

A. INTRODUCTION

The federal Council on Environmental Quality's (CEQ) regulations implementing the procedural provisions of the National Environmental Policy Act (NEPA), set forth in 40 C.F.R. § 1500 et seq., requires federal agencies to consider the potential for indirect and cumulative effects from a proposed project. In addition, State Environmental Quality Review Act (SEQRA) regulations identify that the contents of an Environmental Impact Statement (EIS) include an evaluation of both cumulative effects and the growth-inducing aspects of a proposed action (6 NYCRR § 617.9 [b][5][iii][a] and [d]).

This chapter examines the potential indirect and cumulative effect from the proposed project.

LOWER MANHATTAN COASTAL RESILIENCY (LMCR)-TWO BRIDGES

Although the LMCR-Two Bridges Project is in the early design phase, the project is proposing similar coastal flood protection improvements and would also create opportunities for new programming and enhanced community access (where possible) in the Two Bridges neighborhood. The approaches to providing flood protection with this project are assumed similar to those under the proposed project and would include floodwalls and closure structures. The LMCR-Two Bridges Project has received funding through U.S. Department of Housing and Urban Development (HUD)'s National Disaster Resilience Competition (NDRC) to initiate a coastal flood mitigation project in this area and will be subject to a separate environmental review. As previously stated, the LMCR-Two Bridges Project is in its early design phase; therefore, this section provides a general assessment of the potential indirect and cumulative effects of that project.

B. PRINCIPAL CONCLUSIONS

As discussed below, the proposed project would not result in indirect adverse effects generated by induced or secondary growth. In consideration of the range of technical analyses presented in this EIS, the proposed project has little or no potential to result in any cumulative effects, except in the following areas: visual resources – by blocking views to the waterfront and East River from multiple locations and open space – during construction periods by temporarily displacing open space resources.

C. INDIRECT EFFECTS

This section of the EIS evaluates any indirect effects, both adverse and beneficial, that may occur as a result of the proposed project. The CEQ regulations define indirect effects as those that are “caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable” (40 CFR 1508.8). Indirect effects can occur within the full range of affected areas, such as changes in land use, economic conditions, traffic congestion, air quality, noise, vibration,

and water and natural resources. Examples of indirect effects can include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rates, and related effects on air and water and other natural systems. For the proposed project, this section evaluates any indirect social and economic effects such as the avoided costs associated with flood damage that would otherwise be incurred during design storm events, as well as the reduced likelihood of business closures due to flooding during a design storm event. Indirect hazardous materials effects are evaluated by describing how the proposed project would serve to reduce certain adverse effects associated with flooding, such as mobilization of existing contaminants (e.g., in soil or tanks), and generation of contaminants (e.g., mold or carbon monoxide).

INDIRECT SOCIAL AND ECONOMIC EFFECTS

As discussed in Chapter 5.2, “Socioeconomic Conditions,” under the No Action Alternative (Alternative 1), no new comprehensive coastal protection system would be installed in the proposed project area. In the absence of the system, the existing neighborhoods would remain at risk to coastal flooding during design storm events (the 100-year flood events with sea level rise projections to the 2050s). Socioeconomic effects would include the direct physical damages associated with a design storm event; displacement; human impacts; and loss of services. In addition, the open space amenities associated with other alternatives would not be added to the project area. In particular, with the raising of the majority of East River Park in the Preferred Alternative and Alternative 5, flood damage from design storm events should be significantly reduced.

Under the No Action Alternative, area business conditions would not be affected by substantial increases in pedestrian traffic and associated consumer spending. Rent levels in projects under construction or planned for completion by 2025 also would not be affected under the No Action Alternative assuming non-storm conditions. However, unlike in the other alternatives, none of the economic benefits associated with the construction of comprehensive flood projection systems would be realized under the No Action Alternative.

Although the Preferred Alternative (Alternative 4) would result in a resilient park and neighborhood connection improvements, it does not present new uses or activities to the project area that could markedly influence the study area’s commercial market, as described below. The Additional resiliency measures included as part of the Preferred Alternative for East River Park, including the raising of a majority of East River Park, would not increase the level of flood protection for the study area inland of East River Park, thus the Preferred Alternative would not result in significant indirect residential or business displacement pressures within the study area.

The Preferred Alternative does not introduce a new use to the project area that would have the potential to fundamentally alter real estate values. The project area currently includes large public open spaces—including East River Park—that offer active and passive recreation options to study area residents and visitors and are highly utilized. The proposed project would not create new public parkland that could affect property values, but would protect and reconstruct the existing parks (e.g., East River Park, Murphy Brothers Playground, and Asser Levy Playground) in the study area that already influence property values. Recent trends already show study area market housing costs to be well above rents affordable to low- and moderate-income households. These trends are expected to continue with or without this alternative’s park and neighborhood connection improvements in place. There is also little existing, and limited opportunity to develop additional, market housing abutting the project area, where values and rents would have the

greatest potential to increase as a result of proximity to the park improvements. Moreover, the majority of existing housing abutting the project area is NYCHA housing developments. Thus, even with the Preferred Alternative's open space and connectivity improvements in place, rents in these developments are protected from local market forces.

The Preferred Alternative is also not expected to result in increases in commercial rents that could lead to significant indirect business displacement pressures within the study area. First, to the extent that commercial rents are influenced by consumer spending, should there be some increase in visitation attributable to the proposed project, there are few businesses directly abutting the project area that would be affected by any increases in expenditure potential. Second, most of the businesses in the study area are located several blocks away from the project area, and not located on streets leading to the improved park connections across the FDR Drive, where businesses could be affected by any increased pedestrian traffic. Third, with multiple residential projects expected to be completed by 2025 and the associated increases in population and spending potential, any effects on commercial rent increases would be attributable to these projects and not the proposed project. Finally, although this alternative would provide park and neighborhood connection improvements, it does not present new uses or activities to the project area that could markedly influence the study area's commercial market.

Under the Preferred Alternative, residents and businesses within the 100-year floodplain in the socioeconomic study area would be less vulnerable to flooding during design storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under this alternative, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

With the proposed project, Alternative 2 would not result in the direct displacement of any residents or businesses. While there is the potential for increases in residential and commercial property values and market-rate rents, Alternative 2 would not result in significant adverse effects due to indirect residential or business displacement. Households living in forms of rent-regulated housing within the protected area and within the larger socioeconomic study area, including approximately 5,000 units within Peter Cooper Village and Stuyvesant Town are also protected from rent increases due to market forces. In addition, recent trends already show study area market-rate housing costs to be well above rents affordable to low- and moderate-income households. These trends are expected to continue with or without the proposed flood protections in place.

Businesses within the special flood hazard area portions of the study area would benefit from reduced susceptibility to flooding during a design storm event, thereby reducing the possibility of temporary or permanent business closures due to a storm. While this reduced business risk would enhance the value of properties, potentially leading to increased rents, such an influence is not expected to result in significant indirect commercial displacement. Most commercial uses within the study area are located outside of the special flood hazard area and, therefore, any potential for indirect business displacement from storm-related influences on rent would be limited to businesses within the special flood hazard area and would not have the potential for significant effects throughout the study area. In addition, the proposed project is not expected to attract a substantial number of new visitors to the protected area or larger socioeconomic study area, nor will it introduce or attract a new building use and associated consumers (e.g., office buildings and workers) that would result in higher sales and increased rents. Therefore, the proposed project is

not expected to result in an influx of new businesses to the protected area that would substantively affect existing market conditions and trends.

Under Alternative 2, the minor open space modifications would not affect residential rents in the study area. Similarly, business conditions in the study area are not expected to materially change due to non-storm-related influences under Alternative 2. Without the provision of additional open space amenities, no new uses or activities would be introduced. Therefore, the study area would not experience a significant increase in pedestrian traffic to the project area as a result of the proposed project, and the increased consumer spending potential associated with that visitation.

Residents and businesses within the 100-year floodplain under Alternative 2 would be less vulnerable to flooding during design storm events. Thus, the key objective of the proposed project—to respond quickly to the need for reliable coastal flood protection and resiliency for the design storm—would be met. Under Alternative 2, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise be incurred during storm events.

As with Alternative 2, Alternative 3 would not result in direct displacement of any residents or businesses. Under Alternative 3, an additional concern with respect to potential indirect displacement is whether the proposed park improvements could lead to increases in residential and commercial property values over time due to the following influences: the enhanced waterfront open space amenities that could make the study area neighborhoods a more desirable location in which to live; increased pedestrian traffic and associated consumer spending at study area businesses; and potential increased spending associated with higher income households that may be attracted to the neighborhood. Alternative 3 would not result in significant indirect residential or business displacement pressures within the study area for the same reasons as the Preferred Alternative (see above).

Alternative 5 includes similar flood protection objectives and the same general open space improvements as described in the Preferred Alternative. The addition of a flyover bridge to increase connectivity along the East River would not result in increased residential property values and rent increases that could lead to significant indirect residential or business displacement within the study area. This alternative would not add a new use to the project area.

Under Alternative 5, residents and businesses within the 100-year floodplain area would be less vulnerable to flooding during design storm events. Therefore, as with the other alternatives described above, there would be positive socioeconomic benefits due to the avoided costs associated with flood damage that would otherwise occur during storm events.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project is expected to provide flood protection between Montgomery Street and the Brooklyn Bridge and may create opportunities for programming and community access within that neighborhood. The LMCR-Two Bridges Project is expected to have similar influences on rents and other potential indirect effects in the project area as described above for the proposed project. These effects will be further analyzed independently as part of the environmental review for LMCR-Two Bridges.

INDIRECT HAZARDOUS MATERIALS EFFECTS

As described in more detail below, the proposed project, by reducing the likelihood of and extent of flooding of upland neighborhoods, would serve to reduce certain adverse effects associated

with flooding, such as mobilization of existing contaminants (e.g., in soil or tanks), and generation of contaminants (e.g., mold or carbon monoxide). By avoiding or reducing the likelihood of these effects, the proposed project would have beneficial indirect effects related to hazardous materials.

Under the No Action Alternative, no new comprehensive coastal protection systems would be installed, but a number of projects planned or under construction in the project area might disturb hazardous materials, possibly including MGP wastes, and potentially increase pathways for human or environmental exposure. Additional procedures may need to be set out for the following projects: Pier 42, the Lower East Side Ecology Center at the southern end of East River Park, renovation of the Fireboat House in East River Park (near Grand Street), and improvements to the East River Park Track and Field Complex. In addition, absent the proposed project it would not be expected that Con Edison would perform excavation within Stuyvesant Cove Park (or other portions of the proposed project area). To the extent that construction of elevated or re-graded park areas or flood walls would remove some soils contaminated with manufactured gas plant wastes and/or contaminated groundwater, these activities would serve as additional remediation (beyond any that Con Edison is expected to conduct upland of the project area and/or of sediments in the East River).

FLOODING AND EXPOSURE TO HAZARDOUS MATERIALS

The proposed project would reduce the potential for flooding, which is known to be associated with releases/mobilization of both subsurface contaminants via erosion. The area has known soil contamination (e.g., Peter Cooper Village soils below approximately 5 feet deep are contaminated by manufactured gas plant [MGP] wastes) and petroleum stored in above ground tanks (especially tanks located in basements). During Hurricane Sandy, many such tanks failed. Water damaged materials resulted in sometimes extensive mold conditions. Additionally, power failures resulting from flooding are known to result in increased incidents of poisoning by carbon monoxide, related to the indoor use of (improperly ventilated) portable space heaters, generators, and grills.

REDUCTION IN FLOW OF CONTAMINATION TO EAST RIVER

The proposed project would require excavation and off-site disposal of some contaminated soils and removal and treatment of some contaminated groundwater (as a result of dewatering). As such, there would be expected reductions, over the long term, of contaminant migration into the East River from the project area.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project will be subject to a separate environmental review under NEPA. Based on preliminary assumptions, with the implementation of a variety of flood protection measures, similar to those proposed for the proposed project, adverse indirect effects related to hazardous materials are not anticipated to occur from the LMCR-Two Bridges Project. As necessary, appropriate Soil Management Plans and/or Construction Health and Safety Plans would be implemented to establish appropriate protective measures and manage exposure pathways during construction. Further, similar to the proposed project, any potential excavation and off-site disposal or treatment of contaminated materials encountered during construction could, over the long term, reduce contaminant migration into the East River. Therefore, the LMCR-Two Bridges Project could have similar indirect influence on hazardous materials as those described above for the proposed project.

D. CUMULATIVE EFFECTS

This section relies on the technical analyses of the DEIS and summarizes the proposed project's potential effects in combination with expected conditions in the future without the proposed project, including a description of the potential cumulative effects from the proposed project and the LMCR-Two Bridges Project. **Table 7.0-1** provides an overview of the relevant past, current, and future projects associated with the anticipated conditions in the future without the proposed project that could have a cumulative effect, along with a description of reasonably foreseeable potential effects associated with each project.

Cumulative effects result from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even indirect effects, but nevertheless can eventually lead to a measurable environmental change. Cumulative effects are the net result of both the proposed project and other projects planned near and around the project site. According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, cumulative effects are two or more individual effects on the environment that, when taken together, are significant or that compound or increase other environmental effects.

As described in Chapter 4.0, "Analysis Framework," this DEIS acknowledges cumulative effects by comprehensively defining the environmental setting expected in the No Action Alternative, including a discussion of projects expected to be completed independently of the proposed project by 2025 (the No Action projects listed in **Appendix A1**) and the baseline growth in the No Action Alternative. The DEIS considers as the future baseline condition the combination of existing conditions together with known development plans, recent approved land use actions, public policies, projected population and employment growth, and other general background growth. The potential effects of the proposed project, presented in Chapters 5 and 6 of this DEIS, were assessed in comparison with the future baseline condition, the No Action Alternative.

Table 7.0-1
No Action Projects with the Potential for Cumulative Effects

Project	Description
Relevant Past Projects	
Con Edison Resiliency Upgrades	Upgrades to power generating facilities and installation of flood protection measures
Citywide Ferry Service	Expansion of ferry service throughout New York City
VA Hospital Resiliency Upgrades	Installation of flood protection measures
Relevant Current and Reasonably Foreseeable Future Projects	
Resiliency Projects	
LMCR-Two Bridges Project	Resiliency measures for the Two Bridges neighborhood immediately south of the proposed project area
NYCHA Resiliency Projects	Various coastal flooding protection measures underway at Jacob Riis, Jacob Riis II, Lillian Wald, Campos Plaza II, Lavanburg, Baruch, and Laguardia Houses, and URA Site 7
Open Space Projects	
Pier 42 – Phase IB	Construction of public waterfront open space
Tompkins Square Park Reconstruction	Reconstruction of two playgrounds in Tompkins Square Park with new play equipment, safety surfacing, spray showers, seating, and fencing
Luther Gulick Playground Reconstruction	Reconstruction of playground facilities
East River Park – Lower East Side (LES) Ecology Center	Improvement of the composting site by formalizing and containing the composting components and provide educational and public access opportunities.
Corlears Hook Park Dog Run	Reconstruction of the dog run, adding stable ground surface, water features and dog waste containers, and replacing fencing
Baruch Playground Synthetic Turf Field Reconstruction	Reconstruction of turf field
Seward Park Reconstruction	Reconstruction of a portion of Seward Park
Solar One Environmental Education Center	Existing facility is proposed to be replaced with a new green arts and energy education center
Pier 35	Improvements including an “eco-park”
Fireboat House Renovation	Construction of an Americans with Disabilities Act (ADA) entrance ramp and installation of solar panels
HUD-NDR TPL Green Playgrounds Program	Renovation and improvement of existing playground facilities at two public schools in the Two Bridges neighborhood
East River Waterfront Esplanade – Phase IV	Resurfacing, new seating, and play equipment between Catherine Slip and Pike Slip
Transportation Infrastructure Projects	
Traffic Calming and Bike Route Connections	Traffic calming measures and bike lane installation/connections at various locations, including Delancey, Grand, and Montgomery Street
L Train Tunnel Repair	Repair of L train tunnel under the East River
Rezoning Projects	
Lower East Side Rezoning—various locations	Rezoning to facilitate the development of new residential projects with ground floor retail
Other Projects	
Various Residential and Commercial Development Projects	Proposed mixed-use developments (residential and commercial) including Two Bridges, Extell One Manhattan, Alexandria Science Center, Brookdale Campus, and Essex Crossing
NYCHA Infill at 50 Pitt Street	NYCHA plans to rebuild, expand, and preserve public and affordable housing stock by developing on underutilized land
New York City Community Garden Coalition Gardens Rising (Gardens Rising)	Green infrastructure investments for community gardens to manage stormwater

Table 7.0-2 provides a summary of potential cumulative impacts of the proposed project in combination with other past, present, and reasonably foreseeable future actions.

Table 7.0-2
Summary of Cumulative Effects (40 CFR § 1508.7)

Resource	Proposed Project Effects		Effects of No Action Projects	Cumulative Effects
	Short-term (Construction)	Long-term (Operation)		
Land Use, Zoning, and Public Policy	Minor	Major beneficial	Minor	Major beneficial
Socioeconomic Conditions	Minor	Moderate Beneficial	Minor	Moderate Beneficial cumulative effects due to employment, compensation, and total economic activity
Open Space	Major adverse	Major beneficial	Moderate Adverse due to temporary loss of neighborhood open space during construction; moderate beneficial effects upon completion	Major adverse cumulative effects to availability of open space during construction; long-term major beneficial due to improved open space, waterfront enhancement and flood protection of open spaces
Historic and Cultural Resources	Minor	Minor	Minor	Minor
Urban Design and Visual Resources	Moderate Adverse	Moderate Beneficial with elevated shared-use flyover bridge (urban design); Major adverse due to blocked waterfront views (visual resources)	Minor	Minor
Natural Resources	Moderate adverse effects to terrestrial resources; temporary and permanent moderate adverse effects to littoral zone wetlands and Waters of the United States	Major beneficial (terrestrial resources); minor adverse (Wetlands and Waters of the United States)	Minor	Minor
Hazardous Materials	Moderate adverse	Major beneficial contamination in East River Park underlying soils would be removed	Moderate adverse	Moderate adverse
Water and Sewer Infrastructure	Minor	Major beneficial	Minor	Minor
Transportation	Moderate Adverse	Moderate Beneficial due to improved access to waterfront	Moderate adverse	Moderate adverse cumulative construction effects on transportation that is dependent on the construction schedules and peak construction intensity of each project
Neighborhood Character	Minor	Major beneficial	Minor	Minor
Environmental Justice	Minor	Major beneficial	Minor	Minor
Energy	Minor	Minor	Minor	Minor
Air Quality	Moderate Adverse	Minor	Moderate adverse	Minor
Greenhouse Gas Emissions	Minor	Minor	Minor	Minor
Noise and Vibration	Major Adverse	Minor	Major adverse during construction	Potential major adverse cumulative construction effects on noise that is dependent on the construction schedules and peak construction intensity of each project
Public Health	Moderate Adverse	Minor	Minor	Moderate Adverse

LOWER MANHATTAN COASTAL RESILIENCY (LMCR)-TWO BRIDGES PROJECT

In addition to the proposed project, resiliency measures are being developed for the Two Bridges neighborhood immediately south of the proposed project area. The study area for the Two Bridges project is bounded by Montgomery Street on the north and the Brooklyn Bridge to the south and includes the esplanade under the FDR Drive, two crossings across South Street for the tie-backs, Pier 35/36, and the East River Waterfront (see Figure 2.0-8). The City received funding through HUD's National Disaster Resilience Competition (NDRC) to initiate a coastal flood mitigation project in this area. The LMCR-Two Bridges Project is in the early design phase. It proposes improvements that would similarly protect from coastal flooding and would create opportunities for new programming and enhanced community access (where possible) in the Two Bridges neighborhood. The approaches to providing flood protection with this project are assumed to be similar to those under the proposed project and would include floodwalls and closure structures.

While the LMCR-Two Bridges Project will be subject to a separate environmental review under NEPA, SEQRA, and CEQR, the potential cumulative effects of the LMCR-Two Bridges Project and the proposed project are qualitatively considered in this DEIS. As the LMCR-Two Bridges Project is in the early design phase, the qualitative assessment of the project below is based on preliminary assumptions based on available information. Should additional cumulative effect-related information be available regarding the LMCR-Two Bridges Project after the Draft EIS is certified, the chapter will be updated prior to the issuance of the Final EIS.

LAND USE, ZONING, AND PUBLIC POLICY

The proposed project would be consistent with existing or planned land use, zoning, and public policies within the study area, and would be anticipated to have long-term beneficial effects to land uses within the study area from the improvement of open spaces and implementation of a comprehensive flood protection system, which would also greatly advance public policies that seek to improve access to open spaces, enhance open spaces, and provide coastal flood protection to Lower Manhattan.

Several planned projects will be completed in the land use, zoning, and public policy study area by the 2025 build year, including various residential and commercial development projects rezoning projects, open space projects, and resiliency projects. Several of the projects specifically involve alterations to land uses and zoning within the study area. However, these projects are subject to review under applicable City regulations, including the City Environmental Quality Review Act (CEQR) and Uniform Land Use Review Procedure (ULURP), and therefore would be anticipated to be largely consistent with long-term zoning and land use objectives for the study area. The open space and resiliency projects would be expected to result in long-term beneficial effects to land uses within the study area by improving or enhancing open spaces and providing protection from storm events, which would complement the long-term beneficial effect on land uses anticipated to result from implementation of the proposed project. Similarly, these projects would be anticipated to be compatible with public policies that seek to improve open spaces and consistent with the initiatives to protect Lower Manhattan from coastal surge events and provide access to waterfront parks as discussed in City and local plans. Therefore, it is concluded that cumulative effects would be negligible in the short-term and major beneficial in the long-term.

LMCR-TWO BRIDGES PROJECT

It is also expected that the LMCR-Two Bridges Project would not contribute to cumulative adverse land use, zoning or public policy effects when assessed in combination with the proposed project.

As discussed above, the LMCR-Two Bridges Project is expected to construct a coastal flood mitigation project for the Two Bridges neighborhood, abutting the southern end of the proposed project area. Land uses within the LMCR-Two Bridges Project area include public facilities and institutions, residential, residential with commercial below, transportation and utility, open space and recreation, vacant, commercial and office buildings, industrial and manufacturing, and parking facility. Zoning designations within the LMCR-Two Bridges Project area include R7-2, M1-4, C8-4, Park, C6-4 and M1-6. Public Policy within the LMCR-Two Bridges Project area includes the same policies described above for the proposed project, along with the Brooklyn Bridge Southeast Urban Renewal Area and the Two Bridges Urban Renewal Area.

While the proposed flood protection system in the Two Bridges neighborhood would serve the primary function of physical protection from flooding, it could also provide an opportunity to improve the neighborhood's economic and social resiliency. The flood protection system is expected to be designed to mitigate the effects of inundation from coastal storm surges; in addition, these resiliency investments are expected to create opportunities for programming and enhanced waterfront views and community access. By maintaining the existing East River shared-use path (bikeway/walkway), enhancing connections to the ongoing East River Waterfront Esplanade improvements, and reinventing the waterfront as an appealing destination in the Two Bridges neighborhood, the City aims to strengthen the connection of Two Bridges to the rest of Lower Manhattan and revitalize the area in order to promote a stronger neighborhood. If required, the LMCR-Two Bridges Project would undergo any ULURP or zoning actions independently and would therefore be assumed compatible with long-term land use and zoning objectives for this area and would be consistent with public policies, especially as it pertains to improving resiliency in Lower Manhattan. As such, given that the proposed project is concluded to be consistent with land use, zoning, and public policies for that applicable study area and it is assumed that the LMCR-Two Bridges project would be subject to review processes that would likewise ensure compatibility with long-term objectives for land use, zoning, and public policies, it is assumed no cumulative adverse effect would be anticipated.

SOCIOECONOMIC CONDITIONS

As described in the “Indirect Social and Economic Effects,” section above, no direct residential or business displacement would occur as a result of the proposed project; therefore, the assessment of adverse cumulative effects focuses on the potential for indirect displacement effects. For the reasons stated in the “Indirect Social and Economic Effects,” section above, potential increases in property values attributed to flood protection measures are not expected to result in cumulative significant adverse socioeconomic effects as related to indirect business displacement for the proposed project.

The proposed project's flood protection system and open space and connectivity improvements, and the various residential and commercial development projects rezoning projects, open space projects, and resiliency projects in the study area, could lead to increases in residential property values and market rate rents by making the area more attractive as a residential neighborhood. Potential increases in property values are not expected to result in cumulative significant adverse effects in the area of indirect residential displacement for the same reasons outlined in the “Indirect Social and Economic Effects,” section, above.

Cumulative construction-related effects associated with the proposed project and No Action projects would not generate cumulative significant adverse socioeconomic effects. Construction activities would not directly displace businesses, nor would they require the temporary closure of

businesses within or surrounding the project areas, including businesses on access routes to/from construction sites. Construction activities would, at times, affect pedestrian and vehicular access in the immediate vicinity of construction activities. However, construction activities in the project area, including the Pier 42 and Solar One Environmental Education Center projects, are located far enough away from businesses such that access to businesses would not be impeded. Lane and/or sidewalk closures and construction staging areas would not obstruct entrances to any existing businesses, or obstruct major thoroughfares used by customers. Businesses would not be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project would likely have similar influences on property values and rents as the proposed project. Therefore, based on currently available information about the LMCR-Two Bridges Project, there is little potential for cumulative socioeconomic effects from the LMCR-Two Bridges Project and the proposed project.

If some portion of construction under the proposed project occurs simultaneously with the construction of the LMCR-Two Bridges Project, cumulative construction activities would not be expected to generate significant adverse effects on socioeconomic conditions. As detailed in Chapter 6.1, “Construction—Socioeconomic Conditions,” construction activities associated with the proposed project would not directly displace businesses, nor would they require the temporary closure of businesses within or surrounding the project area. Similarly, any temporary effects on pedestrian and vehicular access would be isolated to areas in the immediate vicinity of construction activities. Given that construction activities associated with the LMCR-Two Bridges Project would be located almost entirely outside the socioeconomic study area for the proposed project, there is little potential for cumulative socioeconomic effects from overlapping construction activities.

Further, if construction under the proposed project occurs simultaneously with construction of the LMCR-Two Bridges Project, the LMCR-Two Bridges Project would result in additional construction costs in the area. These additional costs would result in: additional direct, indirect, and induced person-years of employment during construction; additional direct, indirect, and induced employee compensation during construction; and additional total economic activity in New York State and New York City.

OPEN SPACE

Several planned open space projects will be completed in the open space study area by the 2025 build year. These projects would result in long-term moderate beneficial effects as open spaces within the study area would be reconstructed, enhanced, or otherwise improved; no open space projects were identified that would result in long-term adverse effects on open spaces in the study area. Similarly, upon completion of construction, the proposed project would not change active or passive open space ratios within the study area but would significantly improve the open space amenities within East River Park, Stuyvesant Cove Park, Murphy Brothers Playground, and Asser Levy Playground. Moreover, the proposed project would improve accessibility to these open spaces through reconstructing or improving bridge connections to East River Park and between East River Park and Captain Patrick J. Brown Walk. Further, the proposed project would not introduce a new population that would significantly increase the use of recreational resources that might have an adverse effect. The proposed project would create substantial improved open spaces

in conjunction with other nearby proposed open space projects such as Pier 35 and Pier 42, resulting in beneficial cumulative effects. In addition, the proposed project involves the development and operation of a flood protection system that would help to protect the open spaces within the protected area. Under the Preferred Alternative and Alternative 5, improvements would further enhance open spaces by raising open space amenities in East River Park to increase their resiliency against future surge events.

In combination with the construction of the proposed project, there is the potential for cumulative adverse effects on open space during overlapping periods of construction activities at nearby planned projects. These projects are described in Chapter 2.0, “Project Alternatives,” and listed in **Appendix A1**. Under the With Action Alternatives, the effects of construction on open space are potentially significant and adverse. There is the potential for temporary significant adverse direct effects over multiple analysis years due to the displacement of most park features within East River Park and Stuyvesant Cove Park in addition to closures of Asser Levy Playground and Murphy Brothers Playground. Temporary displacement of open space for construction over the 5 percent threshold is considered significant since it could result in the overburdening of existing facilities within the open space study area. This adverse effect could be exacerbated by the concurrent construction of other open space projects (e.g., Luther Gulick Playground Reconstruction), further straining open space resources within the study area. Although partial mitigation measures are identified for open spaces during construction of the proposed project, it is concluded that there would be potential significant adverse direct and indirect effects on open space during construction.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges flood protection elements are not expected to increase the use of or result in the reduction or expansion of, recreational resources that might have an adverse effect.

Some of the open spaces within the Two Bridges project area include Coleman Square Playground, Murry Bergrtraum Softball Field, Martin F. Tanahey Playground, East River Esplanade, Rutgers Park, Catherine Slip Park, Alfred E. Smith Playground, Little Flower Playground, and Cherry Clinton Playground. Additional open space resources may be identified when a full inventory of open spaces in the Two Bridges project area is completed. Similar to the proposed project, the Two Bridges Project may provide opportunities for recreational programming and open space improvements to be integrated with the proposed flood protection components. The combined protections provided by the proposed project and the LMCR-Two Bridges Project would cumulatively benefit open spaces within the study area by enhancing waterfront access and protecting upland resources during coastal storm events in the protected area.

The LMCR-Two Bridges Project, depending on the design, could result in potential adverse effects to open space by temporarily displacing open space resources during periods of construction. The displaced open space resources for the LMCR-Two Bridges Project would be within the ½-mile open space study area for the proposed project. Therefore, the proposed project and LMCR-Two Bridges Project could result in additional cumulative adverse effects to open spaces during construction.

HISTORIC AND CULTURAL RESOURCES

The cumulative effects on historic and cultural resources of the proposed project and the projects proposed in the future under the No Action Alternative are described in this section. There are

multiple projects planned or under construction in Project Area One and the 400-foot portion of the Primary Area of Potential Effect (APE) that could, in conjunction with the proposed project, result in cumulative effects to historic and cultural resources. However, these cumulative effects are not expected to be significantly adverse.

For the proposed project, the City, in consultation with the New York City Landmarks Preservation Commission (LPC) and the New York State Historic Preservation Office (SHPO), would develop and implement Construction Protection Plans (CPPs) for architectural resources located within 90 feet of proposed construction activities to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment.

Similarly, protections for architectural resources would be put in place under the following projects: Pier 42, which will repair the portion of the East River Bulkhead (S/NR-eligible) within the Pier 42 project site and which will consult with SHPO regarding the design of the Pier 42 project on or around the historic, granite portions of the East River Bulkhead in accordance with a Programmatic Agreement between SHPO, the Lower Manhattan Development Corporation, and the Advisory Council on Historic Preservation; NYCHA resiliency projects at the S/NR-eligible Bernard Baruch and Jacob Riis Houses, as NYCHA is consulting with SHPO regarding the potential for those resiliency projects to result in adverse effects to the housing developments; and three NYC Parks projects at Asser Levy Playground, which will be coordinated with LPC so that there will be no adverse effects to the Asser Levy Playground architectural resource (S/NR, NYCL).

Building Code Section BC 3309: Protection of Adjoining Property will offer protection from accidental construction-related damage to the following architectural resources that are located within 90 feet of proposed NYC Parks park improvement projects: the Bernard Baruch Houses, and Rivington Street Bath.

One NYC Parks project to improve park facilities could result in adverse effects to one architectural resource. NYC Parks is proposing to construct an exterior entrance ramp to the former Marine Engine Co. 66 Fireboat House (S/NR-eligible) in East River Park. In addition, NYC Parks plans interior renovations to the building. As the former Fireboat House has undergone previous interior renovations to house the Lower East Side Ecology Center and to provide public restrooms, it is not expected that the planned interior renovations would result in an adverse effect on the Fireboat House. However, depending on the plans for the exterior ramp, the proposed project could adversely affect the integrity of the building's materials, design, and/or setting. However, if this project were to result in adverse effects to this park facility, it would not result in an adverse cumulative effect in combination with the proposed project and other projects.

The proposed project and other projects could result in construction-related effects to architectural resources. However, these effects would not result in adverse cumulative construction-related effects.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project, which is expected to include flood protection measures similar to those provided by the proposed project, could affect historic and cultural resources located within and adjacent to the LMCR-Two Bridges Project area, as described below.

Archaeological Resources

Previous archaeological studies have determined that portions of the LMCR-Two Bridges Project area are sensitive for potential archaeological resources and recommended further archaeological testing.¹ Depending on the nature and location of the project elements, a scope of work for additional archaeological testing may be needed and prepared in consultation with LPC and SHPO as the design of the LMCR-Two Bridges Project progresses. Additional analysis of potential effects on archaeological resources will be conducted in the environmental review for the LMCR-Two Bridges Project.

Architectural Resources

Architectural resources located within the LMCR-Two Bridges Project area that could experience direct or indirect effects include the FDR Drive (S/NR-eligible), the East River Bulkhead (S/NR-eligible), the Manhattan Bridge (S/NR) and the Brooklyn Bridge (NYCL, S/NR, NHL). In addition, there are a number of architectural resources in the surrounding area that include the Two Bridges Historic District (S/NR). For architectural resources located within 90 feet of proposed construction activities, the LMCR-Two Bridges Project would be required to develop and implement CPPs to avoid inadvertent construction-period damage from ground-borne vibrations, falling debris, collapse, dewatering, subsidence, or construction equipment. For any alterations to architectural resources, the project sponsor would consult with LPC and/or SHPO. Like the proposed project, it is not expected that the LMCR-Two Bridges Project would result in contextual or visual effects on architectural resources. Additional analysis of potential effects on architectural resources will be conducted in the environmental review for the LMCR-Two Bridges Project.

URBAN DESIGN AND VISUAL RESOURCES

As the proposed project would not have adverse effects on urban design, it would have no adverse cumulative effect in combination with other projects within or near the project area. It would, in fact, contribute to beneficial cumulative effects on urban design. The proposed improvements to East River Park that would occur under the proposed project (in varying degrees)—new landscaping, improved park access, a reconstructed bikeway/walkway, a new shared-use flyover bridge—would create visual improvements to East River Park, an enhanced pedestrian experience, and improved open spaces in conjunction with the new Pier 35 and Pier 42 public open spaces. Similarly, the reconstruction of Stuyvesant Cove Park under the proposed project and with the Solar One Environmental Education Center project would have beneficial cumulative effects on urban design and the pedestrian experience in Project Area Two.

The proposed project's floodwalls and closure structures alongside, across, and under the FDR Drive would be installed in locations where there are existing fences, walls, railings, jersey barriers, or where the FDR Drive is elevated on a viaduct. The floodwalls at the Con Edison East River Generating Facility would add to the system of walls and fences that define the urban design and pedestrian experience of the site, further walling it off from the surrounding streets. As the VA Medical Center New York was previously enclosed by walls and fences along East 23rd Street and its east perimeter facing Asser Levy Playground, the new floodwalls did not materially affect

¹ Historical Perspectives, Inc., East River Waterfront Esplanade and Piers – Inboard Resources North of Brooklyn Bridge Phase 1A Archaeological Assessment, 2007; and AKRF, Inc., East River Waterfront Access Project – Catherine Slip Phase 1A Archaeological Documentary Study, 2009.

urban design and the pedestrian experience. Therefore, these three projects together would not result in adverse cumulative effects to urban design.

The proposed project could potentially result in significant adverse visual effects by blocking views to the East River from multiple locations within the study area. These potential significant adverse effects would not be visually mitigated, resulting in unavoidable significant adverse effects. Lowering the floodwalls, levees and/or elevated park areas under Alternatives 2 and 3 or not elevating the majority of East River Park under the Preferred Alternative and Alternative 5 to allow continued views to the East River would impair the ability of the proposed project to provide adequate flood protection to the surrounding communities and would not meet the project goals. Although views to East River Park would be blocked under Alternatives 2 and 3, Alternative 3 would provide enhanced and more direct connections to the park, improving accessibility and the pedestrian experience. The Preferred Alternative and Alternative 5 would maintain views to East River Park and of the East River except from Grand Street, because the park would slope down to the grade of the FDR Drive and there would be no floodwalls along the park's western edge; these alternatives would also improve accessibility to the park. While the finishes of floodwalls would not mitigate the significant adverse effects of blocked views to the East River in Project Area One under Alternatives 2 and 3 or in Project Area Two under Alternative 5, the aesthetics of the finishes would affect the experience of pedestrians, residents, motorists, and bicyclists. Therefore, the finishes are being taken into account, and the floodwalls would be finished with board form concrete to create alternating smooth and textured surfaces to provide visual interest and relieve the monotony of an untextured blank wall. In addition, planting and landscape treatment can be used to mitigate the visual impact of floodwalls. As no significant adverse visual effects are anticipated with any of the proposed No Action Projects within the project area, including Pier 42, Lower East Side Ecology Center, Fireboat House Renovation, and Solar One Environmental Education Center proposed in the No Action Alternative, no cumulative adverse visual effects are anticipated.

In general, the experience of park users in the vicinity of closed and fenced sections of either East River Park or Stuyvesant Cove Park (and Murphy Brothers and Asser Levy Playgrounds under Alternatives 3 through 5) would be adversely affected, but these adverse effects would be temporary during the construction period. Views from residences and sidewalks in the immediate vicinity of construction would be temporarily obstructed during construction, views from the FDR Drive toward the park would be obstructed during the different construction phases, and views of the East River would be temporarily blocked during construction. Due to the temporary nature of construction, the proposed project and the other planned projects in the study area would not be expected to result in cumulative construction-related adverse effects on urban design and visual resources.

LMCR-TWO BRIDGES PROJECT

As it is expected that the flood protection measures proposed under the LMCR-Two Bridges Project would be similar in design to those under the proposed project, the LMCR-Two Bridges Project would similarly not have adverse urban design effects. The existing urban design of the Two Bridges area is similar to that of the proposed project's urban design study area, and it is expected, based on currently available information, that the design of the flood protection measures of this project, which could introduce new urban design elements in the area, would account for the area's specific urban design characteristics and that the LMCR-Two Bridges Project, like the proposed project, would be designed to benefit the urban design of the LMCR-Two Bridges Project area, which is located south of the proposed project area and includes Pier

35. Therefore, it is not expected that the proposed project and the LMCR-Two Bridges Project would result in cumulative adverse effects on urban design.

However, depending on the design, the LMCR-Two Bridges Project, like the proposed project, could result in potential adverse effects to visual resources by blocking views to the waterfront and East River. Therefore, the proposed project and LMCR-Two Bridges Project could result in cumulative adverse effects to visual resources by blocking views to the waterfront and river from multiple locations between East 25th Street and the Brooklyn Bridge.

As construction of the LMCR-Two Bridges Project would be expected to be similar to that for the proposed project, the LMCR-Two Bridges Project may result in adverse effects on urban design and visual resources. As with the proposed project, these adverse effects are expected to be temporary. Due to the temporary nature of the adverse effects and the fact that the adverse effects would be dispersed over a large area between the Brooklyn Bridge and East 25th Street, it is not anticipated that blocked views under the proposed project and the LMCR-Two Bridges project would happen concurrently and are not expected to result in cumulative construction-related adverse effects on urban design and visual resources.

NATURAL RESOURCES

The proposed project would result in the removal of a large number of the overall trees in the project area, many of which are mature trees, resulting in temporary adverse effects to terrestrial resources as the tree canopy is gradually restored. Under the Preferred Alternative, 981 trees would be removed due to project implementation; under Alternative 2, 265 trees would be removed due to project implementation; under Alternative 3, 776 trees would be removed due to project implementation; and Alternative 5 would remove the same number of trees as the Preferred Alternative. This tree removal is a temporary adverse effect. The project would implement a comprehensive planting program as part of a landscape restoration plan and restoration for the tree removals would be provided in compliance with Chapter 5 of Title 56 of the Rules of New York (NYC Department of Parks and Recreation Rules) and Local Law 3 of 2010. NYC Department of Parks and Recreation (NYC Parks). This landscape restoration plan includes over 50 different species, reflecting research around the benefits of diversifying species to increase resilience and adaptive capacity in a plant ecosystem and also pays special attention to species that can handle salt spray, strong winds, and extreme weather events. The design also focuses on creating a more layered planting approach, allowing for informal planting areas that layer plant communities together to express ecological richness. A more diverse native plants palette has the ability to better adapt to climate change stressors. Once planted and established, the new landscape would represent an improvement in ecological sustainability, habitat creation, and adaptability in the face of a changing climate. It should be noted that Under Alternatives 2 and 3, existing trees and other terrestrial resources would remain vulnerable and could be anticipated to be significantly damaged, requiring extended periods of post-storm tree removals for damaged or dying trees. Landscaped areas would be impacted from debris, inundation, salt damage, or wind and effects to terrestrial resources. Other projects that would occur in the future without the proposed project may include tree removal, but none have comparable footprints to the proposed project. Therefore, tree removal from those projects is not expected to have significant adverse effects to terrestrial resources in the project area, and significant cumulative effects to terrestrial resources are not expected.

Several planned projects will be under construction in the natural resources study area at the same time as the proposed project. These projects include the construction of the Lower East Side

Ecology Center compost facility and the construction of Pier 42. Within East River Park, the construction of the Lower East Side Ecology Center would occur in conjunction with the construction of the flood protection system. The Lower East Side Ecology Center is currently used for composting and lacks terrestrial resources. Construction of the Lower East Side Ecology Center would not result in additive tree effects or effects to peregrine falcon habitat.

Under the proposed project, the cumulative construction effects to the East River resulting from the proposed project, and planned projects such as Pier 42, are expected to be temporary. In all projects, in-water work is expected to be minimized to the extent practicable. Pier 42 reconstruction would occur at the southern end of the study area. Barging to support construction of the proposed project would result in temporary disturbance of littoral zone tidal wetlands. In addition, under the Preferred Alternative and Alternative 5, construction to reconstruct sewer infrastructure within East River Park as well as installation of support structures for the shared use flyover bridge, demolition of the existing embayments and existing piles and formwork associated with the esplanade in these areas would also temporarily disturb regulated tidal wetlands. Additional in-water work under Alternative 5 would be required for the installation of the support shafts to elevate the FDR Drive. However, this work would be located north of in-water construction activities to support Pier 42, and appropriate best management practices (BMPs) and mitigatory measures, such as use of turbidity curtains, would be used.

Adverse effects to aquatic resources would be mitigated for with the creation of approximately 26,000 square feet new embayments within the project area and off-site wetland restoration or through the purchase of credits from the Saw Mill Creek Wetland Mitigation Bank operated by New York City Economic Development Corporation (EDC) and located on Staten Island, New York, pursuant to NYSDEC and USACE permit requirements. The proposed embayments would be of comparable or larger size with improved habitat conditions, including the elimination of bridges that shade aquatic habitat, which can reduce benthic organism productivity and biomass. Moreover, the provision of habitat enhancements designed for the recruitment of shellfish and other aquatic life along East River Park is also being explored as design advances. A consultation with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA NMFS) as required by the FWCA, Magnuson Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Clean Water has been reinitiated. Any conservation measures identified as a result of that consultation will be identified in the Final EIS.

There may be overlapping noise effects from the projects in the southern end of the proposed project's study area and a portion of the study area would be inhospitable to fish, including the Atlantic and shortnose sturgeon, for a temporary period during construction. To minimize the noise effects on Atlantic sturgeon, conservation measures would be implemented that would reduce the noise or the likelihood that sturgeon would be exposed to the construction activities. These conservation measures include, to the greatest extent practicable, the use of bubble curtains for pile driving activities, the use of a cushion block, and gradually ramping up pile driving. With these conservation measures in place, Atlantic sturgeon may be discouraged from utilizing the near-shore environment in the East River but the proposed project would not be anticipated to significantly adversely affect the Atlantic sturgeon population. Any conservation measures identified as a result of the consultation with NOAA NMFS will be identified in the FEIS.

Other projects that would occur in the future without the proposed project may include in-water work but would similarly be required to avoid and minimize any adverse effects and, where necessary, mitigate any adverse effects in accordance with applicable USACE and NYSDEC permits and attendant regulations. As no major or even moderate adverse effects to wetland

resources are anticipated from those projects, no cumulative adverse effects to wetland resources are anticipated.

LMCR-TWO BRIDGES PROJECT

Depending on the design and other elements of the LMCR-Two Bridges Project, it is not expected to result in significant adverse effects on natural resources. With the exception of street trees planted landward of the East River, the entire LMCR-Two Bridges Project Area is paved. At this time, it is not known whether the LMCR-Two Bridges Project will have any in-water components. If the in-water components included, they are anticipated to be minimal. Similar to the proposed project, it is expected that the majority of the Two Bridges flood protection elements would be constructed inland. As described above, there may be overlapping noise effects from the LMCR-Two Bridges Project near the southern end of the proposed project's study area if construction occurs concurrently with the proposed project. If in-water work is required, a portion of the study area would be inhospitable to fish, for a temporary period during construction; however, fish would still be expected to utilize areas outside of the construction areas. Any in-water activities or components would require consultation with NOAA NMFS to identify measures to avoid, minimize, and mitigate any adverse effects to listed species and essential fish habitat. While there would be permanent adverse impacts to wetlands and USACE Waters of the United States as part of the proposed project, these impacts would be mitigated through a wetland restoration design that meets all NYSDEC and USACE permit conditions. Due to these mitigatory measures in addition to the limited extent of impact within the East River, the proposed project is unlikely to result in significant adverse effects to wetland or surface water resources. Therefore, based on currently available information about the LMCR-Two Bridges Project, operation of a flood protection system under the proposed project and the LMCR-Two Bridges Project is not expected to result in cumulative adverse effects on any natural resources beyond terrestrial resources, namely trees. If the Two Bridges Project results in removal of the few existing trees in the LMCR-Two Bridges Project Area, then there is the potential for temporary cumulative effects to terrestrial resources.

HAZARDOUS MATERIALS

Subsurface investigation of the project area identified areas with subsurface contamination consistent with wastes from historical MGP contamination and, throughout the project area, as expected, historical fill material. Under the No Action Alternative, no new comprehensive coastal flood protection systems would be installed, but a number of projects planned or under construction in the project area might disturb hazardous materials, possibly including MGP wastes, and potentially increase pathways for human or environmental exposure. Additional procedures would need to be set out for projects in the study area, including Pier 42, the Lower East Side Ecology Center at the southern end of East River Park, renovation of the Fireboat House in East River Park (near Grand Street), and Solar One Environmental Education Center in the project area.

The proposed project would have the potential for significant adverse effects related to hazardous materials since it involves both demolition and excavation. However, with the implementation of appropriate protection measures governing the construction and operational phases, the potential for significant adverse effects related to hazardous materials would be mitigated. Similarly, the planned projects in the study area might disturb the subsurface and any hazardous materials present there, and potentially increase pathways for human or environmental exposure. However, these projects would also need to comply with applicable regulatory requirements. Therefore, no

significant adverse cumulative effects to hazardous materials as a result of the proposed project and the other projects in the study area are expected.

Absent the proposed project, it would not be expected that Con Edison would perform excavation within Stuyvesant Cove Park (or other portions of the proposed project area) based on current information about Con Edison's potential remediation of MGP waste in the area. To the extent that construction of levees, elevated or regraded park areas or flood walls would remove some soils contaminated with manufactured gas plant wastes and/or contaminated groundwater, these activities would serve as additional remediation (beyond that which Con Edison might conduct upland of the project area and/or of sediments in the East River) based on current information about Con Edison's potential remediation of MGP waste in the area.

LMCR-TWO BRIDGES PROJECT

Based on current data, the LMCR-Two Bridges Project area is believed to have less contamination than the proposed project area, and since the potential for significant adverse effects from both the proposed project and the LMCR-Two Bridges Project would be avoided by incorporating similar protection measures into both projects, no adverse cumulative effects to hazardous materials would be expected.

WATER AND SEWER INFRASTRUCTURE

The projects within the drainage protected area include the New York City Community Garden Coalition Gardens Rising (Gardens Rising) green infrastructure investments and the Trust for Public Land (TPL) school playground project would construct green infrastructure to reduce stormwater runoff generated from small storm events at community gardens and two playgrounds within the drainage protected area.

Under the proposed project, modifications to the sewer system include drainage management and drainage isolation components to isolate the protected area from the larger sewershed and to prevent overland flooding from compromising the sewer system during design storm events. In addition, to reduce the risk of sewer surcharge and above-grade flooding during a design storm event, additional conveyance pipes and other infrastructure improvements would be installed to provide drainage management. The new pipes and additional improvements would increase the capacity of the sewer system to store and convey sewer flow to the interceptor. During design storm events, the operation of these drainage components would reduce the risk of sewer surcharging and inland flooding under design storm conditions within the drainage protected area. Operation of the isolation components may result in negligible increases in the hydraulic grade line (HGL) in the main interceptor outside of the drainage protected area; however, any flooding experienced in these areas would be comparable to flooding experienced under the No Action Alternative. During non-storm operations, sewer infrastructure would continue to operate as under existing conditions.

Green infrastructure implemented under the Gardens Rising program and the TPL school playground project would reduce stormwater runoff at community gardens and two playgrounds, incrementally reducing the combined flow to the existing sewer infrastructure system during typical rainfall events, resulting in a moderate beneficial effect. However, the incrementally reduced runoff due to these programs during design storm conditions would not significantly reduce combined sewer flow or require alterations to the existing sewer infrastructure.

Several planned projects will be under construction in the drainage protected area at the same time as the proposed project. These projects include, but are not limited to, the Lower East Side Ecology Center and the construction of Pier 42. The cumulative construction effects on water and sewer infrastructure resulting from the proposed project and other planned projects within the water and sewer infrastructure study area would be minimal. All construction would be performed in accordance with methods and standards approved by the New York City Department of Environmental Protection (DEP). Any interference with existing infrastructure would be identified, and protected, supported, and maintained in place throughout the duration of work. If required, relocation of water and sewer mains or lines would be undertaken without affecting the conveyance of flow through the infrastructure system. No disruption to existing water supply or sewer service is expected. Therefore, no significant adverse cumulative effects to water and sewer infrastructure as a result of the proposed project and the other projects in the study area are expected.

LMCR-TWO BRIDGES PROJECT

The LMCR-Two Bridges Project would include components to isolate its tributary area from the non-storm surge protected sewersheds upstream of it during a design storm event and may install additional components to provide drainage management, as with the proposed project. The LMCR-Two Bridges Project has the potential to be designed to connect to the proposed project in efforts to better protect lower Manhattan from a design storm event.

During design storm events, operation of the proposed project and LMCR-Two Bridges Project and drainage isolation components may result in HGL increases in areas outside of the two protected project areas. However, similar to effects described for the proposed project, this additional surcharge would not result in a significant adverse effect in comparison to the volume and extent of flooding in these unprotected areas under the No Action Alternative. Therefore, based on currently available information, the operation of the proposed project and the LMCR-Two Bridges Project is not expected to result in any cumulative adverse effects on water and sewer infrastructure.

It is expected that both the proposed project and the LMCR-Two Bridges Project would implement similar measures to protect, support, and maintain in place all water and sewer infrastructure during construction. Any relocation associated with the projects, if needed, would be coordinated with DEP and would not affect water or sewer service. Therefore, no adverse cumulative effects on water or sewer infrastructure are anticipated.

TRANSPORTATION

The proposed project consists of a series of flood protection features and would not generate a new residential or employee population and associated vehicular travel demand. During non-storm operations under the proposed project, with the implementation of new comprehensive coastal flood protection systems, modifications to the transportation system include converting East 10th Street between the traffic circle and the FDR Drive service road from a two-way to one-way eastbound and to close the service road in front of the BP Gas Station to vehicular traffic at East 23rd Street. During design storm events, various roads would be closed when the closure structures are deployed. The magnitude of vehicular, pedestrian, and bicycle volumes within the surrounding transportation network is expected to be minimal during emergency operations and traffic/pedestrian operations are expected to be controlled by the New York City Police Department (NYPD). Transit routes would not be restricted when the closure structures are

operational except for the Route 34A bus. Due to the placement of the closure structures across Avenue C at East 23rd Street, the Route 34A bus would not be able to make the East 23rd Street to Avenue C movement. The No Action Alternative would include a variety of new developments within ½ mile of the waterfront that are expected to be complete by 2025. Many of these planned projects would result in modest pedestrian and bicycle generators near the waterfront, and are accounted for as part of the CEQR Technical Manual background growth in addition to the larger projects mentioned above. Therefore, no significant adverse cumulative effects to transportation as a result of the proposed project under the proposed project and the other projects in the study area are expected.

Several planned large-scale development projects will be under construction in the study area at the same time as the proposed project. These projects include, but are not limited to, Brookdale Campus, One Manhattan Square/Extell, Alexandria Phase 3, and the Two Bridges development. Under the proposed project, the cumulative construction effects on transportation resulting from the proposed project and other projects within the transportation study area would be dependent on the construction schedules and peak construction intensity of each project. Typically, construction managers for simultaneous projects on nearby construction sites within New York City would generally coordinate their activities to avoid delays and inefficiencies. Further, Maintenance and Protection of Traffic (MPT) plans would be developed for any temporary curb-lane, sidewalk, and roadway closures. Under Alternatives 2, 3, and the Preferred Alternative, during the installation of closure structures (including gates and associated foundations) across the FDR Drive near East 13th Street as per the preliminary designs, the FDR Drive may require a temporary full closure during construction. Depending on the type of closure and the duration, vehicular traffic from the FDR Drive would need to be diverted to the local roadways in the study area. Approval of the MPT plans and implementation of all temporary closures during construction would be coordinated with NYCDOT's Office of Construction Mitigation and Coordination (OCMC). Therefore, taking into consideration these factors and the varying construction schedules per project, the cumulative construction transportation effects from the proposed project and nearby proposed projects within the study area could be significant.

If additional road closures were needed as part of any other No Action projects then additional significant adverse traffic effects could also be identified during construction.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges Project would be designed to mitigate the effects of inundation from flood waters and to create opportunities for programming and enhance waterfront views and community access where possible. It would not create new developments housing residential or worker populations. Therefore, similar to the proposed project, there may only be a slight increase in pedestrian traffic, which will be verified with additional pedestrian studies. Nevertheless, it is assumed that the LMCR-Two Bridges Project would not increase any pedestrian elements by more than the *CEQR Technical Manual* 200 pedestrians during a peak hour analysis threshold.

For the LMCR-Two Bridges Project, existing sidewalk and bicycle path widths could be narrowed at various locations within the Two Bridges neighborhood, if required by the design of the flood mitigation. However, that effect would only be experienced within the Two Bridges neighborhood. As discussed above, transit routes under the proposed project would not be restricted when the closure structures are operational except for the Route 34A bus due to the placement of the closure structures across Avenue C at East 23rd Street. Any effects on transit routes for the Two Bridges

project is expected to be limited to within the Two Bridges neighborhood. Therefore, the LMCR-Two Bridges Project and the proposed project are not expected to result in cumulative transportation effects.

The LMCR-Two Bridges Project, depending on the design, could result in potential adverse effects to transportation during construction. Depending on the construction schedule and peak construction duration for the LMCR-Two Bridges Project, the average daily construction traffic, pedestrians, transit, and parking demand are likely to increase within the transportation study area when construction of the LMCR-Two Bridges Project would occur simultaneously with the proposed project, especially at key roadways such as the FDR Drive, South Street, Pike Street/Allen Street, and Montgomery Street. Should the LMCR-Two Bridges Project be subject to CEQR review and trigger the CEQR traffic threshold during the construction period, a traffic Levels of Service assessment would likely be warranted, and a disclosure of effects and mitigation required. Therefore, significant adverse transportation effects in addition to those identified for just the proposed project may result where standard mitigation may not be sufficient and Traffic Enforcement agents would be needed as required.

As the design of the LMCR-Two Bridges Project becomes more defined, it will be studied as part of a separate environmental review, for which more details on the predicted construction transportation effects and associated mitigation measures for the LMCR-Two Bridges Project alone and the cumulative effects of the LMCR-Two Bridges Project and the proposed project, would be determined.

NEIGHBORHOOD CHARACTER

As defined in the *CEQR Technical Manual*, neighborhood character is an amalgam of various elements that give neighborhoods their distinct “personality.” These elements may include a neighborhood’s land use, socioeconomic conditions, open space, historic and cultural resources, urban design and visual resources, shadows, transportation, and/or noise. Therefore, the cumulative effects in relevant technical areas were considered for this section.

No significant adverse cumulative effects related to land use, zoning, and public policy; open space; socioeconomic conditions; and transportation are expected on neighborhoods within the study area as a result of the proposed project and the projects proposed under the No Action Alternative. Several planned projects are anticipated to be under construction in the study area at the same time as the proposed project. These projects include the conversion of Pier 42 into waterfront open space, site specific resiliency measures at study area NYCHA locations, open space improvements at two public schools, and the development of the Solar One facility in Stuyvesant Cove Park. Collectively, these planned projects to enhance open space resources, provide targeted resiliency measures, and improve access to parkland and other parts of the City are consistent with the current neighborhood uses, are not anticipated to significantly adversely affect historic and cultural resources, and are not expected to create any substantial change in neighborhood character.

The proposed project would be consistent with existing land use patterns and trends within the study area. Changes to open space resources would not significantly affect the character of the neighborhood. Under the proposed project, potential adverse effects related to one architectural resource (the FDR Drive) was identified as a result of proposed work in East River Park. However, construction of the proposed project would be conducted in coordination with NYCDOT to ensure protection of these resources. Therefore, no significant adverse cumulative effects to historic and cultural resources as a result of the proposed project and the No Action projects are expected.

Potential adverse effects to waterfront and river views from certain locations within the study area were identified as a result of the proposed project. However, none of the projects evaluated for cumulative effects are anticipated to further restrict visual access to the river. Therefore, no significant adverse cumulative effects to urban and visual resources as a result of the proposed project and the No Action projects are expected.

No significant cumulative adverse effects associated with the elements that contribute to neighborhood character were identified as a result of the proposed project and the No Action projects. Therefore, it is not expected that the proposed project and the No Action projects would combine to result in major cumulative adverse effects to the fabric and character of the neighborhoods within the study area, but rather would result in long-term moderate beneficial effects due to the open space access improvements, the enhancements to open spaces, and the installation of a comprehensive flood protection system to reduce the risk of damage from design storms to the neighborhood.

LMCR-TWO BRIDGES PROJECT

Similar to the proposed project, the LMCR-Two Bridges Project would construct a flood protection system to protect the Two Bridges neighborhood, while also striving to enhance waterfront access and improving the area's economic and social resiliency. Like the proposed project, it is expected that the LMCR-Two Bridges Project would introduce flood protection elements designed to integrate into the existing parkland and streets of the study area, while enhancing open space and access to open space for residents. It is expected that any alterations to architectural resources in the LMCR-Two Bridges project area, including the Two Bridges Historic District, would be undertaken in consultation with LPC and/or SHPO. Depending on the design, the LMCR-Two Bridges Project could result in potential adverse effects to visual resources by blocking views to the waterfront and the East River. However, based on currently available information, these potential adverse effects may not result in changes to the context and feeling of the neighborhood. Therefore, no significant cumulative effects to neighborhood character as a result of the proposed project and the LMCR-Two Bridges Project are anticipated. Additional analysis of potential effects on neighborhood character is expected to be conducted as part of the environmental review for the LMCR-Two Bridges Project.

ENVIRONMENTAL JUSTICE

As described in Chapter 5.11, "Environmental Justice," the proposed project is not expected to result in any disproportionately high and adverse effects on minority and low-income populations. Residents in the project area, including minority and low-income populations would benefit from the proposed coastal flood protection. The No Action projects in the study area are not expected to result in any disproportionately high and adverse effects on minority and low-income populations. Accordingly, no adverse cumulative effects would be expected.

LMCR-TWO BRIDGES PROJECT

Similarly, it is not expected that the LMCR-Two Bridges Project would result in any such effects, even though the Two Bridges area has a high concentration of minority and low/moderate-income residents. The LMCR-Two Bridges Project will complete a separate environmental review under NEPA, which would assess the project's environmental justice effects. Together, the proposed project and the LMCR-Two Bridges Project would likely have a cumulative positive effect by reducing flooding potential and enhancing waterfront open spaces and access to the waterfront.

Like the proposed project, it is expected that the LMCR-Two Bridges Project would comply with all applicable NEPA and HUD regulations related to environmental justice protections.

CUMULATIVE CONSTRUCTION EFFECTS

As described in Chapter 6.0, “Construction Overview,” with commencement of construction projected in 2020 and an approximately 3.5 to 5-year construction period, construction under the proposed project is expected to be complete by 2025. This section examines whether the overlapping of construction activities from nearby No Action projects and the proposed project would result in increased adverse effects near the surrounding community in the relevant technical areas.

CONSTRUCTION—ENERGY

The cumulative construction effects on energy resulting from the proposed project and other projects within the study area, including Pier 42 just south of the project area and Solar One Environmental Education Center, would be minimal. All construction would be performed in accordance with NYC laws and regulations. As discussed in Chapter 6.8, “Construction—Energy,” protective measures would be implemented to ensure that construction of the proposed project would not disrupt the function of energy infrastructure and the electrical supply in Lower Manhattan.

LMCR-Two Bridges Project

Similar to the proposed project, LMCR-Two Bridges Project is expected to implement protective measures to ensure that construction activities would not disrupt the function of energy infrastructure and the electrical supply in Lower Manhattan. Therefore, no adverse cumulative effects on energy would be expected.

CONSTRUCTION—AIR QUALITY

The cumulative construction-related effects of the proposed project and No Action projects on air quality are described in this section. The construction air quality effects of the proposed project as described in Chapter 6.10, “Construction—Air Quality,” included emissions generated by construction truck and worker vehicles traveling to and from the project areas as well as emissions generated by construction equipment operating within the project areas (i.e., non-road equipment).

The cumulative construction effects on air quality resulting from the proposed project and other projects near the project area would be dependent on the construction schedules and peak construction intensity of each project. Taking into consideration the varying construction schedules per project, even if the construction of the proposed projects under the No Action Alternative, including Pier 42 just south of the project area and Solar One Environmental Education Center in Project Area Two, would occur at the same time as construction under the proposed project, potential air quality concentration increments at nearby sensitive receptor locations during construction would be considerably diminished by dispersion due to the distance between the construction emissions sources for the proposed projects under the No Action Alternative and the proposed project. In addition, the No Action projects would be constructed in accordance with all applicable laws and regulations, including the use of clean fuel, the idling restriction for on-road vehicles, and dust suppression measures. Therefore, the cumulative air quality effects of simultaneous construction of the No Action projects and the proposed project at local sensitive receptor locations are expected to be minimal.

LMCR-Two Bridges Project

If construction for the proposed project occurs simultaneously with the construction of the LMCR-Two Bridges Project, potential air quality concentration increments at nearby sensitive receptor locations (i.e., residences, open spaces) during construction would be considerably diminished by dispersion due to the distance between the construction emissions sources for the LMCR-Two Bridges Project and the proposed project. Therefore, the cumulative air quality effects of potential simultaneous construction of the LMCR-Two Bridges project and the proposed project on local sensitive receptor locations are expected to be minimal. As the design of the LMCR-Two Bridges Project becomes more defined, it will be studied as part of a separate environmental review, for which more details on the predicted cumulative regional effects of the LMCR-Two Bridges Project and the proposed project would be determined.

CONSTRUCTION—GREENHOUSE GAS

The construction period for several planned projects, including Pier 42 and Solar One Environmental Education Center, would overlap with the construction period of the proposed project. These projects include Pier 42 just south of the project area. In addition, construction of the LMCR-Two Bridges Project could also occur simultaneously with construction for the proposed project.

The proposed project would result in increased greenhouse gas emissions during construction, but the greenhouse gas (GHG) emissions analysis for the proposed project would not be affected by concurrent construction of any other nearby projects. Therefore, no adverse cumulative effects on GHG are anticipated.

LMCR-Two Bridges Project

Construction means and methods for the LMCR-Two Bridges Project are expected to be similar to that for the proposed project. Depending on the design and the construction schedule for the LMCR-Two Bridges Project, its construction may overlap with that of the proposed project. The GHG analysis for the proposed project would not be affected by concurrent construction of the LMCR-Two Bridges Project since the analysis determines consistency with the City's GHG reduction goals based on the total GHG emissions for the estimated life of the proposed project only as well as any potential measures that may reduce emissions. Emissions from outside of the proposed project—both construction and operational—would not result a change to the total GHG emissions for the proposed project. Therefore, no adverse cumulative effects on GHG are anticipated.

CONSTRUCTION—NOISE AND VIBRATION

The construction noise effects of the proposed project as described in Chapter 6.12, "Construction—Noise and Vibration," included noise from the operation of construction equipment and noise from construction and delivery vehicles travelling to and from the site. A screening level mobile-source analysis indicated that vehicle trips associated with construction of the proposed project would not have the potential to result in significant adverse noise effects at any noise receptor locations.

During, construction of the proposed project, noise control measures would be implemented as required by the *New York City Noise Control Code*, including both path control (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors) and source control (i.e., reducing noise levels at the source or during the most sensitive time periods). Even with these measures, the cumulative analysis of construction vehicle trips and

operation of on-site construction equipment indicated the potential for significant adverse noise effects as a result of construction at some receptors for the proposed project.

The cumulative construction effects on noise resulting from the proposed project and other projects near the project area would be dependent on the construction schedules and peak construction intensity of each project. Taking into consideration the varying construction schedules per project, the construction of the proposed projects under the No Action Alternative, including Pier 42 just south of the project area and Solar One Environmental Education Center in Project Area Two, would occur at the same time as construction under the proposed project.

Significant adverse construction noise effects are expected to be similar across the proposed project. Depending on the construction schedule and peak construction intensity of each project, this adverse effect could be exacerbated by the concurrent construction of other projects within or immediately adjacent to the project area (e.g., Pier 42 and Solar One Environmental Education Center), further increasing the temporary noise effects within the study area. Therefore, there is potential for cumulative significant adverse noise effects during construction.

Vibration resulting from construction of the proposed project would not result in exceedances of the acceptable limit, including for historic structures. However, vibration monitoring would be required for all historic structures within 90 feet of the project work areas for the proposed project and any No Action projects according to the project's CPP to ensure vibration does not exceed the acceptable limit at any of these historic structures. In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location. While the vibration may be noticeable at times, for the proposed project and any No Action Projects, it would be temporary and would consequently not rise to the level of a significant adverse effect. Therefore, the cumulative vibration effects of potential simultaneous construction of the LMCR-Two Bridges project and the proposed project on local sensitive receptor locations are expected to be minimal.

LMCR-Two Bridges Project

The combined on-site construction noise associated with both the proposed project and the LMCR-Two Bridges Project could potentially be greater than the level of construction noise from the proposed project alone at locations in proximity to both projects. However, it is unlikely that construction activities would occur in the same area (i.e., adjacent construction segments) or if so, for any extended period of time that would result in a significant adverse noise effect. The additional construction noise associated with the LMCR-Two Bridges Project is not expected to result in either significant adverse noise effects in the analysis of the proposed project or increase the magnitude or duration of effects that were identified.

PUBLIC HEALTH

As discussed in 6.13, "Public Health," the proposed project would not result in a significant adverse public health effect. Furthermore, with the implementation of the proposed project, residents would be less vulnerable to flooding during design storm events. Combining with other resiliency projects in the study area, including NYCHA and the LMCR-Two Bridges projects, the cumulative effects of the proposed project and these resiliency projects are anticipated to have long-term beneficial effects to the residents in the study area. *