# Chapter 17: Construction

## 17.0 INTRODUCTION

This chapter summarizes the construction program and assesses the potential environmental impacts that could result from the construction of one or more proposed initiatives (the Proposed Actions), which are intended to enhance coastal and social resiliency along the Tottenville shoreline of the South Shore of Staten Island. These initiatives include the Living Breakwaters Project (Breakwaters Project) and the Tottenville Shoreline Protection Project (Shoreline Project). Tottenville is bounded by water on three sides, with the Arthur Kill to the west and north, and Raritan Bay to the south.

The construction assessment presented in this chapter was conducted pursuant to the methodologies outlined in the 2014 *City Environmental Quality Review (CEQR) Technical Manual*. The city, state, and federal regulations and policies that govern construction are described, followed by the anticipated construction schedule and the types of activities likely to occur during construction. The types of equipment to be used during construction are discussed, along with the anticipated number of workers, truck, and barge deliveries where required. Based on this information, an assessment is provided of potential impacts from construction activities.

## 17.1 PRINCIPAL CONCLUSIONS

Under the No Action alternative no new structural risk reduction projects or marine habitat restoration projects will be implemented in the project area. The New York City Department of Parks and Recreation (NYC Parks) will be reconstructing the Pavilion, located along the shoreline within Conference House Park, which has been closed to the public since 2011 due to weather damage to the roof and deck. Reconstruction is anticipated to start in spring 2017 and extend into the fall of 2018.

The Proposed Actions would result in the implementation of one of three alternatives analyzed in this Environmental Impact Statement (EIS); Alternative 2 includes the Breakwaters Project and the Shoreline Project; Alternative 3 includes only the Breakwater Project component; and Alternative 4 includes only the Shoreline Project component.

### 17.1.1 LAND USE, NEIGHBORHOOD CHARACTER, SOCIOECONOMIC CONDITIONS AND OPEN SPACE

Construction under the Proposed Actions—as is the case with most large construction projects—would result in temporary disruptions in the surrounding area. However, while construction activities would be evident to the local community, the temporary nature of construction would not result in any significant impacts on local land use patterns or the character of the nearby area. Construction activities would not block or restrict access to any facilities, affect the operations of any nearby businesses, or obstruct major thoroughfares used by customers or businesses. Therefore, nearby businesses would not be significantly affected by the construction activities under Alternative 2, 3, or 4. Although portions of Conference House Park would temporarily be closed during construction of the on-shore elements of Alternative 2, 3, and 4,

access to the waterfront in areas not under construction would continue to be maintained. Construction activities would be phased to minimize the duration of construction at any particular location within Conference House Park. As project components are completed, those sections of the park would be re-opened for use. As such, at any particular time during construction, the majority of Conference House Park and other open space resources in the area would continue to accommodate the largely passive activities displaced from the affected construction areas. Therefore, construction under Alternative 2, 3, or 4 would not result in significant adverse impacts on open space.

### 17.1.2 HISTORIC AND CULTURAL RESOURCES

*ARCHAEOLOGICAL RESOURCES*

As described in Chapter 5, "Historic and Cultural Resources," the Breakwaters Area of Potential Effect (APE), which is located entirely within the Raritan Bay, was determined to have no sensitivity for archaeological resources dating to the historic period and low to moderate sensitivity for precontact archaeological resources at depths between 25 and 35 feet below the bay floor. As such, the Proposed Actions under Alternatives 2 and 3 would not result in impacts to archaeologically sensitive depths. The Draft Phase 1A Archaeological Documentary Study (Draft Phase 1A) concluded that it is not likely that intact archaeological deposits would be within the sandy beaches within the Shoreline APE. However, limited portions of the upland areas were determined to possess moderate sensitivity for precontact archaeological resources and moderate sensitivity for historic period archaeological resources. A Phase 1B archaeological investigation was recommended for those areas of archaeological sensitivity within the Shoreline APE that would be impacted by the proposed project as would be expected under Alternatives 2 and 4.

Following the submission of the Draft Phase 1A to the consulting parties, the proposed project design was revised to include an additional potential location for the Water Hub (Potential Location 2) as well as alternate locations for water access points along the shoreline within Conference House Park. The Draft Phase 1A will therefore be revised to reflect the New York State Historic Preservation Office (SHPO)'s comments and to reflect the changes to the project site's design following the completion of the first draft—including the addition of the new portion of the Shoreline APE located within Conference House Park—and a final version of the Phase 1A will be submitted to SHPO, the New York City Landmarks Preservation Commission (LPC), and the Tribal Nations for review and comment. In

All Phase 1B testing under Alternatives 2, 3, and 4 within identified areas of archaeological sensitivity would be completed in consultation with SHPO, LPC, and the Tribal Nations. Any additional archaeological investigation or consultation with the consulting parties would be completed pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among the Federal Emergency Management Agency (FEMA), SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and the Advisory Council on Historic Preservation (ACHP) and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the Community Development Block Grant-Disaster Recovery (CDBG-DR) grant program for activities in New York City. Any additional archaeological investigations completed subsequent to the Phase 1B investigation (e.g., a Phase 2 archaeological survey or Phase 3 Data Recovery) would be completed prior to construction in consultation with SHPO, LPC, and the Tribal Nations.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) and CEQR, should significant (e.g., eligible for listing on the State and National Registers of Historic Places [S/NR]) archaeological resources be identified in sensitive areas through Phase 1B and Phase 2 archaeological investigations, disturbance or removal of such resources through construction would constitute an adverse effect under Section 106 of the NHPA and a significant adverse impact under CEQR. However, as outlined above, at this time only the *potential* for archaeological resources has been identified in certain locations on the project site. As set forth in the 2014 *CEQR Technical Manual*, a "site's actual, rather than potential, sensitivity cannot be ascertained without some field testing or excavation."[1] Therefore, it is conservatively assumed for purposes of Section 106 and CEQR that the proposed project could *potentially* result in an adverse effects and significant adverse impacts, with the actual presence of any significant resources to be determined through additional archaeological investigations and consultation as set forth in the Programmatic Agreement, described above. However, should no significant archaeological resources be identified through Phase 1B or any subsequent Phase 2 archaeological investigations, and LPC, SHPO and the Tribal Nations concur with the conclusions of those investigations, no *actual* adverse effects or significant adverse impacts would occur.

*ARCHITECTURAL RESOURCES*

Within the Shoreline APE are the Henry Hogg Biddle House (New York City Landmark [NYCL], S/NR-eligible) and the Rutan-Beckett House (potential architectural resource). If Water Hub Location 2 is selected, one of these two historic architectural resources would be rehabilitated and adaptively used. If plans move forward to locate the programming for the Water Hub within one of these two buildings, consultation with the consulting parties would continue to be undertaken pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among FEMA, SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the CDBG-DR program for activities in New York City.

In addition, because the Henry Hogg Biddle House is a NYCL, if the Biddle House Option is selected for the Water Hub, NYC Parks would consult with LPC under the New York City Landmarks Preservation Law regarding any proposed alterations to this NYCL. LPC would review the proposed alterations and, upon approval of the proposed alterations, would issue a Binding Commission Report summarizing LPC's findings. Should the Rutan-Beckett House be determined S/NR-eligible, consultation regarding proposed alterations to this building would also be undertaken with SHPO. Should either Potential Location 2—the Biddle House Option or the Rutan-Beckett Option—be selected for the Water Hub, consultation with SHPO would be undertaken regarding any proposed alterations to the historic resource.

### 17.1.3 VISUAL RESOURCES

Construction equipment such as excavators, loaders, barges, and/or trucks, would be utilized during the construction period under the Proposed Actions and may be visible to the public from certain vantage points. Views towards the waterfront from inland locations on nearby local

[1] *CEQR Technical Manual* (March 2014): page 9-10 (http://www.nyc.gov/html/oec/downloads/pdf/2014_ceqr_tm/09_Historic_Resources_2014.pdf).

streets are limited to residents, pedestrians, motorists and bicyclists, due to the narrowness of the streets and intervening natural features, including wooded areas, street trees, and landscaping elements on residential properties. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding communities. Although the character and quality of views during construction may be modified, such effects would be temporary in any given location. Therefore, construction under Alternative 2, 3, or 4 would not result in significant adverse impacts to visual resources.

### 17.1.4 HAZARDOUS MATERIALS

Although no significant potential for adverse impacts related to hazardous materials would be anticipated given the longstanding recreational parks use of the project site, the potential would be further minimized by incorporating best practices into the project's construction and incorporating the following protocols into the Proposed Actions (via the construction documents and specifications):

- If evidence of contaminated soil/sand (e.g., stains or odors) is encountered, these materials (and all other materials requiring off-site disposal) would be segregated and disposed of in accordance with applicable federal, state and local regulations. If any underground storage tanks (USTs) are encountered, they would be properly assessed, closed and removed in accordance with state and local regulatory requirements (including the New York State Department of Environmental Conservation [NYSDEC] tank registration and spill reporting requirements). Any materials intended for off-site disposal would be tested in accordance with the requirements of the receiving facility. Transportation of these materials would be in accordance with federal, state and local requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.
- Dewatering is not anticipated to be required. Should it be needed, testing would be performed to ensure compliance with proper regulatory discharge requirements (New York City Department of Environmental Protection [NYCDEP] for discharge to combined sewers or NYSDEC requirements for discharges to surface water either directly or via an outfall). If required by the regulatory permit/approval process, pre-treatment would be conducted prior to the discharge.
- For Potential Location 2 of the Water Hub, rehabilitation plans would follow applicable regulatory requirements to address any asbestos-containing materials (ACM), polychlorinated biphenyls (PCB)-containing material, or lead-based paint (LBP). Similar materials and creosote-treated wood could be encountered during excavation, especially where there were previously structures. Any such materials would be properly characterized, managed and disposed of in accordance with applicable regulations.

With the implementation of these protocols, no significant adverse impacts related to hazardous materials would result from construction activities related to Alternative 2.

### 17.1.5 NATURAL RESOURCES

Alternatives 2, 3, and 4 would not result in significant adverse impacts to terrestrial or aquatic resources. Temporary impacts to water quality, NYSDEC littoral zone tidal wetlands and tidal wetland adjacent area (TWAA) due to upland construction activities associated with Alternatives 2, 3, and 4 would be minimized through the use of erosion and sediment control measures (e.g., silt fencing and hay bales) implemented in accordance with Stormwater Pollution Protection

Plan (SWPPP) prepared for the project as required by State Pollutant Discharge Elimination System (SPDES) General Permit GP-0-15-002 for Stormwater Discharges from Construction Activity. These same erosion and sediment control measures would minimize potential impacts to the delineated wetland, along with the use of marsh mats or low ground-pressure equipment to minimize indirect impacts to the not directly affected by the construction of the hybrid dune, transition node structure and pathway under Alternatives 2 and 4.

For Alternatives 2 and 4, which would result in substantial upland construction activity, including the upland areas where threatened or endangered plant species were observed and where the box turtle (species of section concern) has the potential to occur, protection programs (e.g., transplant, and seed collection and propagation) would be developed in coordination with NYC Parks and New York State Natural Heritage Program (NYSNHP) for populations of the state-listed plant species that would have the potential to be affected by construction of the Shoreline Project: northern gamma grass (endangered), and dune sandspur (threatened). Additionally, any eastern box turtles encountered in the area of disturbance prior to or during the construction of earthen berm would be relocated to an area beyond the silt fencing to avoid direct impacts. With the implementation of these measures Alternatives 2 and 4 would not result in significant adverse impacts to threatened or endangered plant species and species of special concern. Alternative 3, with the limited amount of upland disturbance, would have limited potential to affected threatened or endangered plant species or wildlife of concern.

Excavation of soils to construct the on-shore components of Alternatives 2 and 4, including the unpermitted fill determined to meet the NYSDEC Soil Cleanup Objectives (SCOs) for residential use and protection of groundwater, would not have the potential to adversely affect groundwater due to soil contamination. Groundwater removed during any dewatering activities would be treated prior to discharge to Raritan Bay and would not have the potential to adversely affect water quality. Alternative 3 would only result in limited clearing and upland construction associated with the Water Hub.

During placement of the breakwater materials under Alternatives 2 and 3, measures would be implemented to minimize suspension of bottom sediment. Increases in suspended sediment that would result from in-water construction activities would be minor, temporary, and localized, would dissipate upon cessation of the sediment disturbing activities, and would not adversely affect aquatic biota. Fish and mobile benthic invertebrates would be expected to avoid the portions of the bay in which in-water activities would be occurring, moving to similar available habitat nearby. Increased vessel traffic and underwater construction noise would be within the range of typical vessel activity in Raritan Bay and would not adversely affect aquatic resources. Shading of aquatic habitat due to construction barges would be temporary and would not result in adverse effects to aquatic biota. Alternative 4 would not result in any in-water construction activities and would have limited potential to adversely affect water quality and aquatic biota.

### 17.1.6 TRANSPORTATION, AIR QUALITY, NOISE AND VIBRATION

Incremental traffic, transit, and pedestrian trips during peak construction activities would not exceed the *CEQR Technical Manual* analysis thresholds for any hour for all three alternatives. Therefore, the Proposed Actions would not result in any significant adverse traffic, parking, transit, or pedestrian impacts during construction for any of the three Alternatives.

Measures would be taken to minimize pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These measures would include dust suppression measures, idling restrictions, and the use of ultra-low sulfur diesel (ULSD) fuel and

best available technologies (BAT) for equipment at the time of construction. With these measures in place, construction activities associated with the Proposed Actions Alternatives 2, 3, and 4 would not result in any significant adverse local (microscale) and (mesoscale) air quality impacts. The annual emissions generated during the construction activities associated with each of the alternatives would be lower than the *de minimis* rates defined in the general conformity regulations.

Noise resulting from construction associated with the Proposed Actions could result in exceedances of *CEQR Technical Manual* noise impact criteria at beachfront residences between Swinnerton Street and Page Avenue as well as at open spaces such as the Lenape Playground located to the northwest of the earthen berm phase of the Shoreline Project. Exceedances at a single receptor are expected to last for less than 6 months, and construction equipment noise levels would decrease as the Shoreline Project progresses throughout the approximately 21 month schedule. Although the exceedances of CEQR noise impact criteria would be noticeable and potentially intrusive at times, due to the limited duration of construction activities associated with the Proposed Actions, they would not be considered significant adverse construction noise impacts.

Construction associated with the Proposed Actions would not have the potential to produce vibration levels that could result in structural or architectural damage at any receptors near the construction work areas. In terms of potential vibration levels that would be perceptible and annoying, grade-level receptors within approximately 650 feet of pile driving activity would have the potential to experience perceptible and potentially annoying vibration. While vibration resulting from impact pile driving may be perceptible and potentially intrusive, it would be of limited duration as pile driving activities would not last more than approximately two to three months. Because vibration levels associated with construction would not be in the range that could potentially result in damage to adjacent structures, and because levels that would be perceptible would occur intermittently for only a relatively brief period of time, significant adverse impacts from vibrations are not expected to occur as a result of construction associated with the Proposed Actions.

## 17.2 GOVERNMENTAL COORDINATION AND OVERSIGHT

Construction oversight involves several city, state, and federal agencies. The New York City Department of Buildings (NYCDOB) typically enforces safety regulations to protect workers and the general public during upland construction but waterfront projects on city-owned property fall under the jurisdiction of the waterfront permitting division of the New York City Department of Small Business Services (SBS). NYCDEP enforces the *New York City Noise Code.* The New York City Fire Department (FDNY) has primary oversight of compliance with the *New York City Fire Code*. The NYC Parks oversees any construction activities within public open space such as within Conference House Park. The New York City Department of Transportation (NYCDOT) is responsible for the oversight of the implementation of construction protection measures on existing transportation resources.[2] Any archaeological investigations would be conducted in consultation with LPC, along with SHPO, and Tribal Nations representing Richmond County, including the Delaware Nation, the Delaware Tribe of

[2] With the exception of a small portion of the Shoreline Project proposed within an unbuilt portion of the NYCDOT Surf Avenue right-of-way, all on-shore project components would be constructed within the boundaries of Conference House Park.

Indians, the Shinnecock Nation, and the Stockbridge-Munsee Community Band of Mohicans (SMCBM).

At the state level, NYSDEC regulates disposal of hazardous materials. At the federal level, although the U.S. Environmental Protection Agency (USEPA) has wide-ranging authority over environmental matters, including air emissions, noise, and hazardous materials, much of its responsibility is delegated to the state level. The Occupational Safety and Health Administration (OSHA) sets standards for work site safety and construction equipment.

In addition to the above oversight, construction under the Proposed Actions would require waterfront permitting approvals from NYSDEC and USACE. As described in greater detail in Chapter 8, "Natural Resources," the federal and State regulations pertaining to natural resources that would apply to the Proposed Actions include:

### 17.2.1 FEDERAL

- Clean Water Act (33 U.S. Code [USC] §§ 1251 – 1387)
- Rivers and Harbors Act of 1899
- Magnuson-Stevens Act (16 USC §§ 1801 to 1883)
- Executive Order (EO) 11990, "Protection of Wetlands"
- EO 13112 "Invasive Species"
- Endangered Species Act of 1973 (16 USC §§ 1531 to 1544)
- Migratory Bird Treaty Act (50 Code of Federal Regulations [CFR] 10, 20, 21, EO 13186)
- Fish and Wildlife Coordination Act (16 USC 661-667e)
- Bald and Golden Eagle Protection Act (16 USC 668-668c)

### 17.2.2 STATE

- Protection of Waters, Article 15, Title 5, New York Environmental Conservation Law ("ECL"), Implementing Regulations 6, New York City Codes, Rules, and Regulations (NYCRR) Part 608
- State Pollutant Discharge Elimination System (SPDES) (ECL Article 3, Title 3; Article 15; Article 17, Titles 3, 5, 7, 8; Article 21; Article 70, Title 1; Article 71, Title 19; Implementing Regulations 6 NYCRR Articles 2, 3)
- Tidal Wetlands Act, Article 25, ECL, Implementing Regulations 6 NYCRR Part 661
- Freshwater Wetlands Act, Article 24, ECL, Implementing Regulations 6 NYCRR Part 662
- 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 Part 182)
- Removal of Trees and Protected Plants (ECL, Section 9-1503)
- Solid Waste Management Facilities, General Provisions, Beneficial Use 6 NYCRR Part 360-1.15
- Coastal Erosion Hazard Areas Law, Article 34, ECL, Implementing Regulations 6 NYCRR Part 505

## 17.3 CONSTRUCTION DESCRIPTION

As detailed in Chapter 1, "Purpose and Need and Alternatives," there are four Alternatives being studied in this EIS. Alternative 1 is the No Action Alternative, and assumes that no new structural risk reduction or environmental enhancement projects will be implemented in the project area; Alternative 2 consists of the implementation of two individual projects: the Living Breakwaters Project and the Shoreline Project; Alternative 3 includes only the Breakwater Project component; and Alternative 4 includes only the Shoreline Project component. The following section provides a description of construction activities and analysis assumptions associated with both the Breakwaters and Shoreline Projects. Section D, "Effects Assessment," provides an analysis of potential construction-related impacts for each Alternative using the assumptions outlined in this section.

### 17.3.1 CONSTRUCTION PHASING AND SCHEDULE

The conceptual construction schedule for the Breakwaters Project is presented in **Tables 17-1** and reflects the sequencing of construction events as currently planned. Construction of the proposed Breakwaters Project is anticipated to begin in mid-2018 and be complete by early 2020 (over an anticipated 19-month period with approximately 15 months of active construction due to the winter flounder spawning season restriction as discussed below). Construction would consist of the following primary stages, which may overlap at certain times: contractor mobilization, construction of the breakwaters system, shoreline restoration, and contractor demobilization. These construction stages are described in greater detail below under "General Construction Tasks." Construction of the breakwaters system is assumed to begin with the southwestern most location and, generally, proceed from southwest to northeast.

For the purposes of a conservative analysis, it is assumed that in-water construction activities would be restricted by NYSDEC during the winter flounder spawning season (early January through late May). The schedule for the shoreline restoration activities, which is anticipated to take approximately one to two months, could occur any time during the construction schedule and it is assumed that it would not occur during the peak horseshoe crabs mating season (late May to early June). Other seasonal restrictions are not assumed to be necessary for the construction of the Breakwaters Project. If both the Breakwaters Project and the Shoreline Project are implemented as part of the Proposed Actions, the timing of shoreline restoration activities (Breakwaters Project) would be coordinated with the construction schedules for the Shoreline Project. Waivers could be requested and granted for seasonal restrictions due to actual site conditions or with evidence that the construction of the breakwaters system would not cause substantial resuspension of sediment. At this time, it is conservatively assumed that construction activities associated with the proposed Water Hub would commence at the same time as the construction of the proposed breakwaters system and is anticipated to take approximately 12 months to complete.

**Table 17-1**
**Conceptual Construction Schedule – Breakwaters Project**

| Construction Task | Approximate Start Month | Approximate Finish Month | Approximate Duration (months) |
|---|---|---|---|
| Water Hub[1,2] | July 2018 | June 2019 | 12 |
| Contractor Mobilization | July 2018 | July 2018 | 0.5 |
| Construction of Breakwaters System[3] | July 2018 | January 2019 | 6.5 |
| | June 2019 | January 2020 | 7.5 |
| | | *Total:* | 14.0 |
| Shoreline Restoration[4] | - | - | 1.5 |
| Contractor Demobilization | January 2020 | January 2020 | 0.5 |

**Notes:**
[1]Construction activities associated with the proposed Water Hub are assumed to commence at the same time as the construction of the proposed breakwaters system.
[2]Although the rehabilitation and adaptive reuse associated with theWater Hub at Potential Location 2 would be much less intense than those associated with the new structure construction at Potential Location 1, the analysis conservatively assumes that the construction duration at Potential Location 2 would have the same duration as Potential Location 1.
[3]Assumes that in-water construction activities would be restricted during the winter flounder spawning season (early January through late May).
[4]The schedule for the shoreline restoration activities could occur any time during the construction schedule and it is assumed that it would not occur during the peak horseshoe crabs mating season (late May to early June). The timing of shoreline restoration activities would be coordinated with the Shoreline Project construction schedule.
**Source:** MFS Consulting Engineers and Surveyor, DPC. August 2016.

The conceptual construction schedule for the Shoreline Project presented in **Table 17-2** reflects the sequencing of construction events as currently anticipated. Because the Shoreline Project would be constructed almost entirely within Conference House Park, the construction schedule and phasing for this project would continue to be refined in consultation with NYC Parks. Based on preliminary projections, construction of the Shoreline Project is anticipated to begin in mid-2018 and be complete by early 2020 (an anticipated 21-month construction duration). In order to minimize impacts to birds known to breed within the portion of Conference House Park where the earthen berm would be constructed, construction activities, if feasible, would avoid the primary breeding season between early May and July. Assumptions regarding the construction phasing and durations for each Shoreline Project component have been conservatively made to serve as the basis of the analyses in this chapter and are representative of the reasonable worst-case for potential impacts. Construction of the Shoreline Project is assumed to proceed from west to east, with each stage of construction representing the completion of following project elements: earthern berm, hybrid dune system, eco-revetment, raised edge (revetment with trail), and transition nodes. These construction stages are described in greater detail below under "General Construction Tasks." Concrete activities would be performed during warmer weather to the extent practicable to minimize the need for special treatments such as heated water and cold weather protection.

**Table 17-2**
**Conceptual Construction Schedule – Shoreline Project**

| Construction Task | Approximate Start Month | Approximate Finish Month | Approximate Duration (months) |
|---|---|---|---|
| Earthen Berm | July 2018 | December 2018 | 6 |
| Hybrid Dune System | January 2019 | June 2019 | 6 |
| Eco-Revetment | July 2019 | August 2019 | 2 |
| Raised Edge (Revetment with Trail) | September 2019 | January 2020 | 6 |
| Transition Nodes | February 2020 | March 2020 | 2 |
| **Source:** Stantec and RACE. November, 2016. | | | |

### 17.3.2 GENERAL CONSTRUCTION PRACTICES

*HOURS OF WORK*

Construction under the Proposed Actions would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7:00 AM and 6:00 PM on weekdays. The construction work hours for the different project components are projected as follows:

- Breakwaters Project (breakwaters system construction)—7:00 AM to 5:00 PM, Monday to Friday
- Breakwaters Project (shoreline restoration activities)—7:00 AM to 3:00 PM, Monday to Friday
- Water Hub—7:00 AM to 3:00 PM, Monday to Friday
- Shoreline Project—7:00 AM to 3:30 PM, Monday to Friday

It can be expected that, in order to make up for any unforeseen delays (i.e., weather-related delays) and maintain the project schedule, occasional extended work as well as night and weekend work would be needed. Any extended, night, or weekend would not include all construction workers on-site, but only those involved in the specific task requiring additional work time. No work outside of regular construction hours would be performed until appropriate work permits are obtained. The weekend workday, if necessary, would typically be a Saturday.

*STAGING AREAS, ACCESS, AND DELIVERIES*

Access to the construction areas would be controlled; any on-shore work areas would be fenced off or otherwise isolated from the general public to minimize interference between passersby and the construction work. Trees near the on-shore construction area(s) would be protected where necessary and access points to the construction area would be established.

For the construction of the breakwaters system, it is anticipated that all material delivery and on-site staging would take place in-water since there is limited shoreline access for large equipment and material staging from on-shore. Based on preliminary logistics plans, material barges would be used to transport materials from an offsite location to the in-water construction area. Construction workers would be transported from an offsite location via a crew boat to the construction area during this stage of construction. It is assumed that the crew boat would make an average of four round trips per day for departure, arrival, and breaks, over the duration of construction. Materials for shoreline restoration activities and Water Hub construction or rehabilitation and adaptive reuse would be delivered to the project site via construction trucks. The trucks would travel along NYCDOT-designated truck routes, including Amboy Road, Hylan Boulevard, and/or Page Avenue before using the most direct local routes available to reach the

project site at street ends adjacent to the shoreline restoration area or the Water Hub proposed locations. Maintenance and Protection of Traffic (MPT) plans would be developed for any necessary temporary curb-lane closures as required by NYCDOT. Approval of these plans and implementation of the closures would be coordinated with NYCDOT's Office of Construction Mitigation and Coordination (OCMC). As the sand could be delivered directly to the construction area, a staging area may not be needed to support shoreline restoration activities. The construction staging for the Water Hub is anticipated to be located within Conference House Park immediately adjacent to the footprint of the proposed structure and/or along the NYCDOT Surf Avenue right-of-way. Approvals from NYC Parks would be required for any staging area located within Conference House Park.

For the Shoreline Project, it is assumed that all construction activities would be conducted on-shore. Materials for the Shoreline Project are anticipated to be delivered to the project site via construction trucks. Similar to the shoreline restoration activities, trucks would travel along NYCDOT-designated truck routes before using the most direct local routes available to reach the project site at street ends adjacent to the construction staging area. MPT plans would be developed for any necessary temporary curb-lane closures as required by NYCDOT. Staging areas would be within Conference House Park (at this time, the area adjacent to the end of Brighton Street has been identified as a potential construction staging location, and additional areas would be identified in consultation with NYC Parks as project design progresses). Materials would be transported from the staging areas via trucks traveling on heavy equipment mats along the beach before reaching the construction work area. Water-based delivery of material is unlikely for the Shoreline Project but will be explored as design progresses.

### 17.3.3 GENERAL CONSTRUCTION TASKS

The assumptions and estimates for the construction analysis are based on current design information and are for illustrative purposes as specific means and methods would be developed at the time of construction. The following section describes the construction activities that are anticipated to occur associated with the Breakwaters Project and the Shoreline Project.

*BREAKWATERS PROJECT*

Construction of the Breakwaters Project would consist of the following stages, which may overlap at certain times: contractor mobilization, construction of breakwaters system, shoreline restoration, and contractor demobilization and Water Hub construction.

*Contractor Mobilization*

During contractor mobilization, the offsite staging area and the crane barge would be set up to accommodate the construction activities associated with the breakwaters system. Multiple material barges may be onsite simultaneously during contractor mobilization to unload materials. Contractor mobilization tasks are normally completed within weeks.

*Construction of the Breakwaters System*

The Breakwaters Project would comprise of an ecologically enhanced breakwater system, which would include approximately 10 breakwater segments of varying size. The proposed breakwaters (30 percent design) would have a total length of approximately 3,900 linear feet within Raritan Bay; they would be located between 500 and 2,100 feet from the shoreline. Additionally, the vast majority of the breakwater structures would be located more than 1,500 feet from the Federal Navigation Channel with one breakwater segment located more than 700 feet from the channel.

Construction of breakwaters system is assumed to begin with the southwestern most location and would generally proceed from the southwest to the northeast. As discussed above, it is anticipated that the construction of the breakwaters system would be conducted in-water since there is limited shoreline access for large equipment and material staging from the on-shore. To construct the breakwater segments, a high-strength geotextile for soil reinforcement and load distribution would first be prefabricated offsite in large panels. These panels would be transported to the construction area via barges and then be floated to the installation location where they are sunk in place using rocks for the breakwater construction. Bedding stone (scour apron), core stone, riprap stone, and armor units, made of stone or bio-enhancing concrete would then be placed on top of the geotextile with the use of a crane barge in various configurations depending on the type of breakwater being constructed. Rocks used for armoring and to construct the breakwaters would be made of "clean" material to minimize the potential for release of suspended material into the water column. The hoisting of the bio-enhanced units into their final positions must be done with care since the proper placement of these units is critical for their biological performance. Construction of the breakwaters system would also involve the construction of reef ridges and "reef streets," the narrow spaces between the ridges. The current design calls for approximately one linear foot of reef ridge for each linear foot of the main breakwater segment. These reef ridges and "reef streets" would add to the diversity of available habitats within the intertidal and subtidal zones, including interstitial spaces between armor units. These areas would generate additional opportunities for ecological enhancement. It is anticipated that the crane barge would be continually moved during construction to create the best lifting angles and shortest lifting distances to install the breakwater segments. Assuming that in-water construction activities would be restricted during the winter flounder spawning season (early January through late May), construction of the breakwaters system is anticipated to last approximately 6 to 8 months per year for two years, or approximately 12 to 16 months in total.

*Shoreline Restoration*

The proposed shoreline restoration would extend along approximately 800 feet of shoreline between Manhattan Street and Loretto Street. Materials for shoreline restoration activities would be delivered to the project site via construction trucks and offloaded in the area where the sand would be placed. Bulldozers and a front loader would be used to move the sand to the final design locations and to grade to the final design elevations. It is not anticipated that substantial excavation would be required for shoreline restoration activities. Finally, surveyors would ensure that the shoreline restoration construction was completed in accordance with the design specifications. Shoreline restoration activities are anticipated to be completed over a period of approximately one to two months.

*Contractor Demobilization*

During contractor demobilization, the crane barge and the material barge(s) would be removed from the construct area. In addition, the construction staging area would be cleaned up and any materials and equipment associated with the Breakwaters Project would be removed. Contractor demobilization tasks are normally completed within one to two weeks.

*Water Hub Construction*

The Breakwaters Project would also include the Water Hub component which is anticipated to be located within Conference House Park in one of two potential locations—Potential Location 1 would be in the vicinity of the southern terminus of Page Avenue (involving the construction of a new structure). Potential Location 2 would be in the north-western portion of Conference

House Park (involving the rehabilitation and adaptive reuse of an existing NYC Parks building). The Water Hub would provide a place for access to the waterfront, orientation, education, information on shoreline resiliency, community gathering space, and equipment storage for NYC Parks maintenance.

At Potential Location 1, there are two options for the construction of the Water Hub. The first, Page East Option, would locate the proposed Water Hub in an existing Conference House Park parking lot and surrounding wooded area immediately east of Page Avenue. The second, Page West Option, would use a grassy site west of Page Avenue that has previously contained a two-story NYC Parks building. The Water Hub area would also include an approximately 210-foot-long and 8-foot-wide seasonal boat launch to provide access to the water from the shore during the spring to fall seasons. Although the design is still being developed, it is anticipated that the proposed Water Hub building at Potential Location 1 would be a modular structure that would be pre-fabricated and outfitted offsite. The initial construction task for the proposed Water Hub would be the installation of piles to support the proposed modular structure. Following installation of piles, a mobile crane would be used to lift the modular units onto the pilings and the building would be assembled. The next task would involve utility connections to the modular building and finishing (i.e., installation of insulation, electrical, and plumbing, etc.), followed by general site work, including paving of parking areas and landscaping. Water Hub construction at Potential Location 1 is estimated to take approximately 12 months to complete.

At Potential Location 2, there are two options for the adaptive reuse of existing NYC Parks buildings for Water Hub programming. The first, the Biddle House Option, would locate the programming for the Water Hub within the existing Henry Hogg Biddle House (Biddle House). The second, the Rutan-Beckett House Option, would locate the programming for the Water Hub within the existing Rutan-Beckett House which is located southwest of the Biddle House. Similar to Potential Location 1, Potential Location 2 would include access to the water which would either be provided in the area of one of the houses being adaptively reused for Water Hub activities with Americans with Disabilities Act (ADA) accessible pathways/ramps or at the existing Conference House Park pavilion which is undergoing renovations. Adaptive reuse activities would typically involve the use of small equipment such as compressors, welding machines, and a variety of hand tools, and would be much less intense than those described above for new structure construction. Should Water Hub programming be located at Potential Location 2, a small facility to provide seating, wayfinding and potential storage for kayaks and beach cleaning equipment would be constructed near the terminus of Page Avenue. This facility would be connected to the City's water supply but would not require sanitation sewer connections. Water Hub construction at Potential Location 2 is conservatively assumed to have the same construction duration (approximately 12 months) as the activities at Potential Location 1.

*SHORELINE PROJECT*

A long stretch of the Tottenville shoreline—from approximately Swinnerton Street to Sprague Avenue—is currently protected by a temporary dune system (comprising sand-filled barrier bag topped with sand and dune plantings) that was constructed by NYC Parks as an interim protective measure following Superstorm Sandy. As part of the construction of the Shoreline Project, this temporary dune system would be removed and replaced with the project elements proposed for this stretch of the shoreline.

Construction of the Shoreline Project would consist of the following construction stages: contractor mobilization; earthen berm; hybrid dune system; eco-revetment; raised edge;

transition nodes; and contractor demobilization. Construction of the Shoreline Project is assumed to proceed from west to east, from within the wooded area in Conference House Park south of Billop Avenue at approximately Carteret Street, and along the shoreline to Page Avenue. The proposed earthen berm would be constructed within a wooded area in the western section of Conference House Park from approximately Carteret Street to Brighton Street where it would transition to a reinforced, hybrid, planted dune system. The proposed dune system would extend to Loretto Street where it would transition to an eco-revetment along the built Surf Avenue, extending approximately to Sprague Avenue. The eco-revetment would then transition to a raised edge with revetment along the shoreline to Page Avenue and connect to the Water Hub site improvements if sited at Potential Location 1. Transition nodes, including a pedestrian bridge and two overlooks would connect each project element. As discussed above, it is assumed that all construction activities would be conducted on-shore. Materials for the Shoreline Project are anticipated to be delivered to the project site via construction trucks. Water-based delivery of material is unlikely for the Shoreline Project but will be explored as design progresses.

*Contractor Mobilization*

During contractor mobilization, the work area would be prepared for construction, including the installation of public safety measures such as fencing and signs. The staging area would be set up to accommodate the construction activities associated with the Shoreline Project. Contractor mobilization tasks are normally completed within weeks.

*Earthen Berm*

The proposed earthen berm would be approximately 25 feet wide, ranging from 1 foot to 7.5 feet high, and extend approximately 1,211 linear feet. The earthen berm would run through a wooded section of Conference House Park and connect to a transition node with a wetland bridge south of Brighton Street. Construction of the earthen berm would typically begin with site preparation followed by excavation work with the use of excavators and front end loaders. An estimated excavation depth of 4 to 12 feet would be required for the entire length of the Shoreline Project. Excavated soil suitable for reuse would be stockpiled at a construction staging area for use as backfill while excavated soil unsuitable for reuse would be transported off-site to a licensed facility. The earth fill would then be placed, compacted, and graded, followed by planting activities and landscaping for public use and access. Earthen berm construction is anticipated to take approximately 6 months to complete. Removal of the existing temporary dune system along the shoreline would occur following the construction of the proposed earthen berm, so that some measure of shoreline protection would remain in place between Carteret and Brighton Streets while the earthen berm is being constructed.

*Hybrid Dune System*

The proposed hybrid dune system would be at an elevation of approximately 14 feet high (approximately 1 to 3 feet higher, on average, than the existing temporary dune system), and with a 70 feet to 90 feet width, and extend approximately 1,160 linear feet between Brighton and Loretto Streets. The proposed hybrid dune system would also include an ADA accessible pathway. The hybrid dune system would replace the existing temporary dune system along this stretch of shoreline. Following the removal of the existing temporary dune system, construction of the hybrid dune system would begin with site preparation followed by excavation activities. The bedding stone and armor stone would then be placed. Sand placement, final grading, and beach grass planting would follow. While sand may be reused from barrier bags, the analysis conservatively assumed that all sand needed for the hybrid dune system would be trucked in. Hybrid dune construction is anticipated to take approximately 6 months to complete.

*Eco-Revetment*

The proposed eco-revetment would be approximately 60 feet wide and extend approximately 396 feet approximately from Loretto Street to Sprague Avenue, and would comprise a bioswale, sloped plantings, a pathway, and rip rap or concrete steps,. A concrete sidewalk along Surf Avenue would border a 5-foot-wide bioswale, separated by a 6-inch curb. This project element would replace the eastern most stretch of the existing temporary dune system between Loretto Street and Sprague Avenue. Construction of the eco-revetment would begin with site preparation, including the removal of the existing temporary dune, followed by excavation activities. Installation of the stone revetment with steps, planters, and bioswale would follow. The top of the eco-revetment would consist of an 8-foot-wide pathway. While all pathways would use pervious materials where possible, for conservative analyses purposes, the pathway associated with the eco-revetment has been assumed to be made of concrete. Construction of the concrete pathway would involve the placement of forms by hand. After reinforcing mesh is laid, concrete would be poured to form the pathway. Eco-revetment construction is anticipated to take approximately 2 months to complete.

*Raised Edge*

The proposed 8-foot-wide raised edge with trail would begin at Sprague Avenue and extend approximately 2,536 feet to approximately Page Avenue. The raised edge with trail would be bordered upland by an approximately 5-foot-wide bioswale and shoreward by a stone revetment cresting at either 8 feet (same elevation as the proposed pathway) or 12.5 feet, depending on the location. Construction of the raised edge would begin with site preparation followed by excavation activities. The segment of the raised edge parallel to Tricia Way would include the removal of formally unpermitted fill located along the shoreline. The fill material removed would be re-used to the extent practicable in accordance with a beneficial use determination (BUD) prepared for the Proposed Actions. The stone revetment and bioswale would then be placed followed by the installation of the raised edge. The pathway would comprise a top layer of either porous rubber pavement or porous resin bond aggregate pavement. Raised edge construction is anticipated to take approximately 5 months to complete.

*Transition Nodes*

The transition nodes would consist of concrete pavers connected to sidewalks or trails, and stairways to allow shoreline access. Construction of the concrete pavers would involve the placement of forms and the pouring of concrete. As part of the transition between the earthen berm and the hybrid dune system, an approximately 76-foot-long and 8-foot-wide pile-supported, and grated pedestrian bridge would be constructed over the delineated wetland that would undergo wetland enhancement. Construction of the pedestrian bridge would require excavation, pile foundations, concrete pours, and structure installation. An overlook would be constructed at Loretto Street for the transition of the hybrid dune system to the eco-revetment and a revamped overlook would be constructed at Sprague Avenue for the transition of the eco-revetment to the raised edge. Construction of these transition nodes would involve excavation, foundation, concrete pours, and structure installation.

Transition node construction is anticipated to take approximately 2 months to complete.

*Contractor Demobilization*

During contractor demobilization, the construction staging area would be cleaned up and any materials and equipment associated with the Shoreline Project would be removed. Contractor demobilization tasks are normally completed within one to two weeks.

## 17.4 EFFECTS ASSESSMENT

Construction of the Proposed Actions—as is the case with any large construction project—would result in some temporary disruptions in the surrounding area. The following analysis describes the overall temporary effects on the following areas: land use and neighborhood character, socioeconomic conditions, open space, historic and cultural resources, visual resources, hazardous materials, natural resources, transportation, air quality, and noise.

### 17.4.1 ALTERNATIVE 1—NO ACTION ALTERNATIVE

As described in Chapter 1, "Purpose and Need and Alternatives," the No Action alternative assumes that no new structural risk reduction projects or marine habitat restoration projects will be implemented in the project area. NYC Parks will be reconstructing the Pavilion, located along the shoreline within Conference House Park, which has been closed to the public since 2011 due to weather damage to the roof and deck. Reconstruction is anticipated to start in spring 2017 and extend into the fall of 2018. This alternative also assumes that current trends with respect to coastal conditions at Tottenville—i.e., relating to erosion, wave action, ecosystems, and water quality—will continue. Temporary dunes, constructed by NYC Parks as interim protective measures post-Sandy, are currently in place and would continue to exist under the No Action Alternative. The No Action alternative also presumes that existing strategies to educate New Yorkers and the general public on the risks posed by climate change will remain the same in the study area.

### 17.4.2 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)—THE LAYERED TOTTENVILLE SHORELINE RESILIENCY STRATEGY: LIVING BREAKWATERS AND TOTTENVILLE SHORELINE PROTECTION PROJECT (LAYERED STRATEGY)

As described in Chapter 1, "Purpose and Need and Alternatives," the Layered Strategy consists of the implementation of two individual projects: the Living Breakwaters Project and the Tottenville Shoreline Protection Project.

*LAND USE AND NEIGHBORHOOD CHARACTER*

Construction activities under Alternative 2 would include in-water work associated with the breakwaters system, on-shore shoreline restoration activities, on-shore work related to the proposed Water Hub, and the Shoreline Project elements from approximately Carteret Street to Page Avenue. With the exception of a small portion of the Shoreline Project proposed within an unbuilt portion of the NYCDOT Surf Avenue right-of-way, all on-shore project components under Alternative 2 would be constructed within the boundaries of Conference House Park. Construction activities would temporarily affect use of portions of the park during construction, but would not alter surrounding land uses. As is typical with construction projects, during periods of peak activity there would be some disruption to the nearby area. Construction workers, trucks, and barges would come to the area and typical vehicles backing up, loading, and unloading would occur. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as the construction activities would take place within the project site or in-water located between 500 and 2,100 feet from the shoreline. In addition, throughout the construction period, measures would be implemented to control noise and air quality. Overall, while construction activities would be evident to the local community, the temporary nature of construction would not result in any significant impacts on local land use patterns or the character of the nearby area.

*SOCIOECONOMIC CONDITIONS*

This section describes the potential socioeconomic effects of construction activities under Alternative 2 from two perspectives: (1) the economic benefits generated by construction; and (2) the potential for significant adverse socioeconomic effects from construction activities.

*Economic Benefits of Construction*

A detailed assessment of the economic benefits of construction under Alternative 2 is provided in Chapter 3, "Socioeconomic Conditions." The section below provides a summary of the findings.

Economic benefits—including construction-related jobs, wages and salaries, and the total economic output of construction activities—were estimated using IMPLAN (Impact Analysis for PLANning), an economic input-output modeling system. The model uses the most recent economic data from sources such as the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor Statistics, and the U.S. Census Bureau to predict effects on the local economy from direct changes in spending. Estimated construction costs, which serve as inputs to the IMPLAN model, were provided by MFS Consulting Engineers and Surveyor, DPC (MFS) for the Breakwaters Project, and Stantec for the Shoreline Project.

Construction under Alternative 2 is estimated to cost approximately $89.37 million in 2016 dollars. This amount includes all hard costs for the Breakwaters Project with the exception of the Water Hub[3] and all hard costs for the Shoreline Project, but excludes contingency costs for both projects.

*Employment*

As a result of the $89.37 million in direct expenditures associated with this alternative's construction, direct employment from construction is estimated at 394 person-years of employment. A person-year is the equivalent of one person working full-time for one year. Assuming a two-year construction schedule for this alternative, the 394 person-years estimate equates to 197 people working full-time over that two-year period.

When new direct jobs are introduced to an area, those jobs lead to the creation of additional *indirect* and *induced* jobs. Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of Alternative 2 would generate in New York City an additional 86 person-years of indirect employment and 90 person-years of induced employment, bringing the total number of New York City-based jobs from construction to 570 person-years of employment. In the larger New York State economy, the construction of this alternative would generate an estimated 11 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 581 person-years of employment.

[3] There are two potential locations under consideration for siting the Water Hub. Potential Location 1 would involve construction of a new structure, with an estimated cost of $5.00 million. Potential Location 2 would involve the rehabilitation and adaptive reuse of an existing NYC Parks building; the cost of rehabilitation and adaptive reuse has not been estimated, but is expected to be less than $5.00 million cost associated with new construction Potential Location 2. Given that the cost of constructing the Water Hub at Potential Location 2 is not yet known, the economic benefits associated with the development of the Water Hub are excluded from this analysis. However, as it is expected to have less construction costs than the Water Hub at Potential Location 2, it can qualitatively be surmised that Potential Location 1 would have slightly less economic benefit in terms of construction.

*Employee Compensation*

The direct employee compensation during construction is estimated at $35.60 million. Total direct, indirect, and induced employee compensation resulting in New York City from the construction is estimated at $51.80 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $52.57 million.

*Total Effects on the Local Community*

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $139.98 million in New York State, $136.24 million of which would occur in New York City.

*Potential Significant Adverse Socioeconomic Effects Assessment*

The nearest retail businesses are located over ½-mile inland from the project area. Construction activities would not block or restrict access to any facilities, affect the operations of any nearby businesses, or obstruct major thoroughfares used by customers or businesses. Therefore, nearby businesses would not be significantly affected by the construction activities under Alternative 2.

*OPEN SPACE*

The overall construction of the Breakwaters Project is anticipated to take approximately 19 months to complete. Most of the activities for the Breakwaters Project would be in-water. Construction activities associated with the shoreline restoration and the Water Hub components of the Breakwaters Project as well as construction of the Shoreline Project (an anticipated 21-month duration), would be conducted on-shore. With the exception of a small portion of the Shoreline Project proposed within an unbuilt portion of the NYCDOT Surf Avenue right-of-way, all on-shore project components under Alternative 2 would be constructed within the boundaries of Conference House Park. Conference House Park is a 265-acre New York City Park that covers much of the southern point of Staten Island. The park is widest at the southern end, and then tapers to the east, including only a narrow band of beach and dune areas before widening to the north again at Page Avenue where it connects to the habitats in Butler Manor Woods within the within Mount Loretto Unique Area, a 241-acre NYSDEC preserve. Although portions of Conference House Park would temporarily be closed during construction of the on-shore elements of Alternative 2, access to the waterfront in areas not under construction would continue to be maintained. Construction activities would be phased to minimize the duration of construction at any particular location within Conference House Park. As project components are completed, those sections of the park would be re-opened for use. As such, at any particular time during construction, the majority of Conference House Park and other open space resources in the area would continue to accommodate the largely passive activities displaced from the affected construction areas. Therefore, construction under Alternative 2 would not result in significant adverse impacts on open space. Upon completion of construction activities, Alternative 2 would reduce risk from coastal erosion and wave action, providing a level of protection to existing uses in the park and upland residential areas. In addition, the proposed Water Hub would provide a place for access to the waterfront and near-shore waters, orientation, education, information on shoreline resiliency, gathering space and equipment storage.

As described below under "Air Quality," an emissions reduction program would be implemented to minimize the effects of construction activities under Alternative 2 on the surrounding community, including Conference House Park. Construction would also adhere to *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and

to *New York City Administrative Code* limitations on construction-vehicle idling time. Therefore, construction activities under Alternative 2 would not result in any significant adverse air quality impacts on study area open spaces including Conference House Park.

As described below under "Noise," construction for the Proposed Actions would be required to follow the requirements of the *NYC Noise Control Code* to minimize the effects of construction under Alternative 2 on the surrounding community, including Conference House Park. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of Conference House Park would be limited. As discussed above, construction activities would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding community. Based on these factors, construction noise associated with Alternative 2 at these receptors would not be expected to result in a significant adverse impact.

*HISTORIC AND CULTURAL RESOURCES*

A detailed assessment of potential impacts on historic and cultural resources during the construction under Alternative 2 is described in Chapter 5, "Historic and Cultural Resources."

*Archaeological Resources*

Pursuant to Section 106 of the NHPA, a Draft Phase 1A Study for the Breakwaters and Shoreline APEs was prepared in August 2016.[4] The study documented the development history of the APEs as well as their potential to yield archaeological resources, including both precontact and historic archaeological resources. In addition, the Phase 1A study documented the current conditions of the Breakwaters and Shoreline APEs and summarized previous cultural resource investigations which have been undertaken in the vicinity. The proposed project is located in the vicinity of the Ward's Point Archaeological Conservation Area, an archaeological historic district that is listed on the State and National Registers of Historic Places.

The Breakwaters APE, which is located entirely within the Raritan Bay, was determined to have no sensitivity for archaeological resources dating to the historic period and low to moderate sensitivity for precontact archaeological resources at depths between 25 and 35 feet below the bay floor. As such, the Proposed Actions under Alternatives 2 and 3 would not result in impacts to archaeologically sensitive depths. The Draft Phase 1A study concluded that it is not likely that intact archaeological deposits would be within the sandy beaches within the Shoreline APE. However, limited portions of the upland areas were determined to possess moderate sensitivity for precontact archaeological resources and moderate sensitivity for historic period archaeological resources. A Phase 1B archaeological investigation was recommended for those areas of archaeological sensitivity within the Shoreline APE that would be impacted by the proposed project as would be expected under Alternatives 2 and 4. Following the submission of the Draft Phase 1A to the consulting parties, the proposed project design was revised to include an additional potential location for the Water Hub (Potential Location 2) as well as alternate locations for water access points along the shoreline within Conference House Park. The Draft Phase 1A will therefore be revised to reflect SHPO's comments and to reflect the changes to the project site's design following the completion of the first draft—including the addition of the

[4] AKRF, Inc. (2016): "Phase 1A Archaeological Documentary Study: Coastal and Social Resiliency Initiatives for the Tottenville Shoreline: Living Breakwaters and Tottenville Shoreline Protection Projects; Staten Island, Richmond County, New York." Prepared for: the Governor's Office of Storm Recovery; New York, NY.

new portion of the Shoreline APE located within Conference House Park—and a final version of the Phase 1A will be submitted to SHPO, LPC, and the Tribal Nations for review and comment.

Pursuant to Section 106 and CEQR, should significant (e.g., National Register-eligible) archaeological resources be identified in sensitive areas through Phase 1B and Phase 2 archaeological investigations, disturbance or removal of such resources through construction would constitute an adverse effect under Section 106 and a significant adverse impact under CEQR. However, as outlined above, at this time only the *potential* for archaeological resources has been identified in certain locations on the project site. As set forth in the 2014 *CEQR Technical Manual*, a "site's actual, rather than potential, sensitivity cannot be ascertained without some field testing or excavation."[5] Therefore, it is conservatively assumed for purposes of Section 106 and CEQR that the proposed project could *potentially* result in an adverse effects and significant adverse impacts, with the actual presence of any significant resources to be determined through additional archaeological investigations and consultation as set forth in the Programmatic Agreement, described above. However, should no significant archaeological resources be identified through Phase 1B or any subsequent Phase 2 archaeological investigations, and LPC, SHPO and the Tribal Nations concur with the conclusions of those investigations, no *actual* adverse effects or significant adverse impacts would occur.

All Phase 1B testing within the previously identified areas of archaeological sensitivity or any new areas of archaeological sensitivity that may be identified in the newly added portion of the Shoreline APE would be completed in consultation with SHPO, LPC, and the Tribal Nations. Any additional archaeological investigation or consultation with the consulting parties would be completed pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among FEMA, SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the CDBG-DR program for activities in New York City. Any additional archaeological investigations completed subsequent to the Phase 1B investigation (e.g., a Phase 2 archaeological survey or Phase 3 Data Recovery) would be completed prior to construction in consultation with SHPO, LPC, and the Tribal Nations.

The Phase 1A study of the Shoreline APE identified locations of potential precontact archaeological sensitivity along certain portions of the upland areas within the APE. Because the project design has not yet been finalized, the extent to which these areas would be impacted is not yet known. The Phase 1A concluded that if the construction of the proposed Shoreline Project or the proposed Water Hub would result in subsurface impacts, Phase 1B archaeological testing would be completed to determine the presence or absence of archaeological resources within the APE. The Phase 1A determined that upon the completion of the final project design, the project plans be reviewed by an archaeologist to determine if any proposed excavation would impact areas of archaeological sensitivity.

*Architectural Resources*

There are no architectural resources are located in the Breakwaters APE. Therefore, Alternative 2 would not adversely affect any historic architectural resources in the Breakwaters APE. The two architectural resources in the Shoreline APE are the Biddle House and the Rutan-Beckett

[5] *CEQR Technical Manual* (March 2014): page 9-10 (http://www.nyc.gov/html/oec/downloads/pdf/2014_ceqr_tm/09_Historic_Resources_2014.pdf).

House. With Alternative 2, if Water Hub Location 2 is selected, one of these two historic architectural resources would be rehabilitated and adaptively reused. If plans move forward to locate the programming for the Water Hub within one of these two buildings, consultation with the consulting parties would continue to be undertaken pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among FEMA, SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the CDBG-DR program for activities in New York City.

In addition, because the Biddle House is a NYCL, if the Biddle House Option is selected for the Water Hub, NYC Parks would consult with LPC under the New York City Landmarks Preservation Law regarding any proposed alterations to this NYCL. LPC would review the proposed alterations and, upon approval of the proposed alterations, would issue a Binding Commission Report summarizing LPC's findings. Should the Rutan-Beckett House be determined S/NR-eligible, consultation regarding proposed alterations to this building would also be undertaken with SHPO. Should either Potential Location 2—the Biddle House Option or the Rutan-Beckett Option—be selected for the Water Hub, consultation with SHPO would be undertaken regarding any proposed alterations to the historic resource.

*VISUAL RESOURCES*

Construction equipment such as excavators, loaders, barges, and trucks, would be utilized during the construction period for Alternative 2 and may be visible to the public from certain vantage points. Views towards the waterfront from inland locations on nearby local streets are limited to residents, pedestrians, motorists and bicyclists, due to the narrowness of the streets and intervening natural features, including wooded areas, street trees, and landscaping elements on residential properties. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding communities. Although the character and quality of views during construction may be modified, such effects would be temporary in any given location. Therefore, construction under Alternative 2 would not result in significant adverse impacts to visual resources.

*HAZARDOUS MATERIALS*

The in-water portion of the Breakwaters Project (including sediments) is addressed in Chapter 9, "Natural Resources." With respect to the on-shore elements of the Breakwaters Project and the Shoreline Project, significant contamination of the project area's soil or the groundwater or potential vapor intrusion concerns is not anticipated to be encountered during construction. Nevertheless, the possibility of localized areas of residual contamination related to undocumented releases, the former structures, the fill materials (the sources of which are not documented), etc. cannot be ruled out. However, implementation of the Proposed Actions, although they would entail excavation and construction activities that could potentially disturb any such hazardous materials that are present, would not lead to conflicts with the intended utilization of the property, providing standard construction protocols, discussed in more detail below, are followed. Alternative 2 would require excavation for construction of the shoreline elements of the Shoreline Project and for the construction of the Water Hub at Potential Location 1 (e.g., for foundations and utilities). Although not anticipated, such activities could disturb ACM, LBP, and PCB-containing materials and/or creosote-treated wood from buried foundations or debris from former structures. For Potential Location 2 of the Water Hub,

construction would require rehabilitation of one of the existing buildings, which, based on their ages, could disturb any ACM, LBP, and PCB-containing materials and potentially some limited subsurface disturbance associated with building or improving the path/stairway down to the water's edge. Prior to the commencement of construction, the existing building would receive a pre-construction survey for the presence of these materials, and the materials would then be abated with federal, state, and local laws by licensed, certified environmental abatement professionals.

As discussed in Chapter 8, "Hazardous Materials," although no significant potential for adverse impacts related to hazardous materials would be anticipated given the longstanding recreational parks use of the project site, the potential would be further minimized by incorporating best practices into the project's construction and incorporating the following protocols into the Proposed Actions (via the construction documents and specifications):

- If evidence of contaminated soil/sand (e.g., stains or odors) is encountered, these materials (and all other materials requiring off-site disposal) would be segregated and disposed of in accordance with applicable federal, state and local regulations. If any USTs are encountered, they would be properly assessed, closed and removed in accordance with state and local regulatory requirements (including NYSDEC tank registration and spill reporting requirements). Any materials intended for off-site disposal would be tested in accordance with the requirements of the receiving facility. Transportation of these materials would be in accordance with federal, state and local requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.
- Dewatering is not anticipated to be required. Should it be needed, testing would be performed to ensure compliance with proper regulatory discharge requirements (New York City Department of Environmental Protection for discharge to combined sewers or NYSDEC requirements for discharges to surface water either directly or via an outfall). If required by the regulatory permit/approval process, pre-treatment would be conducted prior to the discharge.
- For Potential Location 2 of the Water Hub, rehabilitation plans would follow applicable regulatory requirements to address any ACM, PCB-containing material, or LBP. Similar materials and creosote-treated wood could be encountered during excavation, especially where there were previously structures. Any such materials would be properly characterized, managed and disposed of in accordance with applicable regulations.

With the implementation of these protocols, no significant adverse impacts related to hazardous materials would result from construction activities related to Alternative 2.

*NATURAL RESOURCES*

A detailed assessment of the potential effects on natural resources during construction under Alternative 2 is presented in Chapter 9, "Natural Resources."

Construction of Alternative 2 would not result in significant adverse impacts to terrestrial or aquatic resources. Temporary impacts resulting from construction of on-shore components, such as vegetation removal, wildlife displacement, and alteration of NYSDEC littoral zone tidal wetlands and the TWAA, and the delineated tidal wetland, would be minimized through the use of erosion and sediment control measures (e.g., silt fencing and hay bales), marsh mats or low ground-pressure equipment within wetlands, vegetation protection and propagation measures, and compliance with the Stormwater Pollution Protection Plan (SWPPP) prepared for the project

as required by SPDES General Permit GP-0-15-002 for Stormwater Discharges from Construction Activity ("General Permit").

Protection programs (e.g., transplant, and seed collection and propagation) would be developed in coordination with NYC Parks and NYSNHP for populations of the state-listed plant species that would have the potential to be affected by construction of the Shoreline Project: northern gamma grass (endangered), and dune sandspur (threatened). Additionally, any eastern box turtles encountered in the area of disturbance prior to or during the construction of earthen berm would be relocated to an area beyond the silt fencing to avoid direct impacts. With the implementation of these measures the Proposed Actions would not result in significant adverse impacts to threatened or endangered plant species and species of special concern.

Excavation of soils to construct the on-shore components of the Proposed Actions would not have the potential to adversely affect groundwater due to soil contamination. The proposed removal of unpermitted fill determined to meet the NYSDEC SCOs for residential use and for protection of groundwater would not adversely affect groundwater. Groundwater removed during any dewatering activities would be treated prior to discharge to Raritan Bay and would not adversely affect water quality.

During placement of the breakwater materials, measures would be implemented to minimize suspension of bottom sediment. Increases in suspended sediment that would result from in-water construction activities would be minor, temporary, and localized, would dissipate upon cessation of the sediment disturbing activities, and would not adversely affect aquatic biota. Fish and mobile benthic invertebrates would be expected to avoid the portions of the bay in which in-water activities would be occurring, moving to similar available habitat nearby. Increased vessel traffic and underwater construction noise would be within the range of typical vessel activity in Raritan Bay and would not adversely affect aquatic resources. Shading of aquatic habitat due to construction barges would be temporary and would not result in adverse effects to aquatic biota.

*TRANSPORTATION*

The construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities. The analysis is based on the peak worker and truck trips during construction under Alternative 2, which were developed based on several factors including worker modal splits, vehicle occupancy and trip distribution, truck passenger car equivalents (PCEs), and arrival/departure patterns.

The following sections evaluate the potential for the peak construction worker and truck trips under Alternative 2 to result in significant adverse impacts to traffic, transit facilities, pedestrian elements, and parking.

*Traffic*

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

*Construction Trip-Generation Projections*

Based on preliminary estimates, construction of the breakwater system would require one crew of approximately 11 workers per day (equipment operators, tugboat operators, divers, diver tenders, and dock builders) and an average of less than one material barge trip per day. Construction workers would be transported from an on-shore location via a crew boat to the in-water construction area and it is estimated that the crew boat would make an average of four

round trips per day for departure, arrival, and breaks, over the duration of construction. Shoreline restoration activities would require one crew of approximately 6 workers per day (operators and laborers) and approximately 39 truck trips per day. Water Hub construction at either potential location is estimated to require one crew of approximately 15 workers per day and an average of approximately 5 truck trips per day. Although the rehabilitation and adaptive reuse activities associated the Water Hub at Potential Location 2 would be much less intense than those associated with the new structure construction at Potential Location 1, the analysis conservatively assumes that the number of construction workers and trucks for Potential Location 2 during the peak construction period would be the same as those for Potential Location 1. Construction activities for each stage of the Shoreline Project would require one crew of approximately 15 workers per day and average of 3 to 19 truck trips per day. **Table 17-3** shows the estimated average daily numbers of workers and deliveries by calendar quarter for the duration of the construction period under Alternative 2.

**Table 17-3**
**Alternative 2 -Average Number of Daily Workers and Trucks by Year and Quarter**

| Year | 2018 | | | | 2019 | | | | 2020 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarter | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | Average | Peak |
| Workers | - | - | 41 | 41 | 34 | 34 | 26 | 30 | 19 | - | - | - | 32 | 41 |
| Trucks | - | - | 8 | 8 | 23 | 23 | 11 | 45 | 16 | - | - | - | 19 | 45 |

**Source:**
MFS Consulting Engineers and Surveyor, DPC. August 2016
Stantec and RACE. November, 2016.

These worker and truck trip projections were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and truck PCEs.

*Daily Workforce and Truck Deliveries*

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter were used as the basis for estimating peak-hour construction trips. It is expected that construction activities would generate approximately 30 workers and 45 truck deliveries per day during the peak quarter of construction (fourth quarter of 2019; the peak number of construction workers on-site is expected to be approximately 41 per day during the third and fourth quarters of 2018). These estimates of construction activities are discussed further below.

*Construction Worker Modal Splits and Vehicle Occupancy*

Based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site using private autos at an average occupancy of approximately 1.09 persons per vehicle.

*Peak-Hour, Construction-Worker Vehicle and Truck Trips*

As discussed above, construction for the Proposed Actions would typically take place on weekdays from 7:00 AM to 3:00 PM, 3:30 PM, or 5:00 PM, depending on the type of activity being performed. While construction truck trips would occur throughout the day, and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips during the same hour (one “in” and one “out”), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart near the work-

shift end hour. Further, in accordance with the 2014 *CEQR Technical Manual*, the traffic analysis assumed that each truck would have a PCE of 2.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after the work shift. Construction truck deliveries would be distributed throughout the day. As shown in **Table 17-4**, based on these projections, the maximum construction-related traffic increments would be approximately 35 PCEs between 6:00 AM and 7:00 AM. These incremental construction PCEs would be well below the *CEQR Technical Manual* threshold of 50 vehicle trips; therefore, no further quantified analysis is warranted and construction under Alternative 2 would not result in any significant adverse traffic impacts.

**Table 17-4**
**Alternative 2 - Peak Construction Vehicle Trip Projections (4th Quarter of 2019)**

| | Auto Trips | | | Truck Trips | | | Total | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Regular Shift | | | Regular Shift | | | Vehicle Trips | | | PCE Trips | | |
| Hour | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total |
| 6 AM - 7 AM | 21 | 0 | 21 | 7 | 0 | 7 | 28 | 0 | 28 | 35 | 0 | 35 |
| 7 AM - 8 AM | 6 | 0 | 6 | 7 | 7 | 14 | 13 | 7 | 20 | 20 | 14 | 34 |
| 8 AM - 9 AM | 0 | 0 | 0 | 6 | 7 | 13 | 6 | 7 | 13 | 12 | 14 | 26 |
| 9 AM -10 AM | 0 | 0 | 0 | 5 | 6 | 11 | 5 | 6 | 11 | 10 | 12 | 22 |
| 10 AM -11 AM | 0 | 0 | 0 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 10 | 20 |
| 11 AM - 12 PM | 0 | 0 | 0 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 10 | 20 |
| 12 PM - 1 PM | 0 | 0 | 0 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 10 | 20 |
| 1 PM - 2 PM | 0 | 0 | 0 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 10 | 20 |
| 2 PM - 3 PM | 0 | 1 | 1 | 0 | 5 | 5 | 0 | 6 | 6 | 0 | 11 | 11 |
| 3 PM - 4 PM | 0 | 14 | 14 | 0 | 0 | 0 | 0 | 14 | 14 | 0 | 14 | 14 |
| 4 PM - 5 PM | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 5 | 5 |
| 5 PM - 6 PM | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 7 | 7 | 0 | 7 | 7 |
| Daily Total | 27 | 27 | 54 | 45 | 45 | 90 | 72 | 72 | 144 | 117 | 117 | 234 |

**Note:** Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

*Transit*

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that only approximately 8 percent of construction workers would commute to the project site via transit. During the peak construction period under Alternative 2 (a maximum of 36 daily construction workers), this would correspond to approximately 3 workers traveling by transit, which is well below the *CEQR Technical Manual* 200-transit-trip analysis threshold. Therefore, no further quantified transit analysis is warranted and construction under Alternative 2 would not result in any significant adverse transit impacts.

*Pedestrians*

As summarized above, approximately 41 daily construction workers are anticipated during peak construction for Alternative 2. This increment would be well below the *CEQR Technical Manual* analysis threshold of 200 pedestrian trips. Therefore, no further quantified pedestrian analysis is warranted and construction under Alternative 2 would not result in any significant adverse pedestrian impacts.

*Parking*

The peak number of workers during construction for Alternative 2 would be approximately 41 per day. As discussed above, based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site by private autos at an average occupancy of approximately 1.09 persons per vehicle. The anticipated construction activities under Alternative 2 are therefore projected to generate a maximum parking demand of 35 spaces. This construction parking demand is expected to be adequately accommodated by the ample on-street spaces available within a ¼-mile radius of the project site and the off-site staging area for breakwater construction. Therefore, construction under Alternative 2 would not result in any parking shortfalls or the potential for any significant adverse parking impacts.

*AIR QUALITY*

Emissions from on-site construction equipment (i.e., excavators, tug boats, etc.) and on-road construction-related vehicles (i.e., construction trucks), as well as dust generating construction activities, have the potential to affect air quality. In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of nitrogen oxides ($NO_x$) and particulate matter (PM) emissions. Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of carbon monoxide (CO). Since EPA mandates the use of ULSD fuel for all highway and non-road diesel engines, sulfur oxides ($SO_x$) emitted from the Proposed Actions' construction activities would be negligible. Therefore, the four primary air pollutants of concern for construction activities are nitrogen dioxide ($NO_2$), particles with an aerodynamic diameter of less than or equal to 10 micrometers ($PM_{10}$), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO. For more details on air pollutants and applicable regulations, standards, and benchmarks, see Chapter 13, "Air Quality."

The analysis presented in this section addresses both local (microscale) concentrations and regional (mesoscale) emissions.

*Local (Microscale) On-site Construction Activity Assessment*

The *CEQR Technical Manual* lists several factors for consideration in determining whether a quantified on-site and/or off-site construction impact assessment for air quality is appropriate. These factors include the duration and intensity of construction activities, the location of nearby sensitive receptors, the use of emission control measures, and project generated construction-related vehicle trips.

*Location of Nearby Sensitive Receptors*

The largest and most striking single sensitive receptor location is Conference House Park, a 265 acre park under the jurisdiction of NYC Parks. The portion of the park immediately adjacent to the project site contains coastal wetlands and beaches lining the shore. The Lenape Playground within the Conference House Park is located approximately 100 feet to the west of the proposed earthen berm. Moving inland from Conference House Park, the next set of sensitive receptors are the single-family detached houses to the north and west of the project site, the nearest of which are approximately 50 feet from the transition node construction at Loretto Street, wetland bridge construction near Brighton Street, raised edge construction between Joline Avenue and Bedell Avenue, or the dune system construction across the unbuilt portion of the NYCDOT Surf Avenue right-of-way. These residential locations are approximately 1,000 feet from the Breakwaters Project in-water construction areas. The construction of the proposed Water Hub at

Potential Location 1 would be in close proximity (approximately 50 feet) of the New York City Housing Preservation and Development (NYCHPD) building near the western street end of Page Avenue, and potentially 50 feet from the nearest residence to the northwest of the proposed building if the site of the recently demolished administrative building for Conference House Park is selected. The proposed Water Hub at Potential Location 2 would include the adaptive reuse of either the Biddle House or Rutan-Beckett House, which are approximately 103 feet from each other. There is a residential building at 8 Shore Road approximately 68 feet east of the Rutan-Beckett House and approximately 85 feet south of the Biddle House. The nearest residence to the north of these potential locations is along Wards Point Avenue at a distance of approximately 75 feet from the Biddle House and 180 feet from the Rutan-Beckett House. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location.

*Duration and Intensity of Construction Activities*

Construction under Alternative 2, as is the case with any large construction project, would be disruptive to the surrounding area. However, since the overall construction for the Breakwaters Project and the Shoreline Project are anticipated to take approximately 19 months and 21 months, respectively, and are assumed to occur simultaneously or with some overlap, the construction periods are considered of short-term (i.e., less than two years) duration according to the *CEQR Technical Manual*.

For the construction of the breakwaters system, it is anticipated that all material delivery and on-site staging would take place in-water since there is limited shoreline access for large equipment and material staging from the on-shore. In-water construction activities would take place between 500 and 2,100 feet from the shoreline and approximately 1,000 feet from the nearest residence. Compared to urban construction projects in New York City where receptors are oftentimes adjacent to the construction activities (i.e., less than 50 feet away), such distances between the construction sources and sensitive receptors would result in increased dispersion of pollutants. With the exception of the crane operation, maritime activity associated with the Proposed Actions is expected to be infrequent and would consist of a crew boat transporting workers to and from the in-water construction areas approximately four times per day, a tug boat transporting the material barge to and from the breakwaters in-water construction areas on an average of once per day, and the repositioning of the materials barge and the crane barge with an on-site tug boat as necessary. In addition, in-water construction activities would be phased to minimize the duration of construction at any particular location. Therefore, based on these reasons, potential pollutant concentration increments from construction sources over water at on-shore sensitive receptor locations (Conference House Park) would be minimal.

For the Shoreline Project, and the shoreline restoration and Water Hub components of the Breakwaters Project, it is assumed that all construction activities would be conducted on-shore. On-shore activities would generally be limited to excavation and the placement of armor stone, bedding stone, and fill, and for the construction of the proposed Water Hub, the erection of a modular structure at Potential Location 1 and adaptive reuse at Potential Location 2. The number of engines required for on-shore construction activities under Alternative 2 would be less than those that are required for typical ground-up building construction. In addition, construction activities would be phased to minimize the duration of construction at any particular location within Conference House Park. Overall, emissions associated with the construction of under Alternative 2 would be even lower due to the emission control measures implemented during construction (see "Emission Control Measures," below).

*Emission Control Measures*

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. Measures would be taken to minimize pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include dust suppression measures and idling restrictions:

- *Dust Control.* To minimize fugitive dust emissions from construction activities, a fugitive dust control plan including a robust watering program would be required as part of contract specifications. For example, all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the project site; and water sprays would be used for all soil transfer activities to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air. Loose materials would be watered, stabilized with a chemical suppressing agent, or covered. All measures required by the portion of the *New York City Air Pollution Control Code* regulating construction-related dust emissions would be implemented.
- *Idling Restriction.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time will be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or are otherwise required for the proper operation of the engine.

Construction under the Proposed Actions would be subject to New York City Local Law 77, which requires the use of ULSD and Best Available Technology (BAT) for equipment at the time of construction.[6]

- *Clean Fuel*. ULSD[7] fuel will be used exclusively for all diesel engines throughout the development area.
- *Best Available Tailpipe Reduction Technologies*. Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) including but not limited to concrete mixing and pumping trucks would utilize the BAT for reducing DPM emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either installed by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by USEPA or the California Air Resources Board (CARB). Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.

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

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

In addition, construction contractors are encouraged to implement the following measures to the extent practicable to further reduce air pollutant emissions during construction:

- *Utilization of Newer Equipment.* USEPA's Tier 1 through 4 standards for nonroad diesel engines regulate the emission of criteria pollutants from new engines, including PM, CO, $NO_x$, and hydrocarbons. All diesel-powered non-road construction equipment on land or on barges with a power rating of 50 hp or greater would meet at least the Tier 3[8] emissions standard. All diesel-powered engines in the project rated less than 50 hp would meet at least the Tier 2 emissions standard.

Overall, this emissions control program is expected to substantially minimize air pollutant emissions during construction under Alternative 2.

*Off-Site Sources*

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

*Conclusions*

Based on the analyses provided above and the implementation of an emissions reduction program, construction under Alternative 2 would not result in any significant adverse construction air quality impacts on a microscale level, and no further analysis is required.

*Regional (Mesoscale) On-site Construction Activity Assessment*

*Conformity with State Implementation Plans*

In November 1993, USEPA promulgated the General Conformity Rule under the Clean Air Act (CAA) to ensure that actions taken by federal entities do not impede State Implementation Plan (SIP) efforts to attain and maintain the National Ambient Air Quality Standards (NAAQS). Actions conforming to the SIP would not:

1. Cause or contribute to any new violation of any standard in any area;
2. Interfere with provisions in the applicable SIP for maintenance of any standard;
3. Increase the frequency or severity of any existing violation of any standard in any area; or

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

4. Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

Conformity for federally assisted, funded, permitted, and approved projects must be analyzed according to the general conformity regulations (40 CFR Part 93 Subpart B). Under this rule, a conformity determination is required for any criteria pollutant in a non-attainment or maintenance area affected by a federal action if the action would result in pollutant emissions exceeding the established screening criteria (*de minimis*) emissions rates or exceeding 10 percent of the area-wide emissions. Actions that would not result in emissions exceeding the above criteria would conform to the SIPs.

The Proposed Actions must conform to the $CO_2$, ozone, $PM_{10}$, and $PM_{2.5}$ SIPs in the metropolitan area. The applicable *de minimis* threshold for $PM_{10}$, CO, $PM_{2.5}$, $SO_2$ ($PM_{2.5}$ precursor), and $NO_x$, a $PM_{2.5}$ and ozone precursor, is 100 tons per year; the *de minimis* threshold for Volatile Organic Compounds (VOC), an ozone precursor, is 50 tons per year since New York City is within an ozone transport zone.

Temporarily, during construction, there would be emissions associated with on-site construction equipment and with the transport of construction materials. Aggregate emissions from the construction of the Proposed Actions are evaluated in this section.

*Engine Exhaust Emissions*

Emissions from on-road trucks and from non-road construction equipment, including marine engines, were calculated on an annual basis. The projected usage factors, sizes, types, and number of construction equipment were estimated based on the construction activity schedule. Emission factors for $PM_{10}$, $PM_{2.5}$, $NO_x$, VOC, CO, and $SO_2$ from on-site construction engines were developed using the latest USEPA NONROAD Emission Model (NONROAD2008a). The model is based on source inventory data accumulated for specific categories of non-road equipment. The emission factors for each type of equipment, with the exception of trucks, were determined from the output files for the NONROAD model (i.e., calculated from regional emissions estimates). Tailpipe emission rates from heavy trucks on-site (e.g., dump trucks, concrete trucks) were developed using the most recent version of the USEPA Mobile Source Emission Simulator (MOVES2014a) as referenced in the *CEQR Technical Manual*. 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 MOVES incorporate the most current guidance available from NYSDEC. Tugboat emissions were estimated according to the latest emission factors and methodologies delineated by USEPA[9].

*Regional Analysis Results*

Annual construction activity and the associated emissions are presented in **Table 17-5**. The annual emissions would be lower than the *de minimis* rates defined in the general conformity regulations. Since all diesel engines will be using ultra low sulfur diesel, $SO_2$ emissions would be negligible.

[9] USEPA, Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, April 2009.

**Table 17-5**
**Alternative 2 - Emissions from Construction Activities (ton/yr)[1]**

| Year | $PM_{2.5}$ | $PM_{10}$ | $NO_x$ | VOC | CO |
|---|---|---|---|---|---|
| 2018 | 1.7 | 1.8 | 36.5 | 1.5 | 4.7 |
| 2019 | 2.7 | 2.9 | 57.4 | 2.5 | 10.2 |
| 2020 | 0.2 | 0.2 | 3.8 | 0.2 | 0.8 |
| ***De minimis level:*** | ***100*** | ***100*** | ***100*** | ***50*** | ***100*** |

**Note:** The regional analysis conservatively assumes that the Water Hub would be at Potential Location 1 since activities at Potential Location 1 would involve new structure construction which is more intense than the rehabilitation and adaptive reuse work.

*NOISE*

Impacts on community noise levels during construction under Alternative 2 could result from noise from construction equipment operation and from construction and delivery vehicles and barges traveling to and from the construction areas. Noise levels caused by construction activities vary widely and depend on the stage of construction and the location of the construction relative to sensitive receptor locations. The most significant construction noise sources are expected to be the operation of on-site equipment such as bulldozers, excavators, front-end loaders, pavers, concrete mixer trucks, and dump trucks as well as movements of delivery trucks and barges to and from the staging and delivery locations. Noise from construction activities and some construction equipment is regulated by the *New York City Noise Control Code*. The *New York City Noise Control Code* requires the adoption and implementation of a noise mitigation plan for each construction site, limits construction (absent special approvals) to weekdays between the hours of 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction equipment.

*Construction Noise Impact Criteria*

The *CEQR Technical Manual* breaks construction duration into "short-term" and "long-term", and states that assessment of construction noise is not likely to result in an impact unless it "affects a sensitive receptor over a long period of time." Consequently, the construction noise analysis considers both the potential for construction for the Proposed Actions to create high noise levels (the "intensity"), and whether construction noise would occur for an extended period of time (the "duration") in evaluating potential construction noise impacts.

The *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No-Action noise level as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No-Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would be considered significant.
- If the No-Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- If the No-Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the *CEQR* criteria as being between 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.

*Noise Analysis Fundamentals*

Construction activities for the Proposed Actions would be expected to result in increased noise levels as a result of: (1) the operation of construction on-site equipment; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) to and from the construction areas, and at in-water equipment docking stations on the shoreline.

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

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

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

- The noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, barge, tug boat, etc.);
- Volume of vehicular traffic on each roadway segment and at each in-water vehicle docking location;
- Vehicular speed;
- The distance between the roadway or in-water vehicle docking location and the receptor;
- Topography and ground effects; and
- Shielding.

*Locations of Nearby Sensitive Receptors*

The areas immediately surrounding the construction areas consist predominantly of residential and open space uses. Residential buildings up to three stories are located north and west of the project site between Swinnerton Street and Page Avenue along the shoreline, the nearest of which are approximately 50 feet from the Shoreline Project, shoreline restoration, and Water Hub at the Page West Option of Potential Location 1 (potential site of the proposed Water Hub near the recently demolished administrative building for Conference House Park) on-shore construction areas, and approximately 1,000 feet from the breakwaters in-water construction areas. The western portion of the Conference House Park would be within 1,000 feet of the on-shore construction areas, including the Lenape Playground which is located approximately 100 feet to the north of the proposed earthen berm. The Lenape Playground is the open-space location where maximum project effects due to construction noise would be expected and is representative of other open space receptors in the immediate on-shore construction area. The proposed Water Hub at Potential Location 2 would include the adaptive reuse of either the Biddle House or Rutan-Beckett House, which are approximately 103 feet from each other. There is a residential building at 8 Shore Road approximately 68 feet east of the Rutan-Beckett House and approximately 85 feet south of the Biddle House. The nearest residence to the north of these

potential locations is along Wards Point Avenue at a distance of approximately 75 feet from the Biddle House and 180 feet from the Rutan-Beckett House.

*Noise Reduction Measures*

Construction for the Proposed Actions would follow the requirements of the *New York City Noise Control Code* for construction noise control measures. Specific noise control measures would be described in a noise mitigation plan required under the *New York City Noise Control Code*. These measures would include a variety of source and path controls.

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

- Equipment that meets the sound level standards specified in Subchapter 5 of the *New York City Noise Control Code* would be used from the start of construction. **Table 17-6** shows the noise levels for typical construction equipment.
- Where feasible and practical, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

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

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, delivery trucks, barges, generators and compressors, would be located away from and shielded from sensitive receptor locations.
- Noise barriers constructed from plywood or other comparable materials would be installed around the perimeter of the work areas to the extent practicable at a height of at least 8 feet to provide shielding.

**Table 17-6**
**Typical Construction Equipment Noise Emission Levels (dBA)**

| Equipment List | NYCDEP Mandated Noise Level at 50 feet |
|---|---|
| Loader | 80 |
| Bulldozer | 85 |
| Compressor | 80 |
| Concrete Pump | 82 |
| Concrete Truck | 85 |
| Cranes (Mobile) | 85 |
| Delivery Truck | 84 |
| Rotary Drill | 78 |
| Mobile Crane | 77 |
| Paver | 82 |
| Dump Truck | 84 |
| Excavator | 85 |
| Impact Pile Driver | 88 |
| Generator | 82 |

*Construction Noise Analysis*

The construction noise analysis considers the noise generated by construction-related traffic, including delivery trucks and worker vehicles, traveling to and from the construction areas as well as by on-site construction equipment and activity. The analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact. The most noise-sensitive construction activities associated with the Proposed Actions include the excavation work associated with the Shoreline Project, which would last approximately 21 months. The most noise-sensitive construction activities associated with the Breakwaters Project would involve shoreline restoration which would occur for 1 to 2 months and crew and tug boats transporting workers and materials to and from shore, which would last approximately 15 months. Noise-sensitive construction activities from the Proposed Actions are conservatively assumed to occur simultaneously. Noise-sensitive construction activities associated with the Water Hub would include site preparation, foundation, assembly of pre-fabricated modules, finishing, and site improvements, which would last approximately 12 months, and could occur at the start of the Breakwaters Project.

*Mobile Construction Noise Sources*

On-Shore Vehicular Traffic

Throughout the construction period, vehicles including construction-related trucks as well as vehicles driven by construction workers would travel near the on-shore construction areas. Most of the construction-related trucks, including vehicles driven by construction workers, would be expected to use Main Street, Sprague Avenue and Page Avenue. However, the amount of traffic generated by the construction of Alternative 2 would be low compared with the traffic volumes on major feeder streets in the neighborhood. In addition, the construction-related vehicles would be distributed amongst the different routes to and from the on-shore construction areas. Accordingly, the construction of Alternative 2 would not result in significant adverse construction noise impacts due to mobile sources, and no further analysis is required.

In-Water Vehicular Traffic

Maritime activity associated with Alternative 2 in the vicinity of noise sensitive receptors will consist of a crew boat transporting workers to and from the in-water construction areas approximately four (4) times per day and a construction materials tug boat transporting material barges to the breakwaters in-water construction areas on an average of once per day. Crew boats would be expected to load workers at nearby marinas, and materials are expected to be loaded in the contractor's home yard. Exact docking locations for worker and material loading are yet to be determined but would be expected to be located outside the study area. There would not be more than five (5) boat docking events over the course of a construction day, and each boat would be expected to idle in the vicinity of the nearest noise-sensitive receptor for a short period of time only while loading passengers at the docking station. Given the relative infrequency of the barge operations and the docking locations relative to noise sensitive receptors in the study area, the noise levels predicted to be generated by in-water transportation associated with Alternative 2 would not be expected to result in significant adverse impacts at any nearby noise receptors.

*INTENSITY OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

*Shoreline and Breakwater Projects*

Beachfront residential buildings located along the Tottenville shoreline between Swinnerton Street and Page Avenue represent the receptor locations most likely to experience increased noise levels resulting from the operation of on-site construction equipment. The Shoreline Project is expected to progress from approximately Swinnerton Street to Page Avenue which represents a distance of approximately 5,000 feet. For each phase of the Shoreline Project construction and the shoreline restoration phase of the Breakwaters Project, equipment would operate between approximately 50 and 1,000 feet away from any single residential building. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels at any single residential building would be expected to range approximately from the mid-80s dBA with construction equipment operating 50 feet away, to the high 50s dBA with equipment operating 1,000 feet away during a single phase of the Shoreline Project and the shoreline restoration phase of the Breakwaters Project. The maximum noise levels during construction of Alternative 2 would occur during excavation phases of the Shoreline Project and the shoreline restoration phase of the Breakwaters Project, using excavators, front-end loaders, trucks, and bulldozers. These pieces of equipment would be used continuously throughout the duration of the projects, but would only operate during daytime construction hours between 7:00 AM to 3:00 PM or 3:30 PM and would not be used continuously throughout each day. Furthermore, no single sensitive receptor would be exposed to these pieces of equipment for the entire duration of construction for Alternative 2. During times when the dominant pieces of equipment would not be operating, or would be operating far from a given sensitive receptor, construction noise levels would be substantially lower at these adjacent residential buildings. Measured existing noise levels near these locations were in the high 40s to mid-50s dBA, and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Consequently, at all the nearest residential buildings, the maximum noise levels predicted to be generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during certain portions of the construction period when work is occurring nearest the receptors. These receptors are discussed further in the "*Duration of Construction Noise from On-Site Sources*" section below.

At the Lenape Playground, located approximately 100 feet from the northwest portion earthen berm phase of the Shoreline Project, maximum $L_{eq(1)}$ noise levels would be expected to range between approximately the high 70s dBA when construction equipment is operating 100 feet away to approximately the high 50s dBA when construction equipment is operating 1,000 feet away, and would occur during the excavation work for the proposed earthen berm. Measured existing noise levels near this location were in the high 40s to mid-50s dBA and would be expected to remain relatively unchanged in the future without the proposed project. Consequently, at the Lenape Playground, noise generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during the portion of construction when work is occurring nearest the playground. This receptor is discussed further in the "*Duration of Construction Noise from On-Site Sources"* section below.

*Proposed Water Hub*

Residential buildings along Ottavio Promenade, a private street, and an existing NYCHPD house located at 862 Page Avenue represent the receptor locations most likely to experience increased noise levels resulting from the on-site operation of equipment for the construction of the

proposed Water Hub at Potential Location 1. At the proposed Page West Option location, equipment would operate between approximately 50 and 150 feet away from nearest residential building: the NYCHPD house at 862 Page Avenue. At the proposed Page East Option location (the current NYC Parks parking lot east of Page Avenue), equipment would operate between approximately 50 and 190 feet from the NYCHPD house at 862 Page Avenue. On-site construction equipment operating at the Page West Option location are more likely to result in elevated noise levels at multiple residential receptors, therefore the noise impact of construction activities from the Page West Option location are conservatively used to represent construction noise impacts from construction activity at either potential Water Hub location. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels in the high 70s to high 80s dBA are predicted to occur at the residence at 862 Page Avenue during pile driving. At other receptors located at least 200 feet from the Page West Option location, maximum $L_{eq(1)}$ noise levels are predicted to be in the low to mid-70s dBA during pile driving. Pile driving would be expected to occur for two to three months. Outside of the brief period of pile driving, maximum $L_{eq(1)}$ noise levels are predicted to be in the mid-70s to low 80s dBA at the 862 Page Avenue residence and in the high 60s to low 70s dBA at other receptors in the area. Aside from pile driving, the maximum noise levels resulting from the Water Hub construction are predicted to occur during the foundation, site preparation, and building assembly phases, using mobile cranes, trucks, and paving equipment. Each piece of equipment would not be used continuously throughout the duration of the project, would only operate during daytime construction hours between 7:00 AM and 3:00 PM, and would not be used continuously throughout each day. During times when the dominant pieces of equipment would not be operating, construction noise levels would be substantially lower at these adjacent residential buildings. Measured existing noise levels near this location was in the high 40s to mid-50s dBA, and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Consequently, at all the nearest residential buildings, the maximum noise levels predicted to be generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during certain portions of the construction period when work is occurring nearest the receptors. These receptors are discussed further in the "*Duration of Construction Noise from On-Site Sources"* section below.

Rehabilitation and adaptive reuse activities for the Water Hub at Potential Location 2 would not require pile driving and would typically involve the use of small equipment such as compressors, welding machines, and a variety of hand tools. Activities at Potential Location 2 would be much less intense than those described above for new structure construction and are not expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria.

*DURATION OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

The noisiest construction activities would occur during the excavation work associated with the Shoreline Project, during the shoreline restoration phase of the Breakwaters Project, and during the construction of the proposed Water Hub at Potential Location 1. The Shoreline Project work is expected to last a total of approximately 21 months: approximately 6 months for installation of the earthen berm, 6 months for the installation of the hybrid sand dune, 2 months for installation of the eco-revetment, 5 months for the installation of the raised edge, and 2 months for installation of the transition nodes; the shoreline resotration is expected to last a total of approximately 1 to 2 months concurrent with the Shoreline Project. The Water Hub work is expected to last a total of approximately 12 months. The dominant noise sources would include excavators, dump trucks, concrete mix trucks, front-end loaders, mobile crane, pile driver, and bulldozers. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise

levels during construction of the breakwaters and shoreline project are predicted to be in the mid-80s dBA with dominant noise sources operating 50 feet away from a receptor, and in the high 50s with dominant noise sources operating 1,000 feet away from a receptor. Maximum $L_{eq(1)}$ noise levels during construction of the Water Hub would be expected to range from high 80s dBA when an impact pile driver would operate approximately 50 feet away from the nearest receptor to the mid-70s dBA with dominant noise sources operating 200 feet or more away from receptors. Maximum $L_{eq(1)}$ noise levels during construction of the Water Hub at Potential Location 1 aside from pile driving would be from the high 60s to mid-80s dBA depending on the distance between dominant noise sources and surrounding receptors. The use of such equipment is anticipated to last for approximately 21 months, but for a maximum of approximately 6 months near any one specific sensitive receptor. During times when these dominant pieces of equipment would not be operating, construction noise levels would be lower. Noise levels from construction activities typically fluctuate throughout the day and from day to day, and would not be sustained at the maximum noise levels during the entire 21 month project duration. While noise level increases of this magnitude would be noticeable and potentially intrusive at times, the noise level increases are predicted to occur over the course of no more than 6 consecutive months of construction at a single receptor, and would consequently not rise to the level of a significant adverse construction noise impact.

*CONSTRUCTION NOISE IMPACTS*

As described above, noise resulting from construction under Alternative 2 could result in exceedances of *CEQR Technical Manual* noise impact criteria at beachfront residences between Swinnerton Street and Page Avenue as well as at open spaces such as the Lenape Playground located to the northwest of the earthen berm phase of the Shoreline Project. The exceedances at a single receptor are expected to last for less than 6 months, and construction equipment noise levels would decrease as the Shoreline Project progresses throughout the approximately 21 month schedule.

Although the exceedances of CEQR noise impact criteria would be noticeable and potentially intrusive at times, due to the limited duration of construction activities associated with Alternative 2, they would not be considered significant adverse construction noise impacts.

*VIBRATION*

*Introduction*

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

*Construction Vibration Criteria*

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

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

*Analysis Methodology*

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: $PPV_{equip}$ is the peak particle velocity in in/sec of the equipment at the receiver location;

$PPV_{ref}$ is the reference vibration level in in/sec at 25 feet; and

D is the distance from the equipment to the received location in feet.

For purposes of assessing potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$L_v(D) = L_v(ref) - 30\log(D/25)$$

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;

$L_v(ref)$ is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

**Table 17-7** shows vibration source levels for typical construction equipment.

**Table 17-7**
**Vibration Source Levels for Construction Equipment**

| Equipment | | $PPV_{ref}$ (in/sec) | Approximate $L_v$ (ref) (VdB) |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | Typical | 0.644 | 104 |
| Hydromill (slurry wall) | In soil | 0.008 | 66 |
| | In rock | 0.017 | 75 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Vibratory Roller | | 0.210 | 94 |
| Ram Hoe | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

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

*Construction Vibration Analysis Results*

Proposed construction activities associated with the Shoreline Project and breakwater segments would not involve impact equipment and therefore do not have the potential to result in vibration

levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities.

Construction of the Water Hub would include the use of impact pile drivers. Therefore, this section analyzes the potential vibration levels associated with Water Hub construction to be damaging to surrounding residential structures or to be perceptible and annoying at nearby receptor locations.

The building of most concern with regard to the potential for structural or architectural damage due to vibration is the three-story residence 862 Page Avenue, approximately 50 feet from the nearest potential Water Hub construction location. Based on the distance from the pile driving activity, PPV would not exceed the 0.6 in/sec threshold for non-historic buildings at the nearest receptor location. At other receptors further from the construction site, vibration levels would be lower. In terms of potential vibration levels that would be perceptible and annoying, the equipment that would have the most potential for producing levels which exceed the 65 VdB limit is the impact pile driver. It would not produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at grade-level receptors within approximately 650 feet. While vibration resulting from impact pile driving may be perceptible and potentially intrusive, it would be of limited duration as pile driving activities would not last more than approximately two to three months. During the period that pile driving would occur, pile driving would not occur every day or every hour of construction, and when pile driving is not occurring, vibration levels would not be in the perceptible range at the nearby receptors. Furthermore, vibration levels would be lower at floors above the grade level (reducing by approximately 2 dB per floor). Because vibration levels associated with construction would not be in the range that could potentially result in damage to adjacent structures, and because levels that would be perceptible would occur intermittently for only a relatively brief period of time, in no case are significant adverse impacts from vibrations expected to occur.

### 17.4.3 ALTERNATIVE 3 – BREAKWATERS WITHOUT SHORELINE PROTECTION SYSTEM

This alternative will evaluate conditions with the proposed breakwaters in place (including the proposed shoreline restoration, on-shore community Water Hub and associated landscape elements), but without a proposed shoreline protection system between approximately Carteret Street and Page Avenue. Construction for the Proposed Actions would result in some temporary disruptions in the surrounding area. The following analysis describes the overall temporary effects on the following areas: land use and neighborhood character; socioeconomic conditions; historic and cultural resources; visual resources; hazardous materials; natural resources; transportation; air quality; and noise.

*LAND USE AND NEIGHBORHOOD CHARACTER*

Construction activities under Alternative 3 would include in-water work associated with the breakwaters system, on-shore beach fill activities within the boundaries of Conference House Park, and on-shore work related to the proposed Water Hub. As with Alternative 2, construction activities under Alternative 3 would temporarily affect use of portions of the park during construction, but would not alter surrounding land uses. As is typical with construction projects, during periods of peak activity there would be some disruption to the nearby area. Construction workers, trucks, and barges would come to the area and typical vehicles backing up, loading, and unloading would occur. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as the construction activities would take

place within the project site or in-water located between 500 and 2,100 feet from the shoreline. In addition, throughout the construction period, measures would be implemented to control noise and air quality. Overall, as with Alternative 2, while construction activities would be evident to the local community, the temporary nature of construction would not result in any significant impacts on local land use patterns or the character of the nearby area.

*SOCIOECONOMIC CONDITIONS*

This section describes the potential socioeconomic effects of construction activities under Alternative 3 from two perspectives: (1) the economic benefits generated by construction; and (2) the potential for significant adverse socioeconomic effects from construction activities.

*Economic Benefits of Construction*

A detailed assessment of the economic benefits of construction under Alternative 3 is provided in Chapter 3, "Socioeconomic Conditions." The section below provides a summary of the findings.

As with Alternative 2, economic benefits under Alternative 3 were estimated using IMPLAN, an economic input-output modeling system. Construction under Alternative 3 is estimated to cost approximately $61.5 million in 2016 dollars, with the exception of the Water Hub[10]. This amount includes all hard costs for the breakwaters and the water hub. The $61.5 million amount excludes contingency costs.

*Employment*

As a result of the $61.5 million in direct construction expenditures, direct employment from construction is estimated at 273 person-years of employment. Assuming a two-year construction schedule for this alternative, the 273 person-years estimate equates to approximately 136 people working full-time over that two-year period.

When new direct jobs are introduced to an area, those jobs lead to the creation of additional *indirect* and *induced* jobs. Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of Alternative 3 would generate an additional 60 person-years of indirect employment and 62 person-years of induced employment in New York City, bringing the total number of jobs from construction to 395 person-years of employment. In the larger New York State economy, the construction of this alternative would generate an estimated 8 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 402 person-years of employment.

*Employee Compensation*

The direct employee compensation during construction is estimated at $24.64 million. Total direct, indirect, and induced employee compensation resulting in New York City from the

[10] There are two potential locations under consideration for siting the Water Hub. Potential Location 1 would involve construction of a new structure, with an estimated cost of $5.00 million. Potential Location 2 would involve the rehabilitation and adaptive reuse of an existing NYC Parks building; the cost of rehabilitation and adaptive reuse has not been estimated, but is expected to be less than $5.00 million cost associated with new construction Potential Location 2. Given that the cost of constructing the Water Hub at Potential Location 2 is not yet known, the economic benefits associated with the development of the Water Hub are excluded from this analysis. However, as it is expected to have less construction costs than the Water Hub at Potential Location 2, it can qualitatively be surmised that Potential Location 1 would have slightly less economic benefit in terms of construction.

construction is estimated at $35.86 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $36.35 million.

*Total Effects on the Local Community*

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $97.08 million in New York State, $94.41 million of which would occur in New York City.

*Potential Significant Adverse Socioeconomic Effects Assessment*

The nearest retail businesses are located over ½-mile inland from the project area. Construction activities would not block or restrict access to any facilities, affect the operations of any nearby businesses, or obstruct major thoroughfares used by customers or businesses. Therefore, nearby businesses would not be significantly affected by the construction activities under Alternative 3.

*OPEN SPACE*

The overall construction of the Breakwaters Project is anticipated to take approximately 19 months to complete. Most of the activities for the Breakwaters Project would be in-water, with the exception of shoreline restoration and the Water Hub components of the Breakwaters Project which would be conducted on-shore within Conference House Park. Although portions of Conference House Park would temporarily be closed during construction of the on-shore elements of Alternative 3, access to the waterfront in areas not under construction would continue to be maintained. However, shoreline restoration activities and the construction of the Water Hub are anticipated to be limited in duration, taking approximately 1 to 2 months and 12 months to complete, respectively. At any particular time during construction, the majority of Conference House Park and other open space resources in the area would continue to accommodate the largely passive activities displaced from the affected construction areas. Therefore, construction under Alternative 3 would not result in significant adverse impacts on open space.

As described below under "Air Quality," an emissions reduction program would be implemented to minimize the effects of construction activities under Alternative 3 on the surrounding community, including Conference House Park. Construction would also adhere to *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and to *New York City Administrative Code* limitations on construction-vehicle idling time. Therefore, construction activities under Alternative 3 would not result in any significant adverse air quality impacts on study area open spaces including Conference House Park.

As described below under "Noise," construction for the Proposed Actions would be required to follow the requirements of the *NYC Noise Control Code* to minimize the effects of construction under Alternative 3 on the surrounding community, including Conference House Park. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of Conference House Park would be limited. Based on these factors, construction noise associated with Alternative 3 at these receptors would not be expected to result in a significant adverse impact.

*HISTORIC AND CULTURAL RESOURCES*

A detailed assessment of potential impacts on historic and cultural resources during the construction under Alternative 3 is described in Chapter 5, "Historic and Cultural Resources."

*Archaeological Resources*

Similar to Alternative 2, Alternative 3 would not result in impacts to archaeological resources within the Breakwaters APE since potentially sensitive deposits were identified within the Breakwaters APE at depths far greater than the depths of impacts associated with Alternative 2. However, the construction of the proposed Water Hub (in either Potential Location 1 or 2) and associated landscaping could result in the continued disturbance of archaeological resources in the upland areas adjacent to the sandy beach lining the waterfront. The Phase 1A concluded that if the construction of the proposed Water Hub would result in subsurface impacts, Phase 1B archaeological testing would be completed to determine the presence or absence of archaeological resources within the sensitive portions of the APE.

Following the submission of the Draft Phase 1A to the consulting parties, the proposed project design was revised to include an additional potential location for the Water Hub (Potential Location 2) as well as alternate locations for water access points along the shoreline within Conference House Park. The Draft Phase 1A will therefore be revised to reflect SHPO's comments and to reflect the changes to the project site's design following the completion of the first draft—including the addition of the new portion of the Shoreline APE located within Conference House Park. A determination of the newly added portion of the Shoreline APE's archaeological sensitivity will be made at that time and a final version of the Phase 1A will be submitted to SHPO, LPC, and the Tribal Nations for review and comment. In the event that archaeological sensitivity is identified in the newly added portions of the Shoreline APE that would be impacted as a result of the proposed project, a Phase 1B archaeological investigation would be recommended.

All Phase 1B testing within the previously identified areas of archaeological sensitivity or any new areas of archaeological sensitivity that may be identified in the newly added portion of the Shoreline APE would be completed in consultation with SHPO, LPC, and the Tribal Nations. Any additional archaeological investigation or consultation with the consulting parties would be completed pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among FEMA, SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the CDBG-DR program for activities in New York City. Any additional archaeological investigations completed subsequent to the Phase 1B investigation (e.g., a Phase 2 archaeological survey or Phase 3 Data Recovery) would be completed prior to construction in consultation with SHPO, LPC, and the Tribal Nations.

*Architectural Resources*

There are no architectural resources are located in the Breakwaters APE. Should the Water Hub programming be located in either the Biddle House or the Rutan-Beckett House, any alterations to either building would be subject to review and approval by SHPO and the consulting parties, and LPC as appropriate.

*VISUAL RESOURCES*

Construction under Alternative 3 would mostly be in-water although the construction of the Water Hub and shoreline restoration activities would be conducted on-shore. As with Alternative 2, construction equipment such as excavators, loaders, barges, and trucks, would be utilized during the construction period under Alternative 3 and may be visible to the public from certain vantage points. Views towards the waterfront from inland locations on nearby local streets are

limited to residents, pedestrians, motorists and bicyclists, due to the narrowness of the streets and intervening natural features, including wooded areas, street trees, and landscaping elements on residential properties. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding communities. Although the character and quality of views during construction may be modified, such effects would be temporary in any given location. Therefore, as with Alternative 2, construction under Alternative 3 would not result in significant adverse impacts to visual resources.

*HAZARDOUS MATERIALS*

Alternative 3 would result in less ground disturbance than Alternative 2. However, in the on-shore areas requiring construction under Alternative 3, the protocols outlined under Alternative 2 would be incorporated into the Proposed Actions.

*NATURAL RESOURCES*

A detailed assessment of the potential effects on natural resources during construction under Alternative 3 is presented in Chapter 9 "Natural Resources."

Alternative 3 would not result in significant adverse impacts to terrestrial or aquatic resources. Temporary impacts resulting from construction of on-shore components, such as vegetation removal, wildlife displacement, and alteration of NYSDEC littoral zone tidal wetlands and TWAA, would be minimized through the use of erosion and sediment control measures (e.g., silt fencing and hay bales), in compliance with the SWPPP. Because the only upland construction activities associated with Alternative 3 would be those associated with the Water Hub, which would be limited, construction of Alternative 3 would have limited potential to affect terrestrial resources, would have limited potential to affect threatened or endangered plant species or the box turtle (species of special concern).

Given the limited excavation that would occur for Alternative 3, which would only be associated with the construction of the Water Hub, this alternative would not have the potential to adversely affect groundwater resources.

As with Alternative 2, during placement of the breakwater materials, measures would be implemented to minimize suspension of bottom sediment. Any increases in suspended sediment that would result from in-water construction activities would be minor, temporary, and localized, would dissipate upon cessation of the sediment disturbing activities, and would not adversely affect aquatic biota. Fish and mobile benthic invertebrates would be expected to avoid the portions of the bay in which in-water activities would be occurring, moving to similar available habitat nearby. Increased vessel traffic and underwater construction noise would be within the range of typical vessel activity in Raritan Bay and would not adversely affect aquatic resources. Shading of aquatic habitat due to construction barges would be temporary and would not result in adverse effects to aquatic biota.

*TRANSPORTATION*

The construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities. As with Alternative 2, the analysis is based on the peak worker and truck trips during construction under Alternative 3, which are developed based on several factors including worker modal splits, vehicle occupancy and trip distribution, truck passenger car equivalents (PCEs), and arrival/departure patterns.

The following sections evaluate the potential for the peak construction worker and truck trips under Alternative 3 to result in significant adverse impacts to traffic, transit facilities, pedestrian elements, and parking.

*Traffic*

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

*Construction Trip-Generation Projections*

Based on preliminary estimates, construction of the breakwater system would require one crew of approximately 11 workers per day (equipment operators, tugboat operators, divers, diver tenders, and dock builders) and an average of less than one barge trip per day. Shoreline restoration activities would require one crew of approximately 6 workers per day (operators and laborers) and approximately 39 truck trips per day. Water Hub construction at either potential location is estimated to require one crew of approximately 15 workers per day and an average of approximately 5 truck trips per day. Although the rehabilitation and adaptive reuse activities associated the Water Hub at Potential Location 2 would be much less intense than those associated with the new structure construction at Potential Location 1, the analysis conservatively assumes that the number of construction workers and trucks for Potential Location 2 during the peak construction period would be the same as those for Potential Location 1. **Table 17-8** shows the estimated average daily numbers of workers and deliveries by calendar quarter for the duration of the construction period under Alternative 3.

**Table 17-8**

**Alternative 3 - Average Number of Daily Workers and Trucks by Year and Quarter**

| Year | 2018 | | | | 2019 | | | | 2020 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarter | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | Average | Peak |
| Workers | - | - | 26 | 26 | 19 | 19 | 11 | 15 | 4 | - | - | - | 17 | 26 |
| Trucks | - | - | 5 | 5 | 5 | 5 | - | 26 | - | - | - | - | 7 | 26 |

**Sources:**
MFS Consulting Engineers and Surveyor, DPC. August 2016

These worker and truck trip projections were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and truck PCEs.

*Daily Workforce and Truck Deliveries*

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter were used as the basis for estimating peak-hour construction trips. It is expected that construction activities would generate approximately 15 workers and 26 truck deliveries per day during the peak quarter of construction (fourth quarter of 2019; the peak number of construction workers on-site is expected to be approximately 21 per day during the third and fourth quarters of 2018). These estimates of construction activities are discussed further below.

*Construction Worker Modal Splits and Vehicle Occupancy*

Based on the 2000 U.S. Census data for workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site using private autos at an average occupancy of approximately 1.09 persons per vehicle.

*Peak-Hour, Construction-Worker Vehicle and Truck Trips*

As discussed above, construction for the Proposed Actions would typically take place on weekdays from 7:00 AM to 3:00 PM or 5:00 PM, depending on the type of activity being performed. While construction truck trips would occur throughout the day, and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips during the same hour (one "in" and one "out"), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart near the work-shift end hour. Further, in accordance with the 2014 *CEQR Technical Manual*, the traffic analysis assumed that each truck would have a PCE of 2.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after the work shift. Construction truck deliveries would be distributed throughout the day. As shown in **Table 17-9**, based on these projections, the maximum construction-related traffic increments would be approximately 19 PCEs between 6:00 AM and 7:00 AM. These incremental construction PCEs would be well below the *CEQR Technical Manual* threshold of 50 vehicle trips; therefore no further quantified analysis is warranted and construction under Alternative 3 would not result in any significant adverse traffic impacts.

**Table 17-9**
**Alternative 3 - Peak Construction Vehicle Trip Projections (4th Quarter of 2019)**

| | Auto Trips | | | Truck Trips | | | Total | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Regular Shift | | | Regular Shift | | | Vehicle Trips | | | PCE Trips | | |
| Hour | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total |
| 6 AM - 7 AM | 11 | 0 | 11 | 4 | 0 | 4 | 15 | 0 | 15 | 19 | 0 | 19 |
| 7 AM - 8 AM | 3 | 0 | 3 | 4 | 4 | 8 | 7 | 4 | 11 | 11 | 8 | 19 |
| 8 AM - 9 AM | 0 | 0 | 0 | 3 | 4 | 7 | 3 | 4 | 7 | 6 | 8 | 14 |
| 9 AM -10 AM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 6 | 12 |
| 10 AM -11 AM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 16 | 12 |
| 11 AM - 12 PM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 16 | 12 |
| 12 PM - 1 PM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 16 | 12 |
| 1 PM - 2 PM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 16 | 12 |
| 2 PM - 3 PM | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 6 | 6 |
| 3 PM - 4 PM | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 4 | 4 |
| 4 PM - 5 PM | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 3 | 3 |
| 5 PM - 6 PM | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 7 | 7 | 0 | 7 | 7 |
| Daily Total | 14 | 14 | 16 | 26 | 26 | 52 | 40 | 40 | 80 | 66 | 66 | 132 |

**Note:** Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

*Transit*

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that only approximately 8 percent of construction workers would commute to the project site via transit. During the peak construction period under Alternative 3 (a maximum of 26 daily construction workers), this would correspond to approximately two workers traveling by transit, which is well below the *CEQR Technical Manual* 200-transit-trip analysis threshold.

Therefore, no further quantified transit analysis is warranted and construction under Alternative 3 would not result in any significant adverse transit impacts.

*Pedestrians*

As summarized above, approximately26 daily construction workers would be expected during peak construction for Alternative 3. This increment would be well below the *CEQR Technical Manual* analysis threshold of 200 pedestrian trips. Therefore, no further quantified pedestrian analysis is warranted and construction under Alternative 3 would not result in any significant adverse pedestrian impacts.

*Parking*

The peak number of workers during construction for Alternative 3 would be approximately 26 per day. As discussed above, based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site by private autos at an average occupancy of approximately 1.09 persons per vehicle. The anticipated construction activities under Alternative 3 are therefore projected to generate a maximum parking demand of 21 spaces. This construction parking demand is expected to be adequately accommodated by the ample on-street spaces available within a ¼-mile radius of the project site and the off-site staging area for breakwater construction. Therefore, construction under Alternative 3 would not result in any parking shortfalls or the potential for any significant adverse parking impacts.

*AIR QUALITY*

As with Alternative 2, the analysis presented in this section addresses both local (microscale) concentrations and regional (mesoscale) emissions.

*Local (Microscale) On-site Construction Activity Assessment*

The *CEQR Technical Manual* lists several factors for consideration in determining whether a quantified on-site and/or off-site construction impact assessment for air quality is appropriate. These factors include the duration and intensity of construction activities, the location of nearby sensitive receptors, the use of emission control measures, and project generated construction-related vehicle trips.

*Location of Nearby Sensitive Receptors*

The largest and most striking single sensitive receptor location is Conference House Park, a 265 acre park under the jurisdiction of NYC Parks. The portion of the park immediately adjacent to the project site contains coastal wetlands and beaches lining the shore. Moving inland from Conference House Park, the next set of sensitive receptors are the single-family detached houses to the north of the project site; the construction of the proposed Water Hub at Potential Location 1 would be approximately 50 feet from the NYCHPD building near the street end of Page Avenue, and potentially 50 feet away from the nearest residence to the northwest of the proposed building if the site of the recently demolished administrative building for Conference House Park is selected. The proposed Water Hub at Potential Location 2 would include the adaptive reuse of either the Biddle House or Rutan-Beckett House, which are approximately 103 feet from each other. There is a residential building at 8 Shore Road approximately 68 feet east of the Rutan-Beckett House and approximately 85 feet south of the Biddle House. The nearest residence to the north of these potential locations is along Wards Point Avenue at a distance of approximately 75 feet from the Biddle House and 180 feet from the Rutan-Beckett House. These residential locations are approximately 1,000 feet from the breakwaters in-water construction

areas. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location.

*Duration and Intensity of Construction Activities*

Construction under Alternative 3, as is the case with any large construction project, would be disruptive to the surrounding area. However, since the overall construction for the Breakwaters Project is anticipated to take approximately 19 months, the construction period is considered of short-term (i.e., less than two years) duration according to the *CEQR Technical Manual*.

For the construction of the breakwaters system, it is anticipated that all material delivery and on-site staging would take place in-water since there is limited shoreline access for large equipment and material staging from the on-shore. In-water construction activities would take place between 500 and 2,100 feet from the shoreline and approximately 1,000 feet from the nearest residence. Compared to urban construction projects in New York City where receptors are oftentimes adjacent to the construction activities (i.e., less than 50 feet away), such distances between the construction sources and sensitive receptors would result in increased dispersion of pollutants. With the exception of the crane operation, maritime activity associated with the Proposed Actions is expected to be infrequent and would consist of a crew boat transporting workers to and from the in-water construction areas approximately four times per day, a tug boat transporting the material barge to and from the breakwaters in-water construction areas on an average of once per day, and the repositioning of the materials barge and the crane barge with an on-site tug boat as necessary. In addition, in-water construction activities would be phased to minimize the duration of construction at any particular location. Therefore, based on these reasons, potential pollutant concentration increments from construction sources over water at on-shore sensitive receptor locations (Conference House Park) would be minimal.

For the shoreline restoration and Water Hub components of the Breakwaters Project, it is assumed that all construction activities would be conducted on-shore. Shoreline restoration activities would generally be limited to the placement of sand and the Water Hub construction would involve the installation of the modular structure at Potential Location 1 and rehabilitation and adaptive reuse activities at Potential Location 2. The duration of these on-shore activities is anticipated to be limited to a few months and number of engines required for these on-shore construction activities would be less than those that are required for typical ground-up building construction. Overall, emissions associated with the construction of under Alternative 3 would be even lower due to the emission control measures implemented during construction (see "Emission Control Measures," below).

*Emission Control Measures*

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. Measures would be taken to minimize pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. As with Alternative 2, these measures would include dust suppression measures, idling restrictions, and the use of ULSD and BAT for equipment at the time of construction. Construction contractors are also encouraged to use newer and cleaner to the extent practicable to further reduce air pollutant emissions during construction. Overall, this emissions control program is expected to substantially minimize air pollutant emissions during construction under Alternative 3.

*Off-Site Sources*

Construction worker commuting trips and construction truck deliveries would generally occur during off-peak hours. In addition, when distributed over the transportation network, the construction trip increments would not concentrate at any single location. As presented above in

"Transportation," construction generated traffic increments are not expected to be substantial. Construction generated traffic increments would not exceed the *CEQR Technical Manual* CO screening threshold of 170 peak hour trips at intersections in the area, or the fine particulate matter ($PM_{2.5}$) emissions screening thresholds discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manua*l. Therefore, further mobile-source air quality analysis is not required.

*Conclusions*

Based on the analyses provided above and the implementation of an emissions reduction program, construction under Alternative 3 would not result in any significant adverse construction air quality impacts on a microscale level, and no further analysis is required.

*Regional (Mesoscale) On-site Construction Activity Assessment*

*Conformity with State Implementation Plans*

Temporarily, during construction, there would be emissions associated with on-site construction equipment and with the transport of construction materials. The following analysis estimates the potential projected pollutant emissions associated with the construction under Alternative 3 and evaluates the need for a conformity determination.

*Engine Exhaust Emissions*

The projected usage factors, sizes, types, and number of construction equipment as well the number of deliveries and trip distances were estimated based on the preliminary construction activity schedule. Emission factors from on-site construction engines were developed using the USEPA's NONROAD2008 Emission Model (NONROAD). With respect to construction trucks, emission rates from truck engines were developed using the USEPA Motor Vehicle Emission Simulator (MOVES2014a) emission model. Tugboat emissions were estimated according to the latest emission factors and methodologies delineated by USEPA[11].

*Regional Analysis Results*

Annual construction activity and the associated emissions are presented in **Table 17-10**. The annual emissions would be lower than the *de minimis* rates defined in the general conformity regulations. Since all diesel engines will be using ultra low sulfur diesel, $SO_2$ emissions would be negligible.

**Table 17-10**
**Alternative 3 - Emissions from Construction Activities (ton/yr)**

| Year | $PM_{2.5}$ | $PM_{10}$ | $NO_x$ | VOC | CO |
|---|---|---|---|---|---|
| 2018 | 1.6 | 1.7 | 33.4 | 1.3 | 3.7 |
| 2019 | 1.7 | 1.8 | 35.8 | 1.5 | 4.6 |
| 2020 | 0.0 | 0.0 | 1.0 | 0.0 | 0.1 |
| ***De minimis level:*** | ***100*** | ***100*** | ***100*** | ***50*** | ***100*** |

**Note:** The regional analysis conservatively assumes that the Water Hub would be at Potential Location 1 since activities at Potential Location 1 would involve new structure construction which is more intense than the rehabilitation and adaptive reuse work.

[11] USEPA, Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, April 2009.

*NOISE*

As with Alternative 2, the construction noise analysis for Alternative 3 considers the noise generated by construction-related traffic and on-site construction equipment and activity. The analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact. The most noise-sensitive construction activities associated with the Breakwaters Project would involve shoreline restoration which would occur for 1 to 2 months and crew and tug boats transporting workers and materials to and from shore, which would last approximately 15 months. Noise-sensitive construction activities from the Proposed Actions are conservatively assumed to occur simultaneously. Noise-sensitive construction activities associated with the Water Hub would include site preparation, foundation, assembly of pre-fabricated modules, finishing, and site improvements, which would last approximately 12 months, and could occur at the start of the Breakwaters Project.

*Mobile Construction Noise Sources*

On-Shore Vehicular Traffic

Throughout the construction period, vehicles including construction-related trucks as well as vehicles driven by construction workers would travel near the on-shore construction areas. Most of the construction-related trucks, including vehicles driven by construction workers, would be expected to use Main Street, Sprague Avenue and Page Avenue. However, the amount of traffic generated by the construction of the Proposed Actions would be low compared with the traffic volumes on major feeder streets in the neighborhood. In addition, the construction-related vehicles would be distributed amongst the different routes to and from the on-shore construction areas. Accordingly, the construction of the Proposed Actions would not result in significant adverse construction noise impacts due to mobile sources, and no further analysis is required.

In-Water Vehicular Traffic

Maritime activity associated with the Proposed Actions in the vicinity of noise sensitive receptors will consist of a crew boat transporting workers to and from the - in-water construction areas approximately four (4) times per day and a construction materials tug boat transporting material barges to the breakwaters in-water construction areas on an average of once per day. Docking locations for worker and material loading are yet to be determined but would be expected to be located at minimum approximately 100 feet from beachfront residences in the study area. Noise levels at a beachfront residence located 100 feet from the proposed boats would be in the approximately mid-50s dBA, based on measured noise levels from boats with comparable engine size to the proposed crew and materials tug boats. There would not be more than five (5) boat docking events over the course of a construction day, and each boat would be expected to idle in the vicinity of the nearest noise-sensitive receptor for a short period of time only while loading passengers at the docking station. Measured existing noise levels along the Tottenville shoreline were in the high-40s to mid-50s dBA, and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Noise level increments related to in-water equipment activity would be approximately between 0 and 7 dBA. Noise level increments of this level are would be perceived as imperceptible to barely perceptible when boats are at least 100 feet from shore to readily noticeable when boats are as close as possible to shore. Given the relative infrequency of the barge operations and the magnitude of the associated noise increment, the noise levels predicted to be generated by in-water transportation associated with the Proposed Actions would not be expected to result in significant adverse impacts at any nearby noise receptors.

*INTENSITY OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

*Breakwaters Project*

Beachfront residential buildings located along the Tottenville shoreline between Manhattan Street and Loretto Street as well as near Page Avenue represent the receptor locations most likely to experience increased noise levels resulting from the operation of on-site construction equipment. For the shoreline restoration phase of the Breakwaters Project, equipment would operate between approximately 50 and 1,000 feet away from any single residential building. With the construction noise control measures described above under Alternative 2 which would also be applicable under Alternative 3, maximum $L_{eq(1)}$ noise levels at any single residential building would be expected to range approximately from the mid-80s dBA with construction equipment operating 50 feet away, to the high 50s dBA with equipment operating 1,000 feet away during the shoreline restoration phase of the Breakwaters Project. The maximum noise levels during the Proposed Actions would occur during the shoreline restoration phase of the Breakwaters Project, using excavators, front-end loaders, trucks, and bulldozers. These pieces of equipment would be used continuously throughout the duration of the projects, but would only operate during daytime construction hours between 7:00 AM to 3:00 PM and would not be used continuously throughout each day. Furthermore, no single sensitive receptor would be exposed to these pieces of equipment for the entire duration of construction for Alternative 3. During times when the dominant pieces of equipment would not be operating, or would be operating far from a given sensitive receptor, construction noise levels would be substantially lower at these adjacent residential buildings. Measured existing noise levels near these locations were in the high 40s to mid-50s dBA, and would be expected to remain relatively unchanged in the future without the proposed project. Consequently, at all the nearest residential buildings, the maximum noise levels predicted to be generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during certain portions of the construction period when work is occurring nearest the receptors. These receptors are discussed further in the "*Duration of Construction Noise from On-Site Sources* section below."

At the Lenape Playground, located approximately 1000 feet from the proposed shoreline restoration activities, maximum $L_{eq(1)}$ noise levels would be expected to be in the high 50s dBA when construction equipment is operating. Measured existing noise levels near this location were in the high 40s to mid-50s dBA and would be expected to remain relatively unchanged in the future without the proposed project. Consequently, at the Lenape Playground, noise generated by on-site construction activities under Alternative 3 would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria.

*Proposed Water Hub*

Residential buildings along Ottavio Promenade, a private street, and an existing NYCHPD house located at 862 Page Avenue represent the receptor locations most likely to experience increased noise levels resulting from the on-site operation of equipment for the construction of the proposed Water Hub at Potential Location 1. At the proposed Page West Option location, equipment would operate between approximately 50 and 150 feet away from nearest residential building: the NYCHPD house at 862 Page Avenue. At the proposed Page East Option location (the current NYC Parks parking lot east of Page Avenue), equipment would operate between approximately 50 and 190 feet from the NYCHPD house at 862 Page Avenue. On-site construction equipment operating at the Page West Option location are more likely to result in elevated noise levels at multiple residential receptors, therefore the noise impact of construction

activities from the Page West Option location are conservatively used to represent construction noise impacts from construction activity at either potential Water Hub location. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels in the high 70s to high 80s dBA are predicted to occur at the residence at 862 Page Avenue during pile driving. At other receptors located at least 200 feet from the Page West Option location, maximum $L_{eq(1)}$ noise levels are predicted to be in the low to mid-70s dBA during pile driving. Pile driving would be expected to occur for two to three months. Outside of the brief period of pile driving, maximum $L_{eq(1)}$ noise levels are predicted to be in the mid-70s to low 80s dBA at the 862 Page Avenue residence and in the high 60s to low 70s dBA at other receptors in the area. Aside from pile driving, the maximum noise levels resulting from the Water Hub construction are predicted to occur during the foundation, site preparation, and building assembly phases, using mobile cranes, trucks, and paving equipment. Each piece of equipment would not be used continuously throughout the duration of the project, would only operate during daytime construction hours between 7:00 AM and 3:00 PM, and would not be used continuously throughout each day. During times when the dominant pieces of equipment would not be operating, construction noise levels would be substantially lower at these adjacent residential buildings. Measured existing noise levels near this location was in the high 40s to mid-50s dBA, and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Consequently, at all the nearest residential buildings, the maximum noise levels predicted to be generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during certain portions of the construction period when work is occurring nearest the receptors. These receptors are discussed further in the "*Duration of Construction Noise from On-Site Sources"* section below.

Rehabilitation and adaptive reuse activities for the Water Hub at Potential Location 2 would not require pile driving and would typically involve the use of small equipment such as compressors, welding machines, and a variety of hand tools. Activities at Potential Location 2 would be much less intense than those described above for new structure construction and are not expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria.

*DURATION OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

The noisiest construction activities would occur during the shoreline restoration phase of the Breakwaters Project and during the construction of the proposed Water Hub at Potential Location 1. The shoreline restoration is expected to last a total of approximately 1 to 2 months. The Water Hub work is expected to last a total of approximately 12 months. The dominant noise sources would include excavators, dump trucks, concrete mix trucks, front-end loaders, mobile crane, pile driver, and bulldozers. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels during construction of the breakwaters and shoreline project are predicted to be in the mid-80s dBA with dominant noise sources operating 50 feet away from a receptor, and in the high 50s with dominant noise sources operating 1,000 feet away from a receptor. Maximum $L_{eq(1)}$ noise levels during construction of the Water Hub would be expected to range from high 80s dBA when an impact pile driver would operate approximately 50 feet away from the nearest receptor to the mid-70s dBA with dominant noise sources operating 200 feet or more away from receptors. Maximum $L_{eq(1)}$ noise levels during construction of the Water Hub at Potential Location 1 aside from pile driving would be from the high 60s to mid-80s dBA depending on the distance between dominant noise sources and surrounding receptors. The use of such equipment is anticipated to last for a maximum of approximately 12 months near any one specific sensitive receptor. During times when these dominant pieces of equipment would not be operating, construction noise levels would be lower. Noise levels from construction

activities typically fluctuate throughout the day and from day to day, and would not be sustained at the maximum noise levels during the entire project duration. While noise level increases of this magnitude would be noticeable and potentially intrusive at times, the noise level increases are predicted to occur over the course of no more than 12 consecutive months of construction at a single receptor, and would consequently not rise to the level of a significant adverse construction noise impact.

*CONSTRUCTION NOISE IMPACT*

As described above, noise resulting from construction under Alternative 3 could result in exceedances of *CEQR Technical Manual* noise impact criteria at beachfront residences between Manhattan Avenue and Loretto Street as well as near Page Avenue. The exceedances at a single receptor are expected to last for less than 12 months, and would not occur continuously for the duration of the construction activities.

Although the exceedances of CEQR noise impact criteria would be noticeable and potentially intrusive at times, due to the limited duration of construction activities associated with Alternative 3, they would not be considered significant adverse construction noise impacts.

*VIBRATION*

*Introduction*

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

*Construction Vibration Criteria*

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

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

*Analysis Methodology*

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: $PPV_{equip}$ is the peak particle velocity in in/sec of the equipment at the receiver location;

$PPV_{ref}$ is the reference vibration level in in/sec at 25 feet; and

D is the distance from the equipment to the received location in feet.

For purposes of assessing potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$L_v(D) = L_v(ref) - 30\log(D/25)$$

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;

$L_v(ref)$ is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

**Table 17-11** shows vibration source levels for typical construction equipment.

**Table 17-11**
**Vibration Source Levels for Construction Equipment**

| Equipment | | $PPV_{ref}$ (in/sec) | Approximate $L_v$ (ref) (VdB) |
|---|---|---|---|
| Pile Driver (impact) | upper range | 1.518 | 112 |
| | Typical | 0.644 | 104 |
| Hydromill (slurry wall) | In soil | 0.008 | 66 |
| | In rock | 0.017 | 75 |
| Clam shovel drop (slurry wall) | | 0.202 | 94 |
| Vibratory Roller | | 0.210 | 94 |
| Ram Hoe | | 0.089 | 87 |
| Large bulldozer | | 0.089 | 87 |
| Caisson drilling | | 0.089 | 87 |
| Loaded trucks | | 0.076 | 86 |
| Jackhammer | | 0.035 | 79 |
| Small bulldozer | | 0.003 | 58 |

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

*Construction Vibration Analysis Results*

Proposed construction activities associated with the Shoreline Project and breakwaters segments would not involve impact equipment and therefore do not have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities.

Construction of the Water Hub would include the use of impact pile drivers. Therefore, this section analyzes the potential for vibration levels associated with Water Hub construction to be damaging to surrounding residential structures or to be perceptible and annoying at nearby receptor locations. The building of most concern with regard to the potential for structural or architectural damage due to vibration is the three-story residence at 862 Page Avenue approximately 50 feet from the nearest potential Water Hub construction location. Based on the distance from the pile driving activity, PPV would not exceed the 0.6 in/sec threshold for non-historic buildings at the nearest receptor location. At other receptors further from the construction site, vibration levels would be lower. In terms of potential vibration levels that would be perceptible and annoying, the equipment that would have the most potential for producing levels which exceed the 65 VdB limit is the impact pile driver. It would not produce

perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at grade-level receptors within approximately 650 feet. While vibration resulting from impact pile driving may be perceptible and potentially intrusive, it would be of limited duration as pile driving activities would not last more than approximately two to three months. During the period that pile driving would occur, pile driving would not occur every day or every hour of construction, and when pile driving is not occurring, vibration levels would not be in the perceptible range at the nearby receptors. Furthermore, vibration levels would be lower at floors above the grade level (reducing by approximately 2 dB per floor). Because vibration levels associated with construction would not be in the range that could potentially result in damage to adjacent structures, and because levels that would be perceptible would occur intermittently for only a relatively brief period of time, in no case are significant adverse impacts from vibrations expected to occur.

### 17.4.4 ALTERNATIVE 4—SHORELINE PROTECTION SYSTEM WITHOUT BREAKWATERS

The analysis for Alternative 4 evaluates conditions with the proposed shoreline protection system in place, but without the proposed breakwaters, Water Hub, and associated landscape elements. Construction for the Proposed Actions would result in some temporary disruptions in the surrounding area. The following analysis describes the overall temporary effects on the following areas: land use and neighborhood character; socioeconomic conditions; historic and cultural resources; visual resources; hazardous materials; natural resources; transportation; air quality; and noise.

*LAND USE AND NEIGHBORHOOD CHARACTER*

Construction activities under Alternative 4 would include the Shoreline Project elements from approximately Carteret Street to Page Avenue. With the exception of a small portion of the Shoreline Project proposed within an unbuilt portion of the NYCDOT Surf Avenue right-of-way, all on-shore project components under Alternative 4 would be constructed within the boundaries of Conference House Park. As with Alternatives 2 and 3, construction activities under Alternative 4 would temporarily affect use of portions of the park during construction, but would not alter surrounding land uses. As is typical with construction projects, during periods of peak activity there would be some disruption to the nearby area. Construction workers and trucks would come to the area and typical vehicles backing up, loading, and unloading would occur. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as the construction activities would take place within the project site. In addition, throughout the construction period, measures would be implemented to control noise and air quality. Overall, as with Alternatives 2 and 3, while construction activities would be evident to the local community, the temporary nature of construction would not result in any significant impacts on local land use patterns or the character of the nearby area.

*SOCIOECONOMIC CONDITIONS*

This section describes the potential socioeconomic effects of construction activities under Alternative 4 from two perspectives: (1) the economic benefits generated by construction; and (2) the potential for whether significant adverse socioeconomic effects from construction activities.

*Economic Benefits of Construction*

A detailed assessment of the economic benefits of construction under Alternative 4 is provided in Chapter 3, "Socioeconomic Conditions." The section below provides a summary of the findings.

As with Alternatives 2 and 3, economic benefits under Alternative 4 were estimated using IMPLAN, an economic input-output modeling system. Construction under Alternative 3 is estimated to cost approximately $27.87 million in 2016 dollars. This amount includes all hard costs for the Shoreline Project. The $27.87 million amount excludes contingency costs.

*Employment*

The direct expenditures for the construction of this alternative are estimated at $27.87 million. As a result of the direct expenditures, direct employment from construction is estimated at 121 person-years of employment. Assuming a two-year construction schedule for this alternative, the 121 person-years estimate equates to 61 people working full-time over that two-year period.

When new direct jobs are introduced to an area, those jobs lead to the creation of additional *indirect* and *induced* jobs. Based on the IMPLAN model's economic multipliers for New York City sectors, the construction of Alternative 4 would generate an additional 27 person-years of indirect employment and 28 person-years of induced employment in New York City, bringing the total number of jobs from construction to 176 person-years of employment. In the larger New York State economy, the construction of this alternative would generate an estimated 3 person-years of indirect and induced employment, bringing the total direct and generated jobs from construction to 179 person-years of employment.

*Employee Compensation*

The direct employee compensation during construction is estimated at $10.96 million. Total direct, indirect, and induced employee compensation resulting in New York City from the construction is estimated at $15.95 million. In the broader New York State economy, total direct, indirect, and induced employee compensation from the construction is estimated at $16.21 million.

*Total Effects on the Local Community*

Based on the IMPLAN models for New York City and State, the total economic activity that would result from construction is estimated at $42.91 million in New York State, of which $41.84 million of which would occur in New York City.

*Potential Significant Adverse Socioeconomic Effects Assessment*

The nearest retail businesses are located over ½-mile inland from the project area. Construction activities would not block or restrict access to any facilities, affect the operations of any nearby businesses, or obstruct major thoroughfares used by customers or businesses. Therefore, nearby businesses would not be significantly affected by the construction activities under Alternative 4.

*OPEN SPACE*

Construction of the Shoreline Project (an anticipated 21-month duration) would be conducted on-shore. With the exception of a small portion of the Shoreline Project proposed within an unbuilt portion of the NYCDOT Surf Avenue right-of-way, all on-shore project components under Alternative 4 would be constructed within the boundaries of Conference House Park. Although portions of Conference House Park would temporarily be closed during construction of the on-shore elements of Alternative 4, access to the waterfront in areas not under

construction would continue to be maintained. Construction activities would be phased to minimize the duration of construction at any particular location within Conference House Park. As project components are completed, those sections of the park would be re-opened for use. As such, at any particular time during construction, the majority of Conference House Park and other open space resources in the area would continue to accommodate the largely passive activities displaced from the affected construction areas.

Therefore, construction under Alternative 4 would not result in significant adverse impacts on open space. As described below under "Air Quality," an emissions reduction program would be implemented to minimize the effects of construction activities under Alternative 4 on the surrounding community, including Conference House Park. Construction would also adhere to *New York City Air Pollution Control Code* regulations regarding construction-related dust emissions, and to *New York City Administrative Code* limitations on construction-vehicle idling time. Therefore, construction activities under Alternative 4 would not result in any significant adverse air quality impacts on study area open spaces including Conference House Park.

As described below under "Noise," construction for the Proposed Actions would be required to follow the requirements of the *NYC Noise Control Code* to minimize the effects of construction under Alternative 4 on the surrounding community, including Conference House Park. While the noise from construction would be noticeable at times, the duration of construction noise at any given area of Conference House Park would be limited. As discussed above, construction activities would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding communities. Based on these factors, construction noise associated with Alternative 4 at these receptors would not be expected to result in a significant adverse impact.

*HISTORIC AND CULTURAL RESOURCES*

A detailed assessment of potential impacts on historic and cultural resources during the construction under Alternative 4 is described in Chapter 5, "Historic and Cultural Resources."

*Archaeological Resources*

The Phase 1A study of the Shoreline APE identified locations of potential precontact archaeological sensitivity along certain portions of the upland areas within the APE. Because the project design has not yet been finalized, the extent to which these areas would be impacted is not yet known. The Phase 1A concluded that if the construction of the proposed Shoreline Project would result in subsurface impacts, Phase 1B archaeological testing would be completed to determine the presence or absence of archaeological resources within the APE. The Phase 1A determined that upon the completion of the final project design, the project plans be reviewed by an archaeologist to determine if any proposed excavation would impact areas of archaeological sensitivity. Although the archaeological sensitivity of the newly added portions of the Shoreline APE within Conference House Park has not yet been determined, the improvements currently proposed in those areas would not be constructed under Alternative 4. As such, regardless of the potential future identification of archaeological sensitivity in the newly added areas within the project site, there would be no impacts to archaeological resources in that portion of the APE under Alternative 4.

*Architectural Resources*

There are no architectural resources are located in the Shoreline APE. Therefore, Alternative 4 would not result in any construction period impacts to historic architectural resources.

*VISUAL RESOURCES*

Construction activities under Alternative 4 would be conducted on-shore. Construction equipment such as excavators, loaders, and trucks, would be utilized during the construction period under Alternative 4 and may be visible to the public from certain vantage points. Views towards the waterfront from inland locations on nearby local streets are limited to residents, pedestrians, motorists and bicyclists, due to the narrowness of the streets and intervening natural features, including wooded areas, street trees, and landscaping elements on residential properties. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location so as to lessen the effects of construction on the surrounding communities. Although the character and quality of views during construction may be modified, such effects would be temporary in any given location. Therefore, as with Alternatives 2 and 3, construction under Alternative 4 would not result in significant adverse impacts to visual resources.

*HAZARDOUS MATERIALS*

As with Alternatives 2 and 3, in the on-shore areas requiring construction, the protocols outlined above would be incorporated for construction activities under Alternative 4.

*NATURAL RESOURCES*

A detailed assessment of the potential effects on natural resources during construction under Alternative 4 is presented in Chapter 9 "Natural Resources."

Alternative 4 would not result in significant adverse impacts to terrestrial or aquatic resources. Temporary impacts resulting from construction of on-shore components, such as vegetation removal, wildlife displacement, and alteration of NYSDEC littoral zone tidal wetlands TWAA, and the delineated tidal wetland, would be as discussed for Alternative 2 and would be minimized through the use of erosion and sediment control measures (e.g., silt fencing and hay bales) in compliance with the SWPPP prepared for the project, and the use marsh mats or low ground-pressure equipment within the portion of the delineated wetland that would not be directly affected due to the construction of the hybrid dune, transition node and pathway. Protection programs (e.g., transplant, and seed collection and propagation) would be developed in coordination with NYC Parks and NYSNHP for populations of the state-listed plant species that would have the potential to be affected by construction of the Shoreline Project: northern gamma grass (endangered), and dune sandspur (threatened). Additionally, any eastern box turtles encountered in the area of disturbance prior to or during the construction of earthen berm would be relocated to an area beyond the silt fencing to avoid direct impacts. With the implementation of these measures the Proposed Actions would not result in significant adverse impacts to threatened or endangered plant species, and species of special concern.

Excavation of soils to construct the on-shore components of the Proposed Actions would not have the potential to adversely affect groundwater due to soil contamination. The proposed removal of soil in the vicinity of Tricia Way determined to meet the NYSDEC SCOs for residential use and for protection of groundwater would not adversely affect groundwater. Groundwater removed during any dewatering activities would be treated prior to discharge to Raritan Bay.

*TRANSPORTATION*

The construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities.

As with Alternatives 2 and 3, the analysis is based on the peak worker and truck trips during construction under Alternative 4, which were developed based on several factors including worker modal splits, vehicle occupancy and trip distribution, truck PCEs, and arrival/departure patterns.

The following sections evaluate the potential for the peak construction worker and truck trips under Alternative 4 to result in significant adverse impacts to traffic, parking, transit facilities, and pedestrian elements.

*Traffic*

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

*Construction Trip-Generation Projections*

Based on preliminary estimates, construction activities for each of the stages of the Shoreline Project would require one crew of approximately 15 workers per day and an average of 3 to 19 truck trips per day. **Table 17-12** shows the estimated average daily numbers of workers and deliveries by calendar quarter for the duration of the construction period.

**Table 17-12**
**Alternative 4 - Average Number of Daily Workers and Trucks by Year and Quarter**

| Year | 2018 | | | | 2019 | | | | 2020 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quarter | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | Average | Peak |
| Workers | - | - | 15 | 15 | 15 | 15 | 15 | 15 | 15 | - | - | - | 15 | 15 |
| Trucks | - | - | 3 | 3 | 18 | 18 | 11 | 19 | 16 | - | - | - | 13 | 19 |

**Source:**
MFS Consulting Engineers and Surveyor, DPC. August 2016
Stantec and RACE. November, 2016.

These worker and truck trip projections were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and truck PCEs.

*Daily Workforce and Truck Deliveries*

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter were used as the basis for estimating peak-hour construction trips. It is expected that construction activities would generate approximately 15 workers and 19 truck deliveries per day during the peak quarter of construction. These estimates of construction activities are discussed further below.

*Construction Worker Modal Splits and Vehicle Occupancy*

Based on the 2000 U.S. Census data for workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site using private autos at an average occupancy of approximately 1.09 persons per vehicle.

*Peak-Hour, Construction-Worker Vehicle and Truck Trips*

As discussed above, construction of the Proposed Actions would typically take place on weekdays from 7:00 AM to 3:30 PM. While construction truck trips would occur throughout the day, and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips during the same hour (one “in” and one “out”), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart

near the work-shift end hour. Further, in accordance with the 2014 *CEQR Technical Manual*, the traffic analysis assumed that each truck would have a PCE of 2.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after each work shift. Construction truck deliveries would be distributed throughout the day. As shown in **Table 17-13**, based on these projections, the maximum construction-related traffic increments would be approximately 16 PCEs between 6:00 AM and 7:00 AM. These incremental construction PCEs would be well below the *CEQR Technical Manual* threshold of 50 vehicle trips; therefore no further quantified analysis is warranted and construction under Alternative 4 would not result in any significant adverse traffic impacts.

**Table 17-13**
**Alternative 4 - Peak Construction Vehicle Trip Projections**
**(1st and 2nd Quarter of 2019)**

| | Auto Trips | | | Truck Trips | | | Total | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Regular Shift | | | Regular Shift | | | Vehicle Trips | | | PCE Trips | | |
| Hour | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total |
| 6 AM - 7 AM | 10 | 0 | 10 | 3 | 0 | 3 | 13 | 0 | 13 | 16 | 0 | 16 |
| 7 AM - 8 AM | 5 | 0 | 5 | 3 | 3 | 6 | 6 | 3 | 9 | 9 | 6 | 15 |
| 8 AM - 9 AM | 0 | 0 | 0 | 3 | 3 | 6 | 3 | 3 | 6 | 6 | 6 | 12 |
| 9 AM -10 AM | 0 | 0 | 0 | 2 | 3 | 5 | 2 | 3 | 5 | 4 | 6 | 10 |
| 10 AM -11 AM | 0 | 0 | 0 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 | 8 |
| 11 AM - 12 PM | 0 | 0 | 0 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 | 8 |
| 12 PM - 1 PM | 0 | 0 | 0 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 | 8 |
| 1 PM - 2 PM | 0 | 0 | 0 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 | 8 |
| 2 PM - 3 PM | 0 | 1 | 1 | 0 | 2 | 2 | 0 | 3 | 3 | 0 | 5 | 5 |
| 3 PM - 4 PM | 0 | 10 | 10 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 10 | 10 |
| 4 PM - 5 PM | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 |
| 5 PM - 6 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Daily Total | 13 | 13 | 26 | 19 | 19 | 38 | 32 | 32 | 64 | 51 | 51 | 102 |

**Note:** Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

*Transit*

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that only approximately 8 percent of construction workers would commute to the project site via transit. During the peak construction period under Alternative 4 (a maximum of 15 daily construction workers), this would correspond to approximately 2 workers traveling by transit, which is well below the *CEQR Technical Manual* 200-transit-trip analysis threshold. Therefore, no further quantified transit analysis is warranted and construction under Alternative 4 would not result in any significant adverse transit impacts.

*Pedestrians*

As summarized above, approximately 15 daily construction workers would be expected during peak construction for Alternative 4. This increment would be well below the *CEQR Technical Manual* analysis threshold of 200 pedestrian trips. Therefore, no further quantified pedestrian analysis is warranted and construction under Alternative 4 would not result in any significant adverse pedestrian impacts.

*Parking*

The peak number of workers during construction for Alternative 4 would be approximately 15 per day. As discussed above, based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that 92 percent of construction workers would commute to the project site by private autos at an average occupancy of approximately 1.09 persons per vehicle. The anticipated construction activities under Alternative 4 are therefore projected to generate a maximum parking demand of 13 spaces. This construction parking demand is expected to be adequately accommodated by the ample on-street spaces available within a ¼-mile radius of the project site. Therefore, construction for Alternative 4 would not result in any parking shortfalls or the potential for any significant adverse parking impacts.

*AIR QUALITY*

As with Alternatives 2 and 3, the analysis presented in this section addresses both local (microscale) concentrations and regional (mesoscale) emissions.

*Local (Microscale) On-site Construction Activity Assessment*

The *CEQR Technical Manual* lists several factors for consideration in determining whether a quantified on-site and/or off-site construction impact assessment for air quality is appropriate. These factors include the duration and intensity of construction activities, the location of nearby sensitive receptors, the use of emission control measures, and project generated construction-related vehicle trips.

*Location of Nearby Sensitive Receptors*

The largest and most striking single sensitive receptor location is Conference House Park, a 265 acre park under the jurisdiction of NYC Parks. The portion of the park immediately adjacent to the project site contains coastal wetlands and beaches lining the shore as well as Lenape Playground 100 feet to the north of the proposed earthen berm. Moving inland from Conference House Park, the next set of sensitive receptors are the single-family detached houses to the north of the project site, the nearest of which are approximately 50 feet from the transition node construction at Loretto Street, wetland bridge construction near Brighton Street, raised edge construction between Joline Avenue and Bedell Avenue, or the dune system construction across the unbuilt portion of the NYCDOT Surf Avenue right-of-way. Construction activities would be temporary in nature and would be phased to minimize the duration of construction at any particular location.

*Duration and Intensity of Construction Activities*

Construction under Alternative 4, as is the case with any large construction project, would be disruptive to the surrounding area. However, since the overall construction for the Shoreline Project is anticipated to take approximately 21 months to complete, the construction periods are considered of short-term (i.e., less than two years) duration according to the *CEQR Technical Manual*. For the Shoreline Project, it is assumed that all construction activities would be conducted on-shore. Shoreline Project activities would generally be limited to excavation and the placement of armor stone, bedding stone, and fill. The number of engines required for on-shore construction activities under Alternative 4 and the intensity of activities would be less than those that are required for typical ground-up building construction. In addition, construction activities would be phased to minimize the duration of construction at any particular location within Conference House Park. Overall, emissions associated with the construction of under Alternative 4 would be substantially minimized due to the emission control measures implemented during construction (see “Emission Control Measures,” below).

*Emission Control Measures*

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. Measures would be taken to minimize pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. As with Alternatives 2 and 3, these measures would include dust suppression measures, idling restrictions, and the use of ULSD and BAT for equipment at the time of construction. Construction contractors are also encouraged to use newer and cleaner to the extent practicable to further reduce air pollutant emissions during construction. Overall, this emissions control program is expected to substantially minimize air pollutant emissions during construction under Alternative 4.

*Off-Site Sources*

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

*Conclusions*

Based on the analyses provided above and the implementation of an emissions reduction program, construction under Alternative 4 would not result in any significant adverse construction air quality impacts on a microscale level, and no further analysis is required.

*Regional (Mesoscale) On-site Construction Activity Assessment*

*Conformity with State Implementation Plans*

Temporarily, during construction, there would be emissions associated with on-site construction equipment and with the transport of construction materials. The following analysis estimates the potential projected pollutant emissions associated with the construction under Alternative 4 and evaluates the need for a conformity determination.

*Engine Exhaust Emissions*

The projected usage factors, sizes, types, and number of construction equipment as well the number of deliveries and trip distances were estimated based on the preliminary construction activity schedule. Emission factors from on-site construction engines were developed using the USEPA's NONROAD2008 Emission Model (NONROAD). With respect to construction trucks, emission rates from truck engines were developed using the USEPA Motor Vehicle Emission Simulator (MOVES2014a) emission model. Tugboat emissions were estimated according to the latest emission factors and methodologies delineated by USEPA[12].

*Regional Analysis Results*

Annual construction activity and the associated emissions are presented in **Table 17-14**. The annual emissions would be lower than the *de minimis* rates defined in the general conformity regulations. Since all diesel engines will be using ultra low sulfur diesel, $SO_2$ emissions would be negligible.

[12] USEPA, Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, April 2009.

**Table 17-14**
**Alternative 4 - Emissions from Construction Activities (ton/yr)**

| Year | $PM_{2.5}$ | $PM_{10}$ | $NO_x$ | VOC | CO |
|---|---|---|---|---|---|
| 2018 | 0.1 | 0.1 | 3.2 | 0.2 | 1.0 |
| 2019 | 1.0 | 1.1 | 21.6 | 1.1 | 5.6 |
| 2020 | 0.1 | 0.1 | 2.8 | 0.1 | 0.7 |
| ***De minimis level:*** | ***100*** | ***100*** | ***100*** | ***50*** | ***100*** |

*NOISE AND VIBRATION*

*Noise*

As with Alternative 2, the construction noise analysis for Alternative 4 considers the noise generated by construction-related traffic and on-site construction equipment and activity. The analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact. The most noise-sensitive construction activities associated with Alternative 4 would be due to excavation work associated with the Shoreline Project, which would last approximately 21 months.

*Mobile Construction Noise Sources*

Throughout the construction period, vehicles including construction-related trucks as well as vehicles driven by construction workers would travel near the on-shore construction areas. Most of the construction-related trucks, including vehicles driven by construction workers, would be expected to use Main Street, Sprague Avenue and Page Avenue. However, the amount of traffic generated by the construction of Alternative 4 would be low compared with the traffic volumes on major feeder streets in the neighborhood. In addition, the construction-related vehicles would be distributed amongst the different routes to and from the on-shore construction areas. Accordingly, the construction of Alternative 4 would not result in significant adverse construction noise impacts due to mobile sources, and no further analysis is required.

*INTENSITY OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

Beachfront residential buildings located along the Tottenville shoreline between Swinnerton Street, and Page Avenue represent the receptor locations most likely to experience increased noise levels resulting from the operation of on-site construction equipment. The Shoreline Project is expected to progress from approximately Swinnerton Street to Page Avenue which represents a distance of approximately 5,000 feet. For each phase of the Shoreline Project construction, equipment would operate between approximately 50 and 1,000 feet away from any single residential building. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels at any single residential building would be expected to range approximately from the mid-80s dBA with construction equipment operating 50 feet away, to the high 50s dBA with equipment operating 1,000 feet away during a single phase of the Shoreline Project. The maximum noise levels during construction of Alternative 4 would occur during excavation phases of the Shoreline Project, using excavators, front-end loaders, trucks, and bulldozers. These pieces of equipment would be used continuously throughout the duration of the projects, but would only operate during daytime construction hours between 7:00 AM to 3:30 PM and would not be used continuously throughout each day. Furthermore, no single sensitive receptor would be exposed to these pieces of equipment for the entire duration of construction for Alternative 4. During times when the dominant pieces of equipment would not

be operating, or would be operating far from a given sensitive receptor, construction noise levels would be substantially lower at these adjacent residential buildings. Measured existing noise levels near these locations were in the high 40s to mid-50s dBA, and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Consequently, at all the nearest residential buildings, the maximum noise levels predicted to be generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during certain portions of the construction period when work is occurring nearest the receptors. These receptors are discussed further in the "*Duration of Construction Noise from On-Site Sources"* section below.

At the Lenape Playground, located approximately 100 feet from the northwest portion earthen berm phase of the Shoreline Project, maximum $L_{eq(1)}$ noise levels would be expected to range between approximately the high 70s dBA when construction equipment is operating 100 feet away to approximately the high 50s dBA when construction equipment is operating 1,000 feet away, and would occur during the excavation work for the proposed earthen berm. Measured existing noise levels near this location were in the high 40s to mid-50s dBA and would be expected to remain relatively unchanged in future conditions without the Proposed Actions. Consequently, at the Lenape Playground, noise generated by on-site construction activities would be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria during the portion of construction when work is occurring nearest the playground. This receptor is discussed further in the "*Duration of Construction Noise from On-Site Sources"* section below.

*DURATION OF CONSTRUCTION NOISE FROM ON-SITE SOURCES*

The noisiest construction activities would occur during the excavation work associated with the Shoreline Project. The Shoreline Project work is expected to last a total of approximately 21 months: approximately 6 months for installation of the earthen berm, 6 months for the installation of the hybrid sand dune, 2 months for installation of the eco-revetment, 5 months for the installation of the raised edge, and 2 months for installation of the transition nodes. The dominant noise sources would include excavators, dump trucks, concrete mix trucks, front-end loaders, and bulldozers. With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels during construction are predicted to be in the mid-80s dBA with dominant noise sources operating 50 feet away from a receptor and in the high 50s with dominant noise sources operating 1,000 feet away from a receptor. The use of such equipment is anticipated to last for approximately 21 months, but for a maximum of approximately 6 months near any one specific sensitive receptor. During times when these dominant pieces of equipment would not be operating, construction noise levels would be lower. Noise levels from construction activities typically fluctuate throughout the day and from day to day, and would not be sustained at the maximum noise levels during the entire 21 month project duration. While noise level increases of this magnitude would be noticeable and potentially intrusive at times, the noise level increases are predicted to occur over the course of no more than 6 consecutive months of construction at a single receptor, and would consequently not rise to the level of a significant adverse construction noise impact.

*CONSTRUCTION NOISE IMPACT*

As described above, noise resulting from construction under Alternative 4 could result in exceedances of *CEQR Technical Manual* noise impact criteria at beachfront residences between Swinnerton Street and Page Avenue as well as at open spaces such as the Lenape Playground located to the northwest of the earthen berm phase of the Shoreline Project. The exceedances at a

single receptor are expected to last for less than 6 months, and construction equipment noise levels would decrease as the Shoreline Project progresses throughout the approximately 21 month schedule.

Although the exceedances of CEQR noise impact criteria would be noticeable and potentially intrusive at times, due to the limited duration of construction activities associated with Alternative 4, they would not be considered significant adverse construction noise impacts.

*VIBRATION*

The proposed construction activities would not involve impact equipment and therefore do not have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. Therefore, construction for Alternative 4 is not expected to result in significant adverse construction impacts with respect to vibration.

## 17.5 MINIMIZATION AND MITIGATION OF IMPACTS

The Proposed Actions would not result in significant adverse construction impacts in the areas of land use, neighborhood character, socioeconomic conditions, open space, visual resources, hazardous materials, natural resources, transportation, air quality, noise and vibration. Therefore, no mitigation with respect to construction in these areas is required.

With respect to archaeological resources, pursuant to Section 106 and CEQR, should significant (e.g., S/NR-eligible) archaeological resources be identified in sensitive areas through Phase 1B and Phase 2 archaeological investigations, disturbance or removal of such resources through construction would constitute an adverse effect under Section 106 and a significant adverse impact under CEQR. However, as outlined above, at this time only the *potential* for archaeological resources has been identified in certain locations on the project site. As set forth in the 2014 *CEQR Technical Manual*, a "site's actual, rather than potential, sensitivity cannot be ascertained without some field testing or excavation."[13] Therefore, it is conservatively assumed for purposes of Section 106 and CEQR that the proposed project could *potentially* result in an adverse effects and significant adverse impacts, with the actual presence of any significant resources to be determined through additional archaeological investigations and consultation as set forth in the Programmatic Agreement, described above. However, should no significant archaeological resources be identified through Phase 1B or any subsequent Phase 2 archaeological investigations, and LPC, SHPO and the Tribal Nations concur with the conclusions of those investigations, no *actual* adverse effects or significant adverse impacts would occur.

If plans move forward to locate the programming for the Water Hub within either the the Henry Hogg Biddle House or the Rutan-Beckett House, consultation with the consulting parties would continue to be undertaken pursuant to the terms outlined in the Programmatic Agreement executed in May 2013 among FEMA, SHPO, the New York State Office of Emergency Management, the Delaware Nation, the Delaware Tribe of Indians, the Shinnecock Nation, the Stockbridge-Munsee Community Band of Mohicans, LPC, and ACHP and specifically pursuant to Appendix D to the Programmatic Agreement, which pertains to the CDBG-DR program for activities in New York City.

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[13] *CEQR Technical Manual* (March 2014): page 9-10 (http://www.nyc.gov/html/oec/downloads/pdf/2014_ceqr_tm/09_Historic_Resources_2014.pdf).

In addition, because the Henry Hogg Biddle House is a NYCL, if the Biddle House Option is selected for the Water Hub, NYC Parks would consult with LPC under the New York City Landmarks Preservation Law regarding any proposed alterations to this NYCL. LPC would review the proposed alterations and, upon approval of the proposed alterations, would issue a Binding Commission Report summarizing LPC's findings. Should the Rutan-Beckett House be determined S/NR-eligible, consultation regarding proposed alterations to this building would also be undertaken with SHPO. Should either the Biddle House Option or the Rutan-Beckett Option be selected for the Water Hub, consultation with SHPO would be undertaken regarding any proposed alterations to the historic resource. ✷