# 962-972 FRANKLIN AVENUE REZONING
# Chapter 5: Natural Resources

## A. INTRODUCTION

The 2021 *City Environmental Quality Review (CEQR) Technical Manual* defines natural resources 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." The purpose of this chapter is to evaluate the potential impacts of the Proposed Actions on natural resources in New York City.

This natural resources evaluation focuses on the consequences of the Proposed Project on the vegetative communities within neighboring open spaces, particularly the Brooklyn Botanic Garden, due to project-generated shadows (see also **Chapter 4, "Shadows"**). The Proposed Development Site itself is devoid of any significant natural resources and would be developed either on an as-of-right basis in the absence of the Proposed Actions, or the Proposed Project (described below) would be facilitated by the Proposed Actions.

In accordance with the *CEQR Technical Manual*, this chapter describes:

- The regulatory programs that protect groundwater, floodplains, wildlife, threatened or endangered species and their habitat, aquatic resources, and/or other natural resources within the area affected by the Proposed Actions (the "Proposed Development Site") and surrounding area;
- The current condition of the groundwater, floodplains, and natural resources within the Proposed Development Site and surrounding study area, including water quality, aquatic and terrestrial biota, and threatened or endangered species and species of special concern;
- The groundwater, floodplains, water quality, and natural resources conditions in the future without the Proposed Actions (the "No-Action condition"); and,
- The potential impacts of the Proposed Actions on the groundwater, floodplains, water quality, and natural resources (the "With-Action condition").

Further, this chapter studies the potential for early morning shadows cast on the Brooklyn Botanic Garden to harm the flora contained in that Terrestrial Cultural community. In regards to fauna, as the Proposed Project would not have any direct effects on the Brooklyn Botanic Garden as opposed to direct impacts on flora from shadows, it was determined that a detailed documentation of any potential fauna within the Brooklyn Botanic Garden was not warranted.

## B. PRINCIPAL CONCLUSIONS

**Wetlands and Open Water Areas**
There are no wetlands or open water areas within or adjacent to the Project Area; therefore, the Proposed Actions would have no effect on resources of this nature.

**Groundwater**
Construction and operation of the Proposed Project would not result in any significant adverse impacts on soil or groundwater. Rather, as described in detail in **Chapter 6, "Hazardous Materials,"** construction for the Proposed Project would remove on-site sources of contamination or otherwise prevent future human exposure through capping in place and importing clean fill, thus providing a benefit with respect to local soil and groundwater quality. In addition, groundwater is not used as a source of drinking water in Brooklyn.

**Floodplains**
The Project Area lies well beyond the boundaries of existing or future floodplains. Thus, the Proposed Actions would have no effect on floodplains.

**Wildlife and Fish**
The Project Area would contain typical city dwelling wildlife accustomed to developed areas, and may include: mice, squirrels, rabbits, rats, song birds, and raptors. Potential impacts to wildlife would be minimal as habitat for these species is marginal at best, with little vegetation present on site. As described in **Chapter 1, "Project Description,"** the Proposed Development Site would be developed with and without approval of the Proposed Actions. In addition, species are mobile and adaptable and able to move to adjacent areas for similar habitat. No streams/open waters occur within the Project Area; thus, no fish are present.

**Vegetation and Significant Natural Communities**
The nearby Brooklyn Botanic Garden is considered an upland natural resource that contains Terrestrial Cultural communities as defined by the *CEQR Technical Manual*. This subsystem includes 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. The *Ecological Communities of New York State* describes flower/herb gardens as residential, commercial, or horticultural land cultivated for the production of ornamental herbs and shrubs. Characteristic birds with varying abundance include American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), and house finch (*Carpodacus mexicanus*).[1]

As described in **Chapter 4, "Shadows,"** the Proposed Project's incremental shadows could extend over portions of the Brooklyn Botanic Garden, including propagation spaces, collections, growing spaces, education greenhouses and display houses, in the morning. **Table 4-4** of the shadows chapter includes the anticipated shadow entry and exit times, along with the duration of the incremental shadow for each sunlight-sensitive feature. The detailed shadows analysis finds that the extent and duration of incremental shadows has the potential to (1) significantly reduce or completely eliminate direct sunlight exposure on sunlight sensitive features; and (2) would significantly alter the public's use or enjoyment of the Garden, or threaten the viability of vegetation or other elements located within Garden. Thus, in accordance with *CEQR Technical Manual* methodology, incremental shadows would be considered a significant adverse impact to natural resources.

[1] Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero (editors). 2014. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

An arborist was retained to assess the effects of shading on different classes and categories of plants that may be more sensitive to the incremental shading, including desert plants, Mediterranean plants, and aquatic plants. The incremental shadow coverage, entry and exit times, and duration were considered for both the growing season as well as for the winter months, as were the plants that were being shaded. Conservatory curators, horticulturists, and greenhouse managers were consulted to assist in this assessment. Detailed information specifying the light requirements of each type of plant at the Brooklyn Botanic Garden is not available and various greenhouse experts consulted did not agree on the severity of the potential impact that incremental shading would have on the plants. Nevertheless, the study concluded that, among the consulted experts most agreed that 1-1.5 hours of additional shade might not have a serious impact even on light-demanding greenhouses or workhouse plants, but that increasing duration of shadows beyond that point might have increasingly serious effects. Experts stated that there could be long-term changes to the plants over time such as possible reduction in flowering, turning of flowers towards light sources, and slowing of the rate of plant growth. However, the decline of plant health is not anticipated for the vast majority of plants. The potential changes would be greatest for those plants that require high light in their natural habitat, including the desert collection, the high-light demanding plants of the Mediterranean collection and overstory plants (such as palms) of the tropical collection. The consequences of additional shading would be greatest during the winter months when sunlight hours are already limited. Measurement data on light intensity in the photosynthetic range showed that adequate light would reach the BBG plants even in shaded conditions on sunny days, but not on cloudy days. Thus the effect on plant growth could be more intense in years with greater than average number of cloudy days. Additionally, it is important to note that many of the Garden's growhouses are non-public and it was not possible for the arborist to access non-public areas without the cooperation of the Garden. However, based on observations of many of the Garden's non-public grow areas from publicly-accessible areas, it was determined that supplemental lighting is regularly used by the Garden.

Inconsideration of the effects of the Proposed Actions' incremental shadows, the additional shading is considered a significant adverse impact under CEQR. As discussed in **Chapter 4, "Shadows",** incremental shadows from the Proposed Project would be cast on several individual resources within the Brooklyn Botanic Garden. Though these resources would continue to receive 6-8 hours of direct sunlight throughout the growing season, several of these Greenhouses are used to propagate plants for desert, tropical, and warm temperate climates that require full, year-round sun including sunlight during the important winter months. Therefore, any incremental shading of these greenhouses, specifically during the winter months, would have a significant adverse impact on the plants in these greenhouses. Though the *CEQR Technical Manual* states that 6-8 hours of sunlight is necessary for plant survival, the Brooklyn Botanic Garden contains over 18,500 kinds of plants, with globally rare species and native rare species. The sunlight needed to constitute survival may not be enough to promote healthy growth of these rare plants. Therefore, due to the incremental shadows created by the Proposed Project, significant adverse impacts are likely on the natural resources found within Brooklyn Botanic Garden. Potential measures to mitigate in full or part these impacts are discussed in **Chapter 11, "Mitigation."**

## C. METHODOLOGY

### Study Area

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 the Project Area. 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 Area.

## Existing Conditions

Existing conditions within the study area were obtained from the following governmental and nongovernmental sources:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps
- NYSDEC Environmental Resource Mapper
- NYSDEC Freshwater Wetlands Mapping
- NYSDEC Tidal Wetlands and Mapping
- USFWS National Wetland Inventory (NWI) Mapping
- New York City Waterfront Revitalization Program (WRP)
- USFWS Information for Planning and Conservation (IPaC) system
- New York Natural Heritage Program
- U.S. Department of Agriculture (USDA) Plants Database
- Brooklyn Botanic Garden
- NYSDEC Breeding Bird Atlas
- NYSDEC Mammals
- USDA NRCS Web Soil Survey
- Correspondence regarding New York Natural Heritage Program (NYNHP) data
- Phase I Environmental Site Assessment (ESA) for the Proposed Development Site (February 2023)

## *CEQR Technical Manual* Guidance

A natural resource assessment was conducted because the development facilitated by the Proposed Actions would cast shadow on the nearby Brooklyn Botanic Garden, which is considered an upland natural resource that contains Terrestrial Cultural communities as defined by CEQR. The Project Area does not contain any sensitive water resources, upland resources or other natural resources defined in the *CEQR Technical Manual*. Therefore, this chapter focuses on the potential effects of the Proposed Actions potential for significant adverse impacts to rare, threatened and endangered species or special habitats (i.e., special status species and significant natural communities).

As to defining significant adverse impacts, the *CEQR Technical Manual* considers an impact to be significant when:

- An action would likely render a water resource unfit for one or more uses for which it is classified and/or cause or exacerbate a water quality violation;
- An action would, directly or indirectly, adversely affect a significant, sensitive, or designated resource;
- An action would likely diminish habitat for or result in the loss of endangered, threatened, or rare animal species of or species of special concern;

- An action would likely result in the loss of plant species that are endangered, threatened, rare, vulnerable or rare for the City;

## D. REGULATORY CONTEXT

### Federal

***National Flood Insurance Act of 1968 (44 Committee of the Federal Register [CFR] § 59) and Floodplain Management Executive Order 11988 (42 Federal Register [FR] 26951*)**

Development in floodplains defined by FEMA mapping is regulated at the federal level by the Floodplain Management Executive Order 11988 and National Flood Insurance Act of 1968 (44 CFR § 59). Executive Order 11988 requires federal agencies to avoid to the extent possible the short- and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

***Executive Order 11990, Protection of Wetlands***

In accordance with Executive Order 11990, "Protection of Wetlands," federal agencies must avoid undertaking or providing assistance for new construction in wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland.

***Clean Water Act (33 U.S. Code [USC] §§ 1251-1387)***

The objective of the Clean Water Act, also known as the Federal Water Pollution Control Act, is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. It regulates point sources of water pollution, such as discharges of municipal sewage, industrial wastewater, and stormwater runoff; the discharge of dredged or fill material into navigable waters and other waters; and non-point source pollution (e.g., runoff from streets, construction sites, etc.) that enter water bodies from sources other than the end of a pipe. Applicants for discharges to navigable waters in New York must obtain a Water Quality Certificate from the NYSDEC.

***Endangered Species Act of 1973 (16 USC §§ 1531-1544)***

The Endangered Species Act (ESA) of 1973 recognizes that endangered species of wildlife and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. The ESA provides for the protection of critical habitats on which endangered or threatened species depend for survival and prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, as well as interstate or foreign commercial activities. Species protected under the ESA have the potential to occur in the half-mile study area.

### State

***State Pollutant Discharge Elimination System (SPDES) (N.Y. Environmental Conservation Law [ECL] Article 3, Title 3; Article 15; Article 17, Titles 3, 5, 7, and 8; Article 21; Article 70, Title 1; Article 71, Title 19; Implementing Regulations 6 New York Codes, Rules and Regulations [NYCRR] Articles 2 and 3)***

Title 8 of Article 17, ECL, Water Pollution Control, authorized the creation of the SPDES to regulate discharges to New York State's waters. Activities requiring a SPDES permit include point source discharges of wastewater into surface or groundwater of the state, including the intake and discharge of water for cooling purposes, constructing or operating a disposal system (sewage treatment plant), discharge of

stormwater, and construction activities that disturb one or more acres. The Proposed Actions would facilitate construction on a site that is over one acre in size. Soil disturbing activities resulting from development facilitated by the Proposed Actions would be conducted in accordance with the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). To obtain coverage under this permit, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared and a Notice of Intent (NOI) would be submitted to the NYSDEC. The SWPPP would comply with all of the requirements of GP-0-10-001, NYSDEC's technical standard for erosion and sediment control, presented in "New York Standards and Specifications for Erosion and Sediment Control," and NYSDEC's technical standard for post- construction stormwater control practices presented in the *New York State Stormwater Management Design Manual*.

***Tidal Wetlands Act, Article 25, ECL, Implementing Regulations 6 NYCRR § 661.***

Tidal wetlands regulations apply anywhere tidal inundation occurs on a daily, monthly, or intermittent basis. In New York, tidal wetlands occur along the tidal waters of the Hudson River up to the salt line and along the saltwater shore, bays, inlets, canals, and estuaries of Long Island, New York City, and Westchester County. NYSDEC administers the tidal wetlands regulatory program and the mapping of the State's tidal wetlands. A permit is required for almost any activity that would alter wetlands or the adjacent areas (up to 300 feet inland from the wetland boundary or up to 150 feet inland within New York City).

***Endangered and Threatened Species of Fish and Wildlife; Species of Special Concern (ECL, Sections 11-0535[1]-[2], 11-0536[2], [4], Implementing Regulations 6 NYCRR § 182)***

The Endangered and Threatened Species of Fish and Wildlife, and Species of Special Concern Regulations prohibit the taking, import, transport, possession, or selling of any endangered or threatened species of fish or wildlife, or any hide or other part of these species as listed in 6 NYCRR §182.6. Under these regulations, adverse modification of occupied habitat of endangered or threatened species is prohibited without authorization from the NYSDEC.

***Waterfront Revitalization of Coastal Areas and Inland Waterways Act (Sections 910-921, Executive Law, Implementing Regulations 6 NYCRR § 600 Et. Seq)***

The Waterfront Revitalization of Coastal Areas and Inland Waterways Act offers local governments the opportunity to participate in the State's Coastal Management Program (CMP), on a voluntary basis, by preparing and adopting local waterfront revitalization programs (LWRP) providing more detailed implementation of the State's CMP through use of existing broad powers such as zoning and site plan review. When an LWRP is approved by the New York State Secretary of State, State agencies' actions must be consistent with the approved LWRP to the maximum extent practicable. When the federal government concurs with the incorporation of an LWRP into the CMP, federal agencies' actions must be consistent with the approved addition to the CMP. 19 NYCRR § 600, 601, 602, and 603 provide the rules and regulations that implement each of the provisions of the Waterfront Revitalization of Coastal Areas and Inland Waterways Act including, but not limited to, the required content of an LWRP, the processes of review and approval of an LWRP, or LWRP amendments. New York City adopted a LWRP in 1982, which was subsequently revised in 2013. The New York State Secretary of State approved the revisions to the WRP on February 3, 2016; and the U.S. Secretary of Commerce concurred with the State's request to incorporate the WRP into the New York State CMP.

### Local

***New York City Street Tree Zoning Amendment and Local Law 3 of 2010***

The City of New York passed a zoning text amendment that requires trees to be planted along the curb of City streets following the construction of new buildings and certain types of alterations citywide. All applicants must apply to NYC Parks for street tree planting permits. The current zoning requires all new buildings and all enlargements exceeding 20 percent of the floor area to have one tree for every 25 feet of road frontage, including existing trees. Like other zoning rules, these requirements must be satisfied in order for the builder to obtain a Certificate of Occupancy from DOB. Species shall be selected from the list of approved street trees for New York City. The methodology used to determine the number and size of trees to be replanted (e.g., caliper replacement method) is determined in consultation with NYC Parks in accordance with this zoning amendment and local law and Chapter 5 Title 56 of the Rules of the City of New York (RCNY).

***Flood Resilience Zoning Text Amendment***

The City of New York passed a zoning text amendment to encourage flood-resilient building construction throughout designated flood zones. These changes removed regulatory barriers that hindered or prevented the reconstruction of storm-damaged properties. The amendment enables new and existing buildings to comply with new, higher flood elevations issued by FEMA and new requirements in the New York City Building Code. Building to these new standards would reduce vulnerability to future floods and help avoid higher flood insurance premiums.

## E. EXISTING CONDITIONS

With the exception of the Brooklyn Botanic Garden, natural resources with ½ mile of the Project Area are highly disturbed and considered to be low quality as is typical in densely developed urban areas.

### Wetlands and Open Water Areas

According to USFWS NWI data, the Project Area does not contain any wetlands or watercourses.

***Freshwater Wetlands***

There are no NYSDEC-regulated freshwater wetlands mapped within, or adjacent to the Project Area.

***Tidal Wetlands***

There are no NYSDEC-regulated tidal wetlands mapped within, or adjacent to the Project Area.

**Groundwater**

Groundwater beneath the Project Area originates either as precipitation that falls and infiltrates on-site or infiltrates as inflowing groundwater from topographically higher terrain located to the north/northeast. Groundwater is not used as a drinking water source in this section of Brooklyn.

The Project Area is located over the Brooklyn-Queens sole source aquifer and is located within the boundaries of the Jamaica Bay Watershed. However, the Project Area is not located within a sensitive area of the watershed.

As indicated in the Phase I ESA for the Proposed Development Site, analytical results of on-site soil samples collected in March 2017 detected several compounds at concentrations exceeding the NYSDEC Unrestricted Residential and Restricted Residential Soil Cleanup Objectives (SCOs). The contaminants identified do not appear to be related to an operational release at the Proposed Development Site, but rather a result of non-indigenous fill brought into the Proposed Development Site as part of former grading/development activities. Based on the location of the Proposed Development Site and the fact that groundwater was not encountered in the deepest soil borings installed to 12 feet bgs, there is a limited risk of impact to groundwater from the detected metals and Polycyclic Aromatic Hydrocarbons (PAHs). However, as noted above, there are concerns at the site due to soil contaminants detected on site. More information is provided in **Chapter 6, "Hazardous Materials"**.

**Floodplains**

There are no floodplains within or in the vicinity of the Project Area.

**Wildlife and Fish**

***Wildlife***

Aside from Prospect Park and Brooklyn Botanic Garden, the half-mile study area is entirely developed and provides little habitat for wildlife species. However, wildlife adapted to urban settings may find potential habitat in the study area. Species expected to utilize habitat within the study area include: mice, squirrels, rats, rabbits, song birds and raptors.

The Prospect Park and Brooklyn Botanic Garden portions of the study area offer habitat that is expected to be used by the additional wildlife species. These include: song birds, butterflies, insects/bees, raccoons, chipmunk, rabbit and squirrel.

***Special Status Species***

A literature review and database records search was completed to identify the existence or potential occurrence of special status species and significant communities within the half-mile study area that may be affected by the Proposed Actions. Information was obtained from the USFWS through IPaC. Information was requested from the NYNHP regarding the potential presence of any federal and/or state threatened, endangered, proposed, or candidate species that could be affected by the Proposed Actions.

The USFWS IPaC database identifies three bird species and one flower plant that may be affected by activities at the Project Area. These special status species include: two threatened bird species of bird, Piping Plover (*Charadrius melodus*) and Red Knot (*Calidris canutus rufa*); one endangered bird species, Roseate Tern (*Sterna dougallii dougallii*), and one threatened plant species Seabeach Amaranth (*Amaranthus pumilus*). There are no USFWS Critical Habitats in the study area.

As indicated in NYNHP correspondence, no records of rare or state-listed animals or plants, or significant natural communities at the Project Area itself. However, one endangered bird species, Peregrine Falcon (*Falco peregrinus*), is found within the vicinity of the Project Area and has been documented nesting within the half-mile study area. In addition, one NYS-listed endangered rare plant, minute duckweed (*Lemna perpusillaa*) and the yellow bumble bee *(Bombus fervidus,* not listed but rare in New York and of conservation concern) have been documented in Prospect Park, also within the half-mile study area.

According to USFWS, Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. Neither habitat is found in the vicinity of the half-mile study area.

The Red Knot is a migratory species, traveling between South American and Caribbean wintering grounds to the Arctic, with stopover areas along the Atlantic coast, including New York and New Jersey beaches and mudflats. Atlantic Coast stopovers are critical for refueling for the remainder of the migration. Food sources along the coast include horseshoe crab eggs, mussels, clams, snails and other invertebrates. Beaches and mudflats are not located in or near the study area. The Proposed Actions would not affect individual birds, favored stopover habitat or marine food sources.

The Roseate Tern, a marine coastal species, breeds along the coasts of the Atlantic, Pacific and Indian oceans on salt marsh islands and beaches with sparse vegetation. The nest may be only a depression in sand, shell or gravel, and may be lined with bits of grass and other debris. It is usually placed in dense grass clumps, or even under boulders or riprap. The tern feeds primarily on American sand lance, a small marine fish. Suitable habitat for this species is not found in the vicinity of the study area.

Seabeach amaranth is endemic to Atlantic Coast beaches and barrier islands. The primary habitat consists of overwash flats at accreting ends of islands, lower foredunes, and upper strands of non-eroding beaches. The species occasionally establishes small temporary populations in other habitats, including sound-side beaches, blowouts in foredunes, inter-dunal areas, and on sand and shell material deposited for beach replenishment or as dredge spoil. Seabeach amaranth usually grows on a nearly pure sand substrate, occasionally with shell fragments mixed in. The plant grows in the upper beach zone above the high tide line and is intolerant of even occasional flooding during its growing season. This habitat does not occur in or proximate to the study area.

According to NYNYP correspondence, the peregrine falcon has been documented as nesting within the half-mile study area, in the vicinity of the Project Area. The peregrine falcon prefers open country from tundra, savannah and sea coasts, to high mountains, as well as open forests and tall buildings. Nests are built on high ledges, 50 to 200 feet off the ground. The nest itself is a well-rounded scrape and is occasionally lined with grass. The Project Area includes buildings with ledges 50 to 200 feet above ground and, as such, may provide habitat suitable for use by peregrine falcons.

Habitat for the minute duckweed, an aquatic plant, can be found in kettlehole ponds, the surface of rivers, in ponds, springs, rivers and lakes, particularly quiet waters. Portions of Prospect Park within the half-mile study area may provide suitable habitat for this rare aquatic plant; however, the Project Area does not.

Yellow bumble bees are generalist foragers that require nesting habitat (above or belowground) in the spring, flowers for adult and larval nutrition throughout the spring and summer, and sites for queens to overwinter. Suitable habitat for this rare species of concern is found within Prospect Park, and may also be found in other portions of the study area and Project Area.

### *Fish*

While the National Wetlands Inventory (NWI) database indicates that one freshwater pond (PUBH) and one lake (L1UBH) are located within the half-mile study area, no wetlands or surface waters are located within or proximate to the Project Area.

## Vegetation and Significant Natural Communities

### *Vegetation*

With the exception of Prospect Park and Brooklyn Botanic Garden, vegetation with the half-mile study area is currently limited to street trees, trees on private properties (typically in backyards and/or courtyards), and landscaping. The majority the study area consists of urban communities, including paved roadways, parking lots, and commercial, residential, community facility and/or light industrial buildings. Industrial/commercial developments, infrastructure and transportation facilities. Vegetative species are dominated by invasive, exotic plants such as tree-of-heaven and black locust.

The study area includes the northeastern portion of Prospect Park that generally lies east of Grand Army Plaza, between Eastern Parkway to the north and Hawthorne Street to the south. This part of the park includes forested areas and woodlands that contain a wide range of tree species, such as: white ash (*Fraxinus americana*), black cherry (*Prunus serotine*), red maple (*Acer rubrum*), American bladdernut (*Staphylea trifolia*), Austrian pine (*Pinus nigra*), pin oak (*Quercus palustris*), Norway maple (*Acer platanoides*), European beech (*Fagus sylvatica*), Kentucky coffeetree (*Gymnocladus dioicus*), London planetree (*Platanus x acerifolia*), boxelder (*Acer negundo*), slippery elm (*Ulmus rubra*), horsechestnut (*Aesculus hippocastanum*), Japanese flowering cherry (*Prunus serrulata*), white oak (*Quercus alba*), and white mulberry (*Morus alba*).[2]

The forested areas include smaller plants that are divided into understory, shrub and ground layers. The ground layer is composed of the lowest growing plants, the wildflowers and ferns. Species include Canada mayflower (*Maianthemum canadense*) and Joe Pye weed (*Eupatorium fistulosum*). The shrub layer comprises woodland shrubs, such as lowbush blueberry (*Vaccinium angustifloium*) and the spicebush (Lindera benzoin). The understory consists of small trees such as sassafras (Sassafras albidum) and dogwood (*Cornus florida*).[3]

### ***Brooklyn Botanic Garden[4]***

The 52-acre Brooklyn Botanic Garden contains over 18,500 kinds of plants, with globally rare species and native rare species. The garden has collections growing indoors and outdoors. Among the outdoor collections are the following notable examples: Spanish bluebells (*Hyacinthoides hispanica* 'Excelsior'); flowering cherry trees (Prunus sargentii 'Fudan-zakura,' P. 'Okame,' P. 'Kanzan' and P. serrulata 'Ukon'); daffodils (Narcissus 'King Alfred' and N. 'Spellbinder'); nearly 150 lilac species and cultivars, magnolia trees; tree peonies (Paeonia suffruticosa); 60 varieties of hardy and tropical water-lilies and sacred lotuses; and the overall plant family collection, which covers a third of the Garden's 52-acres and is devoted to trees, shrubs, and herbaceous plants systematically arranged to show their evolutionary progression.

Among the BBG's indoor collections are the following:

The ***Steinhardt Conservatory*** is a 25,510-square-foot complex of display and support greenhouses holding BBG's indoor plant collections. The plants in the domed pavilions are staged in realistic environments that

[2] TreeKeeper database, https://www.prospectpark.org/learn-more/what-we-do/sustaining-environment/trees/treekeeper-database/

[3] Information was obtained from https://www.nycgovparks.org/parks/B073/highlights/12455

[4] Information from Brooklyn Botanic Gardens' comments on the Draft Scope of Work for a previous application at the site (CEQR No. 19DCP095K).

simulate a range of global habitats.

The ***Conservatory Entry House*** is an approximately 3,760-square-foot glazed conservatory open to the public. It is a public display house at the entry to Steinhardt Conservatory, growing/exhibiting many tropical and subtropical species. The growing environment is climate controlled between 77 and 83°F to simulate tropical and sub-tropical climates, and is home to a plant collection of aroids, cycads, and palms. The Conservatory Entry House plant collection comprises 75 plant families, 274 taxa, 292 plant accessions, and 548 individual plants. Major plant families represented in this collection are the Araceae, Zamiaceae and Arecaceae families. 35 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***C.V. Starr Bonsai Museum*** displays the Garden's bonsai collection, with more than 350 temperate and tropical trees trained in classic modes such as the windswept, slanted trunk, rock clinging, and forest styles. The collection is presented in rotation during the year. The Bonsai Museum is an approximately 2,280 sq. ft. glazed conservatory open to the public. It is a public display house for a rotating exhibit of approximately 30 specimens from BBG's collection of bonsai, including the oldest trees in BBG's collections. The 30 specimens are selected on a rotating basis from the 500+ plants that are housed in nonpublic spaces based on seasonal, cultural, and botanic significance. The growing environment is climate controlled between 36 and 42°F to simulate temperate and Mediterranean to tropical and subtropical climates. It is home to a plant collection of tropical and temperate woody perennials. The Bonsai Museum's plant collection comprises 46 plant families, 261 taxa, 496 plant accessions, and 529 individual plants. Major plant families represented in this collection, in order of frequency, are the Cupressaceae, Rosaceae, Pinaceae, Sapindaceae and Ulmaceae families. 19 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Robert W. Wilson Aquatic House*** displays a rotating selection from BBG's collection of over 6,000 orchids. The aquatic house provides a public display and interpretation of tropical and subtropical aquatic and wet environment plants from around the world, plus exhibit of rotating selections from BBG's cold- and warm-climate orchid collections. The Aquatic House is an approximately 2,960-square-foot glazed conservatory open to the public. The growing environment is climate-controlled between 75 and 82°F to simulate tropical and subtropical aquatic and moist environments, and is home to a plant collection of aquatics, orchids, aroids, carnivorous plants, ferns and mosses. The Aquatic House plant collection comprises 28 plant families, 227 taxa, 308 plant accessions, and 616 individual plants. Major plant families represented in this collection, in order of frequency, are the Orchidaceae, Araceae and Alismataceae families. One of these taxa is an at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Desert Pavilion*** is an approximately 2,890-square-foot glasshouse open to the public. It houses plants from warm deserts and other arid regions of the New World (the American Southwest and Mexico) and the Old World (African deserts and scrublands). The growing environment is climate controlled between 65 and 85°F to simulate arid regions of the New and Old World, and is home to a plant collection of shrubs, cacti, succulents, wildflowers and living stones. The Desert plant collection comprises 31 plant families, 275 taxa, 288 plant accessions, and 423 individual plants. 20 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*. Major plant families represented in this collection, in order of frequency, are the Cactaceae, Asphodelaceae, Crassulaceae, Aizoaceae and Euphorbiaceae families.

The ***Helen Mattin Warm Temperate Pavilion*** is an approximately 2,890-square-foot glasshouse open to the public. The growing environment is climate controlled between 60 and 70°F to simulate warm temperate and Mediterranean regions of Africa, Australasia and Asia, and western coastal North and South America. It is home to a plant collection of warm temperate herbaceous and woody perennials,

bulbs, and ferns. The plant collection comprises 63 plant families, 181 taxa, 195 plant accessions, and 311 individual plants. Major plant families represented in this collection, in order of frequency, are the Lamiaceae, Amaryllidaceae, Dryopteridaceae, Asparagaceae and Myrtaceae families. 9 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Tropical Pavilion*** is an approximately 5,840-square-foot public glasshouse pavilion. The growing environment is climate controlled between 80 - 86°F to simulate tropical forests such as the Amazon Basin, African Rainforest, and tropical Eastern Asia. It is home to a plant collection of palms, aroids, bromeliads, gingers, economic crop plants. This plant collection comprises 61 plant families, 245 taxa, 252 plant accessions, and 716 individual plants. Major plant families represented in this collection, in order of frequency, are the Araceae, Zingiberaceae and Asparagaceae families. 14 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

***Collections Growing Spaces***

Behind-the-scenes growing spaces contain the majority of BBG's glasshouse plant collections because BBG's living collections are so large that they cannot all be on display at any given time. These secure (non-public) spaces also hold rare and endangered species, are actively used for *ex-situ* plant conservation, and hold custody of rare plant customs seizures for the Federal Government. They also serve as a backup of the public facing collections. These facilities are subdivided into independently climate-controlled zones best suiting the cultivation requirements of the collection.

The ***Children's Garden Production House*** is an approximately 212-square-foot non-public glasshouse. Over 8,000 annual and biennial fruit and vegetable crop plants are grown for the Children's Garden. Major plant families represented in this collection are the Apiaceae, Asteraceae, Brassicaceae, Cucurbitaceae, Fabaceae, Lamiaceae, Poaceae and Solanaceae families.

The ***Hardy Plant Nursery Yard*** is an approximately 17,976-square-foot non-public exterior growing space that is home to a plant collection of hardy woody and herbaceous perennials destined for public display in areas throughout the garden. The plant collection comprises 56 plant families, 202 taxa, 207 plant accessions, and 2,358 individual plants. Major plant families represented in this collection, in order of frequency, are the Asphodelaceae, Rosaceae and Paeoniaceae families. Nine of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***New York-Native Flora and Temperate Plant Propagation Tunnel*** is an approximately 2,320-square-foot non-public growing tunnel. It is home to a plant collection of regional US native plants, rare New York State flora, and temperate woody and herbaceous perennials that will be planted throughout the garden. The plant collection comprises 84 plant families, 326 taxa, 348 plant accessions, and 3,820 individual plants. Major plant families represented in this collection, in order of frequency, are the Salicaceae, Asphodelaceae and Oleaceae families. 19 of these taxa are at-risk protected species on The *IUCN Red List of Threatened Species*.

The ***Production House*** is an approximately 930-square-foot non-public glasshouse. The growing environment is climate controlled between 60 and 80°F as an adaptable, specialist growing space. This house is used year-round to grow over 25,000 annual and biennial plants from seedlings.

The ***Tropical and Desert Plant Propagation House*** is an approximately 840-square-foot non-public glazed conservatory space. It is home to a plant collection of bromeliads, orchids and carnivorous plants. Its plant collection comprises 26 plant families, 127 taxa, 157 plant accessions, and 232 individual plants. This glasshouse is for propagating and storing warm-region plants destined for the Conservatory collections.

Major plant families represented in this collection, in order of frequency, are the Bromeliaceae, Sarraceniaceae, Orchidaceae and Apocynaceae families. 19 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Tropical Plant Propagation House*** is an approximately 790-square-foot non-public, glazed conservatory space. It is an indoor nursery for propagating and growing tropical plants destined for the public Conservatory collections. The growing space is home to a plant collection of tropical perennials. It is used to propagate plants for all the tropical glasshouse spaces. This plant collection comprises 8 plant families, 9 taxa, 20 plant accessions, and 30 individual plants. Major plant families represented in this collection, in order of frequency, are the Araceae and Araucariaceae families. 3 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Auxiliary House*** is an approximately 465-square-foot non-public glasshouse. The growing space is home to a plant collection of tender and tropical perennials for seasonal display. Its plant collection comprises 10 plant families, 22 taxa, 22 plant accessions, and 49 individual plants. The major plant family represented in this collection is the Araceae family.

The ***Desert, Mediterranean, South African Bulb (Arid) Workhouse*** is an approximately 2,080-square-foot non-public glazed conservatory space. This is a collection growing area for plants to be planted or rotated seasonally into the Desert and Warm Temperate houses, including the South African Bulb Collection. The growing space is home to a plant collection of cacti, succulents, living stones and bulbs. Its plant collection comprises 61 plant families, 589 taxa, 633 plant accessions, and 946 individual plants. Major plant families represented in this collection, in order of frequency, are the Iridaceae, Asparagaceae, Asphodelaceae, Cactaceae, Amaryllidaceae, Euphorbiaceae, Oxalidaceae and Crassulaceae families. 33 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Highland Moist Tropical Orchid Workhouse*** is an approximately 1,020-square-foot non-public glazed conservatory space. It is an indoor growing space where the majority of BBG's extensive epiphytic orchid collection is housed at any given time while not on public display. This plant collection comprises 11 plant families, 2,483 taxa, 4,880 plant accessions, and 5,198 individual plants. The major plant family represented in this collection is the Orchidaceae family. 61 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Humid Tropics Workhouse*** is an approximately 1,480-square-foot non-public glazed conservatory space for tropical and seasonal display plants. The growing environment is climate controlled between 72 and 80°F to simulate the moist tropics, and is home to a plant collection of tropical palms, bulbs and ferns. The plant collection comprises 55 plant families, 141 taxa, 147 plant accessions, and 284 individual plants. Major plant families represented in this collection, in order of frequency, are the Apocynaceae, Arecaceae, Euphorbiaceae and Amaryllidaceae families. 7 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*.

The ***Lowland Moist Tropical Orchid Workhouse*** is an approximately 860-square-foot non-public glazed conservatory space where the majority of BBG's extensive orchid collection is housed at any given time. The growing environment is climate-controlled between 68 and 76°F to simulate lowland moist tropics, and is home to a plant collection of epiphytic orchids. The plant collection comprises 5 plant families, 1,177 taxa, 2,000 plant accessions, and 2038 individual plants. 48 of these taxa are at-risk protected species on *The IUCN Red List of Threatened Species*. The major plant family represented in this collection is the Orchidaceae family.

The ***Mediterranean Display Plants Tunnel*** is an approximately 870-square-foot non-public growing tunnel. The growing environment is climate controlled between 35 and 45°F to simulate the Mediterranean and is home to a plant collection of citrus and olive plants. This plant collection comprises 4 plant families, 26 taxa, 28 plant accessions, and 30 individual plants. Major plant families represented in this collection, in order of frequency, are the Rutaceae and Oleaceae families. This greenhouse is primarily for growing citrus trees when they are not on public display.

The ***Temperate Bonsai Tunnel*** is an approximately 1,190-square-foot non-public growing tunnel. The growing environment is climate controlled between 38 and 45°F to simulate temperate regions, and is home to a plant collection of hardy woody perennials, broad-leaf and conifers. It is a nursery area for growing cold-hardy bonsai trees when they are not on display.

The ***Tropical Bonsai House*** is an approximately 465-square-foot non-public glasshouse. The growing environment is climate controlled between 70 and 80°F to simulate tropical and sub-tropical climates, and is home to a plant collection of tropical woody perennials. This greenhouse houses bonsai trees from tropical climates when they are not on public display.

***Educational Greenhouses***

The Education Greenhouses are where plants are propagated for school visits and other education groups (including children and adults with sensory and cognitive disabilities). They are also the only spaces that house and display "touchable" plants in service of hands-on, experiential learning and experimentation.

The ***Desert Plants Education Greenhouse*** is an approximately 900-square-foot glazed conservatory space open to school groups and other workshop participants. The growing environment is climate controlled between 70 and 80°F to simulate arid regions and is home to a plant collection of cacti and succulents. Its plant collection comprises 403 individual plants. Additionally, 3,050 seasonal plants are produced in this space annually for educational use and give-aways. Major plant families represented in this collection, in order of frequency, are the Cactaceae, Asphodelaceae, Asparagaceae and Euphorbiaceae families. This glasshouse is used to propagate, grow, and display plants used by visiting school groups; allows hands-on learning experiences.

The ***Tropical Plants Education Greenhouse*** is an approximately 900-square-foot glazed conservatory space open to school groups and other workshop participants. The growing environment is climate controlled between 80 and 85°F to simulate tropical and sub-tropical climates and is home to a plant collection of tropical ornamentals and crop plants. The plant collection comprises 394 individual plants. Additionally, 150 seasonal plants are produced in this space annually for educational use and giveaways. Major plant families represented in this collection, in order of frequency, are the Rutaceae, Zingiberaceae, Rubiaceae, Bromeliaceae and Musaceae families. This is a glasshouse to propagate, grow, and display plants used by visiting school groups; allows hands-on learning experiences.

The ***Warm Temperate Plants Education Greenhouse*** is an approximately 900-square-foot glazed conservatory space open to school groups and other workshop participants. The growing environment is climate controlled between 60 and 75°F to simulate warm temperate climates, and is home to a plant collection of warm temperate ornamentals, culinary and medicinal plants. This plant collection comprises 380 individual plants. Additionally, 1,100 seasonal plants are produced in this space annually for educational use and giveaways. Major plant families represented in this collection, in order of frequency, are the Geraniaceae, Lamiaceae, Fabaceae, Solanaceae and Droseraceae families. This is a glasshouse to propagate, grow, and display plants used by visiting school groups; allows hands-on learning experiences.

### *Significant Natural Communities*

The NYNHP tracks locations of significant natural communities because they serve as habitat for a wide range of plants and animals, both rare and common, and because community occurrences in good condition support intact ecological processes and provide ecological value and services. Significant natural communities include rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and natural areas. According to the NYNHP's Biodiversity Database, the half-mile study area does not contain any significant natural communities.

## F. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

### Wetlands and Open Water Areas

The Project Area contains no wetland or open water areas; therefore, these resources would not be affected by the No-Action condition.

### Groundwater

The No-Action Condition assumes that the Proposed Development Site would be redeveloped with an as-of-right residential development. Therefore, groundwater would be unlikely to differ from its existing condition and is expected to remain largely unchanged.

Because redevelopment of the site in the No-Action Condition would occur as-of-right, and no institutional controls (e.g., (E) designations or Restrictive Declarations that require the owner of a property to assess potential hazardous material impacts prior to construction) currently exist on the Proposed Development Site, the existing soil contaminants and groundwater concerns that were identified in the Phase I ESA report would be expected to remain.

### Floodplains

Because there are no floodplains in the vicinity of the Project Area, there would be no effect to these resources.

### Wildlife and Fish

Wildlife and fish resources within the half-mile study area are not expected to change in the No-Action Condition. While some as-of-right development is expected to occur, as well as a limited amount of development requiring discretionary approvals, the study area would continue to primarily be occupied by existing uses. Habitat in Prospect Park and Brooklyn Botanic Garden would continue to be occupied by the same wildlife and fish species as under existing conditions. The study area would continue to be used by the same suite of urban-adapted, disturbance-tolerant wildlife species as under existing conditions. In general, wildlife and fish would not be disturbed in the No-Action Condition.

Changes to any endangered, threatened, or special concern species habitat may occur in the No-Action Condition. The peregrine falcon and minute duckweed are the only special status species with the potential to occur in the study area. A limited amount of new development Is expected to occur in the study area, including the (as-of-right) redevelopment of the Proposed Development Site and the site directly to the north. Therefore, removal and/or construction of buildings between 50 and 200 feet in height that may contain habitat suitable for the peregrine falcon, may occur in the No-Action Condition, including at the Proposed Development Site.

### Vegetation and Significant Natural Communities

Vegetation within the half-mile study area are not expected to change in the No-Action condition. The study area would continue to be occupied by existing uses, with some new limited development anticipated on the inland blocks. The study area would continue to be used by the same suite of urban-adapted, disturbance-tolerant plant species as under existing conditions. No vegetation and significant natural communities would be disturbed from their existing condition in the No-Action condition.

## G. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

### Wetlands and Open Water Areas

The Proposed Actions would have no effect on wetlands or open water areas because these resources are not present within or adjacent to the Project Area.

### Groundwater

The Proposed Actions would not result in significant adverse impacts to groundwater. As previously noted, groundwater is not used as a source of drinking water in Brooklyn. Although the Project Area is located over the Brooklyn-Queens sole source aquifer, the Proposed Actions would not include the installation of wells or subsurface waste disposal. While the Project Area is also located within the Jamaica Bay Watershed, it lies outside of any sensitive areas of the watershed. Further, as presented in **Attachment E, "Water and Sewer Infrastructure,"** of the Environmental Assessment Statement (EAS), the Proposed Actions would result in a minimal increase in the amount of impervious surface area compared to No-Action conditions. Therefore, the Proposed Actions would not have an adverse effect on the sole source aquifer or watershed.

Construction of the Proposed Project would remove or otherwise prevent future human exposure through capping in place and importing clean fill, thus providing a benefit with respect to local soil and groundwater quality. As discussed in in **Chapter 7, "Hazardous Materials,"** development on the site would take place pursuant to an approved Remedial Action Plan, where appropriate, and a mandatory Construction Health and Safety Plan, prior to construction. In addition, groundwater is not used as a source of drinking water in Brooklyn. Thus, the Proposed Actions would not result in any significant adverse impacts to groundwater.

### Floodplains

The Proposed Actions would have no effect on floodplains, because the Project Area is situated well beyond the boundaries of existing or future floodplains.

### Wildlife and Fish

#### *Wildlife*

Wildlife and fish resources within the half-mile study area are not expected to change in the With-Action Condition. The Proposed Project would not have a direct or indirect significant adverse effect on wildlife in the study area, including Prospect Park and Brooklyn Botanic Garden. While there is the potential for limited impacts to bird flight patterns initially during construction, potential effects would be reduced once flight patterns are adjusted. Existing wildlife within the Project Area's limited suitable habitat are adaptable and mobile and would move to other suitable habitat once construction starts.

The Proposed Actions would not have an effect on any federal special concern species, because the study area does not contain habitat suitable to support these species. While the Project Area may provide habitat suitable for the peregrine falcon, the Proposed Actions are not expected to result in a significant adverse impact to this bird species. The Proposed Actions would entail the removal of existing on-site buildings that may provide suitable habitat, and redevelopment of the site with tall buildings that may also provide suitable habitat. This represents no change from the No-Action Condition. In addition, no peregrine falcon occurrences have been documented at the Proposed Development Site. As recommended by NYSDEC Region 2 Environmental Permit staff, if any peregrine falcons are observed on the construction site, NYSDEC would be contacted immediately.

New York City is a major migratory route and stopover site along the Atlantic Flyway, a major migratory route for neotropical migrant songbirds (i.e., migratory bird species that breed in North America and winter in the Caribbean, Mexico, and Central/South America). Surveys of migrating birds in open spaces in the New York City metropolitan area have revealed a high abundance and diversity of such birds.[5] The rate of migratory movement through an urban area can be remarkable; over the course of a few hours during spring migration, over 50 million birds were detected passing over the southern U.S. during peak movement. Many bird species passing through the City during spring and fall are nocturnal migrants.[6]

Migration altitudes vary depending on species, location, geographic features, season, time of day, and weather.[7] Approximately 75 percent of neotropical migratory birds fly at altitudes between 500 and 6,000 feet during migration.[8, 9] Tall buildings and other structures are known to present strike hazards for many birds, especially those migrating along major routes, such as the Atlantic Flyway. In the U.S., instances of bird mortality due to building window strikes have been estimated at 97 million to 976 million bird deaths per year or more.[10, 11, 12] While bird mortality associated with an individual building may appear low, the cumulative loss due to building collisions along the Atlantic Flyway may be an important cause of mortality for migratory songbirds. Breeding and migratory bird species have been recorded as window strike casualties in the New York City area during nighttime and daytime periods.[13]

In general, structures that are approximately 500 feet or less in height (i.e., below the migratory altitude for most migratory songbirds) would be expected to pose a lower risk for nighttime migratory bird collisions. The Proposed Actions would result in the development of one building with a height of approximately 145-feet above grade. As the proposed maximum building height (145 feet) would be less than 500 feet, the Proposed Actions would pose a low risk for migratory bird losses due to building strikes,

[5] Elbin, S. 2008. Personal communication between Dr. Susan Elbin of NYC Audubon and Dr. Andrew Bernick, AKRF on December 10, 2008. Regarding value of urban habitats to migratory bird species.
[6] Evans Ogden, L. P. 1996. Collision course: the hazards of lighted structures and windows to migrating birds. World Wildlife Fund Canada and the Fatal Light Awareness Program. 46 pp.
[7] *Ibid*.
[8] Gill, F. B. 1990. Ornithology. W.H. Freeman and Co., New York, N.Y
[9] Able, K.P. 1999. A Gathering of Angels. Comstock Books. Cornell University Press, Ithaca, N.Y.
[10] Klem, D., Jr. 1990. Collisions between birds and windows: Mortality and prevention. Journal of Field Ornithology 61(1):120-128.
[11] USFWS. 2002. Migratory bird mortality: Many human caused threats afflict our bird populations. Pamphlet. January 2002. 2pp.
[12] Hager, S.B., H. Trudell, K.J. McKay, S.M. Crandall, L. Mayer. 2008. Bird density and mortality at windows. Wilson Journal of Ornithology 120(3):550-564.
[13] Seewagen, C. L. 2008. Bird collisions with windows: An annotated bibliography. New York City Audubon and the Wildlife Conservation Society, New York, USA. 15pp.

and no significant adverse impacts to populations of songbirds migrating through New York City are expected.

Buildings with glass surfaces also have the potential to result in losses of migratory songbirds during daylight hours. During the day, the most hazardous areas of all buildings, regardless of overall height, are the ground level and bottom few stories. In this area, birds are most likely to fly into glazed facades that reflect surrounding vegetation, sky and other features attractive to birds.[14] For daylight collisions, building and landscape design are important factors in collisions. Highly reflective surfaces, such as glass curtain walls, are known to play an important role in bird collisions.[15] Locating landscaping within one to 33 feet of the building, the use of reflective glass, and the presence of highly visible indoor plants behind clear glass have been found to affect the potential for buildings to result in daytime bird strikes.[16] To minimize the potential for daytime collisions, the Applicant could consider the use of materials and landscape-building configurations during the architectural design phase that reduce the potential for resident and migratory bird strikes, such as those outlined in NYC Audubon's 'Bird-Safe Building Guidelines.' This may include options for new construction such as using patterned, opaque, etched, stained, frosted, or translucent glass to reduce bird collision.[17]

### *Fish*

The Project Area does not contain any water resources or fish species, and the Proposed Actions would not impact any wetlands or open water areas. Therefore, the Proposed Actions would not have an adverse effect on any fish habitat or species.

## Vegetation and Significant Natural Communities

The Proposed Actions would not have an adverse effect on vegetation, except at the Brooklyn Botanic Garden. The Proposed Project would introduce new street trees and remove any invasive species currently present on the Proposed Development Site. As such, the Proposed Actions would have a beneficial effect on vegetation at the Proposed Development Site.

The Proposed Project would result in incremental shadows on vegetation in Brooklyn Botanic Garden. Incremental shadow from the Proposed Project would not be cast on Prospect Park. As indicated in **Chapter 4, "Shadows",** incremental shadows from the Proposed Project have the potential to result in significant adverse impacts on vegetation within the Brooklyn Botanic Garden, as many species require six to eight hours, and in some cases more than eight hours, of sunlight.

An arborist was retained to assess the effects of shading on different classes and categories of plants that may be more sensitive to the incremental shading, including desert plants, Mediterranean plants, and aquatic plants (refer to **Appendix A** for the Arborist Report). The incremental shadow coverage, entry and exit times, and duration were considered for both the growing season as well as for the winter months, as were the plants that were being shaded. Conservatory curators, horticulturists, and greenhouse managers were consulted to assist in this assessment. Detailed information specifying the light requirements of each type of plant at the Brooklyn Botanic Garden is not available and various greenhouse

[14] NYC Audubon. 2008. Bird-Safe Building Guidelines.
http://www.nycaudubon.org/pdf/BirdSafeBuildingGuidelines.pdf
[15] Klem, D., Jr. 2006. "Glass: A Deadly Conservation Issue for Birds". Bird Observer 34(2): 73-81
[16] Klem, D., Jr. 1990. Collisions between birds and windows: Mortality and prevention. Journal of Field Ornithology 61(1):120-128.
[17] Sheppard, C. 2011. Bird-friendly building design. The Plains, VA: American Bird Conservancy.

experts consulted did not agree on the severity of the potential impact. Nevertheless, the study concluded that in general there would be a potential for long-term changes such as reduction in flowering, turning of flowers towards light sources, and slowing of the rate of plant growth.

The potential for impacts over time would be greatest for those plants that require high-light in their natural habitat, including the desert collection, the high-light demanding plants of the Mediterranean collection and overstory plants (such as palms) of the tropical collection. The impact of additional shading would be greatest during the winter months when sunlight hours are already limited.

A map of the various BBG facilities is provided in **Appendix A** and the location-specific findings of the shadow study presented in **Chapter 4, "Shadows,"** are as follows:

- Greenhouses A-C are respectively, the Desert Plants Education Greenhouse, the Warm Temperate Plants Education Greenhouse, and the Tropical Plants Education Greenhouse. These non-public greenhouses would be shaded for approximately three minutes during the December 21 analysis day. These resources would generally have six hours of sunlight daily. These greenhouses would not be shaded during the growing season (refer to **Table 4-6**).
- Greenhouses D, E and F are the Warm Temperate, Tropical and Desert Pavilions. The Warm Temperate Pavilion would not be cast in incremental shadow by the Proposed Project. The Tropical and Desert Pavilions would receive approximately 27 and 43 minutes of incremental shadow on the March 21/September 21 analysis day. The Proposed Project would not cast incremental shadow during the middle of the growing season (May 6/August 6 and June 21) or the winter (December 21). However, these greenhouses have high sunlight requirements. These greenhouses are tiered to maximize sunlight duration and light levels to allow sunlight to filter through the tree canopy to lower growth layers.
- Greenhouses G, H and I represent the Bonsai Museum, the Conservatory Entry House and the Orchid Collection, respectively. All receive at least five hours of sunlight during the important winter months. All receive seven to ten hours of sunlight through the height of the growing season. Again, some effects may occur when the sunlight hours are less than eight. The tropical and sub-tropical species in these greenhouses all require full, all-day sunlight and some of the orchids would likely no longer flower under the projected loss of sunlight to the orchid collection.
- Greenhouses J, K, L, M, N, and O are workhouses and propagation houses and are artificially lit. These greenhouses were not available to arborist to observe directly. They may be shaded by existing tall evergreens that are located immediately to the east of the buildings along Washington Avenue, especially in the morning hours. These greenhouses often receive only in the five to six hour range during the winter. They receive 7.5 to ten hours of sunlight during the growing season. This area would experience up to a 1.5-hour loss of sunlight during the March to October time period and up to a half hour loss of sunlight during the winter months. All plants in the workhouse have high sunlight requirements as the associated plants represent a wide-range of warm weather climates, including humid tropical, desert, as well as warm temperate areas of the Mediterranean and South Africa.
- Greenhouses P, Q, R, S, T, U and V are nursery yards, propagation tunnels and production houses that serve the rest of the garden. There will be little or no shade in these greenhouses during the winter months. This area would experience up to a 2.75-hour loss of sunlight during the March to October time period. There will be seven to nine hours of sunlight during the height of the growing season. These greenhouses were not available to arborist to observe directly. As these areas are used to propagate new plants to supply the Brooklyn Botanic Garden, they require full sun year-round.

Overall, the duration of new shading on various areas of the Garden is long-term/permanent. In consideration of the effects of the Proposed Actions' incremental shadows the lead agency has determined that project-generated shadows would lead to a significant adverse impact to Natural Resources. Incremental shadows from the Proposed Project would be cast on several individual resources within the Brooklyn Botanic Garden. Several of these Greenhouses are used to propagate plants for desert, tropical, and warm temperate climates that require full, year-round sun including sunlight during the important winter months. Therefore, any incremental shading of these greenhouses, specifically during the winter months, would have a significant adverse impact on the plants in these greenhouses. Though the *CEQR Technical Manual* states that 6-8 hours of sunlight is necessary for plant survival, the Brooklyn Botanic Garden contains over 18,500 kinds of plants, with globally rare species and native rare species. The sunlight needed to constitute survival may not be enough to promote healthy growth of these rare plants. Therefore, due to the incremental shadows created by the Proposed Project, significant adverse impacts are likely on the natural resources found within Brooklyn Botanic Garden. Potential measures to mitigate in full or part these impacts are discussed in **Chapter 11, "Mitigation."**