Astoria Cove
CHAPTER 15: GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

A. INTRODUCTION

As discussed in the *City Environmental Quality Review* (CEQR) *Technical Manual*, increased concentrations of greenhouse gases (GHGs) are changing the global climate, resulting in wide-ranging effects on the environment, including rising sea levels and intensity, increases in temperature, and changes in precipitation levels. Although this is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level. Through PlaNYC, New York City's long-term sustainability program, the City advances sustainability initiatives and goals to both greatly reduce GHG emissions and increase the City's resilience to climate change. The New York City Climate Protection Act, enacted as Local Law 22 of 2008, established the goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 (the "GHG reduction goal"). This goal was developed for the purpose of planning for an increase in population of almost one million residents while achieving significant greenhouse gas reductions. As noted in the *CEQR Technical Manual*, seeking to expand its codified goal of reducing GHG emissions by 30 percent by 2030, the City is considering potential strategies to reduce its GHG emissions by more than 80 percent by 2050.

The contribution of a proposed project's GHG emissions to global GHG emissions is likely to be considered insignificant when measured against the scale and magnitude of global climate change. However, certain projects' contribution of GHG emissions still should be analyzed to determine their consistency with the City's GHG reduction goal, which is currently the most appropriate standard by which to analyze a project under CEQR. The GHG consistency assessment focuses on those projects that have the greatest potential to produce GHG emissions that may result in inconsistencies with the GHG reduction goal to a degree considered significant. Correspondingly, those projects have the greatest potential to reduce those emissions through the adoption of project measures and conditions. The *CEQR Technical Manual* recommends that a GHG consistency assessment be conducted for any project resulting in 350,000 square feet (sf) of development or more and other energy-intense projects.

The Proposed Action is expected to facilitate the construction of new multi-unit mixed-use buildings totaling 2,189,068 gross sf (gsf).[1] Therefore, a GHG consistency assessment has been conducted. GHG emissions that would be generated as a result of the Proposed Action—and measures that would be implemented to limit those emissions—are presented in this chapter, along with an assessment of the Proposed Action's consistency with the citywide GHG reduction goal.

In addition, as a portion of the project site falls within the 100-year flood zone and an analysis of consistency with Policy 6.2 of the Revised Waterfront Revitalization Program (WRP) was warranted and provided in Chapter 2, "Land Use, Zoning, and Public Policy," a qualitative discussion of the potential effects of climate change on the proposed project is provided below.

[1] Pursuant to CEQR, the GHG assessment is based on the total GHG emissions associated with a project, rather than the relative increment of a project's GHG emissions as compared to a No-Action scenario.

B. PRINCIPAL CONCLUSIONS

It is estimated that the proposed project would result in approximately 26,348 total metric tons of GHG emissions from its operations and 7,569 metric tons of GHG emissions from mobile sources annually. This would represent an annual total of approximately 33,917 total metric tons of GHG emissions. In comparison, New York City's annual GHG emissions total in 2012 was approximately 47.9 million metric tons. In addition, according to the PlaNYC document *Inventory of New York City Greenhouse Gas Emissions* (December 2013), the total for supplying energy to buildings (residential, commercial, industrial, and institutional) was 33.9 million metric tons.[1] Compared to these values, the contribution of the proposed project's GHG emissions to GHG emissions citywide is insignificant and represents approximately 0.07 percent of the total citywide emissions.

The *CEQR Technical Manual* provides specific GHG reduction goals through which a project's consistency with the City's emissions reduction goal is evaluated. The Applicant is currently evaluating the specific energy efficiency measures and design elements that may be implemented to support these goals. The proposed project's use of natural gas for heating systems, its commitment to construction air quality controls, its introduction of a residential shuttle to the 30th Avenue subway station, and its use of water-conserving features and water-efficient landscaping would advance New York City's GHG reduction goals as stated in PlaNYC. In addition, the development could be subject to changes in the New York City Building Code that are currently being considered to require greater energy efficiency and to further the goals of PlaNYC. These could include energy efficiency requirements, specifications regarding cement, and other issues influencing GHG emissions. Furthermore, by virtue of the location of the project site in relation to public transportation, the Proposed Action, which would facilitate dense and efficient mixed-use buildings, would be consistent with the GHG reduction goals. The Proposed Action is, therefore, based on the aforementioned commitments to energy efficient project features, and by virtue of the project's location and nature, consistent with the City's GHG reduction goals, as defined in the *CEQR Technical Manual*.

All waterfront buildings would be constructed to meet the standards of the New York City Building Code and the Best Available Flood Hazard Data available from the Federal Emergency Management Agency (FEMA) at the time of their construction (which will be reflected in the Restrictive Declaration to be recorded). Specific areas of the project site that are within the 100-year floodplain include a small area of Building 1 and small portions of the waterfront esplanade. Should the base flood elevation rise to these projected elevations in the future, the Applicant anticipates retrofitting the perimeter of Building 1 with flood prevention systems (either temporary or permanently installed flood gates/shutters), potentially in conjunction with an emergency flood protection plan. As the potential future floodplain elevations on the remaining waterfront buildings may be slightly above the currently anticipated ground floor elevations for the waterfront buildings, the ground floor elevations could be raised to be out of the applicable floodplain, as zoning permits the proposed buildings' Base Plane to be set at the 100-year flood elevation. Therefore, the proposed project would minimize the potential for public and private losses due to flood damage, reduce the exposure of public utilities to flood hazards, and prepare for and address future risks, and would be consistent with the City's climate change goals.

[1] City of New York, *Inventory of New York City Greenhouse Gas Emissions, December 2013*, by Jonathan Dickinson, Jamil Khan, and Mikael Amar. Mayor's Office of Long-Term Planning and Sustainability, New York, 2013.

C. BACKGROUND

Recognized Greenhouse Gases

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the general warming of the Earth's atmosphere, or the "greenhouse effect." Some GHGs, such as carbon dioxide (CO_2), occur naturally and are emitted into the atmosphere through natural processes and human activities. The principal GHGs emitted as a result of human activities are described below.

Carbon Dioxide (CO_2)

Carbon dioxide (CO_2) enters the atmosphere via the combustion of fossil fuels (oil, natural gas, and coal), solid waste, trees, and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Although not the GHG with the strongest effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG.

Methane (CH_4)

Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, as well as by the decay of organic waste in municipal solid waste landfills. Methane, in addition to nitrous oxide (noted below), play an important role since the removal processes for these compounds are limited and they have a relatively high impact on global climate change as compared to an equal quantity of CO_2.

Nitrous Oxide (N_2O)

Nitrous oxide (N_2O) is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste.

Fluorinated Gases

Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are powerful synthetic greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons [CFCs], hydrochlorofluorocarbons [HCFCs], and halons). These gases are typically emitted in smaller quantities. However, because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases (High GWP gases).

The *CEQR Technical Manual* lists six GHGs that could potentially be included in the scope of an Environmental Impact Statement (EIS): CO_2, nitrous oxide (N_2O), methane, Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). This analysis focused on CO_2, N_2O, and methane as there are no significant direct or indirect sources of HFCs, PFCs, or SF_6 associated with the Proposed Action.

GHGs differ in their ability to trap heat. To compare emissions of GHGs, compilers use a weighting factor called a Global Warming Potential (GWP), where the heat-trapping ability of one metric ton (1,000 kilograms) of CO_2 is taken as the standard, and emissions are expressed in terms of CO_2 equivalents

(CO_2e), but can also be expressed in terms of carbon equivalents. The GWPs for the main GHGs are presented in Table 15-1.

Table 15-1: Global Warming Potential for Primary Greenhouse Gases

Greenhouse Gas	Common sources	Global Warming Potential
CO_2 - Carbon Dioxide	Fossil fuel combustion, forest clearing, cement production	1
CH_4 - Methane	Landfills, production and distribution of natural gas and petroleum, anaerobic digestion, rice cultivation, fossil fuel combustion	21
N_2O - Nitrous Oxide	Fossil fuel combustion, fertilizers, nylon production, manure	310
HFCs - Hydrofluorocarbons	Refrigeration gases, aluminum smelting, semiconductor manufacturing	140-11,700*
PFCs - Perfluorocarbons	Aluminum production, semiconductor manufacturing	6,500-9,200*
SF_6 - Sulfur Hexafluoride	Electrical transmissions and distribution systems, circuit breakers, magnesium production	23,900

Notes: Since the Second Assessment Report (SAR) was published in 1995, the IPCC has published updated GWP values in its Third Assessment Report (TAR) and Fourth Assessment Report (AR4) that reflect new information on atmospheric lifetimes of greenhouse gases and an improved calculation of the radiative forcing of CO_2. However, GWP values from the SAR are still used by international convention to maintain consistency in GHG reporting, including by the United States when reporting under the United Nations Framework Convention on Climate Change.

* The GWPs of HFCs and PFCs vary depending on the specific compound emitted. A full list of these GWPs is available in Table ES-1 of the U.S. Environmental Protection Agency's *Inventory of Greenhouse Gas Emissions and Sinks: 1990-2008*, available at: http://epa.gov/climatechange/emissions/usinventoryreport.html.

Climate Change

Climate change is expected to result in increasing temperatures, changes in precipitation patterns, rising sea levels, and more intense and frequent extreme weather events, such as heavy downpours, heat waves, droughts, and high winds. As discussed in Chapter 2, "Land Use, Zoning, and Public Policy," the New York City Panel on Climate Change (NPCC) projects that by the 2050s sea levels could be between 11 and 24 inches higher than they are today; the NPCC's high estimate for sea level rise is 31 inches by 2050. In addition, coastal flood and storms are projected to occur more frequently with higher associated storm surges. Table 15-2 summarizes projected changes in air temperature, precipitation, and sea level rise published by the NPCC in its 2013 Climate Risk Information Report.

Table 15-2: NPCC Baseline Climate and Mean Annual Changes

Air Temperature Baseline (1971-2000) 54˚F	**Low-Estimate (10^{th} Percentile)**	**Middle Range (25^{th} to 75^{th} Percentile)**	**High-Estimate (90^{th} Percentile)**
2020s	+ 1.5˚F	+ 2.0 to 3.0˚F	+ 3.0˚F
2050s	+ 3.0˚F	+ 4.0 to 5.5˚F	+ 6.5˚F
Precipitation Baseline (1971-2000) 50.1 inches	**Low-Estimate (10^{th} Percentile)**	**Middle Range (25^{th} to 75^{th} Percentile)**	**High-Estimate (90^{th} Percentile)**
2020s	- 1 percent	0 to 10 percent	+ 10 percent
2050s	1 percent	+ 5 to + 10 percent	+ 15 percent
Sea Level Rise Baseline (1971-2000) 0 inches	**Low-Estimate (10^{th} Percentile)**	**Middle Range (25^{th} to 75^{th} Percentile)**	**High-Estimate (90^{th} Percentile)**
2020s	2 inches	4 to 8 inches	11 inches
2050s	7 inches	11 to 24 inches	31 inches

Source: NPCC Climate Risk Information 2013; Observations, Climate Change Projections, and Maps.
Based on 35 GCMs (24 for sea level rise) and two Representative Concentration Pathways. Baseline data are from the National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center (NCDC) United States Historical Climatology Network (USHCN), Version 2 (Menne et al., 2009). Shown are the 10^{th} percentile, 25^{th} percentile, 75^{th} percentile, and 90^{th} percentile 30-year mean values form model-based outcomes. Temperature values are rounded to the neared 0.5˚F, precipitation values are rounded to the nearest five percent, and sea level rise values are rounded to the nearest inch.

D. METHODOLOGY

Greenhouse Gas Emissions

New York City determined that consideration of GHG emissions is appropriate under CEQR for at least certain projects for several reasons: (a) greenhouse gas emission levels may be directly affected by a project's effect on energy use; (b) the U.S. Supreme Court has upheld the determination that carbon dioxide, one of the main greenhouse gases, is an air pollutant, subject to regulation as defined by the Clean Air Act; and (c) Local Law 22 of 2008 codified PlaNYC's citywide GHG emissions reduction goal of 30 percent below 2005 levels by 2030 (the "GHG reduction goal"). In accordance with the *CEQR Technical Manual*, the GHG consistency assessment focuses on proposed actions that would result in development of 350,000 sf or greater and other energy-intense projects. As previously stated, the Proposed Action is projected to result in approximately 2,189,068 gsf of residential, commercial, and community facility development on the project site.

A project's GHG emissions can generally be assessed in two steps: by estimating the GHG emissions of a proposed action and then by examining the resulting project in terms of qualitative goals for reducing GHG emissions, as defined in the *CEQR Technical Manual*. A project's emissions are estimated with respect to the following main emissions sources: on-site operational emissions (direct and indirect); mobile source emissions (direct and indirect); and, when applicable, construction emissions and emissions from solid waste management. After the emissions are estimated, the source of GHG emissions are examined in terms of goals for reducing GHG emissions using qualitative considerations. As defined in the *CEQR Technical Manual*, the qualitative goals that should be assessed, as relevant to the project are: (1) pursuing transit-oriented development; (2) generating clean, renewable power; (3) constructing new resource- and energy-efficient buildings and/or improving the efficiency of existing buildings; and (4) encouraging sustainable transportation.

Operational emissions and mobile source emissions were considered for this analysis. Pursuant to CEQR methodology, the assessment is based on the total GHG emissions associated with the proposed project, rather than the relative increment of the proposed project's GHG emissions as compared to the No-Action condition. As the construction schedules for most of the proposed buildings are not expected to take longer than two years, a quantitative construction emissions analysis is not required pursuant to CEQR. Similarly, because the project is not expected to fundamentally change the City's solid waste management system, an estimate of emissions from solid waste management is not warranted.

Climate Change

Although significant climate change impacts are unlikely to occur in the analysis year for most projects, depending on a project's sensitivity, location, and useful life, it may be appropriate to provide a qualitative discussion of the potential effects on climate change on a proposed project in environmental review. The *CEQR Technical Manual* recommends that such a discussion should focus on early integration of climate change considerations into the project and may include proposals to increase climate resilience and adaptive management strategies to allow for uncertainties in environmental considerations resulting from climate change.

Pursuant to CEQR, rising sea levels and increases in storm surge and coastal flooding are the most immediate threats in New York City for which site-specific conditions can be assessed. As stated in the *CEQR Technical Manual*, for site-specific development plans, an analysis of consistency with Policy 6.2 of the Revised WRP may provide sufficient information to assess the potential effects of sea level rise, storm surge, and coastal sea flooding. As such, an analysis of Policy 6.2 of the Revised WRP is provided below.

E. GHG EMISSIONS

Operational Emissions

Emissions due to electricity and fuel usage were determined using projections of energy consumption developed specifically for the proposed project. Electricity use estimates for Building 5's school were developed using survey data from the U.S. Department of Energy's Energy Information Administration.[1] Emission factors reference the December 2013 *Inventory of New York City Greenhouse Gas Emissions.*

Table 15-3 displays the estimated GHG emissions associated with the operation emissions of the proposed project. As shown in the table, operational GHG emissions are estimated to be approximately 26,347.5 metric net tons of carbon dioxide equivalents. This represents less than 0.05 percent of the City's overall 2012 GHG emissions of approximately 47.9 million metric tons.[2] Note that the estimated GHG emissions for the proposed project conservatively do not include energy efficiency measures described under "Elements of the Proposed Action That Would Reduce GHG Emissions," below, which are currently under consideration for the proposed project.

Table 15-3: Annual Operational Emissions

	Natural Gas	**Electricity**
Annual Consumption (GJ)		
Residential	85,535.49[1]	215,996.46
Retail		18,916.42
School		18,913.43
Garage		5,329.80
Total	***85,535.49***	***259,156.11***
Annual Emissions		
Emission Factor[1]	0.050 $C0_2e$/GJ (metric tons)	0.085 $C0_2e$/GJ (metric tons)
GHG Emissions	***4,309.5***	***22,038.0***
	26,347.5	

Notes:
[1] Based on energy consumption projections developed specifically for the proposed project.
Source: City of New York, *Inventory of New York City Greenhouse Gas Emissions, December 2013,* by Jonathan Dickinson, Jamil Khan, and Mikael Amar. Mayor's Office of Long-Term Planning and Sustainability, New York, 2013.

Mobile Source Emissions

The number of annual weekday motorized vehicle trips by mode (cars, taxis, trucks, school bus, and shuttle) that would be generated by the proposed project was calculated using the transportation planning assumptions developed for the analysis and presented in Chapter 13, "Transportation." The assumptions used in the calculation include average daily weekday person trips and delivery trips by proposed use, the percentage of vehicle trips by mode, and the average vehicle occupancy. Travel distances shown in Table 18-6 and 18-7 of the *CEQR Technical Manual* were used in the calculations of annual vehicle miles traveled by cars and taxis. An average one-way truck trip was assumed to be 38 miles, pursuant to CEQR, and the average one-way shuttle trip (one mile) was based on the proposed shuttle route, as detailed in Chapter 13, "Transportation." Table 18-8 of the *CEQR Technical Manual* was used to determine the percentage of vehicle miles traveled by road type and the mobile GHG emissions calculator was used to

[1] U.S. Energy Information Administration, "Commercial Buildings Electricity Consumption Survey, 2003," Table E3A. School electricity use based on the ratio of energy intensity by use type.
[2] City of New York, *Inventory of New York City Greenhouse Gas Emissions, December 2013,* by Jonathan Dickinson, Jamil Khan, and Mikael Amar. Mayor's Office of Long-Term Planning and Sustainability, New York, 2013.

obtain an estimate of car, taxi, truck, school bus, and shuttle GHG emissions attributable to the proposed project.

As shown Table 15-4, annual mobile source emissions related to the Proposed Action would result in approximately 7,569 metric tons of carbon dioxide equivalents.

Table 15-4: Mobile Source Emissions

Carbon Dioxide Equivalent (CO_2e) Emissions (metric tons/year)				
Road type	**Passenger Vehicles**	**Taxis**	**Trucks, Shuttles, and School Buses**	**Total**
Local	1,267	48	646	1,960
Arterial	2,227	84	1,060	3,371
Interstate/Expressway	1,496	55	687	2,239
Total	***4,990***	***187***	***2,392***	***7,569***

Construction Phase Emissions

As per *CEQR Technical Manual* guidance, emissions associated with construction of the proposed project have not been estimated explicitly, but other similar analyses have shown that construction emissions (both direct and emissions embedded in the production of materials, including on-site construction equipment, delivery trucks, and upstream emissions from the production of steel, rebar, aluminum, and cement used for construction) would be equivalent to the total emissions from the operation of the buildings over approximately five to ten years.

Emissions from Solid Waste Management

The Proposed Action would not change the City's solid waste management system. Therefore, pursuant to CEQR, GHG emissions from solid waste generation, transportation, treatment, and disposal were not quantified.

Summary

The operational and mobile source emissions estimates are presented in Table 15-3 and Table 15-4, respectively. As noted above, the estimated operational GHG emissions for the proposed project conservatively do not include additional energy efficiency measures, which are still being evaluated for the proposed project. The total projected GHG emissions from the proposed project are shown in Table 15-5 below. The estimated total of 33,917 metric tons of GHG emissions is approximately 0.07 percent of New York City's 2012 annual total of 47.9 million metric tons.

Table 15-5: Total Emissions

Emissions Source	CO_2e Emissions (metric tons)
Operations	26,348
Mobile Sources	7,569
Total	***33,917***

Consistency with the GHG Reduction Goal

According to the *CEQR Technical Manual*, the assessment of consistency with the City GHG reduction goal should answer the following question: "Is the project consistent with the goal of reducing GHG emissions, specifically the attainment of the City's established GHG reduction goal of reducing citywide

GHG emissions by 30 percent below 2005 levels by 2030?" To determine consistency with the City's overall GHG reduction goal, one is to assess consistency with the four major goals as cited in the *CEQR Technical Manual*, as relevant to the project:

- Pursue transit-oriented development;
- Generate clean renewable power through replacement of inefficient power plants with state-of-the-art technology and expanding the use of clean distributed generation; (not applicable in the case of this Proposed Action);
- Construct new resource- and energy-efficient buildings (including the use of sustainable construction materials and practices) and improve the efficiency of existing buildings; and
- Encourage sustainable transportation through improving public transit, improving the efficiency of private vehicles, and decreasing the carbon intensity of fuels.

Elements of the Proposed Action That Would Reduce GHG Emissions

The Applicant is currently evaluating the specific sustainability and energy efficiency measures and design elements that may be implemented to, among other benefits, result in lower GHG emissions. A description of these project elements as they relate to the *CEQR Technical Manual*'s specific listing of GHG reduction measures is provided below.[1]

Build Efficient Buildings

The Proposed Action would facilitate the development of mixed-use buildings on previously developed urban land, thereby minimizing vegetation/forest loss. As described in Chapter 9, "Natural Resources," the project site largely comprises manmade landscapes including both unoccupied and occupied industrial lots. While construction of the proposed project would require minimal tree removal on the project site as well as the 9th Street sidewalk located along the project site boundaries, as part of the proposed project, trees would be planted along the sidewalks and within the project site. In addition, the proposed new stormwater outfalls would conserve adjacent natural areas by treating all stormwater for quality for discharge and lowering combined sewer volumes. Furthermore, the project site would facilitate development on a site with existing urban infrastructure, including roadways, transit, sewer infrastructure, and water mains, thereby minimizing the need for extensive infrastructure development

The Proposed Action includes large scale general development (LSGD) Special Permits to permit waivers to height, as well as other bulk requirements (see Chapter 1, "Project Description"). The height waivers would facilitate the construction of taller buildings with smaller buildings footprints, compared to the building massing that would be permitted absent the LSGD Special Permits. As a result, approximately 181,826 sf (48 percent) of the project site would be comprised of open space and new streets and sidewalks, thereby allowing for the expansion of natural areas on the project site. The proposed 1.92 acres of waterfront open space would be subject to waterfront public access requirements, and therefore would be permanently protected.

In addition, the proposed project's buildings would maximize interior daylighting due to the high ratio of window area, thereby reducing reliance on interior lighting energy use during the day. Water conserving fixtures meeting the stringent New York City building code requirements would be installed, and it is anticipated that water-efficient landscaping (e.g., native and drought resistant species of plants) would be selected to reduce water consumption, indirectly reducing energy consumption associated with potable

[1] New York State Department of Environmental Conservation, *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements.*

water production and consumption. Furthermore, the 8th Street Mews would incorporate seating elements that are designed as rain gardens to capture stormwater.

Use Clean Power

All of the project site buildings would use natural gas, a low carbon fuel, for the normal operation of the heat and hot water systems. Use of natural gas HVAC systems at the locations analyzed in Chapter 14, "Air Quality," would not result in significant adverse stationary source air quality impacts.

Transit-Oriented Development and Sustainable Transportation

The project site is located in an area supported by several public transit options and bike routes. The Q102, Q18, and Q103 local bus routes, which provide connections from Astoria to Roosevelt Island, Maspeth, and Hunters Point, respectively, have stops along 27th Avenue, one block (approximately 0.1 miles) to the south of the project site. In close proximity to the project site, there are bicycle lanes on 27th Avenue between 1st and 8th Streets; 8th Street between 27th and Main Avenues; Astoria Park South from the waterfront to 29th Street; Vernon Boulevard between Welling Court and 40th Avenue; and a one-way bike lane on a two-way street on 14th Street between 27th Avenue and Astoria Park South. There are protected bicycle paths with access points along the waterfront esplanade between 9th Street and Astoria Park South and along the waterfront esplanade at Halletts Cove Playground. There are shared lanes on 1st Street between 26th Avenue and Astoria Boulevard; 9th and 12th Streets between the waterfront and 27th Avenue, with 12th Street having a one-way bike lane on a two-way street; 27th Avenue between 8th and 14th Streets; and Main Avenue between Welling Court and Vernon Boulevard. There are potential bicycle paths and routes along the Astoria Park waterfront.

In addition, the proposed project would provide new transit service; it is currently anticipated to include a residential shuttle bus, which would connect the project site to the 30th Avenue subway station, thereby further encouraging the use of public transit. Thus, the Proposed Action supports an important PlaNYC goal of continuing transit-oriented development.

The Proposed Action would facilitate mixed-use development, including new residential and retail uses, thereby promoting short commutes and walkable destinations from residential uses to local retail and other services. The Applicant would also encourage sustainable transportation through the provision of bicycle parking, in accordance with zoning requirements.

The proposed project would include a number of roadway improvements that would improve traffic flow and support pedestrian and bicycle safety. The proposed project would include multi-use paths to and through the site: the proposed 4th Street extension would serve bicycles, pedestrians, and vehicles; the waterfront public access easement would further improve traffic flow through the site, while providing pedestrian and bicycle access to the currently inaccessible waterfront; and the proposed 8th Street Mews would integrate the project site into the urban fabric by providing an alternate pedestrian path to and through the site.

Reduce Construction Operation Emissions

During construction, the Proposed Action will comply with the New York City Air Pollution Control Code, which includes use of ultra-low sulfur diesel (ULSD) fuel and best available technology (BAT) as described in Chapter 21, "Construction." In addition, all on-site construction equipment would meet the EPA's Tier 3 emissions standard for nonroad engines (which will be reflected in the Restrictive Declaration to be recorded). The EPA emission standards regulate the emission of criteria pollutants from

new engines, including PM, CO, NO_x, and hydrocarbons (HC). Tier 3 NO_x emissions range from 40 to 60 percent lower than Tier 1 emissions and considerably lower than uncontrolled engines.

Assessment

The proposed project's use of natural gas for heating systems, its commitment to construction air quality controls, its introduction of a residential shuttle to the 30th Avenue subway station, and its use of water-conserving features and water-efficient landscaping would advance New York City's GHG reduction goals as stated in PlaNYC. In addition, the development could be subject to changes in the New York City Building Code that are currently being considered to require greater energy efficiency and to further the goals of PlaNYC. These could include energy efficiency requirements, specifications regarding cement, and other issues influencing GHG emissions. Furthermore, by virtue of the location of the project site in relation to public transportation, the Proposed Action, which would facilitate dense and efficient mixed-use buildings, would be consistent with the GHG reduction goals. The Proposed Action is, therefore, based on the aforementioned commitments to energy efficient project features, and by virtue of the project's location and nature, consistent with the City's GHG reduction goals, as defined in the *CEQR Technical Manual*.

F. CLIMATE CHANGE

As stated in the *CEQR Technical Manual,* for site-specific development plans, an analysis of consistency with Policy 6.2 of the Revised WRP may provide sufficient information to assess the potential effects of sea level rise, storm surge, and coastal sea flooding. Policy 6.2 of the Revised WRP states that consideration of the latest New York City projections of climate change and sea level rise (as published by the NPCC, or any successor thereof) should be integrated into the planning and design of projects in the City's Coastal Zone. As discussed in Section G, "Waterfront Revitalization Program," of Chapter 2, "Land Use, Zoning, and Public Policy," based on future 100-year and 500-year flood zone projections for the 2020s and 2050s, Buildings 4 and 5 on the upland parcel fall outside of the 100-year and 500-year future floodplain projections. A small northeastern portion of Building 3 falls within the projected 2020s and 2050s 100-year floodplain, and a small southwestern portion of Building 2 falls within the 2020s 100-year floodplain; all waterfront building sites are located within the 2020s and 2050s 500-year floodplain (see Figure 2-9 in Chapter 2, "Land Use, Zoning, and Public Policy"). However, coastal floodplains are influenced by astronomic tide and meteorological forces and not by fluvial flooding and, as such, are not affected by the placement of obstructions within the floodplain. Therefore, the construction and operation of the proposed project would not exacerbate future projected flooding conditions.

NPCC projections indicate that the majority of the Building 1 site would fall within the 100-year floodplain by 2050. Should the base flood elevation rise to these projected elevations in the future, the Applicant anticipates retrofitting the perimeter of the building with flood prevention systems (either temporary or permanently installed flood gates/shutters), potentially in conjunction with an emergency flood protection plan. In addition, as a small portion of Building 1 falls within the 100-year flood zone, provisions to address potential flood risks have been developed in the building design.

The waterfront buildings, as stated in Chapter 19, "Construction Impacts," are anticipated to be developed in the second, third, and fourth phases of the project's construction and therefore would meet the standards of the New York City Building Code and the Best Available Flood Hazard Data available from FEMA at the time of their construction (which will be reflected in the Restrictive Declaration to be recorded). In the event that Buildings 2 and 3 fall within the future applicable 100-year floodplain, all mechanical space would be elevated above this elevation, most likely to the second floor (Queens Datum elevation 26 feet), and all ground floor uses within the building would need to be protected from flooding

conditions per New York City Building Code requirements. As the potential future floodplain elevations may only be slightly above the currently anticipated ground floor elevations for the waterfront buildings, the ground floor elevations could be raised out of the applicable floodplain, as zoning permits the proposed buildings' Base Plane to be set at the 100-year flood elevation. If this approach were to be taken, stairs and accessible ramps would then be used to transition between the street/sidewalk and other interior spaces.