nations Avenue North, and a mix of landscaped and paved areas north of United Nations Avenue North and south of the existing NTC fenceline;

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[1] TPPN #10/88 was issued by DOB on June 6, 1988, to supplement Building Code regulations with regard to historic structures. TPPN #10/88 outlines procedures for the avoidance of damage to historic structures resulting from adjacent construction, defined as construction within a lateral distance of 90 feet from the historic resource.

and the approximately 0.3-acre landscaped area south of United Nations Avenue North, which would be developed as the relocated connector roadway and remain under City jurisdiction.

The project site does not contain any architectural resources. Louis Armstrong Stadium (Stadium 2) and Grandstand Stadium (Stadium 3) were originally constructed for the 1964-1965 World's Fair; however, they were both extensively remodeled and expanded for NTC use in 1978. The stadiums were further altered as part of the 1993 NTC project that was completed in 1997. As such, neither retains historic or architectural integrity.

STUDY AREA

The study area is located entirely within Flushing Meadows Corona Park, which was the location of two World's Fairs, in 1939-1940 and 1964-1965. While the first extensive filling-in of Flushing Meadows marshes occurred in the general vicinity of the project area during the winter and spring of 1910, as part of a proposed plan to create a port along Flushing Bay and Flushing Creek, the creation of the 1939-1940 World's Fair fairgrounds also required moving many tons of soil to level and grade the irregular terrain, planting many thousands of trees, and installing utility lines. In addition, a complex new drainage system for the Flushing area was created that included placing a branch of the Flushing Creek into an enormous conduit and forming the two lakes in the park.

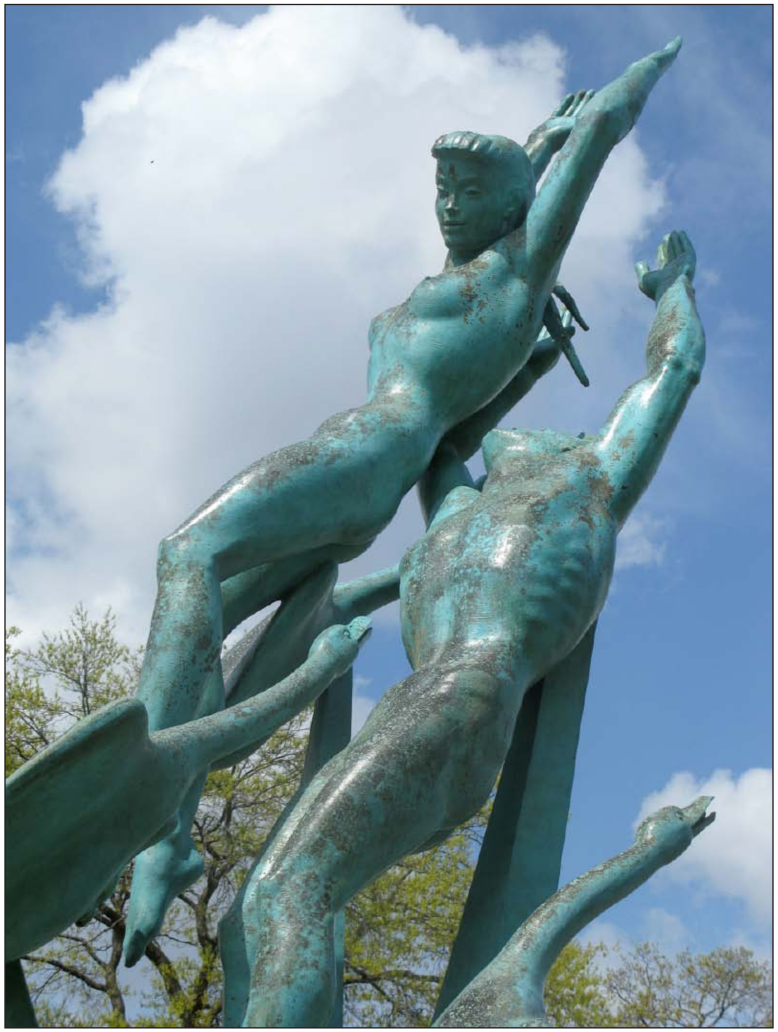
Although most of the structures constructed for the 1939-1940 and 1964-1965 World's Fairs were demolished, some remain, including the following within and just outside of the study area: New York City Building (now the Queens Museum of Art), the Passerelle Building, the Unisphere, the Pavilion (now the Aviary at the Queens Zoo); and the Hall of Science. The Unisphere, New York City Building, and Hall of Science have been determined eligible for listing on the Registers. The 1993 *USTA National Tennis Center FEIS* identified the Passerelle Building and the Aviary, as well as the remaining original elements of the Flushing Meadows Corona Park plan, as significant for their association with the two World's Fairs.

KNOWN ARCHITECTURAL RESOURCES

Located just south of NTC's South Gate is a statue titled **Freedom of the Human Spirit** (S/NR-eligible). This bronze sculpture depicting a male and female nude with wild swans soaring skyward—manifesting one of the Fair's central themes, space exploration—was sculpted by Marshall Fredericks for the 1964-1965 World's Fair (see View 1 of **Figure 5-2**). At the Fair, the sculpture stood in what was known as the Court of States; in 1996, it was relocated to its current site and conserved in consultation with the artist.

Just Outside Study Area

The **Unisphere** (NYCL, S/NR-eligible)—located directly south of NTC's South Gate and the Freedom of the Human Spirit sculpture—was the centerpiece and visual logo of the 1964-1965 World's Fair, symbolic of the fair's theme "Peace Through Understanding." The 120-foot-high, 35-ton steel globe—said to be the world's largest—is circled by three rings representing the first NASA satellites to orbit the earth (see View 2 of **Figure 5-2**). Surrounding the sphere's base is a large, circular pool with fountains. The Unisphere was designed by Gilmore Clarke, who had also collaborated on the overall design of the 1939-1940 World's Fair, and sponsored by the U.S. Steel Corporation. This structure was part of a group of permanent sculptures commissioned for the fair that celebrate the dawn of the space age. In 1994 the sculpture was conserved, cleaned, reinforced. The area around the sculpture was re-landscpaed, and the number of spray jets in the fountain was doubled, from 48 to 96.



Freedom of the Human Spirit sculpture **1**

Unisphere **2**

Study Area
Architectural Resources
Figure 5-2

The **New York City Building** (S/NR-eligible), located directly west of the Unisphere, was constructed in 1937-1938 as the New York City Pavilion for the 1939-1940 World's Fair. This Art Moderne-style building was designed by Aymer Embury II as a permanent structure, and contained exhibits of various municipal agencies, as well as roller and ice skating rinks and a two-story interior court. The restrained classical design of the building was reflective of the prevailing architectural attitude of the design board to promote a unifying context for the fair-built buildings. The symmetrical, long, low limestone building had central colonnades on both the main east and west façades (see View 3 of **Figure 5-3**). From 1941 to 1946, the building operated as an ice and roller skating rink; in 1946, it was renovated for use as the annual meeting place of the United Nations General Assembly (1946-1952); and from 1952-1962 it once again served as a skating rink. During the 1964-1965 World's Fair, the north wing of the building was converted for city exhibits, including the "Panorama" scale model of New York City's five boroughs. The north wing of the building became the home of the Queens Museum of Art in 1972; the south wing contained a public skating rink. Rafael Vinoly designed an expansion to the building in 1994, and in 2009 the World's Fair Ice Rink was moved to a new recreation center across the park. In April 2011, the Museum broke ground on an expansion project in the former skating rink space. Designed by Grimshaw Architects, the expansion will roughly double the size of the institution and add new galleries, classrooms, public event spaces, a café, and museum shop. The design includes a new 220-foot-long illuminated glass façade and entry plaza on the Grand Central Parkway side of the building, a new entrance and expanded outdoor space on the park side of the building, and a skylit atrium between.

The **Hall of Science** (S/NR-eligible) was one of only a few buildings constructed with the intention that it would remain in the park after the 1964-1965 World's Fair. Designed by the architectural firm of Harrison and Abramovitz—which also designed the United Nations building and the Perisphere and Trylon of the 1939-1940 World's Fair—the building's undulating form is composed of precast concrete panels of stained glass (see View 4 of **Figure 5-3**). It exemplifies the interest and popularity of science, technology, and space both at the fair and in America in the 1960s. In 1973, the building closed for renovations that included the construction of a new planetarium; it closed again in 1980, and reopened with an additional 25,000 square feet of space. In 1992, construction began on the first phase of a major renovation, and in 1996 the Hall of Science reopened with a new rotunda entrance, auditorium, dining area, and classroom space.

Directly adjacent to the Hall of Science is the sculpture **Forms in Transit** (S/NR-eligible). This distinctive sculpture by modernist sculptor Theodore Roszak dates to 1964 and was commissioned as part of the permanent sculpture program of the 1964-1965 World's Fair. Forty-three feet long and constructed of aluminum and steel tubes and sheet metal, the sculpture is intended to suggest an aircraft's fuselage and wings, but also to embody the concept of motion and change (see View 5 of **Figure 5-4**). Portions of a damaged wing were removed in 1970. Though environmental corrosion is evident, some of the patchy, blistered surface of the sculpture appears to be original to the piece, and intended to suggest the incendiary voyage of the vessel as it passes at rapid speed through the atmosphere.

East of the Unisphere are three additional pieces of sculpture from the 1964-1965 World's Fair: the **Rocket Thrower**, **George Washington**, and the **Column of Jerash**, all of which have been determined S/NR-eligible.

The Rocket Thrower is a bronze sculpture designed by Donald De Lue. The sculpture depicts a male figure hurling a rocket heavenward with his right hand and reaching for a constellation of

New York City Building (now Queens Museum of Art) **3**

Hall of Science **4**

Study Area
Architectural Resources

Figure 5-3

Forms in Transit **5**

Rocket Thrower **6**

Study Area
Architectural Resources

Figure 5-4

gilded stars with his left (see View 6 of **Figure 5-4**). The sculpture was cast at the Fonda Artista in Via Reggio, Italy. A conservation analysis of the statue recently has been completed to inform future restoration.

The statue of George Washington was also sculpted by Donald De Lue (see View 7 of **Figure 5-5**). The first version of the statue was created by De Lue in 1959 for the Louisiana Lodge of the Free and Accepted Masons, and a full-size, faux-patinated plaster model was displayed at the Masonic Pavilion of the 1964-1965 World's Fair. Following the fair, the De Lue was commissioned to create the existing replica in bronze. The statue was cast in Italy, positioned on a pedestal of North Carolina pink granite, and dedicated on June 3, 1967. Additional copies of the statue were installed at the Masonic Hospital in Wallingford, Connecticut and at the Detroit Civic Center in Michigan. The sculpture was repaired and conserved in 1999.

The Column of Jerash is a 30-foot-high marble column that was presented to the New York World's Fair Corporation and the City of New York by King Hussein of Jordan on the occasion of Jordan's participation in the 1964-1965 World's Fair (see View 8 of **Figure 5-5**). The column, which has a modified Corinthian capital, was originally erected in 120 A.D. by Romans in the ancient Jordanian city of Jerash. It was part of the Temple of Artemis, and portions of the temple's ruins remain on view in Jordan.

POTENTIAL ARCHITECTURAL RESOURCES

Constructed as the main entrance of the 1964-1965 World's Fair and possibly incorporating portions of a LIRR building from the 1939-1940 World's Fair, the **Passerelle Building** serves as the ramp to the adjacent LIRR and MTA stations, as well as having offices in pavilions separated by a central staircase. The tan brick, one-story structure fits into the landscape and serves as a bridge over Meridian Road and the LIRR tracks to the north, with a terrace area on the roof, covered by fixed canopies from which visitors could look across the fairgrounds (see Views 9 and 10 of **Figure 5-6**). The modern structure was named by Robert Moses for the French word for footbridge or ramp.

The plan for the Flushing Meadows area during the 1930s was to use the 1939-1940 World's Fair to furnish the city with a major new park featuring both passive and active recreational uses. The configuration and path system was originally conceived as the layout for the fair and later used as the plan for the 1964-1965 World's Fair. The landscape design is credited to Gilmore D. Clarke, a landscape architect from the New York City Department of Parks and Recreation (DPR) and member of the fair's Board of Design. The geometric Beaux-Arts plan is composed of main spokes radiating out from a central point, which was the location of the Trylon and Perisphere and is now the location of the Unisphere. A major axis of the plan extends east toward another circular area, now the Fountain of the Planets. Another major axis connects Federal Circle, the Unisphere, the Queens Museum of Art, the New York State Pavilion, and the New York State Amphitheater. Various sculptures were installed in the park to create focal points and emphasize the park's geometry during both fairs. The formal plan of the park was contrasted with its more natural southern section, which included two artificial lakes. The original park plan for the project site was modified substantially during the 1964-1965 World's Fair with the creation of Federal Circle, which replaced two radial roadways and terminated the park's main north-south axis. The project site has been further altered in subsequent years, as described above and in Chapter 2, "Land Use, Zoning, and Public Policy."

George Washington **7**

Column of Jerash **8**

Study Area
Architectural Resources

Figure 5-5

Passerelle Building (from park) **9**

Passerelle Building (on ramp) **10**

Study Area
Potential Resources

Figure 5-6

The **Aviary** at the Queens Zoo, a geodesic dome, was originally known as the Pavilion and located south of the Passerelle Building. It was designed by the architectural firms of Eggers & Higgins and Synergetics, a firm with which R. Buckminster Fuller had at one time been associated. Although Fuller had designed geodesic domes since the late 1940s, the dome at the 1964-1965 World's Fair was architecturally advanced; it predates the United States pavilion at Expo '67 in Montreal, which represents Fuller's largest and most visible example of such a structure. The pavilion was used for general assemblies in 1964 and renamed the Churchill Pavilion during the 1964-1965 World's Fair. It housed a memorial to Winston Churchill, who died in 1965. The geodesic dome was removed from its base, relocated to its current site in the Queens Zoo near the Hall of Science, and glazed with transparent glass in 1967. It was converted into an aviary at that time (see View 11 of **Figure 5-7**).

D. FUTURE WITHOUT THE PROPOSED PROJECT

PROJECT SITE

As part of USTA's on-going management of capital projects at the NTC, a range of capital improvements are expected to be made to the NTC between US Open periods. As described in greater detail in Chapter 2, "Land Use, Zoning, and Public Policy," the capital projects program includes repairs, upgrades and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease boundaries. As there are no architectural resources within the boundaries of the project site, none would be affected by the capital improvement program.

STUDY AREA

No projects are anticipated to be developed by 2019 within the 400-foot study area for this analysis. An expansion of the Queens Museum of Art is currently underway and is anticipated to be complete by 2019. This expansion entails an addition and other exterior changes to the S/NR-eligible New York City Building. Beyond the 400-foot study area, there is a proposal to construct a new stadium for professional soccer purposes on the present site of the Fountain of the Planets and land surrounding the fountain, as described in Chapter 2, "Land Use, Zoning and Public Policy." In addition to the elimination of the fountain, the stadium would require replacement or reconfiguration of landscaped areas and pathways, as well as soccer fields and a basketball court. Ongoing capital improvement projects also are being carried out by DPR to provide for up to date recreational facilities within Flushing Meadows Corona Park. Renovations of three soccer fields are assumed to be complete by 2019. Other projects have been identified, some of which have been allocated capital funding, but are not anticipated to be complete by 2019. By replacing the Fountain of the Planets and surrounding pathways, the soccer stadium project could potentially affect elements of the original Beaux Arts plan for Flushing Meadows Corona Park. It is possible that other capital improvement projects within Flushing Meadows Corona Park could affect its Beaux Arts plan or other park elements identified above.

E. FUTURE WITH THE PROPOSED PROJECT

PROJECT SITE

The proposed project would result in a series of improvements to the project site, as summarized in **Table 5-1** and described in greater detail in Chapter 1, "Project Description."

Aviary at Queens Zoo **11**

Study Area
Potential Resources

Figure 5-7

Table 5-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
	Stadium Improvements and New Construction	
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
	Tournament Court Modifications	
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
	Ancillary Building Construction	
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium
	Parking and Transportation Improvements	
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
	Pedestrian Enhancements	
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
Source: USTA

The proposed project would also include lighting, infrastructure, utility, landscaping, paving, and drainage improvements within the NTC site. Construction of the proposed project would require removal of trees both outside the existing fence line and inside the NTC site; tree replanting and replacement would comply with DPR's applicable rules and regulations. As there are no architectural resources within the boundaries of the project site, none would be affected by the proposed project.

Outside of the existing NTC site, the relocated connector roadway and new pedestrian pathways would be developed on an approximately 0.3-acre area south of United Nations Avenue North, and landscaped and paved areas—including the existing connector roadway between Meridian Road and United Nations Avenue North—would be added to the NTC site along its southern and western boundaries. The existing connector roadway and the other affected landscaped and paved areas are not significant elements of Flushing Meadows Corona Park's original Beaux Arts plan. The affected roadways are not one of the main spokes radiating outward from the Unisphere, or one of the major axes extending to the Fountain of the Planets or connecting the Unisphere, Federal Circle, the Queens Museum of Art, and the New York State Pavilion. Therefore, the Park's original plan elements would not be significantly adversely affected by the proposed project.

STUDY AREA

The proposed project would result in construction activities within 90 feet of the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with LPC's *Guidelines for Construction Adjacent to a Historic Landmark* as well as the guidelines set forth in section 523 of the *CEQR Technical Manual* and the procedures set forth in DOB's TPPN #10/88. This includes the preparation of a Construction Protection Plan (CPP) that would be prepared prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project.

In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. These potentially include: the renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades. It is not currently expected that any of the park improvement projects would affect any historic resources within the park. However, if improvement projects are planned near historic resources, measures would be undertaken to prevent inadvertent construction-related impacts to such resources, including compliance with LPC and DOB guidelines, as described above. In comment letters dated September 7 and 10, 2012, LPC determined that the potential park improvement project areas do not have archaeological significance (see **Appendix B**, "Historic and Cultural Resources").

The changes to the project site would be most visible from within the NTC's boundaries; from outside the NTC site, the extensive vegetation and tree cover of Flushing Meadows Corona Park—as well as the distance to viewing locations created by the Corona Rail Yards and Grand Central Parkway—would serve to limit the visibility of the proposed changes, and thus the potential for contextual impacts to architectural resources (see **Figures 5-8, 5-9, and 5-10**). The new parking and administrative and retail building at the north side of the site and the proposed addition to the north side of Arthur Ashe Stadium (Stadium 1) are anticipated to be minimally visible, if at all, from west of the Grand Central Parkway or from south of the NTC site. The replacement Stadium 3 at the southwest corner of the site is anticipated to be somewhat visible from the Freedom of the Human Spirit sculpture, Unisphere, and New York City Building, as well as possibly the Queens Zoo aviary; however, the stadium would be visually consistent with the exiting structures on the rest of the NTC site, and would not introduce an incompatible visual element to the setting of these resources. The new parking garages and the administrative and retail building at the northeast corner of the NTC site would change the immediate context of the Passerelle Building, but would not be expected to significantly alter or introduce an incompatible visual element to the setting of this resource (see **Figures 5-11 and 5-12**).

Using the impact criteria of the *CEQR Technical Manual*, the proposed project would not isolate any architectural resources from or significantly alter their setting or visual relationship with the streetscape; would not introduce incompatible visual, audible, or atmospheric elements to the setting of any architectural resource; and would not introduce significant new shadows over a historic landscape or on a historic structure with sunlight-dependent features. In addition, the proposed project would not eliminate or screen publicly accessible views of any architectural resource.

Overall, the proposed project would not result in any significant adverse impacts to historic and cultural resources. ✷

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View at South Gate Looking Northeast

Figure 5-8

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View on Meridian Road Looking East

Figure 5-9

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View of Parking Garage A

Figure 5-10

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View from Passerelle Ramp (Summer View)

Figure 5-11

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View Toward Parking Lot B

Figure 5-12

Chapter 6: Urban Design and Visual Resources

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, urban design is defined as the totality of components that may affect a pedestrian's experience of public space. An urban design assessment considers whether and how a project may change the experience of a pedestrian in a project area.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This chapter considers the potential of the proposed project to affect urban design and visual resources on the project site and in the surrounding area, and provides an assessment of existing and future conditions with and without the proposed project for the project site and a study area surrounding the site.

PRINCIPAL CONCLUSIONS

As described in detail below, this analysis finds that the proposed project would not have any significant adverse impacts related to urban design or visual resources. Instead, the proposed project would substantially improve the circulation, landscaping, and visitor amenities within the NTC site, and thus would enhance the pedestrian experience within the project site. The height of several structures—and the total bulk of structures—on the NTC site would increase in the future with the proposed project; the most notable elements would include: two new parking garages that would be built on existing surface parking lots in the northeast and northwest corners of the site, along Meridian Road; and the relocated Grandstand Stadium (Stadium 3) that would be built in the southwest corner of the site. These incremental increases in height and bulk would be modest relative to the existing facilities, and would not be inconsistent with the surrounding park land context. The NTC is already highly visible in this section of the park, and the trees and other landscaping to be provided along the site's perimeter, including adjacent to Stadium 3 along United Nations Avenue North and adjacent to Parking Garage B and the Passerelle Building, would serve to moderate the visual presence of the new site elements from most locations. The proposed project would not alter the visual character of the surrounding area, except to make certain sections of the NTC site more prominent in directly adjacent views. With the exception of the modest change to park land acreage, the elimination of one lane of the three-lane United Nations Avenue North, and the relocated connector roadway, the proposed project would not result in any changes to natural features, open spaces, or streets in the study area.

Therefore, the proposed project would be consistent with the existing urban design characteristics of the study area and would not result in any significant adverse impact related to urban design and visual resources.

B. METHODOLOGY

This analysis has been prepared in accordance with CEQR procedures and follows the guidelines of the 2012 *CEQR Technical Manual*.

Based on the *CEQR Technical Manual,* a preliminary assessment of urban design and visual resources is appropriate when there is the potential for a pedestrian to observe, from the street level, a physical alteration beyond that allowed by existing zoning. Examples include projects that permit the modification of yard, height, and setback requirements, and projects that result in an increase in built floor area beyond what would be allowed "as-of-right" or in the future without the proposed project.

The NTC project site is not subject to zoning. However, the proposed project would result in physical changes to the project site that would be visible to pedestrians from public areas, including Flushing Meadows Corona Park and the Passerelle ramp. Therefore, the proposed project meets the threshold for a preliminary assessment of potential impacts to urban design and visual resources.

The *CEQR Technical Manual* defines urban design as the totality of components that may affect a pedestrian's experience of public space, including: streets, buildings, visual resources, open spaces, natural resources, and wind. The *CEQR Technical Manual* guidelines recommend the preparation of a preliminary assessment of urban design and visual resources, followed by a detailed analysis, if warranted based on the conclusions of the preliminary assessment. The analysis provided below addresses urban design characteristics and visual resources for existing conditions and the future without and with the proposed project (the No-Action and With Action condition, respectively).

According to the *CEQR Technical Manual,* the study area for urban design is the area where the project may influence land use patterns and the built environment, and is generally consistent with that used for the land use analysis. For visual resources, the view corridors within the study area from which such resources are publicly viewable should be identified. The land use study area may serve as the initial basis for analysis; however, in cases where significant visual resources exist, it may be appropriate to look beyond the land use study area to encompass views outside of this area, as is often the case with waterfront sites or sites within or near historic districts.

The project site is located within Flushing Meadows Corona Park in Queens. Consistent with the analysis of land use, zoning, and public policy, the study area for the urban design and visual resources analysis has been defined as a ¼-mile radius around the project site (see **Figures 6-1** and **6-2**).[1]

The *CEQR Technical Manual* recommends an analysis of pedestrian wind conditions for projects that result in the construction of large buildings at locations that experience high wind conditions (such as along the waterfront, or other location where winds from the waterfront are not attenuated by buildings or natural features), which may result in an exacerbation of wind conditions due to "channelization" or "downwash" effects that may affect pedestrian safety. The proposed project would not involve any substantial new building construction that could affect wind conditions, and thus a pedestrian wind analysis is not warranted.

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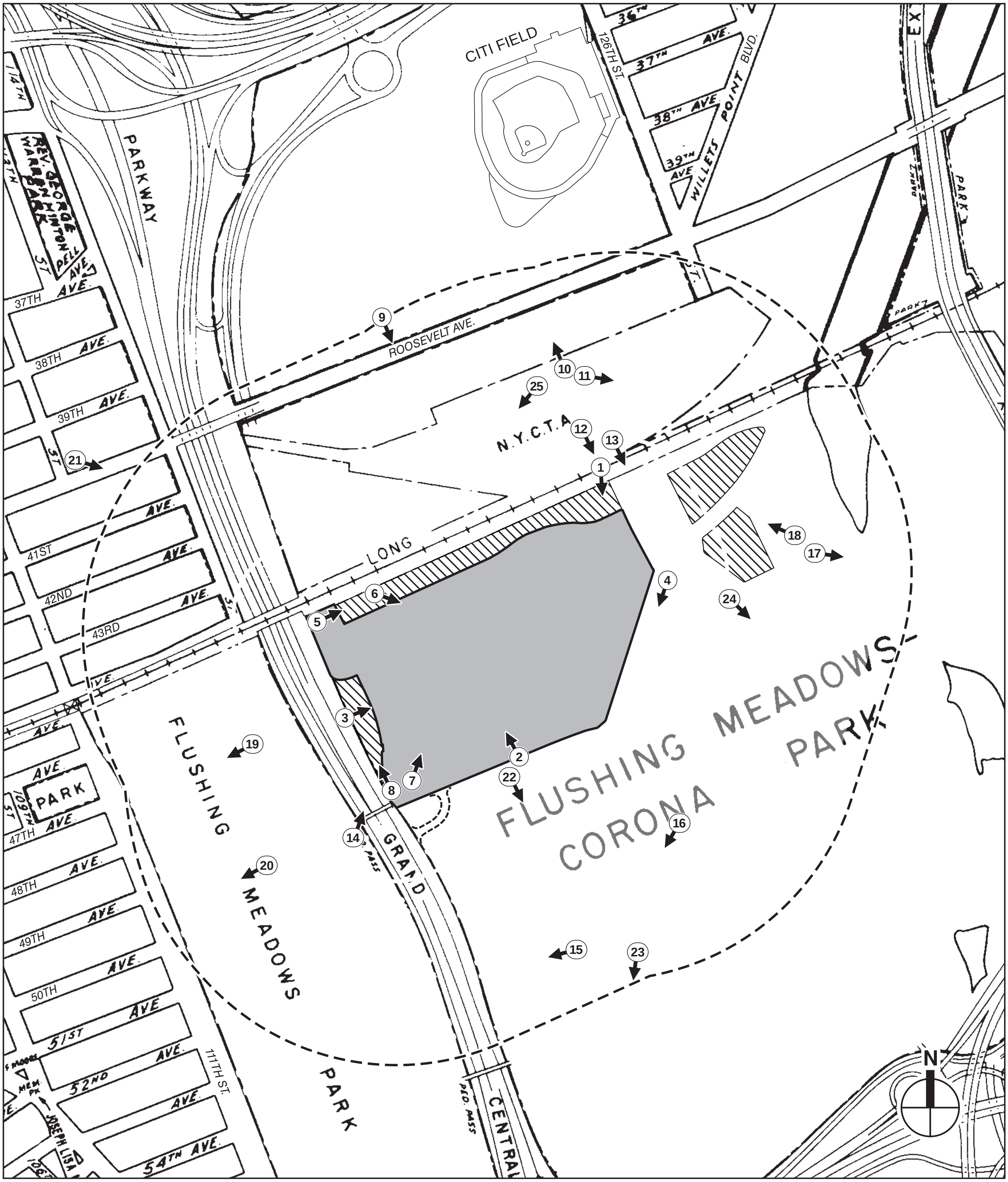
[1] **Figure 6-2** is the most recent publicly-accessible aerial photograph (2010). The aerial does not reflect more recent site plan changes to the NTC, which are shown on Figure 1-4.



Project Site

National Tennis Center Land not Affected by the Proposed Project

Study Area Boundary (1/4 Quarter Mile Perimeter)

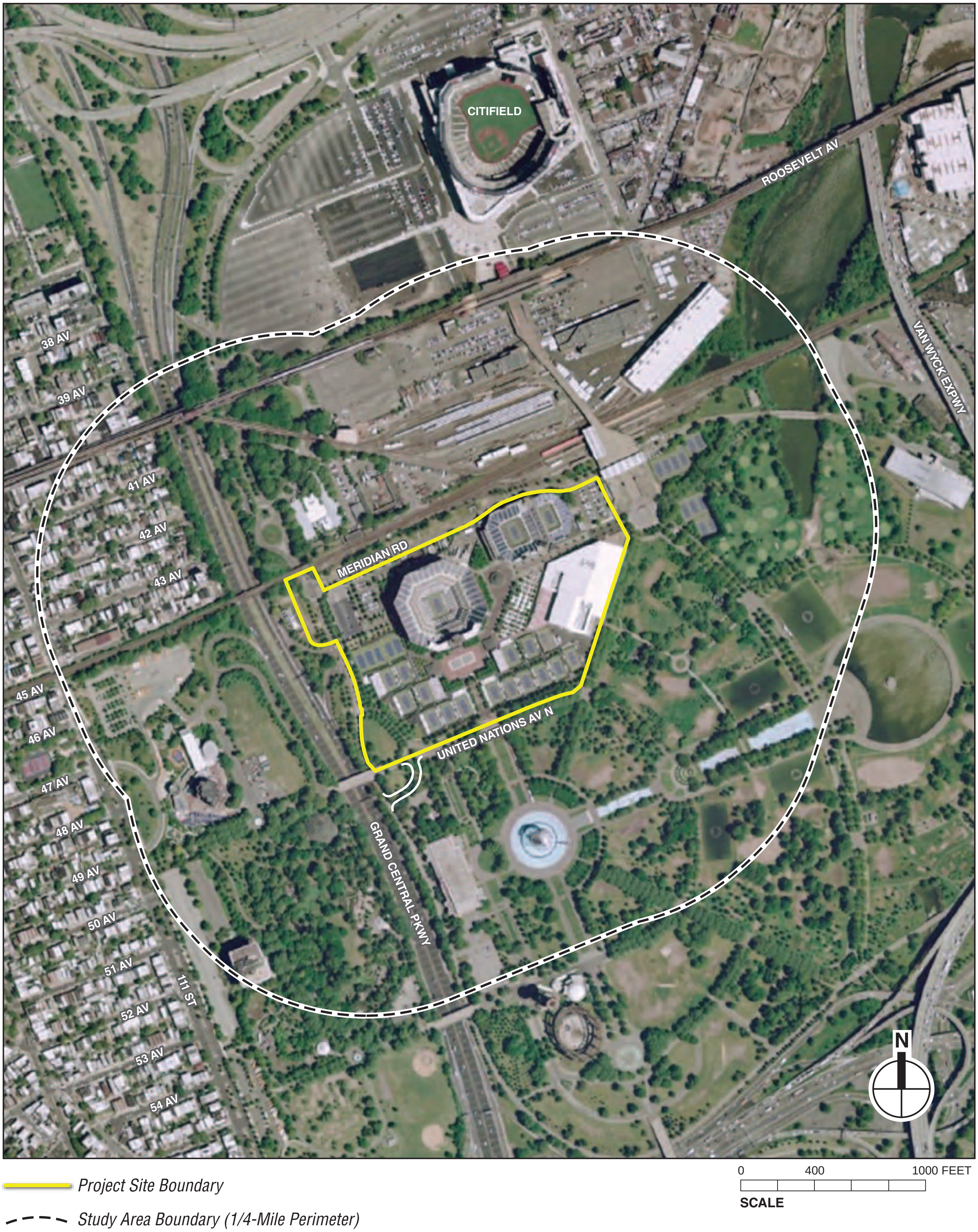
1 Photograph View Direction and Reference Number

Note: Roads within the NTC site are not included in the lease

Urban Design and Visual Resources Reference Map

Figure 6-1

12.14.12



Orthoimagery Source: World Imagery, ESRI ArcGIS Online

Urban Design and Visual Resources

Aerial Photograph of the Project Site and Study Area

Figure 6-2

C. EXISTING CONDITIONS

URBAN DESIGN

PROJECT SITE

The project site consists of a 37.48-acre portion of the 42-acre NTC site within Flushing Meadows Corona Park. The project site includes the 35.3-acre portion of the NTC bounded by Meridian Road, United Nations Avenue North, and Path of the Americas; the 0.94 acres that would be added to the site along the southern and western boundaries; the 0.94-acre Lot S, located west of Meridian Road at the northwest corner of the site; and the approximately 0.3-acre relocated connector road area, which would remain under City ownership and control. The project site includes surface parking lots at the northwest and northeast corners of the site; three stadiums along the northern side of the site, decreasing in size from west to east; surface tournament courts along the western and southern edges of the site, some of which have bleacher-style seating; and a micro-stadium (Court 17) and the ±245,000 gross square foot (gsf), 60-foot-tall Indoor Training Center at the southeast corner of the site (see **Figure 6-3**). The stadiums on the site include, from west to east, the ±362,000-gsf, 120-foot-tall Arthur Ashe Stadium; Louis Armstrong Stadium; and the Grandstand Stadium (both of which are approximately 70 feet tall and collectively comprise approximately 117,000-gsf of enclosed space, approximately 280,000-gsf total). The Indoor Training Center is a multi-purpose tennis pavilion, clad in red brick and metal panels along Path of the Americas and with a glass façade near the Passerelle Building and northeast corner parking lot (see View 1 of **Figure 6-4**). There is a tennis bubble at the northwest corner of the site (see View 3 of **Figure 6-4**). The project site also includes food, beverage, and retail kiosks, temporary trailers for broadcast use during the US Open, and pedestrian plazas, including South Plaza and the Food Village. South Plaza serves as the focal point of the site during the US Open, and contains two fountains, seating, and retail/informational kiosks. East of South Plaza is the Food Village, which contains tables and seating, and kiosks for food sales during the US Open. Trees, landscaping, and seating are found throughout the site.

There are three pedestrian entrances to the site. The primary entrance is the East Gate entrance, which is at the eastern side of the site, near the Passerelle Building and the Indoor Training Center. The South Gate entrance is at the southern edge of the site, on axis with the entrance to Arthur Ashe Stadium and the Unisphere to the south of the project site (see View 2 of **Figure 6-4**). The West Gate/President's Gate entrance is off Meridian Road on the western side of the site (see View 3 of **Figure 6-5**). Loading dock entrances are located at the rear (north) side of the site along Meridian Road and to the southeast along Path of the Americas. The perimeter of the project site is mostly defined by chain link fencing, some of which is screened with hedges (and vinyl wind screening during the U.S. Open). Along Path of the Americas, the Indoor Training Center presents a solid façade of metal cladding and red brick (see View 4 of **Figure 6-5**). The north side of the project site has a tall metal fence and a narrow sidewalk along Meridian Road—with no sidewalk at all near Parking Lot B—and the portions of project site structures facing along this street are not the primary façades (see Views 5 and 6 of **Figure 6-6**). At the southwestern corner of the site, the surface tournament courts are at or slightly below grade and the chain link perimeter fence is not screened, allowing pedestrians outside the NTC to have clear views into the court area (see View 7 of **Figure 6-7**). The pedestrian pathways at the perimeter of the site are paved and surrounded by trees (see View 8 of **Figure 6-7**). There are no public (non-park land) streets within the project site.

1	*Arthur Ashe Stadium*	**7**	*Parking Lot A*	**E**	*East Gate*
2	*Louis Armstrong Stadium*	**8**	*Parking Lot B*	**S**	*South Gate*
3	*Grandstand Stadium*	**9**	*Existing Connector Road*	**W**	*West Gate*
4	*Northwest Tournament Courts*	**10**	*Arthur Ashe Concourse*		
5	*Southerly Tournament Courts*	**11**	*Food Village*		
6	*Indoor Tennis Center*	**12**	*South Plaza*		

Existing Site Plan
Figure 6-3

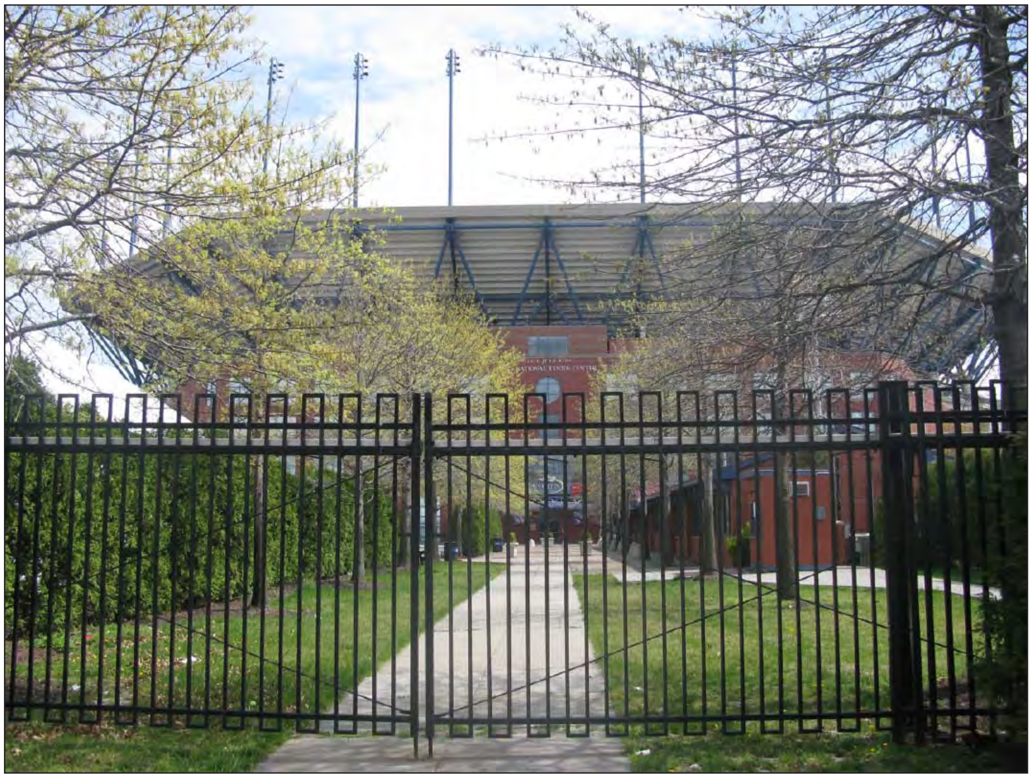
Indoor Tennis Center and Lot B, view south from Meridian Road **1**

South Gate entrance, looking north toward Arthur Ashe Stadium **2**

Parking Lot A, view south from Meridian Road **3**

Photographs of the Project Site

Figure 6-4



West Gate/President's Gate entrance, looking east **3**

Indoor Tennis Center, view southwest along Path of the Americas **4**

Photographs of the Project Site

Figure 6-5

North side of project site along Meridian Road, looking east **5**

Arthur Ashe Stadium, view from Meridian Road **6**

Photographs of the Project Site

Figure 6-6

Southwest corner of National Tennis Center **7**

West side of project site, along Meridian Road **8**

Photographs of the Project Site

Figure 6-7

As the project site is entirely within Flushing Meadows Corona Park, a mapped City park, it is not subject to zoning. Therefore, zoning, floor area, and lot and tower coverage calculations for the project site cannot be provided.

STUDY AREA

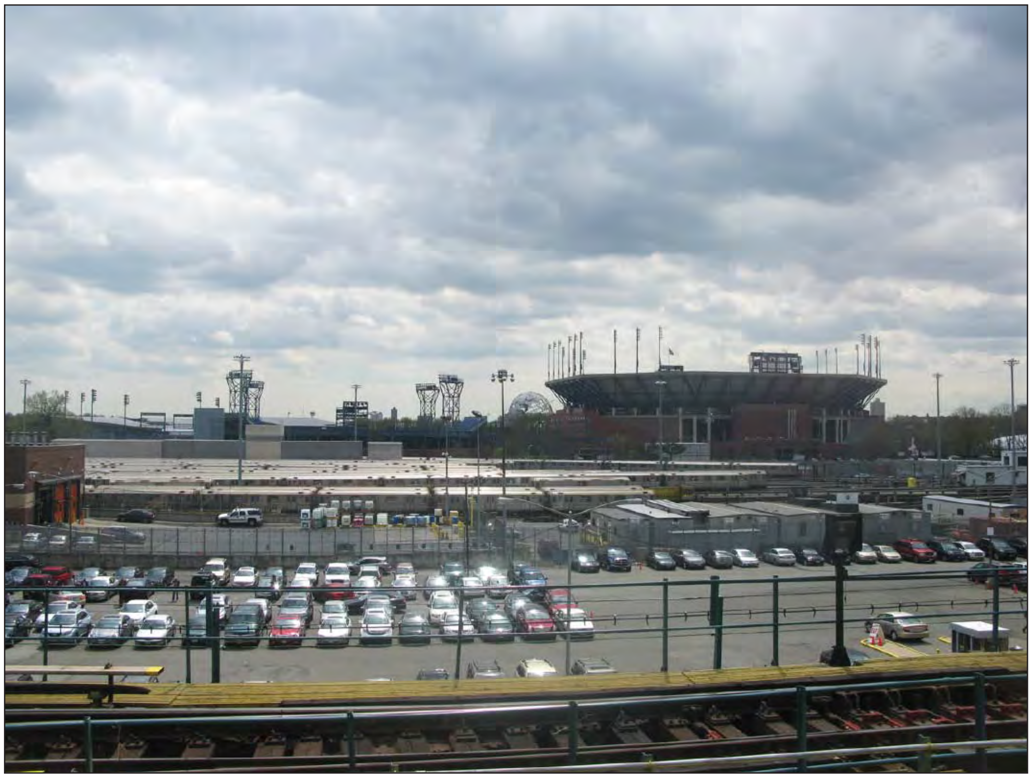
The ¼-mile study area roughly extends from just north of Roosevelt Avenue to the north, just south of the Unisphere to the south, Industry Pond and the Flushing River to the east; and 111th Street to the west. All but a small portion of the study area is within the nearly 900-acre Flushing Meadows Corona Park; however, the northwest corner of the study area comprises a portion of the predominantly residential neighborhood of North Corona.

The northern portion of the study area includes the Olmsted Center, Metropolitan Transportation Authority (MTA) Corona Rail Yard, the elevated No. 7 subway line and Mets-Willets Point station above Roosevelt Avenue, and a small portion of the parking field for Citi Field, the baseball stadium for the New York Mets. The Olmsted Center is a one-story modular building originally constructed for the 1964-1965 World's Fair and currently used by the New York City Department of Parks and Recreation (DPR); it is located between Roosevelt Avenue, the Grand Central Parkway, and the MTA Corona Rail Yard.

The 23-acre MTA Corona Rail Yard is primarily used for the storage and maintenance of subway trains, but also includes surface parking areas for cars and city buses and a few brick utilitarian structures (see Views 9 and 10 of **Figure 6-8**). The rail yard is lighted by tall posts with flood lights and bounded by chain link fencing. There is a Long Island Rail Road (LIRR) Mets-Willets Point station within the rail yard, which operates on Citi Field game days and during the US Open. The elevated No. 7 train station (and the LIRR station when operational) is accessed by the Passerelle ramp, a pedestrian bridge which extends above Roosevelt Avenue, Meridian Road, and the rail yard and connects the station with Flushing Meadows Corona Park (see View 11 of **Figure 6-9**). The Passerelle Building, which consists of two tan brick, one-story pavilions separated by a central ramp, comprises the southern end of the Passerelle ramp and is directly east-adjacent to the project site. The terrace area on the roof of the Passerelle Building, which is covered by fixed canopies, originally provided a viewing area from which visitors to the 1964-1965 World's Fair could look across the fairgrounds (see View 12 of **Figure 6-9**). The entrance to Flushing Meadows Corona Park off the Passerelle ramp is surrounded by flagposts and has a decorative pavement, including mosaics depicting significant scenes and structures from the World's Fairs (see View 13 of **Figure 6-10**).

The MTA Corona Rail Yard creates a visual and physical barrier between the project site and areas to the north. The Grand Central Parkway, which runs in a north-south direction through the study area, also creates a visual and physical barrier between the project site and areas to the west. Overpasses for United Nations Avenue North and South provide vehicular and pedestrian access between the east and west sides of Flushing Meadows Corona Park, which are separated by this roadway (see View 14 of **Figure 6-10**). East of the Grand Central Parkway, the pedestrian pathways in Flushing Meadows Corona Park generally have a geometric, Beaux-Arts plan composed of main spokes radiating out from a central point, the location of the Unisphere. One major axis extends east from the Unisphere toward another circular area, Industry Pond/the Fountain of the Planets; another connects the Unisphere, the Queens Museum of Art, and the New York State Pavilion.

As described more fully in Chapter 5, "Historic and Cultural Resources," the Unisphere, Queens Museum of Art (formerly the New York City Building), and the New York State Pavilion are all

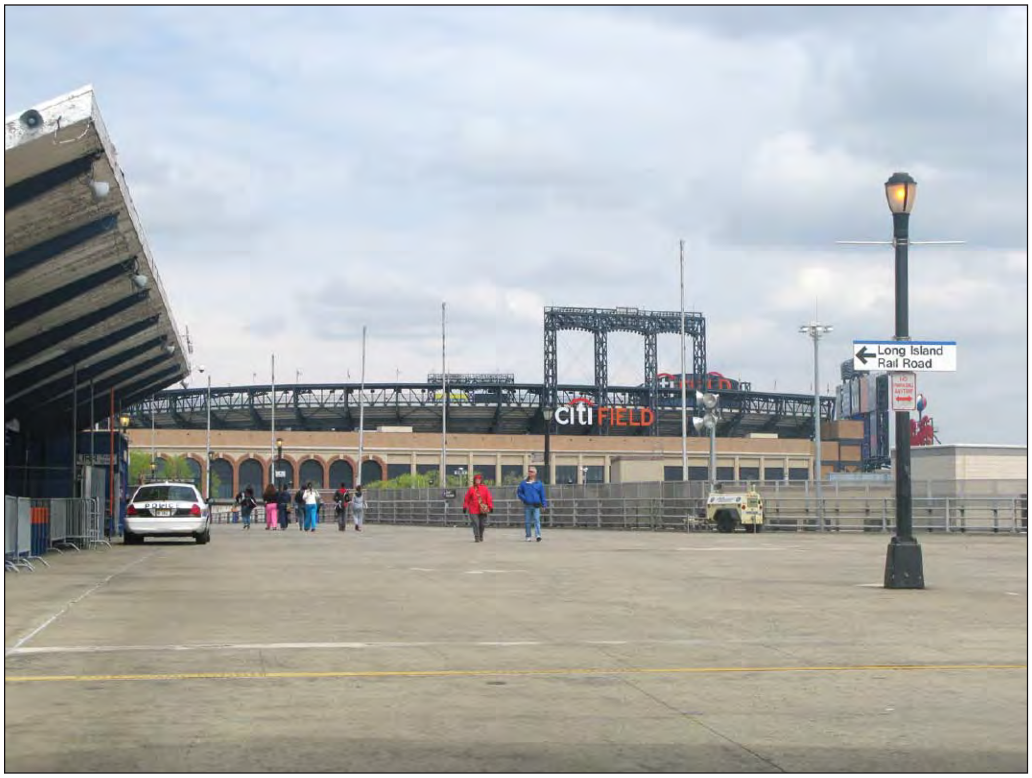


MTA Corona Railyard, view from No. 7 train **9**

MTA Corona Railyard, view east from Passerelle ramp **10**

Photographs of the Study Area

Figure 6-8



Passerelle Ramp, view north to Citi Field **11**

Passerelle Ramp, view south to Flushing Meadows Corona Park **12**

Photographs of the Study Area

Figure 6-9

Passerelle Ramp, view toward Passerelle Building and Flushing Meadows Corona Park **13**

View towards project site from Grand Central Parkway overpass **14**

Photographs of the Study Area

Figure 6-10

structures remaining from the 1939-1940 and 1964-1965 World's Fairs. The New York State Pavilion, currently unused and in a deteriorated state, includes three observation towers and an elliptical plaza surrounded by tubular columns and topped by radial cables, the remains of a former double diaphragm canopy roof. It is located just outside the study area to the south. The Queens Museum of Art, formerly the New York City Building, is a long, low limestone building with a classical design. It is located directly west of the Unisphere and is currently being renovated and expanded (see View 15 of **Figure 6-11**). The Unisphere is a 120-foot-tall steel globe circled by three rings representing satellites, above a steel base; surrounding the sphere's base is a large, circular pool with fountains (see View 16 of **Figure 6-11**). As described above, the Unisphere is located directly south of the NTC's South Gate and the Arthur Ashe Stadium (Stadium 1).

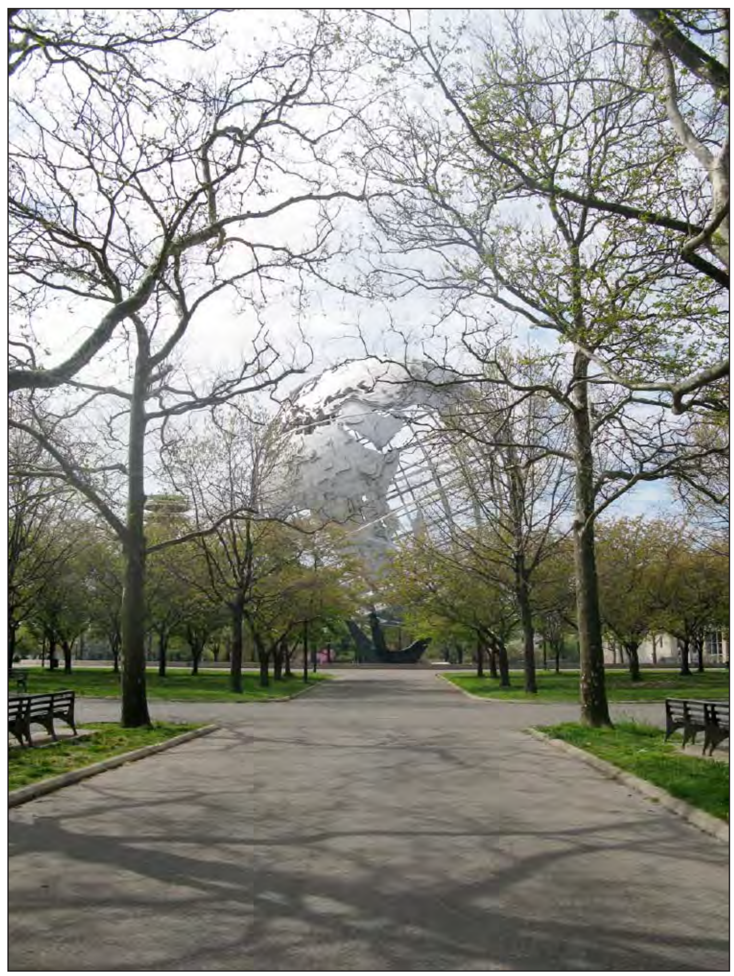
Various sculptures create focal points within the park and emphasize its geometry. Most of these sculptures date from the 1964-1965 World's Fair and are described in Chapter 5, "Historic and Cultural Resources." East of the project site, the park contains a pitch and putt golf center, tennis courts, playgrounds, playing fields, broad lawn areas, Industry Pond, and trees, pathways, and sitting areas (see Views 17 and 18 of **Figure 6-12**). There is perpendicular street parking adjacent to the tennis courts along Meridian Road east of the site, but no sidewalks or pedestrian paths along this portion of the street. Because of the narrow sidewalks near the project site and lack of pedestrian paths or sidewalks elsewhere, there is little pedestrian traffic along Meridian Road within the study area.

West of the Grand Central Parkway, the plan of Flushing Meadows Corona Park is less geometric. Pedestrian pathways wind around the major park uses in this area, including the New York Hall of Science, the Queens Zoo, and Terrace on the Park. The original Hall of Science structure is an undulating form composed of precast concrete panels with stained glass; subsequent additions have added a new rotunda entrance and other elements. Surrounding the Hall of Science is a playground, sculpture, and Mercury-Atlas and Gemini-Titan rockets (see View 19 of **Figure 6-13**). The Queens Zoo grounds include a geodesic dome from the 1964-1965 World's Fair, now used as an aviary. The Terrace on the Park was also constructed for the 1964-1965 World's Fair, as an "aerial gateway" for helicopter transportation. Four large beams support two stories at the top of the structure, forming a large "T," for transportation, on each side of the 120-foot-tall concrete structure (see View 20 of **Figure 6-13**). There are surface parking areas associated with the major institutional uses on both sides of the park.

The northwest corner of the study area includes a small section of the neighborhood of North Corona. The buildings in this area include two- and three-story detached, semi-detached and attached houses, and small apartment buildings of up to three stories (see View 21 of **Figure 6-14**). They are generally set back slightly from the lot line and faced in brick or aluminum/vinyl siding. Neighborhood retail uses are primarily located along Roosevelt Avenue; other non-residential uses include gas stations, car washes, and vehicle repair shops. This portion of the study area contains rectangular blocks and thus a regular street pattern, with one-way traffic. Power lines run overhead and sidewalks are lined with street trees.

The topography of the study area is generally flat, with some gentle rises and falls, particularly surrounding the Grand Central Parkway. As the study area is primarily park land, there are few public (non-park land) streets or regular city blocks within this area and descriptions of floor area calculations, street-wall heights, building heights and setbacks, and average floorplate sizes cannot be provided.

Queens Museum of Art, view west from Unisphere **15**



Unisphere, view southwest **16**

Photographs of the Study Area

Figure 6-11

Pitch and putt golf center east of project site **17**

Tennis courts east of project site **18**

New York Hall of Science **19**

Terrace on the Park **20**

Photographs of the Study Area
Figure 6-13

Northwest corner of study area, view from No. 7 train **21**

View to Unisphere from project site **22**

Photographs of the Study Area

Figure 6-14

VISUAL RESOURCES

As defined in the *CEQR Technical Manual*, a visual resource is the connection from the public realm to significant natural or built features, including views of the waterfront, public parks, landmark structures or districts, otherwise distinct buildings or groups of buildings, or natural resources.

PROJECT SITE

The project site is not considered to be a visual resource, although Arthur Ashe Stadium is a notable element in surrounding views. From certain portions of the project site—particularly along the visual corridor leading from the South Gate to Arthur Ashe Stadium, and from the site's southern perimeter—the Unisphere and the New York State Pavilion can be seen (see View 22 of **Figure 6-14**). Both the Unisphere and the New York State Pavilion are visual landmarks in this area and significant for their association with the 1964-1965 Worlds Fair (see Chapter 5, "Historic and Cultural Resources," regarding the Unisphere; the New York State Pavilion lies outside the study area).

STUDY AREA

Visual resources that can be seen from within the study area include the Unisphere and the New York State Pavilion, which are visible from a variety of vantage points (see View 23 of **Figure 6-15** and View 16 of **Figure 6-11** above). Citi Field and Terrace on the Park, like Arthur Ashe Stadium, are notable elements in study area views (see View 11 of **Figure 6-9** above). Though they have limited visibility except from nearby locations, the various sculptures within Flushing Meadows Corona Park also contribute to its visual environment and are considered to be visual resources. The long allees of mature trees along Flushing Meadow Corona Park's main axes—including the Path of the Americas between the Unisphere and the park entrance at the Passarelle Ramp, the Avenue of Commerce leading south from this park entrance, and the Herbert Hoover and Dwight Eisenhower Promenades between the Unisphere and Industry Pond—are also considered to be visual resources (see View 24 of **Figure 6-14** and View 4 of **Figure 6-5** above).

From the study area, the taller elements on the project site—in particular Arthur Ashe Stadium—can be seen from the elevated perspectives of the No. 7 train platform and the Passerelle ramp, as well as from the United Nations Avenue North overpasses above Grand Central Parkway, Meridian Road, and from the pedestrian pathways closest to the project site, including the Path of the Americas and United Nations Avenue North (see View 25 of **Figure 6-16,** and View 9 of **Figure 6-8** and View 14 of **Figure 6-10** above). Fleeting views of the site are also visible from the No. 7 train itself, as it enters and leaves the elevated Mets-Willets Point station. Although Flushing Meadows Corona Park is extensively landscaped, there are also some views from more distant locations within the park to the taller project site elements.

D. FUTURE WITHOUT THE PROPOSED PROJECT

PROJECT SITE

In the future without the proposed action, or the No-Action condition, various capital improvements are anticipated to be made to the NTC as part of USTA's ongoing capital projects program. The capital projects program includes repairs, upgrades and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease

View to New York State Pavilion **23**

View of Flushing Meadows Corona Park **24**

Photographs of the Study Area

Figure 6-15

View from Passerelle Ramp to project site **25** boundaries, as described in Chapter 2, “Land Use, Zoning, and Public Policy.” These improvements are anticipated to result in minimal changes to the site’s urban design and views to surrounding visual resources.

STUDY AREA

In the No-Action condition, there is the potential for a new stadium to be constructed for professional soccer purposes on the present site of the Fountain of the Planets and land surrounding the fountain, as described in Chapter 2, “Land Use, Zoning and Public Policy.” In addition to the elimination of the fountain, the stadium would require replacement or reconfiguration of landscaped areas and pathways, as well as soccer fields and a basketball court.

Ongoing capital improvement projects also are being carried out by DPR to provide for up to date recreational facilities within Flushing Meadows Corona Park. Overall, four soccer fields are anticipated to be improved, new volleyball courts are expected to be created, and the City is undertaking a study to determine the condition of the Porpoise Bridge (including the bridge’s tide gates).

By replacing the Fountain of the Planets and surrounding pathways, the soccer stadium project would be anticipated to change the urban design of that portion of Flushing Meadows Corona Park, and thus the pedestrian’s experience of that portion of the study area. It is possible that the other capital improvement projects also could affect the urban design of the park, or views to visual resources.

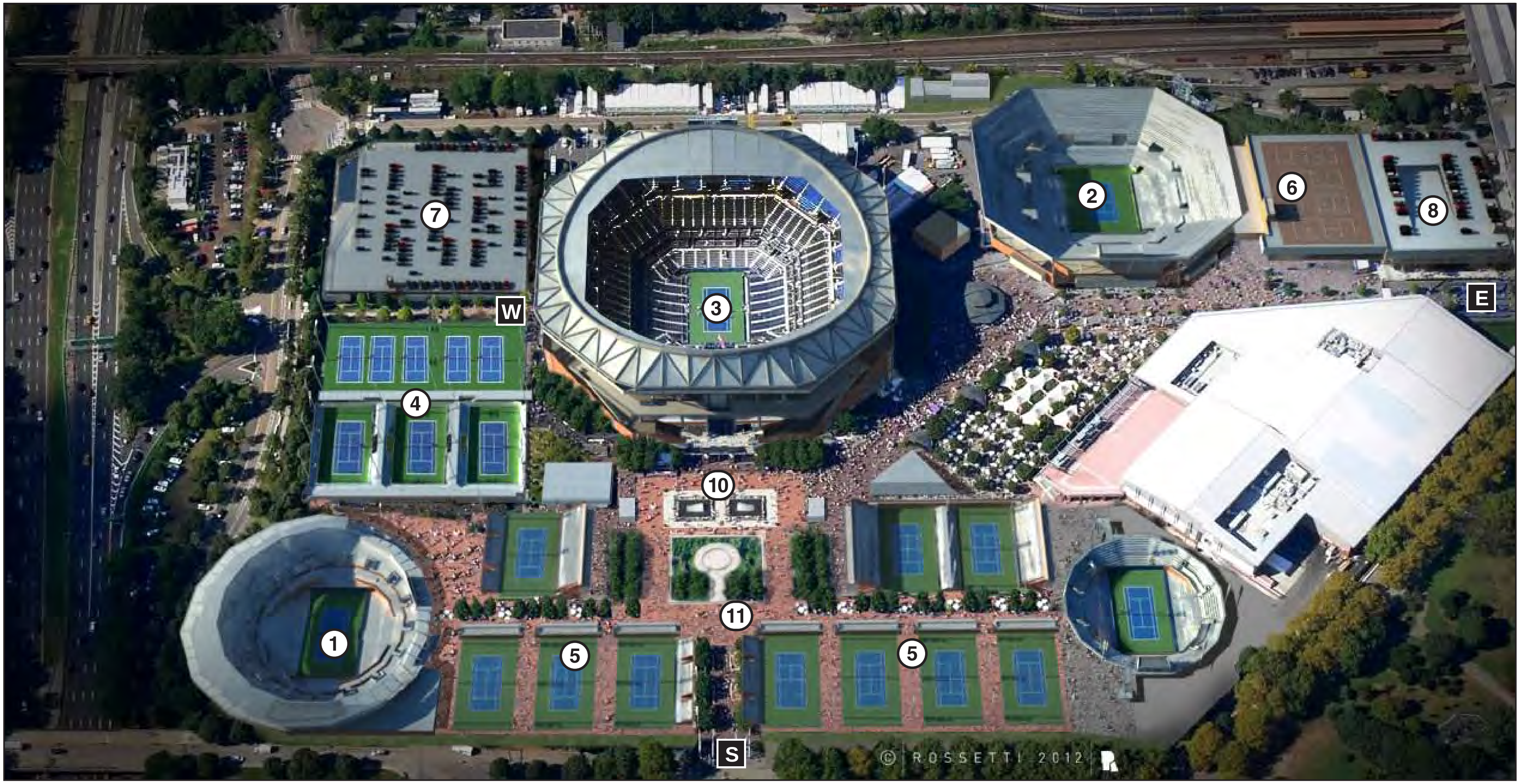
E. FUTURE WITH THE PROPOSED PROJECT

URBAN DESIGN

PROJECT SITE

The proposed project would result in a series of improvements to the project site, as summarized in **Table 6-1**, depicted in **Figure 6-17,** and described in greater detail in Chapter 1, “Project Description.” In addition to the changes noted in **Table 6-1**, the proposed project would include lighting, infrastructure, utility, landscaping, paving, and drainage improvements within the NTC site.

The proposed project would not result in modest changes in the land uses located on the project site. The locations of the various uses would be reconfigured and there would be a net increase in building area and the number of structures on the site. The uses on the project site would continue to be compatible with surrounding uses, including Citi Field and the various recreational amenities contained in Flushing Meadows Corona Park.



1 *Stadium 3*
2 *Stadium 2*
3 *Arthur Ashe Stadium*
4 *Northwest Tournament Courts*
5 *Southerly Tournament Courts*
6 *Administrative and Retail Building*
7 *Parking Lot A*
8 *Parking Lot B*
9 *Relocated Connector Road (See Figure 6)*
10 *Arthur Ashe Concourse*
11 *Walkway*
E *East Gate*
S *South Gate*
W *West Gate*

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY
DETAIL ALONG SOUTHERN BOUNDARY NOT SHOWN;
PLEASE REFER TO FIGURE 3-2 FOR THIS INFORMATION

Proposed Site Plan
Figure 6-17

Table 6-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
	Stadium Improvements and New Construction	
1	Grandstand Stadium (Stadium 3)	Demolition of existing 70-foot-tall, 6,000-seat stadium and replacement with 37-foot-tall, 8,000-seat stadium in southwest corner of NTC site. A portion of the relocated stadium would be located on parkland outside the current NTC site and would require the relocation of a segment of the connector road between United Nations Avenue North and Meridian Road.
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 70-foot-tall, 10,500-seat stadium and replacement with a 60-foot-tall,15,000-seat stadium in place.
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space on north side of stadium underneath existing seating platform; and canopy above center court
	Tournament Court Modifications	
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
	Ancillary Building Construction	
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail and sponsorship building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium
	Parking and Transportation Improvements	
7	New Parking Garage A	Construction of new 423-space, 2-level (15-foot-tall) garage on current surface parking Lot A, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level (30-foot-tall) garage on current surface parking Lot B
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North. near Queens Museum of Art parking lot
	Pedestrian Enhancements	
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17, with plantings and seating

Notes: [1]See **Figure 6-3** for the location of these elements under existing conditions. See **Figure 6-17** for their proposed future location.
Source: USTA

The proposed project would result in an overall increase in the bulk of development on the site. Specifically, Stadium 2 would be 10 feet shorter and 4,500 seats larger than the stadium it would replace (Louis Armstrong Stadium), and Stadium 3 would be 23 feet shorter and 2,000 seats larger than the stadium it would replace (Grandstand Stadium). Collectively, the enclosed space of these stadiums would be reduced by approximately 6,000 square feet (111,000-sf vs. 117,000-sf) and the total bulk of the stadiums would increase by approximately 48,000-gsf (328,000-gsf vs 280,000-gsf). Arthur Ashe Stadium (Stadium 1) would increase in total bulk by approximately 90,000-sf (over the existing ±362,000-gsf). In addition, it is possible that the canopy under consideration for above Arthur Ashe Stadium would add to the height of this facility, increasing it from its present height of approximately 137 feet to approximately 160 feet. The addition of the canopy above the stadium would be expected to add to its visibility in the surrounding area (see **Figure 6-18a** for an aerial view of the project site without the parabolic canopy, and **Figure 6-18b** for an aerial view of the project site with the parabolic canopy on Arthur Ashe Stadium). The incremental increases in height and bulk would be modest relative the existing facilities, however. The proposed 2-story (30-foot-tall) 80,000-gsf retail and sponsorship building would be a new structure on the site and would represent an increase in the square footage on the project site dedicated to such uses. In addition, the two proposed parking garages would be built in areas that are currently occupied by parking lots. The proposed parking facilities may have vegetated screen walls to enhance their appearance. The proposed parking facilities would also include new landscaping features, including a landscape buffer to include trees along the northern and western end of Garage A and the southern and eastern edges of Garage B (see also Figure 6-26, referenced below).

All of these proposed buildings would be substantially smaller, and less prominent, than Arthur Ashe Stadium, to which they are all closely situated. They would also be built within an existing recreational campus that contains a variety of building types and heights. The proposed Stadium 3 represents the largest change in height and bulk, as it would be an up to 55-foot tall building constructed on the site of a former connector road and lawn, and would be adjacent to the surrounding park land in Flushing Meadows Corona Park (see **Figure 6-19** for an aerial view of the project site facing south, with the proposed Stadium 3). However, the NTC is already highly visible in this section of the park, and trees and other landscaping would be provided along the new perimeter of the site would serve to minimize the visual presence of the proposed Stadium 3. The loading dock for the proposed stadium would be internally situated within the project site’s boundaries, behind (and screened by) fencing.

The proposed project would substantially improve the circulation, landscaping, and visitor amenities within the NTC site, and thus would be anticipated to enhance the pedestrian experience within the project site. Specifically, there would be a broad plaza area in front of the proposed Stadium 3, surrounded by trees, which would connect to the new walkway with plantings and seating on the north side of the relocated southerly tournament courts. This esplanade would provide a linear connection between the proposed Stadium 3 and Court 17 on the southeast corner of the site, and would provide for better sightlines to these two features of the NTC (see **Figures 6-20 and 6-21**). The 11,000-sf expansion of the existing concourse areas at the promenade level on the south side of Arthur Ashe Stadium also would improve circulation and visitor amenities. Potential façade improvements could also be implemented on the south side of Arthur Ashe Stadium. The new elevated viewing platform between the practice and tournament courts would provide a better spectator experience and would not create a significant new visual presence in views within or outside of the NTC site (see **Figure 6-22**).

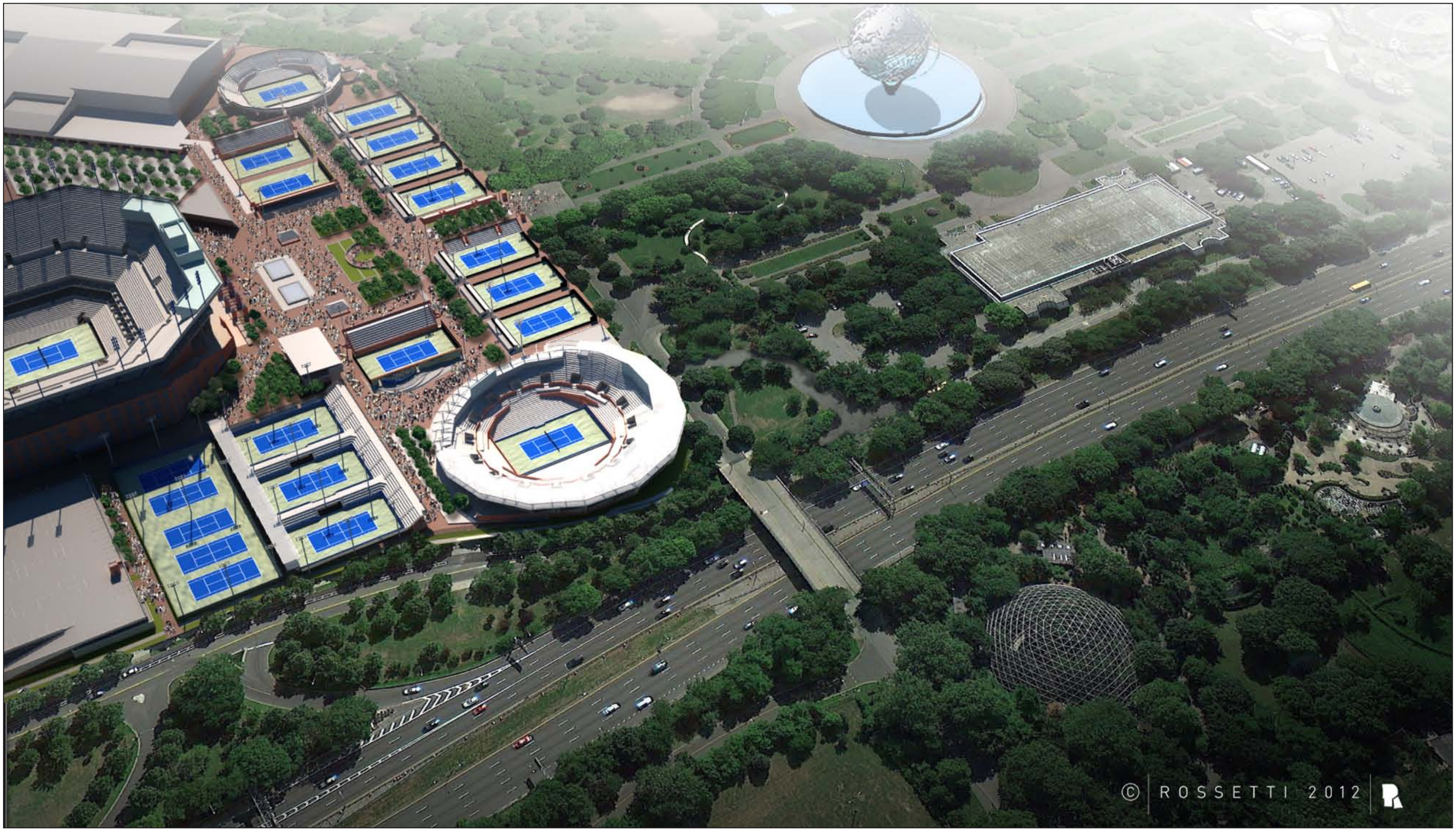
The proposed project would require 0.94 acres of land to be added to the NTC site. This area includes 0.26 acres of the connector roadway between Meridian Road and United Nations Avenue North, which contains no recreation park features (such as benches, play equipment, or statues), and the area north of United Nations Avenue North, and south of the existing NTC fence line, which is currently a mix of landscaped and paved areas, including one lane of the three-lane United Nations Avenue North. The relocation of the connector roadway would reroute pedestrian circulation around the proposed Stadium 3, thus locating it closer to Meridian Road, but would not significantly alter the pedestrian experience of this area, as it would still contain paved pathways surrounded by landscaping. It is possible, rather, that the new pedestrian

Aerial Rendering of Project Site Facing East
(without Parabolic Canopy on Arthur Ashe Stadium)

Figure 6-18a

Aerial Rendering of Project Site Facing East
(with Parabolic Canopy on Arthur Ashe Stadium)

Figure 6-18b



Aerial Rendering of Project Site Facing East

Figure 6-19

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
New Walkway View West

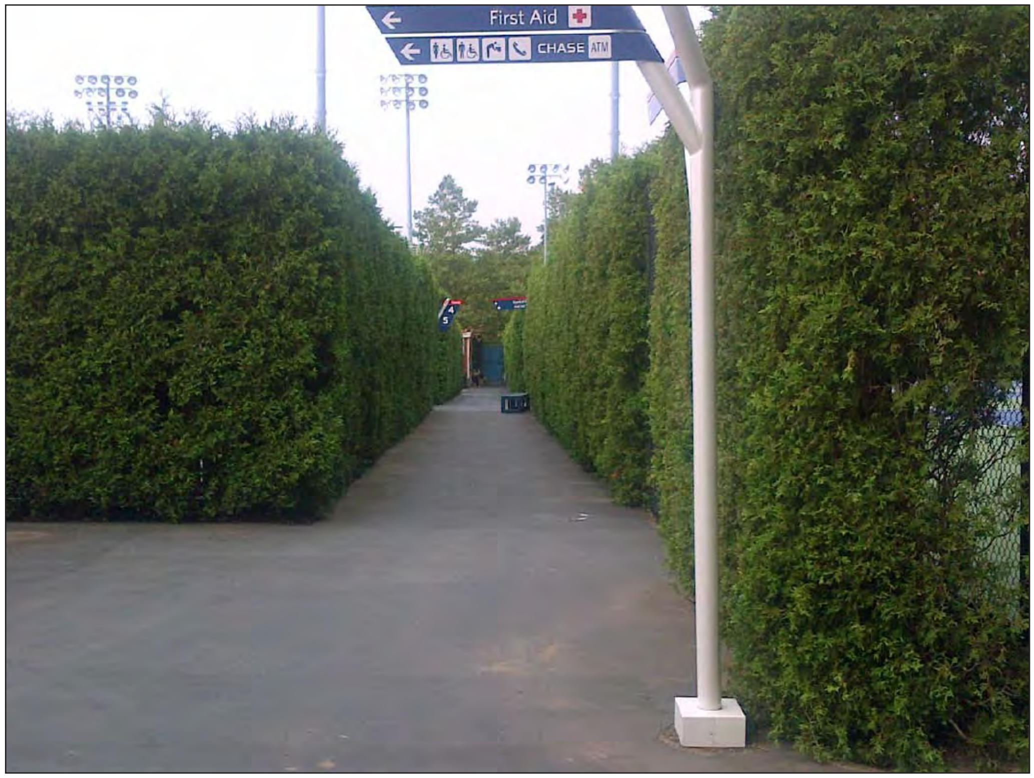
Figure 6-20

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
New Walkway View East

Figure 6-21



Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View Toward Viewing Platform

Figure 6-22

pathways to be created along the relocated roadway could be an improvement over existing conditions.

Construction of the proposed project also would require relocation or removal of trees both outside the existing fence line and inside the NTC site. Tree replanting and replacement would comply with DPR's applicable rules and regulations. Approximately 422 trees would be displaced, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations, and thus this change would not be anticipated to significantly adversely affect the project site's visual character.

As described above, the project site is not considered to be a visual resource, while the Arthur Ashe Stadium is a notable element in surrounding views. The visual corridor leading from Arthur Ashe Stadium to the South Gate would be maintained and no new structures would be developed within this area, and thus views south from this area to the Unisphere and the New York State Pavilion would not change significantly.

STUDY AREA

The uses on the project site, which are primarily recreational, would continue to be compatible with surrounding uses, including the various recreational amenities contained in Flushing Meadows Corona Park. While the height of several structures—and the total bulk of structures—on the NTC site would increase in the future with the proposed project, these incremental increases would be modest relative to the existing facilities, and would not be inconsistent with the surrounding parkland context (see **Figure 6-23a and 23b**). As described above, the NTC is already highly visible in this section of the park, and the trees and other landscaping to be provided along the NTC site's perimeter would serve to minimize the visual presence of the new site elements from most locations. The proposed project would not alter the visual character of the surrounding area, except to make certain sections of the NTC site more prominent in directly adjacent views. Specifically, views of the southwest corner of the NTC site would now include the proposed Stadium 3 rather than perimeter fencing and practice courts, and views of the northwest and northeast corners of the NTC site would now include structured parking facilities screened with landscaping and vegetation rather than surface parking lots and a tennis bubble (see **Figures 6-24 through 6-30**). With the exception of the small change to park land acreage and the relocation connector roadway, the proposed project would not result in any changes to natural features, open spaces, or streets in the study area.

As described in greater detail in Chapter 4, "Shadows," the proposed Stadium 3 and the new structured parking facility on Lot B would cast new shadow on four small portions of adjacent park land within Flushing Meadows Corona Park. Three of these areas are lightly used, primarily for pass-through activity, and were concluded to be only minimally sensitive to the effects of incremental shadows. The fourth area that could be affected by project-generated shadow—a portion of the circular plaza at the base of the Passerelle ramp—could potentially receive new shadows late in the afternoons of the late spring and summer, but would likely receive direct sun for most of the remaining day in those seasons. Therefore, project-generated shadows are not considered to be substantial enough to significantly affect the urban design or visual character of these elements of Flushing Meadows Corona Park. Overall, the proposed project would not change the arrangement, appearance, or functionality of the build environment in such a way that the change would negatively affect a pedestrian's experience of the area.

The changes to the project site would be most visible from within the NTC's boundaries, from the immediately-adjacent Meridian Road, United Nations Avenue North, and Path of the

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View from Passerelle Ramp (Summer View)

Figure 6-23a

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View from Passerelle Ramp (Winter View)

Figure 6-23b

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View Toward Parking Lot B

Figure 6-24

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View of Parking Lot A

Figure 6-25

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View Toward North

Figure 6-26

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View at South Gate Looking East

Figure 6-27

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View at South Gate Looking Northeast

Figure 6-28

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View on Meridian Road Looking East

Figure 6-29

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View of Parking Garage A

Figure 6-30

Americas, and from the elevated perspectives of the No. 7 train platform and the Passerelle ramp. From outside this area, the extensive vegetation and tree cover of Flushing Meadows Corona Park—as well as the distance to viewing locations created by the LIRR rail yards and Grand Central Parkway—would serve to limit the visibility of the proposed changes, and thus the potential for impacts to visual resources in the surrounding area. The new parking structures and administrative and retail building at the north side of the site and the proposed addition to the north side of Arthur Ashe Stadium are anticipated to be minimally visible, if at all, from west of the Grand Central Parkway or from south of the NTC site (see **Figure 6-31**). The proposed Stadium 3 at the southwest corner of the site is anticipated to be somewhat visible in some views of the Freedom of the Human Spirit sculpture, Unisphere, and New York City Building; however, the stadium would be visually consistent with the exiting structures on the rest of the NTC site, and would not introduce an incompatible visual element to the setting of these resources. The new parking structures and the administrative and retail building at the northeast corner of the NTC site would change the immediate context of the Passerelle Building, but would not be expected to significantly alter or introduce an incompatible visual element to the setting of this resource. The Unisphere, the New York State Pavilion, Citi Field, and Terrace on the Park would continue to be notable elements in study area views, along with Arthur Ashe Stadium. The area south of the existing NTC fence line and north of United Nations Avenue north, which is presently a mix of paved and landscaped areas, would be reconfigured for the relocation of the southerly tournament courts to the south. This relocation could require the potential removal of some trees and light fixtures within the landscaped area. Any tree removal and replacement would be conducted in conformance with DPR requirements, and are assumed to be designed such that the views to the long allees of mature trees along Flushing Meadows Corona Park's main axes would not be obstructed or significantly altered. Overall, the proposed project would not significantly alter the context of any visual resources and would not obstruct any view corridors to visual resources.

In addition to the improvement of the NTC, certain additional improvements would be undertaken for the benefit of the general public within other portions of Flushing Meadows Corona Park. As described in Chapter 1, "Project Description," these potentially include: the renovation of existing soccer fields; development of a new comfort station; and vehicular, pedestrian, landscape, and drainage upgrades. The potential park land improvements are expected to enhance the visual appearance and pedestrian experience of Flushing Meadows Corona Park.

Overall, the proposed project would not be expected to have any significant adverse impacts on urban design and visual resources. ✷

Existing/no action conditions

With-action condition

No-Action and With-Action View Comparison,
View Southeast Toward Arthur Ashe Stadium

Figure 6-31

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, natural resources are defined as "(1) the City's biodiversity (plants, wildlife and other organisms); (2) any aquatic or terrestrial areas capable of providing suitable habitat to sustain the life processes of plants, wildlife, and other organisms; and (3) any areas capable of functioning in support of the ecological systems that maintain the City's environmental stability." A natural resources assessment considers species in the context of the surrounding environment, habitat or ecosystem and examines a project's potential to impact those resources.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This chapter considers the proposed project's potential impacts on natural resources present within and adjacent to the project site. The analysis describes and evaluates the potential for direct and indirect impacts to these resources from the construction and operation of the proposed project.

PRINCIPAL CONCLUSIONS

The analysis finds that the proposed project would not result in any significant adverse natural resources impacts.

Most project components would entail redevelopment of existing facilities, relocation of facilities, or construction of new facilities in previously developed areas within the NTC. The relocation of Grandstand Stadium (Stadium 3), a connector road, and the relocation of the southern NTC fence line 25 to 38 feet to the south are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southern section of the NTC, which is outside of any floodplain and would not increase local flood risk. Construction would require the disturbance of ecological communities present on-site and removal of approximately trees from both outside the existing fence line and various locations inside the NTC site. Tree replanting and replacement within the NTC and elsewhere within the park would comply with the New York City Department of Parks and Recreation (DPR)'s applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations. The proposed project would not significantly alter the ecological communities of the region, as similar ecological communities would be created as a result of the landscaping plans, after the proposed development has taken place. Because the wildlife community in the study area is composed of disturbance-tolerant, synanthropic species and levels of human disturbance are already high, noise generated during construction and operation of the proposed project would not be expected to displace or otherwise negatively affect wildlife. No federally or state-listed endangered wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Six state-listed endangered willow oak trees located in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center would be displaced as a result of the proposed project. However, if deemed feasible, these trees may be relocated to another area of the NTC or onto adjacent DPR property. Willow oak is commonly planted as a street tree in New York City and is listed on the DPR-approved tree planting list for sidewalk and rights-of-way (ROW). Therefore, the removal and/or transplanting of willow oaks within and/or adjacent the NTC as part of the proposed project would not result in a significant adverse impact to naturally occurring and naturalized willow oak populations within the region.

B. METHODOLOGY

ASSESSMENT OF EXISTING CONDITIONS

The methodology outlined in the *CEQR Technical Manual* was used to determine the study area. Due to the highly developed nature of the surrounding land uses, the study area for the natural resources assessment is limited to a 400-ft radius surrounding the project site. An exception is made for the establishment of the study area for the rare, threatened, and endangered species or special habitats assessment, which is a ½-mile radius surrounding the project site.

A reconnaissance-level field investigation was conducted on May 1, 2012 to characterize existing conditions of natural resources in the study area. In accordance with the Section 322 “Field Reconnaissance” assessment methods of the *CEQR Technical Manual*, the field investigation involved walking the study area to document the ecological communities, vegetation, and wildlife present. In addition to the field investigation, existing conditions within the study area were summarized from existing sources of information, including:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps;
- New York State Department of Environmental Conservation (NYSDEC) 2000-2005 Breeding Bird Atlas, Herp Atlas Project;
- United States Fish & Wildlife Service (USFWS) list of Endangered, Threatened, Candidate, and Proposed species for Queens County, NY;
- Response to a request for information the New York Natural Heritage Program (NYNHP) on rare, threatened and endangered species or special habitats within the study area; and
- Results from a September 2011 Tree Survey conducted for the project.

FUTURE WITHOUT THE PROPOSED PROJECT

Conditions within the study area in the future without the proposed project (the No-Action condition) were assessed by considering potential impacts to natural resources from other projects in the area. These include USTA’s on-going management of capital projects at the NTC, which would result in a range of improvements that are typically made to the NTC between US Open periods. These projects are not part of the NTC Strategic Vision and would proceed regardless of the status of the NTC Strategic Vision.

POTENTIAL IMPACTS FROM THE PROPOSED PROJECT

Potential impacts to natural resources from the proposed project were evaluated for ground water, floodplains, terrestrial ecological communities, vegetation, wildlife, and threatened, endangered, and special concern species. Wetlands were not evaluated because NYSDEC and

USFWS National Wetlands Inventory (NWI)-mapped wetlands are not present in the study area and no wetlands were observed during the field reconnaissance investigation. In addition, no aquatic habitats are present within the study area. Potential impacts were assessed by considering the existing conditions and then the permanent and direct effects such as land disturbance and tree removal, and temporary indirect effects such as noise disturbances to wildlife during project construction and operation.

C. EXISTING CONDITIONS

GROUNDWATER

As discussed in Chapter 8, "Hazardous Materials," geotechnical studies indicate that groundwater is first encountered at approximately 5 to 15 feet below grade and appears to be flowing in a northeasterly direction (i.e., either toward the Flushing River approximately 1,100 feet to the east, or toward Flushing Bay approximately 3,200 feet to the north). Groundwater in this part of Queens is not used as a source of potable water (the municipal water supply uses upstate reservoirs). Soil and groundwater testing conducted in the vicinity of the project site in 1991-1992 identified somewhat elevated concentrations of certain semivolatile organic compounds (SVOCs), metals and total petroleum hydrocarbons (TPH) in soil samples, which are typical for fill materials containing ash, cinders etc. The detected volatile organic compound (VOC) concentrations met or were only slightly above NYSDEC Part 375 Soil Cleanup Objectives for Unrestricted Use (USCOs) for soils and met NYSDEC Class GA Standards (drinking water standards) for groundwater, and also appeared to be attributable to fill materials rather than a spill.

FLOODPLAINS

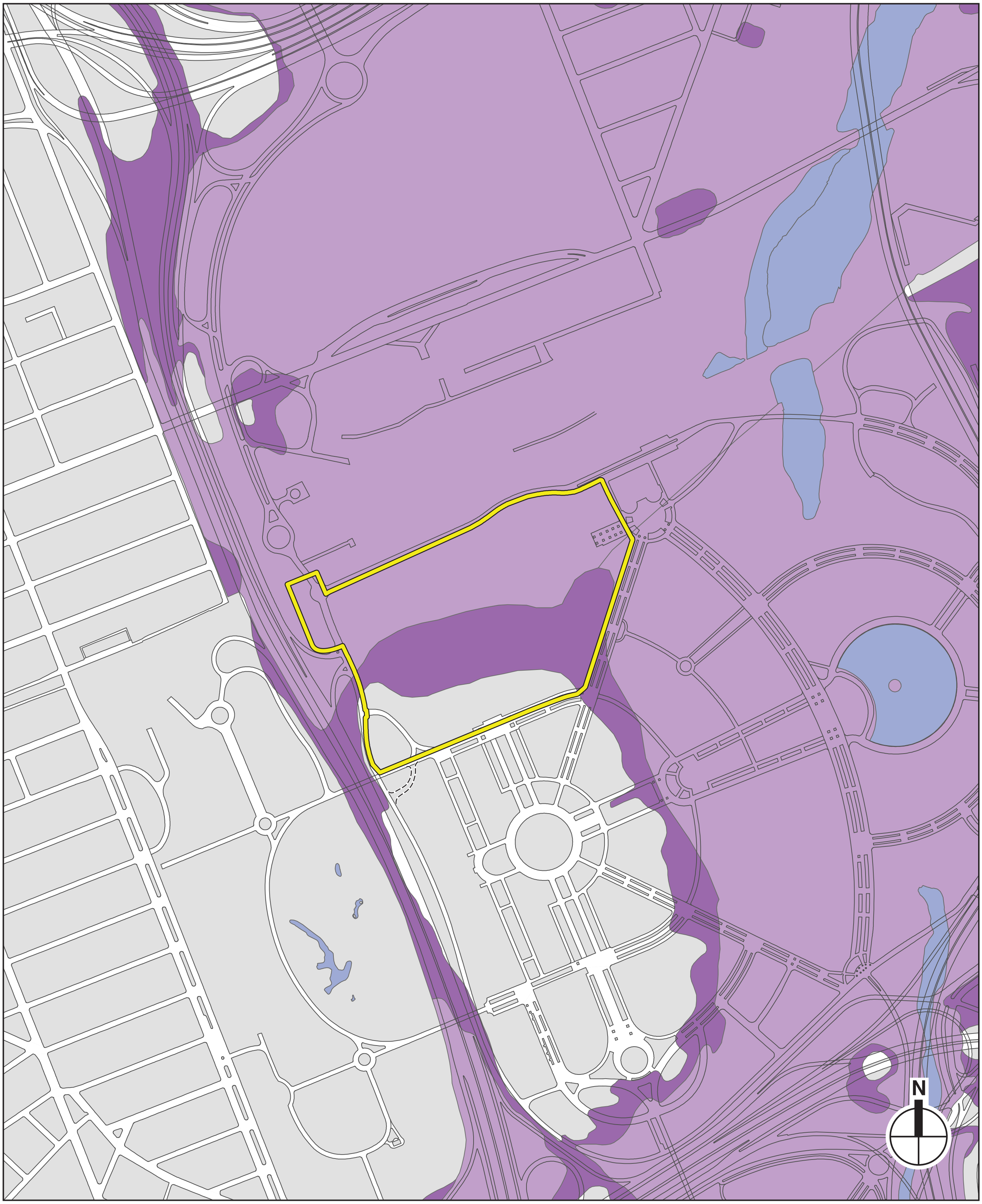
The southwestern extent of the project site, including the present site of a portion of the southerly tournament courts, the proposed location of the new Grandstand Stadium (Stadium 3), and the site of the proposed relocated connector road, is outside of any floodplain. The midsection of the project site, extending from the eastern to the western boundary is within a 500-year floodplain (an area with a 0.2 percent annual chance of flooding) and the remainder of the NTC to the north is within a 100-year floodplain (an area with a 1 percent annual chance of flooding) (see **Figure 7-1**). These floodplains are associated with Flushing Creek. Portions of Arthur Ashe Stadium (Stadium 1), the Indoor Training Center, Court 12, and portions of the southerly tournament courts are within the 500-year floodplain. A portion of Louis Armstrong Stadium (Stadium 2), a portion of Grandstand Stadium, portions of parking lots A and B, and a portion of Arthur Ashe Stadium, are within the 100-year floodplain.

ECOLOGICAL COMMUNITIES

As stated above, the NTC consists of buildings with pockets of maintained landscapes (i.e., planted medians and lawns). These landscapes would be characterized by Edinger et al. (2002) as "terrestrial cultural" communities. Terrestrial cultural communities are defined as "communities that are either created and maintained by human activities, or are modified by human influence to such a degree that the physical conformation of the substrate, or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence (Edinger et al. 2002)."

12.14.12

Orthoimagery Source: National Flood Hazard Layer, FEMA, 2010



Project Site Boundary

100-Year Floodplain

500-Year Floodplain

0 1500 FEET

SCALE

FEMA Floodplain

Figure 7-1

Vegetated terrestrial cultural communities that are present within the project site include flower/herb garden,[1] mowed lawn,[2] and mowed lawn with trees.[3] As shown in **Figure 7-2**, the majority of these terrestrial ecological communities are situated in strips or blocks that are surrounded by walkways, tennis courts, stadiums, and buildings (see **Figure 7-3**). Within these areas, there are several variations of the three terrestrial ecological community descriptions given that the landscaping of each vegetated strip or block is slightly different. However, the understory of all of these communities consists of lawn, lawn with small to large trees, or areas with ornamental herbaceous, shrub, and groundcover species (see **Figures 7-4, 7-5, and 7-6**). Species observed in lawn areas include common grasses and broadleaf plants such as fescues (F*estuca* sp.), orchard grass (*Dactylis glomerata*), mugwort (*Artemisia vulgaris),* common plantain (*Plantago major*), and clovers (*Trifolium* sp.). More manicured areas on the site include ornamental shrubs, such as meadowsweet (*Spirea* sp.), rhododendron (*Rhododendron* sp.), and Japanese barberry (*Berberis thunbergii*).

A tree survey was conducted within the project site as part of the proposed project. Most of the species in and adjacent to the project site are commonly planted along roadways within the City. In the vicinity of the NTC, trees are present along United Nations Avenue North, Meridian Road (including the connector road that would be relocated as part of the proposed project), and along the walkways between the NTC facilities. The most common tree species include the following: honey locust (*Gleditsia triacanthos*), which is prominent in the paved areas at the main entrance of NTC and between Arthur Ashe Stadium and Louis Armstrong Stadium; London planetree (*Platanus* x *acerifolia*), which occurs along Meridian Road North/South, in the median along United Nations Avenue North, and most of the road in the surrounding area of Corona Park; and little leaf linden (*Tilia cordata*) found along Meridian Road East/West and in the parking lot northwest of Arthur Ashe Stadium. Less common tree species include Eastern white pine (*Pinus strobus*), pin oak (*Quercus palustris*), Japanese zelkova (*Zelkova serrata*), and Kwanzan cherry (*Prunus kwanzan*).

These maintained terrestrial ecological communities are expected to provide limited habitat to wildlife, as described below.

WILDLIFE

The habitat available to terrestrial wildlife in the study area primarily consists of manicured lawn with small clusters and rows of mature shade trees. There is no woody understory beneath the tree canopies, and herbaceous ground cover consists of landscaped and mowed areas. The majority of the study area is unvegetated and covered by impervious surfaces. As such, wildlife

[1] Edinger et al. (2002) defines this community as "[r]esidential, commercial, or horticultural land cultivated for the production of ornamental herbs and shrubs. This community includes gardens cultivated for the production of culinary herbs."

[2] Edinger et al. (2002) defines this community as "[r]esidential, recreational, or commercial land, or unpaved airport runways in which the groundcover is dominated by clipped grasses and there is less than 30% cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50% cover. The groundcover is maintained by mowing."

[3] Edinger et al. (2002) defines this community as "[r]esidential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and it is shaded by at least 30% cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50% cover. The groundcover is maintained by mowing."

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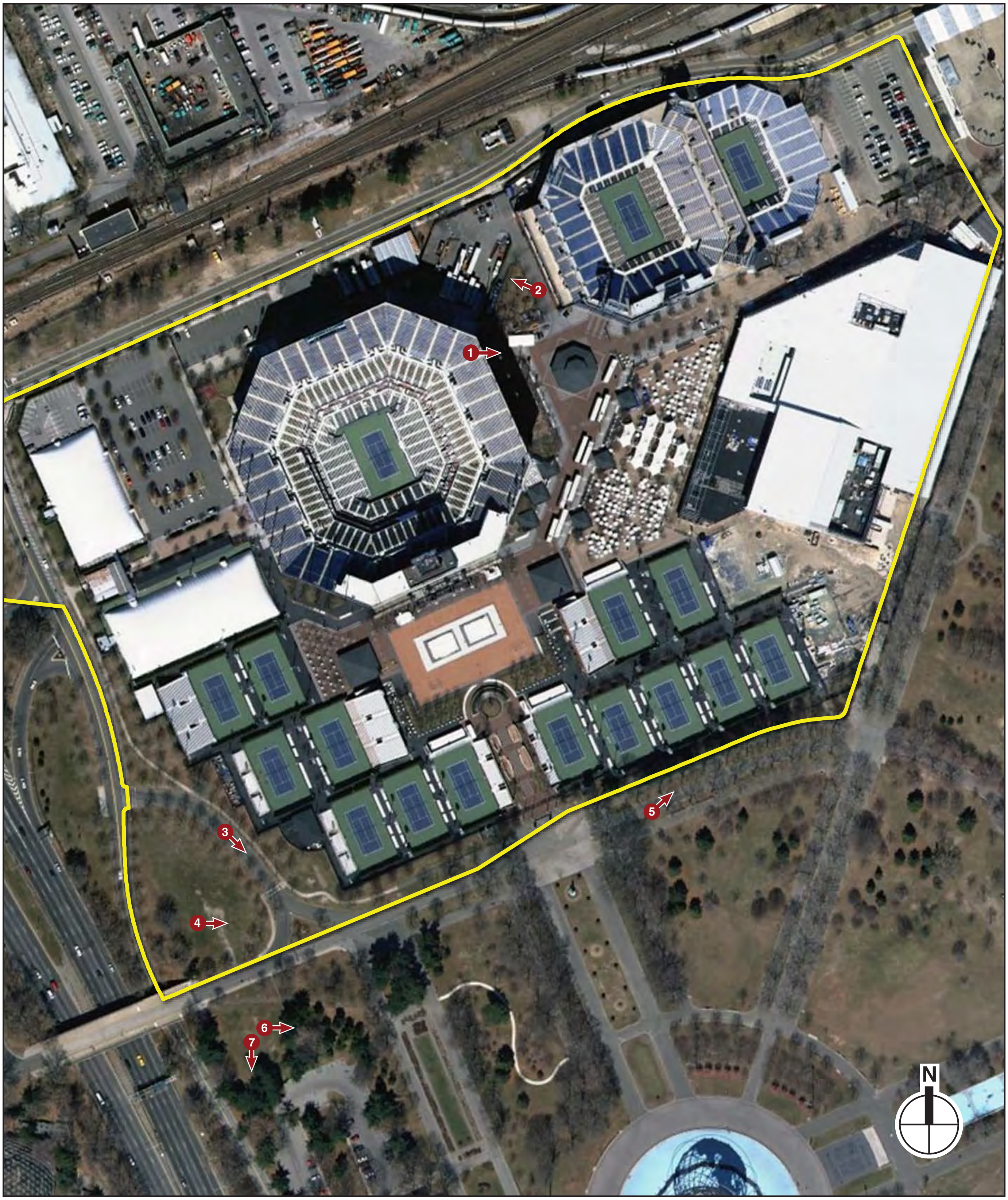


Orthoimagery Source: World Imagery, ESRI ArcGIS Online

Project Site Boundary

Photograph View Direction and Reference Number

0 200 400 FEET

SCALE

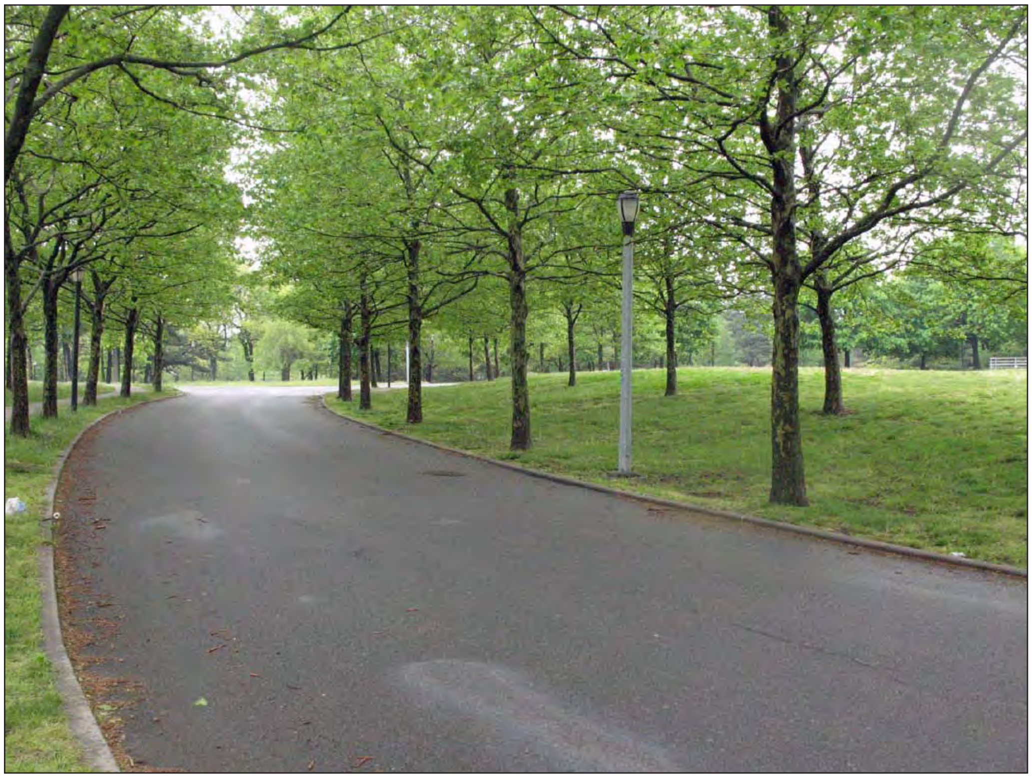
Natural Resources
Photograph Key
Figure 7-2

View from Arthur Ashe Stadium, facing east **1**

View of typical mowed lawn with trees and shrubs, facing west **2**

Natural Resources
Photographs

Figure 7-3



View along Meridian Road North/South of street trees and mowed lawn with trees, facing south east **3**

View of mowed lawn with trees at the location of the proposed Grandstand Stadium, facing east **4**

Natural Resources
Photographs

Figure 7-4

View along United Nations Avenue North, facing north east **5**

View of mowed lawn with trees in the vicinity of the proposed road, facing east **6**

Natural Resources
Photographs

Figure 7-5

View of mowed lawn with trees in the vicinity of the proposed road, facing south **7**

Natural Resources
Photographs

Figure 7-6

occurring in the study area is largely limited to urban-adapted species that are tolerant of degraded environments and high levels of human activity.

BIRDS

The Breeding Bird Atlas is a periodic census of the distribution of breeding birds across New York State. The most recent census was conducted from 2000-2005 and documented 48 species as confirmed or probable/possible breeders in the survey block in which the study area is located (Block 5951C; in **Appendix C**). The three square mile survey block encompasses larger and different types of habitat (e.g., Flushing Bay, forested areas of Flushing Meadows Park, and Meadow Lake) than what is present within and around the project site. As such, many bird species that appear in the atlas block are unlikely to breed in the study area. Only 10 of the 48 species listed in the atlas block are considered to have the potential to breed in study area on the basis of their habitat requirements (see **Appendix C**). They are disturbance-tolerant, generalist species that have small area requirements and thrive in human-modified environments, including American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), rock dove (*Columbia liva*), and mourning dove (*Zenaida macroura*). Bird species with the potential to occur in the study area during the breeding season are mainly year-round residents that remain throughout the winter. Birds that are expected to occur in the study area during winter include urban-adapted species such as blue jay, downy woodpecker (*Picoides pubescens*), European starling, house sparrow, rock dove, and mourning dove.

Additional bird species have the potential to occur in the study area during spring and fall, when migratory birds are traveling between southern wintering grounds and northern breeding grounds. Most bird species are more generalistic in their habitat preferences during migration than during the non-migratory periods, and far more species occur in the New York City area during spring and fall than at other times of year. However, the limited vegetative cover within the study area provides minimal stopover habitat for migrating birds, and migrants are likely to occur in the area only on rare occasions. Any migrants seeking stopover habitat in the area are likely to select the more suitable habitat available in forested sections of Flushing Meadows Corona Park to the south. Examples of some migratory birds with the potential to occur in the study area during spring and fall include arboreal species that forage in mature trees and can be found in small city parks, such as American redstart (*Setophaga ruticilla*), northern parula (*Parula americana*), red-eyed vireo (*Vireo olivaceous*), and yellow-rumped warbler (*Dendroica coronata*). No habitat is available for ground- or understory-foraging migrants such as *Catharus* thrushes.

The May 1, 2012 field survey coincided with the peak passage period of spring migrants through New York, yet no such migrants were observed.

Birds observed within the study area during the May 1, 2012 field survey included: American robin, American goldfinch (*Carduelis tristis*), American crow (*Corvus brachyrhynchos*), blue jay, chipping sparrow (*Spizella passerine*), European starling, gray catbird (*Dumetella carolinensis*), house sparrow, mallard (*Anas platyrhynchos*), and northern flicker (*Colaptes auratus)*. Each of these species is expected to nest within the study area.

MAMMALS

Similar to the bird community, minimal terrestrial resources available in the study area limit the mammal community to species that can thrive in extremely altered and disturbed habitats within urban landscapes and those that benefit from an association with humans (i.e., synanthropic species). The only mammals expected to occur in the study area include raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), Norway rat (*Rattus norvegicus*), and domestic cat (*Felis catus*). Gray squirrel was the only mammal observed during the May 1, 2012 field survey.

REPTILES AND AMPHIBIANS

The NYSDEC Herp Atlas Project was a 10-year survey (1990-1999) of the geographic distribution of herpetofauna in New York State. Of the 73 species of amphibians and reptiles that occur in the state, the following 14 species were documented in the atlas block that covers the study area (*Flushing* USGS quadrangle): spotted salamander (*Ambystoma maculatum*), northern two-lined salamander (*Eurycea bislineata*), American toad (*Bufo americanus*), Fowler's toad (*Bufo fowleri*), gray treefrog (*Hyla versicolor*), spring peeper (*Pseudacris crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), common snapping turtle (*Chelydra serpentina*), eastern box turtle (*Terrapene carolina*), red-eared slider (*Trachemys scripta*), painted turtle (*Chrysemys picta*), Italian wall lizard (*Podarcis sicula*), and northern brown snake (*Storeria dekayi*). However, the atlas block spans a large geographic area (most of northern Queens, Flushing Bay, and the south Bronx) that encompasses much larger and more diverse areas of habitat (e.g., Pelham Bay Park and the lower Bronx River) than what is present within and around the project site. On the basis of their habitat requirements (Mitchell et al. 2006, Gibbs et al. 2007), only the Italian wall lizard is considered to have the potential to occur in the study area. The study area's lack of wetlands, streams, or other freshwater habitats particularly prohibits it from being suitable for many of these species. The Italian wall lizard is a non-native species that was introduced to Long Island in the 1960's and has since spread to other parts of the New York metropolitan area (Burke et al. 2002).

No reptiles or amphibians were observed during the May 1, 2012 field survey.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

A request for information on rare, threatened, or endangered species within a 0.5 mile radius of the NTC was submitted to NYNHP on April 30, 2012. NYNHP indicated that no species listed by NYNHP have been recorded for the study area (Pietrusiak 2012). The USFWS list of federally threatened, endangered, candidate, and proposed species for Queens County includes piping plover (*Charadrius melodus*), roseate tern (*Sterna dougalli*), and seabeach amaranth (*Amaranthus pumilus*). No federally- or state-listed bird species were documented by the 2000-2005 Breeding Bird Atlas in the census block in which the study area is located. One state-listed species, the eastern box turtle (special concern), was documented by the Herp Atlas Project in the Flushing census quadrangle, but as explained above, suitable habitat for this species and all other native reptiles is lacking within and near the study area. No federally- or state-listed wildlife species were observed within the study area during the May 1, 2012 field investigation. However, one plant, the willow oak (*Quercus phellos*), was observed in planted rows within the NTC and is described in more detail below. Because these trees were planted within the site, they would not qualify as a NYNHP species record.

PIPING PLOVER

The piping plover is a federally threatened (and NYS endangered) species listed by the USFWS as occurring in Queens County. The breeding range of piping plovers in New York State is limited to the beaches of Long Island, from Queens to Peconic Bay (Wasilco 2008). Within New York City, piping plovers are limited to a small breeding population in Jamaica Bay National Wildlife Refuge and on Rockaway Beach, along the south shore of Rockaway Peninsula (Boretti et al. 2007). Piping plovers do not nest on the north shore of Queens which lacks wide, open expanses of unvegetated beach that Atlantic piping plovers most commonly select for nesting (Elliot-Smith and Haig 2004). Piping plovers do not have the potential to occur within the study area.

ROSEATE TERN

The roseate tern is a federally endangered (and NYS endangered) species listed by USFWS as occurring in Queens County. Northeastern colonies are located on rocky offshore islands, barrier beaches, or salt marsh islands in areas with little human disturbance (Gochfeld et al. 1998). The project site and the surrounding area of Queens lack any habitat that would be suitable for the roseate tern, and this species is not considered to have the potential to occur within the study area.

SEABEACH AMARANTH

Seabeach amaranth is a federally threatened (and NYS endangered) species listed by USFWS as occurring in Queens County. However, appropriate habitat for the species (accreting shoreline, upper beach, foredune, overwash flat, dredge spoil, and sand/shell beach replenishment areas) is lacking in the study area. Seabeach amaranth was not observed during the May 1, 2012 field visit and is not considered to have the potential to occur within the study area.

WILLOW OAK

The willow oak is ranked as “S1” by NYNHP, indicating that it is critically imperiled in the state because of extreme rarity (i.e., five or fewer sites or very few remaining individuals) (NYNHP 2010). Habitat for this species is mostly on the coastal plain in moist soils or swamps (Gleason and Cronquist 1963).

Twenty seven willow oak (most between 3 to 6 inches in diameter at breast height [dbh] and one 24 in dbh) trees have been planted in the NTC and are present in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center. These trees occur in two linear arrangements, in tree pits, and are surrounded by paving stones. The one larger willow oak is located north of the east plaza walkway and south of parking lot B. Willow oak is a common tree in New York City, and these trees 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 NYNHP “S1” rank. Otherwise, due to the urbanized nature and absence of moist soils, this species would not be likely to occur within the study area.

D. FUTURE WITHOUT THE PROPOSED PROJECT

In the future No Action condition, natural resources within the study area would be expected to remain in a similar condition as under existing conditions. The NTC’s ongoing management of capital projects would result in minor alterations to the project site, as described in Chapter 2, “Land Use, Zoning, and Public Policy.” However, construction activities would generally be limited to maintenance and small-scale construction projects on existing facilities in an area with few natural resources. Therefore, these projects would not result in a significant adverse impact to natural resources of the region.

The City, through DPR, is currently in discussions with a private entity for a lease covering the construction and operation of a new stadium for professional soccer purposes in an approximately 13-

acre area within the northern portion of Flushing Meadows Corona Park south of Roosevelt Avenue and eastward of the NTC, as described in Chapter 2, “Land Use, Zoning, and Public Policy.”

The Fountain of the Planets, which covers a 6.6 acre area, would be filled as part of the stadium development project. The fountain is not operational, its water is typically stagnant, and no vegetation grows within the fountain; therefore, the fountain is not considered a natural feature. However, as the fountain was constructed in the former alignment of Flushing Creek and to allow drainage from the watershed through it, DEC and the US Army Corps of Engineers are expected to maintain or assert jurisdiction over it. DEC has mapped the fountain as a Class B Protected Water and the National Wetland Inventory maps the fountain as a freshwater pond with a riverine channel bisecting it. It is anticipated that the filling of the fountain will require mitigation to offset the loss of this jurisdictional water, but the exact nature of this mitigation is yet to be determined.

Development of the new soccer stadium would include in-line structured water detention facilities below field level to accommodate Flushing Creek. Drainage systems east and west of the proposed stadium site, which are currently connected to the Fountain of the Planets, would be intercepted and discharge downstream of Porpoise Bridge. This flow would be disconnected from Flushing Meadows Corona Park site flows that discharge upstream of Porpoise Bridge. Stormwater drainage from the MLS site itself would be split and connect to the existing drainage systems east of west of the proposed stadium site.

In addition, approximately 71 trees would be removed in order to construct the soccer stadium. Tree replacement, protection, and transplanting would comply with the City’s applicable rules and regulations.

E. FUTURE WITH THE PROPOSED PROJECT

As described in Chapter 1, “Project Description,” the NTC Strategic Vision would result in a number of physical improvements and alterations to the facility. Overall, the proposed project would add 0.94 acres to the NTC site, including 0.68 acres of parkland that would be alienated, and 0.26-acres of previously alienated parkland that is outside the current lease. The principal elements of the proposed project are summarized below in **Table 7-1**.

Because the majority of these activities would take place in heavily developed areas and in most cases entail redevelopment of existing structures and facilities, there is minimal potential for impacts to natural resources.

GROUNDWATER

As stated in Chapter 8, “Hazardous Materials,” a New York City Department of Environmental Protection (NYCDEP)-approved Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP) would be prepared for implementation during subsurface disturbance associated with project construction. The RAP would address requirements for items such as soil stockpiling, soil disposal and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The RAP would include the requirement for any future enclosed construction to include appropriate vapor control (e.g., vapor barriers) to prevent the migration of methane or VOCs into enclosed areas. The RAP would also include the requirements for a cap of clean imported soil to be placed in areas not covered by buildings or paving. If dewatering is required during construction activities, it would be performed in accordance with NYCDEP requirements. With these measures in place, no significant adverse impacts to groundwater would be expected.

Table 7-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
Stadium Improvements and New Construction		
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
Tournament Court Modifications		
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
Ancillary Building Construction		
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail and sponsorship building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium
Parking and Transportation Improvements		
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
Pedestrian Enhancements		
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
Source: USTA

FLOODPLAINS

As discussed above, nearly all project components would entail redevelopment of existing facilities, relocation of facilities, or construction of new facilities in previously developed areas within the NTC. The relocation of Grandstand Stadium (Stadium 3), a connector road, and the relocation of the southern NTC fence line 25 to 38 feet to the south are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southern section of the NTC, which is outside of any floodplain. Land-disturbing project elements that would take place in sections of the NTC that are within 100 and 500 year floodplains include construction of two new parking garages, construction of retail and sponsorship building, and redevelopment of Louis Armstrong Stadium (Stadium 2). The parking garages would be constructed over two existing parking lots, and the redevelopment of Louis Armstrong Stadium and the construction of the proposed adjacent retail and sponsorship building would occur within the footprints of the existing structures and surrounding areas of impervious surface (e.g., pedestrian walkways). The elevation in the vicinity of the Louis Armstrong Stadium would be slightly increased to reduce flooding around the stadium. Redevelopment and construction in other areas of the site would not require grading that would significantly change the elevation of the area. As such, there would be no alteration of the function or distribution of the existing floodplain zone, and no changes to the current risk of flooding in the area from the proposed project.

The new Stadium 2 and a portion of the proposed transportation center are the only structures that would be built within the 100 year flood zone as part of the proposed project. All critical infrastructure would be built above the 100 year flood zone for these structures, and the portions of these structures that would be built below this elevation will be designed to withstand damage due to flooding.

ECOLOGICAL COMMUNITIES

Due to the highly urban nature of the terrestrial ecological communities present on the site, the loss of some of these communities as a result of the proposed project would not result in a significant adverse impact on ecological communities of the region. For instance, the area where the proposed Grandstand Stadium would be constructed, near the intersection of Meridian Road and United Nations Avenue North, as shown in **Figure 7-2**, is currently occupied by pavement, "mowed lawn with trees," and "mowed lawn" communities. In addition, many of the areas within NTC, such as the area located between the main entrance and Arthur Ashe Stadium (Stadium 1), are paved with paving stones and planted with single species of tree, in this case honey locust. The proposed project would not significantly alter the ecological communities of the region, as similar ecological communities would be created as a result of the landscaping plans, after the proposed development has taken place.

Construction of the proposed project would require the removal trees both outside the existing fence line, including United Nations Avenue North and the proposed location of the connector road south of United Nations Avenue North, and various locations inside the NTC site including in the vicinity of the practice courts, parking lot A, northwest corner of Arthur Ashe Stadium, west side of parking lot B, west side of the Grandstand Stadium, proposed Grandstand Stadium relocation site, and a small number in the Food Village. Tree replanting and replacement would comply with DPR's applicable rules and regulations. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations. Where possible, some of the existing younger London planetree and willow oak trees may be transplanted within the NTC site or surrounding area where the circumstances deem feasible. Tree relocation would take place to maintain the benefits of having larger, more mature trees on site. In addition, approximately 54 percent, or 500, of the existing trees would remain in place, would be protected during construction, and would be incorporated into the landscaping design.

Tree replacement, protection, and transplanting would comply with the City's applicable rules and regulations. Trees under the jurisdiction of DPR may not be removed without a permit pursuant to Title 18 of the Administrative Code of the City of New York. Chapter 5 of Title 56 of the Rules of the City of New York establishes rules for valuing trees that are approved for removal in order to determine the appropriate number of replacement trees. A method to calculate the number of replacement trees as per the New York City tree replacement code would be used to quantify the size and number of trees that would be required to replace those removed from the NTC and adjacent area. Measures to protect existing trees and transplant trees would include protection plans to minimize impacts to the critical root zones, trunks, and canopies. Plans would show the exact locations, species, and installation details of the replacement and transplant trees.

In addition to tree replacement, protection, and transplanting, a landscaping plan developed for the proposed project would incorporate some native shrubs (i.e., mountain laurel [*Kalmia latifolia*], Viburnum [*Viburnum*] sp.) and small trees (i.e., flowering dogwood [*Cornus florida*], eastern redbud [*Cercis Canadensis*]). Native plants used in the landscaping plans could benefit some species of wildlife, such as beneficial insects and songbirds. Therefore, the landscape design associated with the proposed project would be expected to benefit ecological communities of the NTC and the surrounding area.

WILDLIFE

The majority of the proposed project would involve construction and reconstruction in presently developed areas of the project site, which are almost entirely unvegetated and covered by impervious surfaces. Construction of these project elements would not eliminate or degrade any habitat of use to native wildlife. The relocation of Grandstand Stadium to the southwestern section of the NTC would require removal of several mature shade trees and loss of an approximately 1.21 acre area of manicured lawn. As described under "Existing Conditions," this area represents marginal quality wildlife habitat that is suitable to few native wildlife species, such as gray squirrel, blue jay, and American robin. The native and non-native wildlife species expected to occur in this area are extremely common, urban-adapted generalists that are ubiquitous throughout the metropolitan area. Relocation of the Grandstand Stadium to this area would not significantly impact these species at the individual or population level. Individuals currently inhabiting the area would, as extreme generalists, easily relocate to the extensive amounts of alternative habitat that would remain available elsewhere in Flushing Meadows Corona Park and the surrounding neighborhoods.

Because the wildlife community in the study area is composed of disturbance-tolerant, synanthropic species and levels of human disturbance are already high, noise generated during construction and operation of the proposed project would not be expected to displace or otherwise negatively affect wildlife.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

As discussed above, no federally or state-listed wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Therefore, the proposed project would not result in a significant adverse impact to federally- or state-listed wildlife of the region.

As stated above, 27 state-listed endangered willow oak trees are present in the walkway between Louis Armstrong Stadium and the Indoor Training Center. Six of these willow oak trees would be displaced as a result of the proposed project. However, if deemed feasible, these trees may be relocated to another area of the NTC or onto adjacent DPR property. Willow oak is commonly planted as a street tree in New York City and is listed on the DPR-approved tree planting list for sidewalk and rights-of-way (ROW). The planted willow oaks in the site demonstrate the common use of this species in maintained landscapes. Therefore, the removal and/or transplanting of willow oaks within and/or adjacent the NTC as part of the proposed project would not result in a significant adverse impact to naturally occurring and naturalized willow oak populations within the region.

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Chapter 8: Hazardous Materials

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a hazardous materials analysis presents the findings of the hazardous materials assessment and identifies potential issues of concern with respect to workers, the community, and/or the environment during construction and after implementation of the proposed project. The potential for hazardous materials was evaluated based on a June 2012 *Phase I Environmental Site Assessment* (ESA) prepared by AKRF, Inc.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." The proposed project would entail soil disturbance associated with improvements and expansion of NTC facilities, including demolition of existing structures, construction of new structures, and roadway construction and improvements. This chapter provides an assessment of existing and future conditions with and without the proposed project for the project site, which is described in detail below.

B. PRINCIPAL CONCLUSIONS

The Phase I ESA identified potential sources of contamination, including: historical on-site marshland potentially associated with methane emissions; filling of the project site and nearby land with a mixture of ash, refuse, street sweepings, and soil and rock removed during subway construction in Brooklyn; and a historical on-site underground storage tank (UST). Soil and groundwater testing on and in the vicinity of the project site in 1991-1992 identified somewhat elevated concentrations of certain semivolatile organic compounds (SVOCs), metals and total petroleum hydrocarbons (TPH) in soil samples, which are typical for fill materials containing ash. The detected volatile organic compound (VOC) concentrations met or were only slightly above New York State Department of Environmental Conservation (NYSDEC) Part 375 Soil Cleanup Objectives for Unrestricted Use (USCOs) for soils and met NYSDEC Class GA Standards (drinking water standards) for groundwater, and also appeared to be attributable to fill materials rather than a spill.

Based on the above findings, to reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a Subsurface (Phase II) Investigation Work Plan to determine whether past or present, on or off-site activities have affected subsurface conditions, would be prepared and submitted to the New York City Department of Environmental Protection (NYCDEP) for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP), to be implemented during project construction, would be prepared and submitted to NYCDEP for review and approval. The RAP would address requirements for items such as soil stockpiling, soil disposal and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The CHASP would identify potential hazards that may be encountered during construction and specify appropriate health and safety measures to be undertaken to ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment (such as personal protective equipment, dust control, air monitoring, and emergency response procedures).

Lead-based paint, asbestos-containing materials (ACM) and PCB-containing electrical equipment, hydraulic equipment and fluorescent lighting fixtures may be present (primarily within the older structures) at the project site. During and following demolition and renovation associated with the proposed project, regulatory requirements pertaining to ACM, lead-based paint and Polychlorinated Biphenyls (PCBs) and chemical use and storage would be followed.

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

C. EXISTING CONDITIONS

SUBSURFACE CONDITIONS

The project site lies at an elevation of approximately 10 to 20 feet above mean sea level, with surface topography sloping down toward the project site from the southeast and southwest. Bedrock depth is expected to be more than 250 feet below grade. Previous geotechnical studies indicated that urban fill materials containing ash/cinders and building debris are present beneath the surface with a thickness of approximately 15 to 30 feet. The foundations of historical World's Fair buildings also remain beneath portions of the project site.

The geotechnical studies indicated that groundwater is first encountered at approximately 5 to 15 feet below grade and appears to be flowing in a northeasterly direction, i.e., either toward the Flushing River approximately 1,100 feet to the east, or toward Flushing Bay approximately 3,200 feet to the north. Groundwater in this part of Queens is not used as a source of potable water (the municipal water supply uses upstate reservoirs).

HAZARDOUS MATERIALS ASSESSMENT

A Phase I Environmental Site Assessment (ESA) was prepared for the project site. The scope of the Phase I ESA included a reconnaissance of the project site and surrounding area, review of a variety of information sources, including historical Sanborn fire insurance maps, environmental regulatory agency databases identifying state and federally listed sites, and review of previous studies. The Phase I ESA identified the following:

- The project site was historically a tidal marsh, which was filled in the early 20th century with some mixture of ash, refuse, street sweepings, and soil and rock removed during subway construction in Brooklyn. The fill layer is approximately 15 to 30 feet thick based on prior geotechnical information. In 1939, the project site was occupied by the World's Fair. The fair buildings were subsequently demolished and the project site became part of a park. In 1964, the project site was again occupied by the World's Fair. All buildings on the project site were subsequently demolished, except for Louis Armstrong Stadium (Stadium 2) and a historical building (since demolished) in the northwestern corner of the project site. In 1993, a fuel oil UST was associated with this historical building. It is not known whether this UST has been removed or remains beneath the project site. Regulatory databases identified hazardous waste generator listings for the project site: PCB waste, PCB-containing transformers, silver and lead waste, benzene, and ignitable solid waste. The transformer-related listings, reported in 1994 and 1995, were likely associated with removal of historical transformers during the expansion of the NTC.

- Soil gas screening in 1991-1992 in the vicinity of the project site identified detectable concentrations of methane, which can be associated with former marshlands. Soil and groundwater testing conducted in the vicinity of the project site in 1991-1992 identified somewhat elevated concentrations of certain semivolatile organic compounds (SVOCs), metals and total petroleum hydrocarbons (TPH) in soil samples, which are typical for fill materials containing ash, cinders etc. The detected volatile organic compound (VOC) concentrations met or were only slightly above NYSDEC Part 375 Soil Cleanup Objectives for Unrestricted Use (USCOs) for soils and met NYSDEC Class GA Standards (drinking water standards) for groundwater, and also appeared to be attributable to fill materials rather than a spill. In 1992, soil and groundwater testing was conducted at three locations on the project site. Laboratory analysis indicated findings generally similar to those for soil and groundwater in the vicinity of the project site.
- One, approximately 600-gallon diesel aboveground storage tank (AST) for an emergency generator was observed in Arthur Ashe Stadium (Stadium 1). Slight staining was noted on the concrete floor beneath the tank; however, this surface staining is not likely to have affected subsurface conditions.
- Chemical storage on the project site included paints and cleaning and maintenance chemicals in containers up to five gallons in size, one-gallon containers of gasoline for lawn mowers, and a 55-gallon drum of propylene glycol for a chiller plant. These chemicals were generally neatly stored and labeled, with no odors or staining noted. Green liquid was noted in a sump in the Arthur Ashe Stadium chiller room where the 55-gallon ethylene glycol drum was stored, possibly due to a propylene glycol release or algae. NTC representatives indicated that this sump was cleaned following the Phase I ESA reconnaissance.
- Based on the buildings' ages, asbestos-containing materials (ACM) may be present in the Louis Armstrong/Grandstand building, but are less likely to be present in other project site structures, which were built at a time when few ACM were utilized in construction. Asbestos abatement was reportedly conducted in the Louis Armstrong/Grandstand building in 1998. Suspect ACM observed during the reconnaissance included roofing materials, 12-inch by 12-inch vinyl floor tiles, vinyl floor cover, suspended 24-inch by 48-inch ceiling tiles, thermal pipe insulation, and sheetrock walls. The suspect ACM appeared to be in good condition.
- Based on the buildings' ages, lead-based paint may be present on interior surfaces in the Louis Armstrong/Grandstand building and on outdoor surfaces, but is not expected to be present in the other buildings' interiors. Painted surfaces throughout the project site were observed to be in good condition.
- Based on the buildings' ages, fluorescent lighting fixtures, electrical equipment and hydraulic equipment in the Louis Armstrong/Grandstand building may contain PCBs. Fluorescent lights may also contain mercury. Electrical transformers in this building appeared to be dry-type (i.e. not utilizing potentially PCB-containing transformer oil). Mr. Jettmar indicated that some PCB-containing lighting fixture ballasts were removed from this building in the past. No leaks or stains from potentially PCB-containing equipment were noted. If installed prior to 1979, electrical manholes on the Property may also utilize PCB-containing equipment. No PCBs are expected to be present in other project site structures.

- The surrounding area was sparsely developed with dwellings and a Long Island Rail Road (LIRR) rail line running north of the project site in the early 20th century. A train repair facility was constructed north of the rail line (i.e., downgradient/cross-gradient of the project site) by 1931, and expanded into a rail yard with train and bus maintenance by 1950. An ash removal facility located east of the project site in 1931 was likely associated with historical on-site dumping. The area surrounding the project site to the south, east and west was occupied by two World's Fairs in the 20th century before becoming the Flushing Meadows Corona Park.

D. FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project (the No-Action condition), the project site would continue in its current uses. Legal requirements, including requirements for petroleum storage tank maintenance and handling and disposal of ACM, lead-based paint and PCBs, would continue to be followed.

E. FUTURE WITH THE PROPOSED PROJECT

The future with the proposed project (the With Action condition) would involve subsurface disturbance for the proposed NTC improvements and expansion, as well as demolition of or alterations to some existing structures. Soil that would be disturbed by the proposed project includes historical fill materials known to contain ash, which have somewhat elevated concentrations of certain metals and SVOCs. As noted above, on-site structures may contain hazardous materials such as ACM, PCBs and/or lead-based paint. The proposed project could disturb these hazardous materials and potentially increase pathways for human or environmental exposure. Impacts would be avoided by implementing the following measures:

- A Subsurface (Phase II) Investigation Work Plan to determine whether past or present, on or off-site activities have affected subsurface conditions, would be prepared and submitted to NYCDEP for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a NYCDEP-approved Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP) would be prepared for implementation during subsurface disturbance associated with project construction. The RAP would address requirements for items such as soil stockpiling, soil disposal and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The RAP would include the requirement for any future enclosed construction to include appropriate vapor control (e.g., vapor barriers) to prevent the migration of methane or VOCs into enclosed areas. The RAP would also include the requirements for a cap of clean imported soil to be placed in areas not covered by buildings or paving. The CHASP would identify potential hazards that may be encountered during construction and specify appropriate health and safety measures to be undertaken to ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment (such as personal protective equipment, air monitoring, and emergency response procedures).
- During subsurface disturbance, excavated soil would be handled and disposed of in accordance with applicable regulatory requirements. This would include characterization of all fill material sent for off-site disposal in accordance with the requirements of the receiving facility.

- If dewatering is required during construction activities, it would be performed in accordance with NYCDEP requirements.
- If the emergency generator AST would be disturbed by the proposed project, or if any petroleum storage tanks are unexpectedly encountered during construction, such tanks would be properly closed and removed along with any associated contaminated soil. Any evidence of a petroleum spill would be reported to NYSDEC and addressed in accordance with applicable requirements.
- Prior to any activities (such as demolition or renovation) with the potential to disturb suspect ACM, an asbestos survey of the areas to be disturbed would be completed and all ACM would be removed and disposed of in accordance with local, state and federal requirements.
- All renovation/demolition activities with the potential to disturb lead-based paint would be performed in accordance with the applicable Occupational Safety and Health Administration regulation (OSHA 29 CFR 1926.62—Lead Exposure in Construction).
- Unless there is labeling or test data indicating that suspect PCB-containing lighting fixtures, electrical equipment (including equipment in electrical manholes) and hydraulic equipment do not contain PCBs, if disposal is required, it should be performed in accordance with applicable federal, state and local requirements.

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

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a water and sewer infrastructure analysis evaluates the potential of a proposed project to affect New York City's infrastructure, including the City's water supply, sanitary sewage treatment, and stormwater discharge systems.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." Bordering the NTC are water mains and separate sanitary and stormwater pipes owned by New York City Department of Parks and Recreation (DPR). This chapter analyzes the effects of additional project-generated NTC attendees and staff, who would increase the project site's water demand and sewage generation. In addition, there would be an increase in impervious surfaces and stormwater runoff at the site, as compared to the future without the proposed project. However, all of the site stormwater runoff would continue to be discharged via an outfall to Flushing River. This assessment also discusses sustainability elements that would be incorporated into the proposed project to reduce the expected stormwater runoff volume to existing conditions levels. The analysis finds that the proposed project would not result in any significant adverse impacts to water and sewer infrastructure.

B. METHODOLOGY

This analysis follows the methodologies set forth in the 2012 *CEQR Technical Manual.* According to the *CEQR Technical Manual*, a preliminary water analysis would be needed if a project would result in an exceptionally large increase in demand of water of over 1 million gallons per day (mgd), or is located in an area that experiences low water pressure (i.e., at the end of the water supply distribution system, such as the Rockaway Peninsula or Coney Island). The project site is not located in an area that experiences low water pressure and the proposed actions would not result in an incremental water demand exceeding 1,000,000 gallons per day (gpd). Therefore, further water analysis is not warranted; however, the total water demand has been calculated for purposes of the preliminary sewer assessment.

A preliminary sewer assessment would be warranted if a proposed project involves development on a site five acres or larger where the amount of impervious surface would increase. The proposed project meets this CEQR threshold; therefore, a preliminary sewer assessment has been conducted.

Existing and future water demands and sanitary sewage generation are calculated based on use generation rates set forth in the *CEQR Technical Manual*.[1] The New York City Department of

[1] *CEQR Technical Manual*, January 2012, p.13-12.

Environmental Protection (DEP) Volume Calculation Matrix was then used to calculate the overall combined sanitary sewage and stormwater runoff volume discharged to the separate sewer system for four rainfall volume scenarios with varying durations. The ability of the City's water and sewer infrastructure to handle the proposed project's anticipated demand is assessed by estimating existing water demand and sewage generation rates, and then comparing the future with and without the proposed actions. In addition, this chapter calculates the incremental water demand and sewage generated by comparing the demand from the proposed project in the With Action condition to the future without the proposed project (the No-Action condition), per *CEQR Technical Manual* methodology. This analysis considers conditions during the US Open, which represent the maximum extent of water demand and sewage generation on the project site.

C. EXISTING CONDITIONS

WATER SUPPLY

New York City obtains its water supply from the Delaware, Catskill, and Croton reservoir systems, which are operated by DEP. Some residents of southeast Queens obtain their water supply from New York City's groundwater system beneath Queens. The watersheds of the three reservoir systems extend as far as 125 miles north and west of the City, encompassing several reservoirs and lakes, with a storage capacity of over 550 billion gallons. Water is delivered from these watersheds to New York City through a network of reservoirs, aqueducts, and tunnels. Within the City, networks of underground pipes distribute water to consumers.

New York City water systems provide approximately 1.1 billion gallons per day (bgd) to the five boroughs as well as Westchester, Putnam, Ulster, and Orange counties. In 2005, 98 percent of New York City's water was supplied west of the Hudson River by the Catskill and Delaware systems located in Delaware, Greene, Schoharie, Sullivan, and Ulster counties; two percent of the City's water supply came from the Croton system with reservoirs in Putnam, Westchester, and Dutchess counties. New York City's Groundwater System in Queens supplied a daily average of 2.2 million gallons, less than 1 percent of the City's total usage.

Queens draws its water supply primarily from watershed areas in the Catskill Mountains via the Catskill and Delaware systems. The Ashokan and Rondout Reservoirs collect water within the system and deliver it through the Catskill and Delaware aqueducts, then into the Kensico Reservoir in Westchester County, and then into the Hillview Reservoir in the City of Yonkers. From Yonkers, water is distributed to the City through three tunnels, City Tunnel Nos. 1, 2 and 3. City Tunnel No. 1 delivers water through the Bronx and Manhattan to Brooklyn; City Tunnel No. 2 delivers water through the Bronx, Queens and Brooklyn to Staten Island; while City Tunnel No. 3 delivers via the Bronx and Manhattan to Queens.

Average daily water consumption in Queens is estimated at about 200 mgd and the water pressure in the area of the project site is 71 pounds per square inch (psi) based on a hydrant flow test conducted at the site in 2007. A pressure of 20 psi is the minimum water pressure acceptable for uninterrupted service and New York City Fire Department (FDNY) service requirements.

Water service is available to the project site via existing water mains in Meridian Road, United Nations Avenue North, and Path of the Americas. 12-inch diameter mains exist in Meridian Road North/South, 8-inch diameter mains exist in Meridian Road East/West, 8-inch to 20-inch diameter mains exist in United Nations Avenue North and a 20-inch diameter main exists in Path of the Americas. These mains provide service to the several fire hydrants located in the above streets adjacent to the project site.

Table 9-1 summarizes the current estimated water consumption of the project site during the US Open.

Table 9-1
Existing Conditions: Project Site Water Consumption

Use	Unit	Size (Square feet)	Rate	Water Consumption (Gallons per day)
NTC Attendees	40,000 (people)	NA	5 gallons/person/day[1]	200,000
NTC Event Staff	8,000 (people)	NA	5 gallons/person/day[1]	40,000
Enclosed Space[2]				
Domestic	NA	703,000	0.24 gpd/sf[3]	168,720
Air Conditioning	NA	527,300	0.17 gpd/sf[3]	89,641
TOTAL (With A/C)				**498,361**
TOTAL(Without A/C)				**408,720**

Note:
1. Rate from DEC Design Standards for Wastewater Treatment Works last revised 1988 (See **Appendix D**).
2. Uses include administrative and operational support space, retail space and food service space.
3. Rates from *CEQR Technical Manual* (2012 edition).

SANITARY SEWAGE

For purposes of this analysis, the amount of sanitary sewage is conservatively estimated as all water demand excluding air conditioning, which is typically not discharged to the sewer system. The estimated amount of daily sanitary sewage currently generated by the project site is 408,720 gpd.

The project site is served by the Tallman Island Wastewater Treatment Plant (WWTP). The Tallman Island WWTP treats wastewater through full secondary physical and biological processes before the wastewater is discharged into the Flushing River. Secondary treatment includes the removal of a minimum of 85 percent of biological oxygen demand and total suspended solids in the influent. Effluent from this WWTP is regulated by the New York State Pollution Discharge Elimination System (SPDES) permit issued by the New York State Department of Conservation (DEC). The permit specifies the maximum limit for effluent parameters that include suspended solids, fecal coliform and other pollutants. The SPDES permit specifies the treatment capacity of the Tallman Island WWTP be limited to a maximum of 80 mgd. The running average monthly flow for the WWTP over the last 12 months is 62 mgd, below the permitted limit.

For the transport of sanitary sewage, the project site relies on DPR sanitary sewers that convey sanitary sewage to a DEP sanitary sewer located in Fowler Avenue from where it is conveyed further north to the Tallman Island WWTP.

There are two DPR sewers that serve the site. The first is a 12-inch sewer located in Path of the Americas that provides service for the Indoor Tennis Center in addition to park facilities. No new connections will be made to this sewer.

The second sewer enters the site from United Nations Avenue North, through the south gate and runs through the center of the site, exiting at the east plaza. This sewer services the remaining facilities on the site as well as the Queens Museum, Olmsted Center and park facilities west of Grand Central Parkway. It is a 12-inch sewer on United Nations Avenue North, and through the south plaza, where it serves the Queens Museum and the southwest portion of the site. It increases to 18-inch at the southeast corner of Arthur Ashe to pick up the stadium. It increases to

24-inch in the east plaza to pick up Louis Armstrong Stadium, the Olmsted Center, and the park facilities west of Grand Central. The segment through the site was constructed as part of the 1996 program that built Arthur Ashe Stadium.

STORMWATER

The project site is served by a network of stormwater drain inlets and storm sewers that collect and convey onsite stormwater runoff that ultimately discharge into the Flushing River. Direct discharge of stormwater runoff into the Flushing River does not affect combined sewer outfall (CSO) conditions in the City's combined sewer system. The NTC, within the proposed leased boundaries, is approximately 42.59 acres in area, and it is estimated that approximately 3.60 acres (8 percent) of the project site is covered by building roof, 12.40 acres (29 percent) is courts and stadiums, 18.31 acres (43 percent) is concrete/asphalt pavement, and 8.28 acres (20 percent) is landscaped area.

Table 9-2 describes the surface types and areas of the project site, and how stormwater runoff is currently discharged.

Table 9-2
Existing Conditions: Project Site Surface Coverage

Surface Type	Surface Areas (sf)	Discharge Method
Building Roofs	157,013	Direct Drainage
Courts and Stadiums	539,946	Direct Drainage
Paved Surfaces	797,546	Direct Drainage
Landscaped Areas	360,520	Infiltration/Direct Drainage
Total	**1,855,025**	**----**
Sources: Site surfaces data provided by DeBruin Engineering		

The weighted runoff coefficient of the project site is calculated to be 0.74, which corresponds to the percentage of precipitation that becomes surface runoff.

D. FUTURE WITHOUT PROPOSED PROJECT

In the future No-Action condition, uses at the project site are not expected to change compared to existing conditions. As a result, water consumption, sanitary sewer generation, and stormwater runoff volumes are assumed to remain unchanged.

E. FUTURE WITH THE PROPOSED PROJECT

WATER SUPPLY

The existing water mains in and around the project site would be available for new service connections. These mains are expected to provide adequate water service for the proposed project. As a result of the proposed project, increases of approximately 10,000 attendees per day during the first ten days of the US Open and 100 US Open event staff are expected, as compared to the No-Action condition. The proposed project would also result in approximately 166,800 square feet (sf) of additional enclosed spaces, which include administrative and operational support spaces, retail spaces and food service spaces.

Table 9-3 summarizes the estimated water consumption of the proposed project by the mix of proposed uses during the US Open. The proposed uses on the project site are estimated to have a water demand of 614,872 gpd.

Table 9-3
With Action Condition: Water Consumption

Use	Unit	Size (Square feet)	Rate	Water Consumption (Gallons per day)
NTC Attendees	50,000 (people)	NA	5 gpd/person[1]	250,000
NTC Event Staff	8,100 (people)	NA	5 gpd/person[1]	40,500
Enclosed Space[2]				
Domestic	NA	869,800	0.24 gpd/sf[3]	208,752
Air Conditioning	NA	680,115	0.17 gpd/sf[3]	115,620
TOTAL(With A/C)				**614,872**
TOTAL(Without A/C)				**499,252**

Note:
1. Rate from DEC Design Standards for Wastewater Treatment Works last revised 1988 (See **Appendix D**).
2. Uses include administrative and operational support space, retail space and food service space.
3. Rates from CEQR technical Manual (2012 edition)

While this new demand represents an increase over and above conditions in the No-Action condition of approximately 116,511 gpd, the incremental demand for water is not expected to place enough of a load on the water supply system to necessitate any upgrades to the existing supply system. The 614,872 gpd demand generated by the US Open after completion of the proposed project would represent approximately 0.06 percent of the City's total daily demand (1.1 bgd), a minimal increase. In addition, local water pressure is not expected to be significantly affected. The small changes in demand are unlikely to affect water pressure and the overall water consumption rate, and would therefore not result in any significant adverse impacts on the water supply.[1]

SANITARY SEWAGE

The estimated amount of sewage generated from the proposed project conservatively includes the water demand excluding air conditioning, which is typically not discharged into the sewer system. The estimated amount of sanitary sewage generated by the proposed project would therefore be 499,252 gpd. Peak flow is estimated at 2.1 cfs. The volume of sanitary sewage generated by the proposed project would be 0.6 percent of the permitted average daily flow of 80 mgd at the Tallman Island WWTP and would not result in an exceedance of the WWTP's capacity. Therefore, the proposed project would not result in a significant adverse impact on the City's sanitary sewage treatment system. Sanitary sewage from the project site would continue to be conveyed via the onsite sanitary sewers to the DEP sanitary sewer system. New sanitary sewer connections to the existing sanitary sewers from the new buildings and stadiums would be built. The increase of 0.3 cfs in estimated peak flow is well within the capacity of the existing sewers.

The small changes in sewage generation are unlikely to affect the overall sewage treatment capacity and would therefore not result in any significant adverse impacts on the sewage system supply. As per the New York City Plumbing Code (Local Law 33 of 2007), low-flow fixtures are required to be implemented and would help to reduce sanitary flows from the project site.

[1] *CEQR Technical Manual*, January 2012, p.13-8.

STORMWATER

Based on the proposed site plan, the project site would be developed, with 9.95 acres (23 percent) of the site occupied by building roofs, 12.90 acres (30 percent) occupied by courts and stadiums, 15.14 acres (36 percent) occupied by pavement, and 4.60 acres (11 percent) occupied by grassed areas and landscaping. Runoff from the site will be kept at the pre-development rates through the use of permeable pavers, landscaped areas, and leaching systems in the southern portion of the site.

Using the existing and proposed site data, the DEP Volume Calculation Matrix was completed for the existing and proposed actions under Phase 1. The summary tables, taken from the DEP Volume Matrix, are included in **Table 9-4.**

Table 9-4
DEP Volume Calculation Matrix—Existing and With Action Volume Comparison

		Existing 1,855,025 sf / 42.59 Acres				With Action 1,855,025 sf / 42.59 Acres			
Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume To River (MG)	Runoff Volume To CSS (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)	Runoff Volume To River (MG)	Runoff Volume To CSS (MG)	Sanitary Volume To CSS (MG)	Total Volume To CSS (MG)
0.00	3.80	0.00	0.00	0.06	0.06	0.00	0.00	0.08	0.08
0.40	3.80	0.34	0.00	0.06	0.06	0.37	0.00	0.08	0.08
1.20	11.30	1.03	0.00	0.19	0.19	1.12	0.00	0.24	0.24
2.50	19.50	2.14	0.00	0.33	0.33	2.34	0.00	0.41	0.41

Notes:
CSS = Sanitary to Combined Sewer System; MG = Million Gallons
Source: NYCDEP Volume Calculation Matrix (See **Appendix D**).

The calculations from the volume calculation matrix help to determine the change in wastewater volumes to the combined sewer system from existing conditions to the With Action condition. Runoff volumes were calculated for four rainfall volume scenarios with varying durations; however, all stormwater runoff would be directly discharged to Flushing River. The overall increase in sanitary sewer discharge from the project site for the above rainfall volume-duration scenarios would be 0.02MG, 0.02MG, 0.05MG and 0.08MG, respectively. The increase in flows would be due to an increase in sanitary sewer discharge from the proposed project.

Stormwater from the project site is directly discharged to the Flushing River and is not conveyed to the City’s combined or separate sewers; therefore the proposed project would have no impact on the City’s stormwater conveyance infrastructure.

As part of the proposed project, coverage under a DEC SPDES General Permit for Stormwater Discharges (GP-0-10-001) would be required. As part of this permit, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared outlining specific erosion and sediment control and water quality treatment practices. A copy of the SWPPP would be provided to DEP for review.

STORMWATER BMP CONCEPT PLAN

The *DEC Stormwater Management Manual* (2010) requires that redevelopment of a site limits post-development discharge from the 90 percent rainfall event to predevelopment levels unless circumstances exist that prevent this from being possible. The objective of the Stormwater BMP concept plan for this site is to maintain the existing discharge to Flushing Creek from the site by infiltrating the water quality volume for the southern portion of the site into the ground. This will be accomplished by a combination of landscaped areas, pervious pavement, and leaching systems, as shown in **Figure 9-1**.

F. CONCLUSIONS

The proposed project would result in an increased demand for water supply and an increase in sanitary sewage generation. These increases, however, would be minimal and would not significantly impact existing infrastructure. Stormwater runoff discharge in the With Action condition would be similar to runoff under the No-Action condition. As there is a stormwater outfall available to project site, through which stormwater runoff is directly discharged into the Flushing River, the City’s stormwater conveyance infrastructure would not be affected. Overall, the proposed project would not result in any significant adverse impacts on the City’s water supply, wastewater treatment, or stormwater conveyance infrastructure. ✷

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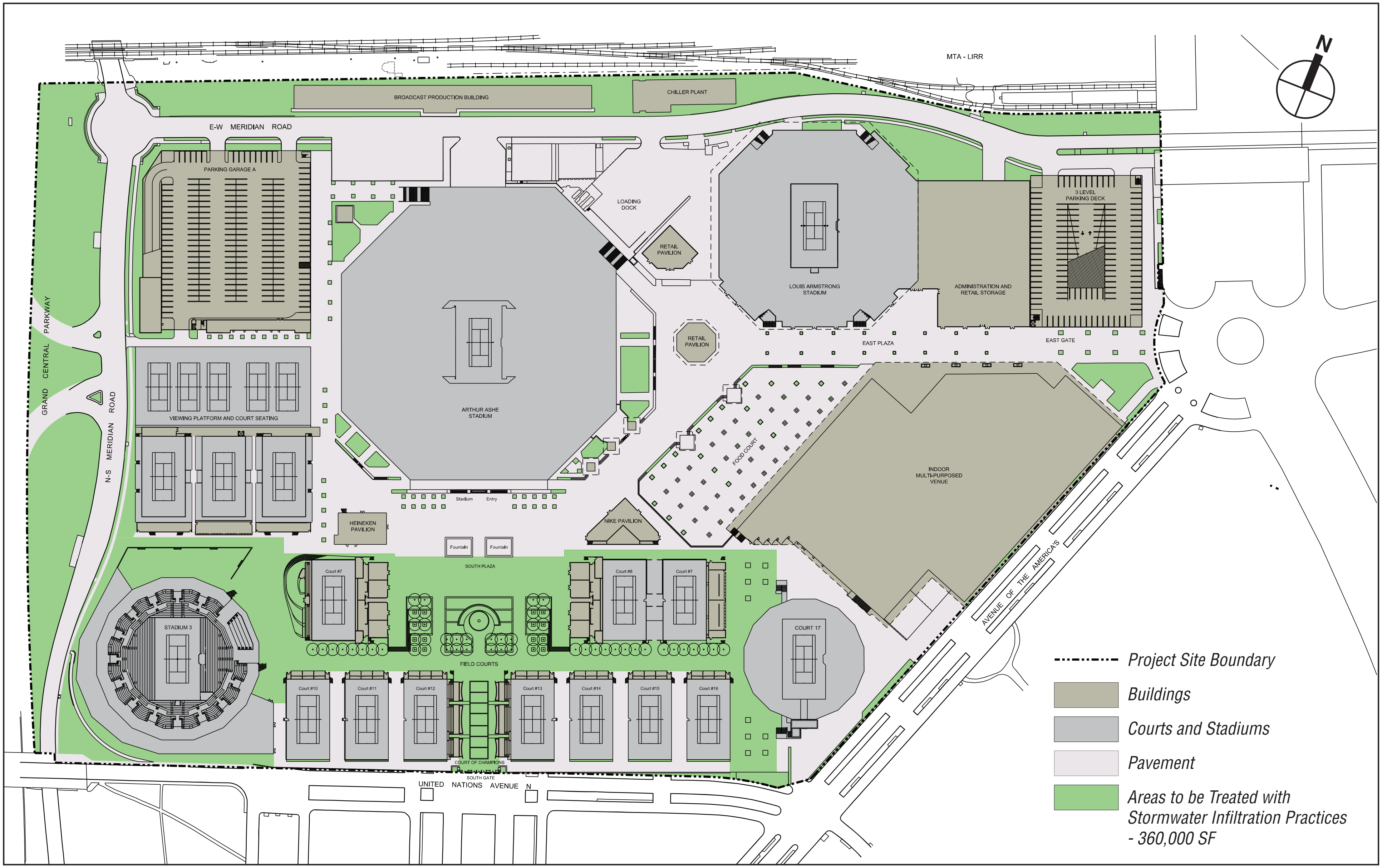


Best Management Practices for Stormwater Concept Plan

Figure 9-1

A. INTRODUCTION

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site by 2019, as described in Chapter 1, "Project Description." For 11 months of the year, the NTC is primarily a public recreational facility, except during the US Open period at the end of August and early September. Principal elements of the proposed project that are addressed for potential transportation-related impacts include:

1. A proposed increase in the permitted attendance for the daytime sessions of the US Open of 10,000 persons, resulting in a permitted capacity of 50,000 on non-conflict days (without a New York Mets game), and 45,000 on conflict days (with a New York Mets game).
2. Construction of two new parking garages where there are currently surface lots, providing approximately 389 net additional parking spaces. The parking garages are proposed to accommodate the existing demand experienced at the NTC on an everyday basis during non-US Open conditions and are not considered a traffic generating element during the US Open or during other times.
3. At the southwest corner of the NTC where a new stadium would be constructed, the internal park roadway would be realigned to maintain the existing circulation pattern.

Of the three principal elements, the proposed increase in attendance has the greatest potential to impact traffic and transportation conditions and therefore is the focus of the following traffic and transportation analysis. The parking garages and roadway realignment are proposed to accommodate or maintain an existing condition. Other less significant improvements include changes to site layout, visitor amenities, and support services that would not affect travel characteristics associated with the US Open.

This chapter examines the potential effects of the proposed project on nearby transportation systems to determine whether the proposed project is expected to have potential significant impacts on traffic operations and mobility, public transportation facilities and services, pedestrian elements and flow, safety of roadway users (pedestrians, bicyclists, and vehicles), on- and off-street parking, and goods movement. Presented in the following sections is a description of the proposed project, an overview of the analysis methodology, a projection of site generated trips and assignments, the results of the traffic analysis for existing and future conditions with and without the proposed project (analyzed cumulatively with other relevant projects in the study area), and findings of potential significant adverse transportation impacts. The travel demand projections, trip assignments, and capacity analysis were conducted pursuant to the methodologies outlined in the 2012 *City Environmental Quality Review (CEQR) Technical Manual*.

PRINCIPAL CONCLUSIONS

The proposed increase in attendance of 10,000 persons for the daytime session would result in a projected peak period increase of approximately 2,030 transit trips and 954 vehicle trips. The peak period transit trips would consist of approximately 1,540 subway trips, 455 Long Island Rail Road (LIRR) trips, and 35 Metropolitan Transportation Authority (MTA) New York City Transit bus trips. The peak period vehicle trips are estimated to consist of 452 auto trips, 498 taxi trips (or 249 roundtrips), and four charter bus trips.

When distributed over the transportation network, the projected trip increments would result in significant adverse traffic impacts, including increased levels of congestion and delays, though temporary in nature and only during the event's peak periods. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would be able to effectively manage the increased level of traffic operations and project-related significant adverse impacts on traffic. This is primarily due to the distribution of trips over the large transportation network, the proximity and direct access to the local highway network from the project site, the capacity of the Mets-Willets Point subway station, and the special event management program implemented by the New York City Police Department (NYPD), especially along College Point Boulevard. There are no significant impacts to transit, pedestrian, or safety conditions.

Though the projected increase in vehicle trips exiting the US Open at the conclusion of the daytime session is anticipated to lengthen the travel time for departing patrons, these delays would largely be confined within Flushing Meadows Corona Park and to a segment of the Long Island Expressway (LIE).

With the additional site-generated traffic, the roadway network is anticipated to continue to experience congested levels of service and delays during event conditions. Due to the traffic management program, however, conditions typically observed when intersection operations become saturated (queues extending beyond storage capacity, blocked turning movements, aggressive driver behavior, etc.) would be managed in the field. Field observations conducted during the US Open validate that the traffic management program and TEAs are able to effectively manage traffic flow during event peak periods.

These findings take into consideration the frequency of the event, the duration of the event's peak period, the infrequency of conflict dates with Mets games, direct connectivity to the area highways, and the special event traffic management provided by the New York City Police Department including TEAs.

B. FRAMEWORK FOR ANALYSIS AND ADDITIONAL CONSIDERATIONS

In coordination with the New York City Department of Transportation (NYCDOT), the transportation analysis was focused on the critical period representing a Reasonable Worst-Case scenario (RWCS). The critical period was identified as the weekday evening peak hour conflicting with a Mets home game during the first week of the US Open. During this period, focus was placed on identifying potential impacts due to the proposed increase in attendance, which consists of additional patrons departing the daytime event. The following section presents the framework for analysis and other considerations that served as the basis for selecting the critical period.

An important initial step for analyzing a special event condition such as the US Open is establishing the framework for the analysis. This section presents the critical elements and time periods affecting traffic conditions during the US Open as well as the parking and traffic management plans implemented to manage this event.

The critical time period to be analyzed was established as the weekday evening peak period from 6:00 PM to 7:00 PM during a conflict date, meaning a day in which a Citi Field event coincides with the US Open. It has been identified as the critical peak period since it experiences the overlap of four critical elements: (1) the end of the weekday commuter peak period; (2) the departure of tennis patrons from the US Open's daytime session; (3) patrons arriving for the evening session; and (4) the arrival of baseball fans for a Mets home game. This time was validated based on a review of current and historical data including parking lot counts, manual turning movement counts and Automatic Traffic Recorder (ATR) counts.

In addition to the conflict date, a non-conflict date was also evaluated. In coordination with NYCDOT, it was determined that transportation conditions during a non-conflict event closely resemble a typical Mets home game with less intensive peak hour arrival and departure volumes. The findings were supported by discussions with NYPD supervisors responsible for managing the events. These considerations, combined with the overall infrequency of the event, indicate a quantitative analysis for the non-conflict event was not warranted. It was also determined that traffic impacts to the local street network are more likely to be experienced during the conflict dates. On non-conflict dates, US Open patrons have full use of the Citi Field parking facilities. Consistent with the previous Final Environmental Impact Statement (FEIS) from 1993 described below, no weekend or weekday morning analyses were conducted.

Although the previous Final Environmental Impact Statement (FEIS) was a larger project, the analysis and methodologies followed are consistent with the current project. *The USTA National Tennis Center Project FEIS*, dated July 23, 1993, involved expanding the size of the NTC from 17.3 acres to 42.2 acres, an increase of 24.9 acres. Elements of the project included the construction of the Arthur Ashe Stadium (Stadium 1, 23,500 capacity) and renovations to Louis Armstrong Stadium (Stadium 2) and the Grandstand Stadium (Stadium 3). Additionally, 28 outdoor tennis courts were replaced with 15 tournament quality courts and 20 practice courts. Off-site improvements included the construction of a new park entrance at College Point Boulevard and new ramps to the Grand Central Parkway, specifically a southbound on ramp from the Hall of Science and a northbound on and off ramp at the USTA Main Entrance, known as Exit 9P.

Additional background information on the US Open, including average daily ticket scans for each week of the US Open and the frequency of the conflicts dates is presented in **Table 10-1** and **Table 10-2**, respectively. **Table 10-1** shows attendance is highest during the first week of the tournament, when all tennis courts are active.

A review of the data presented in **Table 10-2** demonstrates that a weekday analysis for a conflict date during the first week of the tournament represents a conservative "reasonable worst case scenario" that has occurred historically but infrequently. Over the past five years, there have been a total of six weekday Mets games and two weekend games scheduled during the first week of the US Open.

Table 10-1
US Open Average Daily Ticket Scans Including Daytime and Evening Sessions

	1st Week		2nd Week	
Year	Mon-Fri	Sat-Sun	Mon-Fri	Sat-Sun
2011	46,562	53,228	20,723	25,037
2010	45,096	52,152	28,638	21,216
Sources: USTA, draft				

Table 10-2
Number of Occurrences When a Mets Home Game Conflicted with the US Open

	1st Week		2nd Week	
Year	Mon-Fri	Sat-Sun	Mon-Fri	Sat-Sun
2012	0	0	1	2
2011	4	0	2	2
2010	0	0	1	2
2009	1	2	3	0
2008	1	0	1	1
2007	0	0	1	2
Sources: BaseballReference.com, USopen.org				

Therefore, in coordination with the New York City Department of Transportation (NYCDOT), it was determined that the traffic and transportation analysis would focus on the weekday evening peak hour with a Mets home game during the first week of the US Open with a specific focus on the potential impacts created from the proposed increase in patrons departing the daytime event.

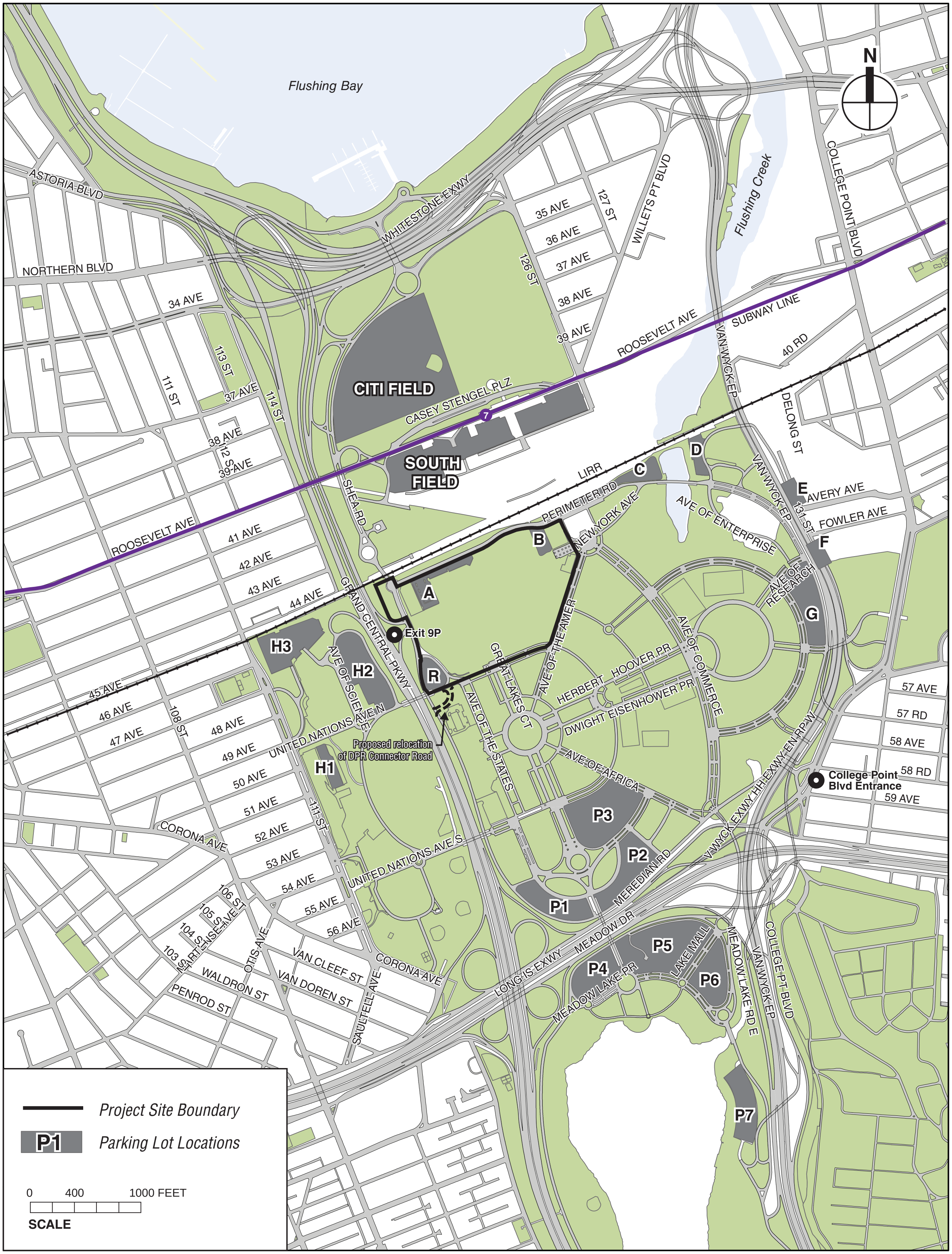
PARKING AND TRAFFIC MANAGEMENT

Parking for the US Open is generally divided into two categories: Permit Parking and General Parking.

PERMIT PARKING

Permit parking is defined as parking for those vehicles with parking permits issued by USTA as part of the purchase of an advance ticket package. Vehicles with USTA-issued parking permits are not subject to parking fees. Permit lots are identified as the lettered lots “A” through “H” and are located throughout Flushing Meadows Corona Park. **Figure 10-1** identifies the parking layout for the USTA US Open within the NTC and roadway network.

- Lots A, B, C, and D are composed primarily of special suite holders, sponsors and USTA Executive staff.
- Lots E, F, and G are primarily used by US Open seasonal staff and vendors.
- Lot H is a cluster of three lots used by seasonal staff as well as ticket holders who have purchased a full series parking plan. Bus parking is available in Lot H with a limited capacity for 5 buses. Americans with Disabilities Act (ADA) parking is also permitted in this lot, and anyone arriving at the US Open with an ADA placard or license plate is directed to park in this area for the standard general parking rate. An ADA golf cart and shuttle bus is operated from this lot providing service to the South Gate entrance.



Roadway Network and Parking Lot Layout

Figure 10-1

GENERAL PARKING

General parking is defined as parking available to all patrons upon arrival at the US Open. The primary lots are operated by the Mets parking vendor and are located at Citi Field and the Southfield lot; however, parking operation changes on conflict days, in which the Mets also have a home game.

On conflict dates, the US Open attendees are directed to General Parking Lots #1-7. These lots are dedicated to US Open patron parking.

On non-conflict dates, US Open attendees will be directed to park in the Citi Field lots located adjacent to the stadium and parking operations are comparable to a typical Mets home game.

A summary of the capacities of the USTA parking lots follows in **Table 10-3**. Shuttle bus service is available from all of the USTA public parking lots.

Table 10-3
Parking Lot Capacities and Availalibilty for US Open Patrons

Type	Designation	Parking Spaces	Conflict Day	Non Conflict Day
Permit, Vendor and Staff	A (1)	200	X	X
	B (1)	104	X	X
	C (1)	156	X	X
	D (1)	150	X	X
	E (2)	339	X	X
	F (2)	334	X	X
	G (2)	300	X	X
	H (3)	865	X	X
	R (3)	50	X	X
	S (3)	300	X	X
	Subtotal	**2,798**	**2,789**	**2,789**
General	#1	450	X	--
	#2	500	X	--
	#3	800	X	--
	#4	937	X	--
	#5	500	X	--
	#6	250	X	--
	#7	404	X	--
	Subtotal	**3,841**	**3,841**	**--**
Citi Field	Main Lot	4,500	--	X
	Southfield Lot(4)	1,795	**1,795**	X
	Subtotal	**6,295**	**--**	**6,295**
All Lots	**Grand Total**	**12,934**	**8,425**	**9,084**

Notes:
(1) Suite holders, sponsors executive staff.
(2) Seasonal staff and vendors
(3) Seasonal staff and full series ticket holders, ADA parking and bus parking.
(4) Estimated based on data from previous studies.
Source: USTA

TRAFFIC MANAGEMENT

The Traffic Management Program is characterized by a heavy presence of Traffic Enforcement Agents (TEAs) from the NYPD providing safety, security, maintaining circulation and directing vehicles to parking areas. The TEAs are heavily staffed both within the park and at all local and highway access points to the park. This includes staffing along College Point Boulevard from the Van Wyck Expressway access ramp near Booth Memorial Avenue to the Horace Harding Expressway and at access points to the Grand Central Parkway. On conflict dates, additional TEAs are staffed around the perimeter of Citi Field along 126th Street, Roosevelt Avenue, and Northern Boulevard. Within the park, TEAs are staffed at every principal intersection along Meridian Road, Perimeter Road, and Shea Road.

In addition to maintaining safety and security, the objectives of the TEAs are to get patrons to and from the park using the most direct route. To minimize impacts to local roadways and the highway network TEAs work to keep the queue moving during arrivals as well as metering the traffic flow to College Point Boulevard and the area highways during departures. In order to control traffic, barricades are erected at some locations to channelize and restrict vehicle movements. Police override traffic signal phasing, stop traffic to allow safe pedestrian crossings, and redirect traffic as parking areas reach capacity.

The following traffic and parking management program was observed for vehicles arriving at the US Open on a conflict date:

- US Open patrons are first directed to parking Lot #4 because it is the closest paved parking lot (parking Lot #4 and #7 are the only paved non-Citi Field parking lots).
- Once Lot #4 is nearly filled, patrons are directed to parking Lot #2 and then Lot #3. These lots are grass banked parking areas. The first vehicles arriving are directed to park around the border of the lot to create a perimeter and later arriving vehicles fill in the interior spaces. This approach is effective to managing ingress and egress from the lot.
- After Lot #3 is nearly filled, vehicles are routed to Lot #5.
- Parking Lot #1, Lot #6, and Lot #7 serve as overflow lots and are used less frequently.

The following program was observed for vehicles departing the US Open:

- All patrons departing Lots #1, #2, and #3 are directed to the College Point Boulevard exit. Once exiting the park, the TEAs require all vehicles to turn right onto College Point Boulevard. From southbound College Point Boulevard, the patrons gain access to the Van Wyck Expressway and the Horace Harding Expressway. The Horace Harding Expressway serves as the service road for the Long Island Expressway and provides access to the Grand Central Parkway.
- US Open patrons departing from Lot #4, Lot #5, and Lot #6 are directed to cross the boathouse bridge and travel through parking Lot #7. Once exiting Lot #7, they will have direct access to the Van Wyck Expressway and the Horace Harding Expressway via College Point Boulevard.

The TEAs were observed on site as early as 7:00 AM (the US Open daytime session begins at 11:00 AM) and remained in position until the last patron exited the site or they received the “All Clear” notice from their Supervisor. The effectiveness of the NYPD TEAs is partially attributable to their long term experience managing these events.

C. PRELIMINARY ANALYSIS METHODOLOGY

The *CEQR Technical Manual* recommends a two-tier screening procedure for the preparation of a "preliminary analysis" to determine if quantified operational analyses of transportation conditions are warranted. As discussed in the following sections, the preliminary analysis begins with a trip generation analysis (Level 1) to estimate the volume of person and vehicle trips attributable to the proposed project. According to the *CEQR Technical Manual*, if the proposed project is expected to result in fewer than 50 peak period vehicle trips and fewer than 200 peak period transit or pedestrian trips, further quantified analyses are not warranted. If these thresholds are exceeded, detailed trip assignments (Level 2) are performed to estimate the incremental trips for specific transportation elements and to identify potential locations for further analyses. If the trip assignments show that the proposed project would generate 50 or more peak period vehicle trips at an intersection, 200 or more peak period subway trips at a station, 50 or more peak period bus trips in one direction along a bus route, or 200 or more peak period pedestrian trips traversing a pedestrian element, then further quantified operational analyses may be warranted to assess the potential for significant adverse impacts on traffic, transit, pedestrians, parking, and vehicular and pedestrian safety.

LEVEL 1 SCREENING ASSESSMENT

A Level 1 trip generation screening assessment was conducted to estimate the number of person and vehicle trips by mode expected to be generated by the proposed project during the peak period. These estimates were then compared to the CEQR analysis thresholds to determine if a Level 2 screening and/or quantified operational analyses may be warranted.

The trip generation estimates and departure routing assignments were developed based on a review of the data collected at the 2011 US Open and with consideration to previous studies. These previous studies include:

- USTA Patron Survey data, September 2010 and 2011
- *USTA National Tennis Center Project FEIS*, July 1993
- *Shea Stadium Redevelopment FEIS*, December 2001

The 2011 US Open data collection effort was conducted over a two-week period at the end of August and early September during the 2011 US Open. The primary data collection survey was conducted on Wednesday, August 31, 2011 during a conflict date. The August survey was conducted under normal special event operations and clear weather conditions.

The Level 1 trip generation and Level 2 departure routing assignments are summarized as follows:

- Modal Split – Modal splits were identified using on-site patron interviews conducted on the date of the survey, August 31, 2011. The results are consistent with similar surveys conducted at the 2010 US Open. The results of the 2011 surveys are provided in **Appendix E**.
- Vehicle Occupancy Rate – The vehicle occupancy rate for auto trips was determined based on field surveys conducted at general parking Lots #4, #5, and #6. Observations of vehicles entering the parking lot from 9:00 AM to 9:00 PM were conducted, encompassing a sample size of 814 vehicles. The vehicle occupancy rate for taxi and charter bus trips were carried forward from the 1993 *USTA National Tennis Center Project FEIS*. The taxi occupancy rate of 1.67 is approximately 20 percent greater than the standard Manhattan occupancy rate of 1.40. This reflects a greater number of multi-person taxi trips as would be expected for a

special event destination such as the US Open. To account for the potential increase in charter buses, a vehicle occupancy rate of 40 persons per bus was utilized reflecting 73 percent occupancy of a typical 55-seat charter bus.

- Peak Period Departure Rate – The peak departure rates were adjusted based on site observations and data obtained during the 4-hour transit counts conducted at the Willets Point subway station, the LIRR station and parking lot counts conducted at Lots #4, #5, and #6 and Lot “H.” The peak departure rate represents the 6:00 PM to 7:00 PM departures as a percentage of the four hours of highest activity, from 4:00 PM to 8:00 PM. Although this time frame captures the majority of patrons leaving the daytime session, using only the four highest hours for comparison in place of the ten hours the lots are typically open, results in a conservative rate. Since there was a consistency in range of departure rates by mode, a single rate of 35 percent was used for all travel modes.
- Regional Route Assignments - Regional area trip assignments were based on the origin and destination patron interviews conducted at the 2011 US Open and validated against the previous year’s survey and information provided in the 1993 *USTA National Tennis Center Project FEIS*.

Table 10-4 summarizes the estimated increases in vehicular and transit trips for a departure scenario at a daytime event at the US Open for the projected increase in attendance of 10,000 patrons. The table includes a small component of “Other” trips; for analysis purposes, these trips were added to the subway trip population.

Table 10-4
Travel Demand Assumptions and Trip Generation Estimates

	Daily Trip Increment				Peak Period Departure Trip Increment		
Modal Split	**Percent**	**Person Trips**	**VOR (1)**	**Vehicle Trips (2)**	**Peak Period**	**Person Trips**	**Vehicle Trips (2)**
Auto	25.9%	2,590	2.01	1,288	35%	907	452
Taxi/Car Service	11.9%	1,190	1.67	713	35%	416	249
Charter Bus	4.2%	420	40.0	11	35%	147	4
MTA NYCT Bus	1.0%	100	--	--	35%	35	--
Subway	40.4%	4,040	--	--	35%	1,414	--
LIRR	13.0%	1,300	--	--	35%	455	--
Other	3.6%	360	--	--	35%	126	--
Total	**100.0%**	**10,000**	**--**	**2,012**	**--**	**3,500**	**705**

Notes: (1) Vehicle Occupancy Rate
(2) Projected total vehicle trip-ends will be 2,725 daily and 952 peak period with the additional taxi/car service round trips.

LEVEL 2 SCREENING ASSESSMENT

A Level 2 screening assessment involves the distribution and assignment of projected trips to the transportation network and the determination of whether specific locations are expected to incur volumes in excess of the CEQR thresholds. For the proposed project, trips projected for the 2019 analysis year, representing the maximum amount of project-generated trips, were allocated to the area’s roadways, transit facilities, and pedestrian elements to identify the various study areas for which detailed analyses of potential impacts would be prepared.

Table 10-5 summarize the projected regional auto departure route trip distribution and increment trip volumes for a departure scenario following a daytime US Open event for the proposed increase in attendance of 10,000 patrons. As previously stated, the departure assignments were developed based on a review of the data collected at the 2011 US Open, including patron interviews, and with consideration of previous studies. The taxi trips followed the same route assignments as the auto trips.

Table 10-5
Regional Auto Departure Route Trip Assignments

Regional Departure Route	Percent	Vehicle Trips	Typical Destination
Long Island Expressway E/B	25%	113	Nassau County & Long Island
Long Island Expressway W/B	15%	68	Manhattan, NJ, & PA
Grand Central Parkway E/B	5%	23	Brooklyn & Queens
Grand Central Parkway W/B	18%	81	Manhattan, NJ, & PA
Van Wyck Expressway S/B	5%	23	Brooklyn & Queens
Whitestone Expressway N/B	27%	121	Bronx, NY & NJ
Local Assignments	5%	23	Northern Blvd., Roosevelt Av., etc.
Total	**100.0%**	**452**	**--**

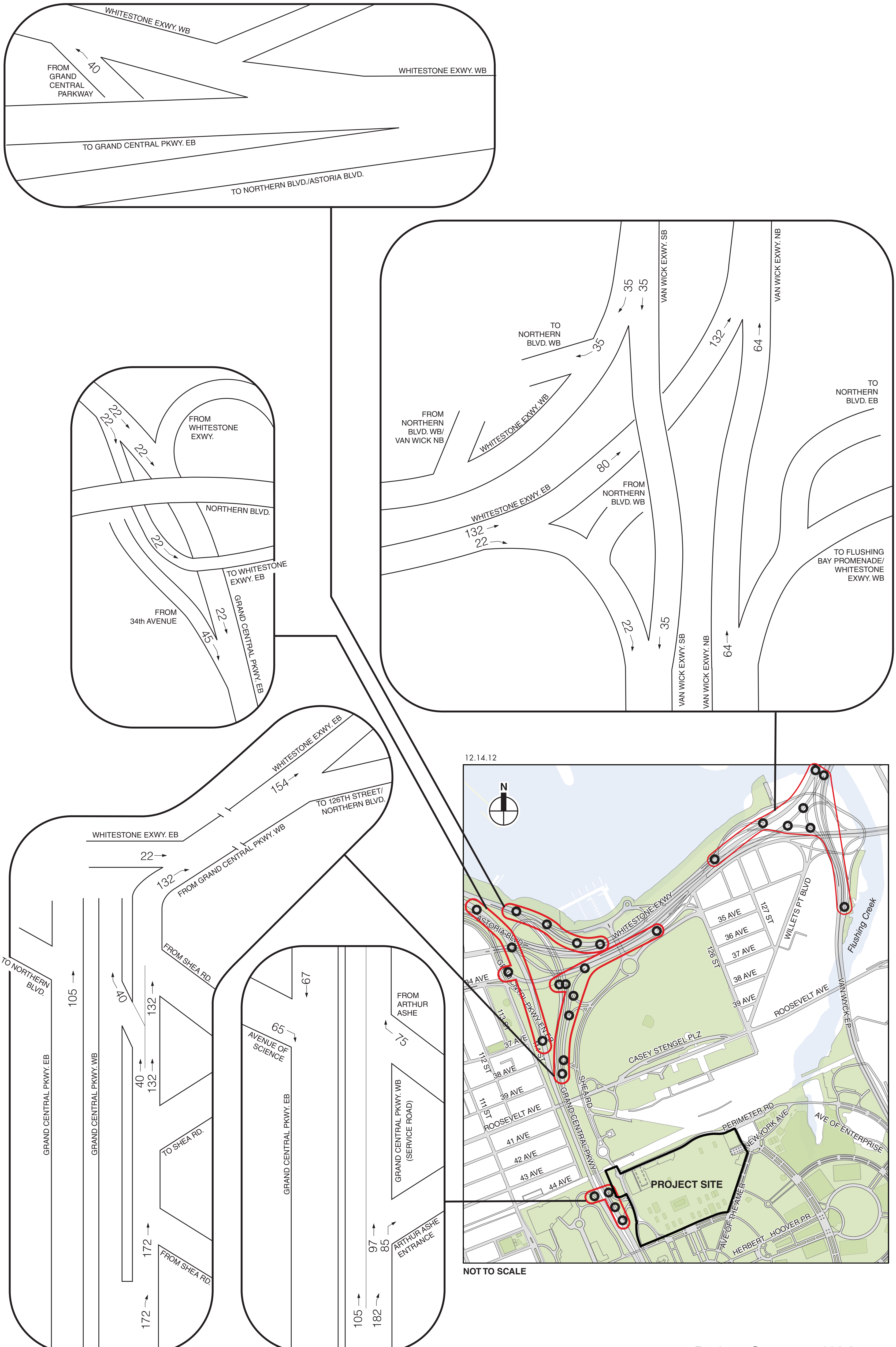
TRAFFIC

Figures 10-2A through 10-2D present the trip assignments of project traffic to the local intersections and highway networks. As indicated in the tables and the trip assignment figures, the CEQR threshold for quantified analysis is projected to be exceeded for traffic and transit operations.

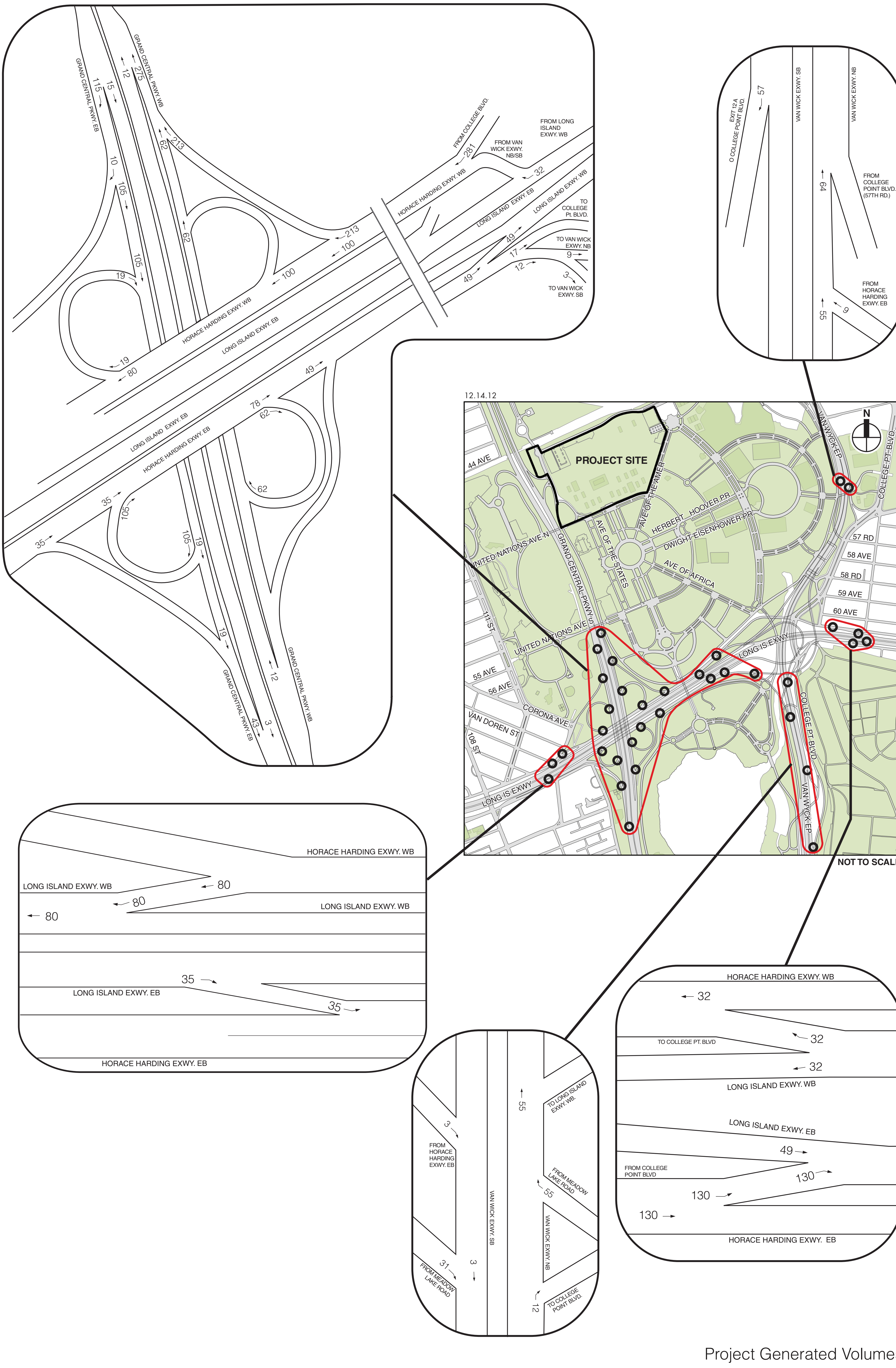
Two factors were considered when assigning the departure routes for the auto trips. First, the regional assignments were determined based on on-site patron interviews at the 2011 US Open. This information was validated against patron interviews from previous years. The second factor is the pattern of where and how the patrons depart from the US Open. A majority of the additional auto trips would be generated from the general admission and permit parking lots. As previously, discussed the general admission lots are designated as the numbered Lots #1 through #7. The permit lots are designated as Lot H, Lot F, and Lot G. The peak period auto trips were assigned to the area roadways based on the following:

- General Admission Parking Lots #1, #2, and #3 – approximately 35 percent, or 158 trips, are anticipated to depart from this lot via the College Point Boulevard exit.
- General Admission Parking Lots #4, #5, and #6 – approximately 45 percent, or 203 trips, are anticipated to depart from this lot via the Boathouse Bridge.
- Permit Lot H – approximately 15 percent, or 68 trips, are anticipated to depart from this lot via the ramp to the Grand Central Parkway (95 percent of the 68 trips) and 111th Street (5 percent).
- Permit Lot F and Lot G – approximately 5 percent, or 23 trips, are anticipated to depart from this lot via the College Point Boulevard exit.

The taxi and car service trips are projected to follow the same regional assignments as the auto trips. All taxi and car service trips are conservatively assumed to arrive and depart the US Open within the same peak period. Based on site observations, approximately 50 percent of the

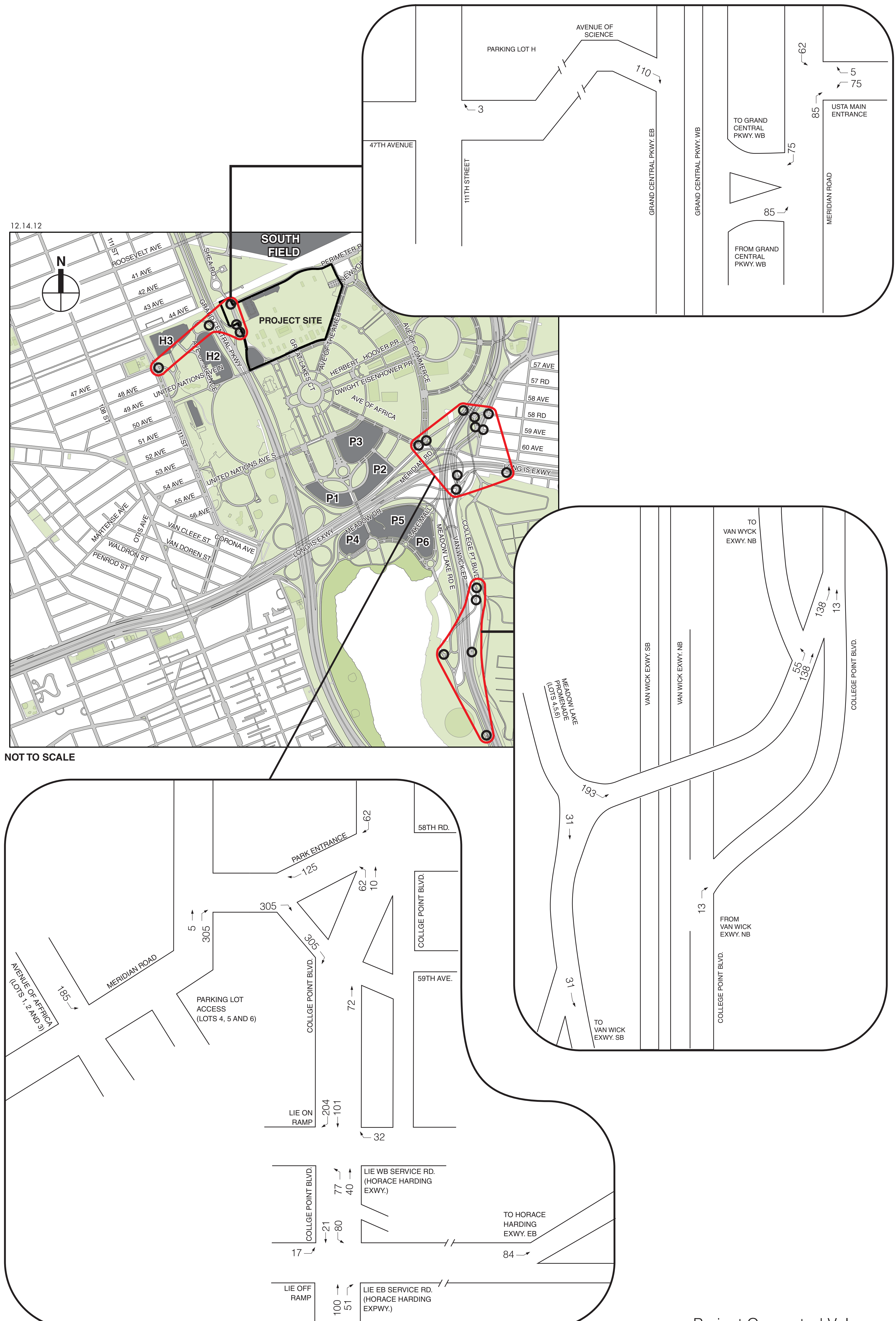


Project Generated Volumes
Highway Network North
PM Peak Period (6:00-7:00PM)
Figure 10-2A



Project Generated Volumes
Highway Network South
PM Peak Period (6:00-7:00PM)
Figure 10-2B

Project Generated Volumes
Local Network North
PM Peak Period (6:00-7:00PM)
Figure 10-2C



Project Generated Volumes
Local Network South
PM Peak Period (6:00-7:00PM)
Figure 10-2D

taxi/car service drop offs will occur at the Presidents Gate, near Exit 9P of the Grand Central Parkway, and the remaining 50 percent will access the site via the College Point Boulevard entrance to drop off near the South Gate.

Since approximately 4 percent of patrons attend the US Open on a charter bus, it is estimated that the proposed increase in attendance would result in a corresponding increase in the number of charter buses. As indicated in **Table 10-4**, four additional charter buses are projected to arrive and depart the site during the peak period. These vehicles are projected to arrive and depart via the Long Island Expressway to Manhattan.

Additional detail regarding site access, circulation and parking management is presented in Section B, "Framework for Analysis and Additional Considerations."

LOCAL INTERSECTIONS

Based on a review of the trip generation and trip assignments, the following local intersections have been identified for analysis:

1. College Point Boulevard at Long Island Expressway Eastbound Service Road Exit (Horace Harding Expressway S);
2. College Point Boulevard at Long Island Expressway Westbound Service Road Entrance (Horace Harding Expressway N);
3. College Point Boulevard at the Flushing Meadows Corona Park Exit—South Leg;
4. College Point Boulevard at the Flushing Meadows Corona Park Entrance—North Leg (58th Road); and,
5. College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road.

HIGHWAY NETWORK

Segments of the highway network serving the US Open, including ramps and connector roads, were analyzed using VISSIM micro-simulation modeling software. The micro-simulation model includes the following critical freeway segments:

- Horace Harding Expressway (or Long Island Expressway westbound service road) starting at the entrance from College Point Boulevard to just beyond the ramp connections to the Grand Central Parkway, this includes the merge from the westbound Long Island Expressway;
- Grand Central Parkway westbound just south of the entrance ramp from the Horace Harding Expressway to a point just past the exit and entrance ramps to the NTC;
- Van Wyck Expressway northbound at the entrance ramp from Meadow Lake Road/College Point Boulevard to just beyond the Long Island Expressway overpass; and
- Other associated connectors/ramps between the above freeway segments.

VISSIM micro-simulation software was utilized since it provides the capability to model complex interchange configurations and merge/diverge areas that operate at capacity that other traditional software packages are not able to analyze. Output from the VISSIM model provided the ability to quantify the operational impacts of queuing from downstream bottlenecks. For this application, the VISSIM model was used to determine travel times, speeds and the back of queue length within the study area for a one-hour peak condition.

TRANSIT

SUBWAY

The project site is located in close proximity to the Mets-Willets Point subway station (No. 7 line) operated by the MTA New York City Transit (NYCT). The Passerelle ramp provides a connection from the NTC to the LIRR and the Mets-Willets Point subway station. Therefore, all projected subway trips are expected to be served by this station and the No.7 line.

As presented in **Table 10-4**, the proposed project is projected to result in an additional 1,540 subway trips departing the NTC during the weekday PM peak departure period. These trips were assigned to the Mets-Willets Point station (No. 7), which links Times Square and Grand Central Terminal in Manhattan to the NTC, Citi Field, and Main Street in Flushing, Queens.

The following station elements were identified for a detailed analysis for the weekday PM peak period departure:

- Station passageways to/from Manhattan (north platform) and the adjoining control area elements;
- Station stairways (P-2, P-4, P-10, and P-12) to/from Flushing (center platform) and the adjoining control area elements;
- Station stairway (P-6) to/from the southern platform; and
- Station passageway connecting the Passerelle ramp and the Mets-Willets Point station.

The estimated incremental ridership for the No. 7 subway line by direction was compared with the peak period service frequency to determine the increase in subway riders per subway car as shown in **Table 10-6**.

Table 10-6
Subway Line Haul Screening Analysis
PM Peak Period Departure

No. 7 Subway Line	Projected Riders	No. of Cars	No. Riders/Car
To Manhattan	1,463	231	6.3
To Main Street	77	253	0.3

Source: Number of cars available for each line during the PM peak period was obtained from MTA New York City Transit 2010 Weekday Cordon Count.

According to the *CEQR Technical Manual*, an incremental ridership of fewer than five riders per subway car is unlikely to result in the potential for a significant subway line-haul impact. The detailed subway trip assignments as presented **Table 10-6** show that the downtown subway service (to Manhattan) would experience slightly more than five additional riders per car. The data in **Table 10-6** reflect PM peak period subway service during a typical weekday when downtown subway ridership to Manhattan is the off peak direction experiencing substantially lower background ridership. Moreover, these conditions are not adjusted to reflect special event conditions experienced during the US Open when additional trains are in service. Discussions with NYCT indicate that service at the Mets-Willets Point subway station is adjusted to reflect events at Citi Field and the US Open.

Based on the anticipated special event conditions, the infrequency of the event, and the fact USTA patron travel is in the off-peak direction when a line-haul analysis is typically conducted in the peak direction, a detailed subway line-haul analysis was not warranted.

LIRR

Port Washington Branch trains stop at the Mets-Willets Point LIRR station during Mets home games and the US Open. As presented in **Table 10-4**, the proposed project is expected to generate approximately 455 incremental peak period LIRR trips during the weekday PM peak period departure, which would exceed the CEQR analysis threshold of 200 peak period transit trips per station. However, given the capacity of the control area and the fact that NTC would be the primary generator at the station, the proposed project is not expected to result in any significant adverse LIRR impacts, and a quantified analysis of the LIRR was not performed.

NYCT BUS

As presented in **Table 10-4**, the proposed project is expected to generate approximately 35 incremental peak period bus trips during the weekday PM peak period departure. The bus routes would not experience more than 50 peak period bus trips in one direction—the CEQR recommended threshold for undertaking a quantified bus analysis. Therefore, the proposed project is not expected to result in any significant adverse bus impacts.

PEDESTRIANS

As shown in **Table 10-4**, the projected peak period pedestrian departure trips would be greater than the CEQR analysis threshold, requiring a Level 2 screening assessment.

As described above, all of the subway and LIRR person trips generated by the proposed project would connect directly from the station to the NTC via the Passerelle ramp and a majority of all the non-transit orientated patrons leaving the NTC would connect directly to the various general admission or permit parking lots within the park grounds. Therefore, US Open patrons will not utilize any of the off-site pedestrian facilities—sidewalks, corner reservoirs, and crosswalks—from the local street network.

Internal to the park, the USTA provides shuttle bus service between every parking area and the NTC. The walking environment within the park is characterized by broad pedestrian boulevards.

There would be a negligible amount of person trips generated by the proposed project that would walk to the project grounds from the surrounding area, and as discussed above, only 35 NYCT bus trips would be generated. Based on these assignments, no public pedestrian elements are expected to receive more than 200 project-generated pedestrian trips, the CEQR pedestrian analysis threshold, and a detailed pedestrian analysis is not warranted. The proposed project is not expected to result in any significant adverse pedestrian impacts.

D. TRANSPORTATION ANALYSIS METHODOLOGY

TRAFFIC OPERATIONS

The operation of all of the signalized and unsignalized intersections in the study area were assessed using methodologies presented in the *2000 Highway Capacity Manual (HCM)* using the *Highway Capacity Software (HCS+ 5.5)*. The *HCM* procedure evaluates the levels of service (LOS) for signalized and unsignalized intersections using average control delay, in seconds per vehicle, as described below.

For signalized and unsignalized intersections, the average control delay is defined as the total elapsed time from which a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue to the first-in-queue position. The average control delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

SIGNALIZED INTERSECTIONS

The average control delay per vehicle is the basis for LOS determination for individual lane groups (grouping of movements in one or more travel lanes), the approaches, and the overall intersection. The LOS are defined in **Table 10-7**.

The *HCM* methodology calculates a volume-to-capacity (v/c) ratio and a high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay actually represents the most efficient condition in terms of traffic engineering standards, where an approach or the whole intersection processes traffic close to its theoretical maximum capacity with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. Other important variables affecting delay include cycle length, progression, and green time. LOS A and B indicate good operating conditions with minimal delay. At LOS C, the number of vehicles stopping is higher, but congestion is still fairly light. LOS D describes a condition where congestion levels are more noticeable and individual cycle failures (a condition where motorists may have to wait for more than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels, and cycle breakdowns are frequent. The *HCM* methodology also provides for a summary of the total intersection operating conditions. The analysis chooses the critical movements (the worst case from each cycle phase) and calculates a summary critical v/c ratio. The overall intersection delay, which determines the intersection's LOS, is based on a weighted average of control delays of the individual lane groups. Within New York City, the midpoint of LOS D (45 seconds of delay) is generally considered as the threshold between acceptable and unacceptable operations.

Table 10-7
LOS Criteria for Signalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds

Source: Transportation Research Board. *Highway Capacity Manual*, 2000.

Significant Impact Criteria

According to the criteria presented in the *CEQR Technical Manual*, impacts are considered significant and require examination of mitigation under the following conditions. For a lane group operating at LOS D in the No Action condition, an increase of 5 or more seconds is considered significant if the With Action delay exceeds mid-LOS D. For No-Action condition LOS E, a 4-second increase in delay is considered significant. For No-Action condition LOS F, a 3-second increase in delay is considered significant. In addition, impacts are considered significant if levels of service deteriorate from acceptable A, B, or C in the No-Action condition to marginally unacceptable LOS D (a delay in excess of 45 seconds, the midpoint of LOS D), or unacceptable LOS E or F in the With Action condition.

UNSIGNALIZED INTERSECTIONS

The LOS criteria for unsignalized intersections are summarized in **Table 10-8**.

Table 10-8
LOS Criteria for Unsignalized Intersections

LOS	Average Control Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 15.0 seconds
C	> 15.0 and ≤ 25.0 seconds
D	> 25.0 and ≤ 35.0 seconds
E	> 35.0 and ≤ 50.0 seconds
F	> 50.0 seconds
Source: Transportation Research Board. *Highway Capacity Manual*, 2000.	

The LOS thresholds for unsignalized intersections are different from those for signalized intersections. The primary reason is that drivers expect different levels of performance from different types of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection; hence, the corresponding control delays are higher at a signalized intersection than at an unsignalized intersection for the same LOS. In addition, certain driver behavioral considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections. For these reasons, the corresponding delay thresholds for unsignalized intersections are lower than those of signalized intersections. As with signalized intersections, within New York City, the midpoint of LOS D (30 seconds of delay) is generally perceived as the threshold between acceptable and unacceptable operations.

Significant Impact Criteria

The same sliding scale of significant delays described for signalized intersections applies for unsignalized intersections. For the minor street to trigger significant impacts, at least 90 passenger car equivalents (PCE) must be identified in the With Action condition in any peak period.

HIGHWAY NETWORK

Due to existing congestion on the adjacent freeways and the existing queues created from downstream bottlenecks, traditional analysis of freeway operations are beyond the capabilities of standard traffic operations software (i.e., Highway Capacity Software). Therefore, a VISSIM micro-simulation model representing a weekday 6:00 PM to 7:00 PM peak period was applied to quantify the potential impacts generated by an increase in the volume of patrons departing the daytime session at the US Open. The calibration of the VISSIM model is addressed in **Appendix E**. Measures for evaluating the highway network includes vehicles processed, travel times, speeds, and queue lengths.

TRANSIT OPERATIONS

SUBWAY STATION ELEMENTS

The methodology for assessing station circulation (stairs, escalators, and passageways) and fare control (regular turnstiles, high entry/exit turnstiles, and high exit turnstiles) elements compares the user volume with the analyzed element's design capacity, resulting in a volume-to-capacity (v/c) ratio.

For stairs, the design capacity considers the effective width of a tread, which accounts for railings or other obstructions, the friction or counter-flow between upward and downward pedestrians (up to 10 percent capacity reduction applied to account for counter-flow friction), surging of exiting pedestrians (up to 25 percent capacity reduction applied to account for detraining surges near platforms), and the average area required for circulation. For passageways, similar considerations are made. For escalators and turnstiles, capacities are measured by the number and width of an element and the NYCT optimum capacity per element. The analysis accounts for the surging of exiting pedestrians. In the analysis for each of these elements, volumes and capacities are presented for 15-minute intervals.

The estimated v/c ratio is compared with NYCT criteria to determine a LOS for the operation of an element, as summarized in **Table 10-9**.

Table 10-9
LOS Criteria for Subway Station Elements

LOS	V/C Ratio
A	0.00 to 0.45
B	0.45 to 0.70
C	0.70 to 1.00
D	1.00 to 1.33
E	1.33 to 1.67
F	Above 1.67

Source: *CEQR Technical Manual* (January 2012).

At LOS A ("free flow") and B ("fluid flow"), there is sufficient area to allow pedestrians to freely select their walking speed and bypass slower pedestrians. When cross and reverse flow movement exists, only minor conflicts may occur. At LOS C ("fluid, somewhat restricted"), movement is fluid although somewhat restricted. While there is sufficient room for standing without personal contact, circulation through queuing areas may require adjustments to walking speed. At LOS D ("crowded, walking speed restricted"), walking speed is restricted and reduced. Reverse and cross flow movement is severely restricted because of congestion and the difficult passage of slower moving pedestrians. At LOS E ("congested, some shuffling and queuing") and F ("severely congested, queued"), walking speed is restricted. There is also insufficient area to bypass others, and opposing movement is difficult. Often, forward progress is achievable only through shuffling, with queues forming.

Significant Impact Criteria

The determination of significant impacts for station elements varies based on their type and use. For stairs and passageways, significant impacts are defined in term of Width Increment Threshold (WIT) based on the minimum amount of additional capacity that would be required either to mitigate the location to its service conditions (LOS) under the future No-Action condition levels, or to bring it to a v/c ratio of 1.00 (LOS C/D), whichever is greater. Significant impacts are typically considered to occur once the WITs in **Table 10-10** are reached or exceeded.

For escalators and control area elements, impacts are significant if the proposed action causes a v/c ratio to increase from below 1.00 to 1.00 or greater. Where a facility is already at or above its capacity (a v/c of 1.00 or greater) in the No-Action condition, a 0.01 increase in v/c ratio is also significant.

Table 10-10
Significant Impact Guidance for Stairs and Passageways

	WIT for Significant Impact (inches)	
No Action V/C Ratio	**Stairway**	**Passageway**
1.00 to 1.09	8.0	13.0
1.10 to 1.19	7.0	11.5
1.20 to 1.29	6.0	10.0
1.30 to 1.39	5.0	8.5
1.40 to 1.49	4.0	6.0
1.50 to 1.59	3.0	4.5
1.60 and up	2.0	3.0

Notes: WIT = Width Increment Threshold
Source: *CEQR Technical Manual* (January 2012).

VEHICULAR AND PEDESTRIAN SAFETY EVALUATION

An evaluation of vehicular and pedestrian safety is necessary for locations within the traffic and pedestrian study areas that have been identified as high accident locations: where 48 or more total reportable and non-reportable crashes or five or more pedestrian/bicyclist injury crashes occurred in any consecutive 12 months of the most recent three-year period for which data are available.

For the high accident locations, accident trends would be identified to determine whether projected vehicular and pedestrian traffic would further impact safety at these locations or whether existing unsafe conditions could adversely impact the flow of the projected new trips. The determination of potential significant safety impacts depends on the type of area where the project site is located, traffic volumes, accident types and severity, and other contributing factors. Where appropriate, measures to improve traffic and pedestrian safety should be identified and coordinated with NYCDOT. The results of the safety assessment are provided in Section G, Vehicular and Pedestrian Safety.

PARKING CONDITIONS ASSESSMENT

The parking conditions assessment for the USTA is specialized for the character of this site and event since the inventory of parking available to the US Open patrons includes the parking lots at and around Citi Field, the Southfield commuter parking lot, and a large inventory of paved and land-banked parking provided within Flushing Meadows Corona Park. Moreover, the large dedicated parking supply features remote shuttle operations and a directed parking management operation. The objective of the parking conditions assessment is to determine if the anticipated increase in parking can be accommodated within the footprint of the existing parking program.

E. TRAFFIC

2011 EXISTING CONDITIONS

ROADWAY NETWORK

The roadway network supporting the US Open includes the following local roadways and area highways:

- College Point Boulevard
- Roosevelt Avenue
- Horace Harding Expressway
- Grand Central Parkway
- Long Island Expressway
- Whitestone Expressway
- Van Wyck Expressway

TRAFFIC OPERATIONS

Existing traffic volumes for the study area intersections were established based on manual turning movement counts in conjunction with Automatic Traffic Recorder (ATR) counts, conducted over a two-week period at the end of August and early September during the 2011 US Open.

ATRs collected hourly traffic data from Monday, August 30, 2011 through Tuesday, September 13, 2011. The primary survey date for manual traffic and parking counts was Wednesday, August 31st, 2011 during a "conflict date," which is when the US Open coincides with a Mets home game. The August 31, 2011 survey was conducted under normal special event operations and clear weather conditions.

As stated previously in Section B, "Parking and Traffic Management," traffic operations within the study are characterized by a heavy presence of TEAs maintaining circulation and managing parking assignments.

The analyses of traffic conditions on the local street network reflects operations with permanent traffic controls and special event turn restrictions (e.g., traffic signals, traffic cones, stop signs, striping) but do not reflect the enhanced traffic service conditions which occur due to the dynamic TEA operations.

A summary of the Existing traffic volumes is presented in **Figure 10-3**.

TRAFFIC CONDITIONS

Local Roadway Network

Table 10-11 provides a summary of the results of the Level of Service analysis for Existing Conditions. As indicated in the table, the overall levels of service are LOS D or better.

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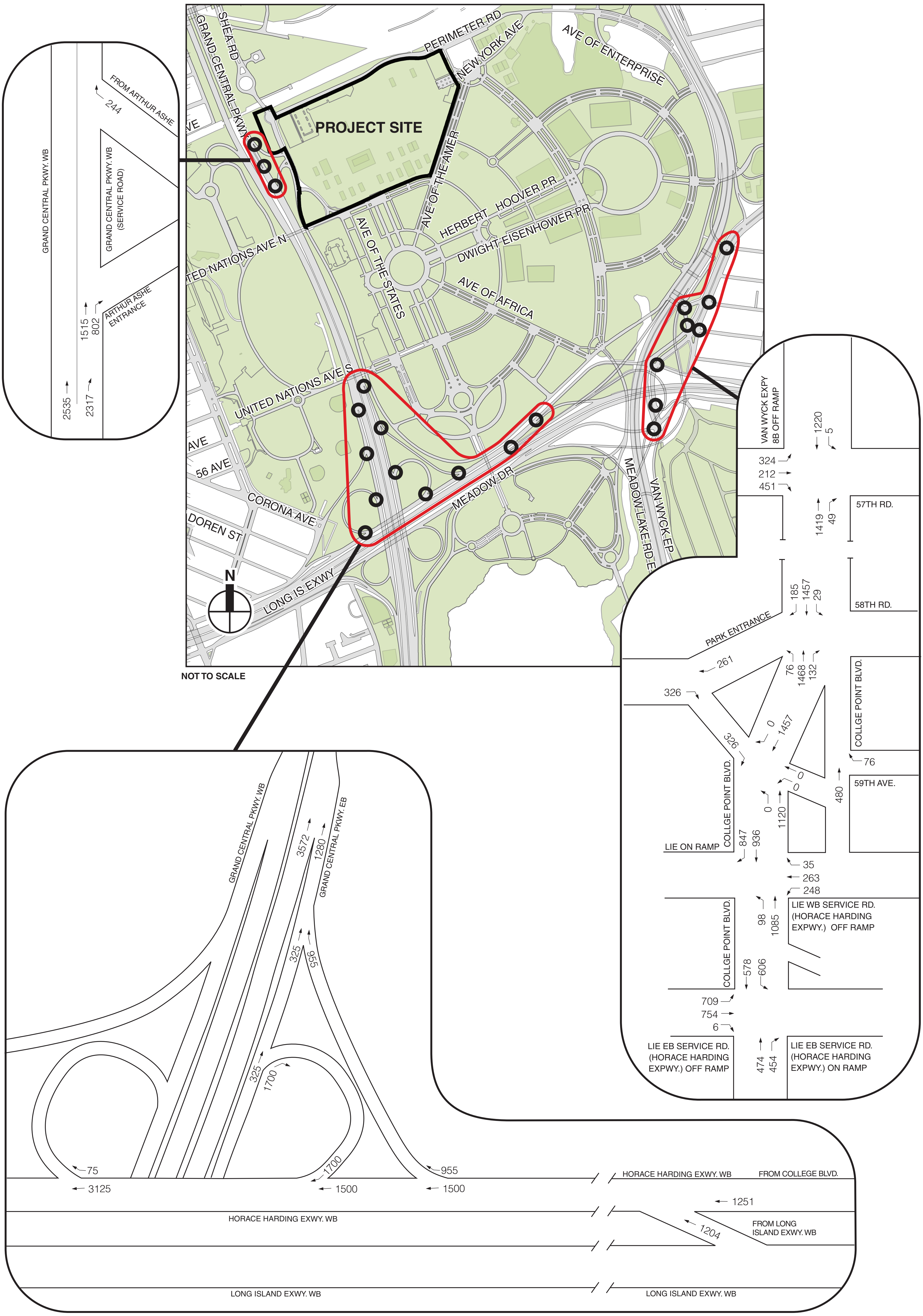

2011 Existing Traffic Volumes
PM Peak Period (6:00-7:00PM)
Figure 10-3

Table 10-11
2011 Existing Conditions Level of Service Analysis

Intersection	Approach	Lane Group	v/c Ratio	Delay (sec.)	LOS
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.26	20.8	C
	Southbound	LT	0.09	16.8	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.83	33.1	C
		R	0.79	31.1	C
	Northbound	TR	0.76	23.9	C
	Southbound	LT	0.66	21.5	C
	Overall	**--**	--	**25.3**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.53	24.2	C
	Westbound	LTR	0.00	16.8	B
	Northbound	LT	0.72	20.4	C
	Southbound	TR	0.66	18.1	B
	Overall	**--**	**--**	**19.7**	**B**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.52	22.7	C
	Northbound	L T	0.27 0.67	28.1 18.9	C B
	Southbound	T R	1.03 0.93	67.6 57.7	E E
	Overall	**--**	**--**	**39.3**	**D**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.00	43.5	D
	Northbound	T	0.74	40.0	D
	Southbound	L T	1.05 0.49	76.6 22.8	E C
	Overall	**--**	**--**	**45.5**	**D**

Highway Network

As previously discussed, the critical highway segment identified for analysis is the westbound Horace Harding Expressway from the College Point Boulevard on ramp to the Grand Central Parkway access ramps and includes the on-ramp from the westbound Long Island Expressway. The initial step to evaluating traffic conditions on this critical highway segment is establishing a calibrated existing conditions model, which serves as the basis for comparing future conditions with and without the proposed project.

The main objective of model calibration effort is to ensure that the model accurately reflects the special event traffic conditions experienced on the date of the survey. This includes reasonably replicating traffic flow to match observed operating conditions, volume data, and queue observations.

Lane geometries (lane widths, interchange designs, etc.) were coded into the model based on field observations and existing aerials. Existing counts collected during the opening week of the US Open were also coded into the model in 15-minute intervals.

During calibration of a VISSIM model, individual components are adjusted to match field-observed data. Calibration involves setting background traffic operation and driver behavior characteristics including yielding right-of-way, gap acceptance, driver aggressiveness, and vehicle characteristics. The VISSIM model was calibrated and validated to the 6:00-7:00 PM peak hour period based on traffic volumes and observed vehicle queues. During this process, the model was visually inspected to ensure that it accurately reflected observed conditions. **Appendix E** provides a detailed description of the model calibration methodology

Free Flow Travel Speeds

Table 10-12 presents the free-flow travel speed ranges for passenger vehicles and trucks coded into the VISSIM model.

Table 10-12
Free Flow Speeds

Location	Free Flow Speed (MPH)	
	Passenger Cars	Trucks
Grand Central Parkway	50-60	-
Collector-Distributor Roads	33-37	33-37
Loop Ramps	20-30	-
Direct Ramps	40-45	-
Perimeter Road	13-17	-

Model Validation

During validation, the VISSIM model output is compared against field data to determine if the output is within acceptable levels. The following criteria, based on the “Guidelines for Applying Traffic Microsimulation Modeling Software Volume III (Federal Highway Administration, 2003)” were used for the model calibration:

Hourly Flows, VISSIM Model vs. Field Counts

Individual Link Flows

Within 100 vph, for Flow < 700 vph	>85% of Cases
Within 15% for 700 vph < Flow < 2,700 vph	>85% of Cases
Within 400 vph, for Flow > 2,700 vph	>85% of Cases

GEH Statistic

GEH < 5	> 85% of Cases

The GEH statistic is computed as follows:

$$GEH = \sqrt{\frac{(V-C)^2}{(V+C)/2}}$$

Where:
V = model estimated directional hourly volume at a location.
C = directional hourly count at a location.

The results from the VISSIM analysis are summarized **Table 10-13.** This table presents the field counts and the resulting VISSIM simulated volumes and shows that the VISSIM model is successfully meeting the calibration criteria.

Table 10-13
Traffic Volume Comparison - Microsimulation Model vs. Field Counts

Location	Field Counts	VISSIM	Difference[1]	Percent Served[2]	GEH	Meets Criteria?
College Point on-ramp to Horace Harding Expressway	1,360	1,360	0	0%	0.0	YES
LIE off-ramp to Horace Harding Expressway	1,204	1,220	-16	-1%	0.5	YES
Horace Harding Expressway to Grand Central Parkway (GCP) westbound direct ramp	955	934	+21	2%	0.7	YES
GCP westbound to loop ramp service road	1,700	1,688	+12	1%	0.3	YES
Horace Harding Expressway to GCP east loop ramp	75	72	+3	4%	0.3	YES
GCP service road westbound at loop ramp	325	324	+1	0%	0.1	YES
GCP mainline westbound at loop ramps	3,572	3,574	-2	0%	0.0	YES
GCP westbound on-ramp from Horace Harding Expressway	1,280	1,247	+33	3%	0.9	YES
GCP westbound off-ramp to Exit 9P USTA	802	750	+52	6%	1.9	YES
GCP westbound mainline at off-ramp to Exit 9P USTA	4,050	4,046	+4	0%	0.1	YES
GCP westbound mainline (after split)	2,535	2,522	+13	1%	0.3	YES
GCP westbound service road (after split)	1,515	1,515	0	0%	0.0	YES
GCP westbound on-ramp from Exit 9P USTA	244	235	+9	4%	0.6	YES

Notes: Average of ten simulation runs.
1. Difference = Field Counts –VISSIM
2. Percent Served = (Field Counts – VISSIM) / Field Counts

In addition to validating the model to field counts, the simulation was checked to demonstrate queuing that is consistent with the field observations. During the 6:00 PM to 7:00 PM peak period, the Grand Central Parkway westbound off-ramp to Exit 9P was observed to queue back to the Grand Central Parkway mainline, growing throughout the peak hour. By the end of the peak hour (around 7:00 PM), the queue from the Exit 9P exit ramp extended to the Horace Harding Expressway.

The VISSIM model replicated this queue length during the simulation, with queues from the Exit 9P off-ramp extending through the peak hour, spilling back onto the Horace Harding Expressway and back to the College Point Boulevard and Long Island Expressway (LIE) approaches at the end of the simulation peak hour.

Table 10-14 provides a summary of the VISSIM travel time analysis for 2011 Existing Conditions. The table presents the estimated travel times for two key routes within the highway segment under analysis. As indicated in the table, the estimated travel time on the Horace Harding Expressway from the entrance point from the Long Island Expressway (LIE) to a point on the exit ramp to the Grand Central Parkway (GCP) westbound, a segment of 2,911 feet, would be 106.9 seconds, or at an average speed 18.6 miles per hour. Similarly, the estimated travel time from the entrance point from College Point Boulevard to a point on the Horace Harding Expressway, just past the exit ramp to the Grand Central Parkway, a segment of 2,218 feet, would be 60.4 seconds, or at an average speed 25.0 miles per hour.

Table 10-14
2011 Existing Conditions - Travel Time Analysis

Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Existing	LIE to GCP Westbound Entrance	2,911	106.9	18.6
	College Point Blvd. to mid-GCP	2,218	60.4	25.0

2019 FUTURE NO-ACTION CONDITION

DEVELOPMENT OF A FUTURE DUAL EVENT CONDITION

The 2019 Future No-Action condition includes the development of a Reasonable Worst-Case Scenario (RWCS). A component of this scenario is a future condition where the US Open coincides with a well-attended Mets home game. Consistent with the *Shea Stadium Redevelopment FEIS*, December 2001, and the previous *USTA National Tennis Center Project FEIS*, July 1993, an 85th percentile attendance condition was identified for analysis.

On the date of the 2011 US Open survey, the Mets attendance was 27,905. Based on a review of the attendance data for all weekday Mets games over the 2010 and 2011 baseball seasons, the 85th percentile attendance was 35,914. Therefore, an adjustment was made to the traffic and transit networks to reflect an increase in attendance of 8,009 baseball fans to Citi Field.

Trip generation and trip assignments for the additional 8,009 patrons were based on the information provided in the *Shea Stadium Redevelopment FEIS*, December 2001. For auto trips, the FEIS identified a 62 percent mode share, a 2.70 vehicle occupancy rate, and a 61 percent total vehicle peak hour arrival rate (please see FEIS Table 11-1, p 11-5).

In order to account for the increase in Mets attendance, an additional 1,122 vehicle trip ends were assigned to the roadway network and Citi Field parking lot under the future condition. Subsequently, 562 US Open patrons departing the Citi Field lot during the peak departure hour under existing conditions were “reassigned” to general parking lots #4, #5 and #6 under the future condition.

For transit trips, the FEIS identified a subway modal split of 31 percent and a temporal distribution of 62 percent during the peak hour; therefore, an additional 1,539 subway trips were added to the transit network during the peak hour. This corresponds to approximately 428 additional subway trips exiting the Mets-Willets Point subway station and entering the stadium during the peak 15 minutes.

The number of US Open patrons (568 vehicle trips) departing the Citi Field parking lots was determined by reviewing the volumes exiting the Citi Field parking lots and volumes observed on the highway entrance ramps in the immediate vicinity of Citi Field during the peak hour departure period. A total volume of 568 vehicle trips were observed departing the Citi Field parking lot during the peak departure period. Under the future dual event condition, with an escalated Mets attendance level, the 568 vehicles trips were “reassigned” to depart the US Open general public parking Lots #4, #5, and #6.

BACKGROUND GROWTH

The 2019 Future No-Action condition was developed by increasing existing traffic volumes by the expected growth in overall travel through and within the study area. As per *CEQR* guidelines, an annual background growth rate of 0.5 percent was assumed for the first five years and then 0.25 percent for the remaining years to the year 2019.

In addition, planned or proposed background projects were researched within the study area. **Table 10-15** and **Figure 10-4** summarize the projects that were included in the future 2019 baseline. Smaller projects that would generate a very modest volume of traffic were considered as part of the general study area background traffic growth rate while others of greater significance were evaluated individually. Projects still under development, such as Willets Point Redevelopment, were evaluated based on information available at the time of this report. Person and vehicle trips generated were then determined, their traffic assigned, and their trips added to background growth to form the 2019 Future No-Action traffic volumes.

Similar to the other No-Action projects in the vicinity of the study area, the proposed Willets Point Redevelopment Project was evaluated based on information available at the time of the preparation of this DEIS and may not reflect the final assumptions used in the proposed Willets Point project's environmental review. The proposed Willets Point program is not expected to be increased beyond what is accounted for in the No Action analysis. Overall, any future modifications to the Willets Point program are not expected to change the findings of the DEIS transportation analysis, especially when considering the differences in travel patterns and the frequency and duration of the US Open event. Therefore, the procedures and methodologies followed for the No Action analysis are appropriate for the specific needs of the USTA Billie Jean King National Tennis Center Strategic Vision DEIS.

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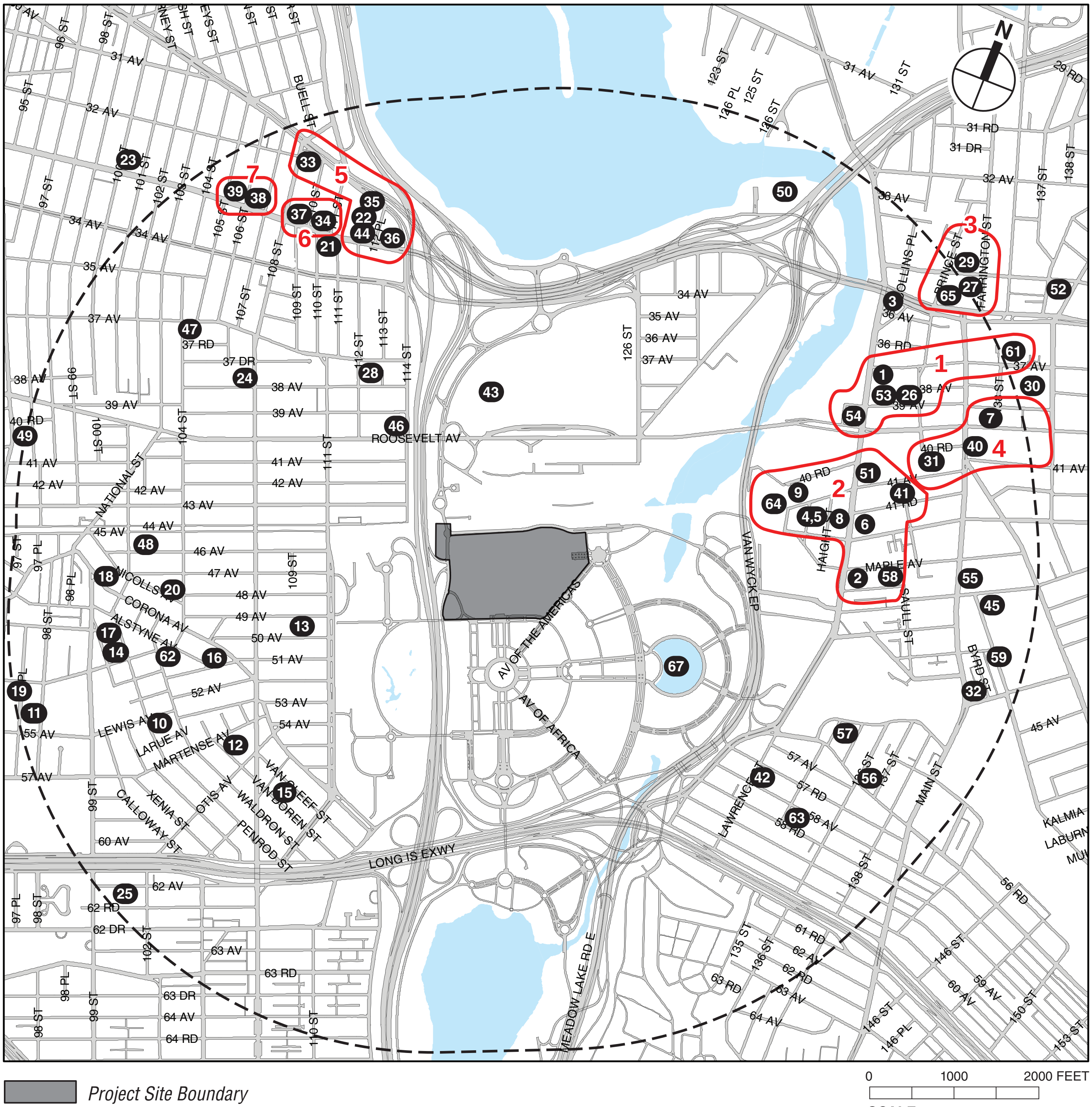


Project Site Boundary

1-Mile Study Area Perimeter

11 No Action Projects

1 Cluster

Transportation Analysis No Action Projects

Figure 10-4

Table 10-15
Planned Projects Within or Near the Study Area

Site No.	Location	Description	Transportation Assumptions	Build Year
1	133-12 37th Avenue	Mixed use development with 10 dwelling units, 22,336 sf of commercial use, and a 1,971 sf community facility	Travel demand assumptions from the *Willets Point Development Plan FGEIS* (2008)	2018
2	132-08 Pople Ave	Mixed use development with 22 dwelling units, a 4,500 sf community facility, and 12 parking spaces	See Site 1	2018
3	35-19 College Point Boulevard	35,580 sf of light manufacturing and 11 parking spaces	Trip rates and temporal distributions from *Greenpoint Williamsburg Rezoning FEIS (*2005); modal split and auto and taxi vehicle occupancies from 2000 U.S. Census Transportation Planning Package Reverse Journey-to-Work Data and *Greenpoint Williamsburg Rezoning FEIS (*2005)	2018
4	41-09-15 Haight Street	Mixed use development with 28 dwelling units and a 12,584 sf community facility	See Site 1	2018
5	33-39 Prince Street	6,396 sf of light manufacturing	See Site 3	2018
6	132-18 41st Road	Mixed use development with 10 dwelling units and a 4,095 sf community facility	See Site 1	2018
7	136-11 Roosevelt Avenue	2,800 sf commercial development	See Site 1	2018
8	41-38 College Point Boulevard	Mixed use development with 8 dwelling units, 1,577 sf retail use, and a 4,095 sf community facility	See Site 1	2018
9	131-10-14 40 Road	5,795 sf retail development	See Site 1	2018
10	102-06-10 Lewis Avenue	Residential development with 14 dwelling units and 8 parking spaces	Included in background growth	2018
11	50-18 98 Street	8,000 sf of light manufacturing and 6 parking spaces	Included in background growth	2018
12	105-10-12 Martense Avenue	Residential development with 6 units and 2 parking spaces	Included in background growth	2018
13	108-30 49 Avenue	Residential development with 3 units and 2 parking spaces	Included in background growth	2018
14	50-30-32 102 Street	Residential development with 8 units and 4 parking spaces	Included in background growth	2018
15	57-37 Van Doren Street	Residential development with 4 units and 1 parking space	Included in background growth	2018
16	104-24-28 Corona Avenue	Mixed use development with 4 residential units and1,144-sf retail use	Included in background growth	2018
17	50-08-10 102nd Street	Residential development with 6 dwelling units	Included in background growth	2018
18	99-21 Corona Avenue	Mixed use development with 6 residential units and a 280-sf community facility	Included in background growth	2018
19	50-02 97th Place	Mixed use development with a 10,530 sf community facility and 9,105 sf light manufacturing use	Included in background growth	2018
20	102-57 Nicolls Avenue	Mixed use development with 5 residential units and 1,434-sf retail	Included in background growth	2019

Table 10-15 (cont'd)
Planned Projects Within or Near the Study Area

Site No.	Location	Description	Transportation Assumptions	Build Year
21	PS 287: 110-08 Northern Boulevard	A 379-seat (49,471 sf) primary school	Assumed no trips during the evening peak period	2016
22	32-29-33 112th Street	A residential development with 2 dwelling units	See Site 1	2018
23	32-56 101st Street	11,407 sf commercial development	Included in background growth	2016
24	37-56 108th Street	Mixed use development with 4 residential units and 1,785-sf retail	Included in background growth	2018
25	99-31 62nd Road	A residential development with 2 dwelling units	Included in background growth	2018
26	133-47 39th Avenue	Mixed use development with 12,270 sf office use, 11,420 sf retail, and a 9,755 sf medical office	See Site 1	2018
27	RKO Keith Theater - Main Street and Northern Boulevard	Mixed use development with 357 residential units, 17,000 sf retail, a 12,500 sf community facility, and 385 parking spaces	See Site 1	2018
28	37-06 112th Street	A residential development with 3 dwelling units	Included in background growth	2018
29	New Millennium - 134-03 35th Avenue	Mixed use development with 84 residential units, 3,600 sf retail, a 33,600 sf community facility, and 222 parking spaces	See Site 1	2016
30	Flushing Commons (Municipal Parking Lot 1) and Macedonia Plaza - 138th Street, 37th Avenue, 39th Avenue, and Union Street	Mixed use development with 620 residential units, 275,000 sf retail, 110,000 sf office, a 98,000 sf community facility, either 250 hotel rooms or an additional 124,000 sf office and 1,600 parking spaces	See Site 1	2016
31	Flushing Municipal Lot 3	Mixed use development with 120 residential units, 23,000 sf commercial, a 10,000 sf community facility, and 200 parking spaces	See Site 1	2015
32	43-57 Main Street	2,085 sf of office and retail uses	See Site 1	2018
33	108-04, 14, 16 Astoria Boulevard	Mixed use development with 84 residential units, and a 34,965 sf community facility	See Site 1	2018
34	110-09 Northern Boulevard	Mixed use development with 31 residential units, and a 15,500 sf community facility	See Site 1	2018
35	112-12, 18, 24 Astoria Boulevard	Mixed use development with 38 residential units, and a 16,034 sf community facility	See Site 1	2018
36	Block bounded by Astoria Boulevard, Northern Blvd, and 112th Place	Mixed use development with 147 residential units, and 73,329 sf of commercial use	See Site 1	2018
37	108-09 Northern Boulevard	Mixed use development with 18 residential units, and 8,970 sf retail	See Site 1	2016
38	106-15 Northern Boulevard	Mixed use development with 11 residential units, and 5,502 sf retail	See Site 1	2016
39	32-56 106th Street	Mixed use development with 14 residential units, and 7,144 sf retail	See Site 1	2016
40	Caldor Site - 136-20 Roosevelt Avenue	155,000 sf retail	See Site 1	2016
41	132-27 to 132-61 41st Road	Residential development with 37 units	See Site 1	2018
42	57-35 Lawrence Street	Residential development with 5 units	See Site 1	2016
43	Willets Point Redevelopment Phase 1A	Mixed use development with retail uses within the existing Citi Field parking lot and local retail, hotel, and other recreational uses within the Willets Point District	Trip generation factors from the *CEQR Technical Manual* (2012), the *Willets Point Development Plan FGEIS* (2008), and other applicable sources, including inter-agency coordination regarding the new 2012 plan.	2018
44	112-15 Northern Boulevard	163-room hotel	See Site 1	2018

Table 10-15 (cont'd)
Planned Projects Within or Near the Study Area

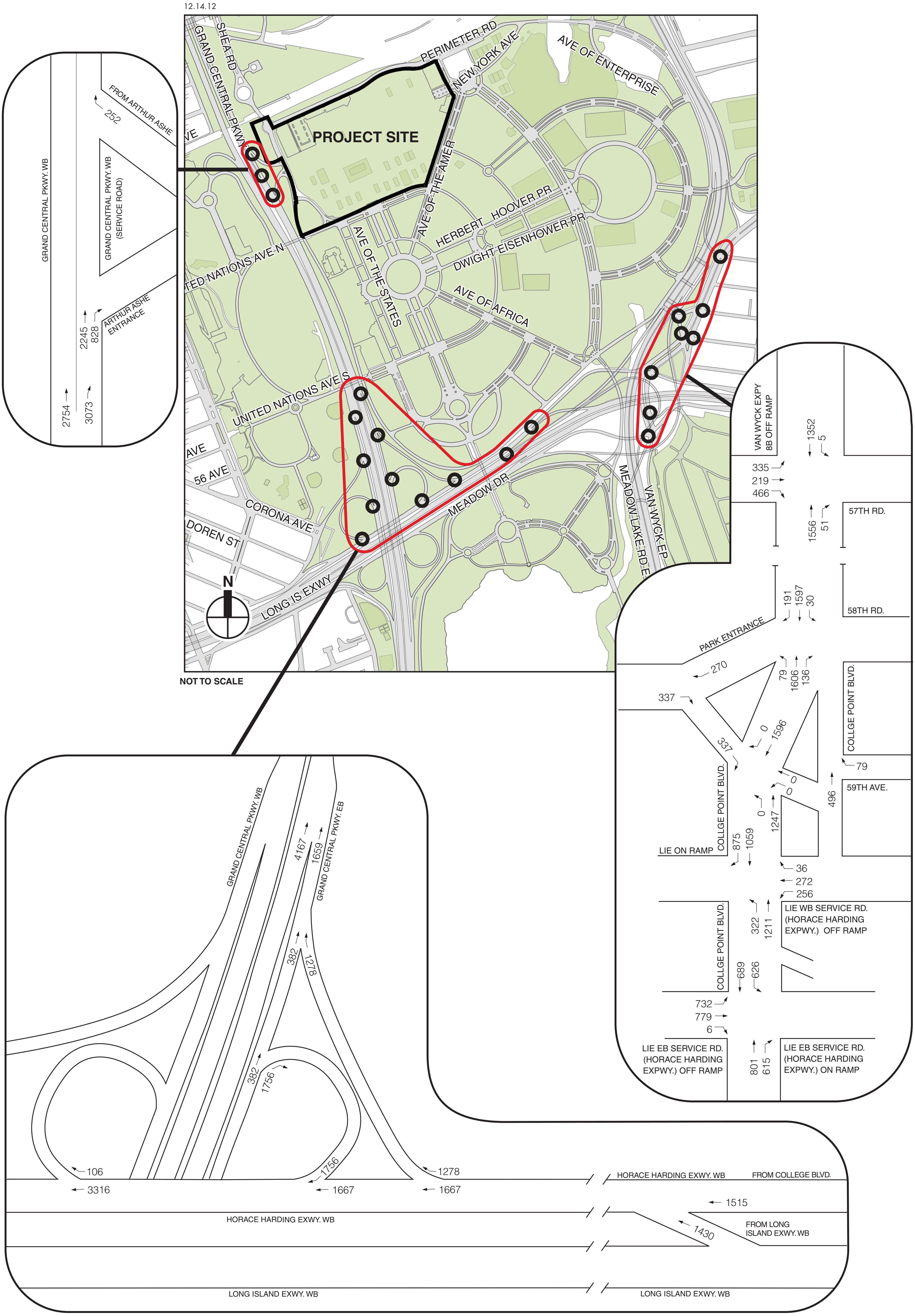
Site No.	Location	Description	Transportation Assumptions	Build Year
45	P.S. 244 - 137-20 Franklin Avenue	A 425-seat primary school	Assumed no trips during the evening peak period	2016
46	39-14 114th Street	Mixed use development with 23 residential units, 18,638 sf commercial use, a 4,794 sf community facility, and 38 parking spaces	Included in background growth	2018
47	37-19 104th Street	Mixed use development with 2 residential units and a 1,100 sf community facility	Included in background growth	2018
48	102-12-14 45th Avenue	Residential development with 8 dwelling units and 2 parking spaces	Included in background growth	2018
49	40-53 Junction Boulevard	Mixed use development with 7 residential units and a 1,458 sf community facility	Included in background growth	2018
50	32-11 Harper Street	137 sf Diesel Monitoring Booth	Included in background growth	2018
51	132-15 41st Avenue	Mixed use development with 25 residential units, a 5,933 sf community facility, and 8 parking spaces	See Site 1	2018
52	35-01-05 Leavitt Street	Residential development with 12 dwelling units and 6 parking spaces	See Site 1	2018
53	37-19 College Point Boulevard	Mixed use development with 1 residential unit, 56,595 sf commercial, a 1,000 sf community facility, and 31 parking spaces	See Site 1	2018
54	One Fulton Square	Mixed use development with 88 residential units, 142,180 sf office, a 168-room hotel, a 16,722 sf community facility, and 283 parking spaces	See Site 1	2018
55	42-33 Main Street	Residential development with 79 dwelling units	See Site 1	2018
56	56-40 137th Street	Mixed use development with 3 residential units and a 4,401 sf community facility	Included in background growth	2018
57	56-18 135th Street	Residential development with 2 dwelling units	Included in background growth	2018
58	132-29 Pople Avenue	Mixed use development with 9 residential units and a 560 sf community facility	See Site 1	2018
59	43-02 Colden Street	Mixed use development with 7 residential units, 2,298 sf office, and 3 parking spaces	Included in background growth	2018
60	136-68 Roosevelt Avenue	Mixed use development with 29,124 sf commercial, a 14,279 sf community facility, and 34 parking spaces	See Site 1	2018
61	136-33 37th Avenue	116,894 sf office and 97 parking spaces	See Site 1	2018
62	50-15 103rd Street	A residential development with 1 dwelling unit	Included in background growth	2018
63	134-06 58th Avenue	Addition of 1 residential dwelling unit	Included in background growth	2018
64	131-08 40 Road	4,548 sf retail	See Site 1	2018
65	135-17 Northern Boulevard	Mixed use development with 28 residential units, 8,465 sf retail, a 2,867 sf community facility, and 45 parking spaces	See Site 1	2018
66	154-32 Barclay Avenue	Mixed use development with 18 residential units and a 5,950 sf community facility	Included in background growth	2018
67	Flushing Meadows Corona Park	Major league soccer stadium	Assumed no event overlap with USTA events	2016
Sources: AKRF, Inc., New York City Department of City Planning, New York City Department of Buildings				

A summary of the Future No-Action condition traffic volumes is presented in **Figure 10-5**.

TRAFFIC CONDITIONS

Local Roadway Network

Table 10-16 provides a summary of the results of the LOS analysis for the 2019 Future No-Action condition. As with existing conditions, the analysis does not take credit for the effect of dynamic TEA operations. Based on the analysis results, the majority of the approaches/lane groups would operate at the same LOS as in existing conditions with the following notable exceptions:



2019 Future No Action Traffic Volumes
PM Peak Period (6:00-7:00PM)
Figure 10-5

Table 10-16
2019 Future No Action Level of Service Analysis

Intersection	Approach	Lane Group	v/c Ratio	Delay (sec.)	LOS
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.31	24.6	C
	Southbound	LT	0.11	18.7	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.86	35.4	D
		R	0.81	32.9	C
	Northbound	TR	0.84	26.5	C
	Southbound	LT	0.74	23.1	C
	Overall	--	--	**27.3**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.55	24.6	C
	Westbound	LTR	0.00	16.8	B
	Northbound	LT	0.81	23.2	C
	Southbound	TR	0.72	19.4	B
	Overall	**--**	**--**	**21.4**	**C**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.54	23.0	C
	Northbound	L	0.88	54.2	D
		T	0.74	20.8	C
	Southbound	T	1.16	115.7	F
		R	0.99	70.4	E
	Overall	**--**	**--**	**57.0**	**E**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.03	52.1	D
	Northbound	T	1.26	163.1	F
	Southbound	L	1.09	87.7	F
		T	0.58	24.4	C
	Overall	**--**	**--**	**77.3**	**E**

College Point Boulevard at Horace Harding Expressway Westbound

- The northbound left turn movement experiences an increase in delay of 26.1 seconds and a change from LOS C to LOS D.
- The southbound through movement experiences an increase in delay of 48.1 seconds and a change from LOS E to LOS F.
- Overall, the intersection experiences an increase in delay of 17.7 seconds and change from LOS D to LOS E.

College Point Boulevard at Horace Harding Expressway Eastbound

- The northbound through movement experiences an increase in delay of 123.1 seconds and a change from LOS D to LOS F.
- The southbound left turn movement experiences an increase in delay of 11.1 seconds and a change from LOS E to LOS F.
- Overall, the intersection experiences an increase in delay of 31.8 seconds and change from LOS D to LOS E.

Highway Network

Table 10-17 provide a summary of the results of the micro-simulation model analysis for the 2019 Future No-Action condition. The vehicle demand analysis presented in **Table 10-17** indicates the critical roadway segment is operating above capacity.

Table 10-17
2019 Future No-Action Condition - Vehicle Demand Analysis

Design Year	Segment (Ramp Approach)	Demand Volume	Vehicles Served	Unmet Demand	Percent Served
Future No-Action	College Point Boulevard	1,624	1,588	36	98%
	Long Island Expressway	1,467	994	473	68%

The results of the analysis for the College Point Boulevard approach indicates 1,588 of the total peak hour demand of 1,624 vehicle, or 98 percent, can be processed by the highway segment. The remaining unmet demand will contribute to the queuing that currently extends along College Point Boulevard and into the park.

For the Long Island Expressway approach, 988 of the total peak hour demand of 1,467, or 67 percent, can be processed by the highway segment during the peak hour. The remaining unmet demand will be processed outside of the peak hour and will contribute to congestion on the Long Island Expressway.

Table 10-18 provides additional information regarding traffic operations projected for the 2019 Future No-Action condition. The table presents the estimated travel times for two key routes within the highway segment under analysis. As indicated in the table, the estimated travel time on the Horace Harding Expressway from the entrance point from the Long Island Expressway (LIE) to a point on the exit ramp to the Grand Central Parkway (GCP) westbound, a segment of 2,911 feet, would be 179.0 seconds, or at an average speed 11.1 miles per hour. Similarly, the estimated travel time from the entrance point from College Point Boulevard to a point on the Horace Harding Expressway, just past the exit ramp to the Grand Central Parkway, a segment of 2,218 feet, would be 128.3 seconds, or at an average speed 11.8 miles per hour.

Table 10-18
2019 Future No-Action Condition - Travel Time Analysis

Design Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Future No-Action	LIE to GCP Westbound Entrance	2,911	179.0	11.1
	College Point Blvd. to mid-GCP	2,218	128.3	11.8

2019 FUTURE WITH ACTION CONDITION

As discussed above in Section C, “Level 2 Screening Assessment,” the project-generated vehicle trips were assigned to the study area.

The related peak hour traffic and assignments are discussed above in Section C, “Level 2 Screening Assessment,” and the incremental peak hour trips resulting from the proposed project are shown in **Figures 10-2A through 10-2D**.

TRAFFIC CONDITIONS

The 2019 Future With Action condition traffic volumes were constructed by layering the Future No-Action condition traffic volumes and the incremental peak hour trips resulting from the proposed project. The Future With Action traffic volumes are shown in **Figure 10-6**.

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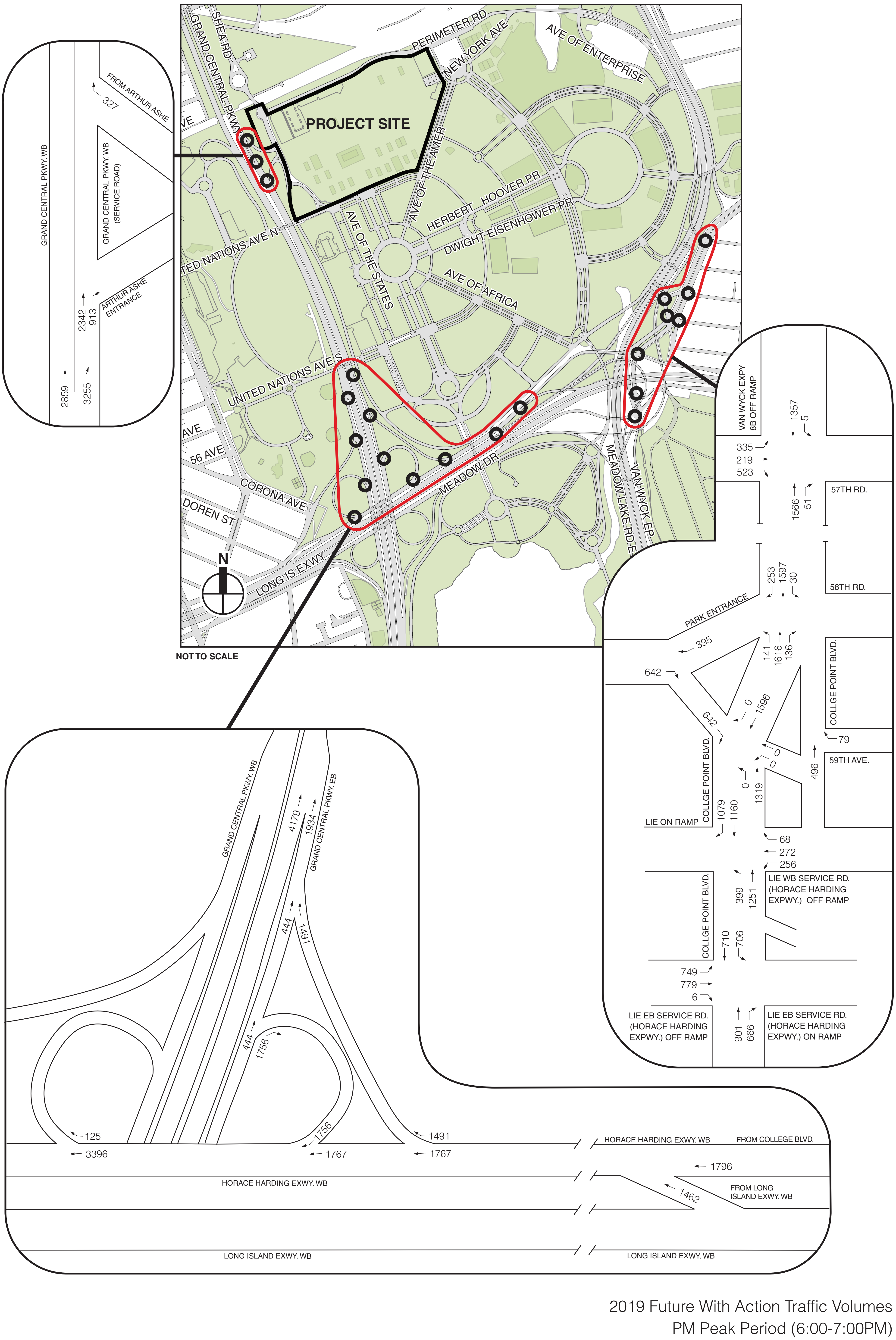

2019 Future With Action Traffic Volumes
PM Peak Period (6:00-7:00PM)
Figure 10-6

Local Roadway Network

Table 10-19 provides a comparison of the results of the LOS analysis for the 2019 Future With Action condition with the Future No-Action condition. As with Existing and No Action conditions, the capacity analysis does not take credit for the effect of the Traffic Enforcement Agents (TEAs) staffed at every intersection.

Table 10-19
2019 Future No-Action and Future With Action Level of Service Analysis

			Future No Action			Future With Action		
Intersection	**Approach**	**Lane Group**	**v/c Ratio**	**Delay (sec.)**	**LOS**	**v/c Ratio**	**Delay (sec.)**	**LOS**
College Point Boulevard at 58th Road and Park Entrance (unsignalized)	Northbound	LT	0.31	24.6	C	0.58	38.1	E
	Southbound	LT	0.11	18.7	C	0.11	18.9	C
College Point Boulevard at Van Wyck Expressway Southbound Exit and 57th Road (signalized)	Eastbound	LT	0.86	35.4	D	0.86	35.4	D
		R	0.81	32.9	C	0.91	43.3	D
	Northbound	TR	0.84	26.5	C	0.84	26.7	C
	Southbound	LT	0.74	23.1	C	0.74	23.2	C
	Overall	--	--	**27.3**	**C**	--	**28.9**	**C**
College Point Boulevard at 59th Avenue and Park Exit (signalized)	Eastbound	LR	0.55	24.6	C	1.05	75.8	E
	Westbound	LTR	0.00	16.8	B	0.00	16.8	B
	Northbound	LT	0.81	23.2	C	0.85	25.4	C
	Southbound	TR	0.72	19.4	B	0.72	19.4	B
	Overall	**--**	**--**	**21.4**	**C**	**--**	**32.0**	**C**
College Point Boulevard at Horace Harding Expressway Westbound (signalized)	Westbound	LTR	0.54	23.0	C	0.57	23.6	C
	Northbound	L	0.88	54.2	D	1.09	106.7	F
		T	0.74	20.8	C	0.77	21.5	C
	Southbound	T	1.16	115.7	F	1.27	162.0	F
		R	0.99	70.4	E	1.43	238.3	F
	Overall	**--**	**--**	**57.0**	**E**	**--**	**103.1**	**F**
College Point Boulevard at Horace Harding Expressway Eastbound (signalized)	Eastbound	LTR	1.03	52.1	D	1.04	55.6	E
	Northbound	T	1.26	163.1	F	1.41	230.5	F
	Southbound	L	1.09	87.7	F	1.23	140.4	F
		T	0.58	24.4	C	0.60	24.7	C
	Overall	**--**	**--**	**77.3**	**E**	**--**	**105.8**	**F**

College Point Boulevard at 58th Road and the Park Entrance (unsignalized)

- The northbound approach experiences a change in level of service from LOS C to LOS E and an increase in delay from 24.6 seconds to 38.1 seconds, an increase of 13.5 seconds.

College Point Boulevard at 59th Avenue and the Park Exit

- The eastbound approach experiences a change in level of service from LOS C to LOS E and an increase in delay from 24.6 seconds to 75.8 seconds, an increase of 51.2 seconds.

College Point Boulevard at Horace Harding Expressway Westbound

- The northbound left turn lane group experiences a change in level of service from LOS D to LOS F and an increase in delay from 54.2 seconds to 106.7 seconds, an increase of 52.5 seconds.
- The southbound through lane group remains at LOS F but experiences an increase in delay from 115.7 seconds to 162.0 seconds, an increase of 46.3 seconds.

- The southbound right turn lane group experiences a change in level of service from LOS E to LOS F and an increase in delay from 70.4 seconds to 238.3 seconds, an increase of 167.9 seconds.

College Point Boulevard at Horace Harding Expressway Eastbound

- The eastbound approach experiences a change in level of service from LOS D to LOS E and an increase in delay from 52.1 seconds to 55.6 seconds, an increase of 3.5 seconds.
- The northbound approach remains at LOS F but experiences an increase in delay from 163.1 seconds to 230.5 seconds, an increase of 67.4 seconds.
- The southbound approach remains at LOS F but experiences an increase in delay from 87.7 seconds to 140.0 seconds, an increase of 52.3 seconds.

According to the CEQR impact criteria outlined in Section D, “Transportation Analysis Methodology,” the projected levels-of-service deterioration and increased delay would constitute significant adverse impacts during the analysis peak hour. However, as mentioned earlier, the capacity analysis summarized in **Table 10-19** does not reflect actual field conditions as the analysis does not quantitatively account for the special event traffic management provided by the New York City Police Department including TEAs.

Multiple TEAs are staffed at each intersection within the study area along College Point Boulevard during the full duration of the US Open. The TEAs are onsite in the early morning and remain in position until the completion of the event day. The TEAs ensure that traffic operation and safety of all street users (i.e., pedestrians, cyclists, transit users and motorists) are managed in the field when traffic operations become saturated (i.e., queues extending beyond storage capacity, blocked turning movements, grid-lock, aggressive driver behavior, etc.).

Additionally, this analysis reflects a weekday evening commuter peak hour during the first week of the tournament when US Open patrons are departing the daytime event, patrons are arriving for the evening event and baseball fans are arriving for a Mets home game. These conditions reflect a worst case scenario which occurs infrequently, typically two to four times every other year.

Due to the infrequency and duration of the event, and the ability of the traffic management program and TEAs to adequately manage traffic flow and safety of all street users during the US Open, no mitigation measures beyond the continuous traffic management provided by the TEAs would be necessary.

Highway Network

Table 10-20 provide a summary of the results of the micro-simulation model analysis for the 2019 Future With Action condition. As indicated in the table, the vehicle demand analysis shows the critical roadway segment, which was operating above capacity in Future No-Action condition worsens under the Future With Action condition.

Table 10-20
2019 Future No-Action and Future With Action - Vehicle Demand Analysis

Design Year	Segment (Ramp Approach)	Demand Volume	Vehicles Served	Unmet Demand	Percent Served
Future No-Action	College Point Boulevard	1,624	1,588	36	98%
	Long Island Expressway	1,467	994	473	68%
Future With Action	College Point Boulevard	1,903	1,679	224	88%
	Long Island Expressway	1,499	788	711	53%
Change	College Point Boulevard	**+279**	**+91**	**+188**	--
	Long Island Expressway	**+32**	**-206**	**+238**	**--**
Future With Action With TEA metering	College Point Boulevard	1,679	1,683	0	100%
	Long Island Expressway	1,499	850	649	57%
Change	College Point Boulevard	**+55**	**+95**	**0**	**--**
	Long Island Expressway	**+32**	**-144**	**+176**	**--**

The results of the analysis under the Future With Action condition for the College Point Boulevard indicates that 1,679 of the total peak hour demand of 1,903 vehicles, or 88 percent, can be processed by the highway segment. The remaining 224 vehicles, or the unmet demand, would contribute to the queuing that currently extends along College Point Boulevard and into the park.

Vehicles merging from the Long Island Expressway approach would also experience greater delays due to the reduction in opportunities to merge. As indicated in the table, only 788 of the total peak hour demand of 1,499, or 53 percent, can be processed by the highway segment during the peak hour. The remaining 711 "unserved" vehicles, or unmet demand, would be processed outside of the peak hour and would contribute to congestion on the Long Island Expressway.

As a result of the proposed project, the volumes of unmet demand during the peak hour would increase by 188 vehicles at the College Point Boulevard approach and 238 vehicles at the Long Island Expressway merge.

In addition, a VISSIM analysis was conducted to reflect the TEA metering described above. Under this scenario, all of the College Point Boulevard demand would be met. However, while improved compared to the Future With Action scenario, there will continue to be unmet demand from the Long Island Expressway, which would be served outside the peak hour.

Table 10-21 provides a travel time comparison of the Future With Action and Future No-Action conditions for two routes within the highway segment under analysis. As indicated in the table, the average speed for the travel segment from the Long Island Expressway (LIE) to the westbound entrance to the Grand Central Parkway (GCP) would decrease from 11.1 miles per hour to 8.6 miles per hour. Comparably, the highway segment from College Point Boulevard to a point just past the Grand Central Parkway entrance ramp would experience a decrease in average speed from 11.8 miles per hour to 7.6 miles per hour. In addition, **Table 10-21** presents the travel times and speeds for the Future With Action with TEA metering. While travel times will continue to increase and speeds continue to decrease, there is still improvement compared to the Future With Action condition.

Table 10-21
2019 Future No-Action and Future With Action – Travel Time Analysis

Design Year	Segment	Distance (feet)	Time (sec.)	Speed (mph)
Future No Action	LIE to GCP Westbound Entrance	2,911	179.0	11.1
	College Point Blvd. to mid-GCP	2,218	128.3	11.8
Future With Action	LIE to GCP Westbound Entrance	2,911	230.6	8.6
	College Point Blvd. to mid-GCP	2,218	197.7	7.6
Change	LIE to GCP Westbound Entrance	--	**+51.7**	**-2.5**
	College Point Blvd. to mid-GCP	--	**+69.3**	**-4.1**
Future With Action With TEA Metering	LIE to GCP Westbound Entrance	2,911	212.4	9.3
	College Point Blvd. to mid-GCP	2,218	181.9	8.3
Change	LIE to GCP Westbound Entrance	--	**33.4**	**-1.7**
	College Point Blvd. to mid-GCP	--	**53.5**	**-3.5**

The results are conservative since they do not reflect how congestion on the Long Island Expressway serves to meter the demand onto the Horace Harding Expressway. The design of the model assumes all drivers wanting to exit onto the Horace Harding Expressway can do so during the peak hour analysis period, without regard to traffic conditions on the Long Island Expressway. However, field observations and video surveys indicate congestion on the Long Island Expressway constrain this demand. The metering effect results in a reduction in the demand volume of vehicles exiting the Long Island Expressway. Although the results are more conservative by not accounting for these conditions, the methodology and findings of the analysis are appropriate to identify the incremental effects of the proposed project on the transportation network.

F. TRANSIT

Mass transit options serving the study area are provided by the NYCT and include the No. 7 subway line at the Mets-Willets Point station, Port Washington Branch trains at the Mets-Willets Point LIRR station during game days, and the Q19, Q48, and Q66 local bus routes. An analysis of subway station operations during the weekday PM peak period departure is presented below.

2011 EXISTING CONDITIONS—SUBWAY STATION OPERATIONS

As presented in **Table 10-4**, “Travel Demand Assumptions and Trip Generation Estimates,” the proposed project is expected to result in approximately 1,540 project-generated subway trips during the weekday PM peak period departure. These trips were all assigned to the Mets-Willets Point station and the corresponding station elements. As detailed in Section C, “Level 2 Screening Assessment,” the following station elements were identified for analysis:

- Station passageways to/from Manhattan (north platform) and the adjoining control area elements;
- Station stairways (P-2, P-4, P-10, and P-12) to/from Flushing (center platform) and the adjoining control area elements;
- Station stairway (P-6) to/from the southern platform; and
- Station passageway connecting the Passerelle ramp and the Mets-Willets Point station.

Field surveys conducted on August 31, 2011 during the hours of 4:00 to 8:00 PM provided the baseline volumes for the analysis of the above subway station elements. As shown in **Tables 10-22** and **Table 10-23**, all analyzed stairways, passageways, and control areas currently operate at acceptable levels during the weekday PM peak period departure.

Table 10-22
2011 Existing Conditions: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
			Up	Down				
Manhattan Platform								
West Ramp Passageway	17.6	15.6	431	51	0.75	0.90	0.158	A
East Ramp Passageway	19.6	17.6	284	89	0.75	0.90	0.113	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	12	524	0.75	1.00	0.552	B
West Stair (P-10)	9.6	8.3	6	575	0.75	1.00	0.618	B
East Stair (P-4)	9.9	8.7	16	427	0.75	1.00	0.450	B
East Stair (P-2)	10.1	8.8	28	455	0.75	0.90	0.532	B
Stair to/from Southern Platform (P-6)	5.8	4.8	16	81	0.75	0.90	0.190	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,476	1,960	0.80	0.90	0.464	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-23
2011 Existing Conditions: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
		Into Control Area	Out from Control Area				
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	284	89	0.75	0.90	0.14	A
Two-Way Turnstiles West	6	431	51	0.75	0.90	0.21	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	60	963	0.80	0.90	0.28	A
Two-Way Turnstiles West	6	18	1,099	0.80	1.00	0.36	A

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

2019 FUTURE NO-ACTION CONDITION—SUBWAY STATION OPERATIONS

As detailed in Section E, "Traffic," the existing transit volumes were adjusted to reflect an 85th percentile attendance at a Citi Field event. Using trip generation assumptions presented in the *Shea Stadium Redevelopment FEIS* (December 2001), a subway modal split of 31 percent and a peak period temporal distribution of 62 percent was used, resulting in an additional 1,539 subway trips being added to the subway network during the peak period. This corresponds to approximately 428 subway trips exiting the Mets-Willets Point subway station and entering Citi Field during the peak 15-minute period. Consistent with the *Willets Point FGEIS* (2008), it was assumed that 95 percent of the additional subway trips entering/exiting the station would be originating/ending in Manhattan, Brooklyn, or other areas in Queens, and the remaining 5 percent would be originating/ending in Flushing.

Estimates of peak period subway volumes in the 2019 No-Action condition were developed by applying the *CEQR Technical Manual* recommended annual background growth rates to the adjusted 85th percentile volumes. An annual compounded background growth rate of 0.5 percent was applied to the transit volumes from 2011 to 2016, and an annual compounded background growth rate of 0.25 percent was applied to the transit volumes from 2016 to 2019. In addition, trips associated with the *Willets Point Development Plan SEIS* Phase 1A No Action project were incorporated into the No-Action condition transit volumes.

The No-Action condition peak period volume projections were allocated to the transit analysis elements described above.

As shown in **Tables 10-24** and **Table 10-25**, all station stairways, passageways, and control area elements would continue to operate at acceptable levels during the weekday PM peak period departure.

Table 10-24
2019 Future No-Action Condition: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes		Surging Factor	Friction Factor	V/C Ratio	LOS
			Up	Down				
Manhattan Platform								
West Ramp Passageway	17.6	15.6	524	65	0.75	0.90	0.193	A
East Ramp Passageway	19.6	17.6	346	108	0.75	0.90	0.137	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	13	685	0.75	1.00	0.719	C
West Stair (P-10)	9.6	8.3	7	750	0.75	1.00	0.806	C
East Stair (P-4)	9.9	8.7	18	555	0.75	1.00	0.583	B
East Stair (P-2)	10.1	8.8	32	590	0.75	0.90	0.687	B
Stair to/from Southern Platform (P-6)	5.8	4.8	18	107	0.75	0.90	0.246	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,525	2,025	0.80	0.90	0.480	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-25
2019 Future No-Action Condition: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes: Into Control Area	15-Minute Pedestrian Volumes: Out from Control Area	Surging Factor	Friction Factor	V/C Ratio	LOS
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	346	108	0.75	0.90	0.17	A
Two-Way Turnstiles West	6	524	65	0.75	0.90	0.26	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	68	1,252	0.80	0.90	0.36	A
Two-Way Turnstiles West	6	20	1,434	0.80	1.00	0.47	B

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

2019 FUTURE WITH ACTION CONDITION—SUBWAY STATION OPERATIONS

The 1,540 PM peak period departure project-generated subway trips (see **Table 10-4**) were allocated to the transit analysis elements previously described. These trips were added to the projected 2019 No Action volumes to generate the 2019 With Action volumes for analysis.

As shown in **Tables 10-26** and **Table 10-27**, all station stairways, passageways, and control area elements would continue to operate at acceptable levels during the weekday PM peak period departure. Therefore, the proposed project would not result in any significant adverse subway impacts.

Table 10-26
2019 Future With Action Condition: Subway Stairway and Passageway Analysis

Stairway/ Passageway	Width (ft.)	Effective Width (ft.)	15-Minute Pedestrian Volumes Up	Down	Surging Factor	Friction Factor	V/C Ratio	LOS
Manhattan Platform								
West Ramp Passageway	17.6	15.6	755	65	0.75	0.90	0.266	A
East Ramp Passageway	19.6	17.6	500	108	0.75	0.90	0.181	A
Flushing Platform								
West Stair (P-12)	9.8	8.6	19	685	0.75	1.00	0.724	C
West Stair (P-10)	9.6	8.3	10	750	0.75	1.00	0.808	C
East Stair (P-4)	9.9	8.7	27	555	0.75	1.00	0.590	B
East Stair (P-2)	10.1	8.8	48	590	0.75	0.90	0.700	B
Stair to/from Southern Platform (P-6)	5.8	4.8	27	107	0.75	0.90	0.260	A
Station Stairway								
Station to Passerelle Passageway	44.0	41.8	1,953	2,025	0.80	0.90	0.530	B

Notes:
Capacities were calculated based on rates presented in the *CEQR Technical Manual* (January 2012 edition).
Surging factors are only applied to the exiting pedestrian volume (*CEQR Technical Manual*).
V/C Stairway = [Vin / (150 * We * Sf * Ff)]+ [Vx/ (150 * We * Sf * Ff)]
V/C Passageway = [Vin / (225 * We * Sf * Ff)]+ [Vx/ (225 * We * Sf * Ff)]
Where
Vin = Peak 15-minute entering passenger volume
Vx = Peak 15-minute exiting passenger volume
We = Effective width of stairs/passageways
Sf = Surging factor (if applicable)
Ff = Friction factor (if applicable)

Table 10-27
2019 Future With Action Conditions: Subway Control Area Analysis

Station Elements	Qty.	15-Minute Pedestrian Volumes Into Control Area	Out from Control Area	Surging Factor	Friction Factor	V/C Ratio	LOS
Location 1. Manhattan Platform							
Two-Way Turnstiles East	7	500	108	0.75	0.90	0.22	A
Two-Way Turnstiles West	6	755	65	0.75	0.90	0.36	A
Location 2. Flushing Platform							
Two-Way Turnstiles East	8	102	1,252	0.80	0.90	0.37	A
Two-Way Turnstiles West	6	29	1,434	0.80	1.00	0.47	B

Notes: Capacities were calculated based on rates presented in the CEQR Technical Manual (January 2012 edition).
V/C =Vin / (Cin x Ff)+ Vx / (Cx x Sf x Ff)
Vin = Peak 15 Min Entering Passenger Volume
Cin= Total 15-Minute Capacity of all turnstiles for entering Passengers
Vx = Peak 15- Minute Exiting Passenger
Cx = Total 15-minute Capacity of all turnstile for exiting Passengers
Sf = Surging Factor
Ff = Friction Factor

G. VEHICULAR AND PEDESTRIAN SAFETY

Accident data for the study area intersections was obtained from the New York State Department of Transportation (NYSDOT) for the time period between January 1, 2009 and December 31, 2011. The data obtained quantify the total number of reportable accidents (involving fatality, injury, or more than $1,000 in property damage), fatalities, and injuries during the study period, as well as a yearly breakdown of pedestrian- and bicycle-related accidents at each location. According to the *CEQR Technical Manual*, a high pedestrian accident location is one where there were five or more pedestrian/bicyclist-related accidents or 48 or more reportable and non-reportable accidents in any consecutive 12 months of the most recent three-year period for which data are available. During the three-year period, a total of 221 reportable and non-reportable accidents were recorded along College Point Boulevard within the study area, an average of 74 accidents per year. Seventy-three accidents were recorded in 2009, 76 accidents in 2010 and 72 accidents in 2011. The eastbound and westbound intersections of Horace Harding Expressway at College Point Boulevard experienced a total of 101 accidents over the three-year period, or approximately 46-percent of the total 221 accidents. No fatalities were recorded; however, a total of 203 injuries including 10 pedestrian/bicyclist-related accidents were reported.

Based on a review of the accident data, the intersections within the study area are not identified as high-accident locations according to the *CEQR Technical Manual*. It should be noted the NYSDOT data did not distinguish between the eastbound and westbound Horace Harding Expressway; therefore, the two locations were conservatively analyzed as a single intersection. **Table 10-28** depicts total accident characteristics by intersection during the study period, as well as a breakdown of pedestrian and bicycle accidents by year and location.

Table 10-28
Accident Summary

Intersection		Study Period					Accidents by Year					
		All Accidents by Year					Pedestrian			Bicycle		
North-South Roadway	East-West Roadway	2009	2010	2011	Total Fatalities	Total Injuries	2009	2010	2011	2009	2010	2011
College Point Boulevard	Roosevelt Avenue	14	13	11	0	41	0	2	1	2	1	2
College Point Boulevard	Avery Avenue	3	0	5	0	11	0	0	0	0	0	0
College Point Boulevard	Fowler Avenue	2	3	4	0	10	0	0	0	0	0	0
College Point Boulevard	Booth Memorial Ave.	2	8	2	0	4	0	0	0	0	1	0
Lawrence Street	57th Avenue	1	0	0	0	0	0	0	0	0	0	0
College Point Boulevard	57th Road	8	17	13	0	40	0	0	0	0	0	0
College Point Boulevard	58th Avenue	3	1	1	0	4	0	0	0	0	0	0
College Point Boulevard	58th Road	4	2	2	0	4	0	0	0	0	0	0
College Point Boulevard	59th Avenue	0	0	0	0	0	0	0	0	0	0	0
College Point Boulevard	60th Avenue	1	0	0	0	1	0	0	0	0	1	0
College Point Boulevard	Horace Harding Expressway	35	32	34	0	88	0	0	0	0	0	0
TOTAL	--	73	76	72	0	203	0	2	1	2	3	2

Notes: NYSDOT does not distinguish between Horace Harding Expressway Eastbound and Westbound service roads
Source: NYSDOT

H. PARKING

Parking needs were evaluated for two conditions: (1) parking during the US Open under the Future With Action scenario and (2) parking needs on a daily basis outside the US Open period.

As previously discussed, there are approximately 2,798 permit spaces and 3,841 general parking spaces available for US Open staff, vendors, and patrons in Flushing Meadows Corona Park. Parking supply at the NTC would be increased by 389 spaces with the construction of parking structures on Lots A and B.

As indicated in **Table 10-4**, the proposed program would result in a daily increase of 1,288 autos during the daytime session of the US Open. It was estimated that 193 vehicles, or 15 percent, would be assigned to the permit parking Lot H. Approximately 580 vehicles, or 45 percent would be assigned to General Parking Lots #4, 5, 6, and 7, and the remaining 515 vehicles, or 40 percent would be assigned to General Parking Lots #1, 2, and 3.

Lot H has a capacity of 865 spaces and historically does not exceed 2/3 capacity, or 577 spaces occupied. Therefore, a minimum of 288 spaces are available to accommodate the estimated additional demand of 193 vehicles.

General Parking Lot #1 is generally not used for event parking and could accommodate 450 of the 515 vehicles assigned to General Parking Lots #1, 2, and 3. The remaining demand of 65 spaces can be accommodated among Lot #2 and Lot #3. Lot #2 has a capacity of 500 spaces, and Lot #3 has a capacity of 800 spaces. The additional 65 parking spaces would result in a 5 percent demand on the combined parking inventory.

General Parking Lots #6 and #7 are also infrequently used and have capacities of 250 and 404 spaces, respectively. Combined, the 654 parking spaces in these lots could accommodate the remaining 580 spaces. However, it should be noted that General Parking Lot #7 is immediately adjacent to the Flushing Meadows Corona Park Boathouse on Meadow Lake. Recent renovations to the Boathouse have increased activity and programming on Meadow Lake and subsequently increased the usage of the parking lot. Therefore, additional coordination and advance planning will be required should the parking lot be designated for US Open use in the future.

Based on a review of historical data, interviews with the NYPD staff managing the parking lots and informal parking lot counts, the USTA parking facilities rarely exceed 85 percent capacity during the US Open. Additionally, it is important to note the availability of an estimated 300 to 400 partially paved parking spaces under the Van Wyck Expressway adjacent to Lot #4 and Lot #6. An estimated 50 to 60 spaces are also available parallel to Meadow Drive between parking Lot #4 and Lot #5. Overall, there is sufficient parking inventory available to accommodate the estimated increase in demand.

During non-event conditions, parking Lots A and B are designated to serve the every day needs of the NTC, including administrative, facility and park users, as well as visitors. Lot A has a capacity of 200 spaces, and Lot B has a capacity of 104 spaces. Both surface lots are currently often over capacity with double parking. In addition, overflow parking occurs along the park roadways, and on the grass areas under and adjacent to the Passerelle ramp.

During event conditions, the US Open parking Lots A and B are designated for suite holders, sponsors and executive staff. Parking Lot A also serves as a pickup and drop-off location for participants during the US Open. Under the proposed project, new parking garages would be constructed expanding the capacity of Lots A and B by approximately 223 spaces and 166 spaces, respectively. The proposed Lot A would consist of a 2-story garage accommodating 423 vehicles with approximately 6,500 square feet designated for a traffic management center. The center would be used primary by NYPD staff and TEAs and would be most active in the weeks leading up to and including the US Open. Currently, the NYPD operate out of a temporary trailer and guard house located across from Lot A. The proposed Lot B would serve as a 3-story garage accommodating 270 vehicles.

The proposed construction of two new parking garages in place of the currently surface lots will provide for additional parking spaces to satisfy the existing and future daily demand experienced for year-round operations at the NTC. ✷

Chapter 11: Air Quality

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heat and hot water systems, or emissions from parking garage ventilation systems. Indirect impacts are caused by emissions from nearby existing stationary sources (impacts on the proposed project) or by emissions from on-road vehicle trips generated by a project or other changes to future traffic conditions due to a project.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." The potential for air quality impacts from the proposed improvements and expansion to the NTC, located in Flushing Meadows Corona Park in Queens, is examined in this chapter.

The maximum hourly incremental traffic from the proposed project would exceed the *CEQR Technical Manual* carbon monoxide screening threshold of 170 peak hour trips at nearby intersections in the study area. In addition, the particulate matter emission screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual* would be exceeded. Therefore, the potential for mobile source impacts from the proposed project was analyzed.

The proposed project would include construction of two new stadiums to replace the existing Louis Armstrong Stadium (Stadium 2) in the same location, and Grandstand Stadium (Stadium 3), in a new location at the southwest corner of the NTC site. The proposed project would include natural gas fired heating, ventilation and air conditioning (HVAC) systems. Therefore, a stationary source analysis was conducted to evaluate potential future pollutant concentrations from these systems.

The proposed project would include the construction of two accessory parking garages for staff and event-related uses. Therefore, an analysis was conducted to evaluate potential future pollutant concentrations in the vicinity of the proposed accessory parking garages.

PRINCIPAL CONCLUSIONS

As discussed below, the maximum predicted pollutant concentrations and concentration increments from mobile sources with the proposed project would be below the corresponding guidance thresholds and ambient air quality standards. The project's accessory parking facilities would also not result in any significant adverse air quality impacts. Thus, the proposed project would not have significant adverse impacts from mobile source emissions.

Based on a stationary source screening analysis, there would be no potential significant adverse air quality impacts from pollutant emissions associated with the proposed project's heat and hot water systems.

B. POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of carbon monoxide (CO) are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide, NO, and nitrogen dioxide, NO_2, collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

The proposed project would result in changes in traffic patterns and an increase in traffic volume in the study area. Therefore, a mobile source analysis was conducted at critical intersections in the study area to evaluate future CO concentrations in the No-Action and With Action conditions. A parking garage analysis was also conducted to evaluate future CO concentrations with the operation of the proposed parking garages.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone during the two-week US Open. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions; the change in regional mobile source emissions of these pollutants would be related to the total vehicle miles traveled added or subtracted on various roadway types throughout the New York metropolitan area, which is designated as a moderate non-attainment area for ozone by the United States Environmental Protection Agency (EPA).

The proposed project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional NO_x emissions or on ozone levels is predicted. An analysis of project-related emissions of these pollutants from mobile sources was therefore not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary point sources, and not a local concern from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may become of greater concern for this pollutant.

Potential impacts on local NO_2 concentrations from the fuel combustion for the proposed project's HVAC systems were evaluated.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Effective January 1, 1996, the Clean Air Act (CAA) banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding a 25-year effort to phase out lead in gasoline. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the 3-month average national standard of 0.15 micrograms per cubic meter ($\mu g/m^3$).

No significant sources of lead are associated with the proposed project and, therefore, analysis was not warranted.

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

Diesel-powered vehicles, especially heavy duty trucks and buses, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy diesel powered vehicles.

An analysis was conducted to assess the worst case PM impacts due to the increased traffic associated with the proposed project.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). Monitored SO_2 concentrations in New York City are lower than the current national standards. Due to the federal restrictions on the sulfur content in diesel fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore, an analysis of SO_2 from mobile sources was not warranted.

As part of the proposed project, natural gas would be burned in the proposed HVAC systems. The sulfur content of natural gas is negligible; therefore, no SO_2 analysis was performed for these systems. However, a central power generation plant utilizing diesel fuel-fired reciprocating engines could be utilized; therefore, potential SO_2 impacts were analyzed for this source.

C. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards are the same for NO_2 (annual), ozone, lead, and PM, and there is no secondary standard for CO and the 1-hour NO_2 standard. The NAAQS are presented in **Table 11-1**. The NAAQS for CO, annual NO_2, and SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only

EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 and retaining the level of the annual standard at 15 µg/m^3. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked. EPA also proposed lowering the primary annual-average standard to within the range 12-13 µg/m^3. A final decision on this standard is expected by December 14, 2012.

EPA has also revised the 8-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective as of May 2008. On January 6, 2010, EPA proposed a change in the 2008 ozone NAAQS, lowering the primary NAAQS from the current 0.075 ppm level to within the range of 0.060 to 0.070 ppm.

Table 11-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
8-Hour Average [1]	9	10,000	None	
1-Hour Average [1]	35	40,000		
Lead				
Rolling 3-Month Average [2]	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average [3]	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average [4,5]	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average [1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean [6]	NA	15	NA	15
24-Hour Average [7]	NA	35	NA	35
Sulfur Dioxide (SO_2) [8]				
1-Hour Average[9]	0.075	196	NA	NA
Maximum 3-Hour Average [1]	NA	NA	0.50	1,300

Notes:

ppm – parts per million
µg/m³ – micrograms per cubic meter
NA – not applicable

All annual periods refer to calendar year.

PM concentrations (including lead) are in µg/m³ since ppm is a measure for gas concentrations. Concentrations of all gaseous pollutants are defined in ppm and approximately equivalent concentrations in µg/m³ are presented.

(1) Not to be exceeded more than once a year.
(2) EPA has lowered the NAAQS down from 1.5 µg/m³, effective January 12, 2009.
(3) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(5) EPA has proposed lowering this standard further to within the range 0.060-0.070 ppm, and adding a secondary standard measured as a cumulative concentration within the range of 7 to 15 ppm-hours aimed mainly at protecting sensitive vegetation. A final decision on this standard has been postponed but is expected to occur in 2013.
(6) EPA has proposed lowering the primary standard to within the range 12-13 µg/m³. A final decision on this standard is expected by December 14, 2012.
(7) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(8) EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
(9) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration. Effective August 23, 2010.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

EPA lowered the primary and secondary standards for lead to 0.15 μg/m^3, effective January 12, 2009. EPA revised the averaging time to a rolling 3-month average and the form of the standard to not-to-exceed across a 3-year span.

EPA established a new 1-hour average NO_2 standard of 0.100 ppm, effective April 12, 2010, in addition to the annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

EPA established a new 1-hour average SO_2 standard of 0.075 ppm, replacing the 24-hour and annual primary standards, effective August 23, 2010. The statistical form is the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations (the 4th highest daily maximum corresponds approximately to 99th percentile for a year.)

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the Clean Air Act, followed by a plan for maintaining attainment status once the area is in attainment.

In 2002, EPA re-designated New York City as in attainment for CO. Under the resulting maintenance plan, New York City is committed to implementing site-specific control measures throughout the City to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period.

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA took final action designating the five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties as a $PM_{2.5}$ non-attainment area under the Clean Air Act due to exceedance of the annual average standard. Based on recent monitoring data (2006-2009), annual average concentrations of $PM_{2.5}$ in New York City no longer exceed the annual standard. EPA has determined that the area has attained the 1997 annual $PM_{2.5}$ NAAQS, effective December 15, 2010.

As described above, EPA has revised the 24-hour average $PM_{2.5}$ standard. In October 2009, EPA finalized the designation of the New York City Metropolitan Area as non-attainment with the 2006 24-hour $PM_{2.5}$ NAAQS, effective in November 2009. The non-attainment area includes the same 10-county area originally designated as non-attainment with the 1997 annual $PM_{2.5}$ NAAQS. Based on recent monitoring data (2007-2009), 24-hour average concentrations of $PM_{2.5}$ in this area no longer exceed the standard. New York has submitted a “Clean Data” request to the EPA. Any requirement to submit a SIP is stayed until EPA acts on New York’s request.

New York City, Nassau, Rockland, Suffolk, Westchester, and Lower Orange County Metropolitan Area (LOCMA) counties had been designated as a severe non-attainment area for ozone (1-hour average standard, 0.12 ppm). On June 18, 2012, EPA determined that the New York–New Jersey–Long Island NAA has attained the standard. Although not yet a redesignation to attainment status, this determination removes further requirements under the 1-hour standard.

Effective June 15, 2004, EPA designated these same counties as moderate non-attainment for the 1997 8-hour average ozone standard (LOCMA was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). On February 8, 2008, the New York State Department of Environmental Conservation (NYSDEC) submitted final revisions to the SIP to EPA to address the 1997 8-hour ozone standard. On June 18, 2012, EPA determined that the New York–New Jersey–Long Island NAA has attained the 1997 8-hour ozone NAAQS (0.08 ppm). Although not yet a redesignation to attainment status, this determination removes further requirements under the 8-hour standard.

In March 2008, EPA strengthened the 8–hour ozone standards. EPA designated the counties of Suffolk, Nassau, Bronx, Kings, New York, Queens, Richmond, Rockland, and Westchester (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT NAA) as a marginal non-attainment area for the 2008 ozone NAAQS, effective July 20, 2012. SIPs are due in 2015.

New York City is currently in attainment of the annual-average NO_2 standard. EPA has designated the entire state of New York as "unclassifiable/attainment" for the new 1-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available (2016 or 2017).

EPA has established a new 1-hour SO_2 standard, replacing the 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. Additional monitoring will be required. EPA plans to make final attainment designations in 2013. SIPs for non-attainment areas will be due in 2015.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large, or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[1] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 11-1**) would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the impact of proposed projects or actions on mobile sources, as set forth in the *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No-Action

[1] *CEQR Technical Manual*, Chapter 17, section 410, Jan 2012 (Rev. 6/18/12); and State Environmental Quality Review Regulations, 6 NYCRR § 617.7

condition 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No-Action) concentrations and the 8-hour standard, when No-Action conditions concentrations are below 8.0 ppm.

$PM_{2.5}$ INTERIM GUIDANCE CRITERIA

NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts[1]. This policy would apply only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

In addition, New York City uses interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts for projects subject to CEQR. The interim guidance criteria currently employed for determination of potential significant adverse $PM_{2.5}$ impacts under CEQR are as follows:

- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 5 $\mu g/m^3$ at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 2 $\mu g/m^3$ but no greater than 5 $\mu g/m^3$ would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the interim guidance criteria above will be considered to have a potential significant adverse impact.

The proposed project's stationary source annual emissions of PM_{10} are anticipated to be well below the 15-ton-per-year threshold under NYSDEC's $PM_{2.5}$ policy guidance. The above CEQR interim guidance criteria have been used to evaluate the significance of predicted $PM_{2.5}$ impacts of the proposed project associated with mobile source emissions.

[1] CP33/Assessing and Mitigating Impacts of Fine Particulate Emissions, NYSDEC 12/29/2003.

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

MOBILE SOURCES

The prediction of vehicle-generated emissions and their dispersion in an urban environment incorporates meteorological phenomena, traffic conditions, and physical configuration. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and physical configuration combine to affect pollutant concentrations. The mathematical expressions and formulations contained in the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions, and since it is necessary to predict the reasonable worst-case condition, most dispersion analyses predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The mobile source analyses for the proposed project employ a model approved by EPA that has been widely used for evaluating air quality impacts of projects in New York City, other parts of New York State, and throughout the country. The modeling approach includes a series of conservative assumptions relating to meteorology, traffic, and background concentration levels resulting in a conservatively high estimate of expected pollutant concentrations that could ensue from the proposed project. The assumptions used in the PM analysis were based on the City's $PM_{2.5}$ interim guidance criteria.

VEHICLE EMISSIONS

Engine Emissions

Vehicular CO and PM engine emission factors were computed using the EPA mobile source emissions model, MOBILE6.2[1]. This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOBILE6.2 incorporate the most current guidance available from NYSDEC and the New York City Department of Environmental Protection (DEP).

Vehicle classification data were based on field studies and data obtained from other traffic studies. Appropriate credits were used to accurately reflect the inspection and maintenance program. The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from each vehicle exhaust system are lower than emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

[1] EPA, User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model, EPA420-R-03-010, August 2003.

All taxis were assumed to be in hot stabilized mode (i.e., excluding any start emissions). The general categories of vehicle types for specific roadways were further categorized into subcategories based on their relative breakdown within the fleet.[1]

An ambient temperature of 43.0° Fahrenheit was used, as referenced in the *CEQR Technical Manual*.

Road Dust

The contribution of re-entrained road dust to PM_{10} concentrations, as presented in the PM_{10} SIP, is considered to be significant; therefore, the PM_{10} estimates include both exhaust and road dust. In accordance with the $PM_{2.5}$ interim guidance criteria methodology, $PM_{2.5}$ emission rates were determined with fugitive road dust to account for their impacts in local microscale analyses. However, fugitive road dust was not included in the neighborhood scale $PM_{2.5}$ microscale analyses, since DEP considers it to have an insignificant contribution on that scale. Road dust emission factors were calculated according to the latest procedure delineated by EPA[2] and the *CEQR Technical Manual*.

TRAFFIC DATA

Traffic data for the air quality analysis were derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the traffic analysis for the proposed project (see Chapter 10, "Transportation"). Traffic data for the future No-Action and With Action conditions was employed in the respective air quality modeling scenarios. The weekday evening (6 to 7 PM) peak period was analyzed. This time period was selected for the mobile source analysis because it would produce the maximum anticipated project-generated traffic and therefore have the greatest potential for significant air quality impacts. The scenario would represent the conflict date scenario that includes the New York Mets home game situation.

For particulate matter, the peak evening period traffic volumes were used as a baseline for determining off-peak volumes. Off-peak traffic volumes in the existing condition, future No-Action condition, and off-peak increments from the proposed project, were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations. For annual impacts, average weekday and weekend 24-hour distributions were used to more accurately simulate traffic patterns over longer periods.

DISPERSION MODEL FOR MICROSCALE ANALYSES

Maximum CO concentrations adjacent to streets within the surrounding area, resulting from vehicle emissions, were predicted using the CAL3QHC model Version 2.0.[3] The CAL3QHC model employs a Gaussian (normal distribution) dispersion assumption and includes an algorithm for estimating vehicular queue lengths at signalized intersections. CAL3QHC predicts

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[1] The MOBILE6.2 emissions model utilizes 28 vehicle categories by size and fuel. Traffic counts and predictions are based on broader size categories, and then broken down according to the fleet-wide distribution of subcategories and fuel types (diesel, gasoline, or alternative).

[2] EPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42, January 2011.

[3] EPA, User's Guide to CAL3QHC, A Modeling Methodology for Predicted Pollutant Concentrations Near Roadway Intersections, Office of Air Quality, Planning Standards, Research Triangle Park, North Carolina, EPA-454/R-92-006.

emissions and dispersion of CO from idling and moving vehicles. The queuing algorithm includes site-specific traffic parameters, such as signal timing and delay calculations (from the 2000 *Highway Capacity Manual* traffic forecasting model), saturation flow rate, vehicle arrival type, and signal actuation (i.e., pre-timed or actuated signal) characteristics to accurately predict the number of idling vehicles. The CAL3QHC model has been updated with an extended module, CAL3QHCR, which allows for the incorporation of hourly meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters. This refined version of the model, CAL3QHCR, is employed if maximum predicted future CO concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first level of CAL3QHC modeling.

To determine motor vehicle generated PM concentrations adjacent to streets within the traffic study area, the CAL3QHCR model was applied. This refined version of the model can utilize hourly traffic and meteorology data, and is therefore more appropriate for calculating 24-hour and annual average concentrations.

METEOROLOGY

In general, the transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind direction, wind speed, and atmospheric stability. Wind direction influences the direction in which pollutants are dispersed, and atmospheric stability accounts for the effects of vertical mixing in the atmosphere. These factors, therefore, influence the concentration at a particular prediction location (receptor).

Tier I Analyses—CAL3QHC

In applying the CAL3QHC model, the wind angle was varied to determine the wind direction resulting in the maximum concentrations at each receptor.

Following the EPA guidelines[1], CAL3QHC computations were performed using a wind speed of 1 meter per second, and the neutral stability class D. The 8-hour average CO concentrations were estimated by multiplying the predicted 1-hour average CO concentrations by a factor of 0.70 to account for persistence of meteorological conditions and fluctuations in traffic volumes. A surface roughness of 3.21 meters was chosen. At each receptor location, concentrations were calculated for all wind directions, and the highest predicted concentration was reported, regardless of frequency of occurrence. These assumptions ensured that worst-case meteorology was used to estimate impacts.

Tier II Analyses—CAL3QHCR

A Tier II analysis performed with the CAL3QHCR model includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period of 2007-2011. All hours were modeled, and the highest resulting concentration for each averaging period is presented.

[1] *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*, EPA Office of Air Quality Planning and Standards, Publication EPA-454/R-92-005.

ANALYSIS YEAR

The microscale analyses were performed for existing conditions and 2019, the year by which the proposed project is likely to be completed. The future analysis was performed both in No-Action and With Action conditions.

BACKGROUND CONCENTRATIONS

Background concentrations are those pollutant concentrations originating from distant sources that are not directly included in the modeling analysis, which directly accounts for vehicular emissions on the streets within 1,000 feet and in the line of sight of the analysis site. Background concentrations must be added to modeling results to obtain total pollutant concentrations at an analysis site.

The background concentrations for the area of the project are presented in **Table 11-2**. PM backgrounds are the highest measured concentrations from the latest available three years of monitored data (2009–2011), consistent with the NAAQS. All other pollutants are based on the latest available five years of monitored data (2007–2011). Consistent with the NAAQS for each pollutant, for averaging periods shorter than a year, the second highest value is used, aside from $PM_{2.5}$, which is the 98th percentile. These values were used as the background concentrations for the mobile source analysis.

Table 11-2
Maximum Background Pollutant Concentrations (µg/m^3)

Pollutant	Average Period	Location	Concentration	NAAQS
CO	1-hour	Queens College, Queens	3.4 ppm	35 ppm
	8-hour		2.0 ppm	9 ppm
PM_{10}	24-hour	Queens College, Queens	50	150
$PM_{2.5}$	24-hour	Queens College, Queens	26	35
	Annual		10	15

Sources: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2007–2011.
Notes: Consistent with the NAAQS, PM values are the highest of the latest available 3 years; all other pollutants are the highest of the latest 5 years. Consistent with the NAAQS for each pollutant, for averaging periods shorter than a year the second highest value is used, aside from $PM_{2.5}$ which is the 98th percentile.

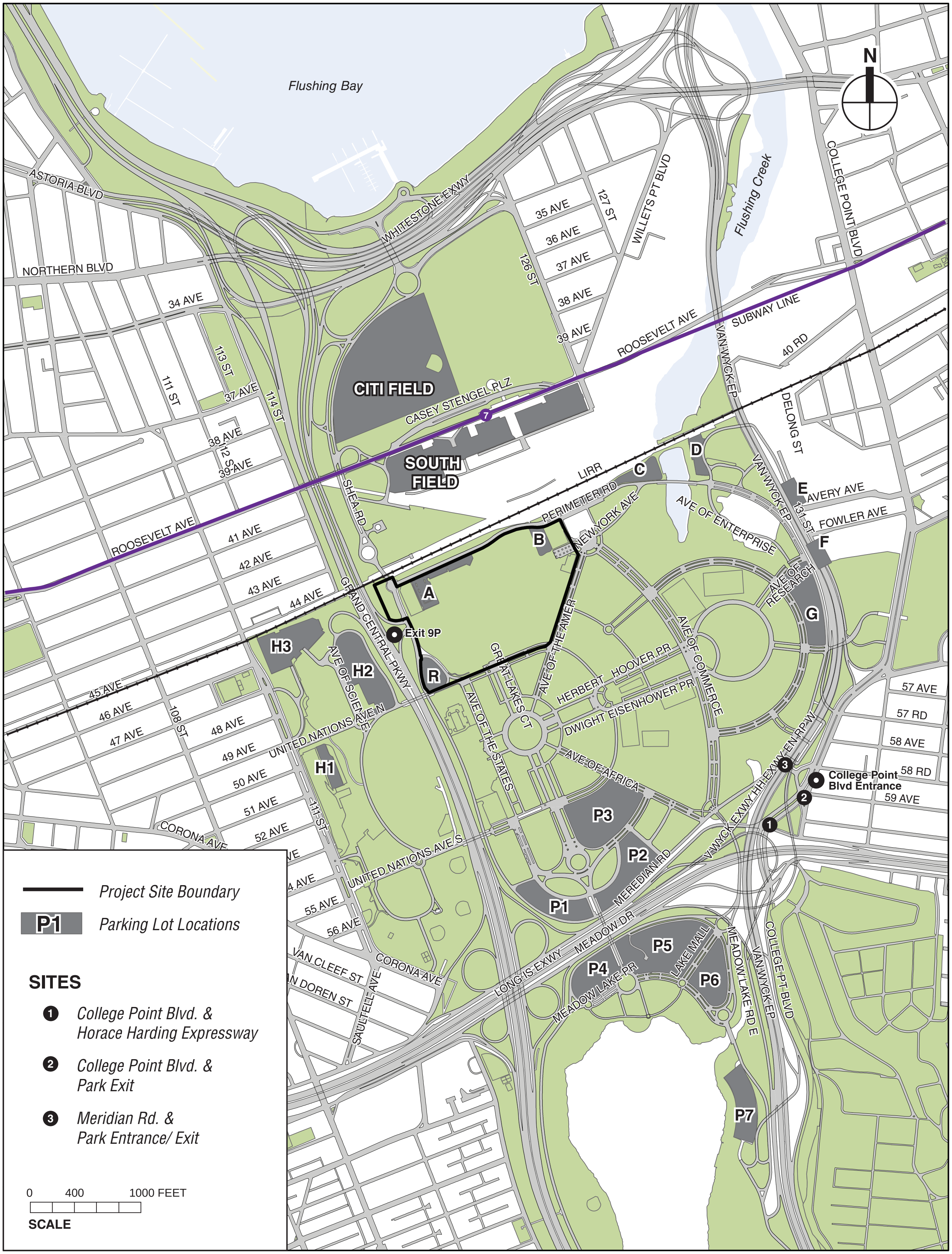
ANALYSIS SITES

A total of three analysis sites were selected for microscale analysis (see **Table 11-3 and Figure 11-1**). These sites were selected because they are the locations in the study area where the largest levels of project-generated traffic are expected, and, therefore, where the greatest air quality impacts and maximum changes in concentrations would be expected. Each of these intersections was analyzed for CO and PM.

Table 11-3
Mobile Source Analysis Sites

Analysis Site	Location
1	College Point Blvd. & Horace Harding Expy.
2	College Point Blvd & Park Exit
3	Park Entrance/Exit & Meridian Rd

12.14.12



Mobile Source Analysis Sites
Figure 11-1

RECEPTOR PLACEMENT

Multiple receptors (i.e., precise locations at which concentrations are predicted) were modeled at each of the selected sites; receptors were placed along the approach and departure links at spaced intervals. Ground level receptors were placed at sidewalk or roadside locations near intersections with continuous public access, at a pedestrian height of 1.8 meters. Receptors in the analysis models for predicting annual average neighborhood-scale $PM_{2.5}$ concentrations were placed at a distance of 15 meters, from the nearest moving lane at each analysis location, based on the DEP guidance for neighborhood-scale corridor $PM_{2.5}$ modeling.

PARKING FACILITIES

The proposed project would result in the construction of two new aboveground naturally ventilated parking garages that would accommodate 423 and 270 spaces. These garages would replace existing surface lots that currently are able to accommodate 200 and 104 spaces, respectively. Emissions from vehicles using the parking garages could potentially affect ambient levels of CO in the project study area.

An analysis was performed using the methodology set forth in the *CEQR Technical Manual*, applying modeling techniques and calculating pollutant levels at various distances from the larger of the two parking garages, located on Lot A. Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA MOBILE6.2 mobile source emission model and an ambient temperature of 43.0°F, as referenced in the *CEQR Technical Manual*. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking garages. In addition, all departing vehicles were assumed to idle in the parking space for 1 minute before proceeding to the exit. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 1-hour and 8-hour averaging periods.

To determine pollutant levels from each level of the modeled parking facility, the analysis was based on a correction factor for an elevated point source using the methodology in EPA's *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO concentrations by determining the appropriate height correction factor for each level, based on the difference between pedestrian height and the respective parking level elevation. Total ambient levels at each receptor location are then calculated by adding together contributions from each level of the facility and ambient background levels.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility. Departing vehicles were assumed to be operating in a "cold-start" mode, emitting higher levels of CO than arriving "hot-stabilized" vehicles. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Traffic data for the parking garage analysis was derived from a parking lot utilization survey performed for one of the existing lots, during non-event conditions, which is when overall garage activity would be highest due to parking turn over from employee parking. Maximum parking garage impacts would be located more than 3,000 feet from the analyzed mobile source intersections. Additionally, maximum parking garage and mobile source impacts would occur in different seasons. Therefore, potential cumulative impacts from parking garages and on-street traffic would be negligible.

The emissions from the larger proposed parking garage was modeled to directly discharge to Meridian Road located to the north of the garage, and "near" and "far" receptors were placed along the sidewalks at a pedestrian height of 6 feet and at a distance 6 feet and 47 feet, respectively, from the parking garage. A persistence factor of 0.70, as referenced in the *CEQR Technical Manual*, was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

Background CO concentrations were added to the modeling results to obtain the total ambient levels.

STATIONARY SOURCES

EMERGENCY GENERATORS

Backup battery power packs or a low power emergency diesel-fueled generator would be installed at each of the two new stadiums to serve in the event of the loss of utility electrical power. In the case that diesel-fueled emergency generators are implemented, the generator units would be tested periodically for a short period to ensure their availability and reliability in the event of a sudden loss in utility electrical power. Additionally, testing would only be conducted during non-event conditions. The generator would not be utilized in a peak load shaving program, minimizing the use of this equipment during non-emergency periods. Emergency generators are exempt from NYSDEC air permitting requirements, but would require a permit or registration issued by DEP, depending on the generator capacity. The emergency generators would be installed and operated in accordance with DEP requirements, as well as other applicable codes and standards. Potential air quality impacts from the emergency generator would be insignificant, since it would be used only for testing purposes outside of an actual emergency use.

HEAT AND HOT WATER SYSTEMS ANALYSIS

Screening Analysis

A stationary source analysis was conducted to evaluate potential impacts from the proposed project’s heat and hot water systems. Since the proposed project would not result in any major stationary source emissions, a screening analysis was initially conducted; this procedure evaluates whether or not a refined analysis using dispersion modeling is necessary.

The proposed project would include natural gas fired heat and hot water. The methodology described in the *CEQR Technical Manual* was used for the analysis of the heating and hot water systems and considered impacts on sensitive uses (both existing residential development as well as other residential developments under construction). The *CEQR* methodology determines the threshold of development size below which the action would not have a significant adverse impact. The screening procedures utilize information regarding the type of fuel to be used, the maximum development size, and the boiler exhaust stack height to evaluate whether a significant adverse impact is likely. Based on the distance from the development to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size in the *CEQR Technical Manual*, there is the potential for significant air quality impacts, and a refined dispersion modeling analysis would be required. Otherwise, the source passes the screening analysis, and no further analysis is required.

The project site was evaluated and any nearby projected residential development of similar or greater height was analyzed as a potential receptor. The maximum development floor area of the proposed project’s building were used as input for the screening analysis, and that the stacks would be located three feet above roof height (as per the *CEQR Technical Manual*). If the source did not pass any of the screening analyses (oil or gas) using the *CEQR Technical Manual* procedures, a refined dispersion model would be applied.

Dispersion Modeling

Since the screening analysis of potential air quality impacts from the proposed project's stationary source emissions resulted in potential exceedance at the administrative and retail building, a refined dispersion modeling analysis was performed. This potential impact was re-evaluated using the EPA/AMS AERMOD dispersion model.[1] AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of terrain interactions.

The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. The analysis of potential impacts from exhaust stacks was performed assuming stack tip downwash where appropriate, urban dispersion and surface roughness length, with and without building downwash, and elimination of calms. Hourly meteorological data measured at the LaGuardia Airport station during the years 2007 through 2011 were employed in this analysis.

The AERMOD model also incorporates the algorithms from the PRIME model, which is designed to predict impacts in the "cavity region" (i.e., the area around a structure which, under certain conditions, may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). The Building Profile Input Program for the PRIME model (BPIPRM) was used to determine the projected building dimensions modeling with the building downwash algorithm enabled. The modeling of downwash from sources accounts for all obstructions within a radius equal to five obstruction heights of the stack.

Receptor Placement

Elevated receptors were placed along the top of the proposed Louis Armstrong Stadium at a height of 85 feet. Additionally, lower receptors were placed within the stadium seating area near the façade adjacent to the administrative/retail building.

Emission Estimates and Stack Parameters

In order to assess worst case concentrations, multiple stack locations were run at varying distances to the façade of the Louis Armstrong Stadium adjacent to the administrative and retail building. The stack locations run began at distances of 6 feet, 15 feet, and every 15 feet until a distance of 60 feet based on the minimum distance determined by the screening method mentioned above. **Table 11-4** presents the emission rates and stack parameters used in the modeling analysis.

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[1] EPA, *AERMOD: Description Of Model Formulation*, 454/R-03-004, September 2004; and EPA, *User's Guide for the AMS/EPA Regulatory Model AERMOD*, 454/B-03-001, September 2004 and Addendum December 2006.

Table 11-4
Adminstrtive and Retail Building HVAC Emission Rates and Stack Parameters

Parameter	Value
Stack Parameters	
Stack Height (ft)	28
Stack Diameter (ft) (1)	1.0
Exhaust Exit Velocity (ft/s) (1)	25.6
Exhaust Temperature (°F) (1)	300
Emission Rates (g/s)	
NO_x	0.025
$PM_{2.5}$	0.00187
SO_2	0.000147
CO	0.021

Notes:
1. The stack diameter, exhaust velocity, and exhaust temperature were based on NYCDEP Boiler Permit Database.

Sources: AP-42

NO_2 concentrations from the administrative/retail HVAC systems were estimated using NO_2 to NO_x ratio of 0.8 for the maximum 1-hour concentration. The 0.8 ratio used for the maximum 1-hour concentration is the recommended default ambient ratio per EPA's guidance memo providing additional clarification regarding application of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS.[1]

Background Concentrations

As with the mobile source analysis, the predicted impacts from stationary sources analyzed must be added to a background value that accounts for existing pollutant concentrations from sources that are not directly accounted for in the model to estimate the maximum expected pollutant concentration at a given location (receptor). All background concentrations used in the stationary source analysis are based on data collected at the DEC Queens College 2 monitoring station from 2007 to 2011. The annual NO_2 background is based on the maximum annual average value measured over the five years. The 1-hour CO, 8-hour CO, and 3-hour SO_2 background levels are based on maximum second-highest concentrations recorded over the five year period. The 24-hour average PM_{10} background concentration is based on the maximum second-highest 24-hour average concentration measured over the most recent 3-year period for which monitoring data are available (2009-2011). The 1-hour average SO_2 concentration is based on the 3-year average of the annual 99th percentile of the daily maximum 1-hour SO_2 concentrations, and the NO_2 1-hour average background concentrations is based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour NO_2 concentrations, consistent with the form of the NAAQS.

[1] EPA, Memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011.

Table 11-5
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1 hour	Queens College 2, Queens	126	188
	Annual		54.5	100
SO_2	1 hour	Queens College 2, Queens	78.6	196
PM_{10}	24 Hour	Queens College 2, Queens	50	150

Sources: 2007-2011 Annual New York State Air Quality Report Ambient Air Monitoring System, NYSDEC

CENTRAL CHILLER PLANT

To meet electrical power needs during peak demand conditions, the proposed project may include additional reciprocating engines that would serve a central chiller plant. Due to insufficient natural gas availability, it is assumed that the engines would use diesel fuel. The plant would have a maximum capacity of up to 8 megawatts and would be operated only during the US Open.

The plant would be located to north of the project site—north of Meridian Road, east of Arthur Ashe Stadium (Stadium 1), and west of Louis Armstrong Stadium (Stadium 2). This would be approximately 350 feet from areas that would be accessible to the public.

Federal regulations for generator engines[1] phase-in Tier 4 exhaust emission standards beginning in the 2011 model year and will be completed by the 2015 model year. The Tier 4 exhaust emission standards present significant reductions of NO_x and PM (CO emissions limits remain unchanged) compared to the Tier 2-3 stage. It was assumed that Tier 4 engines would be readily available and utilized in the operation of the central chiller plant by the 2019 Build Year.

The NO_2 and SO_2 1-hour analyses were evaluated using the EPA/AMS AERMOD dispersion model and background concentrations mentioned above.

Receptor Placement

A network of ground level discrete receptors (i.e., locations at which concentrations are calculated) were modeled along the public accessible walkways within the project site at a pedestrian height of 1.8 m.

Emission Estimates and Stack Parameters

Table 11-6 presents the emission rates and stack parameters used in the modeling analysis. Since use would be limited to operation during the US Open, engine generator emissions were modeled as occurring only during the months of August and September.

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[1] *Protection of Environment* 40 CFR 1039.101. July 2005.

Table 11-6
Central Chiller Plant Emission Rates and Stack Parameters

Parameter	Value
Stack Parameters	
Stack Height (ft)	20
Stack Diameter (ft) (1)	1.3
Exhaust Flowrate (cfm) (1)	70,400
Exhaust Temperature (°F) (1)	800
Emission Rates (g/s) (2)	
NO_x	1.489
$PM_{2.5}$	0.0667
SO_2	0.00755(3)
CO	7.778

Notes:
1. The stack diameter, exhaust velocity, and exhaust temperature were based on vender data for similar size systems.
2. The emission rates are based on emissions standards set out in the Standards of Performance for New Stationary Sources.
3. The SO_2 emission rate for fuel oil assumes the use of ultra low sulfur diesel with a maximum sulfur content of 15 parts per million.

Sources: 40 CFR §1039.101

Similar to the HVAC analysis described above, NO_2 concentrations from the proposed plant were estimated using NO_2 to NO_x ratio of 0.8 for the maximum 1-hour concentration. The 0.8 ratio used for the maximum 1-hour concentration is the recommended default ambient ratio per EPA's guidance memo providing additional clarification regarding application of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS.[1]

E. EXISTING CONDITIONS

The most recent concentrations of all criteria pollutants at NYSDEC air quality monitoring stations nearest to the proposed project are presented in **Table 11-7**. As shown, the recently monitored levels did not exceed the NAAQS. It should be noted that these values are somewhat different from the background concentrations used in the mobile source analyses. For most pollutants, the concentrations presented in **Table 11-7** are based on measurements obtained in 2011, the most recent year for which data are available; the background concentrations are obtained from several years of monitoring data and represent a conservative estimate of the highest background concentrations for future conditions.

MODELED CO CONCENTRATIONS FOR EXISTING TRAFFIC CONDITIONS

As noted previously, receptors were placed at multiple sidewalk locations next to the intersections selected for the analysis. **Table 11-8** shows the maximum modeled existing (2011) CO 8-hour average concentrations for each peak period analyzed. (No 1-hour values are shown since predicted values are much lower than the 1-hour standard of 35 ppm.) At all receptor sites, the maximum predicted 8-hour average concentrations are well below the national standard of 9 ppm.

[1] EPA, Memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011.

Table 11-7
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	Queens College 2, Queens	ppm	8-hour	1.8	9
			1-hour	2.1	35
SO_2	Queens College 2, Queens[1]	µg/m^3	3-hour	81.5	1,300
			1-hour	78.6	196
PM_{10}	Queens College 2, Queens	µg/m^3	24-hour	47	150
$PM_{2.5}$	Queens College 2, Queens[2]	µg/m^3	Annual	9.9	15
			24-hour	26	35
NO_2	Queens College 2, Queens[3]	µg/m^3	Annual	38.7	100
			1-hour	126	188
Lead	Morrisania, Bronx[4]	µg/m^3	3-month	0.008	0.15
Ozone	Queens College 2, Queens[5]	ppm	8-hour	0.075	0.075

Notes:
(1) The 1-hour value is based on a three-year average (2009-2011) of the 99th percentile of daily maximum 1-hour average concentrations. EPA replaced the 24-hr and the annual standards with the 1-hour standard.
(2) Annual value is based on a three-year average (2009-2011) of annual concentrations. The 24-hour value is based on the 3-year average of the 98th percentile of 24-hour average concentrations.
(3) The 1-hour value is based on a three-year average (2009-2011) of the 98th percentile of daily maximum 1-hour average concentrations.
(4) Based on the highest quarterly average concentration measured in 2011.
(5) Based on the 3-year average (2009-2011) of the 4th highest daily maximum 8-hour average concentrations.
Source: NYSDEC, New York State Ambient Air Quality Data.

Table 11-8
Modeled Existing 8-Hour Average CO Concentrations (2011)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	College Point Blvd. & Horace Harding Expy.	PM	4.7
2	College Point Blvd & Park Exit	PM	4.2
3	Park Entrance/Exit & Meridian Rd	PM	3.5

Notes:
8-hour standard (NAAQS) is 9 ppm.
Concentration includes a background concentration of 2.0 ppm.

F. THE FUTURE WITHOUT THE PROPOSED PROJECT

MOBILE SOURCES

ON-STREET SOURCES

CO concentrations in the No-Action condition were determined for future 2019 conditions using the methodology previously described. **Table 11-9** shows future maximum predicted 8-hour average CO concentrations, including background concentrations, at the analysis intersections in the No-Action condition. The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed.

Table 11-9
Maximum Predicted Future (2019) 8-Hour
Average Carbon Monoxide No-Action Concentrations

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	College Point Blvd. & Horace Harding Expy.	1	4.3
2	College Point Blvd & Park Exit	2	3.8
3	Park Entrance/Exit & Meridian Rd	3	3.3

Notes:
8-hour standard (NAAQS) is 9 ppm.
Concentration includes a background concentration of 2.0 ppm.

As shown in **Table 11-9**, 2019 No-Action values are predicted to be well below the 8-hour CO standard of 9 ppm, and lower than predicted existing average concentrations (shown in **Table 11-8**). The predicted decrease in CO concentrations would result from the increasing proportion of newer vehicles with more effective pollution controls as well as the continuing benefits of the New York State I&M Program.

PM_{10} concentrations for the No-Action condition were also determined using the methodology previously described. **Table 11-10** presents the future maximum predicted PM_{10} 24-hour concentrations, including background concentrations, at the analyzed intersections in 2019 No-Action condition. The values shown are the highest predicted concentrations for the receptor locations. Note that $PM_{2.5}$ concentrations for the No-Action condition are not presented, since impacts are assessed on an incremental basis.

Table 11-10
No-Action Condition Maximum Predicted 24-Hour Average
PM_{10} Concentrations (μg/m^3)

Receptor Site	Location	Concentration
1	College Point Blvd. & Horace Harding Expy.	83.82
2	College Point Blvd & Park Exit	70.32
3	Park Entrance/Exit & Meridian Rd	69.18

Notes:
NAAQS—24-hour average 150 μg/m^3.
Concentration includes a background concentration of 50 .0 μg/m^3.

STATIONARY SOURCES

In the future without the proposed project, HVAC emissions would similar to existing conditions.

G. THE FUTURE WITH THE PROPOSED PROJECT

MOBILE SOURCES

ON-STREET SOURCES

CO concentrations for future 2019 No-Action and With Action conditions were predicted using the methodology previously described. **Table 11-11** shows the future maximum predicted 8-hour average CO concentrations at the three intersections studied. (No 1-hour values are shown, since no exceedances of the NAAQS would occur and the *de minimis* criteria are only applicable to 8-hour concentrations; therefore, the 8-hour values are the most critical for impact assessment.) The values shown are the highest predicted concentrations. The results indicate that the proposed project would not result in any violations of the 8-hour CO standard. In addition, the incremental increases in 8-hour average CO concentrations are very small, and consequently would not result in a violation of the CEQR *de minimis* CO criteria. Therefore, the proposed project mobile source CO emissions would not result in a significant adverse impact on air quality.

Table 11-11
Maximum Predicted 2019
CO Concentrations

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)		De minimis
			No Action	With Action	
1	College Point Blvd. & Horace Harding Expy.	PM	4.3	4.5	6.7
2	College Point Blvd & Park Exit	PM	3.8	3.9	6.4
3	Park Entrance/Exit & Meridian Rd	PM	3.3	3.6	6.1

Notes:
8-hour standard is 9 ppm.
Concentration includes a background concentration of 2.0 ppm.

PM_{10} concentrations for the With Action condition were also determined using the methodology previously described. **Table 11-12** presents the future maximum predicted PM_{10} 24-hour concentrations, including background concentrations, at the analyzed intersections in 2019 With Action condition. The values shown are the highest predicted concentrations for the receptor locations.

Table 11-12
No-Action Condition Maximum Predicted 24-Hour Average
PM_{10} Concentrations (μg/m^3)

Receptor Site	Location	Concentration	
		No Action	With Action
1	College Point Blvd. & Horace Harding Expy.	83.82	84.61
2	College Point Blvd & Park Exit	70.32	71.41
3	Park Entrance/Exit & Meridian Rd	69.18	71.78

Notes:
NAAQS—24-hour average 150 μg/m^3.
Concentration includes a background concentration of 50.0 μg/m^3.

Using the methodology previously described, maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments were calculated so that they could be compared to the interim guidance criteria that would determine the potential significance of any impacts from the proposed project. Based on this analysis, the maximum predicted localized 24-hour average and neighborhood-scale annual average incremental $PM_{2.5}$ concentrations are presented in **Tables 11-13 and 11-14**, respectively. Note that $PM_{2.5}$ concentrations in the No-Action condition are not presented, since impacts are assessed on an incremental basis.

Table 11-13
2019 Maximum Predicted 24-Hour Average
$PM_{2.5}$ Concentration

Location	Increment (µg/m^3)
College Point Blvd. & Horace Harding Expy.	0.32
College Point Blvd & Park Exit	0.46
Park Entrance/Exit & Meridian Rd	0.66

Note: $PM_{2.5}$ interim guidance criteria—24-hour average, 2 µg/m^3 (5 µg/m^3 not-to-exceed value).

Table 11-14
2019 Maximum Predicted Annual Average
$PM_{2.5}$ Concentration

Location	Increment (µg/m^3)
College Point Blvd. & Horace Harding Expy.	0.09
College Point Blvd & Park Exit	0.08
Park Entrance/Exit & Meridian Rd	0.06

Note: $PM_{2.5}$ interim guidance criteria—annual (neighborhood scale), 0.1 µg/m^3.

The results show that the annual and daily (24-hour) $PM_{2.5}$ increments are predicted to be below the interim guidance criteria. Therefore, there would be no potential for significant adverse impacts on air quality from vehicle trips generated by the proposed project.

PARKING FACILITIES

The CO levels from the proposed parking garages were predicted using the methodology set forth in the *CEQR Technical Manual*. The proposed parking garages would replace existing surface parking lots. A conservative, worst-case peak period was considered in the analysis of the 1-hour average CO concentrations. A persistence factor of 0.70, as referenced in the *CEQR Technical Manual*, was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period. Pollutant levels were predicted at a pedestrian height of 6 feet. Receptors (locations where CO levels were predicted) were modeled on Meridian Road locations near the proposed entrance of the larger garage.

The maximum predicted CO concentration, with ambient background, would be 3.7 ppm for the 1-hour period and 2.2 ppm for the 8-hour period. The maximum 1- and 8-hour contributions from the parking garage alone would be 0.3 ppm and 0.2 ppm, respectively. These maximum predicted CO levels are below the CO NAAQS and the City's CO *de minimis* criteria. As these results show, the proposed parking garages would not result in a significant adverse air quality impact.

STATIONARY SOURCES

HEAT AND HOT WATER SYSTEMS ANALYSIS

Screening Analysis

A screening analysis was performed to assess the potential for air quality impacts from the HVAC systems for the proposed Louis Armstrong Stadium (Stadium 2), Grandstand (Stadium 3) Stadium, and the administrative and retail building.

The analysis for the stadiums was based on the total proposed enclosed or conditioned floor areas of 80,000 and 31,000 gross square feet, respectively, with an exhaust height of approximately 88 and 58 feet, respectively (3 feet above the appropriate stadium building's rooftop). Based on this height, the nearest building of a similar or greater height was determined to be Arthur Ashe Stadium (Stadium 1) for each stadium. It was determined that there was a distance of 85 feet between the new Stadium 2 and Arthur Ashe Stadium, and a distance of 300 feet between the new Stadium 3 and Arthur Ashe Stadium; therefore, these distances were used for the analysis in accordance with the guidance provided in the *CEQR Technical Manual*.

The use of natural gas for the heat and hot water systems for each of the proposed stadiums would not result in a significant adverse impact on air quality because for both of the stadiums analyzed, the respective gross square footage would be below the maximum permitted size shown in Figure 17-8 in the Air Quality Appendix of the *CEQR Technical Manual*.

Dispersion Modeling

The initial screening analysis for the administrative/retail building which would be located adjacent to the proposed Lois Armstrong Stadium used a total proposed enclosed area of 80,000 gross square feet and an exhaust height of approximately 28 feet. Based on the guidance provided in the *CEQR Technical Manual* a minimum distance between the exhaust stack and the adjacent stadium was determined to be 62 feet. Therefore, an analysis was performed with multiple stack locations ranging from 6 feet to 60 feet using the AERMOD model to evaluate potential impacts of PM_{10}, 1-hour NO_2 and 1-hour SO_2. The maximum predicted concentrations for any distance analyzed were added to the maximum 1-hour, 24-hour, and annual ambient background concentration and compared to the NAAQS. The results of this analysis are presented in **Table 11-15**.

Table 11-15
Maximum Modeled NO_2, SO_2 and PM_{10} Concentrations from Proposed Administrative/Retail Building (in µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Modeled Setback (ft)	Background(1)	Total Concentration	NAAQS / Threshold
NO_2	1-hour	48.58 (2)	60	126	174.58	188
	Annual	0.1	60	54.5	54.6	100
SO_2	1-hour	0.51	60	78.6	79.11	196
PM_{10}	24-hour	2.07	45	50	52.07	150

Notes:
(1) Background concentrations for NO_2 1-hour and SO_2 1-hour, which are the maximum daily 98th percentile and 99th percentile, respectively, background concentrations, averaged over three years, in accordance with the form of the standards.
(2) Includes a 1-hour conversion ratio of NO_2 to NO_x of 80 percent.

As shown in **Table 11-15**, the predicted 1-hour NO_2, SO_2 and PM_{10} concentrations are less than their respective NAAQS. As shown in the table, the predicted pollutant concentrations for each of the pollutant time averaging periods shown are below their respective standards.

The air quality modeling analysis also determined the highest predicted increase in annual average $PM_{2.5}$ concentrations (see **Table 11-16**). As shown in Table 11-16, the maximum projected $PM_{2.5}$ increments from the proposed project would be less than the applicable interim guidance criterion of 0.3 µg/m^3 for local impacts and 0.1 for neighborhood scale impacts.

Table 11-16
Maximum Modeled $PM_{2.5}$ Concentrations from Proposed Administrative/Retail Building (in µg/m^3)

Averaging Period	Maximum Modeled Impact	Modeled Setback (ft)	NAAQS / Threshold
24-hour	2.07	45	5/2$^{(1)}$
Annual	0.01	60	0.3/0.1 $^{(2)}$

Notes:
(1) 24-hour $PM_{2.5}$ interim guidance criterion, > 2 µg/m^3 (5 µg/m^3 not to exceed value), depending on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations.
(2) Annual $PM_{2.5}$ interim guidance criterion, > 0.3 µg/m^3 at any discrete receptor location for localized impacts and >0.1 µg/m^3 averaged over a 1km by 1km ground level receptor grid for neighborhood-scale impacts.

The air quality modeling analysis also determined the highest predicted increase in 24-hour average $PM_{2.5}$ concentrations. The 24-hour average $PM_{2.5}$ concentration increments with the proposed project were compared to the 24-hour average interim guidance criterion of 2 µg/m^3 for discrete receptor locations (see Section C., *Air Quality Standards, Regulations Benchmarks* for a description of the City's $PM_{2.5}$ interim guidance criteria). The assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 µg/m^3 threshold averaged over a 24-hour period could occur.

Table 11-17 presents a summary of the frequency, magnitude and extent of predicted $PM_{2.5}$ concentration increments at receptor locations which exceed 2 µg/m^3 (there are no receptor locations where the maximum predicted incremental concentrations of $PM_{2.5}$ would exceed 5 µg/m^3). The results presented in **Table 11-17** represent the maximum incremental concentrations of $PM_{2.5}$ for a period of five years (2007 to 2011).

Table 11-17
Magnitude, Frequency and Extent of 24-hour $PM_{2.5}$ Impacts > 2 µg/m^3 From the Administrative/Retail Building's HVAC System

Year	Frequency	Extent of Impacted Receptors (Number of Receptors)	Max Conc. (µg/m^3)	2nd Max Conc. (µg/m^3)
2007	0	0	<2	<2
2008	0	0	<2	<2
2009	0	0	<2	<2
2010	1	2	**2.08**	2.04
2011	0	0	<2	<2

Notes:
(1) Maximum predicated 24-hour average concentration increment shown in bold. Represents the maximum predicted 24-hour concentration over a five year period (2007-2011).

At receptors where the maximum 24-hour average concentration were predicted to be greater than 2 µg/m^3, the maximum annual frequency of concentrations greater than 2 µg/m^3 was once per year, with the average frequency of once per year or less, over five years.

Overall, the magnitude, extent, and frequency of 24-hour average $PM_{2.5}$ concentrations above 2.0 µg/m^3 are low. Therefore, it would not result in a significant impact based on the City's interim guidance criteria. Overall, the proposed project's HVAC systems would not result in any significant adverse air quality impacts.

CENTRAL CHILLER PLANT ANALYSIS

An analysis was performed using the AERMOD model to evaluate potential impacts of PM2.5, 1-hour NO2 and 1-hour SO2 from operation of a conceptual central chiller plant for the proposed project. The maximum predicted concentrations from the modeling analysis were added to the maximum 1-hour, 24-hour, and annual ambient background concentration and compared to the NAAQS. The results of this analysis are presented in **Table 11-18**.

Table 11-18
Maximum Modeled Chiller Plant Pollutant Concentration (in µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Background(1)	Total Concentration	NAAQS / Threshold
NO_2	1-hour	43.59 (2)	126	169.59	188
	Annual	1.3	54.5	55.8	100
SO_2	1-hour	0.32	78.6	78.92	196
$PM_{2.5}$	24-hour	1.8	N/A	N/A	5/2(3)
	Annual	0.06	N/A	N/A	0.3/0.1 (4)
PM_{10}	24-hour	1.8	50	51.8	150

Notes:
(1) Background concentrations for NO_2 1-hour and SO_2 1-hour, which are the maximum daily 98th percentile and 99th percentile, respectively, background concentrations, averaged over three years, in accordance with the form of the standards.
(2) Includes a 1-hour conversion ratio of NO_2 to NOx of 80 percent.
(3) 24-hour $PM_{2.5}$ interim guidance criterion, > 2 µg/m^3 (5 µg/m^3 not to exceed value), depending on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations.
(4) Annual $PM_{2.5}$ interim guidance criterion, > 0.3 µg/m^3 at any discrete receptor location for localized impacts and >0.1 µg/m^3 averaged over a 1km by 1km ground level receptor grid for neighborhood-scale impacts.

As shown in **Table 11-18**, the predicted 1-hour NO_2 and SO_2 concentrations are less than their respective NAAQS, and the maximum incremental concentrations of $PM_{2.5}$ are below the City's interim guidance criteria. In addition, since the maximum annual average impact at a discrete receptor was predicted to be 0.06 µg/m^3, neighborhood-scale impacts would not exceed the City's interim guidance criterion of 0.1 µg/m^3. Based on the AERMOD analysis, there would be no potential significant adverse stationary source air quality impacts from the proposed project.

✷

A. INTRODUCTION

As discussed in the 2012 *City Environmental Quality Review (CEQR) Technical Manual*, increased concentrations of greenhouse gases (GHGs) in the atmosphere are changing the global climate, resulting in wide-ranging effects on the environment, including rising sea levels, increases in temperature, and changes in precipitation levels. Although this is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level. Through PlaNYC, the City has established sustainability initiatives and goals for greatly reducing GHG emissions and adapting to climate change in the City. The goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 was codified by Local Law 22 of 2008, known as the New York City Climate Protection Act (the "GHG reduction goal").[1] The *CEQR Technical Manual* recommends that a project resulting in 350,000 square feet of development or more and other energy-intense projects quantify project-related GHG emissions and assess the project's consistency with the citywide GHG reduction goal.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." As the proposed project would result in more than 350,000 square feet of development, the sources of GHG emissions and measures that would be implemented to limit those emissions are discussed in this chapter, along with an assessment of the proposed project's consistency with the citywide GHG reduction goal.

PRINCIPAL CONCLUSION

The proposed project's design includes many features aimed at reducing energy consumption and GHG emissions, and would be consistent with the City's citywide GHG reduction goal.

B. POLICY, REGULATIONS, STANDARDS, AND BENCHMARKS FOR REDUCING GHG EMISSIONS

Countries around the world have undertaken efforts to reduce emissions by implementing both global and local measures that address energy consumption and production, land use, and other sectors. In a step toward the development of national climate change regulation, the U.S. has committed to reducing emissions to 17 percent lower than 2005 levels by 2020 and to 83 percent lower than 2005 levels by 2050 (pending legislation) via the Copenhagen Accord.[2] Without legislation focused on this goal, the U.S. Environmental Protection Agency (USEPA) is required to

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[1] Administrative Code of the City of New York, §24-803.

[2] Todd Stern, U.S. Special Envoy for Climate Change, letter to Mr. Yvo de Boer, UNFCCC, January 28, 2010.

regulate GHGs under the Clean Air Act (CAA), and has already begun issuing regulations. The U.S. Department of Transportation (USDOT) and USEPA have established GHG emissions standards for vehicles that will reduce vehicular GHG emissions over time.

There are also regional, state, and local efforts to reduce GHG emissions. In 2009, Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York by 80 percent compared to 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining the policies required to attain the GHG reduction goal (that effort is currently under way[1]).

New York State also has regulations to cap and reduce carbon dioxide (CO_2) emissions from power plants, as part of the commitment to the Regional Greenhouse Gas Initiative (RGGI), a multistate agreement to reduce the amount of CO_2 from power plants.

Many local governments worldwide, including New York City, are participating in the Cities for Climate Protection campaign and have committed to adopting policies and implementing quantifiable measures to reduce local GHG emissions, improve air quality, and enhance urban livability and sustainability. New York City's long-term sustainability program, PlaNYC 2030, includes GHG emissions reduction goals and identifies specific initiatives that can result in emission reductions and initiatives targeted at adaptation to climate change impacts. As mentioned, the PlaNYC 2030 goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 was codified by Local Law 22 of 2008. Projects that require a GHG assessment under CEQR are evaluated with this goal as the benchmark.

A number of benchmarks for energy efficiency and green building design have also been developed. For example, the LEED system is a benchmark for the design, construction, and operation of high performance green buildings that includes energy efficiency components.

USEPA's *Energy Star* is a voluntary labeling program designed to identify and promote the construction of new energy efficient buildings, facilities, and homes, and the purchase of energy efficient appliances, heating and cooling systems, office equipment, lighting, home electronics, and building envelopes.

C. SOURCES OF GHG EMISSIONS

The GHGs identified for analysis in the *CEQR Technical Manual* include the six internationally-recognized GHGs regulated under the Kyoto Protocol (an international agreement adopted in 1997 that is linked to the United Nations Framework Convention on Climate Change). CO_2 is the primary pollutant of concern from anthropogenic emission sources. CO_2 is emitted as a product of combustion, from some industrial processes such as the manufacture of cement, mineral production, metal production, and the use of petroleum-based products, from volcanic eruptions, and from the decay of organic matter. CO_2 is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake[2] by the oceans. CO_2 is considered in any assessment of GHG emissions from development projects. Other GHG emissions are included where practicable or in cases where they comprise a substantial portion of overall emissions.

[1] http://www.nyclimatechange.us/

[2] Biological and chemical processes by which CO_2 is removed from the atmosphere and stored in the oceans.

The proposed project would incorporate sustainability measures aimed at reducing energy consumption for both the US Open period and the non-event season. During US Open events, which take place over a two-week period in the summer and have been ongoing for years, GHG emissions would be generated as a result of electricity use onsite. Electricity would be used for lighting, displays and communication, and air conditioning of enclosed administrative and retail spaces. For the remainder of the year, peak energy use would be substantially less. As discussed in the following section, measures to minimize energy use and GHG emissions would be implemented as part of the proposed project. In the future With Action condition, the proposed increase in attendance of 10,000 persons for the daytime session would result in a projected peak period increase of approximately 954 vehicle trips (see Chapter 10, “Transportation”). The proposed project is accessible by public transportation, which the majority of the US Open patrons use. As described below, efforts will be made to further improve options for sustainable transportation to and from the proposed site. To minimize emissions from solid waste generated during events, an enhanced waste management and recycling plan would be implemented. Construction of the proposed project would generate GHG emissions—both direct emissions from construction equipment and delivery trucks and emissions embedded in the production and transport of materials used in construction, notably steel, rebar, aluminum, and cement. The majority of emissions from the proposed project would be associated with its construction rather than the two weeks per year the US Open operates. Therefore, many of the emission reduction measures that would be implemented as part of the proposed project would focus on construction activities.

D. STRATEGIES THAT WOULD REDUCE GHG EMISSIONS

The assessment of consistency with the GHG reduction goal, as defined in the *CEQR Technical Manual*, requires examination of how a project would reduce its carbon intensity, considering five goals: building efficient buildings, using clean power, creating transit-oriented development and sustainable transportation, reducing construction activity emissions, and using building materials with low carbon intensity. As discussed, the proposed project would incorporate measures to minimize GHG emissions. Specific measures that would be implemented and additional measures under consideration are described below.

BUILD EFFICIENT BUILDINGS

The following measures would be incorporated into project design:

- Reduce energy demand using peak shaving or load shifting strategies during the US Open.
- Efficient gas fired or generator powered electric air conditioning equipment could be used for the stadiums and retail building to reduce peak load and minimize impact on the electric grid during the US Open event.
- During the non-US Open event season, electric-powered HVAC and food service equipment would be replaced with natural gas.
- Efficient lighting will be used and event lighting would be focused with visors to eliminate spillage.
- During the non-US Open event season, reduced intensity lighting would be used for field courts.
- As with the existing facility, storage and collection of recyclables including paper, corrugated cardboard, glass, plastic, and metals would be provided.

- The project design would facilitate walking, including the provision of new walkways, public spaces, and other circulation improvements within the site. USTA is considering the inclusion of additional bike racks.

Additional measures that are under consideration include:

- Designing energy efficient building envelopes to reduce cooling/heating requirement;
- Potential LEED certification for buildings;
- Installation of high-efficiency HVAC systems and generators that are economical;
- Use of *Energy Star* appliances;
- Use of water conserving fixtures that exceed building code requirements;
- Low impact development for stormwater design;
- Water efficient landscaping;
- Using high-albedo roofing materials;
- Maximizing interior daylighting in the retail spaces;
- Window glazing to optimize daylighting, heat loss, and solar heat gain;
- Providing construction and design guidelines to facilitate sustainable design for build-out for vendor sponsored areas;
- Motion sensors and lighting and climate control; and
- Third party building commissioning to ensure energy performance.

USE CLEAN POWER

The use of clean power or generation of renewable or low power on-site is under consideration for the proposed building that would seek LEED certification, subject to site design and economic feasibility.

TRANSIT-ORIENTED DEVELOPMENT AND SUSTAINABLE TRANSPORTATION

The proposed project strongly supports the City’s transit-oriented development and sustainable transportation objective. Access to the site is available via the 7 subway line and Long Island Rail Road (LIRR). In addition, on-site parking for alternative vehicles and electric vehicle charging stations would support the greening of New York’s vehicle fleet.

The following measures would be included in project design:

- A new east-west pedestrian walkway within the NTC and other pedestrian improvements implemented to support non-motorized transportation to and through the site;
- USTA is considering the inclusion of additional bike racks;
- A parking management program to minimize parking requirements, continuing the existing parking management program;
- Designated on-site parking for alternative vehicles in Parking Garage A;
- A charging station for electric vehicles in Parking Garage A; and
- USTA encouraging the use of public transit for US Open patrons, including in communications efforts.

REDUCE CONSTRUCTION EMISSIONS

A diesel emissions reduction program would be implemented during construction of the proposed project, including diesel particle filters for large construction engines and other measures (see Chapter 16, “Construction Impacts”). These measures would reduce particulate matter emissions; while particulate matter is not included in the list of standard greenhouse gasses (“Kyoto gases”), recent studies have shown that black carbon—a constituent of particulate matter—may play an important role in climate change. Biofuels could be used during construction. The feasibility of using biofuels will be considered and included in construction contracts if found to be practicable.

USE BUILDING MATERIALS WITH LOW CARBON INTENSITY

The proposed project would utilize a design resulting in the use of less concrete and steel by incorporating a structural composite material composed of steel and polyurethane elastomer—in place of stiffened steel and reinforced concrete. It could be used in the construction of the new Grandstand Stadium (Stadium 3) and potentially for the proposed addition of administrative space to Arthur Ashe Stadium (Stadium 1). Cement replacements, cement produced using lower GHG fuel, and concrete produced with optimized cement content would be considered and implemented if feasible, considering structural requirements and costs.

In addition, the requirement to divert construction waste from landfills by reusing and/or recycling materials would be specified. Materials with recycled content will be used to the extent that this would be economically feasible, and materials that are extracted and/or manufactured within the region will be specified. Rapidly renewable building materials and wood that is locally produced and/or certified in accordance with the Sustainable Forestry Initiative or the Forestry Stewardship Council’s Principles and Criteria will be used to the extent practicable.

CONCLUSION

The proposed project’s design includes many features aimed at reducing energy consumption and GHG emissions, and would be consistent with the City’s citywide GHG reduction goal. ✷

A. INTRODUCTION

The project site is located in a public park bordered by highways, and rail lines to the north. When event conditions are underway, it typically generates crowd activity and traffic that may be noisy. During other months of the year, the site is a relatively quiet public recreation facility.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, “Project Description.” As shown in the traffic analysis contained in Chapter 10, “Transportation,” the proposed project would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e., it would not result in a doubling of noise passenger car equivalents [Noise PCEs] on any roadway, which would be necessary to cause a 3 dBA increase in noise levels, see **Appendix F**), and it is assumed that any heating, ventilation, air conditioning/refrigeration (HVAC/R) equipment would be designed to meet applicable regulations and therefore not have the potential to result in any significant noise impacts. Consequently, a noise assessment was performed only to examine potential changes in noise levels at nearby sensitive receptors, including open space at Flushing Meadows Corona Park, resulting from:

- Noise generated by the proposed parking garages included in the design for the proposed project; and
- Stadium and spectator noise associated with the proposed changes to the NTC’s boundaries, and proposed improvements, such as the relocated Grandstand Stadium (Stadium 3).

PRINCIPAL CONCLUSIONS

The proposed project would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e., it would not result in a doubling of Noise Passenger Car Equivalents [Noise PCEs], which would be necessary to cause a 3 dBA increase in noise levels). Nor would the proposed changes to the NTC’s boundaries, including the relocated Grandstand Stadium (Stadium 3), or new parking garages, have the potential to result in a significant noise impacts at any nearby sensitive receptors. With and without the project, noise levels in Flushing Meadows Corona Park adjacent to the project site would be expected to exceed the 55 dBA $L_{10(1)}$ guideline value recommended in the 2012 *City Environmental Quality Review (CEQR) Technical Manual* for open spaces. However, these conditions would be less than or comparable to noise levels in other parks and open spaces throughout New York City, and would not be perceptibly increased under the proposed project. Therefore, they would not constitute a significant noise impact.

B. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called “decibels” (“dB”). The particular character of the sound that we hear (a whistle compared with a French horn, for example) is determined by the speed, or “frequency,” at which the air pressure fluctuates, or “oscillates.” Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz (“Hz”). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernible and therefore more intrusive than many of the lower frequencies (e.g., the lower notes on the French horn).

“A”-WEIGHTED SOUND LEVEL (DBA)

In order to establish a uniform noise measurement that simulates people’s perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or “dBA,” and it is the descriptor of noise levels most often used for community noise. As shown in **Table 13-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA.

Table 13-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80–90
Busy city street, loud shout	80
Busy traffic intersection	70–80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry	50–60
Background noise in an office	50
Suburban areas with medium-density transportation	40–50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.

EFFECTS OF DISTANCE ON SOUND

Sound varies with distance. For example, highway traffic 50 feet away from a receptor (such as a person listening to the noise) typically produces sound levels of approximately 70 dBA. The same highway noise measures 66 dBA at a distance of 100 feet, assuming soft ground conditions. This decrease is known as "drop-off." The outdoor drop-off rate for line sources, such as traffic, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 3 dBA for line sources). Assuming soft ground, for point sources, such as amplified rock music, the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 6 dBA for point sources).

SOUND LEVEL DESCRIPTORS

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise that fluctuates over extended periods have been developed. One way is to describe the fluctuating sound heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level" (L_{eq}) can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted by $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

For the purposes of this Draft Environmental Impact Statement (DEIS) analysis, the maximum one-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *CEQR Technical Manual* for impact evaluation, and is used to provide an indication of highest expected sound levels. The 1-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification.

C. NOISE STANDARDS AND CRITERIA

NEW YORK CEQR NOISE CRITERIA

The *CEQR Technical Manual* sets external noise exposure standards; these standards are shown in **Table 13-2**. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The noise level specified for outdoor areas requiring serenity and quiet is 55 dBA $L_{10(1h)}$.

Table 13-2
Noise Exposure Guidelines For Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	------- $Ldn \leq 60$ dBA -------	NA	NA	NA	NA	NA	NA
Hospital, nursing home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	------- $60 < Ldn \leq 65$ dBA -------	$65 < L_{10} \leq 80$ dBA	(i) $65 < Ldn \leq 70$ dBA, (II) $70 \leq Ldn$	$L_{10} > 80$ dBA	------- $Ldn \leq 75$ dBA -------
Residence, residential hotel, or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public health facility		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
Commercial or office		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:
(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; (ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L_{dn}^{y} (L_{dn} contour) value.

Table Notes:
1 Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.
2 Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.
3 One may use FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
4 External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Source: New York City Department of Environmental Protection (adopted policy 1983).

D. IMPACT DEFINITION

As recommended in the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact:

- An increase of 5 dBA or more, in With Action $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the No-Action condition, if the No-Action levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period;
- An increase of 4 dBA or more, in With Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the No-Action levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period;
- An increase of 3 dBA or more, in With Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the No-Action levels are greater than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period; and

- An increase of 3 dBA or more, in With Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10 PM and 7 AM).

E. NOISE PREDICTION METHODOLOGY

ANALYSIS OF NOISE IMPACTS DUE TO THE PROPOSED PARKING GARAGES

At locations adjacent to the project site, noise levels would have the potential to increase due to the existing parking Lots A and B associated with the NTC site being replaced by parking garages with greater capacity. Noise levels due to vehicles accessing and traversing the existing parking lots and proposed parking garages were determined using methodologies set forth in the Federal Transit Administration's (FTA) May 2006 version of the *Transit Noise and Vibration Impact Assessment* guidance manual. Specifically, the parking lots and garages were modeled using the techniques described for general noise assessment of park and ride lots and parking garages, respectively.

The general noise assessment methodology consists of the following steps:

- Determine the project noise exposure at 50 feet from the center of the parking facility, based on the maximum number of automobiles expected to enter and exit the facility in a given hour;
- Calculate project-generated noise levels at each of the sensitive receptor locations based on the L_{eq} at 50 feet and adjusted for the distance of each receptor relative to the center of the parking facility; and
- Logarithmically add the calculated L_{eq} at each receptor to the measured L_{eq} at that receptor in order to determine a resultant total $L_{eq.}$.

SPECTATOR AND STADIUM NOISE

The proposed project would result in a series of improvements to the project site, as summarized in **Table 13-3** and described in greater detail in Chapter 1, "Project Description." To accommodate the proposed project, 0.94 acres of land would be added to the NTC site, including 0.68 acres of park land that would be alienated, and 0.26 acres of previously alienated park land that is outside the current lease. Outside of the NTC, the relocated connector road would be built on an approximately 0.3-acre area.

The NTC itself generates noise due to the spectators cheering and talking, as well as announcers, throughout the NTC, both within the various stadia, and in other spaces at the project site. The increased area of the NTC and proposed improvements could potentially result in greater noise levels generated by the NTC at nearby sensitive receptors.

Existing noise levels were measured at the NTC during the US Open on August 31 and September 3, 2011 (See **Appendix F** for the full results of the measurements at the existing NTC). Measurements were performed within various stadia and around the NTC at various times during the day while competition was taking place. The results of the measurements and field observations showed that in addition to noise associated with the individual stadia within the project site, noise associated with spectators throughout the NTC is a strong contributor to noise levels in and at locations adjacent to the NTC. In fact, noise levels were essentially constant throughout the NTC regardless of proximity to an actual stadium. This is due to spectators moving around the NTC, talking, cheering, and generally making noise. Consequently, noise due to the NTC was treated uniformly as a single noise source. Noise at nearby receptor locations adjacent to the NTC and within Flushing Meadows Corona Park can therefore be calculated based on proximity to the boundary of the NTC. This presents a conservative and reasonable way to treat the noise due to tennis-related activities.

Table 13-3
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
	Stadium Improvements and New Construction	
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000-seat stadium and replacement with 8,000-seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500-seat stadium and replacement with 15,000-seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
	Tournament Court Modifications	
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
	Ancillary Building Construction	
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building,, including four tennis courts on its roof, on former site of relocated Grandstand Stadium
	Parking and Transportation Improvements	
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
	Pedestrian Enhancements	
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
Source: USTA

The average L_{eq} noise level measured throughout the project site (with the exception of measurements performed within individual stadia) was 72.0 dBA. Measurements at various locations and times were all within 0.5 dBA of this value. This average value was assumed to apply throughout the NTC. In addition, this value was also conservatively assumed at a distance of up to 30 feet from the current boundary of the NTC. This method was used to calculate the noise level associated with operation of the NTC at the nearby sensitive receptors.

Specifically, the analysis of noise associated with the NTC included the following for each analyzed receptor:

- Determine the amount of noise associated with the existing NTC based on the distance the receptor from the existing boundaries of the NTC;

- Logarithmically subtract the noise associated with the existing NTC from the measured noise level to determine the non-tennis noise level, which was assumed to remain constant in the With Action condition;
- Determine the amount of noise associated with the proposed NTC based on the distance the receptor from the proposed future boundaries of the NTC;
- Logarithmically add the noise associated with the proposed future NTC to the non-tennis noise level to determine the total future noise level with the proposed future NTC;
- Compare the calculated total noise level in the With Action condition to the existing noise level to determine the project noise increment; and
- Add the project noise increment to the existing L_{10} value to calculate the future L_{10} value with the proposed project.

F. EXISTING NOISE LEVELS

Four (4) noise receptor locations within Flushing Meadows Corona Park were selected for noise impact analysis (see **Figure 13-1**). These locations represent various areas of Flushing Meadows Corona Park, which are adjacent to the project site, and would have the greatest potential to experience noise impacts as a result of the proposed project. They are locations of active park use, and would be considered open spaces requiring serenity and quiet. **Figure 13-**1 shows the location of the receptor site locations and Table **13-4** lists the receptor site locations and their representative uses. Existing noise levels at sensitive receptors near the project site were measured at three (3) of the four (4) receptor locations, because the proximity of Sites 3 and 4 to the Grand Central Parkway would result in similar existing noise levels at both receptor sites, such that noise level measurements at Site 3 would be representative of the existing levels at Site 4. Site 3 represents the location of active park use closest to the southwestern corner of the NTC, where relocated Grandstand Stadium (Stadium 3) would be constructed, and where the greatest change in the boundaries of the NTC would occur, including Site 4. Site 2 represents a location with the lowest baseline levels to the immediate south of the NTC. Site 1 represents a location with the lowest baseline levels to the east of the NTC. Other sensitive receptors located closer to roadways with higher baseline levels would have less potential to experience noise impacts.

Table 13-4
Noise Receptor Locations

Receptor	Location	Representation
1	Promenade of Industry North of Industry Pond Fountain of the Planets within Flushing Meadows Corona Park	Open Space
2	Herbert Hoover Promenade between United Nations Avenue North and Avenue of Commerce within Flushing Meadows Corona Park	Open Space
3	United Nations Avenue North between Avenue of Science and Grand Central Parkway within Flushing Meadows Corona Park	Open Space
4	South of United Nations Avenue North between Meridian Road and Avenue of the States	Open Space

12.14.12

Project Site Boundary

1/4-Mile Study Area Boundary

1 Noise Receptor Location

0 400 1000 FEET

SCALE

Noise Receptor Locations

USTA Billie Jean King National Tennis Center Strategic Vision

Figure 13-1

At Receptor Sites 1, 2, and 3, existing noise levels were measured for 20-minute periods at various times from approximately 11 AM to 8 PM during a typical weekday and weekend. These time periods correspond with the typical hours of use of the NTC. Measurements were taken on August 31, on which a New York Mets home game also occurred, and September 3, 2011, on which no Mets home game occurred. For the purposes of the analysis, the minimum measured weekday and weekend noise levels at each receptor were used as the baseline noise levels for comparison with predicted future noise levels.

During the noise measurements, wind speed was less than 10mph, and there was no precipitation.

EQUIPMENT USED DURING NOISE MONITORING

Measurements were performed using a Brüel & Kjær Sound Level Meter (SLM) Type 2260, a Brüel & Kjær ½-inch microphone Type 4189, and a Brüel & Kjær Sound Level Calibrator Type 4231. The SLM had a laboratory calibration date within one year of the dates of the measurements. The Brüel & Kjær SLM is a Type 1 instrument according to ANSI Standard S1.4-1983 (R2006). For all receptor sites the instrument/microphone was mounted on a tripod at a height of approximately 5 feet above the ground. Microphones were mounted at least approximately 5 feet away from any large reflecting surfaces. The SLM was calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, L_{90}, and 1/3 octave band levels. 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.

The results of the existing noise level measurements are summarized in **Table 13-5**.

At all three noise measurement locations, contributing noise sources included traffic on roadways in and around Flushing Meadows Park, active recreation such as sports games taking place in Flushing Meadows Park, noise due to rail traffic on the nearby Long Island Rail Road (LIRR) railway, noise due to aircraft overflights, and noise associated with the existing NTC. At Sites 1 and 2, active recreation uses, such as children yelling, running, and playing soccer, were the dominant noise source, and at Site 3, traffic on the Grand Central Parkway was the dominant noise source. The measured L_{10} values at all three noise receptor locations, which include all of the noise sources mentioned above, exceed the CEQR 55 dBA $L_{10(1)}$ threshold for acceptability at an open space area requiring serenity or quiet. However, these measured levels are comparable to or lower than noise levels in a number of open space areas that are within range of substantial noise sources (e.g., roadways, aircraft, etc.), including Prospect Park, Brooklyn Bridge Park, and Fort Greene Park.

Table 13-5
Existing Noise Levels (in dBA)

Site	Measurement Location	Time		L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	Promenade of Industry North of Industry Pond within Flushing Meadows Corona Park	Weekday	12:29 PM	63.1	72.9	63.8	61.1	59.6
		Weekday	4:31 PM	61.3	68.0	62.4	60.7	59.4
		Weekend	11:12 AM	61.7	70.1	63.5	60.0	58.6
		Weekend	12:58 PM	62.1	68.6	63.0	59.6	58.1
		Weekend	3:09 PM	62.1	66.6	63.0	61.6	60.6
		Weekend	4:54 PM	62.4	65.0	63.9	62.1	60.9
		Weekend	6:36 PM	61.8	64.2	63.1	61.7	60.4
		Weekend	8:13 PM	60.3	62.5	61.0	60.1	59.3
2	Herbert Hoover Promenade between United Nations Avenue North and Avenue of Commerce within Flushing Meadows Corona Park	Weekday	1:06 PM	55.9	61.5	57.5	55.2	53.8
		Weekday	5:07 PM	58.3	63.2	59.3	57.8	56.6
		Weekend	11:39 AM	57.8	64.7	59.4	56.9	55.5
		Weekend	1:28 PM	57.6	62.7	59.0	57.1	55.8
		Weekend	3:35 PM	59.9	64.4	61.3	59.4	58.2
		Weekend	5:22 PM	63.5	73.6	64.9	61.3	59.5
		Weekend	7:03 PM	63.6	71.3	65.8	62.0	60.1
3	United Nations Avenue North between Avenue of Science and Grand Central Parkway within Flushing Meadows Corona Park	Weekday	1:42 PM	63.2	69.4	64.8	62.3	61.2
		Weekday	5:48 PM	62.9	67.6	64.9	62.2	60.7
		Weekend	12:16 PM	64.4	72.0	65.4	63.2	62.1
		Weekend	2:04 PM	62.7	66.4	63.9	62.4	61.4
		Weekend	4:12 PM	64.2	67.4	65.5	63.8	62.9
		Weekend	5:57 PM	64.9	72.2	66.4	63.8	62.5
		Weekend	7:34 PM	63.6	68.4	64.6	63.0	62.0

Notes: Measurements were conducted by AKRF on August 31 and September 3, 2011.

G. FUTURE WITHOUT THE PROPOSED PROJECT

In the No-Action condition, noise levels in the vicinity of the NTC would be similar to existing conditions. There would be no appreciable change in noise levels. Future noise levels would be expected to be within 1 dBA of existing noise levels.

H. FUTURE WITH THE PROPOSED PROJECT

EVENT TRAFFIC

As described above, the proposed project, including the relocated connector road south of United Nations Avenue North, would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e., it would not result in a doubling of Noise Passenger Car Equivalents [Noise PCEs], which would be necessary to cause a 3 dBA increase in noise levels).

PARKING GARAGE NOISE

Using the methodology from the FTA's guidance manual, noise levels associated with the existing parking lots and proposed future parking garages were calculated at various distances from the facilities. The results of the parking garage noise analysis show that the noise generated by the proposed future parking garages would be slightly less than or comparable to the noise generated by the existing parking lots, even though the parking garages would have greater capacity. This is due to the semi-enclosed nature of the parking garage, which provides some shielding of the noise associated with vehicles accessing the garage. For the same reason, while the proposed garage will be somewhat closer to the Passerelle Building than existing parking lots, it would not be expected to result in any significant increase in noise levels at this location. Consequently, the new parking garages associated with the proposed project would not have the potential to result in a significant noise impact.

The full results of the parking garage analysis are shown in **Appendix F**.

SPECTATOR AND STADIUM NOISE

Future noise levels in the With Action condition were calculated according to the methodology described above. (No changes in the types of events are anticipated due to the proposed project.) **Table 13-6** shows the results of the analysis of spectator and stadium noise associated with the proposed project.

Table 13-6
Spectator and Stadium Noise Analysis Results (in dBA

Site	Day	Existing/No-Action[1]					Future With Action					
		Distance to NTC Boundary	NTC L_{eq}	Non-Tennis L_{eq}	Total L_{eq}	Total L_{10}	Distance to NTC Boundary	NTC L_{eq}	Non-Tennis L_{eq}	Total L_{eq}	With Action Increment	Total L_{10}
1	Weekday	1250	39.6	61.3	61.3	62.4	1250	39.6	61.3	61.3	0.0	62.4
	Weekend			60.3	60.3	61.0			60.3	60.3	0.0	61.0
2	Weekday	900	42.5	55.7	55.9	57.5	860	42.9	55.7	55.9	0.0	57.5
	Weekend			57.5	57.6	59.0			57.5	57.6	0.0	59.0
3	Weekday	300	52.0	62.5	62.9	64.9	150	58.0	62.5	63.8	0.9	65.8
	Weekend			62.3	62.7	63.9			62.3	63.7	1.0	64.9
4	Weekday	220	54.7	61.7	62.5	62.9	120	60.0	61.7	63.9	1.4	64.3
	Weekend			61.5	62.3	61.9			61.5	63.8	1.5	63.4

Notes: [1]No-Action noise levels are conservatively assumed to be the equal to existing noise levels.

Comparing future With Action noise levels and existing noise levels, the maximum increase in $L_{eq(1)}$ noise level would not exceed 1.5 dBA, which would be barely perceptible and would not be considered significant according to *CEQR Technical Manual* noise impact criteria. While some locations immediately adjacent to the proposed boundary of the NTC may experience somewhat greater noise levels due to the NTC than those shown for the analyzed receptor locations, noise levels decrease fairly significantly with distance from the NTC boundary, and at passive open space locations noise levels would not be significantly different from No-Action values. In addition, at many locations traffic noise from the Grand Central Parkway is the dominant noise source. Consequently, the proposed future boundaries of the NTC would not have the potential to result in a significant noise impact at nearby sensitive open space receptors. The additional attendance that would be expected in the future With Action condition would also not be expected to result in substantially increased noise levels at the adjacent noise receptors, since the additional attendees would be distributed throughout the NTC; measurements made at the existing facility showed that existing noise levels are somewhat uniform throughout the NTC, including the areas adjacent to the stadiums.

As with existing and No-Action conditions, noise levels at the analyzed noise receptor sites—which include the noise associated with traffic vehicular traffic, rail traffic, aircraft traffic, and active recreation present in the existing and No-Action conditions as well as the noise associated with the NTC—are expected to be above the CEQR 55 dBA $L_{10(1)}$ guideline for open spaces requiring serenity and quiet. However, the predicted levels are comparable to or lower than noise levels in a number of open space areas that are within range of substantial noise sources (e.g., roadways, aircraft, etc.). While The 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet, due to the level of activity present at most open space areas and parks throughout New York City (except for areas far away from traffic and other typical urban activities), this relatively low noise level is often not achieved. Consequently, noise levels at the analyzed open space receptor sites, while exceeding the 55 dBA $L_{10(1)}$ *CEQR Technical Manual* guideline value, would not constitute a significant noise impact.

In addition, mechanical systems (i.e., heating, ventilation, and air conditioning systems) associated with the proposed project would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code and the New York City Department of Buildings Code) and to avoid producing levels that would result in any significant increase in ambient noise levels. Therefore, the proposed project would not result in any significant adverse noise impacts. ✷

Chapter 14: Public Health

The 2012 *City Environmental Quality Review (CEQR) Technical Manual* defines as its goal with respect to public health "to determine whether adverse impacts on public health may occur as a result of a proposed project, and if so, to identify measures to mitigate such effects."

According to the *CEQR Technical Manual*, for most proposed projects, a public health analysis is not necessary. Where no significant unmitigated adverse impact is found in other relevant CEQR analysis areas, such as air quality, water quality, hazardous materials, or noise, no public health analysis is warranted. If an unmitigated significant adverse impact is identified in one of these analysis areas, the lead agency may determine that a public health assessment is warranted for that specific technical area.

As described in the relevant analyses of this Draft Environmental Impact Statement (DEIS), the proposed project would not result in significant unmitigated adverse impacts in any of the technical areas related to public health: air quality, water quality, hazardous materials, or noise. Therefore, an assessment of potential impacts on public health is not necessary, and the proposed project would not result in any significant adverse impacts on public health. ✷

Chapter 15: Neighborhood Character

A. INTRODUCTION

According to the 2012 *City Environmental Quality Review (CEQR) Technical Manual*, neighborhood character is an amalgam of various elements that give neighborhoods their distinct "personality." These elements may include a neighborhood's land use, socioeconomic conditions, open space, historic and cultural resources, urban design, visual resources, shadows, transportation, and noise. Not all of these elements affect neighborhood character in all cases; a neighborhood usually draws its distinctive character from a few defining elements.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This analysis considers the impacts of the proposed project on the neighborhood character of the project site and the surrounding area, and relies on the analyses of the components of neighborhood character (i.e., land use, open space, historic and cultural resources, urban design, visual resources, shadows, transportation, and noise) as analyzed elsewhere in the Draft Environmental Impact Statement (DEIS).

PRINCIPAL CONCLUSIONS

Overall, the proposed project would not substantially change the character of the neighborhood. The project site and study area are defined in part by the open space and recreational resources of Flushing Meadows Corona Park, large-scale event uses, and major transportation uses. The proposed project would not affect this essential character, but rather would provide improvements to the existing NTC, as well as park land improvements elsewhere in the park for the benefit of the public. With the exception of transportation, the proposed project would not result in any significant adverse impacts on any of the technical areas that could impact neighborhood character (including land use, socioeconomic conditions, open space, historic and cultural resources, urban design, visual resources, shadows, and noise). However, the significant adverse impact would only occur during the peak periods of the US Open and would be effectively managed by the traffic management program currently in place. Therefore, this impact would not adversely affect neighborhood character. In addition, the proposed project would not be expected to result in a combination of moderate effects to several elements that could cumulatively impact neighborhood character. Therefore, the proposed project would not result in any significant adverse impacts on neighborhood character.

B. METHODOLOGY

An analysis of neighborhood character begins by determining whether a proposed project has the potential to result in significant adverse impacts in any relevant technical area (land use, socioeconomic conditions, open space, historic and cultural resources, urban design, visual resources, shadows, transportation, and noise) or if a project would result in a combination of moderate effects to several elements that could cumulatively impact neighborhood character. If the answer is yes, a preliminary assessment is undertaken; the preliminary assessment first identifies the defining features of the neighborhood, and then assesses whether the project has the potential to impact these defining features, either through the potential for significant adverse impacts or a combination of moderate effects. If the preliminary assessment concludes that the proposed project has the potential to affect defining features of a neighborhood, a detailed assessment of neighborhood character may be appropriate. If needed, the detailed assessment would use the information from the preliminary assessment as a baseline and then project and compare the future No-Action and With Action conditions.

As described in the relevant chapters of this DEIS, with the exception of transportation, the proposed project would not result in significant adverse impacts in the areas of land use, zoning, and public policy; open space; shadows; historic and cultural resources; urban design; or noise. In addition, as the proposed project could result in moderate effects in these categories, a preliminary assessment of neighborhood character impacts from the proposed project is provided below. The preliminary assessment describes the defining features of the neighborhood and then assesses the potential for the proposed project to impact these defining features. The preliminary assessment concludes that a detailed assessment is not warranted.

C. PRELIMINARY ASSESSMENT

DEFINING FEATURES

PROJECT SITE

The character of the project site is defined by its use as a major recreational facility that hosts the US Open over a two-week period and is open to the public 11 months of the year. Tennis facilities on the project site include three stadiums (Arthur Ashe Stadium, Louis Armstrong Stadium, and Grandstand Stadium), a micro-stadium (Court 17), and tennis courts. Two of the stadiums (Grandstand Stadium and Louis Armstrong Stadium) were built for the 1964-1965 World's Fair Singer Bowl, while the largest stadium on the site (Arthur Ashe Stadium) opened in 1997. The project site also includes ancillary buildings, including the Indoor Training Center, kiosks for retail, food and beverage, and informational uses during the US Open, and the broadcast center, which consists of temporary trailers. The site also includes landscaped areas and pedestrian plazas. Trees, landscaping, and seating are found throughout the site, as well as two surface parking lots.

The US Open, the USTA's flagship event, is hosted at the NTC during a two-week period around the beginning of September. One of the sport's four Grand Slam championship tennis tournaments, the US Open is attended by approximately 700,000 spectators and is broadcast worldwide. For the remaining 11 months of the year, the NTC is open to the public for indoor and outdoor tennis. More than 100,000 participants of all ages, the majority of whom are from the local Queens community, participate in hundreds of community tennis programs at the NTC each year. The NTC is home court for more than 70 New York City high schools and colleges and a number of diverse organizations seeking a place to play tennis or host tournaments. USTA offers court rentals to the public at rates calculated under USTA's lease with the City (see Chapter 2, "Land Use, Zoning, and Public Policy" for more information).

STUDY AREA

The ¼-mile study area surrounding the project site is defined primarily by large-scale event uses, major transportation uses, the open space and recreational resources of Flushing Meadows Corona Park, and a small portion of the residential neighborhood of North Corona.

Major events held within the study area include the US Open, baseball games at Citi Field, and various sporting and cultural events that are held in Flushing Meadows Corona Park, ranging from triathlon races to the Hong Kong Dragon Boat Festival. Visitors are brought to these events in part through several large-scale transportation infrastructure resources, including: the Mets-Willets Point Station on the Metropolitan Transportation Authority's (MTA) 7 subway line; the Long Island Rail Road (LIRR), which also has a stop in Flushing Meadows Corona Park that services Citi Field on game days and the NTC during the US Open; and major highways, such as the Long Island Expressway, Van Wyck Expressway, and the Grand Central Parkway, which connects the NTC to LaGuardia Airport, located about 1.5 miles to the northwest of the study area. The area north of the NTC contains the MTA Corona Rail Yard, which is used for storage and maintenance of the 7 line subway trains, and is approximately 23 acres in size.

Most of the study area is within Flushing Meadows Corona Park, a recreational and cultural destination for Queens residents and visitors from throughout the New York metropolitan area. The park covers nearly 900 acres and is under the jurisdiction of the New York City Department of Parks and Recreation (DPR). Within the park to the north of the NTC across Roosevelt Avenue and the MTA Corona Rail Yard is Citi Field, the baseball stadium for the New York Mets, which opened in 2009 and contains 42,000 seats. East of the NTC, Flushing Meadows Corona Park contains a pitch and putt golf center, and a large area available for passive and active recreation, with trees, pathways, and sitting areas. South of the NTC is the core of the former World's Fair grounds, which includes a series of classical promenades planted with mature trees centered on the Unisphere. In this area to the west of the Unisphere is the New York City Pavilion building, which was built for the 1939-1940 World's Fair and today houses the Queens Museum of Art. The western portion of the study area includes several park facilities including the Queens Zoo, New York Hall of Science, and Terrace in the Park. Other facilities within the park that are outside of the ¼-mile study area include an ice rink and natatorium facility, and a recreation center.

The northwest corner of the study area includes a small section of North Corona, a predominantly residential neighborhood that also contains some supporting commercial and light industrial uses, such as grocery stores, delis, and automotive businesses, which are primarily located on Roosevelt Avenue.

Overall, the study area is shaped by the legacy of the World's Fairs that were held in 1939-1940 and 1964-1965. To this day, major event uses continue to be a defining feature of the area, due in part to the US Open, Mets baseball games, and the various community events that are held in Flushing Meadows Corona Park. The neighborhood character is also affected by large-scale transportation facilities, including nearby highways, the subway, LIRR, and Corona Rail Yard. By contrast, a small portion of the study area, in North Corona, is residential in character. The combination of these defining and supporting features contributes to a distinctive neighborhood character.

POTENTIAL TO AFFECT THE DEFINING FEATURES OF THE NEIGHBORHOOD

As described in Chapter 1, "Project Description," the NTC Strategic Vision would result in a number of physical improvements and alterations to the facility. Overall, the proposed project would add 0.94 acres to the NTC site, including 0.68-acres of parkland that would be alienated, and 0.26-acres of previously alienated parkland that is outside the current lease. Outside of the NTC, the relocated connector road would be built on an approximately 0.3-acre area. The principal elements of the proposed project are summarized below in **Table 15-1**.

Table 15-1
NTC Strategic Vision: List of Proposed Improvements

Map No.[1]	Name	Description
	Stadium Improvements and New Construction	
1	Grandstand Stadium (Stadium 3)	Demolition of existing 6,000 seat stadium and replacement with 8,000 seat stadium in southwest corner of NTC site
2	Louis Armstrong Stadium (Stadium 2)	Demolition of existing 10,500 seat stadium and replacement with 15,000 seat stadium in place
3	Arthur Ashe Stadium (Stadium 1)	Renovation and expansion to include 90,000-gsf administrative/operational space; and canopy above center court
	Tournament Court Modifications	
4	Northwest tournament courts	Replacement of existing courts with five practice courts, three tournament courts, and viewing platform
5	Southerly tournament courts	Relocation of existing courts 30 to 50 feet to the south
	Ancillary Building Construction	
6	New administrative and retail building	Construction of new 80,000-gsf administrative and retail building, including four tennis courts on its roof, on former site of relocated Grandstand Stadium
	Parking and Transportation Improvements	
7	New Parking Garage A	Construction of new 423-space, 2-level garage, including a 6,500-sf transportation center.
8	New Parking Garage B	Construction of new 270-space, 3-level garage
9	Relocated connector road and related improvements	Relocation of connector road and sidewalks to new location south of United Nations Avenue North near Queens Museum of Art parking lot
	Pedestrian Enhancements	
10	Arthur Ashe Concourse	Expand existing concourse by 11,000-sf
11	New walkway	Construction of new walkway connecting the new Stadium 3 and Court 17

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
Source: USTA

In addition, certain additional park improvement projects will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. As described in Chapter 1, "Project Description" (and shown on Figure 1-7), these improvements potentially include: renovation of existing soccer fields; development of a new comfort station; development of new picnic and barbeque areas; and vehicular, pedestrian, landscape, and drainage upgrades.

The proposed project would have the potential to affect the defining features of the neighborhood as follows:

LAND USE

The proposed project would result in modest changes in the land uses located on the project site. The locations of the various uses would be reconfigured and there would be a net increase in stadium space, retail and operational uses, and parking facilities. Notably, the existing Grandstand Stadium (Stadium 3) would be relocated to the southwest corner of the site, in: a 1.21 acre teardrop-shaped landscaped area with trees that is within NTC's current lease; a small portion of the 0.68-acre alienation area; and in the 0.26 acre site of the current connector roadway, which would be added to NTC's lease. Two new parking garages of up to 40 feet in height would be built on land facing Meridian Road that is currently in use as surface parking lots. These incremental increases in height and bulk would be modest relative to the overall facility, and visual improvements along the proposed NTC fence line would minimize the prominence of the new structures. As the types of uses would be the same as currently exist in the project site and in the study area, they would continue to be consistent with surrounding open space, transportation, and residential uses. While the proposed project would result in the alienation of small areas of park land, visual improvements would be implemented along the proposed NTC fence line that would improve the NTC's context with the park, and improvements would be provided elsewhere in Flushing Meadows Corona Park, as noted above. The areas outside of the current lease area that would be affected by the expansion are relatively small and would affect a small number of users. The relocated connector road would link Meridian Road to United Nations Avenue North, and maintain access to the viaduct over the Grand Central Parkway. The replacement connector road and sidewalks would ensure that access to the park would not be adversely affected by this component of the proposed project.

Overall, the changes in land use associated with the proposed project would be in keeping with the neighborhood character of the project site and study area. As noted above, the character of the project site is defined by its use as a major recreational campus. Under the proposed project, the site would continue to host the US Open and community tennis programming, while site improvements would enhance the visitor and user experience during both the US Open and non-US Open periods. The neighborhood character of the study area is defined in part by large-scale event and transportation uses, as well as its location within Flushing Meadows Corona Park. The proposed project would not affect this essential character, but rather would provide improvements to the NTC, as well as park land improvements elsewhere in the park for the benefit of the public. Overall, the proposed project would be expected to improve the neighborhood character of the project site and study area by improving the facilities, circulation, landscaping, and public spaces of the NTC. Therefore, the proposed project would not result in significant adverse impacts on neighborhood character due to changes in land use, zoning, and public policy.

OPEN SPACE

Flushing Meadows Corona Park is a defining element to the study area's neighborhood character. The proposed project would result in improvements to landscaping, circulation, and amenities at the NTC that would be provided for the US Open and the general public. The proposed project would affect areas outside of the current NTC fence line, including the landscaped teardrop area, where the new Stadium 3 would be constructed. The areas outside of the current NTC fence line that would be directly affected by the proposed project are lightly used, primarily for walking, running, and bicycling on the perimeter paths. Displacement or relocation of these activities would not be expected to have a notable effect on park users or create a strain on nearby sections of Flushing Meadows Corona Park (see Chapter 3, "Open

Space and Recreational Resources”). Park users would continue to have access to nearby sidewalks or pathways in other adjacent areas of the park for walking, running, and bicycling, and replacement walkways would be provided under the proposed project. Nearby sections of the park could easily accommodate the passive recreation activities that may be displaced from the affected areas. The 0.68-acre area that would be alienated would become part of the NTC, a public tennis recreational facility that is open to the public, outside of the US Open. The 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the overall nearly 900-acre Flushing Meadows Corona Park. The additional 10,000 daily spectators anticipated during the US Open as a result of the proposed project would not have any significant adverse impacts on the park, given the temporary nature of the two-week event. Construction of the proposed project would also require removal of trees both outside the existing fence line, including United Nations Avenue North, and various locations inside the NTC site including in the vicinity of the practice courts, parking lot A, northwest corner of Arthur Ashe Stadium, west of of parking lot B, west side of the Grandstand Stadium, proposed Grandstand Stadium relocation site, and a small number in the Food Village. Tree replacement would be conducted in conformance with DPR requirements. Approximately 422 trees would be removed, which would be transplanted to the extent practicable. Trees that could not be transplanted would be replaced pursuant to City regulations. The new NTC boundaries would include trees and other landscaping features that would minimize the visual presence of the campus, including the proposed Stadium 3 and two parking garages. In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park, as described above and in Chapter 1, “Project Description.”

Overall, the proposed project would be beneficial to neighborhood character due to the improvements in Flushing Meadows Corona Park that would be provided within the NTC, along the boundaries of the NTC, and throughout the park. Therefore, the proposed project would not result in significant adverse impacts on neighborhood character relating to open space.

HISTORIC AND CULTURAL RESOURCES

The historic features of Flushing Meadows Corona Park are a contributing element to the neighborhood character of the study area. As there are no historic resources within the NTC, historic and cultural features are not a component of the character of the project site.

The study area is located within Flushing Meadows Corona Park, which was the location of two World’s Fairs, in 1939-1940 and 1964-1965. Architectural resources within and just outside of the study area include the New York City Building (now the Queens Museum of Art), the Passerelle Building, the Unisphere, the Pavilion (now the Aviary at the Queens Zoo), and the Hall of Science. Located just south of NTC’s South Gate is a statue titled Freedom of the Human Spirit (S/NR-eligible). As described in Chapter 5, “Historic and Cultural Resources,” the proposed project would not result in ground disturbance to archaeologically sensitive areas or adversely affect the context of nearby architectural resources. The proposed project would result in construction activities within 90 feet of the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with applicable New York City Landmarks Preservation Commission (LPC) and New York City Department of Buildings (DOB) guidelines, including the preparation of a Construction Protection Plan (CPP) that would be prepared prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project.

In addition to the improvement of the NTC, certain additional improvements will be undertaken for the benefit of the general public within Flushing Meadows Corona Park. It is not expected that any of the park improvement projects would affect any historic resources within the park. However, if improvement projects are planned near historic resources, measures would be undertaken to prevent inadvertent construction-related impacts to such resources, including compliance with LPC and DOB guidelines, as described above.

Due to these factors, the proposed project would not have a significant adverse impact on neighborhood character due to historic resources.

URBAN DESIGN AND VISUAL RESOURCES

The urban design and visual resources of the project site and study area contribute to their neighborhood character. The proposed project would substantially improve the circulation, landscaping, and visitor amenities within the NTC site, and thus would enhance the pedestrian experience within the project site. The height of several structures—and the total bulk of structures—on the NTC site would increase in the future with the proposed project; the most notable elements would include: two new parking garages that would be built on existing surface parking lots in the northeast and northwest corners of the site, along Meridian Road; and the relocated Grandstand Stadium (Stadium 3) that would be built in the southwest corner of the site. These incremental increases in height and bulk would be modest relative to the existing facilities, and would not be inconsistent with the surrounding park land context. The NTC is already highly visible in this section of the park, and the trees and other landscaping to be provided along the site's perimeter, including adjacent to Stadium 3 along United Nations Avenue North and adjacent to Parking Garage B and the Passerelle Building, would serve to moderate the visual presence of the new site elements from most locations. The proposed project would not alter the visual character of the surrounding area, except to make certain sections of the NTC site more prominent in directly adjacent views. With the exception of the modest change to park land acreage, the elimination of one lane of the three-lane United Nations Avenue North, and the relocated connector roadway, the proposed project would not result in any changes to natural features, open spaces, or streets in the study area.

Therefore, the proposed project would be consistent with the existing urban design characteristics of the study area and would not have a significant adverse impact on neighborhood character resulting from urban design and visual resources.

SHADOWS

As discussed in Chapter 4, "Shadows," the proposed project would not result in significant adverse shadows impacts. The proposed project could result in new shadows on four small areas adjacent to the project site within Flushing Meadows Corona Park. However, three of the four areas are lightly used, primarily for walking, running and bicycling, and any new shadows would not be substantial enough to significantly impact the park or its users. The fourth area, a plaza located near the Passerelle Building, is well-used by the visitors and staff of DPR's Parks Academy. However, only a small portion of this plaza would be affected by the new shadow, and even this small area would receive direct sun for most of the remaining day in those seasons due to the lack of structures to the south and east. Since these areas are not defining features of the neighborhood with respect to uniqueness or overall characterization of the area, the proposed project would not create a significant adverse impact on neighborhood character resulting from shadows.

TRANSPORTATION

As discussed in Chapter 10, “Transportation,” the proposed project would result in temporary significant adverse transportation impacts during the event’s peak periods, which would be effectively managed by the traffic management program currently in place. The proposed project would result in a greater number of vehicular and public transit trips to the US Open, which would be distributed over the large transportation network, the proximity and direct access to the local highway network from the project site, the capacity of the Mets-Willets Point subway station and the special event management program implemented by the New York City Police Department (NYPD), especially along College Point Boulevard.

Although the projected increase in vehicle trips exiting the US Open at the conclusion of the daytime session is anticipated to lengthen the travel time for departing patrons, these delays would largely be confined within Flushing Meadows Corona Park and to the Long Island Expressway. As noted above, a defining characteristic of the study area is the major large-scale event uses that historically and currently take place. As the study area already experiences high volumes of visitors at certain times due to these major events, the proposed project would not affect the essential character of the study area. Therefore, there would be no significant adverse impact on neighborhood character with respect to transportation.

NOISE

While noise levels in the study area would increase in the future With Action condition—due to increased traffic and building mechanical equipment associated with the proposed project—the magnitude of the increase would be generally imperceptible to most listeners and below the CEQR threshold for a significant adverse noise impact. Therefore, there would be no significant adverse impact on neighborhood character with respect to noise.

CONCLUSION OF PRELIMINARY ASSESSMENT

Overall, the proposed project would not substantially change the character of the neighborhood. With the exception of transportation, the proposed project would not result in any significant adverse impacts on any of the technical areas that could impact neighborhood character (including land use, socioeconomic conditions, open space, historic and cultural resources, urban design, visual resources, shadows, and noise). However, the significant adverse impact would only occur during the peak periods of the US Open and would be effectively managed by the traffic management program currently in place. Therefore, this impact would not adversely affect neighborhood character. In addition the proposed project would not be expected to result in a combination of moderate effects to several elements that could cumulatively impact neighborhood character. Therefore the proposed project would not result in any significant adverse impacts on neighborhood character. ✷

A. INTRODUCTION

Under the 2012 *City Environmental Quality Review (CEQR) Technical Manual* guidelines, a construction assessment analyzes the potential impacts from project-related construction activity, and describes the methods that may be employed to avoid significant adverse construction-related impacts.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, "Project Description." This chapter summarizes the construction program for the proposed project and considers the potential for adverse impacts to occur during construction of the proposed project. The construction phasing and schedule for the proposed project are described, followed by a description of the types of construction activities likely to occur.

PRINCIPAL CONCLUSIONS

Although there would be localized, temporary disruptions due to construction activity, as is the case with any construction activity, this analysis finds that the proposed project would not result in any significant adverse impacts due to construction activities. This finding is based on an analysis of the types of construction activities and their intensity, the location of sensitive receptors that could be affected by the proposed project's construction, and the overall construction duration.

TRANSPORTATION

No significant adverse transportation impacts would be expected due to construction of the proposed project.

The proposed project would result in an estimated 192 more construction vehicle trips (passenger car equivalents [PCEs]) during the peak construction period. Because the NTC is in close proximity to several major highways, including the Grand Central Parkway (GCP), Van Wyck Expressway (VWE), and the Long Island Expressway (LIE), most of the construction worker auto trips are expected to enter and exit the site directly from these roadways. Deliveries can also use the Van Wyck Expressway, Long Island Expressway, and other area truck routes that may include College Point Boulevard via Avery Avenue, Northern Boulevard, and/or College Point Boulevard via the Rodman Entrance, to access the site. When distributed over the transportation network, the construction trip increments at any single location, particularly on local streets, would be minimal. In addition, these trip increments would primarily occur outside of the typical commuter peak hours (8–9 AM and 5–6 PM). Therefore, the traffic increase due to construction activities for the proposed project is not expected to result in any significant adverse traffic impacts.

The proposed project would result in an estimated 114 construction-related transit trips which is fewer than the *CEQR Technical Manual* analysis threshold of 200 trips. Therefore, there would not be any potential for any significant adverse transit impacts during construction. In addition, 305 pedestrian trips would be expected during the peak hour. Because these pedestrian trips would primarily occur outside of the typical commuter peak hours and would originate from several nearby transit services and Parking Lot S (located west of Meridian Road, within the NTC leased area) they would be distributed among numerous sidewalks and crosswalks in the area. Furthermore, all of the subway person trips generated by the construction of the proposed project would connect directly from the station to the project site via the Passerelle ramp without utilizing any of the pedestrian facilities—sidewalks, corner reservoirs, and crosswalks—from the local street network. Therefore, no pedestrian elements are expected to incur 200 or more incremental pedestrian trips (the *CEQR Technical Manual* analysis threshold) resulting from the construction of the proposed project. Hence, there would not be a potential for significant adverse pedestrian impacts during construction. Also, if temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with New York City Department of Transportation (NYCDOT) requirements.

AIR QUALITY

Construction of the proposed project would not result in any significant adverse air quality impacts. The quantity of air pollutants emitted during the construction period would likely vary over time. The proposed project's construction activities would take place within the proposed NTC leased premises, except for the relocated connector road and park improvement projects. Construction activities would take place over a period of four years with discrete project elements lasting two years or less, except for the possible construction of the canopy over the center court of Arthur Ashe Stadium (Stadium 1). The walls of the stadium would act as barriers to the transport of air pollutants to nearby areas. The proposed project would not involve extensive excavation, foundation, or superstructure construction activities, which often generate the highest levels of air emissions. With the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, there are very few sensitive receptors near the project site. However, the most intense construction activities (excavation and foundation work) in proximity to the Passerelle Building in terms of air pollutant emissions would be much less than two years. In addition, construction activities associated with the construction of Parking Garage B would not be considered out of the ordinary in terms of intensity and, in fact, emissions would be lower due to the emission control measures that would be implemented during construction of the proposed project. The park areas immediately adjacent to the current NTC fence line but within the proposed lease boundaries are lightly used, primarily for walking and jogging activities on the perimeter paths. Furthermore, the Passerelle ramp that connects the Long Island Rail Road (LIRR)'s Mets-Willets Point station to the Metropolitan Transportation Authority (MTA)'s 7 train station is primarily for transient use, and pedestrians passing through to access public transportation would not be expected to be present for extended durations. The nearest residences located more than 500 feet away from the project site and separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. Moreover, an emissions control program would be implemented to minimize potential construction-period effects on air quality. To ensure that the construction of the proposed project would result in the lowest practicable diesel particulate matter (DPM) emissions, the project would implement an emissions reduction program for all construction activities, including diesel equipment reduction; clean fuel; best available tailpipe reduction technologies; utilization of newer equipment; dust control; and restrictions on vehicle idling. Therefore, construction of the proposed project would not result in any significant adverse air quality impacts.

NOISE AND VIBRATION

Noise

Noise associated with the proposed project's construction activities would not result in any significant adverse impacts. The construction duration for most of the project elements in the proposed project is expected to be short term (less than two years), and therefore any potentially intrusive noise levels generated by construction activities would be of limited duration. Although the possible construction of the canopy at Arthur Ashe Stadium (Stadium 1) would take approximately 28 months to complete, most of the equipment used for this construction element would be located within the stadium where the walls of the stadium would provide acoustical shielding for noise sources. In addition, there are few noise sensitive receptors near the project site. With the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, there are very few sensitive receptors near the project site, with the nearest residences located more than 500 feet away from the project site and separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. The proposed project does not involve extensive excavation, foundation, or superstructure construction activities, which often generate the highest noise levels. The noisiest construction activity associated with the proposed project—pile driving—would be of limited duration compared to the overall project timeline. The most noise intrusive construction activities (excavation and foundation work) in proximity to the Passerelle Building would be much less than two years. The park areas immediately adjacent to the current NTC fence line but within the proposed lease boundaries are lightly used, primarily for walking and jogging activities on the perimeter paths. In addition, the Passerelle ramp that connects LIRR's Mets-Willets Point station to the Metropolitan Transportation Authority (MTA)'s 7 train station is primarily for transient use, and pedestrians passing through to access public transportation would not be expected to be present for extended durations. Due to distance and existing noise levels generated by traffic on Grand Central Parkway and Van Wyck Expressway and the other factors described above, no significant adverse noise impacts would be expected at sensitive receptor locations due to the construction of the proposed project.

As in the existing and future without the proposed project conditions, noise levels at Flushing Meadows Corona Park during construction of the proposed project are expected to be above the CEQR 55 dBA $L_{10(1)}$ guideline for open spaces requiring serenity and quiet, the predicted levels are comparable to or lower than noise levels in a number of open space areas that are within range of substantial noise sources (e.g., roadways, aircraft, etc.), including Hudson River Park, Riverside Park, and Bryant Park. The 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet; however, due to the level of activity present at most open space areas and parks throughout New York City (except for areas far away from traffic and other typical urban activities), this relatively low noise level is often not achieved. Consequently, noise levels during construction at Flushing Meadows Corona Park, while exceeding the 55 dBA $L_{10(1)}$ CEQR guideline value, would not constitute a significant noise impact.

Therefore, based on these factors, no significant adverse noise impacts would be expected at any sensitive receptor locations from the proposed construction activities.

Vibration

The proposed project is not expected to result in significant adverse construction impacts with respect to vibration. To avoid architectural damage, a Construction Protection Plan (CPP) would be developed to protect two known architectural resources— the Freedom of the Human Spirit sculpture and the Passerelle Building—with a lateral distance of 90 feet from the proposed construction activities. The CPP would include a monitoring component to ensure that if vibration levels approach the 0.5 inches per second peak particle velocity (PPV) criterion, corrective action would be taken to reduce vibration levels, thereby avoiding architectural damage and significant vibration impacts.

Construction resulting in vibration levels greater than 65 vibration decibels (VdB) (e.g., equipment used during pile driving) would be perceptible and irritating and would have the potential to result in significant adverse impacts if they were to occur for prolonged period of time. However, the proposed project's construction activities would take place within the proposed NTC leased premises, except for the relocated connector road and park improvement projects. Construction activities would take place over a period of four years with discrete project elements lasting two years or less, except for the possible construction of the canopy over the center court of Arthur Ashe Stadium (Stadium 1). Therefore, these vibration levels are not expected to occur at any location of frequent and prolonged human use, including the nearby Passerelle Building, Olmsted Center (approximately 250 feet north of the project site separated by the railway tracks of the LIRR), and Queens Museum of Art (approximately 500 feet south of the project site). Furthermore, the operations which would result in these perceptible vibration levels would only occur for finite periods of time at any particular location and therefore the resulting vibration levels, while perceptible and irritating, would not result in any significant adverse impacts.

OTHER TECHNICAL AREAS

Open Space

The proposed project would result in improvements to landscaping, circulation, and amenities at the NTC that would be provided for the US Open and the public. The proposed project's construction activities would take place within the proposed NTC leased premises, except for the relocated connector road and park improvement projects; no additional areas of Flushing Meadows Corona Park are anticipated to be used for staging for construction activities associated with the NTC. In order to minimize the effects of construction-related closures on the public, to the extent practicable, court construction would take place during the winter months when these courts are not actively used and are replaced by more activity in indoor courts. At limited times, construction activities would generate noise that could impair the enjoyment of nearby open space users, but such noise effects would be temporary. Construction fences around the project site would shield the park from construction activities. In addition, areas that are outside of the current NTC fence line but within the proposed lease boundaries that would be directly affected by the construction of the proposed project are lightly used, primarily for walking and jogging activities on the perimeter paths. The replacement connector road would be built prior to the closure of the existing connector road, and commencement of construction activities for the new Stadium 3. The replacement connector road would include pedestrian sidewalks that would provide access to the main portions of the park for pedestrians entering the park via the United Nations Avenue North bridge over the Grand Central Parkway. Therefore, vehicle and pedestrian circulation, as well as park activities, would be maintained at all times. It is not currently anticipated that any changes to the extent of pavement or removal of trees would be necessary in Lot S to accommodate construction-related parking. However, if the use of this area during construction of the proposed project would require such changes, the area would be restored to the existing condition upon completion of the proposed project. Construction activities associated with the proposed project would not be expected to create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to sidewalks or pathways in other areas of the park for walking, running, and biking during the entire construction period. Dust control measures—including watering of exposed areas and dust covers for trucks—would be implemented to ensure compliance with the New York City Air Pollution Control Code, which regulates construction-related dust emissions. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

Historic and Cultural Resources

The proposed project would result in construction activities within 90 feet of the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with the New York City Landmarks Preservation Commission (LPC)'s *Guidelines for Construction Adjacent to a Historic Landmark* as well as the guidelines set forth in section 523 of the *CEQR Technical Manual* and the procedures set forth in the New York City Department of Buildings (DOB)'s *Technical Policy and Procedure Notice* (TPPN) #10/88. This includes the preparation of a CPP prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project. Therefore, the proposed project would not result in any significant adverse construction-related impacts to historic and cultural resources.

Hazardous Materials

The proposed project would involve subsurface disturbance for the proposed NTC improvements and expansion, as well as demolition of or alterations to some existing structures. Soil that would be disturbed by the proposed project includes historical fill materials known to contain ash, which have somewhat elevated concentrations of certain metals and semivolatile organic compounds (SVOCs). In addition, on-site structures may contain hazardous materials such as asbestos-containing materials (ACM), polychlorinated biphenyls (PCBs), and/or lead-based paint.

As discussed in Chapter 8, "Hazardous Materials," to reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a Subsurface (Phase II) Investigation Work Plan to determine whether past or present, on or off-site activities have affected subsurface conditions, would be prepared and submitted to the New York City Department of Environmental Protection (NYCDEP) for review and approval. The Phase II investigation would target areas where soil disturbance is proposed. Following implementation of this Phase II investigation, based on its findings, a Remedial Action Plan (RAP) and associated Construction Health and Safety Plan (CHASP), to be implemented during project construction, would be prepared and submitted to NYCDEP for review and approval. The RAP would address requirements for items such as soil stockpiling, disposal, and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The CHASP would identify potential hazards that may be encountered during construction and specify appropriate health and safety measures to be undertaken to ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment (such as personal protective equipment, dust control, air monitoring, and emergency response procedures). During and following demolition and renovation associated with the proposed project, regulatory requirements pertaining to ACM, lead-based paint, PCBs, chemical use, and storage would be followed. With these above-described measures, the proposed project would not result in any significant adverse impacts related to hazardous materials.

Natural Resources

Groundwater within the project site is not potable and soil levels of some compounds are elevated; construction of the proposed project would not be expected to have adverse impacts to groundwater quality or result in human or environmental exposure to contaminants. Nearly all project components would entail redevelopment of existing facilities, relocation of facilities, or construction of new facilities in previously developed areas within the NTC. The relocation of Grandstand Stadium (Stadium 3) and a connector road are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southwestern section of the NTC, which is outside of any floodplain and would not increase local flood risk. Construction would require the disturbance of ecological communities present on-site and the relocation or removal of approximately 422 trees that are both outside the existing fence line and various locations inside the NTC site. Tree replanting and replacement within the NTC and elsewhere within the park would comply with the New York City Department of Parks and Recreation (DPR)'s applicable rules and regulations. Due to the highly urban nature of the terrestrial ecological communities present on the site, the loss of some of these communities as a result of the proposed project would not result in a significant adverse impact on ecological communities of the region. Wildlife occurring in the area is composed of urban-adapted, disturbance-tolerant generalists that would not be affected by construction noise. Some wildlife would be displaced from the site during project construction, but would be expected to relocate elsewhere in Flushing Meadows Corona Park and the surrounding neighborhoods. No federally or state-listed wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Therefore, construction of the proposed project would not result in a significant adverse impact to federally- or state-listed wildlife of the region.

B. OVERVIEW OF CONSTRUCTION ACTIVITIES

This section describes the City, state, and federal regulations and policies that govern construction, the expected construction schedule, construction practices, and construction tasks. The types of equipment to be used are discussed, and the number of workers and truck deliveries is estimated. A detailed description of each type of construction activity is also provided. This section establishes the framework used for the assessment of potential impacts from construction. Following the discussion of construction techniques, the chapter discusses potential impacts with regard to transportation, air quality, noise and vibration, open space, historic and cultural resources, hazardous materials, natural resources, community facilities, land use, and neighborhood character.

GOVERNMENTAL COORDINATION AND OVERSIGHT

The following describes construction oversight by government agencies, which involves a number of city, state, and federal agencies. The project site is located within Flushing Meadows Corona Park, which is under the jurisdiction of DPR. DPR is responsible for overseeing construction activities within the park, and would approve and monitor construction activities associated with the proposed project. **Table 16-1** shows the main agencies involved in construction oversight and the agencies' areas of responsibilities. Primary responsibilities lie with DPR, and with DOB, which ensures that the construction meets the requirements of the Building Code and that the buildings are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect both the workers and the public. The areas of oversight include installation and operation of the equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. NYCDEP enforces the Noise Code, reviews and approves RAPs/CHASPs, and regulates water disposal into the sewer system and the removal of tanks. The Fire Department of New York City (FDNY) has primary oversight for compliance with the Fire Code and for the installation of tanks containing flammable materials. LPC approves studies such as a CPP and conducts monitoring to prevent damage to historic structures. DPR is responsible for the oversight, enforcement, and permitting of the replacement of trees that are lost due to construction. The tree removal and replacement program associated with the proposed project would be approved by DPR. Tree replanting and replacement within the NTC and elsewhere in the park would comply with the City's applicable rules and regulations.

Table 16-1
Construction Oversight in New York City

Agency	Areas of Responsibility
New York City	
Department of Buildings	Primary oversight for Building Code and site safety
Department of Environmental Protection	Noise, RAPs/CHASPs, hazardous materials, dewatering, tanks
Fire Department	Compliance with Fire Code, tanks
Landmarks Preservation Commission	Archaeological and architectural protection
Department of Parks and Recreation	Street trees
Department of Design and Construction	Oversight of relocated connector road
New York State	
Department of Labor	Workers/Asbestos workers
Department of Environmental Conservation	Hazardous materials and tanks
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials, poisons
Occupational Safety and Health Administration	Worker safety

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

CONSTRUCTION PHASING AND SCHEDULE

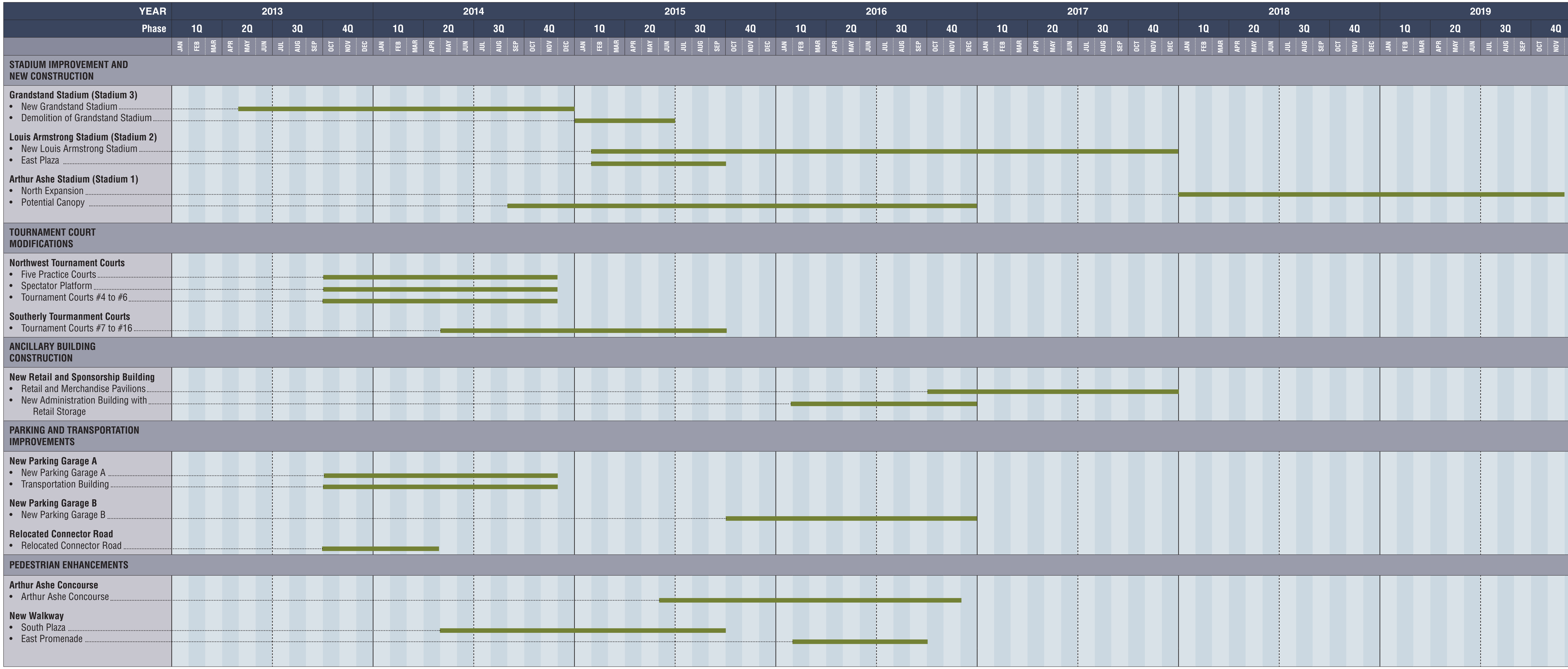
The construction duration for most of the individual project elements is expected to be short-term (less than two years) except for the construction of the possible canopy at the Arthur Ashe Stadium (Stadium 1) where it would take approximately 28 months to complete. Limited construction activities are expected to occur during the US Open event at Louis Armstrong Stadium (Stadium 2) and at the new Grandstand Stadium (Stadium 3) in the southwest corner of the project site. Construction equipment that would be on-site for other project elements would remain idle and would not be in operation during the US Open.

Construction of the proposed project is expected to begin in 2013 and would be completed by 2019, including park improvement projects. **Figure 16-1** and **Table 16-2** show the anticipated construction schedule for the proposed project. As summarized in **Table 16-2**, the major project elements would include stadium improvements and new construction, tournament court modifications, ancillary building construction, parking and transportation improvements, and pedestrian enhancements.

Stadium improvements and new construction elements would include the demolition and replacement of Grandstand Stadium and Louis Armstrong Stadium, and the renovation and expansion of Arthur Ashe Stadium. Demolition of the existing Grandstand Stadium would commence upon completion of the new Stadium 3 in the southwest corner of the project site, which would be completed by the end of 2015 (and would take approximately 6 months). Demolition of Louis Armstrong Stadium would begin in February 2016, with the replacement stadium in place at the same location by the end of 2017. Since the replacement of Louis Armstrong Stadium would take more than one year to complete, the demolition process would be scheduled so that a temporary replacement stadium could be built for the US Open, on the same site. Construction of the new stadium would continue after the US Open and take-down of the temporary structure. Possible construction activities associated with the new canopy at Arthur Ashe Stadium would begin in April 2013 and would take approximately 28 months to complete, while renovation and expansion activities at the stadium would start in the beginning of 2018 and would be completed by November 2019. Construction activities at Arthur Ashe Stadium would not occur during the US Open to avoid any disruption to the tournament.

Tournament court modifications would include the replacement and relocation of existing courts. Construction activities at the northwest tournament courts would commence in October 2013 and would take approximately 14 months to complete. The five practice courts and tournament courts currently in this area would be replaced with five new practice courts, three new tournament courts, along with new elevated viewing platform. Construction at the southerly tournament courts would begin in May 2014 and would take 17 months to complete. The seven tournament courts currently in this area would be relocated to the south. In addition, new bleacher seating areas would be provided. In order to minimize the effects of construction-related closures on the public, to the extent practicable, court construction would take place during the winter months when these courts are not actively used and are replaced by more activity in indoor courts.

Ancillary building construction would include new retail and merchandise pavilions and the new administrative and retail building in the same location as the existing Grandstand Stadium. Construction of the pavilions would begin in October 2016 and would be completed by December 2017, while construction of the new administrative and retail building would commence in February 2016 and would be completed by December 2016.



Anticipated Construction Schedule
Figure 16-1

Table 16-2
Anticipated Construction Schedule

Map No.[1]	Name	Start Month	Finish Month	Approximate Duration (Months)
Stadium Improvements and New Construction				
1	Grandstand Stadium (Stadium 3)			
	New Stadium 3	May 2014	December 2015	20
	Demolition of Grandstand Stadium	January 2016	June 2016	6
2	Louis Armstrong Stadium (Stadium 2)			
	New Stadium 2	February 2016	December 2017	23
	East Plaza	February 2016	September 2016	8
3	Arthur Ashe Stadium (Stadium 1)			
	North Expansion	January 2018	November 2019	23
	Potential Canopy	September 2014	December 2016	28
Tournament Court Modifications				
4	Northwest Tournament Courts			
	Five Practice Courts	October 2013	November 2014	14
	Spectator Platform	October 2013	November 2014	14
	Tournament Courts 4 to 6	October 2013	November 2014	14
5	Southerly Tournament Courts			
	Tournament Courts 7 to 16	May 2014	September 2015	17
Ancillary Building Construction				
6	New Administrative and Retail Building			
	Retail and Merchandise Pavilions	October 2016	December 2017	15
	New Administrative Building with Retail Storage	February 2016	December 2016	11
Parking and Transportation Improvements				
7	New Parking Garage A			
	New Parking Garage A	October 2013	November 2014	14
	Transportation Center	October 2013	November 2014	14
8	New Parking Garage B			
	New Parking Garage B	October 2015	December 2016	15
9	Relocated Connector Road			
	Relocated Connector Road	October 2013	April 2014	7
Pedestrian Enhancements				
10	Arthur Ashe Concourse			
	Arthur Ashe Concourse	June 2015	November 2016	18
11	New Walkway			
	South Plaza	May 2014	September 2015	17
	East Promenade	February 2016	September 2016	8

Notes: [1]See Figure 1-4 for the location of these elements under existing conditions. See Figure 1-5 for their proposed future location.
-Limited construction activities would occur during the US Open event.
Source: USTA

Parking and transportation improvements would include the construction of two new parking garages, a transportation center, and the relocation of the connector road. Construction of the new Parking Garage A and a new transportation center in the northwest corner of the site would begin in 2013 and would be completed by November 2014, while the construction of the new Parking Garage B would begin in October 2015 and would be completed by December 2016. The connector road displaced by the relocation of the Grandstand Stadium would be relocated to the area south of United Nations Avenue North near the Queens Museum of Art parking lot. Construction activities associated with the connector road relocation would start in October 2013 and would take approximately 7 months to complete.

Pedestrian enhancements would include concourse expansion at the Arthur Ashe Stadium, a new walkway at the South Plaza, and a new walkway that would connect the new Stadium 3 and Court 17. Construction activities associated with the Arthur Ashe concourse would begin in June 2015 and would be completed by November 2016. The new walkway in the South Plaza would start in May 2014 and would be completed by September 2015, while the new walkway in the East Promenade would start in February 2016 and would be completed by September 2016.

CONSTRUCTION PRACTICES

USTA would have a field representative throughout the entire construction period. The representative would serve as the contact point for the community and local leaders, and would be available to resolve concerns or problems that arise during the construction process. New York City maintains a 24-hour-a-day telephone hotline (311) so that concerns can be registered with the city. A security staff is at the NTC site 24 hours a day, 365 days a year.

HOURS OF WORK

For the proposed project, construction is expected to take place Monday through Friday and with minimal, weather make-up work on Saturdays with DPR approval. Certain exceptions to these schedules are discussed separately below. In accordance with New York City laws and regulations, construction work would generally begin at 7:00 AM on weekdays, with most workers arriving to prepare work areas between 6:00 AM and 7:00 AM. Normally weekday work would end by 3:30 PM, but it can be expected that to meet the construction schedule or to complete certain construction tasks, the workday may be extended beyond normal work hours on occasions with DPR approval. The work could include such tasks as completing the drilling of piles, finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. The extended workday would generally last until about 6:00 PM and would not include all construction workers on-site, just those involved in the specific task requiring additional work time.

Weekend work would not be regularly scheduled, but could occur to make up for weather delays or other unforeseen circumstances. In such cases, appropriate work permits from DOB would be obtained. Similar to an extended workday, the numbers of workers and pieces of equipment in operation would be limited to those needed to complete the particular task at hand. For extended weekday and weekend work, the level of activity would be reduced from the normal workday. The typical weekend workday would be on Saturday from 7:00 AM with worker arrival and site preparation to 5:00 PM for site cleanup. Construction activities would be scheduled to allow for the staging of the US Open and would be managed to minimize effects on traffic and event conditions.

ACCESS AND DELIVERIES

Access to the construction sites would be tightly controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. The location of the work areas would vary depending on the individual construction task and its associated construction activities. All construction activities associated with the NTC are anticipated to occur within the proposed NTC lease boundaries. Typically, worker vehicles would not be allowed into the construction area. Security guards and flagmen may be posted as necessary, and all persons and trucks would have to pass through security points. Workers or trucks without a need to be on the site would not be allowed entry. Security guards would patrol the construction sites after work hours and over the weekends to prevent unauthorized access.

All deliveries to the site would be controlled and scheduled. To aid in adhering to the truck delivery schedules, as is normal for construction in New York City, flagmen would be employed where needed. The flagmen could be supplied by the subcontractor on-site at that time or by the construction manager. The flagmen would control trucks entering and exiting the site, so that they would not interfere with one another. In addition, they would provide an additional traffic aid as the trucks enter and exit the on-street traffic streams.

STAGING AREA

The staging area of construction materials, equipment, and trucks would vary depending on the individual construction task and the location of the associated construction activities. Due to the large size of the NTC campus, all of the staging activities associated with NTC construction would be accommodated within the proposed NTC leased premises, including the areas adjacent to the project site that border Meridian Road to the east and the LIRR to the north.

LANE AND SIDEWALK CLOSURES

During the course of construction, closures of traffic lanes and sidewalks on Meridian Road are not anticipated. In addition, construction activities are expected to occur within the proposed NTC lease boundaries only, with the exception of the relocated connector road and park improvement projects. The replacement connector road would be built prior to the closure of the existing connector road, and commencement of construction activities for the new Stadium 3. The replacement connector road would include pedestrian sidewalks that would provide access to the main portions of the park for pedestrians entering the park via the United Nations Avenue North bridge over the Grand Central Parkway. Therefore, vehicle and pedestrian circulation, as well as park activities, would be maintained at all times.

RODENT CONTROL

Construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be maintained with appropriate public agencies. Only EPA- and NYSDEC-registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to persons, domestic animals, and non-target wildlife.

CITY IMPROVEMENTS

The proposed location for the relocated connector road would be outside of the NTC, in Flushing Meadows Corona Park, and the relocated connector road would be built by the City. In addition, the park improvement projects that would be implemented elsewhere in the park would be constructed by the City. As described in Chapter 1, “Project Description,” these improvements potentially include: the renovation of existing soccer fields; development of a new comfort station; the development of new picnic and barbecue areas and improvements to pathways; and vehicular, pedestrian, landscape, and drainage upgrades. The City would implement substantially the same controls and procedures as those outlined above for work that would be coordinated by the USTA.

CONSTRUCTION TASKS

CONSTRUCTION STARTUP TASKS

Construction startup work prepares the site for construction. Startup work for each of the construction elements would involve the installation of public safety measures, such as fencing, sidewalk sheds, and Jersey barriers, where needed. The construction area would be fenced off, typically with solid fencing to minimize interference between the persons passing by the site and the construction work. Trailers for the construction engineers and managers would be hauled to the site and installed. These trailers could be placed within the proposed lease boundaries of the NTC. Also, portable toilets, dumpsters for trash, and water and fuel tankers would be brought to the site and installed. Temporary utilities would be connected to the construction trailers. During the startup period, permanent utility connections may be made, especially if the contractor has obtained early electric power for construction use, but utility connections may be made almost any time during the construction sequence. Construction startup tasks would be completed within weeks.

STADIUM IMPROVEMENTS AND NEW CONSTRUCTION

Grandstand Stadium (Stadium 3)

New Stadium 3 (May 2014 to December 2015)
Demolition of Grandstand Stadium (January 2016 to June 2016)

The existing Grandstand Stadium would be demolished and the replacement Stadium 3 would be located at the southwest corner of the project site. Prior to the demolition of the existing Grandstand Stadium, the structure would be abated of asbestos and any other hazardous materials such as lead-base paint and PCBs within the existing structure. Any economically salvageable materials and/or recyclable materials would then be removed. Demolition of the existing Grandstand Stadium would be next. Front-end loaders would be used to load materials into dump trucks. The demolition debris would be sorted prior to being disposed at landfills to maximize reuse and recycling opportunities. The phases envisioned for the new stadium construction at the southwest corner of the project site would include excavation and foundations, the lower concrete superstructure, the upper steel superstructure, the seating area and interior finishing, exterior walls, and specialties. Excavators would be used for the task of excavation. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on a construction site that needs fill. As the final grade of the new Stadium 3 is approached, bulldozers or excavators would be used for shaping the ground. A spread footing foundations system is expected to be used for the new Stadium 3. In this type of foundation system, concrete column footings would be used to accommodate the concentrated load placed on them and support the structure above. Forms would first be placed and reinforcing bars installed. Then the concrete would be poured and/or pumped to form the footings. Next, precast elements would be placed by cranes to form the lower superstructure of the stadium, followed by the assembly of the stadium's upper steel superstructure. The exterior walls of the stadium would then be placed by cranes and local hoists on the superstructure frame. Much of the seating area would be constructed of precast concrete stadia members and would be placed inside the stadium by cranes. After placement, the seats, handrails, and other appurtenances would be installed on the precast concrete members using hand tools. Interior finishing would involve trades, such as electrical, heating/ventilation and air conditioning (as necessary), painting, and furnishing. Finally, specialties such as security equipment, secure telecommunications for radio and television, video display systems, IT and audio visual systems, wireless systems, vertical transportation, concessionaire stands, and commercial kitchens would be installed.

Louis Armstrong Stadium (Stadium 2)

New Stadium 2 (February 2016 to December 2017)
East Plaza (February 2016 to September 2016)

The existing Louis Armstrong Stadium would be demolished with the replacement stadium in place at the same location. The construction methodology for Louis Armstrong Stadium would be similar to that as described above for the Grandstand Stadium. Grading would also be required for the new Louis Armstrong Stadium as the elevation of the new stadium would be increased slightly to avoid flooding around the stadium.

Arthur Ashe Stadium (Stadium 1)

North Expansion (January 2018 to November 2019)
Potential Canopy (September 2014 to December 2016)

The renovation and expansion of Arthur Ashe Stadium would include new administrative and operational space and a possible canopy above center court. Construction equipment for the renovation and expansion activities of Arthur Ashe Stadium would mostly be located within the stadium. USTA continues to explore possible methods of covering Arthur Ashe Stadium in the event of rain during the US Open, and is analyzing possible engineering solutions for a canopy system that would attach along the upper edge of the stadium. Scaffolding systems would be needed for the surrounding perimeter roof during the possible construction of the canopy. The canopy system would most likely be pre-fabricated and lifted into place with the use of mobile cranes. As for the new administrative and operational space, construction equipment that would needed for this project element would include but not limited to concrete pumps, concrete trucks, roller-compactors, forklifts, and mobile cranes.

TOURNAMENT COURT MODIFICATIONS

Northwest Tournament Courts

Five Practice Courts (October 2013 to November 2014)
Spectator Platform (October 2013 to November 2014)
Tournament Courts 4 to 6 (October 2013 to November 2014)

The five practice courts and tournament courts currently in this area would be replaced with five new practice courts, three new tournament courts, along with new elevated viewing platform. The existing courts and spectator stands would first be demolished with the use of an excavator and a bulldozer. Then, the base layers of the courts would be prepared with use of rollers and paving equipment. Each of the courts at NTC would consist of an asphalt base layered with several coatings of rubber and topped with one of more layers of acrylic paint mixed with sand. The construction of the spectator platform would require the use of pile drivers and concrete trucks for the structure's foundation system and mobile cranes to lift the structural pieces into place. In addition, the existing utility networks including the water, sewage, electric, and telecommunication lines would be upgraded during this project element.

Southerly Tournament Courts

Tournament Courts 7 to 16 (May 2014-September 2015)

The seven tournament courts currently in this area would be relocated to the south. In addition, new bleacher seating areas would be provided. The existing courts and spectator stands would first be demolished with the use of an excavator and a bulldozer. Trees would also be removed to facilitate the construction of the tournament courts at the new locations. Then, the base layers of the courts would be prepared with use of rollers and paving equipment. As described above, each of the courts at NTC would consist of an asphalt base layered with several coatings of rubber and topped with one of more layers of acrylic paint mixed with sand. This project element would also require landscaping work. In addition, the existing utility networks including the water, sewage, electric, and telecommunication lines would be upgraded and a new fence to the south of the tournament courts would be installed during this project element.

ANCIILLARY BUILDING CONSTRUCTION

New Administrative and Retail Building

Retail and Merchandise Pavilions (October 2016 to December 2017)
New Administrative Building with Retail Storage (February 2016 to December 2016)

Ancillary building construction would include new retail and merchandise pavilions and the new administrative and retail building in the same location as the existing Grandstand Stadium. Excavation would start with the installation of augured steel piles, with heavy timbers to support the sides, then excavation and loading of the soil onto trucks and carting of the soil from the site. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on a construction site that needs fill. Next, concrete pumps and concrete trucks would be used to erect the foundation of the building. When the below-grade construction is completed, construction of the core and shell of the new building would begin. The core would be the central part of the building and would be the main part of the structural system. It would contain the elevators and the mechanical systems for heating, ventilation, and air conditioning (HVAC). The shell would be the outside of the building. As the core and floor decks of the building are being erected, installation of the mechanical and electrical internal networks would start. As the building progresses upward, the exterior cladding would be lifted into place with mobile cranes, and the interior fit out begins.

PARKING AND TRANSPORTATION IMPROVEMENTS

New Parking Garage A

New Parking Garage A (October 2013 to November 2014)
Transportation Center (October 2013 to November 2014)

Parking and transportation improvements would include the construction of the new Parking Garage A and a new transportation in the northwest corner of the project site center (see Chapter 1, "Project Description," for details about these improvements). The existing surface park lot would first be demolished with the use of an excavator and a bulldozer. Excavation of the soils would be next along with the construction of the foundations. Excavation would start with the installation of augured steel piles, with heavy timbers to support the sides, then excavation and loading of the soil onto trucks and carting of the soil from the site. Building construction would then ensue, followed by interior finishing.

New Parking Garage B

New Parking Garage B (October 2015 to December 2016)

Parking and transportation improvements would also include the construction of the new Parking Garage B and a new transportation center in the northeast corner of the project site. The construction methodology would be similar to the one listed for new Parking Garage A above.

Relocated Connector Road

Relocated Connector Road (October 2013 to April 2014)

The connector road displaced by the relocation of the Grandstand Stadium would be relocated to the area south of United Nations Avenue North near the Queens Museum of Art parking lot. Roller-compactor and paving equipment would be used for the construction of the new connector road. In addition, small mobile cranes would be needed for landscaping and tree removals.

PEDESTRIAN ENHANCEMENTS

Arthur Ashe Concourse

Arthur Ashe Concourse (June 2015 to November 2016)

Pedestrian enhancements would include concourse expansion at the Arthur Ashe Stadium. New concessions and seating would be added to the Arthur Ashe Concourse. Construction equipment that would be needed for this project element would include but not limited to concrete pumps, concrete trucks, roller-compactors, forklifts, and mobile cranes.

New Walkway

South Plaza (May 2014 to September 2015)
Transportation Center (February 2016 to September 2016)

Pedestrian enhancements would also include the construction of a new walkway at the South Plaza, and a new walkway that would connect the new Stadium 3 and Court 17 at the East Promenade. Similar to the construction activities for the Arthur Ashe Concourse, construction equipment that would be needed include concrete pumps, concrete trucks, roller-compactors, forklifts, and mobile cranes.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Construction is labor intensive, and the number of workers varies with the general construction task. Likewise, material deliveries generate trucks, and the number also varies. **Table 16-3** shows the estimated numbers of workers and deliveries to the project site by calendar quarter for all construction based on the anticipated schedule outlined above. These represent the average number of daily workers and trucks within each quarter. The average number of workers would be about 146 per day throughout the construction period. The peak number of workers would be 381 per day in the 2nd quarter of 2016. For truck trips, the average number of trucks would be approximately two trucks per day, and the peak would occur in the 2nd quarter of 2014 with about six trucks per day.

Table 16-3
Average Number of Daily Workers and Trucks by Quarter

Year	2013				2014				2015				2016			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	--	--	--	31	78	110	184	226	262	254	210	142	199	379	381	267
Trucks	--	--	--	3	5	6	3	2	2	2	2	2	3	5	2	1
Year	**2017**				**2018**				**2019**				**Project**			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Average		Peak	
Workers	230	232	193	70	7	20	24	24	24	24	16	5	146		415	
Trucks	1	1	1	1	1	1	1	1	1	1	1	1	2		6	

Notes: Construction estimates do not include City Improvement projects that would be implemented elsewhere in Flushing Meadows Corona Park and not within the project site.
Source: Barton Malow Company

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

As described in Chapter 2, "Land Use, Zoning, and Public Policy," as part of USTA's on-going management of capital projects at the NTC, a range of capital improvements are expected to be made to the NTC between US Open periods. These projects are not part of the NTC Strategic Vision and would proceed regardless of the status of the proposed project. The capital projects program includes repairs, upgrades, and reconstruction of existing facilities and infrastructure, as well as the construction of minor new facilities within the lease boundaries.

D. FUTURE WITH THE PROPOSED PROJECT

Construction of the proposed project, as is the case with any construction activities, may be disruptive to the surrounding area However, with the exception of Flushing Meadows Corona Park, all of the sensitive receptor locations including the nearest residences are located more than 500 feet away from the project site and are separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. In addition, the proposed project would not involve extensive demolition, foundation, or superstructure construction activities, which often generate the highest levels of noise and air pollutant emissions.

The following analysis describes the overall temporary effects on transportation, air quality, noise, open space, historic and cultural resources, hazardous materials, natural resources, socioeconomic conditions, community facilities, land use and public policy, and rodent control.

TRANSPORTATION

Construction of the proposed project would generate trips from workers traveling to and from the site, as well as from the movement of materials and equipment, and removal of construction waste. The estimated number of daily construction workers for each project element is as follows:

- The construction of the new Stadium 3 and the demolition of the existing Grandstand Stadium would require about 25 to 130 workers on-site.
- The construction activities at Louis Armstrong Stadium would require approximately 45 to 220 workers, depending on the task.
- Workers required for the potential new canopy at Arthur Ashe Stadium and the renovation and expansion activities at the stadium would range from 5 to 75 workers.

- The construction activities at the northwest tournament courts would require up to 20 workers on-site.
- Construction at the southerly tournament courts would require about 10 to 45 workers on-site.
- The construction of the new administrative and retail building and the retail and merchandise pavilions would require approximately 5 to 70 workers.
- The construction of the new Parking Garage A including the new transportation building would require approximately up to 45 workers on-site.
- The construction of the new Parking Garage B would require approximately up to 25 workers on-site.
- Workers required for the relocated connector road would range from 5 to 25 workers.
- Construction activities associated with Arthur Ashe Concourse would require about 5 to 20 workers.
- Construction of the new walkways at the South Plaza and East Promenade would require approximately 5 to 40 workers.

Truck movements would generally be distributed throughout the day with peak activities occurring in the early morning. The estimated one-way truck trips required for each project element over the course of the construction period are as follows:

- The construction of the new Stadium 3 would require a total of about 375 deliveries over a 20-month construction period, while the demolition of the existing Grandstand Stadium would require approximately 100 trucks over a 6-month construction period.
- The construction activities at Louis Armstrong Stadium would require approximately 450 deliveries over a 23-month period.
- The total deliveries required for the potential new canopy at Arthur Ashe Stadium would be approximately 525 over a 28-month construction period, while the renovation and expansion activities at the stadium would require about 150 deliveries over a 23-month construction period.
- The construction activities at the northwest tournament courts would require 320 deliveries over a 14-month period.
- Construction at the southerly tournament courts would require about 110 deliveries over a 17-month construction period.
- The construction of the new administrative and retail building would require approximately 100 deliveries over an 11-month construction period, while the construction of the retail and merchandise pavilions would require about 65 deliveries over a 15-month period.
- The construction of the new Parking Garage A including the new transportation building would require approximately 350 deliveries over a 14-month construction period
- The construction of the new Parking Garage B would require approximately 155 deliveries over a 15-month construction period.
- Deliveries required for the relocated connector road would be approximately 100 over a 7-month construction period.
- Construction activities associated with Arthur Ashe Concourse would require about 190 deliveries over an 18-month period.

- Construction of the new roadways at the South Plaza would require approximately 65 deliveries over a 17-month construction period, while construction of the new roadways at the East Promenade would require about 30 deliveries over an 8-month period.

CONSTRUCTION WORKER VEHICLE AND TRUCK TRIPS

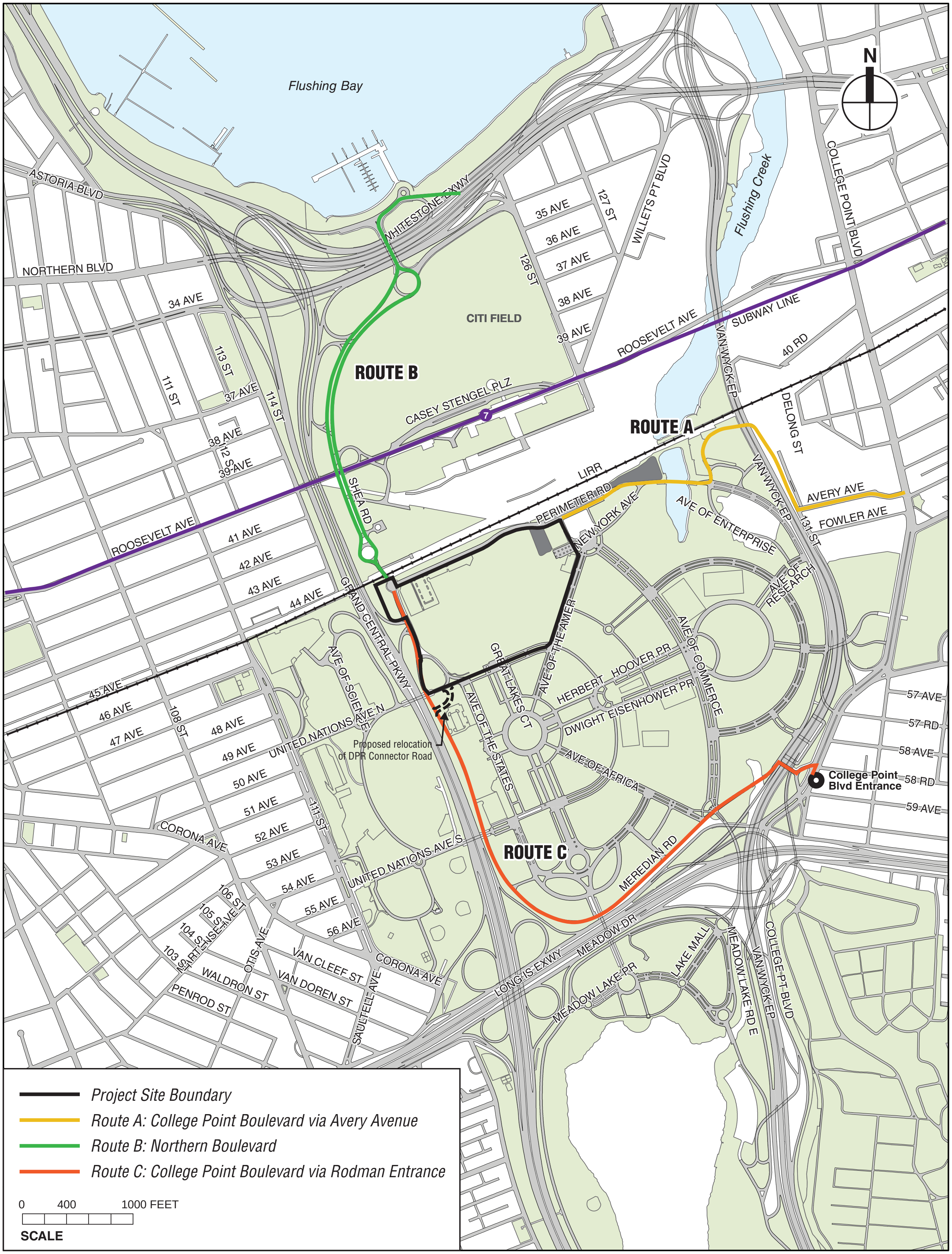
The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each shift (6–7 AM for arrival and 4-5 PM for departure on a regular day shift). Based on the Willets Point Development Plan Final Generic Environmental Impact Statement (2008), it is expected that approximately 70 percent of construction workers would commute to the project site via auto. For construction trucks, deliveries would occur throughout the day when the construction site is active. Truck movements would be spread throughout the day and would generally occur between the hours of 6 AM and 3 PM, depending on the stage of construction. Construction truck deliveries typically peak during the hour before the normal work day (25 percent of daily total), overlapping with construction worker arrival traffic. Therefore, the early morning 6–7 AM construction peak hour is generally considered the most critical hour for a construction traffic analysis. Since construction activities vary among different project elements, construction stages and tasks, representative daily construction traffic is typically summarized using quarterly averages. **Table 16-4** presents the monthly breakdown of the average construction vehicle trips (including the worker and truck trips in PCEs) for the 6–7 AM construction peak hour. The construction of the proposed project would result in peak construction trips during the second quarter of 2016, with a maximum of 192 PCEs during the construction AM peak hour during those months. On average, construction of the proposed project would result in 64 PCEs during the AM peak hour.

Table 16-4
Quarterly Average 6-7 AM Peak Hour Construction Vehicle Trips in PCEs

Year	2013				2014				2015				2016			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
PCEs	-	-	-	19	46	61	94	114	132	128	106	73	101	192	189	134
Year	**2017**				**2018**				**2019**				**Average**		**Peak**	
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	66		192	
PCEs	116	117	98	38	7	14	16	16	16	16	12	2				

Notes: Numbers of construction worker vehicles were calculated using a 70-percent auto split and an auto-occupancy of 1.15 based on the Willets Point Development Plan Final Generic Environmental Impact Statement (2008)

Because the NTC is in close proximity to several major highways, including the Grand Central Parkway (GCP), Van Wyck Expressway (VWE), and the Long Island Expressway (LIE), most of the construction worker auto trips are expected to enter and exit the site directly from these roadways. Deliveries could use three routes, as shown on **Figure 16-2**. Route A would utilize College Point Blvd via Avery Avenue and 131st Street, including the Porpoise Bridge over the Flushing River. However, this bridge may not be available at all times due to a needed repair and resurfacing project that DPR intends to implement in the No-Action condition. Depending on the size and weight of the load, deliveries may also use: Route B, which would utilize Northern Boulevard and Shea Road; and Route C, which would utilize College Point Boulevard via the Rodman Entrance (see **Figure 16-2**). When distributed over the transportation network, the



Proposed Construction Truck Route
Figure 16-2

construction trip increments at any single location, particularly on local streets, would be minimal. In addition, these trip increments would primarily occur outside of the typical commuter peak hours (8–9 AM and 5–6 PM). Therefore, the traffic increase due to construction activities for the proposed project is not expected to result in any significant adverse traffic impacts.

Traffic Lane and Sidewalk Closures

As noted above, construction activities associated with the NTC are expected to occur within the proposed NTC lease boundaries only. The replacement connector road would be built prior to the closure of the existing connector road, and commencement of construction activities for the new Stadium 3. The replacement connector road would include pedestrian sidewalks that would provide access to the main portions of the park for pedestrians entering the park via the United Nations Avenue North bridge over the Grand Central Parkway. Therefore, vehicle and pedestrian circulation, as well as park activities, would be maintained at all times.

PARKING

The construction activities would generate an estimated daily parking demand of up to 232 parking spaces during peak construction. This parking demand could be fully accommodated by the existing, approximately 0.94 acre, parking Lot S, which contains space for approximately 250 vehicles and is located adjacent to the project site on the west side of Meridian Road, within the existing lease boundaries of the NTC. It is not currently anticipated that any changes to the extent of pavement or removal of trees would be necessary to accommodate construction-related parking in Lot S. However, if the use of this area during construction of the proposed project would require such changes, the area would be restored to the existing condition upon completion of the proposed project.

TRANSIT AND PEDESTRIAN

With approximately 70 percent of the construction workers predicted to commute via auto, the remaining 30 percent are expected to travel to and from the project site via transit and walking. During the peak month of construction, up to approximately 381 workers could be at the project site on a given day. This would result in approximately 114 construction-related transit trips (fewer than the *CEQR Technical Manual* analysis threshold of 200 trips). Therefore, there would not be a potential for any significant adverse transit impacts during construction. In addition, 305 pedestrian trips would be expected during the peak hour. Because these pedestrian trips would primarily occur outside of the typical commuter peak hours (8–9 AM and 5–6 PM) and would originate from several nearby transit services including the No. 7 subway line and the Q19, Q48, and Q66 local bus routes and Parking Lot S within the NTC lease boundary, they would be distributed among numerous sidewalks and crosswalks in the area. In addition, as described in Chapter 10, "Transportation," all of the subway person trips generated by the construction of the proposed project would connect directly from the station to the project site via the Passerelle ramp without utilizing any of the pedestrian facilities—sidewalks, corner reservoirs, and crosswalks—from the local street network. Therefore, no pedestrian elements are expected to incur 200 or more incremental pedestrian trips (the 2012 *CEQR Technical Manual* analysis threshold) resulting from the construction of the proposed project. Hence, there would not be a potential for significant adverse pedestrian impacts during construction. Also, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with NYCDOT requirements.

AIR QUALITY

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generating activities, have the potential to affect air quality. In general, much of the heavy equipment used in construction has diesel-powered engines and produces relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Gasoline engines produce relatively high levels of carbon monoxide (CO). Fugitive dust generated by construction activities is composed of particulate matter. As a result, the primary air pollutants of concern for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO.

The main component of diesel exhaust that has been identified as having an adverse effect on human health is $PM_{2.5}$. The construction duration for most of the proposed project's elements is expected to be short-term (less than two years) except for the possible construction of the canopy at Arthur Ashe Stadium (Stadium 1) where most of the construction equipment would be located within the stadium. Nevertheless, in order to minimize the project's potential to have construction-period impacts on air quality, the following measures would be implemented, to the extent practicable:

- *Diesel Equipment Reduction.* Construction of the proposed project would minimize the use of diesel engines and use electric engines, to the extent practicable. This would reduce the need for on-site generators, and require the use of electric engines in lieu of diesel where practicable.
- *Clean Fuel.* To the extent practicable, ultra-low sulfur diesel (ULSD) would be used for diesel engines throughout the construction site.
- *Best Available Tailpipe Reduction Technologies*. Nonroad diesel engines with a power rating of 50 horsepower (hp) or greater would utilize the best available tailpipe (BAT) technology for reducing DPM emissions. Diesel particle filters (DPF) have been identified as being the tailpipe technology currently proven to have the highest PM reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either installed on the engine by the original equipment manufacturer (OEM) or retrofit with a DPF verified by the United States Environmental Protection Agency (USEPA) or the California Air Resources Board, and may include active DPFs[1] if necessary; or other technology proven to reduce DPM by at least 90 percent.
- *Utilization of Newer Equipment*. EPA's Tier 1 through 4 standards for nonroad engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC). All nonroad construction equipment in the project would meet at least the Tier 2 emissions standard, and construction equipment meeting Tier 3 and/or Tier 4

[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).

emissions standards would be used where conforming equipment is widely available, and the use of such equipment is practicable.

- *Dust Control.* Fugitive dust control plans will be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the construction site. Truck routes within the site would be watered as needed to avoid the re-suspension of dust. All trucks hauling loose material will be equipped with tight fitting tailgates and their loads securely covered prior to leaving the site. In addition to regular cleaning by the City, streets adjacent to the site would be cleaned as frequently as needed by the construction contractor. Water sprays will be used for all transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air.
- *Restrictions on Vehicle Idling.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time will also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.

Overall, this emissions control program is expected to significantly reduce diesel particulate matter (DPM) emissions by a similar reduction level that would be achieved by applying the currently defined best available control technologies under New York City Local Law 77, which are required only for publically funded City projects.

The proposed project's construction activities would take place within the proposed NTC leased premises over a period of four years with discrete project elements lasting two years or less, except for the possible construction of the canopy at Arthur Ashe Stadium where most of the construction equipment would be located within the stadium. The walls of the stadium would act as barriers to the transport of air pollutants to nearby areas. The proposed project would not involve extensive foundation, or superstructure construction activities, which often generate the highest levels of air emissions. With the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, there are very few sensitive receptors near the project site. However, the most intense construction activities (excavation and foundation work) in proximity to the Passerelle Building in terms of air pollutant emissions would be much less than two years. In addition, construction activities associated with the construction of Parking Garage B would not be considered out of the ordinary in terms of intensity and, in fact, emissions would be lower due to the emission control measures that would be implemented during construction of the proposed project. The park areas immediately adjacent to the current NTC fence line but within the proposed lease boundaries are lightly used, primarily for walking and jogging activities on the perimeter paths. Furthermore, , the Passerelle ramp that connects the LIRR's Met's Willets Point station to the MTA's 7 train station is primarily for transient use, and pedestrians passing through to access public transportation would not be expected to be present for extended durations.

The nearest residences are located more than 500 feet away from the project site and are separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. Therefore, due to the factors described above and with the implementation of an emissions control program, the proposed project would not result in any significant adverse impact on air quality.

NOISE AND VIBRATION

NOISE

Impacts on community noise levels during construction would include noise from the operation of construction equipment and noise from construction 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). Noise levels of typical construction equipment are shown in **Table 16-5**. Noise levels caused by construction activities would vary widely, depending on the phase of construction (i.e., structure rehabilitation, interior fit-outs, etc.) and the location of the construction activities relative to noise-sensitive receptor locations. As noted above, there are very few noise sensitive receptors near the project site. With the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, all of the sensitive receptor locations including the nearest residences are located more than 500 feet away from the project site and are separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. In fact, the nearest residences are located approximately 550 feet northwest from the project site, at 111-89 44th Avenue. Furthermore, the park areas immediately adjacent to the current NTC fence are lightly used, primarily for pass-through activity on the perimeter path.

Typically, increased noise levels caused by construction activities can be expected to be greatest during the stages of construction where impact equipment (i.e., pile drivers) would be employed. However, the duration of pile driving activities for the proposed project would be limited in duration for each of construction elements where pile drivers would be needed—approximately 2 to 3 months. For each pile, the actual driving time would be short, on the order of 45 minutes. Within this driving period, driving may be intermittent, with 45 minutes of driving followed by an interval of an hour when no driving occurs, followed by tapping down to the final elevation. Moreover, pile driving activities are expected to utilize vibratory hammers rather than impact hammers to the greatest extent possible. In general, vibratory hammers produce less intrusive noise levels than impact hammers (vibratory hammers produce continuous noise versus impulsive noise from an impact hammer). Aside from pile driving, the demolition of Grandstand Stadium and Louis Armstrong Stadium would also generate a high increase in noise levels but these activities would be limited in duration—approximately 2 to 3 months—and occur at the northern portion of the project site, away from sensitive receptor locations in Flushing Meadows Corona Park. The construction duration for most of the elements in the proposed project is expected to be short term (less than two years) and therefore any potentially intrusive noise levels generated by construction activities would be of limited duration. Although the possible construction of the canopy at the Arthur Ashe Stadium would take approximately 28 months to complete, most of the equipment used for this construction element would be located within the stadium where the walls of the stadium would provide acoustical shielding for noise sources, thus limiting noise disruptions to nearby sensitive locations.

Table 16-5
Typical Noise Emission Levels for Construction Equipment

Equipment Item	Noise Level at 50 ft. (dBA)
Backhoe	80
Bar Bender	80
Chain Saw	85
Compactor (ground)	80
Compressor (air, less than or equal to 350 cfm)	53
Compressor (air, greater than 350 cfm)	58
Concrete Mixer Truck	85
Concrete Pump Truck	82
Concrete Saw	90
Crane	85
Drill Rig	84
Drum Mixer	80
Dump Truck	84
Dumpster/Rubbish Removal	78
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator	82
Impact Pile Driver	95
Jackhammer	73
Man Lift	85
Mounted Impact Hammer (Hoe Ram)	90
Pavement Scarafier	85
Paver	85
Pickup Truck	55
Pneumatic Tools	85
Pumps	77
Refrigeration Unit	82
Rivet Buster / Chipping Gun	85
Rock Drill	85
Roller	85
Sand Blasting	85
Soil Mix Drill Rig	80
Tractor	84
Vacuum Excavator (Vac-truck)	85
Vacuum Street Sweeper	80
Vibrating Hopper	85
Vibratory Pile Driver	95
Warning Horn	85
Welder / Torch	73

Source: *CEQR Technical Manual*, Chapter 22, section 330, Table 22-1, January 2012.

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 the 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. As described above, 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 and Parks would be consulted and would need to approve of such activities. As part of the New York City Noise Control Code, a site-specific noise mitigation plan would be developed and implemented that may include source controls, path controls, and receiver controls.

In terms of source controls (i.e., reducing noise levels at the source or during most sensitive time periods), the following measures for construction would be implemented as required by the New York City Noise Control Code:

- The contractors would use equipment that meets the sound level standards for equipment (specified in Subchapter 5 of the New York City Noise Control Code) from the start of construction activities and use a wide range of equipment, including construction trucks, which produce lower noise levels than typical construction equipment.
- As early in the construction period as practicable, electrical-powered equipment, such as electric scissor lifts and electric articulating forklifts (i.e., early electrification), would be used.
- All contractors and subcontractors would be required to properly maintain their equipment and have quality mufflers installed.

In terms of path controls (e.g., placement of equipment and implementation of barriers between equipment and sensitive receptors), the following measures for construction would be implemented as required by the New York City Noise Control Code:

- Perimeter noise barriers would be constructed that satisfy New York City Noise Control Code requirements.
- To the extent feasible, noisy equipment, such as generators, cranes, trailers, concrete pumps, concrete trucks, and dump trucks, would be located away from and shielded from sensitive receptor locations.

For impact determination purposes, significant adverse noise impacts are based on whether maximum predicted incremental noise levels at sensitive receptor locations off-site would be greater than the impact criteria suggested in the *CEQR Technical Manual* for more than two years. As described above, the proposed project's construction activities would take place within the proposed NTC lease boundaries, except for the relocated connector road and park improvement projects. Construction activities would take place over a period of four years with discrete project elements lasting two years or less. While noise associated with the proposed construction activities may be considered noisy and intrusive, potential increases in noise levels as a result of construction-related activities would therefore be of limited duration. In addition, as described above, with the exception of adjacent portions of Flushing Meadows Corona Park and the Passerelle Building, there are very few sensitive receptors near the project site, with the nearest residences located more than 500 feet away from the project site and separated from the site by Grand Central Parkway to the west and Van Wyck Expressway to the east. The proposed project does not involve extensive excavation, foundation, or superstructure construction activities, which often generate the highest noise levels. The nosiest construction activity—pile driving—would be of very limited duration, and is expected to utilize vibratory hammers rather than impact hammers to the greatest extent possible. The most noise intrusive construction activities (excavation and foundation work) in proximity to the Passerelle Building would be much less than two years. The park areas immediately adjacent to the current NTC fence line but within the proposed lease boundaries are lightly used, primarily for walking and jogging activities on the perimeter paths. In addition, the Passerelle ramp that connects LIRR's Mets-Willets Point station to the Metropolitan Transportation Authority (MTA)'s 7 train station is primarily for transient use, and pedestrians passing through to access public transportation would not be expected to be present for extended durations. Due to distance and existing noise levels generated by traffic on Grand Central Parkway and Van Wyck Expressway and the other factors described above, no significant adverse noise impacts would be expected at sensitive receptor locations due to the construction of the proposed project.

As in the existing and future without the proposed project conditions, noise levels at Flushing Meadows Corona Park during construction of the proposed project are expected to be above the CEQR 55 dBA $L_{10(1)}$ guideline for open spaces requiring serenity and quiet, the predicted levels are comparable to or lower than noise levels in a number of open space areas that are within range of substantial noise sources (e.g., roadways, aircraft, etc.), including Hudson River Park, Riverside Park, and Bryant Park. The 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet; however, due to the level of activity present at most open space areas and parks throughout New York City (except for areas far away from traffic and other typical urban activities), this relatively low noise level is often not achieved. Consequently, noise levels during construction at Flushing Meadows Corona Park, while exceeding the 55 dBA $L_{10(1)}$ CEQR guideline value, would not constitute a significant noise impact.

VIBRATION

The proposed project is not expected to result in significant adverse construction impacts with respect to vibration. As described in Chapter 5, "Historic and Cultural Resources," a CPP would be developed to protect known architectural resources with a lateral distance of 90 feet from the proposed construction activities. The CPP would include a monitoring component to ensure that if vibration levels approach the 0.5 inches per second PPV criterion, corrective action would be taken to reduce vibration levels, thereby avoiding architectural damage and significant vibration impacts.

Construction resulting in vibration levels greater than 65 vibration decibels (VdB) (e.g., equipment used during pile driving) would be perceptible and annoying and would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time. However, as described above, the proposed project's construction activities would take place within the proposed NTC leased premises, except for the relocate connector road and parking improvement projects. Construction activities would take place over a period of four years with discrete project elements lasting two years or less, except for the possible construction of the canopy over the center court of Arthur Ashe Stadium (Stadium 1). Therefore, these vibration levels are not expected to occur at any location of frequent and prolonged human use, including the nearby Passerelle Building, Olmsted Center (approximately 250 feet north of the project site separated by the railway tracks of the LIRR), and Queens Museum of Art (approximately 500 feet south of the project site). Furthermore, the operations which would result in these perceptible vibration levels would only occur for finite periods of time at any particular location and therefore the resulting vibration levels, while perceptible and annoying, would not result in any significant adverse impacts.

OTHER TECHNICAL AREAS

OPEN SPACE

The proposed project would result in improvements to landscaping, circulation, and amenities at the NTC that would be provided for the US Open and the public. All construction activities are expected to occur within the proposed NTC lease boundaries, with the exception of the relocated connector road and park improvement projects; no additional areas of Flushing Meadows Corona Park are anticipated to be used for staging for construction activities associated with the NTC. In order to minimize the effects of construction-related closures on the public, to the extent practicable, court construction would take place during the winter months when these courts are not actively used and are replaced by more activity in indoor courts. At limited times, construction activities would generate noise that could impair the enjoyment of nearby open space users, but such noise effects would be temporary. Construction fences around the project site would shield the park from construction activities. In addition, areas that are outside of the current NTC fence line but within the proposed lease boundaries that would be directly affected by the construction of the proposed project are lightly used, primarily for walking and jogging activities on the perimeter paths. The replacement connector road would be built prior to the closure of the existing connector road, and commencement of construction activities for the new Stadium 3. The replacement connector road would include pedestrian sidewalks that would provide access to the main portions of the park for pedestrians entering the park via the United Nations Avenue North bridge over the Grand Central Parkway. Therefore, vehicle and pedestrian circulation, as well as park activities, would be maintained at all times. It is not currently anticipated that any changes to the extent of pavement or removal of trees would be necessary in Lot S to accommodate construction-related parking. However, if the use of this area during construction of the proposed project would require such changes, the area would be restored to the existing condition upon completion of the proposed project. Construction activities associated with the proposed project would not be expected to create a strain on nearby sections of Flushing Meadows Corona Park. Park users would continue to have access to sidewalks or pathways in other areas of the park for walking, running, and biking during the entire construction period. Dust control measures—including watering of exposed areas and dust covers for trucks—would be implemented to ensure compliance with the New York City Air Pollution Control Code, which regulates construction-related dust emissions. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

HISTORIC AND CULTURAL RESOURCES

Architectural resources are defined as buildings, structures, objects, sites or districts listed on the State and National Registers of Historic Places (S/NR) or determined eligible for such listing based on the criteria defined below, National Historic Landmarks (NHLs), New York City Landmarks (NYCLs) and Historic Districts, and properties that have been found by the LPC to appear eligible for designation, considered for designation ("heard") by LPC at a public hearing, or calendared for consideration at such a hearing (these are "pending" NYCLs). Chapter 5, "Historic and Cultural Resources," provides a detailed assessment of potential impacts on architectural and archaeological resources. This section summarizes potential impacts during construction.

The proposed project would result in construction activities within 90 feet of the Freedom of the Human Spirit sculpture and the Passerelle Building. Therefore, to avoid potential inadvertent construction-related impacts to these resources during project demolition and construction activities, the proposed project would comply with LPC's *Guidelines for Construction Adjacent to a Historic Landmark* as well as the guidelines set forth in section 523 of the *CEQR Technical Manual* and the procedures set forth in DOB's TPPN #10/88. This includes the preparation of a CPP that would be prepared prior to construction activities and submitted to LPC for review and approval. None of the other architectural resources in the study area are close enough to experience direct, physical impacts from construction of the proposed project.

Therefore, the proposed project would not result in any significant adverse construction-related impacts to historic and cultural resources.

HAZARDOUS MATERIALS

The proposed project would entail soil disturbance associated with improvements and expansion of NTC facilities, including demolition of existing structures, construction of new structures, and roadway construction and improvements. Based on the findings of the June 2012 *Phase I Environmental Site Assessment* (ESA), several potential sources of contamination were identified, including: historical on-site marshland potentially associated with methane emissions; filling of the project site and nearby land with a mixture of ash, refuse, street sweepings, and soil and rock removed during subway construction in Brooklyn; and a historical on-site underground storage tank (UST). Soil that would be disturbed by the proposed project includes historical fill materials known to contain ash, which have somewhat elevated concentrations of certain metals and semivolatile organic compounds (SVOCs). In addition, on-site structures may contain hazardous materials such as ACM, PCBs and/or lead-based paint.

Based on the above findings, to reduce the potential for human or environmental exposure to contamination during and following construction of the proposed project, a RAP and associated CHASP, to be implemented during project construction, would be prepared and submitted to the NYCDEP for review and approval. The RAP would address requirements for items such as soil stockpiling, disposal, and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The CHASP would identify potential hazards that may be encountered during construction and specify appropriate health and safety measures to be undertaken to ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment (such as personal protective equipment, dust control, air monitoring, and emergency response procedures).

Lead-based paint, ACM and PCB-containing electrical equipment, hydraulic equipment and fluorescent lighting fixtures may be present (primarily within the older structures) at the project site. During and following demolition and renovation associated with the proposed project, regulatory requirements pertaining to ACM, lead-based paint, PCBs, chemical use, and storage would be followed.

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

NATURAL RESOURCES

Groundwater

As discussed above in "Hazardous Materials," a RAP and associated CHASP would be prepared for implementation during subsurface disturbance associated with project construction. The RAP would address requirements for items such as soil stockpiling, disposal, and transportation; dust control; quality assurance; and contingency measures, should petroleum storage tanks or contamination be unexpectedly encountered. The RAP would include the requirement for any future enclosed construction to include appropriate vapor control (e.g., vapor barriers) to prevent the migration of methane or VOCs into enclosed areas. The RAP would also include the requirements for a cap of clean imported soil to be placed in areas not covered by buildings or paving. If dewatering is required during construction activities, it would be performed in accordance with NYCDEP requirements. With these measures in place, no significant adverse impacts to groundwater would be expected during the construction of the proposed project.

Floodplain

Nearly all project components would entail redevelopment of existing facilities, relocation of facilities, or construction of new facilities in previously developed areas within the NTC. The relocation of Grandstand Stadium (Stadium 3) and a connector road are the only project elements that would involve developing previously undeveloped land (mostly consisting of lawn and mature shade trees), but this activity would occur in the southwestern section of the NTC which is outside of any floodplain. The elevation in the vicinity of Louis Armstrong Stadium (Stadium 2) would be slightly increased to reduce flooding around the stadium. Redevelopment and construction in other areas of the site would not require grading that would significantly change the elevation of the area. As such, there would be no alteration of the function or distribution of the existing floodplain zone, and no changes to the current risk of flooding in the area during the construction of the proposed project.

Ecological Communities

As described in detail in Chapter 7, "Natural Resources," the ecological communities present within the project site would be characterized by Edinger et al. (2002) as "terrestrial cultural" communities that include "flower/herb garden," "mowed lawn," and "mowed lawn with tress." Construction of the proposed project would require the removal of approximately 422 trees both outside the existing fence line, including United Nations Avenue North and the proposed location of the connector road south of United Nations Avenue North, and various locations inside the NTC site including in the vicinity of the practice courts, parking Lot A, northwest corner of Arthur Ashe Stadium (Stadium 1), west side of parking Lot B, west side of Grandstand Stadium, proposed Grandstand Stadium relocation site, and a small number in the Food Village. Where possible, some of the existing younger London planetree and willow oak trees may be transplanted within the NTC site or surrounding area where the circumstances deem feasible. Tree relocation would take place to maintain the benefits of having larger, more mature trees on-site. Tree replanting and replacement would comply with DPR's applicable rules and regulations and would be in conformance with DPR requirements. In addition, approximately 54 percent, or 500, of the existing trees would remain in place, would be protected during construction, and would be incorporated into the landscaping design. Due to the highly urban nature of the terrestrial ecological communities present on the site, the loss of some of these communities as a result of the proposed project would not result in a significant adverse impact on ecological communities of the region. Measures would be taken to protect the health and condition of trees on-site that would not require removal. Therese measures would include protection plans to minimize impacts to the critical root zones, trunks, and canopies.

Wildlife

The majority of the proposed project would involve construction and reconstruction in presently developed areas of the project site, which are almost entirely unvegetated and covered by impervious surfaces. Construction of these project elements would not eliminate or degrade any habitat of use to native wildlife. The construction of the new Stadium 3 at the southwestern section of the NTC would not significantly impact species currently inhabiting this area at the individual or population level. Individuals currently inhabiting the area would, as extreme generalists, easily relocate to the extensive amounts of alternative habitat that would remain available elsewhere in Flushing Meadows Corona Park and the surrounding neighborhoods.

Potential impacts to wildlife from construction activities for the project generally include noise and visual disturbances. However, impacts to wildlife would be minimal because wildlife in the surrounding area consists of urban-adapted, highly disturbance-tolerant species, as described in Chapter 7, “Natural Resources.” The species of wildlife in the area are ubiquitous throughout the city and commonly inhabit areas with extensive levels of human disturbance and degraded habitat conditions.

Threatened, Endangered, and Special Concern Species and Significant Habitat Areas

No federally or state-listed wildlife species are known to or considered to have the potential to occur within the project site or adjacent area. Therefore, construction of the proposed project would not result in a significant adverse impact to federally- or state-listed wildlife of the region.

SOCIOECONOMIC CONDITIONS

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

COMMUNITY FACILITIES

No community facilities are located near the construction site. 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. Construction of the proposed project would not block or restrict access to any facilities in the area, and would not materially affect emergency response times. New York Police Department (NYPD) and FDNY emergency services and response times would not be materially affected due to the geographic distribution of the police and fire facilities and their respective coverage areas.

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would not affect land use on the project site nor would they alter surrounding land uses. As is typical with construction projects, during periods of peak construction activity there would be some disruption, predominantly noise, to the nearby area. There would be construction trucks and construction workers coming to the site. There would also be noise, sometimes intrusive, from construction work as well as trucks and other vehicles backing up, loading, and unloading. These disruptions would be temporary in nature and would have minimal effects on land uses within the study area, particularly as most construction activities would take place within the project site or within portions of sidewalks, curbs, and travel lanes of Meridian Road immediately adjacent to the project site. Overall, while the construction at the site would be evident to the local community, the limited duration of construction would not result in significant or long-term adverse impacts on local land use patterns or neighborhood character in the area. ✷

A. INTRODUCTION

In accordance with City Environmental Quality Review (CEQR), this chapter presents and analyzes alternatives to the proposed project. As described in the 2012 *CEQR Technical Manual*, alternatives selected for consideration in an Environmental Impact Statement (EIS) are generally those which are feasible, considering the objectives and capabilities of the project sponsor, and have the potential to reduce, eliminate, or avoid adverse impacts of a proposed project.

The USTA Billie Jean King National Tennis Center (NTC) Strategic Vision (the proposed project) would result in a series of improvements on the project site, as described in Chapter 1, “Project Description.” This chapter summarizes the evaluation of alternatives to the proposed project. CEQR requires the examination of a No-Action Alternative, in which a proposed project would not be undertaken. The technical chapters of this EIS have described the No-Action Alternative (referred to as “the future without the proposed project”, or the “No-Action” condition) and have used it as the basis to assess the potential impacts for the proposed project. In addition to the No-Action Alternative required for examination under CEQR, this chapter examines an Alternative Without Additional Park Land, an Alternative Without New Park Land Alienation, an Alternative With Greater Expansion, and an Alternative With Modified Parking Plan.

This analysis first examines the No-Action Alternative, which describes the conditions that would exist if the proposed project was not implemented. The second alternative is the Alternative Without Additional Park Land, in which 0.94 acres of park land is not added to the NTC site. The third alternative is the Alternative Without New Park Land Alienation, in which 0.26-acres of previously alienated park land is added to the NTC site, but no new alienation is undertaken. The fourth alternative is the Alternative With Greater Expansion, in which additional park land beyond the 0.94-acres anticipated with the proposed project is added to the NTC (see Figure 1-3 for the locations of these areas). The fifth alternative is the Alternative With Modified Parking Plan, in which one or both of the proposed parking garages are not built.

B. NO-ACTION ALTERNATIVE

DESCRIPTION

Consideration of the No-Action Alternative is mandated by both CEQR and is intended to provide the lead and involved agencies with an assessment of the expected environmental impacts of No-Action on their part. As described in Chapter 2, “Land Use, Zoning, and Public Policy,” in the future without the proposed project (the No-Action condition), it is expected that existing uses on the project site would remain and that the NTC’s ongoing management of capital projects would result in minor alterations to the project site. In addition, the future No-Action condition would account for other independent, off-site development projects that are planned to be in place by 2019 absent the proposed project.

ALTERNATIVE COMPARED WITH THE PROPOSED PROJECT

The effects of the No-Action Alternative in comparison to those of the proposed project are summarized below.

LAND USE, ZONING, AND PUBLIC POLICY

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts to land use, zoning, or public policy. Under the No-Action Alternative, existing land use conditions on the project site would not change, except for alterations to the project site that would result from USTA's ongoing management of capital projects, as described in Chapter 2, "Land Use, Zoning, and Public Policy." The NTC would continue to be a public tennis facility that hosts the US Open, a world-class sporting event. The NTC would also continue to be constrained by existing site plan deficiencies, such as congested circulation, and structural challenges, as Grandstand Stadium and Louis Armstrong Stadium have reached the end of their useful lives. The deterioration of these stadiums would threaten the ability of the NTC to host the US Open and function as a world class facility. Existing zoning on the project site and existing public policies are expected to remain in force.

The No-Action Alternative would not result in: an addition of land to the NTC site (including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease); the relocation of the connector road; a reconfiguration of uses on the project site; and an increase in stadium space, retail and operational uses, and parking facilities. While the No-Action Alternative would not result in any increases in height or bulk on the project site, it would also not result in new landscaping improvements along the NTC fence line. The No-Action Alternative would also not replace aging facilities with new modern, recreational facilities that would be open to the public 11 months of the year. In addition, the proposed park improvements in Flushing Meadows Corona Park, including the possible renovation of existing soccer fields and other park enhancements, may not be realized. As the No-Action Alternative may not result in these park improvements, it would be less supportive of the Flushing Meadows Corona Park Strategic Framework Plan, and the City's Waterfront Revitalization Program, compared to the proposed project.

OPEN SPACE AND RECREATIONAL RESOURCES

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts to open space. Under the No-Action Alternative, the current NTC fence line would remain unchanged. The No-Action Alternative would not directly affect any previously-alienated land outside of the current NTC fence line, and would not result in the alienation of 0.68-acres of park land. Proposed improvements to landscaping, circulation, and amenities at the NTC would not be realized. The No-Action Alternative would also not result in additional improvements for the benefit of the general public within Flushing Meadows Corona Park, including potential renovation of existing soccer fields and other park enhancements, as would occur with the proposed project.

SHADOWS

Under the No-Action Alternative, the proposed project would not be implemented, and therefore there would be no change with respect to shadows. Neither the No-Action Alternative nor the proposed project would result in adverse shadow impacts on any sun-sensitive resource. However, unlike the proposed project, four small areas adjacent to the project site within Flushing Meadows Corona Park would not experience incremental shadows with the No-Action Alternative.

HISTORIC AND CULTURAL RESOURCES

Like the proposed project, the No-Action Alternative would not have a significant adverse impact on historic and cultural resources. Neither the No-Action Alternative nor the proposed project would result in ground disturbance to archaeologically sensitive areas or adversely affect the context of nearby architectural resources. Under the proposed project, a Construction Protection Plan (CPP) would be developed to prevent inadvertent construction-related impacts on two architectural resources— the Freedom of the Human Spirit sculpture and the Passerelle Building—that are located within 90 feet of construction activities for the proposed project. The No-Action Alternative would not have the potential to physically affect these two architectural resources.

URBAN DESIGN AND VISUAL RESOURCES

As with the proposed project, the No-Action Alternative would not have significant adverse impacts on urban design and visual resources. Unlike the proposed project, the No-Action Alternative would not result in improvements to NTC circulation, landscaping, and visitor amenities, which would be anticipated to enhance the pedestrian experience within the project site. The No-Action Alternative would not result in new construction that would increase the height and bulk of the facility. The No-Action Alternative would also not result in modest changes to park land acreage and result in a relocated connector roadway, and would therefore not result in any changes to natural features, open spaces, or streets in the study area. Both the proposed project and the No-Action Alternative would be consistent with the existing urban design characteristics of the project site and study area.

NATURAL RESOURCES

Like the proposed project, the No-Action Alternative would not have significant adverse impacts on natural resources. The No-Action Alternative would not result in the removal of 422 trees within and outside of the current NTC fence line, including 6 state-listed endangered willow oak trees located within the NTC in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center. The No-Action Alternative would also not result in the development of previously undeveloped areas including manicured lawn. However, the No-Action Alternative would also not result in grading changes on the site that would improve drainage and flood conditions after major rainfall events.

HAZARDOUS MATERIALS

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to hazardous materials. Under the No-Action Alternative, the project site is expected to continue in its current uses, which do not currently present a hazard to people or the environment.

WATER AND SEWER INFRASTRUCTURE

While the No-Action alternative would generate less demand on New York City's water supply, wastewater and sanitary sewage treatment systems than the proposed project, neither the proposed project nor the No-Action Alternative would result in any significant adverse impacts on the City's water supply, wastewater or stormwater conveyance and treatment infrastructure.

The No-Action Alternative would result in a higher rate of stormwater runoff from the project site as compared to the proposed project, as it would not benefit from the incorporation of select best management practices (BMPs).

TRANSPORTATION

Because the No-Action Alternative would not result in an increase in attendance, the significant adverse impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place. Transportation conditions under the No-Action Alternative are expected to be substantially the same as existing conditions. Therefore, unlike the proposed project, the No-Action Alternative would not be expected to lengthen the travel time for departing patrons exiting the US Open at the conclusion of the daytime session.

Under both the proposed project and the No-Action Alternative, the roadway network is anticipated to continue to experience congested levels of service during event conditions. Due to the traffic management program, however, conditions typically observed when intersection operations become saturated (queues extending beyond storage capacity, blocked turning movements, aggressive driver behavior, etc.) would be managed in the field. Field observations conducted during the US Open show that the traffic management program and the Traffic Enforcement Agents (TEAs) are able to effectively manage traffic flow during event peak periods.

AIR QUALITY

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to air quality. Under the No-Action Alternative the small increase in carbon monoxide (CO) concentrations resulting from traffic generated by the proposed project and the proposed parking garages would not occur. The No-Action Alternative would also not result in incremental emissions from use of natural gas in heat and hot water systems. However, with the proposed project, any incremental emissions from mobile sources would be below the corresponding guidance thresholds and ambient air quality standards, and there would be no potential for significant adverse air quality impacts from stationary sources or the heating and hot water systems for the proposed improvements. Therefore, neither the No-Action Alternative nor the proposed actions would result in significant adverse air quality impacts.

GREENHOUSE GAS EMISSIONS

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to greenhouse gas (GHG) emissions. Both the proposed project and the No-Action Alternative would incorporate sustainability measures aimed at reducing energy consumption for both the US Open period and the non-event season. As the No-Action Alternative would not increase attendance at the US Open, the No-Action Alternative would generate fewer GHG emissions than the proposed project during US Open events, when GHG emissions would be generated as a result of electricity use onsite. New stadium facilities and ancillary buildings would not be constructed with the No-Action Alternative, resulting in fewer GHG emissions from construction activities. The No-Action Alternative would not result in some of the sustainability measures that could be implemented with the proposed project. For example, under the proposed project, the use of clean power or generation of renewable or low power on-site is under consideration for the proposed building that would seek Leadership in Energy and Environmental Design (LEED) certification, subject to site design and economic feasibility.

NOISE

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to noise. Under both the No-Action Alternative and the proposed project, noise levels in Flushing Meadows Corona Park adjacent to the project site would be expected to exceed the 55 dBA $L_{10(1)}$ guideline value recommended in the *CEQR Technical Manual* for open spaces. These conditions would be less than or comparable to noise levels in other parks and open spaces throughout New York City.

NEIGHBORHOOD CHARACTER

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to neighborhood character. The No-Action Alternative would not result in: an addition of land to the NTC site (including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease); relocation of a connector road in a 0.3-acre area; a reconfiguration of uses on the project site; and an increase in stadium space, retail and operational uses, and parking facilities. While the No-Action Alternative would not result in any increases in height or bulk on the project site, it would also not result in new landscaping improvements along the NTC fence line. The No-Action Alternative would also not replace aging facilities with new modern, recreational facilities that would be open to the public 11 months of the year. In addition, the proposed park improvements in Flushing Meadows Corona Park, including renovation of existing soccer fields and other park enhancements, would not be realized.

PUBLIC HEALTH

The No-Action Alternative, like the proposed project, would not result in any significant adverse public health impacts associated with construction or operation of the new development on the project site.

CONSTRUCTION IMPACTS

Like the proposed project, the No-Action Alternative would not result in any significant adverse impacts with respect to construction. Under the No-Action Alternative, no stadium and ancillary building construction would occur on the project site. Therefore, the No-Action Alternative would avoid the temporary construction effects attributable to the proposed project, such as increases in truck traffic and construction-related noise. However, in addition to being largely confined to the project site and its perimeter (except for the relocated connector road and park improvement projects), the construction impacts of the proposed project would be addressed (e.g., through dust-control measures and adherence to noise regulations), and would not result in any significant adverse impacts.

C. ALTERNATIVE WITHOUT ADDITIONAL PARK LAND

DESCRIPTION

Under the Alternative Without Additional Park Land, improvements would be implemented at the NTC without the additional 0.94 acres of park land, including 0.68 acres of park land that would be alienated and 0.26 acres of previously alienated park land. Two of the NTC site's existing three stadiums —Louis Armstrong Stadium and Grandstand Stadium— are approaching 50 years of age and have reached the end of their useful lives, as the stadiums were designed for the 1964-1965 World's Fair. The continued deterioration of these stadiums would threaten the ability of the NTC to host the US Open and function as a world class facility. Absent the proposed expansion of the project site, these facilities would need to be rebuilt in place. The new stadiums would continue to be constrained by an inefficient site plan, and the opportunity to improve pedestrian circulation would be lost.

Rebuilding these stadiums in place would mean that the site plan as proposed could not be achieved. Compared to the proposed project, the following objectives would not be achieved:

- **Expand public plazas and promenades and improve functionality of public spaces and open areas within the NTC.** Without an expansion of the site, new public spaces and walkways could not be provided and site circulation would continue to be congested. Therefore, this objective would not be achieved.
- **Improve circulation, comfort, and safety for visitors and players.** Without the provision of new public spaces and walkways, site circulation would continue to be congested. Existing public spaces could be improved only to a lesser extent. Therefore, this objective would not be achieved.
- **Activate underutilized spaces within the NTC site.** The alternative would maintain the current congested conditions in the northern portion of the site, thereby not achieving a dispersal of patrons.
- **Increase the capacity of the NTC site to allow for more daytime attendance at the US Open.** Without an expansion of the site, new facilities and circulation improvements could not be provided. Thus, additional daytime attendees could not be accommodated. Therefore, this objective would not be achieved.
- **Enhance economic benefits of the US Open in Queens, New York City, and the region.** As this alternative would not allow for an increase in daytime attendance at the US Open, there would not be an increase in economic benefits to Queens, New York City, and the region, compared to the proposed project. In addition, the enhancement of the competitive status of the US Open, with respect to the four Grand Slam events, would not be achieved.

In addition, the opportunity to improve the NTC's context within Flushing Meadows Corona Park would be lost. As the daytime capacity of the NTC for the US Open could not be increased, there would not be improved economic benefits to the City. The competitive position of the NTC would decline in relative terms due to improvements at competing and peer facilities.

ALTERNATIVE COMPARED WITH THE PROPOSED PROJECT

The effects of the Alternative Without Additional Park Land in comparison to those of the proposed project are summarized below.

LAND USE, ZONING, AND PUBLIC POLICY

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts to land use, zoning, or public policy. Under the Alternative Without Additional Park Land, the NTC would continue to be constrained by existing site plan deficiencies, such as congested internal circulation and structural challenges, as Grandstand Stadium and Louis Armstrong Stadium have reached the end of their useful lives. Existing zoning on the project site and existing public policies are expected to remain in force.

The Alternative Without Additional Park Land would not result in: an addition of land to the NTC site (including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease); relocation of a connector road in a 0.3-acre area; a reconfiguration of uses on the project site; and an increase in stadium space, retail and operational uses, although it would result in the construction of replacement facilities for Louis Armstrong Stadium and Grandstand Stadium in their current locations, as well as two parking garages. While the Alternative Without Additional Park Land would result in less substantial changes in height or bulk on the project site compared to the proposed project, it would also not result in new landscaping improvements along the NTC fence line. In addition, the proposed park improvements in Flushing Meadows Corona Park, including the possible renovation of existing soccer fields and other park enhancements, may not be realized. As the Alternative Without Additional Park Land may not result in these park improvements, it would be less supportive of the Flushing Meadows Corona Park Strategic Framework Plan, and the City's Waterfront Revitalization Program, compared to the proposed project.

OPEN SPACE AND RECREATIONAL RESOURCES

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts to open space. Under the Alternative Without Additional Park Land the current NTC fence line would remain unchanged. The Alternative Without Additional Park Land would not directly affect any previously-alienated land outside of the current NTC fence line, and would not result in the alienation of 0.68-acres of park land. Proposed improvements to landscaping, circulation, and amenities at the NTC would not be realized. The Alternative Without Additional Park Land would also not result in additional improvements for the benefit of the general public within Flushing Meadows Corona Park, including potential renovation of existing soccer fields and other park enhancements, as would occur with the proposed project.

SHADOWS

Under the Alternative Without Additional Park Land, the proposed project would not be implemented, and therefore there would be less substantial changes with respect to shadows, although the replacement Louis Armstrong and Grandstand Stadiums could be taller than the current height. Under the Alternative Without Additional Park Land, Parking Garage B would cast between approximately 5 minutes and an hour and 50 minutes of incremental shadow in the spring, summer, and fall on the circular plaza area adjacent to the Passerelle Building, as would occur under the proposed project. Only a small portion of this plaza would be affected by the new shadow, and even this small area would receive direct sun for most of the remaining day in those seasons due to the lack of structures to the south and east (see Chapter 4, "Shadows"). Neither the Alternative Without Additional Park Land nor the proposed project would be result in significant adverse shadow impacts on any sun-sensitive resource. Unlike the proposed project, three small areas adjacent to the project site within Flushing Meadows Corona Park would be unlikely to experience incremental shadows with the Alternative Without Additional Park Land.

HISTORIC AND CULTURAL RESOURCES

Like the proposed project, the Alternative Without Additional Park Land would not have a significant adverse impact on historic and cultural resources. Neither the Alternative Without Additional Park Land nor the proposed project would result in ground disturbance to archaeologically-sensitive areas or adversely affect the context of nearby architectural resources. Because construction activities associated with both the proposed project and the Alternative Without Additional Park Land would have the potential to physically affect two architectural resources within 90 feet of the project site, a CPP would be developed to prevent inadvertent construction-related impacts.

URBAN DESIGN AND VISUAL RESOURCES

As with the proposed project, the Alternative Without Additional Park Land would not have significant adverse impacts on urban design and visual resources. Unlike the proposed project, the Alternative Without Additional Park Land would not result in improvements to NTC circulation, landscaping, and visitor amenities, which would be anticipated to enhance the pedestrian experience within the project site. The Alternative Without Additional Park Land would result in lesser increases to the height and bulk of the facility than the proposed project. The Alternative Without Additional Park Land would also not result in modest changes to park land acreage and result in a relocated connector roadway, and would therefore not result in any changes to natural features, open spaces, or streets in the study area. Both the proposed project and the Alternative Without Additional Park Land would be consistent with the existing urban design characteristics of the project site and study area.

NATURAL RESOURCES

Like the proposed project, the Alternative Without Additional Park Land would not have significant adverse impacts on natural resources. The Alternative Without Additional Park Land would not result in the removal of 422 trees within and outside of the current NTC fence line, including 6 state-listed endangered willow oak trees located within the NTC in the walkway between Louis Armstrong Stadium and the Indoor Tennis Center. The Alternative Without Additional Park Land would also not result in the development of previously undeveloped areas including manicured lawn. However, the No-Action Alternative would also not result in grading changes on the site that would improve drainage and flood conditions after major rainfall events.

HAZARDOUS MATERIALS

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts with respect to hazardous materials. As with the proposed project, the Alternative Without Additional Park Land would include appropriate health and safety/remedial measures that would precede or govern demolition, construction, and soil disturbance activities on the stadium construction sites. With the implementation of these measures, no significant adverse impacts related to hazardous materials would be expected to result from the proposed project or from the Alternative Without Additional Park Land.

WATER AND SEWER INFRASTRUCTURE

While the Alternative Without Additional Park Land would generate less demand on New York City's water supply, wastewater, and sanitary sewage treatment systems than the proposed project, neither the proposed project nor the Alternative Without Additional Park Land would result in any significant adverse impacts on the City's water supply, wastewater or stormwater conveyance, and treatment infrastructure.

The Alternative Without Additional Park Land would result in a higher rate of stormwater runoff from the project site as compared to the proposed project, as it would not benefit from the incorporation of select best management practices (BMPs).

TRANSPORTATION

Because the Alternative Without Additional Park Land would not result in an increase in attendance, the significant adverse impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place. Transportation conditions under the Alternative Without Additional Park Land are expected to be substantially the same as the No-Action condition. Therefore, unlike the proposed project, the Alternative Without Additional Park Land would not be expected to lengthen the travel time for departing patrons exiting the US Open at the conclusion of the daytime session.

Under both the proposed project and the Alternative Without Additional Park Land, the roadway network is anticipated to continue to experience congested levels of service during event conditions. Due to the traffic management program, however, conditions typically observed when intersection operations become saturated (queues extending beyond storage capacity, blocked turning movements, aggressive driver behavior, etc.) would be managed in the field. Field observations conducted during the US Open show that the traffic management program and the TEAs are able to effectively manage traffic flow during event peak periods. Therefore, neither the Alternative Without Additional Park Land nor the proposed project would result in significant adverse transportation impacts.

AIR QUALITY

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts with respect to air quality. Under the Alternative Without Additional Park Land the small increase in carbon monoxide (CO) concentrations resulting from traffic generated by the proposed project would not occur; however there would be a small increase in CO emissions due to the proposed parking garages. The Alternative Without Additional Park Land would also not result in incremental emissions from use of natural gas in heat and hot water systems. However, as with the proposed project, any incremental emissions from mobile sources would be below the corresponding guidance thresholds and ambient air quality standards, and there would be no potential for significant adverse air quality impacts from stationary sources or the heating and hot water systems for the proposed improvements. Therefore, neither the Alternative Without Additional Park Land nor the proposed project would result in significant adverse air quality impacts.

GREENHOUSE GAS EMISSIONS

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts with respect to GHG emissions. Both the proposed project and the Alternative Without Additional Park Land would incorporate sustainability measures aimed at reducing energy consumption for both the US Open period and the non-event season. As the Alternative Without Additional Park Land would likely not increase attendance at the US Open, the Alternative Without Additional Park Land would generate fewer GHG emissions than the proposed project during US Open events, when GHG emissions would be generated as a result of electricity use on-site. The Alternative Without Additional Park Land would result in fewer GHG emissions from construction than the proposed project, due to the construction of fewer structures.

NOISE

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts with respect to noise. Under both the Alternative Without Additional Park Land and the proposed project, noise levels in Flushing Meadows Corona Park adjacent to the project site would be expected to exceed the 55 dBA $L_{10(1)}$ guideline value recommended in the *CEQR Technical Manual* for open spaces. These conditions would be less than or comparable to noise levels in other parks and open spaces throughout New York City.

NEIGHBORHOOD CHARACTER

The Alternative Without Additional Park Land would not result in: an addition of land to the NTC site (including 0.68-acres of park land that would be alienated, and 0.26-acres of previously alienated park land that is outside the current lease); the relocation of a connector road in a 0.3-acre area; a reconfiguration of uses on the project site; and an increase in stadium space, retail and operational uses, although it would result in the construction of replacement facilities for Louis Armstrong Stadium and Grandstand Stadium in their current locations, as well as two parking garages. While the Alternative Without Additional Park Land may not result in any increases in height or bulk on the project site, it would also not result in new landscaping improvements along the NTC fence line. Under both conditions, aging facilities would be replaced with new modern, recreational facilities, although this would be achieved to a lesser extent with the Alternative Without Additional Park Land. In addition, the proposed park improvements in Flushing Meadows Corona Park, including renovation of existing soccer fields and other park enhancements, may not be realized.

PUBLIC HEALTH

The Alternative Without Additional Park Land, like the proposed project, would not result in any significant adverse public health impacts associated with construction or operation of the new development on the project site.

CONSTRUCTION IMPACTS

Like the proposed project, the Alternative Without Additional Park Land would not result in any significant adverse impacts with respect to construction. Under the Alternative Without Additional Park Land, new building construction on the project site would occur to a lesser extent compared to the proposed project. The Alternative Without Additional Park Land would decrease the temporary construction effects attributable to the proposed project, such as increases in truck traffic and construction-related noise. Under both conditions, construction impacts would be largely confined to the project site and its perimeter, would be addressed (e.g., through dust-control measures and adherence to noise regulations), and would not result in any significant adverse impacts.

D. ALTERNATIVE WITHOUT NEW PARK LAND ALIENATION

DESCRIPTION

Under the Alternative Without New Park Land Alienation, 0.26-acres of previously alienated park land could be added to the NTC site, but no new park land alienation would take place and the 0.68 acres of park land that would be alienated under the proposed project would not be affected (see Figure 1-3 for the locations of these areas). Under this alternative, the reduced expansion of the NTC would be insufficient to accommodate a stadium in the southwest corner of the site and consequently, Grandstand Stadium and Louis Armstrong Stadium would need to be rebuilt in their present locations.

This alternative would not allow for the proposed project's improved site plan in which the relocated Grandstand Stadium would be built in the southwest corner of the site, in an area including: the 0.26-acre area of previously alienated park land; the 1.21-acre teardrop-shaped area that is outside of the current NTC fence line, but is already included in the NTC lease; and a small portion of the 0.68-acre alienation area. It would not be feasible to limit the location of the relocated Grandstand Stadium to the existing lease boundaries, as doing so would impact existing adjacent tennis courts and would not allow sufficient space for pedestrian circulation to access the new stadium.

In addition, the existing configuration of the NTC limits access to the southwest area, due to intervening tennis courts and the lack of walkways with the capacity to handle crowds during the US Open. During the US Open, the area of greatest patron concentration is the confined area adjacent to the current cluster of stadiums in the northern portion of the site. Accommodating a stadium in the southwest corner of the site would require improvements in circulation so that crowds can safely and comfortably access that area. Under the proposed project, the locations of tennis courts would be reconfigured to allow for such access. A new approximately 45-foot wide walkway would be provided on the north side of the relocated southerly tournament courts, and a diagonal access route would be available from the relocated Grandstand Stadium to Arthur Ashe Stadium. Absent the alienation of 0.68 acres of park land, the reconfiguration of tennis courts could not take place, and the new, wider walkways could not be provided.

Thus, the southwest corner of the site would not be a feasible location for a stadium, due to physical constraints and insufficient pedestrian circulation. Consequently under this alternative, Louis Armstrong Stadium and Grandstand Stadium would need to be rebuilt in their current location, even with the addition of the 0.26 acres of previously alienated park land to the NTC.

Therefore, the Alternative Without New Park Land Alienation would result in the same development program as the Alternative Without Additional Park Land. Under either alternative, Louis Armstrong Stadium and Grandstand Stadium would be rebuilt in place, and the proposed increase in the US Open attendance cap could not be achieved. The new stadiums would continue to be constrained by an inefficient site plan, and the opportunity to improve pedestrian circulation would be lost. The competitive position of the NTC would decline in relative terms due to improvements at competing and peer facilities.

ALTERNATIVE COMPARED WITH THE PROPOSED PROJECT

As discussed above, site conditions under this alternative would be the same as the Alternative Without Additional Park Land. Therefore, the environmental effects of the Alternative Without New Park Land Alienation would be the same as the Alternative Without Additional Park Land, as analyzed in the preceding section. Because the Alternative Without New Park Land Alienation would not result in an increase in attendance, the significant adverse transportation impact associated with the proposed project would not occur. However, under the proposed project, this temporary impact that would occur during the peak periods of the US Open would be effectively managed by the traffic management program currently in place.

E. ALTERNATIVE WITH GREATER EXPANSION

DESCRIPTION

Under the Alternative With Greater Expansion, the proposed project would be developed with a larger expansion of the site plan than is contemplated under the proposed project. This expansion would require additional alienation of park land, compared to the 0.68 acres that would be alienated under the proposed project. With additional park land, the NTC could provide an enhanced pedestrian experience with broader walkways and additional landscaped areas and public spaces.

Currently, pedestrian circulation is congested in the NTC during the peak periods of the US Open. Addressing these conditions is a project objective in order to achieve an improved visitor experience that would strengthen the competitive position of the USTA compared to peer and competing events. Under the proposed project, a new 45-foot wide pedestrian walkway would be provided, which could be increased up to 60-feet wide under the Alternative With Greater Expansion. Other walkways and public spaces could also be enlarged, resulting in a more visitor- and player-friendly venue than could otherwise be achieved.

While this alternative would achieve most of the objectives of the proposed project (such as improving public spaces and circulation) it would fail to meet the proposed project’s intention to minimize expansion beyond current NTC lease boundaries. Alienation of a substantial amount of park land in Flushing Meadows Corona Park would not be consistent with the objectives of the proposed project.

ALTERNATIVE COMPARED WITH THE PROPOSED PROJECT

The effects of the Alternative With Greater Expansion in comparison to those of the proposed project are summarized below.

LAND USE, ZONING, AND PUBLIC POLICY

The Alternative With Greater Expansion would result in the same development program as the proposed project, with the addition of wider pedestrian pathways and public plazas that would be accommodated through a greater amount of park land alienation. The Alternative With Greater Expansion would result in similar increases in height and bulk on the project site, compared to the proposed project, and would result in new landscaping improvements along the NTC fence line. Similar to the proposed project, the Alternative With Greater Expansion would result in improvements to Flushing Meadows Corona Park, including the possible renovation of existing soccer fields and other park enhancements. As the Alternative With Greater Expansion would add more park land to the NTC site, it would be less supportive of the Flushing Meadows Corona Park Strategic Framework Plan, compared to the proposed project.

OPEN SPACE AND RECREATIONAL RESOURCES

Compared to the proposed project, the Alternative With Greater Expansion would have a greater affect on Flushing Meadows Corona Park, due to the additional park land that would be added to the NTC site. The Alternative With Greater Expansion would affect a greater number of park users than the proposed project, as more areas of open space would be added to the NTC. In addition, this alternative could affect the design integrity of the park. Under the Alternative With Greater Expansion, the opportunity to improve public space and pedestrian circulation within the NTC would be enhanced, compared to the proposed project. The Alternative With Greater Expansion would result in additional improvements for the benefit of the general public within Flushing Meadows Corona Park, including potential renovation of existing soccer fields and other park enhancements, as would occur with the proposed project.

SHADOWS

The shadows effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Neither the Alternative With Greater Expansion nor the proposed project would be likely to result in adverse shadow impacts on any sun-sensitive resource.

HISTORIC AND CULTURAL RESOURCES

The historic and cultural resources effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Neither the Alternative With Greater Expansion nor the proposed project would result in ground disturbance to archaeologically-sensitive areas or adversely affect the context of nearby architectural resources. Construction activities associated with both the proposed project and the Alternative With Greater Expansion would have the potential to physically affect two architectural resources within 90 feet of the project site. Under either condition, a CPP would be developed to prevent inadvertent construction-related impacts. However, this alternative could affect the historical design integrity of the park, as it could impact significant elements of Flushing Meadows Corona Park's original Beaux Arts plan.

URBAN DESIGN AND VISUAL RESOURCES

The urban design and visual resources effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Compared to the proposed project, the Alternative With Greater Expansion would result in similar improvements to NTC circulation, landscaping, and visitor amenities, and would result in wider pedestrian walkways and public spaces. Thus, the pedestrian experience of the NTC would be enhanced with the Alternative With Greater Expansion, compared to the proposed project. The Alternative With Greater Expansion would result in increases to the height and bulk of the facility that would be similar to the proposed project. The Alternative With Greater Expansion would result in greater changes to park land acreage than the proposed project, and affect more land that is currently passive open space in Flushing Meadows Corona Park. Both the proposed project and the Alternative With Greater Expansion would be consistent with the existing urban design characteristics of the project site and study area. However, this alternative could affect the design integrity of the park, as it could impact significant elements of Flushing Meadows Corona Park's original Beaux Arts plan.

NATURAL RESOURCES

The Alternative With Greater Expansion would likely result in the removal of a greater number of trees within and outside of the current NTC fence line than the proposed project. The Alternative With Greater Expansion would also result in the development of a greater amount of previously undeveloped areas including manicured lawn than the proposed project. As with the proposed project, the Alternative With Greater Expansion would result in grading changes on the site that would improve drainage and flood conditions after major rainfall events.

HAZARDOUS MATERIALS

The hazardous materials effects of the Alternative With Greater Expansion would likely be similar to the proposed project. As with the proposed project, the Alternative With Greater Expansion would include appropriate health and safety/remedial measures that would precede or govern demolition, construction, and soil disturbance activities on the stadium construction sites.

WATER AND SEWER INFRASTRUCTURE

The water and sewer infrastructure effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Neither the proposed project nor the Alternative With Greater Expansion would be expected to result in any significant adverse impacts on the City’s water supply, wastewater or stormwater conveyance and treatment infrastructure.

As with the proposed project, the Alternative With Greater Expansion would result in the incorporation of select best management practices (BMPs) that would reduce stormwater runoff from the site, compared to exiting conditions.

TRANSPORTATION

The transportation effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Under both scenarios there would be temporary significant adverse transportation impacts during the US Open’s peak periods, which would be effectively managed by the traffic management program currently in place. Like the proposed project, the Alternative With Greater Expansion would result in an increase in attendance of 10,000 persons for the daytime session, which would result in a projected peak period increase of approximately 2,030 transit trips and 954 vehicle trips. As with the proposed project, the Alternative With Greater Expansion would be expected to lengthen the travel time for departing patrons exiting the US Open at the conclusion of the daytime session, resulting in delays that would largely be confined within Flushing Meadows Corona Park and to a segment of the adjacent highway network. Under both scenarios, this congestion would be managed under either scenario with a traffic management program.

AIR QUALITY

The air quality effects of the Alternative With Greater Expansion would likely be similar to the proposed project. As with the proposed project, the Alternative With Greater Expansion would result in a small increase in CO concentrations resulting from traffic generated by the proposed project and the proposed parking garages. The Alternative With Greater Expansion would also result in incremental emissions from use of natural gas in heat and hot water systems that would be similar to the proposed project. However, as with the proposed project, any incremental emissions from mobile sources would likely be below the corresponding guidance thresholds and ambient air quality standards, and there would be no potential for significant adverse air quality impacts from stationary sources or the heating and hot water systems for the proposed improvements.

GREENHOUSE GAS EMISSIONS

The GHG emissions associated with the Alternative With Greater Expansion would likely be similar to the proposed project. Both the proposed project and the Alternative With Greater Expansion would incorporate sustainability measures aimed at reducing energy consumption for both the US Open period and the non-event season. Both the Alternative With Greater Expansion and the proposed project would increase attendance at the US Open, resulting in an increase in GHG emissions during US Open events, when GHG emissions would be generated as a result of electricity use onsite. Both scenarios would also result in GHG emissions from construction.

NOISE

The noise effects of the Alternative With Greater Expansion would likely be similar to the proposed project. Under both the Alternative With Greater Expansion and the proposed project, noise levels in Flushing Meadows Corona Park adjacent to the project site would be expected to exceed the 55 dBA $L_{10(1)}$ guideline value recommended in the *CEQR Technical Manual* for open spaces. These conditions would be less than or comparable to noise levels in other parks and open spaces throughout New York City.

NEIGHBORHOOD CHARACTER

As with the proposed project, the Alternative With Greater Expansion would result in the reconfiguration of uses on the project site, and an increase in stadium space, retail and operational uses, and parking facilities. The Alternative With Greater Expansion would result in increases in height and bulk on the project site that would be similar to the proposed project. The Alternative With Greater Expansion would improve the character of the NTC by providing wider pedestrian walkways and enhanced public spaces. Like the proposed project, the Alternative With Greater Expansion would replace aging facilities with new modern, recreational facilities that would be open to the public of 11 months of the year. Both conditions would provide for improvements within Flushing Meadows Corona Park, including renovation of existing soccer fields and other park enhancements. However, this alternative could affect the historical design integrity of the park, as it could impact significant elements of Flushing Meadows Corona Park’s original Beaux Arts plan.

PUBLIC HEALTH

The Alternative With Greater Expansion, like the proposed project, would be unlikely to result in any significant adverse public health impacts associated with construction or operation of the new development on the project site.

CONSTRUCTION IMPACTS

Compared to the proposed project, the construction effects of the Alternative With Greater Expansion would have a modestly greater impact on Flushing Meadows Corona Park, due to the larger area that would be affected. Under the Alternative With Greater Expansion, new building construction on the project site would be similar to the proposed project. Under both conditions, construction impacts would be largely confined to the project site and its perimeter, and would be addressed (e.g., through dust-control measures and adherence to noise regulations).

F. ALTERNATIVE WITH MODIFIED PARKING PLAN

DESCRIPTION

Under the Alternative With Modified Parking Plan, one or both of the proposed parking garages would not be constructed as part of the proposed project. The area proposed as the site of the parking garages would instead remain in use as surface parking. The rest of the project elements would be implemented, including new stadium and ancillary building construction, an expansion of the NTC lease by 0.94 acres, the relocation of a connector road in a 0.3-acre area, and a 10,000 person increase in the US Open attendance cap.

Without one or both of the proposed parking garages, the proposed project's stated objective of increasing the availability of on-site parking would not be met, or would be met to a lesser extent. In addition, the objective of improving circulation, comfort and safety for visitors and players would be met to a lesser extent, as there would not be increased parking in close proximity to NTC facilities. Providing enhanced parking in close proximity to the site is an objective of the proposed project, and is important to sustaining the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. Without the proposed parking garages, that improvement would not be achieved. For the non-US Open period, an expanded parking supply would not be available. Visitors to the NTC and to Flushing Meadows Corona Park would continue to use Citi Field parking and other less convenient parking locations.

ALTERNATIVE COMPARED WITH THE PROPOSED PROJECT

The Alternative With Modified Parking Plan would result in limited changes to environmental conditions compared to the proposed project. Under the Alternative With Modified Parking Plan, future land use conditions would be the same as the proposed project, except that an increase in on-site parking would not be provided, or would be provided to a lesser extent. No additional land would be dedicated to parking uses, as one or both of the sites of the proposed parking garages would remain surface parking lots. Thus, there would be no changes to open space conditions, compared to the proposed project. With regard to urban design and visual resources, one or two new structures of up to 40 in height would not be built on the project site; however, the new garages would not result in significant adverse impacts to urban design and visual resources. Compared to the proposed project, views to the project site would include fewer structures on the site boundary, and incremental shadows associated with the garages would be diminished or would not occur; however, no significant adverse shadows impacts would result from the proposed garages. Under the Alternative With Modified Parking Plan, the small increases in CO emissions associated with the proposed parking garages would not occur, or would occur to a lesser extent. Fewer on-site parking spaces would be provided under this alternative than the proposed project, but no other differences in transportation conditions are anticipated. As providing structured parking within the NTC campus would result in a modest change in neighborhood character, the Alternative With Modified Parking Plan would be more in keeping with the existing character of the area than the proposed project. Construction activities would be slightly less intensive under the Alternative With Modified Parking Plan, as fewer new buildings would be constructed. The environmental effects of the Alternative With Modified Parking Plan would be substantially similar to the proposed project in the areas of historic and cultural resources, natural resources, hazardous materials, water and sewer infrastructure, noise, and public health. ✷

Chapter 18: Mitigation

City Environmental Quality Review (CEQR) requires that any significant adverse impacts identified in the Environmental Impact Statement (EIS) be minimized or avoided to the fullest extent practicable, given costs and other factors.

With the exception of transportation, the technical analysis determined that there would not be significant adverse environmental impacts associated with the proposed project.

The transportation analysis determined the projected trip increments would result in significant adverse traffic impacts including increased levels of congestion and delays. However, the traffic management program currently in place including the Traffic Enforcement Agents (TEAs) would effectively manage the increased level of traffic. Therefore, due to the infrequency and duration of the event, and the ability of the traffic management program and TEAs to adequately manage traffic flow and safety of all street users during the US Open, no mitigation measures beyond the continuous traffic management provided by the TEAs would be necessary.

Overall, none of the analyses performed for this Draft Environmental Impact Statement (DEIS) identified the need for mitigation measures. ✷

Chapter 19: Growth Inducing Aspects of the Proposed Project

The term "growth-inducing aspects" generally refers to the potential for a proposed project to trigger additional development in areas outside the project site that would otherwise not have such development without the proposed project. The 2012 *City Environmental Quality Review (CEQR) Technical Manual* indicates that an analysis of the growth-inducing aspects of a proposed project is appropriate when the project:

- Adds substantial new land use, new residents, or new employment that could induce additional development of a similar kind or of support uses, such as retail establishments to serve new residential uses; and/or
- Introduces or greatly expands infrastructure capacity.

While the proposed project would result in increased activity on the project site, the increased activity would be substantially associated with the US Open, which is limited to a 2-week period. The study area is primarily comprised of Flushing Meadows Corona Park, where no development can take place without discretionary approvals that would require further review. The North Corona portion of the study area is fully developed, and the level of development is controlled by zoning. As such, the proposed project would not "induce" new growth in the study area. The proposed project and related actions are specific to the project site only.

As discussed in Chapter 9, "Water and Sewer Infrastructure," the proposed project would not include the introduction of new infrastructure or an expansion of infrastructure capacity that would result in indirect development.

Therefore, the proposed project would not induce significant new growth in the surrounding area. ✷

Chapter 20: Irreversible and Irretrievable Commitment of Resources

There are a number of resources, both natural and built, that would be expended in the construction and operation of the proposed project. These resources include the materials used in construction; energy in the form of fuel and electricity consumed during construction and operation of the proposed project; and the human effort (i.e., time and labor) required to develop, construct, and operate various components of the proposed project.

The resources are considered irretrievably committed because their reuse for some purpose other than the proposed project would be highly unlikely. The proposed project constitutes an irreversible and irretrievable commitment of the project site as a land resource, thereby rendering land use for other purposes infeasible, at least in the near term.

These commitments of land resources and materials are weighed against the benefits of the proposed project. As described under “Purpose and Need” in Chapter 1, “Project Description,” the purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. It would result in much needed improvements to the visitor experience and provide substantial long-term economic benefits to Queens, New York City, and the region. The proposed project would enable the USTA to accommodate an extra 10,000 daily spectators during the US Open. It is expected that the proposed project would increase attendance at the US Open by up to approximately 100,000 new visitors, positively affecting not only the revenues from the US Open but the local hospitality market as well. It would also create jobs during construction and upon completion.

In addition, the proposed project would result in the expansion of the NTC, an existing use. The proposed project has been designed with the intention of minimizing the amount of park land that would be added to the project site. As discussed in Chapter 3, “Open Space and Recreational Resources,” the 0.94 acres that would be added to the NTC represent approximately 0.10 percent of the overall nearly 900-acre Flushing Meadows Corona Park, and the affected areas are lightly used. ✷

APPENDIX A

CONSISTENCY ASSESSMENT FORM

For Internal Use Only:	WRP no.______________________
Date Received:______________________	DOS no.______________________

NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM
Consistency Assessment Form

Proposed action subject to CEQR, ULURP, or other Local, State or Federal Agency Discretionary Actions that are situated within New York City's designated Coastal Zone Boundary must be reviewed and assessed for their consistency with the *New York City Waterfront Revitalization Program (WRP)*. The WRP was adopted as a 197-a Plan by the Council of the City of New York on October 13, 1999, and approved in coordination with local, state and Federal laws and regulations, including the State's Coastal Management Program (Executive Law, Article 42) and the Federal Coastal Zone Management Act of 1972 (P.L. 92-583). As a result of these approvals, state and federal discretionary actions within the city's coastal zone must be consistent to the maximum extent practicable with the WRP policies and the city must be given the opportunity to comment on all state and federal projects within its coastal zone.

This form is intended to assist an applicant in certifying that the proposed activity is consistent with the WRP. It should be completed when the local, state, or federal application is prepared. The completed form and accompanying information will be used by the New York State Department of State, other State Agency or the New York City Department of City Planning in its review of the applicant's certification of consistency.

A. APPLICANT

1. Name:

USTA National Tennis Center, Inc.

Address:

Gordon J. Davis, Venable LLP, 1270 Sixth Avenue, 25th Floor, New York, New York 10019

3. Telephone: Fax:

212-259-8000

E-mail Address:

gjdavis@venable.com

4. Project site owner:

New York City Department of Parks and Recreation

B. PROPOSED ACTIVITY

1. Brief description of activity:

The City of New York Department of Parks and Recreation (DPR), in coordination with USTA National Tennis Center, Incorporated, is seeking a number of discretionary actions in connection with proposed improvements and an expansion to the facilities at the USTA Billie Jean King National Tennis Center (NTC), located in Flushing Meadows Corona Park in Queens. These improvements collectively are known as the NTC Strategic Vision. The proposed project would improve the NTC site plan, visitor amenities, and landscaping, and would include renovations to Arthur Ashe Stadium, and the construction of two new stadiums (see Chapter 1, "Project Description").

2. Purpose of activity:

The purpose of the proposed project is to sustain the long-term viability of the NTC as a world-class spectator venue and outstanding public recreational facility. It would result in a much needed improvement to the visitor experience, and would provide substantial long-term economic benefits to Queens, New York City, and the region.

3. Location of activity: Borough:

Flushing Meadows Corona Park **Queens**

Street Address or Site Description:

A portion of Queens Block 2018, Lot 1, bounded to the north by the railway tracks of Long Island Railroad (LIRR)'s Port Washington line; United Nations Avenue North to the south; the Passerelle Building (that connects LIRR's Mets-Willets Point station to the MTA's 7 train station and Citi Field) and Path of the Americas to the east; and Grand Central Parkway to the west.

Proposed Activity Cont'd

4. If a federal or state permit or license was issued or is required for the proposed activity, identify the permit type(s), the authorizing agency and provide the application or permit number(s), if known:

   - Notice of Intention to seek a New York State Department of Environmental Conservation SPDES General Permit (not subject to CEQR);
   - New York State Legislature approval for alienation of 0.68-acres of park land;
   - Determination by US Department of the Interior National Parks Service as to whether any approval is required in connection with Land and Water Conservation Fund program requirements;

5. Is federal or state funding being used to finance the project? If so, please identify the funding source(s).

   No.

	Yes	No
6. Will the proposed project result in any large physical change to a site within the coastal area that will require the preparation of an environmental impact statement?		
If yes, identify Lead Agency:	X	
The lead agency is the New York City Department of Parks and Recreation.		

7. Identify **City** discretionary actions, such as **zoning amendment or adoption of an urban renewal plan**, required for the proposed project.

   - Uniform Land Use Review Procedure (ULURP);
   - Amendment of existing lease between DPR and USTA;
   - DPR approval under the existing lease for alterations to the site;
   - DPR approval for roadway alterations and improvements in Flushing Meadows Corona Park;
   - Coastal Zone consistency determination by DPR and the New York City Planning Commission; and,
   - New York City Public Design Commission.

C. COASTAL ASSESSMENT

The following questions represent, in a broad sense, the policy of the WRP. The number in the parentheses after each question indicated the policy or policies that are the focus of the question. A detailed explanation of the Waterfront Revitalization Program and its policies are contained in the publication the *New York City Waterfront Revitalization Program.*

Check either "Yes" or "No" for each of the following questions. Once the checklist is completed, assess how the proposed project affects the policy or standards indicated in "( )" after each question with a Yes response. Explain how the action is consistent with the goals of the policy or standard.

Location Questions:	Yes	No
1. Is the project site on the waterfront or at the water's edge?		X
2. Does the proposed project require a waterfront site?		X
3. Would the action result in a physical alteration to a waterfront site, including land along the shoreline, land underwater, or coastal waters?		X

Policy Questions:	Yes	No

The following questions represent, in a broad sense, the policies of the WRP. Numbers in parentheses after each questions indicate the policy or policies addressed by the question. The new Waterfront Revitalization Program offers detailed explanations of the policies, including criteria for consistency determinations.

Check either "Yes" or "No" for each of the following questions. For all "yes" responses, provide an attachment assessing the effects of the proposed activity on the relevant policies or standards. Explain how the action would be consistent with the goals of those policies and standards.

		Yes	No
4.	Will the proposed project result in revitalization or redevelopment of a deteriorated or under- used waterfront site? (1)		X
5.	Is the project site appropriate for residential or commercial redevelopment? (1.1)	X	
6.	Will the action result in a change in scale or character of a neighborhood? (1.2)		X
7.	Will the proposed activity require provision of new public services or infrastructure in undeveloped or sparsely populated sections of the coastal area? (1.3)		X

Policy Questions cont'd:		**Yes**	**No**
8.	Is the action located in one of the designated Significant Maritime and Industrial Areas (SMIA): South Bronx, Newtown Creek, Brooklyn Navy Yard, Red Hook, Sunset Park, or Staten Island? (2)		X
9.	Are there any waterfront structures, such as piers, docks, bulkheads or wharves, located on the project sites? (2)		X
10.	Would the action involve the siting or construction of a facility essential to the generation or transmission of energy, or a natural gas facility, or would it develop new energy resources? (2.1)		X
11.	Does the action involve the siting of a working waterfront use outside of a SMIA? (2.2)		X
12.	Does the proposed project involve infrastructure improvement, such as construction or repair of piers, docks, or bulkheads? (2.3, 3.2)		X
13.	Would the action involve mining, dredging, or dredge disposal, or placement of dredged or fill materials in coastal waters? (2.3, 3.1, 4, 5.3, 6.3)		X
14.	Would the action be located in a commercial or recreational boating center, such as City Island, Sheepshead Bay or Great Kills or an area devoted to water-dependent transportation? (3)		X
15.	Would the proposed project have an adverse effect upon the land or water uses within a commercial or recreation boating center or water-dependent transportation center? (3.1)		X
16.	Would the proposed project create any conflicts between commercial and recreational boating? (3.2)		X
17.	Does the proposed project involve any boating activity that would have an impact on the aquatic environment or surrounding land and water uses? (3.3)		X
18.	Is the action located in one of the designated Special Natural Waterfront Areas (SNWA): Long Island Sound-East River, Jamaica Bay, or Northwest Staten Island? (4 and 9.2)		X
19.	Is the project site in or adjacent to a Significant Coastal Fish and Wildlife Habitats? (4.1)		X
20.	Is the site located within or adjacent to a Recognized Ecological Complex: South Shore of Staten Island or Riverdale Natural Area District? (4.1and 9.2)		X
21.	Would the action involve any activity in or near a tidal or freshwater wetland? (4.2)		X
22.	Does the project site contain a rare ecological community or would the proposed project affect a vulnerable plant, fish, or wildlife species? (4.3)		X
23.	Would the action have any effects on commercial or recreational use of fish resources? (4.4)		X
24.	Would the proposed project in any way affect the water quality classification of nearby waters or be unable to be consistent with that classification? (5)		X
25.	Would the action result in any direct or indirect discharges, including toxins, hazardous substances, or other pollutants, effluent, or waste, into any waterbody? (5.1)		X
26.	Would the action result in the draining of stormwater runoff or sewer overflows into coastal waters? (5.1)		X

		Yes	No
27.	Will any activity associated with the project generate nonpoint source pollution? (5.2)		X

	Policy Questions cont'd:	Yes	No
28.	Would the action cause violations of the National or State air quality standards? (5.2)		X
29.	Would the action result in significant amounts of acid rain precursors (nitrates and sulfates)? (5.2C)		X
30.	Will the project involve the excavation or placing of fill in or near navigable waters, marshes, estuaries, tidal marshes or other wetlands? (5.3)		X
31.	Would the proposed action have any effects on surface or ground water supplies? (5.4)		X
32.	Would the action result in any activities within a Federally designated flood hazard area or State designated erosion hazards area? (6)	X	
33.	Would the action result in any construction activities that would lead to erosion? (6)		X
34.	Would the action involve construction or reconstruction of flood or erosion control structure? (6.1)		X
35.	Would the action involve any new or increased activity on or near any beach, dune, barrier island, or bluff? (6.1)		X
36.	Does the proposed project involve use of public funds for flood prevention or erosion control? (6.2)		X
37.	Would the proposed project affect a non-renewable source of sand? (6.3)		X
38.	Would the action result in shipping, handling, or storing of solid wastes; hazardous materials, or other pollutants? (7)		X
39.	Would the action affect any sites that have been used as landfills? (7.1)	X	
40.	Would the action result in development of a site that may contain contamination or has a history of underground fuel tanks, oil spills, or other form or petroleum product use or storage? (7.2)		X
41.	Will the proposed activity result in any transport, storage, treatment, or disposal of solid wastes or hazardous materials, or the siting of a solid or hazardous waste facility? (7.3)		X
42.	Would the action result in a reduction of existing or required access to or along coastal waters, public access areas, or public parks or open spaces? (8)		X
43.	Will the proposed project affect or be located in, on, or adjacent to any federal, state, or city park or other land in public ownership protected for open space preservation? (8)	X	
44.	Would the action result in the provision of open space without the provision for its maintenance? (8.1)		X
45.	Would the action result in any development along the shoreline but NOT include new water enhanced or water dependent recreational space? (8.2)		X
46.	Will the proposed project impede visual access to coastal lands, waters and open space? (8.3)		X
47.	Does the proposed project involve publically owned or acquired land that could accommodate waterfront open space or recreation? (8.4)		X

		Yes	No
48.	Does the project site involve lands or waters held in public trust by the state or city? (8.5)	X	

Policy Questions cont'd:		Yes	No
49.	Would the action affect natural or built resources that contribute to the scenic quality of a coastal area? (9)		X
50.	Does the site currently include elements that degrade the area's scenic quality or block views to the water? (9.1)		X
51.	Would the proposed action have a significant adverse impact on historic, archeological, or cultural resources? (10)		X
52.	Will the proposed activity affect or be located in, on, or adjacent to an historic resource listed on the National or State Register of Historic Places, or designated as a landmark by the City of New York? (10)		X

D. CERTIFICATION

The applicant must certify that the proposed activity is consistent with New York City's Waterfront Revitalization Program, pursuant to the New York State Coastal Management Program. If this certification cannot be made, the proposed activity shall not be undertaken. If the certification can be made, complete this section.

"The proposed activity complies with New York State's Coastal Management Program as expressed in New York City's approved Local Waterfront Revitalization Program, pursuant to New York State's Coastal Management Program, and will be conducted in a manner consistent with such program."

Applicant/Agent Name: **Lisa Lau, AICP**

Address: **AKRF, Inc. 440 Park Avenue South, 7th Floor, New York, NY 10016**

Telephone

Applicant/Agent Signature: Lisa M. Lau Date: **January 1, 2013**

APPENDIX B

HISTORIC AND CULTURAL RESOURCES

NYC™ Landmarks Preservation Commission
1 Centre Street
9th Floor North
New York, NY 10007
Voice (212)-669-7700
Fax (212)-669-7960
http://nyc.gov/landmarks

ARCHAEOLOGY

Project number: NYC DEPT. OF PARKS AND RECREAT / LA-CEQR-Q
Project: USTA NATIONAL TENNIS CENTER STRATEGIC VISION
Address: HORACE HARDING EXPWY, **BBL:** 4020180001
Date Received: 4/26/2012

This document only contains Archaeological review findings. If your request also requires Architecture review, the findings from that review will come in a separate document.

[X] **No archaeological significance**

[ ] Designated New York City Landmark or Within Designated Historic District

[ ] Listed on National Register of Historic Places

[ ] Appears to be eligible for National Register Listing and/or New York City Landmark Designation

[ ] May be archaeologically significant; requesting additional materials

Comments:

Amanda Sutphin

5/4/2012

SIGNATURE DATE
Amanda Sutphin, Director of Archaeology

File Name: 27960_FSO_ALS_05042012.doc

NYC Landmarks Preservation Commission
1 Centre Street
9th Floor North
New York, NY 10007
Voice (212)-669-7700
Fax (212)-669-7960
http://nyc.gov/landmarks

ARCHAEOLOGY

Project number: NYC DEPT. OF PARKS AND RECREAT / 12DPR005Q
Project: USTA NATIONAL TENNIS CENTER STRATEGIC VISION
Date received: 9/4/2012

Comments: as indicated below. Properties that are individually LPC designated or in LPC historic districts require permits from the LPC Preservation department. Properties that are S/NR listed or S/NR eligible require consultation with SHPO if there are State or Federal permits or funding required as part of the action.

This document only contains Archaeological review findings. If your request also requires Architecture review, the findings from that review will come in a separate document.

There is no further archaeological concerns for:

1) ADDRESS: HORACE HARDING EXPWY, BBL: 4020180001

Amanda Sutphin

9/7/2012

SIGNATURE DATE

Amanda Sutphin, Director of Archaeology

File Name: 27960_FSO_DNP_09072012.doc

NYC Landmarks Preservation Commission
1 Centre Street
9th Floor North
New York, NY 10007
Voice (212)-669-7700
Fax (212)-669-7960
http://nyc.gov/landmarks

ARCHAEOLOGY

Project number: NYC DEPT. OF PARKS AND RECREAT / 12DPR005Q
Project: USTA NATIONAL TENNIS CENTER STRATEGIC VISION
Date received: 9/4/2012

Properties with no Archaeological significance:

sites		
site_id	**BBL**	**Address**
76984	4022090010	GRAND CENTRAL PKWY
76983	4020180001	HORACE HARDING EXPWY
76982	4020180001	HORACE HARDING EXPWY
76981	4020180001	HORACE HARDING EXPWY
76980	4020180001	HORACE HARDING EXPWY
76979	4020180001	HORACE HARDING EXPWY
76978	4020180001	HORACE HARDING EXPWY

Amanda Sutphin

9/10/2012

SIGNATURE DATE
Amanda Sutphin, Director of Archaeology

File Name: 27960_FSO_GS_09102012.doc

APPENDIX C

NATURAL RESOURCES

Birds Documented in New York State Breeding Bird Atlas Block 5951C

Common name	Scientific name
Canada Goose	*Branta canadensis*
Mute Swan	*Cygnus olor*
Wood Duck	*Aix sponsa*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Ring-necked Pheasant	*Phasianus colchicus*
Green Heron	*Butorides virescens*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Red-tailed Hawk	*Buteo jamaicensis*
Killdeer	*Charadrius vociferus*
American Woodcock	*Scolopax minor*
Rock Pigeon	*Columba livia*
Mourning Dove	*Zenaida macroura*
Common Nighthawk	*Chordeiles minor*
Chimney Swift	*Chaetura pelagica*
Downy Woodpecker	*Picoides pubescens*
Northern Flicker	*Colaptes auratus*
Eastern Wood-Pewee	*Contopus virens*
Willow Flycatcher	*Empidonax traillii*
Eastern Kingbird	*Tyrannus tyrannus*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Fish Crow	*Corvus ossifragus*
Tree Swallow	*Tachycineta bicolor*
Barn Swallow	*Hirundo rustica*
Carolina Wren	*Thryothorus ludovicianus*
Marsh Wren	*Cistothorus palustris*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
European Starling	*Sturnus vulgaris*
Cedar Waxwing	*Bombycilla cedrorum*
Yellow Warbler	*Dendroica petechia*
Common Yellowthroat	*Geothlypis trichas*
Chipping Sparrow	*Spizella passerina*
Song Sparrow	*Melospiza melodia*
Northern Cardinal	*Cardinalis cardinalis*
Red-winged Blackbird	*Agelaius phoeniceus*
Common Grackle	*Quiscalus quiscula*
Boat-tailed Grackle	*Quiscalus major*
Brown-headed Cowbird	*Molothrus ater*
Orchard Oriole	*Icterus spurius*
Baltimore Oriole	*Icterus galbula*
House Finch	*Carpodacus mexicanus*
American Goldfinch	*Spinus tristis*
House Sparrow	*Passer domesticus*

Notes: Boldface indicates the subset of species considered to have the potential to breed within the study area on the basis of their habitat associations.
Source: New York State Breeding Bird Atlas 2000-2005

APPENDIX D

WATER AND SEWER INFRASTRUCTURE

NYSDEC DESIGN STANDARDS FOR WASTEWATER TREATMENT WORKS

DEC
PUBLICATION

Division of Water

Design Standards for Wastewater Treatment Works

1988

Intermediate
Sized
Sewerage
Facilities

New York State/Department of Environmental Conservation

CONTENTS

6) Repeat the test a minimum of three times, until the time for the water to drop one inch for two successive tests yields approximately equal results. The last test will then be taken as the stabilized rate for percolation. If different results are obtained from separate pits in the same general area, the slowest percolation rate is used in design.

NOTE: A percolation test whose results are inconsistent with the soil evaluation shall be disregarded, and the percolation test(s) shall be performed again.

DESIGN FLOW

Information on flow rate is necessary for the design of effective wastewater treatment and disposal systems. The wastewater flow rates of existing facilities can often be measured. Table 3 can be used as a basis for the design of sewage treatment and disposal facilities for new developments, and for existing establishments when the hydraulic loading cannot be measured. Alternatively, water-usage data can be used to estimate wastewater flow, if it is available for an establishment. Adjustments should be made for infiltration, and for water that will not reach the sewer (ex., boiler water).

For commercial establishments variations in flow may be extreme. In these cases it is necessary to examine the significant delivery period of the wastewater and base the peak design flow upon this information to prevent an excessive rate of flow through the treatment system. It may be desirable to include an equalization basin prior to the treatment system.

Section 15-0314 of the Environmental Conservation Law mandates the use of water-saving plumbing facilities in new and renovated buildings. Hydraulic loading, as determined from reference to Table 3 may be decreased by 20 percent in those installations serving premises equipped with certified water-saving plumbing fixtures. A combination of new and old fixtures can be considered on a pro rata basis.

New toilets which use as little as 0.5 gallons of water per flush are becoming available on the market and the reduction of wastewater flow attributable to these and other new technologies shall be considered on a case-by-case basis. The reduction allowance shall depend in part upon the ability of the builder or owner to ensure adequate maintainance and/or replacement in kind when necessary.

Table 3. Expected Hydraulic Loading Rates

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Airports		
(per passenger)	3	
(per employee)	15	

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Apartments	75	
1 bedroom		150
2 bedroom		300
3 bedroom		400
Bathhouse - per swimmer	10	
Boarding House	75	
Bowling Alley		75
(per lane - no food)		
(with food - add food service value)		
Campgrounds (Recreational Vehicle - per site)		
Sewered Sites		100
Central Facilities		
Served Sites, 300' radius		100
Peripheral Sites, 500' radius		75
Subtractions from above		
No Showers		25
Dual Service (Central Facilities and sewered facilities overlapping the central)		25
Campground (summer camp)		
Central Facilities	50	
Separate Facilities		
Toilet	10	
Shower	25	
Kitchen	10	
Campground Dumping Stations		
Per Unsewered Site		10
Per Sewered Site		5
Camps, Day	13	
Add for lunch	3	
Add for showers	5	
Carwashes, assuming no recycle		
Tunnel, per car		80
Rollover, per car		40
Wandwash, per 5 minute cycle		20
Churches - per seat		3
(with catering - add food service value)		

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Clubs		
Country		
Per Resident Member		75
Per Non-resident Member		25
Racquet (per court per hour)		80
Factories		
Per person/shift	25	
Add for showers	10	
Food Service Operations (per seat)		
Ordinary Restaurant		35
24-hour Restaurant		50
Restaurant along Freeway		70
Tavern (little food service)		20
Curb Service (drive-in, per car space)		50
Catering, or Banquet Facilities	20	
Hair Dresser (per station)		170
Hospitals (per bed)		175
Hotels (per room)		120
add for banquet facilities, theatre, night club, as applicable		
Homes		
1 bedroom		150
2 bedroom		300
3 bedroom		400
4 bedroom		475
5 bedroom		550
Institutions (other than hospitals)	125	
Laundromats (per machine)		580
Mobile Home Parks		
Less than 5 units: use flow rates for homes		
Twenty or more units		
per trailer		200
double wide		300
Five to twenty units - use prorated scale		
Motels		
Per Living Unit		100
With Kitchen		150

Table 3. Expected Hydraulic Loading Rates (cont'd)

Type of Facility	Flow Rate Per Person (gal./day)	Flow Rate Per Unit (gal./day)
Office Buildings		
Per Employee	15	
Per Square Foot		0.1
Dentist--per chair/day		750
Parks (per picnicker)		
Restroom only	5	
Showers and Restroom	10	
Schools (per student)		
Boarding	75	
Day	10	
Cafeteria - Add	5	
Showers - Add	5	
Service Stations		
Per toilet (not including car wash)		400
Shopping Centers (per sq. ft. - food extra)		0.1
per employee	15	
per toilet		400
Swimming Pools (per swimmer)	10	
Sports Stadium	5	
Theatre		
Drive-in (per space)		3
Movie (per seat)		3
Dinner Theatre, Individual (per seat)	20	
with hotel	10	

TREATMENT CONSIDERATIONS

Detailed data regarding the character and quantity of the wastewater flow is necessary to facilitate the effective design of wastewater treatment and disposal systems.

Many commercial/institutional facilities generate wastewater similar in character to residential wastes. For other facilities consideration of the waste-generating sources will allow an estimate of the character of the wastewater. This will also serve to indicate the presence of any problem constituents in the wastewater such as high grease levels from restaurants and lint fibers from laundromats.

NYCDEP VOLUME CALCULATION MATRIX

COMPARISON OF EXISTING AND WITH-ACTION VOLUME

CSO SUBCATCHMENT AREA:[1]

EXISTING

		Area = 1,855,025 sf (42.59 ACRES)				N/A				
		SITE A				**N/A**				**SITE A**
RAINFALL VOLUME (in)	**RAINFALL DURATION (hr)**[3]	**RUNOFF VOLUME DIRECT DRAINAGE (MG)**[4]	**RUNOFF VOLUME TO CSS (MG)**	**SANITARY VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**	**RUNOFF VOLUME TO RIVER (MG)**	**RUNOFF VOLUME TO CSS (MG)**	**SANITARY VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**
0.00	3.80	0.00	0.00	0.06	0.06				0.00	0.06
0.40	3.80	0.34	0.00	0.06	0.06				0.00	0.06
1.20	11.30	1.03	0.00	0.19	0.19				0.00	0.19
2.50	19.50	2.14	0.00	0.33	0.33				0.00	0.33

With-Action

		Area = 1,855,025 sf (42.59 ACRES)				N/A				
		SITE A				**N/A**				**SITE A**
RAINFALL VOLUME (in)	**RAINFALL DURATION (hr)**[3]	**RUNOFF VOLUME TO RIVER (MG)**[4]	**RUNOFF VOLUME TO CSS (MG)**	**SANITARY VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**	**RUNOFF VOLUME TO RIVER (MG)**	**RUNOFF VOLUME TO CSS (MG)**	**SANITARY VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**	**TOTAL VOLUME TO CSS (MG)**
0.00	3.80	0.00	0.00	0.08	0.08				0.00	0.08
0.40	3.80	0.37	0.00	0.08	0.08				0.00	0.08
1.20	11.30	1.12	0.00	0.24	0.24				0.00	0.24
2.50	19.50	2.34	0.00	0.41	0.41				0.00	0.41

[1] If the proposed project crosses over several different CSO subcatchment areas, the above summary table should be completed for each CSO sub-catchment area.

[2] If proposed project includes a phased implementation plan or discrete sites, assess volumes using additional cells above (e.g., Site B).

[3] Based on ***Intensity/duration/Frequency Rainfall Analysis, New York City and the Catskill Mountain Water Supply Reservoirs,*** Vieux & Associates, Inc., April 4, 2006. The 24-hour rainfall volume is based on average rainfall intensity over 24-hours (inch/per) times 24 hrs. (Duration information provided by T. Newman & P. Jadhav, HydroQual).

[4] The volume (calculated in WS2) of stormwater runoff from any portion of the proposed project site draining to a separate storm sewer or as overland flow directly to a waterbody should be entered here.

APPENDIX E

TRANSPORTATION

2011 PATRON SURVEYS

Demographics

Question 8

Place of residence:

	Qualifying Aug 25	Qualifying Aug 26	Day 1 Aug 29	Day 2 Aug 30	Day 3 Aug 31	Day 4 Sept 1	Day 5 Sept 2	Day 6 Sept 3	Day 7 Sept 4
State of New York	56.6%	67.5%	45.8%	45.0%	43.9%	36.3%	38.6%	33.4%	33.1%
State of New Jersey	15.8%	14.1%	16.7%	15.9%	18.0%	13.5%	12.2%	10.1%	12.0%
State of Connecticut	1.6%	1.3%	6.0%	2.6%	3.6%	3.7%	3.7%	5.6%	3.8%
Commonwealth of Pennsylvania	3.0%	5.1%	2.7%	4.1%	4.9%	5.7%	5.7%	5.3%	5.5%
Another State	7.8%	5.6%	15.9%	18.6%	16.8%	26.0%	29.3%	37.1%	37.8%
Another Country	15.2%	6.4%	12.8%	13.9%	12.9%	14.7%	10.6%	8.5%	7.8%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	565	701	911	958	1080	1079	1144	1243	1254

	Day 8 Sept 5	Day 9 Sept 6	Day 10 Sept 7	Day 11 Sept 8	Day 12 Sept 9	Day 13 Sept 10	Day 14 Sept 11	Aggregate (Mainround)	Aggregate
State of New York	50.6%	39.3%	35.7%	44.4%	44.0%	43.9%	49.4%	41.0%	42.9%
State of New Jersey	13.2%	13.0%	13.0%	11.1%	9.3%	10.9%	15.7%	13.2%	13.4%
State of Connecticut	5.3%	2.5%	4.2%	2.3%	4.8%	4.2%	4.0%	4.1%	3.9%
Commonwealth of Pennsylvania	3.8%	3.7%	2.8%	1.8%	1.6%	2.9%	2.1%	4.1%	4.1%
Another State	17.9%	19.9%	21.6%	15.4%	23.2%	22.1%	18.6%	23.9%	22.4%
Another Country	9.2%	21.5%	22.7%	25.1%	17.1%	16.1%	10.2%	13.7%	13.5%
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Total	1270	669	1108	606	621	697	522	13162	14428

Demographics

Question 13

About what distance from Flushing Meadows do you live?

Answered only if "State of New Jersey", "State of Connecticut" or "State of Pennsylvania" in Question 8 or "Other" in Question 9 was selected

	Qualifying Aug 25	Qualifying Aug 26	Day 1 Aug 29	Day 2 Aug 30	Day 3 Aug 31	Day 4 Sept 1	Day 5 Sept 2	Day 6 Sept 3	Day 7 Sept 4
I live within this area	0.0%	1.9%	2.0%	0.4%	0.3%	0.0%	0.7%	0.0%	2.0%
5 to 30 miles	43.7%	30.9%	35.9%	21.0%	21.0%	20.9%	19.8%	16.5%	20.1%
31 to 60 miles	24.4%	34.6%	25.1%	28.2%	33.4%	31.8%	33.2%	26.3%	27.4%
61 to 90 miles	13.5%	14.8%	18.7%	21.8%	20.1%	20.5%	15.2%	17.9%	18.1%
91 to 150 miles	10.1%	14.2%	13.9%	18.6%	16.2%	20.1%	20.9%	22.6%	19.7%
Over 150 miles	8.4%	3.7%	4.4%	10.1%	8.9%	6.7%	10.3%	16.8%	12.7%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	119	162	251	248	314	283	283	297	299
Calculated Mean (miles)	**56.2**	**56.1**	**56.5**	**73.4**	**69.7**	**69.9**	**73.6**	**85.8**	**76.3**

	Day 8 Sept 5	Day 9 Sept 6	Day 10 Sept 7	Day 11 Sept 8	Day 12 Sept 9	Day 13 Sept 10	Day 14 Sept 11	Aggregate (Mainround)	Aggregate
I live within this area	1.3%	0.7%	0.8%	0.0%	1.9%	1.5%	1.6%	0.9%	0.9%
5 to 30 miles	27.7%	28.1%	23.2%	34.6%	24.3%	27.7%	37.7%	24.2%	25.2%
31 to 60 miles	33.7%	33.8%	37.2%	31.8%	40.2%	26.3%	36.9%	31.3%	31.2%
61 to 90 miles	16.2%	17.3%	20.4%	15.0%	7.5%	25.6%	7.4%	18.0%	17.7%
91 to 150 miles	12.5%	8.6%	10.8%	9.4%	12.2%	11.7%	10.7%	16.0%	15.7%
Over 150 miles	8.6%	11.5%	7.6%	9.4%	14.0%	7.3%	5.7%	9.7%	9.3%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	303	139	250	107	107	137	122	3140	3421
Calculated Mean (miles)	**62.9**	**64.5**	**63.1**	**59.9**	**68.1**	**63.3**	**52.1**	**68.7**	**67.7**

Attendance Characteristics

Question 21

How did you travel to the USTA Billie Jean King National Tennis Center today?

	Qualifying Aug 25	Qualifying Aug 26	Day 1 Aug 29	Day 2 Aug 30	Day 3 Aug 31	Day 4 Sept 1	Day 5 Sept 2	Day 6 Sept 3	Day 7 Sept 4
Subway	42.4%	47.2%	40.8%	53.9%	40.4%	47.0%	49.8%	41.6%	46.2%
Car/Private vehicle and parked	29.6%	30.3%	36.9%	24.7%	25.9%	26.3%	27.0%	24.0%	27.3%
Car/Private vehicle and dropped off	12.0%	9.2%	13.4%	5.5%	11.4%	8.5%	6.4%	12.2%	11.8%
Long Island Railroad	5.6%	6.3%	2.6%	6.0%	13.0%	10.8%	9.9%	10.1%	7.6%
Taxi/car service	2.4%	0.7%	1.9%	1.7%	0.5%	1.9%	2.2%	3.4%	3.4%
Chartered Bus	3.2%	4.2%	2.6%	4.4%	4.2%	2.4%	2.2%	2.1%	1.7%
Walked	3.2%	1.4%	0.6%	1.7%	0.0%	0.5%	0.9%	0.8%	0.4%
MTA Bus	0.8%	0.7%	0.0%	0.0%	1.0%	1.4%	0.9%	1.3%	0.8%
Biked	0.8%	0.0%	0.6%	0.6%	1.0%	0.0%	0.0%	0.4%	0.0%
Other	0.0%	0.0%	0.6%	1.7%	2.6%	1.4%	0.9%	4.2%	0.8%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	125	142	157	182	193	213	233	238	238

	Day 8 Sept 5	Day 9 Sept 6	Day 10 Sept 7	Day 11 Sept 8	Day 12 Sept 9	Day 13 Sept 10	Day 14 Sept 11	Aggregate (Mainround)	Aggregate
Subway	48.5%	51.9%	53.1%	61.2%	59.6%	57.2%	51.5%	49.1%	48.7%
Car/Private vehicle and parked	21.7%	18.8%	17.8%	26.2%	19.3%	19.3%	19.4%	24.2%	24.8%
Car/Private vehicle and dropped off	13.0%	12.0%	11.3%	2.9%	7.3%	8.3%	7.8%	9.8%	9.9%
Long Island Railroad	9.5%	10.5%	7.5%	4.9%	7.3%	7.6%	10.7%	8.6%	8.4%
Taxi/car service	2.6%	3.0%	5.6%	2.9%	2.8%	4.1%	7.8%	3.0%	2.8%
Chartered Bus	1.3%	0.8%	2.4%	0.0%	0.9%	0.7%	0.0%	2.0%	2.2%
Walked	1.7%	0.8%	0.5%	0.0%	0.0%	0.0%	1.9%	0.7%	0.9%
MTA Bus	0.0%	0.0%	0.0%	0.0%	0.9%	0.7%	0.0%	0.6%	0.6%
Biked	0.9%	0.0%	0.9%	0.0%	0.0%	0.7%	0.0%	0.4%	0.4%
Other	0.9%	2.3%	0.9%	1.9%	1.8%	1.4%	1.0%	1.6%	1.5%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	231	133	213	103	109	145	103	2491	2758

Attendance Characteristics

Question 30

How many people are you here with today?

	Qualifying Aug 25	Qualifying Aug 26	Day 1 Aug 29	Day 2 Aug 30	Day 3 Aug 31	Day 4 Sept 1	Day 5 Sept 2	Day 6 Sept 3	Day 7 Sept 4
I am here by myself	22.6%	25.7%	10.0%	12.8%	10.4%	9.7%	9.6%	6.1%	5.4%
One other person	31.3%	32.9%	50.0%	52.9%	44.3%	53.8%	52.2%	52.7%	46.9%
Two other people	20.0%	13.6%	13.2%	12.8%	16.7%	13.5%	16.3%	15.9%	13.7%
Three other people	7.0%	13.6%	12.7%	9.8%	13.1%	14.3%	12.4%	15.5%	18.4%
Four other people	4.4%	4.3%	5.9%	4.9%	5.0%	5.9%	3.6%	3.6%	6.5%
Five other people	1.7%	1.4%	3.6%	1.5%	4.5%	0.8%	2.0%	2.9%	3.3%
Six other people	0.9%	2.1%	2.3%	2.0%	0.5%	0.4%	1.2%	1.8%	1.8%
Seven other people	1.7%	1.4%	0.5%	1.0%	1.8%	0.4%	0.8%	0.7%	1.1%
Eight other people	2.6%	0.0%	0.5%	0.5%	0.0%	0.0%	0.0%	0.4%	0.4%
Nine or more other persons	7.8%	5.0%	1.4%	2.0%	3.6%	1.3%	2.0%	0.4%	2.5%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	115	140	220	204	221	238	251	277	277
Calculated Mean (group size)	**3.4**	**3.0**	**2.9**	**2.8**	**3.1**	**2.7**	**2.8**	**2.8**	**3.2**

	Day 8 Sept 5	Day 9 Sept 6	Day 10 Sept 7	Day 11 Sept 8	Day 12 Sept 9	Day 13 Sept 10	Day 14 Sept 11	Aggregate (Mainround)	Aggregate
I am here by myself	9.2%	17.7%	13.6%	13.1%	12.2%	15.6%	7.1%	10.5%	11.6%
One other person	51.2%	61.4%	59.1%	48.9%	59.2%	55.2%	60.3%	52.9%	51.3%
Two other people	11.7%	10.1%	11.4%	15.3%	12.2%	15.6%	15.9%	13.8%	14.0%
Three other people	15.6%	5.7%	8.7%	11.0%	11.6%	8.4%	11.1%	12.6%	12.4%
Four other people	5.3%	0.6%	2.7%	5.8%	2.7%	3.3%	4.0%	4.4%	4.4%
Five other people	2.8%	1.3%	2.3%	2.9%	1.4%	0.7%	0.8%	2.3%	2.3%
Six other people	2.1%	0.6%	1.5%	0.7%	0.0%	0.7%	0.8%	1.3%	1.3%
Seven other people	0.7%	1.3%	0.0%	0.7%	0.0%	0.7%	0.0%	0.7%	0.8%
Eight other people	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%
Nine or more other persons	1.1%	1.3%	0.4%	1.5%	0.7%	0.0%	0.0%	1.4%	1.7%
	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	283	158	264	137	147	154	126	2957	3212
Calculated Mean (group size)	**2.9**	**2.3**	**2.5**	**2.8**	**2.4**	**2.4**	**2.5**	**2.8**	**2.8**

VISSIM MODEL CALIBRATION AND VALIDATION

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Memorandum

To: Project Files

From: Michael Beattie

Date: August 9, 2012

Re: USTA Existing VISSIM Model Calibration and Validation

cc:

The New York City Department of Parks and Recreation with the United States Tennis Association (USTA) will be proposing a number of improvements and modifications to the National Tennis Center (NTC) as part of their NTC Strategic Vision. The NTC is primarily a public recreational facility, except for a two-week period at the end of August and early September, when it hosts the US Open. As part of the study to identify potential impacts due to the increase in day-time visitation, an analysis of the adjacent freeway system was conducted to determine if vehicles would spill back from the freeway to local surface streets.

Due to existing congestion on the adjacent freeways and the existing queues created from downstream bottlenecks, traditional analysis of freeway operations are beyond the capabilities of standard traffic operations software (i.e. Highway Capacity Software). Therefore, a VISSIM model representing a weekday PM peak hour (6:00-7:00 PM) was developed to quantify the potential impacts generated by an increase in the volume of patrons departing the day-time session at the US Open. **Figure 1** presents the extents of the VISSIM model.

VISSIM micro-simulation software provides the capability to model complex interchange configurations and merge/diverge areas that operate at capacity that other traditional software packages are not able to analyze. Output from the VISSIM model provides the ability to quantify the operational impacts of queuing from downstream bottlenecks. The VISSIM micro-simulation model can also provide a three dimensional representation of these interactions within the study area. For this application, the VISSIM model was used to determine the back of queue length within the study area for a one-hour peak condition.

EXISTING CONDITIONS DEVELOPMENT AND CALIBRATION

The main objective of model calibration is to ensure that the model accurately reflects special event traffic conditions experienced on the date of the survey. This includes reasonably replicating traffic flow to match observed operating conditions, volume data and queue observations.

Lane geometries (lane widths, interchange designs, etc.) were coded into the model based on field observations and existing aerials. Existing counts collected during the opening week of the US Open were also coded into the model in 15-minute intervals.

During calibration of a VISSIM model, individual components are adjusted to match field-observed data. Calibration involves setting background traffic operation and driver behavior characteristics including yielding right-of-way, gap acceptance, driver aggressiveness, and vehicle characteristics. The default values were adjusted during this process so that the model would accurately reflect observed conditions. Adjusted default values and other refinements made to calibrate/validate the VISSIM model are described below:

- At Long Island Expressway (LIE) off-ramp and College Point on-ramp merge, while stripped as a three lane to two lane merge, based on field observations this section acts as a three lane section.
- Adjusted CC1 (Headway Time) factor on LIE/College Point merge from default 0.9 seconds to 0.65 seconds to replicate field conditions
- Adjusted CC1 (Headway Time) factor on between LIE/College Point collector-distributor road between Grand Central Parkway loop ramps from default 0.9 seconds to 0.65 seconds to replicate field conditions
- Adjusted CC1 (Headway Time) factor on Grand Central Parkway collector-distributor road from default 0.9 seconds to 0.65 seconds to replicate field conditions

Since the VISSIM model output is based on the random arrival of vehicles, multiple runs were required to provide a reasonable level of statistical accuracy and validity. Ten separate model runs utilizing random seeds were averaged to determine the final performance measures. The VISSIM model was calibrated and validated to 6:00-7:00 PM existing conditions based on traffic volumes and observed vehicle queues. During this process, the model was visually inspected to ensure that it reflected observed conditions.

FREE FLOW TRAVEL SPEEDS

Table 1 presents the free-flow travel speed ranges for passenger vehicles and trucks coded into the VISSIM model.

Table 1
Free Flow Speeds

Location	Free Flow Speed (MPH)	
	Passenger Cars	Trucks
Grand Central Parkway	50-60	-
Collector-Distributor Roads	33-37	33-37
Loop Ramps	20-30	-
Direct Ramps	40-45	-
Perimeter Road	13-17	-

MODEL VALIDATION

During validation, the VISSIM model output is compared against field data to determine if the output is within acceptable levels. The following criteria, based on the “Guidelines for Applying Traffic Microsimulation Modeling Software Volume III (Federal Highway Administration, 2003)” were used for the model calibration:

Hourly Flows, VISSIM Model vs. Field Counts

Individual Link Flows

Within 15% for 700 vph < Flow < 2,700 vph	>85% of Cases
Within 100 vph, for Flow < 700 vph	>85% of Cases
Within 400 vph, for Flow > 2,700 vph	>85% of Cases

GEH Statistic

GEH < 5	> 85% of Cases

The GEH statistic is computed as follows:

$$GEH = \sqrt{\frac{(V-C)^2}{(V+C)/2}}$$

where:
GEH = The statistic
V = model estimated directional hourly volume at a location.
C = directional hourly count at a location.

The results from the VISSIM analysis are summarized **Table 2.** This table presents the field counts and the resulting VISSIM simulated volumes. This table shows that the VISSIM model is successfully meeting the calibration criteria for the model area.

Table 2
Volume Comparison

Location	Field Counts	VISSIM	Difference[1]	Percent Served[2]	GEH	Meets Criteria?
College Point on-ramp to Horace Harding Expressway	1,360	1360	0	0%	0.0	YES
LIE off-ramp to Horace Harding Expressway	1,204	1220	-16	-1%	0.5	YES
Horace Harding Expressway to Grand Central Parkway (GCP) westbound direct ramp	955	934	+21	2%	0.7	YES
GCP westbound to loop ramp service road	1,700	1688	+12	1%	0.3	YES
Horace Harding Expressway to GCP east loop ramp	75	72	+3	4%	0.3	YES
GCP service road westbound at loop ramp	325	324	+1	0%	0.1	YES
GCP mainline westbound at loop ramps	3,572	3574	-2	0%	0.0	YES
GCP westbound on-ramp from Horace Harding Expressway	1,280	1247	+33	3%	0.9	YES
GCP westbound off-ramp to Exit 9P USTA	802	750	+52	6%	1.9	YES
GCP westbound mainline at off-ramp to Exit 9P USTA	4,050	4046	+4	0%	0.1	YES
GCP westbound mainline (after split)	2,535	2522	+13	1%	0.3	YES
GCP westbound service road (after split)	1,515	1515	0	0%	0.0	YES
GCP westbound on-ramp from Exit 9P	244	235	+9	4%	0.6	YES

Notes: Average of ten simulation runs.
1. Difference = Field Counts – VISSIM
2. Percent Served = (Field Counts – VISSIM) / Field Counts

In addition to validating the model to field counts, the simulation was checked to demonstrate queuing that is consistent with the field observations. During the 6:00 PM to 7:00 PM peak period, the Grand

Central Parkway westbound off-ramp to Exit 9P was observed to queue back to the GCP mainline, growing throughout the peak hour. By the end of the peak hour (around 7:00 PM), the queue from the Exit 9P exit ramp extended to the Horace Harding Expressway.

The VISSIM model replicated this queue length during the simulation, with queues from the Exit 9P off-ramp extending through the peak hour, spilling back onto the Horace Harding Expressway and back to the College Point Boulevard and LIE approaches at the end of the simulation peak hour.

APPENDIX F

NOISE

USTA Tennis Center
Noise Measurement Results
Noise Appendix
Parking Garage Analysis

Parking Lot A

Build

1) Parking Garage

Leq @ 50 Feet =		SEL ref	+	CN	-	35.6
		92		-3.7366		35.6
	=	52.7				
Usage Factor	=	1.0				
SEL ref =	92					
# of autos per hour =	423					
Leq @ 50 Feet =		52.7				

Receptor	Distance (feet)	Leq (1-Hour)
1	3050	17.0
2	2000	20.7
3	800	28.6
4	720	29.5

No Action

1) Park and Ride

Leq @ 50 Feet =		SEL ref	+	CN	-	35.6
		101		-10		35.6
	=	55.4				
Usage Factor	=	1.0				
SEL ref =	101					
# of autos per hour =	200					
Leq @ 50 Feet =		55.4				

Receptor	Distance (feet)	Leq (1-Hour)
1	3050	19.7
2	2000	23.4
3	800	31.3

Parking Lot B

Build

1) Parking Garage

Leq @ 50 Feet =		SEL ref	+	CN	-	35.6
		92		-4.31798		35.6
	=	52.1				
Usage Factor	=	1.0				
SEL ref =	92					
# of autos per hour =	370					
Leq @ 50 Feet =		52.1				

Receptor	Distance (feet)	Leq (1-Hour)
1	1350	23.5
2	1400	23.2
3	2000	20.1
4	720	20.4

No Action

1) Park and Ride

Leq @ 50 Feet =		SEL ref	+	CN	-	35.6
		101		-13.0103		35.6
	=	52.4				
Usage Factor	=	1.0				
SEL ref =	101					
# of autos per hour =	100					
Leq @ 50 Feet =		52.4				

Receptor	Distance (feet)	Leq (1-Hour)
1	1350	23.8
2	1400	23.5
3	2000	20.4

USTA Tennis Center
Noise Measurement Results
Noise Appendix
Parking Garage Analysis

SiteID	Location	Time		Existing/No Action			Future With Action			
				Parking Lot A L_{eq}	Parking Lot B L_{eq}	Total L_{eq}	Parking Lot A L_{eq}	Parking Lot B L_{eq}	Total L_{eq}	Build Increment
1	Promenade of Industry North of Industry Pond	WD	MD	19.7	23.8	63.1	17.0	23.5	63.1	0.0
			PM	19.7	23.8	61.3	17.0	23.5	61.3	0.0
		WE	MD	19.7	23.8	61.7	17.0	23.5	61.7	0.0
			PM	19.7	23.8	60.3	17.0	23.5	60.3	0.0
2	Herbert Hoover Promenade between United Nations Avenue and Avenue of Commerce	WD	MD	23.4	23.5	55.9	20.7	23.2	55.9	0.0
			PM	23.4	23.5	58.3	20.7	23.2	58.3	0.0
		WE	MD	23.4	23.5	57.6	20.7	23.2	57.6	0.0
			PM	23.4	23.5	63.5	20.7	23.2	63.5	0.0
3	United Nations Avenue between Avenue of Science and Grand Central Parkway	WD	MD	31.3	20.4	63.2	28.6	20.1	63.2	0.0
			PM	31.3	20.4	62.9	28.6	20.1	62.9	0.0
		WE	MD	31.3	20.4	62.7	28.6	20.1	62.7	0.0
			PM	31.3	20.4	63.6	28.6	20.1	63.6	0.0

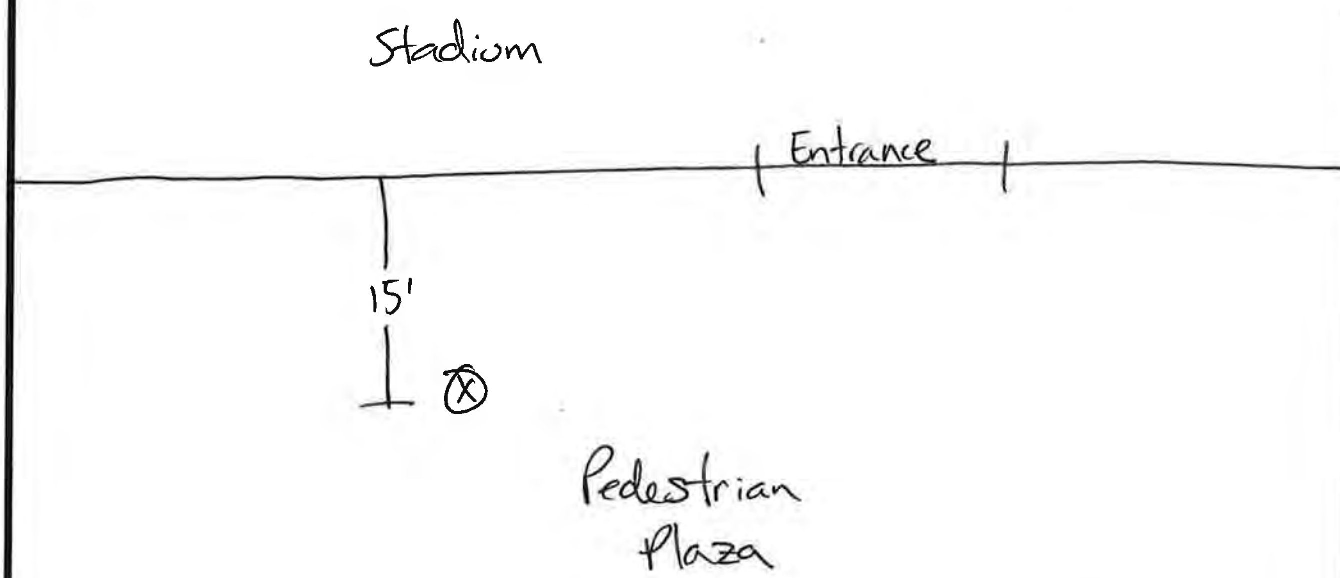
USTA Tennis Center
Noise Measurement Results

SiteID	Location			L_{eq}	L_{1}	L_{10}	L_{50}	L_{90}	L_{Min}	L_{Max}
1	Promenade of Industry North of Industry Pond	WD	12:29 PM	63.1	72.9	63.8	61.1	59.6	56.8	78.9
			4:31 PM	61.3	68.0	62.4	60.7	59.4	58.5	74.7
		WE	11:12 AM	61.7	70.1	63.5	60.0	58.6	57.5	74.8
			12:58 PM	62.1	68.6	63.0	59.6	58.1	56.5	84.7
			3:09 PM	62.1	66.6	63.0	61.6	60.6	59.7	77.8
			4:54 PM	62.4	65.0	63.9	62.1	60.9	59.3	69.5
			6:36 PM	61.8	64.2	63.1	61.7	60.4	58.8	67.0
			8:13 PM	60.3	62.5	61.0	60.1	59.3	58.3	68.5
2	Herbert Hoover Promenade between United Nations Avenue and Avenue of Commerce	WD	1:06 PM	55.9	61.5	57.5	55.2	53.8	53.0	64.8
			5:07 PM	58.3	63.2	59.3	57.8	56.6	55.4	72.0
		WE	11:39 AM	57.8	64.7	59.4	56.9	55.5	54.3	71.3
			1:28 PM	57.6	62.7	59.0	57.1	55.8	54.7	68.0
			3:35 PM	59.9	64.4	61.3	59.4	58.2	56.5	69.1
			5:22 PM	63.5	73.6	64.9	61.3	59.5	58.0	80.3
			7:03 PM	63.6	71.3	65.8	62.0	60.1	58.6	76.7
3	United Nations Avenue between Avenue of Science and Grand Central Parkway	WD	1:42 PM	63.2	69.4	64.8	62.3	61.2	58.4	76.2
			5:48 PM	62.9	67.6	64.9	62.2	60.7	58.8	75.2
		WE	12:16 PM	64.4	72.0	65.4	63.2	62.1	60.5	78.1
			2:04 PM	62.7	66.4	63.9	62.4	61.4	60.1	68.1
			4:12 PM	64.2	67.4	65.5	63.8	62.9	61.8	69.4
			5:57 PM	64.9	72.2	66.4	63.8	62.5	61.5	77.4
			7:34 PM	63.6	68.4	64.6	63.0	62.0	60.5	73.5
15 feet South of Louis Armstrong Stadium		WD	11:29 AM	72.1	76.2	73.8	71.6	70.3	69.0	82.1
			3:37 PM	72.0	77.6	73.3	71.3	70.1	68.9	82.1
			7:54 PM	72.0	75.5	73.9	71.5	70.0	68.7	78.1
65 feet South of Louis Armstrong Stadium		WD	11:56 AM	72.5	78.8	74.7	71.6	69.3	67.7	83.4
			4:00 PM	71.9	76.6	73.7	71.1	69.6	67.8	85.8
			8:17 PM	71.6	76.7	73.9	70.7	68.9	67.4	82.8

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center				Date	8/31/11
Location	15' South of Louis Armstrong Stadium				# Site	2
Equipment / Calibration Info	Meter	SN: 238[illegible]4814	Date: 7/26/11		Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11			
	Calib	SN: 2688762	Date: 8/3/11			

Plan View

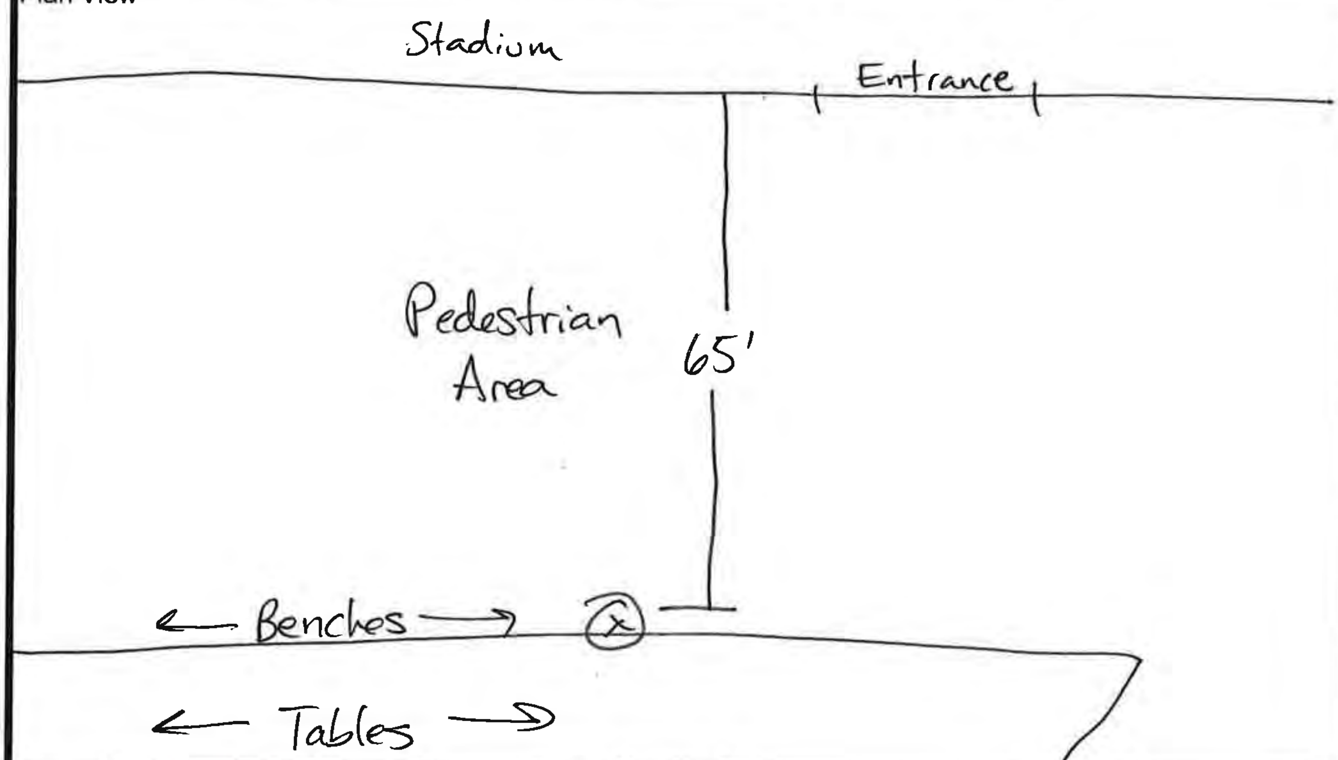


Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:29		# Bus		# Motorcycle		# Airplane/ Train
L1	~~76.0~~ 76.2	L50	~~71.4~~ 71.6	Lmin	69.0	Leq	72.1
L10	~~73.6~~ 73.8	L90	~~70.2~~ 70.3	Lmax	82.1	Lpeak	
Note: \0002 ped noise greater than stadium (amplified)							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	15:37		# Bus		# Motorcycle		# Airplane/ Train
L1	~~77.4~~ 77.6	L50	~~71.2~~ 71.3	Lmin	68.9	Leq	~~72.0~~ ~~72.1~~ 72.0
L10	~~73.2~~ 73.3	L90	~~70.0~~ 70.1	Lmax	82.1	Lpeak	
Note: \0008							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	19:54		# Bus		# Motorcycle		# Airplane/ Train
L1	~~75.4~~ 75.5	L50	~~71.4~~ 71.5	Lmin	68.7	Leq	72.0
L10	~~73.8~~ 73.9	L90	70.0	Lmax	78.1	Lpeak	
Note: \0014							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center			Date	8/31/11
Location	65' South of Louis Armstrong Stadium			# Site	3
Equipment / Calibration Info	Meter	SN: 2384814	Date: ~~8~~ 7/26/11	Observer:	
	Mic	SN: 2385722	Date: 7/26/11	Christian	
	Calib	SN: 2688762	Date: 8/3/11		

Plan View

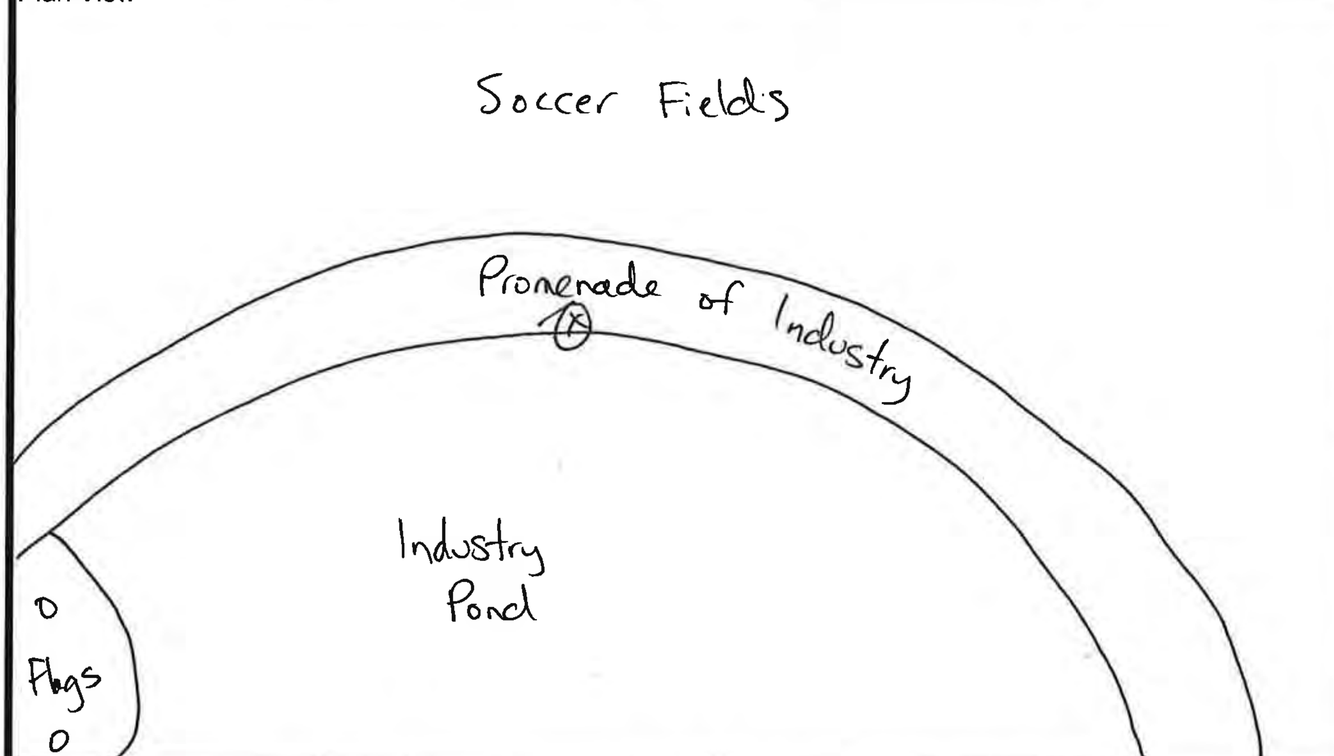


Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:56		# Bus		# Motorcycle		# Airplane/ Train
L1	~~78.6~~ 78.8	L50	~~71.4~~ 71.6	Lmin	67.7	Leq	72.5
L10	~~74.6~~ 74.7	L90	~~69.2~~ 69.3	Lmax	83.4	Lpeak	
Note: \0003 ped noise dominant							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:00		# Bus		# Motorcycle		# Airplane/ Train
L1	76.6	L50	~~71.0~~ 71.1	Lmin	67.8	Leq	71.9
L10	~~73.6~~ 73.7	L90	~~69.4~~ 69.6	Lmax	85.8	Lpeak	
Note: \0009							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	20:17		# Bus		# Motorcycle		# Airplane/ Train
L1	~~76.6~~ 76.7	L50	~~70.6~~ 70.7	Lmin	67.4	Leq	71.6
L10	~~73.8~~ 73.9	L90	~~68.8~~ 68.9	Lmax	82.8	Lpeak	
Note: \0015							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center		Date	8/31/11
Location	Promenade of Industry Immediately N of Pond		# Site	4
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian
	Mic	SN: 2385722	Date: 7/26/11	
	Calib	SN: 2688762	Date: 8/3/11	

Plan View



Period			# Automobile		# Medium Truck		# Heavy Truck
Time	12:29		# Bus		# Motorcycle	2	# ~~Airplane/~~ Train
L1	~~72.8~~ 72.9	L50	~~61.0~~ 61.1	Lmin	56.8	Leq	63.1
L10	63.8	L90	~~59.4~~ 59.6	Lmax	78.9	Lpeak	

Note: \0004 paused for planes

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:31		# Bus		# Motorcycle		# Airplane/ Train
L1	68.0	L50	~~60.6~~ 60.7	Lmin	58.5	Leq	61.3
L10	~~62.2~~ 62.4	L90	~~59.2~~ 59.4	Lmax	74.7	Lpeak	

Note: \0010

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Page of

Project Name	USTA Tennis Stadium		Date	9/3/11
Location	North of Industry Pond (Promenade of Industry)		# Site	4
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian
	Mic	SN: 2385722	Date: 7/26/11	
	Calib	SN: 1800102	Date: 7/26/11	

Plan View

see previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:12		# Bus		# Motorcycle		# Airplane/ Train
L1	70.1	L50	60.0	Lmin	57.5	Leq	61.7
L10	63.5	L90	58.6	Lmax	74.8	Lpeak	
Note: \0017 80°F, 9mph many soccer games going on, paused for planes, event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	12:58		# Bus		# Motorcycle		# Airplane/ Train
L1	~~68.4~~ 68.6	L50	~~59.4~~ 59.6	Lmin	56.5	Leq	62.1
L10	63.0	L90	~~58.0~~ 58.1	Lmax	84.7	Lpeak	
Note: \0020 87°F, 8mph							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	15:09		# Bus		# Motorcycle		# Airplane/ Train
L1	66.6	L50	61.6	Lmin	59.7	Leq	~~63.5~~ 62.1
L10	63.0	L90	~~60.4~~ 60.6	Lmax	77.8	Lpeak	
Note: \0023 80°F, 11mph paused for planes, event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:54		# Bus		# Motorcycle		# Airplane/ Train
L1	~~64.8~~ 65.0	L50	~~62.0~~ 62.1	Lmin	59.3	Leq	62.4
L10	~~63.8~~ 63.9	L90	~~60.8~~ 60.9	Lmax	69.5	Lpeak	
Note: \0026 81°F, 10mph							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Page of

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	North of Industry Pond on Promenade of Industry			# Site	4
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

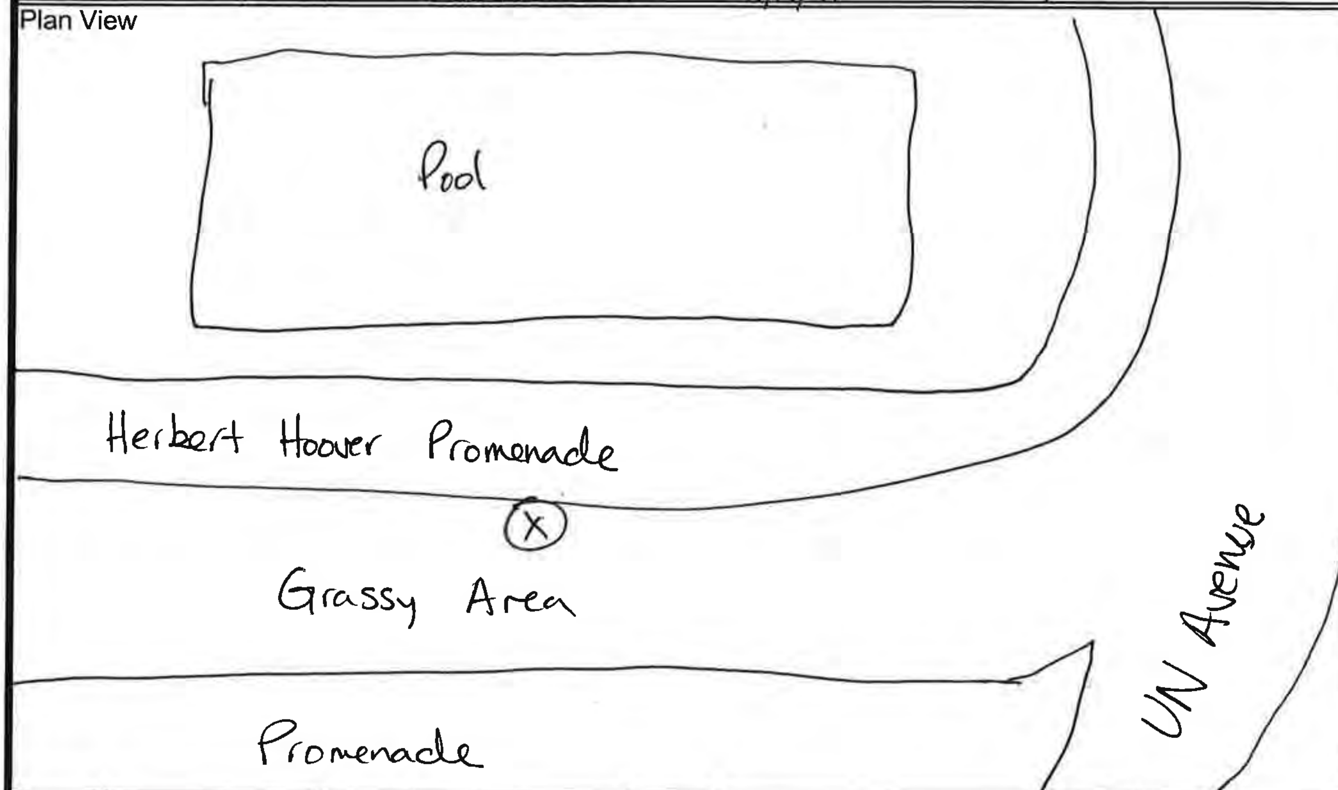
See previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	18:36		# Bus		# Motorcycle		# Airplane/ Train
L1	~~64.0~~ 64.2	L50	~~61.6~~ 61.7	Lmin	58.8	Leq	61.8
L10	~~63.0~~ 63.1	L90	60.4	Lmax	67.0	Lpeak	
Note: \0029 77°F, 9mph							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	20:13		# Bus		# Motorcycle		# Airplane/ Train
L1	~~62.4~~ 62.5	L50	~~60.0~~ 60.1	Lmin	58.3	Leq	60.3
L10	61.0	L90	~~59.2~~ 59.3	Lmax	68.5	Lpeak	
Note: \0032 76°F, 5mph							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center			Date	8/31/11
Location	H. Hoover Promenade btw UN Ave & Ave of Commerce			# Site	5
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer:	Christian
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 2688762	Date: 8/3/11		

Plan View



Period			# Automobile		# Medium Truck		# Heavy Truck
Time	13:06		# Bus		# Motorcycle		# Airplane/ Train
L1	~~61.4~~ 61.5	L50	~~55.0~~ 55.2	Lmin	53.0	Leq	55.9
L10	~~57.4~~ 57.5	L90	53.8	Lmax	64.8	Lpeak	
Note: \0005 paused for planes, vehicles							
Period		2	# Automobile		# Medium Truck		# Heavy Truck
Time	17:07		# Bus		# Motorcycle		# Airplane/ Train
L1	~~63.0~~ 63.2	L50	57.8	Lmin	55.4	Leq	58.3
L10	~~59.2~~ 59.3	L90	~~56.4~~ 56.6	Lmax	72.0	Lpeak	
Note: \0011 paused for planes, event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Stadium	Date	9/3/11
Location	H. Hoover Promenade btw UN Ave & Ave of Commerce	# Site	5

Equipment / Calibration Info				Observer:
	Meter	SN: 2384814	Date: 7/26/11	Christian
	Mic	SN: 2385722	Date: 7/26/11	
	Calib	SN: 1800102	Date: 7/26/11	

Plan View

see previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:39		# Bus		# Motorcycle		# Airplane/ Train
L1	~~64.6~~ 64.7	L50	~~56.8~~ 56.9	Lmin	54.3	Leq	57.8
L10	59.4	L90	~~55.4~~ 55.5	Lmax	71.3	Lpeak	
Note:	\0018 78°F, 7mph paused for planes						
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	13:28		# Bus		# Motorcycle		# Airplane/ Train
L1	~~62.6~~ 62.7	L50	~~57.0~~ 57.1	Lmin	54.7	Leq	57.6
L10	59.0	L90	~~55.6~~ 55.8	Lmax	68.0	Lpeak	
Note:	\0021 82°F, 7mph paused for planes, event vehicles						
Period		5	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	15:35	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	64.4	L50	59.4	Lmin	56.5	Leq	59.9
L10	~~61.2~~ 61.3	L90	~~58.0~~ 58.2	Lmax	69.1	Lpeak	
Note:	\0024 79°F, 6mph lots of people → soccer games, playing paused for planes, event vehicles						
Period		1	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:22	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	73.6	L50	~~61.2~~ 61.3	Lmin	58.0	Leq	63.5
L10	~~64.8~~ 64.9	L90	~~59.4~~ 59.5	Lmax	80.3	Lpeak	
Note:	\0027 78°F, 4mph soccer games, whistles, yelling, paused for above						

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Stadium				Date	9/3/11
Location	H. Hoover Promenade btw UN Ave & Ave of Commerce				# Site	5
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11		Observer:	Christian
	Mic	SN: 2385722	Date: 7/26/11			
	Calib	SN: 1800102	Date: 7/26/11			

Plan View

See previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	19:03		# Bus		# Motorcycle		# Airplane/ Train
L1	~~71.2~~ 71.3	L50	62.0	Lmin	58.6	Leq	63.6
L10	65.8	L90	~~60.0~~ 60.1	Lmax	76.7	Lpeak	
Note: 0030 76°F, 4mph							

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

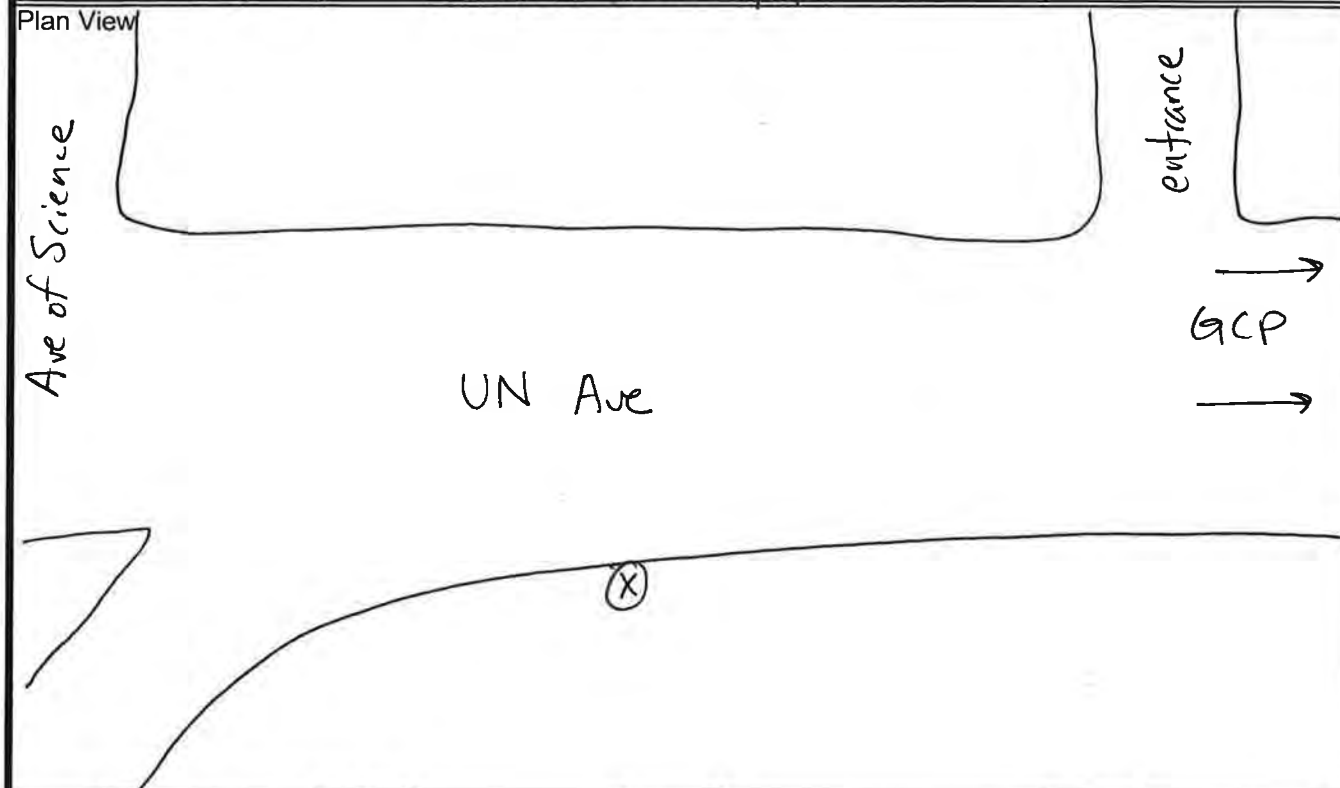
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center			Date	8/31/11
Location	UN Ave btw Ave of Science & GCP			# Site	6
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer:	Christian
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 2688762	Date: 8/3/11		

Plan View



Period		19	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	13:42	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	~~69.2~~ 69.4	L50	~~62.2~~ 62.3	Lmin	58.4	Leq	63.2
L10	~~64.6~~ 64.8	L90	~~61.0~~ 61.2	Lmax	76.2	Lpeak	
Note: \0006 paused for planes & tournament vehicles							
Period		62	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:48	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	67.6	L50	62.2	Lmin	58.8	Leq	62.9
L10	~~64.8~~ 64.9	L90	~~60.6~~ 60.7	Lmax	75.2	Lpeak	
Note: \0012 paused for planes & event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Page of

Project Name	USTA Tennis Stadium		Date	9/3/11
Location	UN Ave btw GCP & Ave of Science		# Site	6
Equipment / Calibration Info	Meter SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic SN: 2385722	Date: 7/26/11		
	Calib SN: 1800102	Date: 7/26/11		

Plan View

see previous drawing

Period		21	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	12:16	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	~~71.8~~ 72.0	L50	63.2	Lmin	60.5	Leq	64.4
L10	65.4	L90	~~62.0~~ 62.1	Lmax	78.1	Lpeak	
Note:	\0019 82°F, 2mph paused for planes & event vehicles						
Period		15	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	14:04	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	~~66.2~~ 66.4	L50	~~62.2~~ 62.4	Lmin	60.1	Leq	62.7
L10	~~63.8~~ 63.9	L90	61.4	Lmax	68.1	Lpeak	
Note:	\0022 82°F, 3mph						
Period		33	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	16:12	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	~~67.2~~ 67.4	L50	63.8	Lmin	61.8	Leq	64.2
L10	~~65.4~~ 65.5	L90	~~62.8~~ 62.9	Lmax	69.4	Lpeak	
Note:	\0025 79°F, 3mph						
Period		64	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:57	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	72.2	L50	~~63.6~~ 63.8	Lmin	61.5	Leq	64.9
L10	66.4	L90	~~62.4~~ 62.5	Lmax	77.4	Lpeak	
Note:	\0028 77°F, 2mph						

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Page of

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	UN Ave btw Ave of Science & 6CP			# Site	6
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

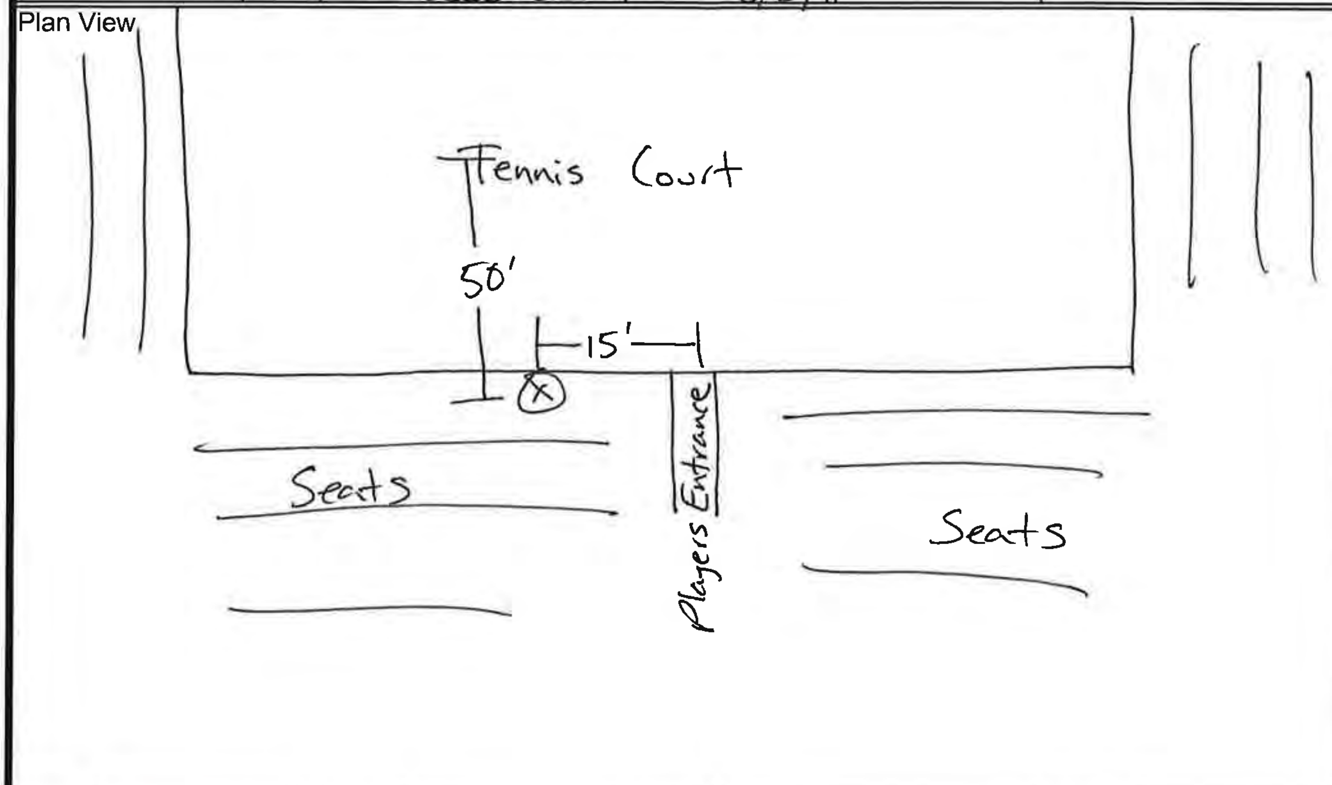
See previous drawing

Period		25	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	19:34	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	68.4	L50	63.0	Lmin	60.5	Leq	63.6
L10	64.6	L90	62.0	Lmax	73.5	Lpeak	
Note: \0031 75°F, 1mph							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET
AKRF, Inc.

Project Name	USTA Tennis Center			Date	8/31/11
Location	Grandstand Court			# Site	7
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 2688762	Date: 8/3/11		

Plan View



Period			# Automobile		# Medium Truck		# Heavy Truck
Time	19:31		# Bus		# Motorcycle		# Airplane/ Train
L1	84.9	L50	65.6	Lmin	57.9	Leq	73.5
L10	77.1	L90	61.0	Lmax	88.4	Lpeak	
Note: \0013							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	21:10		# Bus		# Motorcycle		# Airplane/ Train
L1	92.9	L50	67.1	Lmin	56.3	Leq	81.5
L10	86.1	L90	60.0	Lmax	101.1	Lpeak	
Note: \0016							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC and APLAC signatory)

NVLAP®

NVLAP Lab Code: 200625-0

Calibration Certificate No.24335

Instrument:	**Sound Level Meter**	*Date Calibrated:* **7/26/2011**	*Cal Due:*
Model:	**2260**	*Status:*	**Received** / **Sent**
Manufacturer:	**Brüel and Kjær**	*In tolerance:*	**X** / **X**
Serial number:	**2384814**	*Out of tolerance:*	
Tested with:	**Microphone 4189 s/n 2385722** **Preamplifier ZC0026**	*See comments:*	
Type (class):	**1**	*Contains non-accredited tests:*	__ **Yes** _X_ **No**
		Calibration service:	__ **Basic** _X_ **Standard**
Customer:	**AKRF, Inc.**	*Address:*	**440 Park Avenue South, 7th Floor** **New York, NY 10016**
Tel/Fax:	**212-696-0670 / 212-213-3191**		

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., 06/07/2005
SLM & Dosimeters – Acoustical Tests, Scantek Inc., 06/15/2005

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jan 4, 2011	Scantek, Inc./ NVLAP	Jan 4, 2012
DS-360-SRS	Function Generator	61646	Nov 13, 2009	ACR Env. / A2LA	Nov 13, 2011
34401A-Agilent Technologies	Digital Multimeter	MY41022043	Nov 17, 2010	ACR Env. / A2LA	Nov 17, 2011
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 13, 2010	ACR Env. / A2LA	Dec 13, 2012
HM30-Thommen	Meteo Station	1040170/39633	Jun 26, 2010	ACR Env. / A2LA	Dec 26, 2011
PC Program 1019 Norsonic	Calibration software	v.5.0	Validated July 2009	-	-
1251-Norsonic	Calibrator	30878	Dec 7, 2010	Scantek, Inc./ NVLAP	Dec 7, 2011

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric Pressure (kPa)	Relative Humidity (%)
23.7 °C	99.532 kPa	54.1 %RH

Calibrated by	Kristen van Otterloo	**Checked by**	Mariana Buzduga
Signature	Kristen van Otterloo	Signature	Mb
Date	7/26/2011	Date	7/27/2011

Document stored as: Z:\Calibration Lab\SLM 2011\BNK2260_2384814_M2.doc

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES [1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET[2,3]	NOT MET	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
IEC 60651/ANSI S1.4:			
Input Amplifier Test: Gain Step test/Amplifier Setting (# 6.3/5.3)	X		0.15
Level Linearity Test (#7.9/ 6.9)	X		0.15
Weighting Network Tests: A, C, Lin network (#7.2.1/ 6.2.1-electrical test)	X		0.15
Overload Detector Test: A-network (#9.3.1/8.3.1)	X		0.15
F/S/I/Peak Test: Steady State Response (#7.4/ 6.4)	X		0.15
Fast and Slow Overshoot Test (# 8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
Impulse Test: Continuous Sine Wave Burst (#7.3/ 6.3)	X		0.15
Impulse Test: Single Sine Wave Burst (#7.3/ 6.3)	X		0.15
Peak Detector Tests: single square wave burst (# 9.4.4/8.4.4)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/ 8.4.2)	X		0.15
IEC60804/ANSI S1.43			
Level linearity Test (# 9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/ 8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Global Acoustical response: Summation (w/ actuator) (#5)	X		0.2-0.5
Filter Test: Octave Filters	X		0.2
Filter Test: 1/3 Octave Filters	X		0.2

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 Parameters are certified at actual environmental conditions.

3 The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

X	Microphone 4189 s/n 2385722 for acoustical test
X	Preamplifier ZC0026 for all tests
X	Other: line adaptor ADP005 (18pF) for electrical tests

Measured Data: in Test Report # 24335 of 12 + 1 pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

Calibration Summary of Test Report No.:24335

Brüel and Kjær Type: 2260 Serial no: 2384814

Customer:	**AKRF, Inc.**
Address:	**440 Park Avenue South, 7th Floor New York, NY 10016**
Contact Person:	**Christian Thompson**
Phone No.:	**212-696-0670**
Fax No.:	**212-213-3191**
eMail:	**cthompson@akrf.com**

Instrument software version: 1.2

Microphone:	Brüel & Kjær	Type: 4189	Serial no: 2385722	Sens:-25.8dB
Preamplifier	Brüel & Kjær	Type: ZC0026	Serial no:	
Calibrator:	Brüel and Kjær	Type: 4231	Serial no: 1800102	Level:93.94dB

Measured with Preamplifier

Measurement Results:

Calibration of sound level meter - ANSI S1.4 Clause 3.2	Passed
Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clause 5.3	Passed
Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10	Passed
Weighting Network Test: A Network - ANSI S1.4-1983 Clause 8.2.1	Passed
Weighting Network Test: C Network - According to ANSI S1.4-1983 Clause 8.2.1	Passed
Weighting Network Test: Linear Network - According to ANSI S1.4-1983 Clause 8.2.1	Passed
Overload Detector Test: A-Network - ANSI S1.4-1983 Clause 8.3.1	Passed
F/S/I/Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4	Passed
Fast-Slow Test: Overshoot test - According to ANSI S1.4 1983 Clause 8.4.1	Passed
Fast-Slow Test: Single Sine Wave Burst - ANSI S1.4 1983 Clause 8.4.1 & 8.4.3	Passed
Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3	Passed
Impulse Test: Single Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.1 & 8.4.3	Passed
Peak Detector Test, single square wave burst - According to ANSI S1.4 1983 Clause 8.4.4	Passed
RMS Detector Test: Crest Factor Test - According to ANSI S1.4-1983 Clause 8.4.2	Passed
RMS Detector Test: Continuous Sine Wave Burst - According to ANSI S1.4-1983 Clause 8.4.2	Passed
Time Averaging Test: Averaging Functions - ANSI S1.43 Clause 9.3.2	Passed
Linearity Test - ANSI S1.43 Clause 9.3.3	Passed
Filter Test 1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3	Passed
Filter Test 1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3	Passed
Summation of acoustic tests - ANSI S1.4 Clause 5 using Actuator	Passed

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
99.532 kPa	23.7 °C	54.1 %RH

Date of calibration: 7/26/2011
Date of issue: 7/26/2011
Supervisor: Mariana Buzduga
Measurements performed by:

Kristen van Otterloo

Kristen van Otterloo

Software version: 5.2a

Scantek, Inc.
6430 Dobbin Rd., Suite C, Columbia, MD 21045
Ph: 410-290-7726 eMail: callab@scantekinc.com

Test Report No.:24335

Manufacturer:	Brüel and Kjær
Instrument type:	2260
Serial no:	2384814
Customer:	AKRF, Inc.
Department:	
Order No:	
Contact Person:	Christian Thompson
Address:	440 Park Avenue South, 7th Floor New York, NY 10016

Environmental conditions:

Pressure:	99.532 kPa
Temperature:	23.7 °C
Relative humidity:	54.1 %RH

Supervisor	Mariana Buzduga
Engineer	Kristen van Otterloo
Date:	7/26/2011

Measurement Results:

Calibration of sound level meter - ANSI S1.4 Clause 3.2

Reference Calibrator: WSC4 - NOR1251-30878
Reference calibrator level: 113.97
Before calibration:
  Environmental corrections: 0.00
  Other corrections: 0.1
  Notional level: 114.07
Reference calibrator level before calibration: 114.1
After calibration:
  Environmental corrections: 0.00
  Other corrections: 0.1
  Notional level: 114.07
Reference calibrator level after calibration: 114.1
Associated Calibrator: Brüel and Kjær - 4231 - 1800102
Associated calibrator level: 93.94
Initial level check:
  Environmental corrections before calibration: 0.00
  Other corrections: 0.1
  Notional level: 94.04
Indicated level before calibration: 94.0
Final level statement:
  Environmental corrections after calibration: 0.00
  Other corrections: 0.1
  Notional level: 94.04
Indicated level after calibration: 94.0
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clause 5.3

The level range control is tested in 10 dB steps. The SLM is set to the reference range and the signal generator is adjusted to give a reading equal to the reference level (Normally 94 dB.) The SLM range control is then set to the least sensitive range, and the generator level is set to 10 dB below full scale. The level range control is then decreased in 10 dB steps until the most sensitive range is reached. The generator level is adjusted accordingly.

Full Scale (dB)	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
Measured at 31.5 Hz					
130	114.0	114.0	0.5	0.0	P
120	104.0	104.0	0.5	0.0	P
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P
Measured at 1000 Hz					
130	114.0	113.9	0.5	-0.1	P
120	104.0	104.1	0.5	0.1	P

Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clau

Full Scale (dB)	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P
Measured at 8000 Hz					
130	114.0	114.0	0.5	0.0	P
120	104.0	104.0	0.5	0.0	P
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P

Test Passed

Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10

The SLM is set to the reference range and the signal generator is adjusted to give a reading equal to the reference level (Normally 94dB.) The test signal is increased to give a reading equal to FSD. The generator is lowered in 1 dB step until the lower limit of the reference range is reached. The Fast SPL value is measured. The error is measured relative to 94 dB, in the last one dB step and the max error in a floating 10 dB window.

Nom. Value (dB)	Meas. Value (dB)	Tolerance limits (dB)	Error in the last 1dB (dB)		Max Error in the last 10dB (dB)		Error Rel. to ref. level (dB)	
Measured at 31.5 Hz								
94.0	93.9	0.3/1.0/1.0	0.0	P	0.0	P	-0.1	P
95.0	95.0	0.3/1.0/1.0	0.1	P	0.1	P	0.0	P
100.0	100.0	0.3/1.0/1.0	0.0	P	0.1	P	0.0	P
105.0	105.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
106.0	106.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
107.0	106.9	0.3/1.0/1.0	-0.1	P	0.1	P	-0.1	P
108.0	107.9	0.3/1.0/1.0	0.0	P	0.1	P	-0.1	P
109.0	108.8	0.3/1.0/1.0	-0.1	P	0.2	P	-0.2	P
94.0	94.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
90.0	90.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
85.0	85.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
80.0	80.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
75.0	75.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
70.0	70.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
65.0	65.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
60.0	60.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
55.0	55.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
50.0	50.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
45.0	45.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
40.0	40.0	0.2/0.4/0.7	-0.1	P	0.1	P	0.0	P
37.0	37.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
36.0	36.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
35.0	35.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
34.0	34.2	0.2/0.4/0.7	0.1	P	0.2	P	0.2	P
Measured at 1000 Hz								

Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10

Nom. Value (dB)	Meas. Value (dB)	Tolerance limits (dB)	Error in the last 1dB (dB)		Max Error in the last 10dB (dB)		Error Rel. to ref. level (dB)	
94.0	94.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
95.0	95.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
100.0	100.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
105.0	105.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
106.0	106.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
107.0	107.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
108.0	108.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
109.0	109.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
94.0	94.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
90.0	90.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
85.0	85.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
80.0	80.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
75.0	75.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
70.0	70.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
65.0	65.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
60.0	60.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
55.0	55.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
50.0	50.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
45.0	45.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
40.0	40.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
37.0	37.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
36.0	36.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
35.0	35.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
34.0	34.2	0.2/0.4/0.7	0.1	P	0.2	P	0.2	P
Measured at 8000 Hz								
94.0	94.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
95.0	95.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
100.0	100.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
105.0	105.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
106.0	106.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
107.0	107.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
108.0	108.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
109.0	109.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
94.0	94.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
90.0	90.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
85.0	85.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
80.0	80.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
75.0	75.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
70.0	70.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
65.0	65.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
60.0	60.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
55.0	55.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
50.0	50.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
45.0	45.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
40.0	40.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
37.0	37.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
36.0	36.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
35.0	35.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
34.0	34.2	0.2/0.4/0.7	0.1	P	0.2	P	0.2	P

Test Passed

Weighting Network Test: A Network - ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm Upp. (dB)	Tolerance norm Low. (dB)	Error Value (dB)	Result
31.6	68.6	68.8	1.5	-1.5	0.2	P
63.1	81.8	81.8	1.0	-1.0	0.0	P
125.9	91.9	91.9	1.0	-1.0	0.0	P
251.2	99.4	99.4	1.0	-1.0	0.0	P
501.2	104.8	104.8	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	109.2	109.2	1.0	-1.0	0.0	P
3981.1	109.0	109.0	1.0	-1.0	0.0	P
7943.3	106.9	106.9	1.5	-3.0	0.0	P
12589.3	103.7	103.6	3.0	-6.0	-0.1	P

Test Passed

Weighting Network Test: C Network - According to ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm Upp. (dB)	Tolerance norm Low. (dB)	Error Value (dB)	Result
31.6	105.0	105.0	1.5	-1.5	0.0	P
63.1	107.2	107.2	1.0	-1.0	0.0	P
125.9	107.8	107.8	1.0	-1.0	0.0	P
251.2	108.0	108.0	1.0	-1.0	0.0	P
501.2	108.0	108.0	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	107.8	107.8	1.0	-1.0	0.0	P
3981.1	107.2	107.2	1.0	-1.0	0.0	P
7943.3	105.0	105.0	1.5	-3.0	0.0	P
12589.3	101.8	101.7	3.0	-6.0	-0.1	P

Test Passed

Weighting Network Test: Linear Network - According to ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm Upp. (dB)	Tolerance norm Low. (dB)	Error Value (dB)	Result
31.6	108.0	108.0	1.5	-1.5	0.0	P
63.1	108.0	108.0	1.0	-1.0	0.0	P
125.9	108.0	108.0	1.0	-1.0	0.0	P
251.2	108.0	108.0	1.0	-1.0	0.0	P
501.2	108.0	108.0	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	108.0	108.0	1.0	-1.0	0.0	P
3981.1	108.0	108.0	1.0	-1.0	0.0	P
7943.3	108.0	108.0	1.5	-3.0	0.0	P
12589.3	108.0	107.9	3.0	-6.0	-0.1	P

Test Passed

Overload Detector Test: A-Network - ANSI S1.4-1983 Clause 8.3.1

The SLM is set to A-weighted and the least sensitive range setting. A sine wave of 1000 Hz is applied to the SLM with an amplitude that gives a reading 5 dB less than the maximum level the SLM is designed to measure. The test signal is lowered in 1/3 octave frequency steps until 20 Hz is reached. The amplitude of the test signal is simultaneously increased corresponding to the inverse of the A-weighting curve. The overload indication shall be turned on before the measured Slow SPL value is deviating more than one dB from the initial value measured at 1000 Hz.

The Reference range is used for this test because of expected high signal amplitude.

Freq. (Hz)	Level Increase (dB)	Meas. Value (dB)	Tol. Upp. (dB)	Tol. Low. (dB)	Error Value (dB)		Error Code
1000.0	0.0	105.0	-1.0	1.0	0.0	P	No overload
794.3	0.8	105.0	-1.0	1.0	0.0	P	No overload
631.0	1.9	105.0	-1.0	1.0	0.0	P	No overload
501.2	3.2	105.0	-1.0	1.0	0.0	P	No overload
398.1	4.8	105.0	-1.0	1.0	0.0	P	No overload
316.2	6.6	105.0	-1.0	1.0	0.0	P	Overload

Test Passed

F/S/I/Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4

A continuous sine wave is applied and adjusted to give an indication of 94.0 dB with time constant F(ast). The instrument is set to S(low) and I(mpulse), if applicable. The indication shall not differ more than 0.1 dB for type 0,1,2 instruments and 0.2 for type 3 instruments.

Time Const.	Norm Value (dB)	Measured Value (dB)	Tol. limit (dB)	Error Value (dB)	
Fast	94.0	94.0	0.1	0.0	P
Slow	94.0	94.0	0.1	0.0	P

F/S/I/Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4

Time Const.	Norm Value (dB)	Measured Value (dB)	Tol. limit (dB)	Error Value (dB)	
Imp.	94.0	94.0	0.1	0.0	P

Test Passed

Fast-Slow Test: Overshoot test - According to ANSI S1.4 1983 Clause 8.4.1

The overshoot is tested by applying a sine wave that step (sudden increase) in amplitude by 20 dB. The steady end response shall give a signal 4 dB below the upper limit of primary indicator range. The difference between the maximum value and the end value tells the overshoot. Both F(ast) and S(low) time constants are tested.

Time Const.	Ref.-Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Overshoot (dB)	Error
Fast	89.0	89.0	1.1	0.0	P
Slow	89.0	89.0	1.6	0.0	P
Fast	49.0	49.0	1.1	0.0	P
Slow	49.0	48.6	1.6	-0.4	P

Test Passed

Fast-Slow Test: Single Sine Wave Burst - ANSI S1.4 1983 Clause 8.4.1 & 8.4.3

A continuous sine wave is applied to the SLM and adjusted to give an indication 4 dB below upper limit of the primary indicator range. Then onset transient characteristics are tested using a single sine wave burst with an amplitude equal to the continuous signal and a duration of T(ms). The test is repeated at a level 24 dB below the upper limit of the primary indicator range.

Time Constant	Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)		Error Value (dB)	
Fast	200.0	88.0	88.0	1.0	-1.0	0.0	P
Slow	500.0	84.9	84.9	1.0	-1.0	0.0	P
Fast	200.0	48.0	48.0	1.0	-1.0	0.0	P
Slow	500.0	44.9	44.9	1.0	-1.0	0.0	P

Test Passed

Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3

A continuous sine wave signal is adjusted to give a FSD indication at the reference range. A continuous sine wave burst with the same amplitude as the continuous signal is used as a test signal. The repetition rate of the burst is 100 Hz, 20 Hz, and 2 Hz. The I(mpulse) indication is measured at various repetition rates of the burst signal (100 Hz, 20 Hz, and 2 Hz). At a repetition rate of 2 Hz the signal amplitude is increased by 5dB. The indication shall increase respectively with a tolerance of ±1.0 dB. The test is repeated 20 dB below FSD. The flattest weighting network available is used for this test.

Repetition Frequency (Hz)	Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)	
100	90.3	90.2	1.0	-0.1	P

Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3

Repetition Frequency (Hz)		Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)	
20		85.4	85.4	2.0	0.0	P
2		84.2	84.1	2.0	-0.1	P
2	+5dB	89.1	89.1	1.0	0.0	P
100		50.3	50.0	1.0	-0.3	P
20		45.4	43.7	2.0	-1.7	P
2		44.2	44.2	2.0	0.0	P
2	+5dB	49.2	49.1	1.0	-0.1	P

Test Passed

Impulse Test: Single Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.1 & 8.4.3

Burst Duration (ms)		Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)	
20.0		89.4	89.3	1.5	-0.1	P
5.0		84.2	84.2	2.0	0.0	P
2.0		80.4	80.4	2.0	0.0	P
2.0	+10dB	90.4	90.3	1.0	-0.1	P
20.0		49.4	49.3	1.5	-0.1	P
5.0		44.2	44.1	2.0	-0.1	P
2.0		40.4	40.3	2.0	-0.1	P
2.0	+10dB	50.3	50.3	1.0	0.0	P

Test Passed

Peak Detector Test, single square wave burst - According to ANSI S1.4 1983 Clause 8.4.4

Pulse Duration	Pulse Polarity	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)	Error (dB)	
10ms	+	112.0	112.9	2.0	0.9	P
0.1ms	+	112.0	112.0	2.0	0.0	P
10ms	-	112.0	112.9	2.0	0.9	P
0.1ms	-	112.0	112.2	2.0	0.2	P
10ms	+	92.0	92.9	2.0	0.9	P
0.1ms	+	92.0	92.0	2.0	0.0	P
10ms	-	92.0	92.8	2.0	0.8	P
0.1ms	-	92.0	92.0	2.0	0.0	P

The results have been compensated for the impulse response of the C-weighting network.
Test Passed

RMS Detector Test: Crest Factor Test - According to ANSI S1.4-1983 Clause 8.4.2

The SLM is set to reference range. A continuous square wave with CF=1 is applied and adjusted to give an indication 2 dB below upper limit of primary indicator range. The duration of the square wave pulses is kept constant at 200 µs and rise time less than 10µs. The RMS value of the signal is kept constant while the crest factor (CF) is increased from 1 to 10. The test is performed both for positive and negative going test signals.

Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
Positive Pulses					
3.0	91.0	90.9	0.5	-0.1	P
5.0	91.0	90.9	1.5	-0.1	P
10.0	91.0	90.9	1.5	-0.1	P
Negative Pulses					
3.0	91.0	90.9	0.5	-0.1	P
5.0	91.0	90.9	1.5	-0.1	P
10.0	91.0	90.9	1.5	-0.1	P
Positive Pulses					
3.0	51.0	50.9	0.5	-0.1	P
5.0	51.0	51.0	1.5	0.0	P
10.0	51.0	51.0	1.5	0.0	P
Negative Pulses					
3.0	51.0	51.0	0.5	0.0	P
5.0	51.0	51.0	1.5	0.0	P
10.0	51.0	51.0	1.5	0.0	P

Test Passed

RMS Detector Test: Continuous Sine Wave Burst - According to ANSI S1.4-1983 Clause 8.4.2

The instrument is set to time constant Slow. A continuous sine wave (2kHz) is applied to the SLM and adjusted to give an indication 2 dB below upper limit of the primary indicator range. The signal is replaced by a sequence of tone bursts with a repetition rate of 40Hz. The RMS level of the signal is kept constant while the crest factor is increased from 1 to 10.
Test signal: Continuous sine wave burst with repetition rate of 40Hz

Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)	
3	91.0	91.0	0.5	0.0	P
5	91.0	91.0	1.5	0.0	P
10	91.0	91.0	1.5	0.0	P
3	51.0	51.0	0.5	0.0	P
5	51.0	51.0	1.5	0.0	P
10	51.0	51.0	1.5	0.0	P

Test Passed

Time Averaging Test: Averaging Functions - ANSI S1.43 Clause 9.3.2

The SLM is set to the reference range. The signal generator is adjusted to give a 4 kHz sine wave with an rms level equal to 20dB above the bottom end of the Linearity range. The sine wave is replaced by a sequence of tone burst with the same frequency. The burst duty factor (the distance between each burst) is increased, while the amplitude is increased to keep the same equivalent rms level. The measurement time is 100 sec for type 0 (and manually controlled) instruments and 10 sec for all other instruments.

Burst Duration (ms)	Ref. Value (dB)	Tolerance norm (dB)	Value (LeqA) (dB)	Error Value (dB)		Value (SEL) (dB)	Error Value (dB)	
1000.0	70.0	0.5	70.0	0.0	P	80.0	0.0	P
100.0	70.0	0.5	70.0	0.0	P	80.0	0.0	P
10.0	70.0	1.0	70.0	0.0	P	80.0	0.0	P
1.0	70.0	1.0	69.9	-0.1	P	79.9	-0.1	P
2min	70.0	1.0	70.0	0.0	P	90.8	0.0	P

Test Passed

Linearity Test - ANSI S1.43 Clause 9.3.3

Int. Time (sec.)	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)		Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)	
10	94.0	93.9	0.4	-0.1	P	103.9	0.4	-0.1	P
10	110.0	109.9	0.7	-0.1	P	119.9	0.7	-0.1	P
10	50.0	49.9	0.7	-0.1	P	59.9	0.7	-0.1	P

Test Passed

Filter Test 1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/1 octave filter X= 3 fexact=7943.282Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
1000.00	44.0	0.0	46.0	P
1995.26	63.2	0.0	65.5	P
3981.07	87.0	0.0	90.0	P
5623.41	104.1	103.5	105.7	P
6130.56	107.0	106.9	108.2	P
6683.44	107.9	107.6	108.2	P
7286.18	108.0	107.8	108.2	P
7943.28	108.0	107.9	108.2	P
8659.64	108.0	107.8	108.2	P
9440.61	108.0	107.6	108.2	P
10292.0	107.3	106.9	108.2	P
11220.2	104.7	103.5	105.7	P
15848.9	87.1	0.0	90.0	P
31622.8	.0	0.0	65.5	P
63095.7	.0	0.0	46.0	P

Test 1/1 octave filter X= 4 fexact=15848.932Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
1995.26	42.4	0.0	46.0	P
3981.07	61.7	0.0	65.5	P

Filter Test 1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

7943.28	85.7	0.0	90.0	P
11220.2	104.2	103.5	105.7	P
12232.1	107.2	106.9	108.2	P
13335.2	108.0	107.6	108.2	P
14537.8	108.0	107.8	108.2	P
15848.9	108.0	107.9	108.2	P
17278.3	108.0	107.8	108.2	P
18836.5	108.0	107.6	108.2	P
20535.3	107.6	106.9	108.2	P
22387.2	105.2	103.5	105.7	P
31622.8	.0	0.0	90.0	P
63095.7	.0	0.0	65.5	P
125893	.0	0.0	46.0	P

Test Passed

Filter Test 1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/3 octave filter X= 12 fexact=16000.000Hz class 0

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
5212.50	42.3	0.0	46.0	P
8479.30	60.9	0.0	65.5	P
12349.0	85.2	0.0	90.0	P
14254.4	104.3	103.5	105.7	P
14709.1	107.3	106.9	108.2	P
15152.4	107.9	107.6	108.2	P
15583.0	108.0	107.8	108.2	P
16000.0	108.0	107.9	108.2	P
16428.1	108.0	107.8	108.2	P
16895.0	108.0	107.6	108.2	P
17404.2	107.3	106.9	108.2	P
17959.4	104.3	103.5	105.7	P
20730.4	84.8	0.0	90.0	P
30191.2	.0	0.0	65.5	P
49112.7	.0	0.0	46.0	P

Test 1/3 octave filter X= 13 fexact=20158.737Hz class 0

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
6567.33	42.8	0.0	46.0	P
10683.2	61.2	0.0	65.5	P
15558.8	85.9	0.0	90.0	P
17959.4	104.5	103.5	105.7	P
18532.3	107.3	106.9	108.2	P
19090.8	107.9	107.6	108.2	P
19633.4	108.0	107.8	108.2	P
20158.7	108.0	107.9	108.2	P
20698.2	108.0	107.8	108.2	P
21286.4	107.9	107.6	108.2	P
21927.9	107.3	106.9	108.2	P
22627.4	104.4	103.5	105.7	P
26118.7	36.0	0.0	90.0	P
38038.5	.0	0.0	65.5	P
61878.2	.0	0.0	46.0	P

Test Passed

Summation of acoustic tests - ANSI S1.4 Clause 5 using Actuator

The microphone data are measured using electrostatic actuator.

SLM: A-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-39.2	0.0	0.0		+-1.5	0.2
63	-26.2	0.0	0.0		+-1.5	0.0
125	-16.1	0.1	0.0		+-1.0	0.1
250	-8.6	0.1	0.0		+-1.0	0.1
500	-3.2	0.1	0.0		+-1.0	0.1
1 k	0.0	0.1	0.0		+-1.0	0.1
2 k	1.2	0.1	0.0		+-1.0	0.1
4 k	1.0	0.1	0.0		+-1.0	0.1
8 k	-1.1	-0.1	0.0		+1.5,-3	-0.1
12.5 k	-4.4	0.7	0.0		+3,-6	0.6

SLM: C-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-3.0	0.0	0.0		+-1.5	0.0
63	-0.8	0.0	0.0		+-1.5	0.0
125	-0.2	0.1	0.0		+-1.0	0.1
250	0.0	0.1	0.0		+-1.0	0.1
500	0.0	0.1	0.0		+-1.0	0.1
1 k	0.0	0.1	0.0		+-1.0	0.1
2 k	-0.2	0.1	0.0		+-1.0	0.1
4 k	-0.8	0.1	0.0		+-1.0	0.1
8 k	-3.0	-0.1	0.0		+1.5,-3	-0.1
12.5 k	-6.3	0.7	0.0		+3,-6	0.6

SLM: Lin results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	0.0	0.0	0.0		+-1.5	0.0
63	0.0	0.0	0.0		+-1.5	0.0
125	0.0	0.1	0.0		+-1.0	0.1
250	0.0	0.1	0.0		+-1.0	0.1
500	0.0	0.1	0.0		+-1.0	0.1
1 k	0.0	0.1	0.0		+-1.0	0.1
2 k	0.0	0.1	0.0		+-1.0	0.1
4 k	0.0	0.1	0.0		+-1.0	0.1
8 k	0.0	-0.1	0.0		+1.5,-3	-0.1
12.5 k	-0.1	0.7	0.0		+3,-6	0.6

Test Passed

The overall frequency response of the sound level meter, nominal case reflections and microphone has shown to conform with the requirements in §6 of the ANSI S1.4 for a type 1 sound level meter.

Kyo

USTA NTP Master Plan Noise PCE Screening
Noise Appendix

Intersection	No Action Volume (Fig. 10-5)	With Action Volume (Fig. 10-6)	dB change
AA Exit and GCP WB	2497	2669	0.3
AA Enter and GCP WB	3073	3255	0.2
GCP WB	5827	6114	0.2
VWE 8B offramp and CP Blvd	3984	4056	0.1
58th Rd and CP Blvd	3639	3773	0.2
Park entrance/exit	607	1037	2.3
Park exit and CP Blvd	3180	3557	0.5
59th Ave and CP Blvd	577	577	0.0
LIE WB Service Rd and CP Blvd	4031	4485	0.5
LIE EB Service RD and CP Blvd	4248	4517	0.3
GCP EB	5826	6113	0.2
GCP EB Onramp	1660	1935	0.7
GCP EB Offramp	2138	2200	0.1
HHE Offramp	3422	3521	0.1
HHE and GCP EB Offramp	3423	3523	0.1
HHE and GCP EB Onramp	2945	3258	0.4
HHE WB and LIE WB	2945	3258	0.4

Note: vehicle mix assumed unchanged