Chapter 22: Mitigation

A. INTRODUCTION

In accordance with the 2012 *City Environmental Quality Review (CEQR) Technical Manual*, where significant adverse impacts are identified, mitigation to reduce or eliminate the impacts to the fullest extent practicable is developed and evaluated.

As described below, measures to further mitigate adverse impacts will be refined and evaluated between the Draft and Final Environmental Impact Statement (EIS). Therefore, the Final EIS (FEIS) may include more complete information and commitments on all practicable mitigation measures to be implemented with the proposed project.

B. COMMUNITY FACILITIES

PUBLIC SCHOOLS

The project site is located in Sub-district 3 of Community School District (CSD) 30. Since the proposed project would result in the introduction of a new residential population, which would create new demands on local school resources, the EIS assessed the effects on school capacity within Sub-district 3 of CSD 30. As discussed in Chapter 5, "Community Facilities," the proposed project would result in a potential significant adverse impact to public elementary schools. By 2022, it is anticipated that the proposed project would result in the development of up to 2,644 residential units on the building sites, including 240 units in Building 8, which would be developed pursuant to a future request for proposals (RFP) by the New York City Housing Authority (NYCHA). Based on the public school student generation rates provided in the *CEQR Technical Manual*, the proposed project would introduce 740 public elementary students, 317 public intermediate school students, and 370 high school students to the study area. Of these, approximately 67 elementary students, 29 intermediate students, and 34 high school students would be introduced by the development of Building 8. The proposed project would not result in any potential significant adverse impacts on intermediate or high school seats.

Because the proposed project would be developed sequentially, the potential to result in a significant adverse impact on elementary schools could occur when the proposed project completes construction of 942 residential units that could introduce public elementary school children.[1] As noted in Chapter 1, "Project Description," it is expected that senior housing units would be developed as part of the affordable housing component of the proposed project. If affordable senior housing units are developed, more residential units could be constructed before a significant adverse elementary school impact would occur. Furthermore, the analysis of public elementary school

[1] This represents the number of units that would introduce enough elementary school children to increase the school utilization rate by 5 percentage points or more.

conditions relies on conservative assumptions regarding both the background growth in the student population and the development of new residential units in the Build condition. Should this high level of background growth in the sub-district and residential development in the study area not occur, the shortfall of elementary schools seats in Sub-district 3 of CSD 30 would be reduced but not completely eliminated.

Preliminary discussions have been held among the Applicant, NYCHA, DCP, and the School Construction Authority (SCA), and are expected to continue between the Draft EIS (DEIS) and FEIS, with regard to the potential development of a new school building that could accommodate students in kindergarten through grade 8 on a site located within the NYCHA Astoria Houses Campus. The proposed school would fully mitigate the potential significant adverse impact to public elementary schools, and is anticipated to also provide public intermediate school seats, even though the proposed project would not result in a significant adverse impact to public intermediate schools. Based on preliminary discussions, it is expected that this school building would be approximately 130,000 square feet (sf) and would accommodate 1,057 elementary and intermediate school students. As noted above, the proposed project's school seat demand would materialize over time, with a significant adverse impact on public elementary schools possible as early as completion of 942 residential units that could introduce public elementary school children. If 942 residential units or more are developed before the proposed public school is operational, the proposed project's significant adverse impact on public elementary schools would be unmitigated until such time the proposed school is constructed and operational.

Development of the public school would be subject to the confirmation that the need for a new school exists and the allocation of sufficient capital funding for design and construction of the new school facility in the Department of Education's Five-Year Capital Plan. The disposition of the property within the NYCHA Astoria Houses Campus to the SCA to facilitate the construction of the future school would be subject to approval by the U.S. Department of Housing and Urban Development (HUD) under Section 18 of the National Housing Act of 1937. Similar to the disposition of property for Buildings 6 through 8, HPD would act as Responsible Entity for NYCHA's environmental review of the school sites disposition pursuant to 24 CFR Part 58. While funding for design and construction of the public school would be included in the Capital Plan, the SCA has stated that in order to proceed, the site acquisition cost would be required to be for a nominal amount. As such, a Memorandum of Understanding (MOU) will be entered into between Applicant, NYCHA, and the SCA that sets forth the cost, timing and duration of the disposition of the school site from NYCHA to SCA, among other activities.

No further mitigation measures by the Applicant are proposed in the event that NYCHA is unable to dispose of the proposed school site to SCA for a nominal fee or the SCA were to otherwise decline to develop the proposed public school due to the absence of City capital funding or for other reasons. In the event that the SCA is unable to obtain sufficient capital funding to develop a school of the size proposed above, the SCA could develop a smaller school potentially containing only elementary school seats that would also fully mitigate the significant adverse impact on public elementary schools. In addition, other options to address school seat demand in the future if the SCA were to decline to develop any public school will also be explored in consultation with DOE between the DEIS and FEIS. These options would include standard measures utilized by DOE/SCA to address school capacity such as redistricting, the provision of off-site capacity, or other administrative measures. Such measures could wholly or partially mitigate the significant adverse impact on public elementary schools.

Absent the construction of a new school building or the implementation of other measures by SCA, the proposed project would result in a potential unmitigated significant adverse impact on public elementary school seat demand if projections prove correct. In addition, in the event that construction of the proposed public school occurs after the completion of 942 residential units and background projections and the proposed project's school seat demand materialize as projected in this analysis, there is the potential for a temporary unmitigated significant adverse impact to elementary schools to occur until such time that the proposed elementary school is constructed and operational.

It should be noted that the elementary school analysis does not account for the potential student population that would be generated by the proposed Astoria Cove project nearby, which requires discretionary actions and is subject to its own environmental review and approval. Given the number of residential units expected to be introduced by the proposed Astoria Cove project, it is likely that a significant adverse impact on public schools would be identified as part of its ongoing environmental review. Such an impact would require mitigation, which may include the creation of additional school capacity. It is assumed that this mitigation would accommodate much of the demand created by the Astoria Cove project; therefore, this demand has not been accounted for in the proposed project's schools analysis. As more information becomes available about the Astoria Cove project's potential impacts and mitigation measures, it will be incorporated into this environmental review as appropriate.

Because the school proposed as mitigation could result in impacts different from the proposed project, this chapter provides a qualitative discussion of the possible impacts of locating a public school in the NYCHA Astoria Houses Campus in the "Potential Environmental Impacts of the Public School Mitigation" section below. This discussion is provided in for each analysis area where the school could have potential impacts: land use, community facilities, open space, shadows, urban design and visual resources, natural resources, hazardous materials, water and sewer infrastructure, solid waste and sanitation services, energy, transportation, air quality, noise, neighborhood character, construction, and public health.

CHILD CARE CENTERS

As discussed in Chapter 5, "Community Facilities," the proposed project would result in a potential significant adverse impact to publicly funded child care facilities based on *CEQR Technical Manual* methodology.

Because the proposed project would be developed sequentially, the potential to result in an increase in a deficiency of available publicly funded child care slots by 5 percent or more could occur when the proposed project completes construction of approximately 161 affordable residential units that introduce children eligible for publicly funded child care (or approximately 23 children eligible for publicly funded child care). As noted in Chapter 1, "Project Description," it is expected that senior housing units would be developed as part of the affordable housing component of the proposed project, and that Buildings 6A/6B and 7A/7B may be entirely senior housing units. If affordable senior housing units are developed, more affordable housing units could be constructed before a significant adverse impact to publicly funded child care facilities would occur, or such an impact may not occur. For instance, if all 340 proposed affordable units in Buildings 6A/6B and 7A/7B were senior housing units, the proposed project would introduce 48 fewer children that would be eligible for publicly funded child care, and the proposed project would not result in a significant adverse impact to publicly funded child care facilities.

It should be noted that the analysis conservatively accounts for the potential child care-eligible children (approximately 48 children in 2022) that would be generated by the proposed Astoria Cove

project, which requires discretionary actions and is subject to its own environmental review and approval, without accounting for any potential measures that may be needed to mitigate impacts to publicly funded child care centers that may be identified as part of that project's environmental review. If these mitigation measures were proposed and accounted for in the child care analysis in this EIS, the shortfall of slots would be smaller. As more information becomes available about the proposed Astoria Cove project's potential impacts and mitigation measures, it will be incorporated into this environmental review as appropriate.

At this point, however, it is not possible to know exactly which type of mitigation would be most appropriate or when its implementation would be necessary, because the demand for publicly funded child care depends not only on the amount of residential development in the area but on the proportion of new residents who are children of low-income families (not all children meet the social and income eligibility criteria). Also, the analysis is based on the existing inventory of public child care providers in the area and does not reflect likely shifts in demand or creation of new child care capacity. Furthermore, several factors may limit the number of children in need of publicly funded child care slots in New York City Administration for Children's Services (ACS)-contracted day care facilities. Families in the study area could make use of alternatives to publicly funded day care facilities. There are slots at homes licensed to provide family child care that families of eligible children could elect to use instead of public center-based child care. Parents of eligible children may also use ACS vouchers to finance care at private child care centers in the study area. The voucher system could spur the development of new private child care facilities to meet the need of eligible children that would result from the increase in low-income and low- to moderate-income housing units in the area in the future with the proposed project. Lastly, parents of eligible children are not restricted to enrolling their children in day care facilities in a specific geographical area. They could use the ACS voucher system to make use of public and private day care providers beyond the 1½-mile study area, such as facilities closer to their place of employment.

Possible mitigation measures for this significant adverse impact include adding capacity to existing facilities if determined feasible through consultation with ACS, or providing a new child care facility within or near the project site. As a city agency, ACS does not directly provide new child care facilities, instead it contracts with providers in areas of need. ACS is also working to create public/private partnerships to facilitate the development of new child care facilities where there is an area of need. As part of that initiative, ACS may be able to contribute capital funding, if it is available, towards such projects to facilitate the provision of new facilities.

The Restrictive Declaration for the proposed project will require the Applicant to work with ACS to consider the need for and the implementation of measures to provide additional capacity, if required, to mitigate the significant adverse impact to publicly funded child care facilities within the 1½-mile study area or within Community Board 1. Based on the results of the analysis presented in Chapter 5, "Community Facilities," which accounts for the current inventory of publicly funded child care facilities and conservative future background projections, the proposed project would need to provide 37 child care slots to reduce the increase in the utilization rate to less than 5 percent. Absent the implementation of such needed mitigation measures, the proposed project could have an unmitigated significant adverse impact on publicly funded child care facilities.

C. OPEN SPACE

As discussed in Chapter 1, "Project Description," the proposed project would create approximately 2.35 acres of publicly accessible open space including a waterfront esplanade and five new upland connections to 1st Street. The waterfront esplanade would run the length of the site's waterfront,

connecting on the south to Hallet's Cove Playground and on the north to Whitey Ford Field and to the existing open space in the NYCHA Astoria Houses Campus across 1st Street. The proposed waterfront esplanade would include landscaping and seating along the waterfront as well as a playground. The upland connections are intended to provide view corridors and physical public access from 1st Street to the East River that does not currently exist.

As discussed in Chapter 6, "Open Space," the proposed project's new residential population would place new demands on the area's open space resources. Although the proposed project's open space would include some active open space resources, such as a playground, and additional open space is available within the project site itself and near the study area, including several recreational amenities at the NYCHA Astoria Houses Campus which are available to the facility's residents, and Astoria Park north of the open space study area, the project-generated residential population would exacerbate an existing deficiency of open space in the residential study area. Given the anticipated decrease in the total and active open space ratios in the residential study area, which would exceed five percent, the proposed project would result in a significant adverse impact to total and active open space resources in the study area. The significant adverse impact related to active open space would occur with the completion of approximately 839 residential units and the impact related to total open space would occur with the completion of approximately 1,138 residential units in the study area.

The *CEQR Technical Manual* lists potential mitigation measures for open space impacts. These measures include, but are not limited to, creating new open space within the study area; funding for improvements, renovation, or maintenance at existing local parks; or improving existing open spaces to increase their utility or capacity to meet identified open space needs in the area, such as through the provision of additional active open space facilities. Preliminary discussions have been held between the Applicant and the New York City Department of Parks and Recreation (DPR) regarding potential improvements to open spaces nearby the project site including, potentially, Hallet's Cove Playground and Hallet's Cove Esplanade.

These mitigation measures will be explored by the Applicant in consultation with the lead agency, DCP, and DPR between the DEIS and FEIS. If feasible mitigation is found, the impacts will be considered partially mitigated. Absent the implementation of such measures, the proposed project could have an unmitigated significant adverse impact on open space.

D. TRANSPORTATION

As discussed in Chapter 15, "Transportation," the transportation analyses were prepared based on a slightly smaller version of the development program than the proposed project (71 fewer dwelling units and 25 fewer parking spaces), because the programming changes occurred shortly prior to certification of the DEIS, after substantial transportation-related analysis work had been completed and reviewed. Correspondingly, the transportation mitigation analyses presented below are based on the impact findings from the analysis of the smaller development program. Between the DEIS and FEIS, the transportation and transportation-related analyses will be updated to reflect the proposed project's programming changes, as well as background changes associated with other projects and the addition of new study area traffic intersections. These changes could result in new, different, or worsened significant adverse impacts, all of which will be further detailed in the FEIS. For mitigation, it is expected that the same menu of improvement options will be used to address these impacts. However, if the updated analyses identify new, different, or worsened impacts that could not be fully mitigated, they will be identified as unmitigated in the FEIS.

TRAFFIC

As discussed in Chapter 15, "Transportation," the proposed project would result in potential significant adverse traffic impacts at a number of locations in the traffic study area. This section describes traffic improvements that could help mitigate those impacts. **Table 22-1** summarizes the potential significant adverse traffic impacts and identifies if they could be fully or partially mitigated with the implementation of traffic improvement measures, or could not be mitigated.

Table 22-1
2022 Build Condition
Traffic Impact Mitigation Summary

Intersections	AM Peak Hour	Midday Peak Hour	PM Peak Hour
No significant impact	7	15	8
Impact could be fully mitigated	8	7	11
Impact could be partially mitigated	4	1	2
Unmitigated impact	6	2	4

As shown in **Table 22-1**, in the weekday AM peak hour, 18 of the 25 intersections would be impacted, eight of which could be fully mitigated, four of which could be partially mitigated, and six of which could not be mitigated. In the weekday midday peak hour, ten intersections would be impacted, seven of which could be fully mitigated, one of which could be partially mitigated, and two of which could not be mitigated. In the weekday PM peak hour, 17 intersections would be impacted, 11 of which could be fully mitigated, two of which would be partially mitigated, and four of which could not be mitigated.

The overall finding of the traffic mitigation analysis is that 15 out of 25 intersections under the 2022 Build condition would either not be significantly impacted or could be fully mitigated with readily implementable traffic improvement measures, including installation of traffic signals at currently unsignalized intersections, signal timing and phasing changes, parking regulation changes to gain a travel lane at key intersections, and lane restriping. These measures represent some of the standard traffic capacity improvements that are typically implemented by the New York City Department of Transportation (NYCDOT). Additional review of potential mitigation measures that may fully or partially mitigate other significant impact locations that are identified as unmitigatable in the DEIS will be undertaken for the FEIS.

Details of the intersection capacity analyses and all traffic mitigation measures are presented in the level of service (LOS) tables presented in **Table 22-2** through **Table 22-4** at the end of this section.

Table 22-2

2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

INTERSECTION & APPROACH		2022 No Build				2022 Build				2022 Build with Mitigation				Mitigation Measures
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
SIGNALIZED INTERSECTIONS														
1. 27TH AVENUE & 8TH STREET														
27th Avenue	EB	TR	0.86	34.7	C	TR	1.62	309.9	F	T	0.59	16.1	B	**Partially Mitigated** Install "No Standing Anytime" regulations along the EB approach for 100 feet to daylight the approach. Restripe the EB approach from one 11-foot wide travel lane, one 5-foot wide bike lane, and one 9-foot wide parking lane to one 11-foot wide through lane, and one 14-foot wide right turn lane with "share the road" bike provisions for 100 feet. Modify signal timing: Shift 2 s of green time from the NB phase to the EB/WB phase [EB/WB phase green time shifts from 48 s to 50 s; NB green time shifts from 32 s to 30 s].
		-	-	-	-	-	-	-	-	R	0.90	40.0	D	
	WB	LT	0.98	59.5	E	LT	2.03	495.4	F	LT	1.23	143.4	F	
8th Street	NB	L	0.49	26.2	C	L	0.55	27.7	C	L	0.59	30.3	C	
		R	0.42	26.4	C	R	0.48	28.8	C	R	0.54	33.2	C	
Overall Intersection		**-**	**0.79**	**40.8**	**D**	**-**	**1.43**	**306.9**	**F**	**-**	**0.99**	**61.5**	**E**	
2. VERNON BOULEVARD/MAIN AVENUE & 8TH STREET/WELLING COURT														
Vernon Boulevard	EB	LT	1.13	100.5	F	LT	1.23	141.8	F	LT	1.11	86.8	F	**Partially Mitigated** Modify signal timing: Shift 3 s of green time from the NB phase to the EB/SB phase [EB/SB phase green time shifts from 26 s to 29 s; NB phase green time shifts from 20 s to 17 s; WB phase green time remains the same].
Main Street	WB	TR	0.08	21.5	C	TR	0.08	21.5	C	TR	0.08	21.5	C	
Welling Court	NB	LTR	0.27	31.7	C	LTR	0.27	31.7	C	LTR	0.32	35.7	D	
8th Street	SB	R	0.94	55.7	E	R	1.21	141.1	F	R	1.08	90.1	F	
Overall Intersection		**-**	**0.50**	**72.2**	**E**	**-**	**0.53**	**129.7**	**F**	**-**	**0.53**	**82.5**	**F**	
3. ASTORIA BOULEVARD & 8TH STREET														
Astoria Boulevard	EB	LR	0.26	28.9	C	LR	0.87	57.2	E	LR	0.78	44.5	D	Modify signal timing: Shift 4 s of green time from the NB/SB phase to the EB/WB phase [EB/WB phase green time shifts from 43 s to 47 s; NB/SB phase green time shifts from 67 s to 63 s].
	WB	L	0.33	29.8	C	L	0.33	29.8	C	LR	0.30	26.6	C	
		TR	0.23	28.1	C	TR	0.37	30.8	C	TR	0.34	27.4	C	
8th Street	NB	LT	0.40	15.9	B	LT	0.51	17.7	B	LT	0.56	21.2	C	
	SB	TR	0.64	21.1	C	TR	0.81	27.6	C	TR	0.86	33.8	C	
Overall Intersection		**-**	**0.52**	**22.4**	**C**	**-**	**0.83**	**32.9**	**C**	**-**	**0.82**	**32.4**	**C**	

Table 22-2 (cont.)
2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

4. ASTORIA BOULEVARD & 21ST STREET														
Astoria Boulevard	EB	L	0.87	56.2	E	L	1.00	81.7	F	L	0.93	81.7	F	**Partially Mitigated** Install "No Standing Anytime" regulations along the NB approach for 165 feet, along the NB receiving side for 135 feet, along the SB approach for 340 feet, and along the SB receiving side for 125 feet to allow for three moving lanes at the NB and SB approaches. Shift the NB approach centerline 3 feet to the west and restripe the NB approach from one 11-foot wide travel lane, one 20-foot wide travel lane with parking, one 12-foot wide receiving lane, and one 18-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 12-foot wide receiving lane, and one 15-foot wide receiving lane for 125 feet from the intersection. Shift the SB approach centerline 4 feet to the east and restripe the SB approach from one 11-foot wide travel lane, one 19-foot wide travel lane with parking, one 11-foot wide receiving lane, and one 19-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 11-foot wide receiving lane, and one 15-foot wide receiving lane for 135 feet from the intersection. Modify signal phasing: Allow SBR movements during the EBL/WBL phase. Signal timing remains the same during the peak hour.
		TR	0.75	39.2	D	TR	1.14	112.5	F	TR	1.14	112.5	F	
	WB	L	1.14	116.1	F	L	1.52	289.2	F	L	1.50	289.2	F	
		TR	0.60	34.7	C	TR	0.64	35.3	D	TR	0.64	35.3	D	
21st Street	NB	LTR	0.92	40.7	D	LTR	1.09	86.6	F	LT	0.71	27.4	C	
		-	-	-	-	-	-	-	-	R	0.42	22.5	C	
	SB	LTR	1.05	57.4	E	LTR	1.12	87.3	F	LT	0.84	26.8	C	
		-	-	-	-	-	-	-	-	R	0.53	14.9	B	
Overall Intersection		**-**	**1.06**	**54.0**	**D**	**-**	**1.21**	**102.6**	**F**	**-**	**1.04**	**71.1**	**E**	
5. ASTORIA BOULEVARD & 23RD STREET														
Astoria Boulevard	EB	LT	0.91	33.1	C	LT	1.31	172.3	F					**Unmitigatable Impact**
	WB	TR	0.87	27.4	C	TR	0.91	29.8	C					
23rd Street	NB	LTR	0.50	33.5	C	LTR	0.50	33.5	C					
Overall Intersection		**-**	**0.75**	**30.5**	**C**	**-**	**1.00**	**98.9**	**F**					

Table 22-2 (cont.)
2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

6. ASTORIA BOULEVARD & CRESCENT STREET														
Astoria Boulevard	EB	TR	0.99	52.8	D	TR	1.38	203.3	F					**Unmitigatable Impact**
	WB	LT	1.04	57.7	E	LT	1.27	153.3	F					
Crescent Street	SB	LTR	1.09	83.5	F	LTR	1.09	83.5	F					
Overall Intersection		**-**	**1.06**	**62.7**	**E**	**-**	**1.27**	**159.1**	**F**					
7. ASTORIA BOULEVARD & 31ST STREET														
Astoria Boulevard	EB	LTR	1.26	160.5	F	LTR	1.78	392.8	F	LTR	0.98	51.0	D	Install "No Standing Anytime" regulations along the EB approach for 200 feet to allow for two moving lanes at the approach. Restripe the EB approach from one 25-foot wide travel lane with parking to one 12-foot wide through lane, and one 13-foot wide through-right lane for 200 feet.
31st Street	NB	T	0.51	41.7	D	T	0.51	41.7	D	T	0.51	41.7	D	
		R	0.67	16.4	B	R	0.67	16.4	B	R	0.67	16.4	B	
	SB	T	0.90	34.6	C	T	0.90	34.6	C	T	0.90	34.6	C	
		R	0.56	19.6	B	R	0.56	19.6	B	R	0.56	19.6	B	
Overall Intersection		**-**	**1.04**	**61.1**	**E**	**-**	**1.24**	**145.7**	**F**	**-**	**0.93**	**35.1**	**D**	
8. ASTORIA PARK SOUTH/ HOYT AVE SOUTH & 21ST STREET														
Astoria Park South/ Hoyt Ave South	EB	LTR	0.68	37.3	D	LTR	0.83	40.0	D	LTR	0.91	43.9	D	Modify signal timing: Shift 3 s of green time from the EB phase to the NB/SB phase [EB phase green time shifts from 36 s to 33 s; NB/SB phase green time shifts from 74 s to 77 s].
21st Street	NB	LTR	0.59	15.5	B	LTR	0.62	16.2	B	LTR	0.58	13.8	B	
	SB	LTR	1.10	72.7	E	LTR	1.16	100.0	F	LTR	1.11	73.7	E	
Overall Intersection		**-**	**0.96**	**50.5**	**D**	**-**	**1.06**	**65.4**	**E**	**-**	**1.05**	**51.9**	**D**	
9. HOYT AVENUE SOUTH & RFK BRIDGE OFF-RAMP/29TH STREET														
Hoyt Avenue South	EB	TR	0.60	26.4	C	TR	0.65	27.6	C					Mitigation not required
RFK Bridge Off-Ramp	SB	T	0.73	33.1	C	T	0.77	34.8	D					
Overall Intersection		**-**	**0.66**	**29.3**	**C**	**-**	**0.71**	**30.6**	**C**					
10. HOYT AVENUE SOUTH & 31ST STREET														
Hoyt Avenue South	EB	LT	0.98	62.0	E	LT	1.04	77.9	E	LT	0.98	60.1	E	Modify signal timing: Shift 2 s of green time from the NB/SB phase to the EB phase [EB green time shifts from 31 s to 33 s; NB/SB green time shifts from 31 s to 29 s; SB-lead phase green remains the same].
		R	0.58	48.3	D	R	0.58	48.3	D	R	0.53	44.2	D	
31st Street	NB	TR	0.21	35.4	D	TR	0.21	35.4	D	TR	0.23	37.1	D	
	SB	T	0.49	11.0	B	T	0.49	11.0	B	T	0.50	12.1	B	
Overall Intersection		**-**	**0.63**	**39.1**	**D**	**-**	**0.64**	**47.8**	**D**	**-**	**0.64**	**39.2**	**D**	
11. HOYT AVENUE SOUTH/ASTORIA BOULEVARD & 33RD STREET														
Hoyt Avenue South	EB	LT	0.60	26.5	C	LT	0.63	27.2	C					**Unmitigatable Impact**
Astoria Boulevard	EB	LT	1.12	106.3	F	LT	1.39	221.7	F					
33rd Street	NB	TR	1.09	91.5	F	TR	1.09	91.5	F					
		R	1.08	91.3	F	R	1.08	91.3	F					
Overall Intersection		**-**	**0.85**	**69.2**	**E**	**-**	**0.95**	**115.8**	**F**					

Table 22-2 (cont.)
2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

12. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.02	40.4	D	L	0.02	40.4	D					**Unmitigatable Impact**
		R	0.37	47.5	D	R	0.37	47.5	D					
	WB	L	1.00	57.4	E	L	1.09	86.1	F					
		TR	0.25	14.8	B	TR	0.25	14.8	B					
21st Street	NB	L	0.31	32.2	C	L	0.31	32.3	C					
		T	1.11	111.0	F	T	1.23	158.2	F					
	SB	TR	1.03	61.3	E	TR	1.04	63.1	E					
Overall Intersection		**-**	**0.92**	**66.2**	**E**	**-**	**1.00**	**90.6**	**F**					
13. HOYT AVENUE NORTH & 29TH STREET														
Hoyt Avenue North	WB	L	0.77	12.8	B	L	0.79	13.3	B	L	0.81	14.8	B	Modify signal timing: Shift 2 s of green time from the WB phase to the SB phase [WB green time shifts from 84 s to 82 s; SB green time shifts from 19 s to 21 s; the bus queue jump phase green time remains the same].
		LT	0.76	12.2	B	LT	0.80	13.1	B	LT	0.82	14.6	B	
29th Street	SB	R	1.07	113.1	F	R	1.17	147.4	F	R	1.06	105.7	F	
Overall Intersection		**-**	**0.83**	**21.6**	**C**	**-**	**0.86**	**25.9**	**C**	**-**	**0.86**	**23.3**	**C**	
14. HOYT AVENUE NORTH & 31ST STREET														
Hoyt Avenue North	WB	L	1.05	109.0	F	L	1.05	109.0	F					Mitigation not required
		T	0.97	29.2	C	T	1.01	38.8	D					
		R	0.34	10.4	B	R	0.34	10.4	B					
31st Street	NB	LT	0.29	35.8	D	LT	0.29	35.8	D					
		-	-	-	-	-	-	-	-					
	SB	T	0.28	36.3	D	T	0.28	36.3	D					
		R	0.74	57.8	E	R	0.74	57.8	E					
Overall Intersection		**-**	**0.91**	**48.9**	**D**	**-**	**0.94**	**54.5**	**D**					
15. HOYT AVENUE NORTH & 32ND STREET														
Hoyt Avenue North	WB	T	0.53	8.8	A	T	0.53	8.8	A					**Unmitigatable Impact**
Grand Central Parkway Off-Ramp	WB	T	1.14	162.5	F	T	1.18	180.0	F					
32nd Street	NB	L	0.62	44.7	D	L	0.67	45.5	D					
	SB	R	0.03	38.0	D	R	0.03	38.0	D					
Overall Intersection		**-**	**1.03**	**46.8**	**D**	**-**	**1.07**	**109.4**	**F**					
16. 24TH AVENUE & 21ST STREET														
24th Avenue	EB	LTR	0.11	30.2	C	LTR	0.11	30.2	C					Mitigation not required
	WB	LTR	0.60	41.0	D	LTR	0.60	41.0	D					
21st Street	NB	LTR	0.78	21.0	C	LTR	0.86	25.2	C					
	SB	LTR	0.69	19.9	B	LTR	0.71	20.3	C					
Overall Intersection		**-**	**0.72**	**24.3**	**C**	**-**	**0.78**	**26.1**	**C**					
17. 24TH AVENUE & 29TH STREET														
24th Avenue	EB	TR	0.65	15.3	B	TR	0.72	17.6	B					Mitigation not required
	WB	LT	0.35	9.8	A	LT	0.35	9.8	A					
29th Street	SB	LTR	0.48	19.5	B	LTR	0.48	19.5	B					
Overall Intersection		**-**	**0.58**	**14.7**	**B**	**-**	**0.62**	**15.9**	**B**					

Table 22-2 (cont.)
2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

18. BROADWAY & VERNON BOULEVARD/11TH STREET														
Broadway	EB	LTR	0.01	28.2	C	LTR	0.01	28.2	C	LTR	0.01	28.2	C	**Partially Mitigated** Install "No Standing 7 AM - 10 AM, 4 PM - 7 PM Mon - Fri" regulations along the WB approach for 100 feet to daylight the approach.
	WB	LTR	1.14	105.1	F	LTR	1.18	121.6	F	LT	0.93	42.2	D	
		-	-	-	-	-	-	-	-	R	0.21	29.8	C	
Vernon Boulevard	NB	LT	0.26	8.0	A	LT	0.28	8.2	A	LT	0.28	8.2	A	
		R	0.11	6.8	A	R	0.11	6.8	A	R	0.11	6.8	A	
	SB	LTR	1.14	102.7	F	LTR	1.40	214.1	F	LTR	1.40	214.1	F	
11th Street	NB	LTR	0.38	41.2	D	LTR	0.38	41.2	D	LTR	0.38	41.2	D	
Overall Intersection		**-**	**1.12**	**77.1**	**E**	**-**	**1.27**	**135.8**	**F**	**-**	**1.20**	**100.1**	**F**	
19. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.40	234.0	F	LTR	1.48	269.5	F					**Unmitigatable Impact**
	WB	LTR	1.02	80.2	F	LTR	1.08	98.3	F					
21st Street	NB	LTR	0.51	17.0	B	LTR	0.53	17.3	B					
	SB	LTR	1.09	71.2	E	LTR	1.13	88.4	F					
Overall Intersection		**-**	**1.19**	**78.9**	**E**	**-**	**1.24**	**95.5**	**F**					
UNSIGNALIZED INTERSECTIONS														
20. 27TH AVENUE & 1ST STREET														
27th Avenue	WB	LR	-	9.3	A	LR	-	10.9	B					Mitigation not required
1st Street	NB	TR	-	7.8	A	TR	-	8.7	A					
	SB	LT	-	8.6	A	-	-	-	-					
Overall Intersection		**-**	**-**	**8.8**	**A**	**-**	**-**	**10.1**	**B**					
21. 27TH AVENUE & 2ND STREET														
27th Avenue	EB	LT	-	7.7	A	-	-	-	-	T	0.27	18.0	B	Restripe the SB approach from one 35-foot wide travel lane with parking on both sides to one 22-foot wide travel lane with parking, one 5-foot wide buffer, and one 8-foot wide parking lane. Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 38 s; SB phase green time is 42 s; all phases have 3 s of amber and 2 s of all red time.
	WB	-	-	-	-	-	-	-	-	T	0.59	22.6	C	
2nd Street	SB	LR	-	12.6	B	LR	-	61.2	F	LR	0.89	43.7	D	
Overall Intersection		**-**	**-**	**1.2**	**A**	**-**	**-**	**26.2**	**D**	**-**	**0.75**	**30.8**	**C**	
22. 27TH AVENUE & 4TH STREET														
27th Avenue	EB	LT	-	10.8	B	LT	-	57.9	F	LT	0.80	23.4	C	Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 49 s; SB phase green time is 31 s; all phases have 3 s of amber and 2 s of all red time.
	WB	TR	-	14.0	B	TR	-	31.6	D	TR	0.68	19.4	B	
4th Street	SB	LR	-	11.6	B	LR	-	14.7	B	LR	0.30	23.2	C	
Overall Intersection		**-**	**-**	**12.5**	**B**	**-**	**-**	**42.0**	**E**	**-**	**0.61**	**21.8**	**C**	
23. ASTORIA BOULEVARD & 18TH STREET														
Astoria Boulevard	EB	-	-	-	-	-	-	-	-	T	0.87	36.0	D	Install a traffic signal with a 120-second cycle length and two phases. [EB/WB phase green time is 55 s; SB phase green time is 55 s; all phases have 3 s of amber and 2 s of all red time
	WB	-	-	-	-	-	-	-	-	T	0.65	26.7	C	
18th Street	SB	LR	-	62.4	F	LR	-	518.1	F	LR	0.63	29.9	C	
Overall Intersection		**-**	**-**	**10.0**	**A**	**-**	**-**	**114.8**	**F**	**-**	**0.75**	**31.5**	**C**	

Table 22-2 (cont.)
2022 Mitigation Traffic Levels of Service Comparison – Weekday AM Peak Hour

24. ASTORIA BOULEVARD & 28TH STREET														
28th Street	NB	LR	-	37.5	E	LR	-	115.7	F					Mitigation not required
Overall Intersection		**-**	**-**	**2.8**	**A**	**-**	**-**	**7.3**	**A**					
25. ASTORIA BOULEVARD & 30TH STREET														
Astoria Boulevard	WB	LT	-	15.4	C	LT	-	28.1	D					Mitigation not required
Overall Intersection		**-**	**-**	**2.2**	**A**	**-**	**-**	**3.3**	**A**					

Table 22-3
2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

SIGNALIZED INTERSECTIONS														
1. 27TH AVENUE & 8TH STREET														
27th Avenue	EB	TR	0.76	26.5	C	TR	1.19	124.1	F	T	0.32	12.9	B	**Partially Mitigated**
		-	-	-	-	-	-	-	-	R	0.92	51.6	D	Install "No Standing Anytime" regulations
	WB	LT	0.65	22.6	C	LT	1.10	95.1	F	LT	0.88	39.0	D	along the EB approach for 100 feet to
8th Street	NB	L	0.39	23.8	C	L	0.44	24.8	C	L	0.44	24.8	C	daylight the approach.
		R	0.64	39.0	D	R	0.72	46.6	D	R	0.72	46.6	D	Restripe the EB approach from one 11-foot
Overall Intersection		**-**	**0.71**	**26.4**	**C**	**-**	**1.00**	**91.6**	**F**	**-**	**0.91**	**38.6**	**D**	wide travel lane, one 5-foot wide bike lane, and one 9-foot wide parking lane to one 11-foot wide through lane, and one 14-foot wide right turn lane with "share the road" bike provisions for 100 feet. (Geometric changes are similar to measures identified for the weekday AM peak hour).
2. VERNON BOULEVARD/MAIN AVENUE & 8TH STREET/WELLING COURT														
Vernon Boulevard	EB	LT	0.93	50.7	D	LT	1.01	68.1	E	LT	0.94	50.1	D	Modify signal timing: Shift 2 s of green time
Main Street	WB	TR	0.04	21.1	C	TR	0.04	21.1	C	TR	0.04	21.1	C	from the NB phase to the EB/SB phase
Welling Court	NB	LTR	0.15	29.1	C	LTR	0.15	29.1	C	LTR	0.17	31.0	C	[EB/SB phase green time shifts from 26 s
8th Street	SB	R	0.71	37.1	D	R	0.83	44.3	D	R	0.77	38.0	D	to 28 s; NB phase green time shifts from
Overall Intersection		**-**	**0.38**	**42.9**	**D**	**-**	**0.41**	**54.4**	**D**	**-**	**0.41**	**43.1**	**D**	20 s to 18 s; WB phase green time remains the same].
3. ASTORIA BOULEVARD & 8TH STREET														
Astoria Boulevard	EB	LR	0.13	26.5	C	LR	0.31	29.6	C					Mitigation not required
	WB	L	0.36	30.6	C	L	0.36	30.6	C					
		TR	0.18	27.5	C	TR	0.34	30.3	C					
8th Street	NB	LT	0.37	15.7	B	LT	0.50	17.9	B					
	SB	TR	0.38	16.0	B	TR	0.45	17.2	B					
Overall Intersection		**-**	**0.37**	**20.1**	**C**	**-**	**0.44**	**22.4**	**C**					

Table 22-3
2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

4. ASTORIA BOULEVARD & 21ST STREET														
Astoria Boulevard	EB	L	0.31	25.5	C	L	0.36	27.6	C	L	0.33	24.9	C	Install "No Standing Anytime" regulations along the NB approach for 165 feet, along the NB receiving side for 135 feet, along the SB approach for 340 feet, and along the SB receiving side for 125 feet to allow for thee moving lanes at the NB and SB approaches. Shift the NB approach centerline 3 feet to the west and restripe the NB approach from one 11-foot wide travel lane, one 20-foot wide travel lane with parking, one 12-foot wide receiving lane, and one 18-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 12-foot wide receiving lane, and one 15-foot wide receiving lane for 125 feet from the intersection. Shift the SB approach centerline 4 feet to the east and restripe the SB approach from one 11-foot wide travel lane, one 19-foot wide travel lane with parking, one 11-foot wide receiving lane, and one 19-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 11-foot wide receiving lane, and one 15-foot wide receiving lane for 135 feet from the intersection. Modify signal phasing: Allow SBR movement during the EBL/WBL phase. Modify signal timing: Shift 3 s of green time from the NB/SB phase to the EBL/WBL phase [EBL/WBL phase green time shifts from 10 s to 13 s; NB/SB phase green time shifts from 56 s to 53 s; EB/WB phase green time remains the same]. (Geometric changes are similar to measures identified for the weekday AM peak hour).
		TR	0.43	33.3	C	TR	0.56	36.0	D	TR	0.56	36.0	D	
	WB	L	0.90	53.0	D	L	0.99	74.6	E	L	0.90	54.1	D	
		TR	0.36	31.6	C	TR	0.41	32.3	C	TR	0.41	32.3	C	
21st Street	NB	LTR	0.74	26.6	C	LTR	0.88	30.3	C	LT	0.55	24.9	C	
		-	-	-	-	-	-	-	-	R	0.54	25.0	C	
	SB	LTR	0.76	27.3	C	LTR	0.86	30.2	C	LT	0.56	25.2	C	
		-	-	-	-	-	-	-	-	R	0.53	15.3	B	
Overall Intersection		**-**	**0.85**	**31.1**	**C**	**-**	**0.94**	**35.7**	**D**	**-**	**0.76**	**29.6**	**C**	
5. ASTORIA BOULEVARD & 23RD STREET														
Astoria Boulevard	EB	LT	0.73	19.7	B	LT	0.85	25.4	C					Mitigation not required
	WB	TR	0.73	16.5	B	TR	0.79	17.6	B					
23rd Street	NB	LTR	0.56	28.4	C	LTR	0.56	28.4	C					
Overall Intersection		**-**	**0.66**	**20.3**	**C**	**-**	**0.74**	**23.0**	**C**					

Table 22-3

2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

6. ASTORIA BOULEVARD & CRESCENT STREET														
Astoria Boulevard	EB	TR	0.75	21.1	C	TR	0.87	27.8	C					**Unmitigatable impact**
	WB	LT	1.18	102.9	F	LT	1.33	171.6	F					
Crescent Street	SB	LTR	1.07	68.1	E	LTR	1.07	68.1	E					
Overall Intersection		**-**	**1.13**	**63.5**	**E**	**-**	**1.23**	**87.6**	**F**					
7. ASTORIA BOULEVARD & 31ST STREET														
Astoria Boulevard	EB	LTR	1.02	56.4	E	LTR	1.18	117.7	F	LTR	0.61	23.1	C	Install "No Standing Anytime" regulations along the EB approach for 200 feet to allow for two moving lanes at the approach. Restripe the EB approach from one 25-foot wide travel lane with parking to one 12-foot wide through lane, and one 13-foot wide through-right lane for 200 feet. (Geometric changes are similar to measures identified for the weekday AM peak hour).
31st Street	NB	T	0.53	33.7	C	T	0.53	33.7	C	T	0.53	33.7	C	
		R	0.53	8.8	A	R	0.53	8.8	A	R	0.53	8.8	A	
	SB	T	0.64	19.7	B	T	0.64	19.7	B	T	0.64	19.7	B	
		R	0.31	14.3	B	R	0.31	14.3	B	R	0.31	14.3	B	
Overall Intersection		**-**	**0.81**	**29.4**	**C**	**-**	**0.88**	**51.1**	**D**	**-**	**0.63**	**19.5**	**B**	
8. ASTORIA PARK SOUTH/ HOYT AVE SOUTH & 21ST STREET														
Astoria Park South/ Hoyt Ave South	EB	LTR	0.36	33.3	C	LTR	0.41	34.2	C	LTR	0.39	32.4	C	Mitigation not required. Modify signal timing: Shift 2 s of green time from the NB/SB phase to the EB phase [NB/SB phase green time shifts from 73 to 71 s; EB phase green time shifts from 37 to 39 s]. [Signal timing shift due to mitigation measures at the intersection of Hoyt Avenue North and 21st Street.]
21st Street	NB	LTR	0.46	13.7	B	LTR	0.47	13.8	B	LTR	0.48	15.0	B	
	SB	LTR	0.67	17.2	B	LTR	0.73	18.8	B	LTR	0.75	20.5	C	
Overall Intersection		**-**	**0.57**	**18.5**	**B**	**-**	**0.62**	**19.8**	**B**	**-**	**0.62**	**20.8**	**C**	
9. HOYT AVENUE SOUTH & RFK BRIDGE OFF-RAMP/29TH STREET														
Hoyt Avenue South	EB	TR	0.50	19.5	B	TR	0.52	19.8	B					Mitigation not required
RFK Bridge Off-Ramp	SB	T	0.43	19.9	B	T	0.47	20.4	C					
Overall Intersection		**-**	**0.47**	**19.7**	**B**	**-**	**0.49**	**20.0**	**C**					
10. HOYT AVENUE SOUTH & 31ST STREET														
Hoyt Avenue South	EB	LT	0.65	26.4	C	LT	0.66	26.7	C					Mitigation not required
		R	0.44	26.6	C	R	0.44	26.6	C					
31st Street	NB	TR	0.26	27.3	C	TR	0.26	27.3	C					
	SB	LT	0.54	15.3	B	LT	0.59	15.3	B					
Overall Intersection		**-**	**0.63**	**22.5**	**C**	**-**	**0.63**	**22.6**	**C**					
11. HOYT AVENUE SOUTH/ASTORIA BOULEVARD & 33RD STREET														
Hoyt Avenue South	EB	LT	0.71	27.5	C	LT	0.73	27.8	C	LT	0.78	30.3	C	Modify signal timing: Shift 2 s of green time from the EB Hoyt Avenue S phase to the EB Astoria Boulevard phase [EB Astoria Boulevard phase green time shifts from 22 s to 24 s; EB Hoyt Avenue S phase green time shifts from 31 s to 29 s; NB phase green time remains the same].
Astoria Boulevard	EB	LT	1.05	71.2	E	LT	1.15	108.7	F	LT	1.05	70.8	E	
33rd Street	NB	TR	0.80	38.4	D	TR	0.80	38.4	D	TR	0.80	38.4	D	
		R	0.78	42.2	D	R	0.78	42.2	D	R	0.78	42.2	D	
Overall Intersection		**-**	**0.84**	**44.9**	**D**	**-**	**0.87**	**58.9**	**E**	**-**	**0.87**	**46.7**	**D**	

Table 22-3
2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

12. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.11	42.0	D	L	0.11	42.0	D	L	0.12	44.0	D	Modify signal timing: Shift 2 s of green time from the EB/WB phase to the WB lag phase [EB/WB phase green time shifts from 22 s to 20 s; WB lag phase green time shifts from 38 s to 40 s; NB/SB phase green time remains the same].
		R	0.13	42.5	D	R	0.13	42.5	D	R	0.15	44.5	D	
	WB	L	0.79	41.7	D	L	0.89	47.6	D	L	0.84	43.0	D	
		TR	0.17	14.2	B	TR	0.17	14.2	B	TR	0.17	14.2	B	
21st Street	NB	L	0.12	25.4	C	L	0.12	25.4	C	L	0.12	25.4	C	
		T	0.80	44.9	D	T	0.84	48.3	D	T	0.84	48.3	D	
	SB	TR	0.59	34.0	C	TR	0.61	34.4	C	TR	0.61	34.4	C	
Overall Intersection		**-**	**0.65**	**38.8**	**D**	**-**	**0.71**	**42.7**	**D**	**-**	**0.71**	**40.5**	**D**	
13. HOYT AVENUE NORTH & 29TH STREET														
Hoyt Avenue North	WB	L	0.56	11.9	B	L	0.57	12.0	B					Mitigation not required
		LT	0.56	11.4	B	LT	0.59	11.8	B					
29th Street	SB	R	0.52	35.1	D	R	0.54	35.7	D					
Overall Intersection		**-**	**0.55**	**13.7**	**B**	**-**	**0.58**	**14.1**	**B**					
14. HOYT AVENUE NORTH & 31ST STREET														
Hoyt Avenue North	WB	L	1.05	96.7	F	L	1.05	96.7	F					Mitigation not required
		T	0.77	18.7	B	T	0.81	19.9	B					
		R	0.65	21.3	C	R	0.65	21.3	C					
31st Street	NB	Def L	0.53	30.9	C	Def L	0.53	30.9	C					
		T	0.23	21.2	C	T	0.23	21.2	C					
	SB	T	0.45	24.4	C	T	0.45	24.4	C					
		R	0.26	22.2	C	R	0.26	22.2	C					
Overall Intersection		**-**	**0.68**	**35.0**	**C**	**-**	**0.70**	**35.2**	**D**					
15. HOYT AVENUE NORTH & 32ND STREET														
Hoyt Avenue North	WB	T	0.37	7.9	A	T	0.37	7.9	A					**Unmitigatable Impact**
Grand Central Parkway Off-Ramp	WB	T	1.00	35.4	D	T	1.05	49.7	D					
32nd Street	NB	L	0.37	28.8	C	L	0.38	29.0	C					
	SB	R	0.02	25.9	C	R	0.02	25.9	C					
Overall Intersection		**-**	**0.82**	**27.6**	**C**	**-**	**0.86**	**36.9**	**D**					
16. 24TH AVENUE & 21ST STREET														
24th Avenue	EB	LTR	0.04	29.2	C	LTR	0.04	29.2	C					Mitigation not required
	WB	LTR	0.29	33.3	C	LTR	0.29	33.3	C					
21st Street	NB	LTR	0.74	21.4	C	LTR	0.77	22.8	C					
	SB	LTR	0.40	13.6	B	LTR	0.41	13.8	B					
Overall Intersection		**-**	**0.59**	**20.6**	**C**	**-**	**0.61**	**21.5**	**C**					
17. 24TH AVENUE & 29TH STREET														
24th Avenue	EB	TR	0.44	11.0	B	TR	0.46	11.3	B					Mitigation not required
	WB	LT	0.24	8.7	A	LT	0.24	8.7	A					
29th Street	SB	LTR	0.37	18.0	B	LTR	0.37	18.0	B					
Overall Intersection		**-**	**0.41**	**12.1**	**B**	**-**	**0.42**	**12.2**	**B**					

Table 22-3
2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

18. BROADWAY & VERNON BOULEVARD/11TH STREET														
Broadway	EB	LTR	0.02	26.1	C	LTR	0.02	26.1	C	LTR	0.02	25.4	C	Modify signal timing: Shift 1 s of green time from the NB/SB Vernon Boulevard phase to the EB/WB phase [EB/WB phase green time shifts from 25 s to 26 s; NB/SB Vernon Boulevard phase green time shifts from 35 s to 34 s; NB 11th Street phase green time remains the same].
	WB	LTR	0.98	60.7	E	LTR	1.02	71.0	E	LTR	0.98	59.8	E	
Vernon Boulevard	NB	LT	0.27	8.4	A	LT	0.29	8.6	A	LT	0.30	9.1	A	
		R	0.20	7.8	A	R	0.20	7.8	A	R	0.21	8.3	A	
	SB	LTR	0.60	28.6	C	LTR	0.68	31.1	C	LTR	0.70	32.6	C	
11th Street	NB	LTR	0.22	32.9	C	LTR	0.22	32.9	C	LTR	0.22	32.9	C	
Overall Intersection		**-**	**0.77**	**29.9**	**C**	**-**	**0.83**	**33.5**	**C**	**-**	**0.83**	**31.0**	**C**	
19. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.19	141.5	F	LTR	1.22	155.3	F	LTR	1.18	135.7	F	Modify signal timing: Shift 1 s of green time from the NB/SB phase to the EB/WB phase [EB/WB phase green time shifts from 32 s to 33 s; NB/SB phase green time shifts from 68 s to 67 s; pedestrian phase remains the same].
	WB	LTR	0.98	70.1	E	LTR	1.02	78.7	E	LTR	0.97	65.8	E	
21st Street	NB	LTR	0.91	30.1	C	LTR	0.93	31.5	C	LTR	0.94	33.7	C	
	SB	LTR	0.86	27.4	C	LTR	0.88	28.6	C	LTR	0.90	30.4	C	
Overall Intersection		**-**	**1.01**	**47.1**	**D**	**-**	**1.03**	**50.9**	**D**	**-**	**1.02**	**48.6**	**D**	
UNSIGNALIZED INTERSECTIONS														
20. 27TH AVENUE & 1ST STREET														
27th Avenue	WB	LR	-	9.4	A	LR	-	11.9	B					Mitigation not required
1st Street	NB	TR	-	7.9	A	TR	-	8.9	A					
	SB	LT	-	8.3	A	-	-	-	-					
Overall Intersection		**-**	**-**	**8.9**	**A**	**-**	**-**	**11.1**	**B**					
21. 27TH AVENUE & 2ND STREET														
27th Avenue	EB	LT	-	7.8	A	-	-	-	-	T	0.14	10.5	B	Restripe the SB approach from one 35-foot wide travel lane with parking on both sides to one 22-foot wide travel lane with parking, one 5-foot wide buffer, and one 8-foot wide parking lane. Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 49 s; SB phase green time is 31 s; all phases have 3 s of amber and 2 s of all red time. (Geometric changes are similar to measures identified for the weekday AM peak hour). **[Measures reflect improvements needed for the AM and PM peak periods.]**
	WB	-	-	-	-	-	-	-	-	T	0.44	13.0	B	
2nd Street	SB	LR	-	11.4	B	LR	-	17.1	C	LR	0.47	26.7	C	
Overall Intersection		**-**	**-**	**1.9**	**A**	**-**	**-**	**5.3**	**A**	**-**	**0.45**	**16.9**	**B**	

Table 22-3
2022 Mitigation Traffic Levels of Service Comparison – Weekday Midday Peak Hour

22. 27TH AVENUE & 4TH STREET														
27th Avenue	EB	LT	-	10.0	A	LT	-	15.1	C	LT	0.46	14.3	B	Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 49 s; SB phase green time is 31 s; all phases have 3 s of amber and 2 s of all red time. **[Measures reflect improvements needed for the AM and PM peak periods.]**
	WB	TR	-	12.5	B	TR	-	23.7	C	TR	0.70	19.0	B	
4th Street	SB	LR	-	11.0	B	LR	-	13.0	B	LR	0.32	23.3	C	
Overall Intersection		**-**	**-**	**11.4**	**B**	**-**	**-**	**18.7**	**C**	**-**	**0.55**	**18.0**	**B**	
23. ASTORIA BOULEVARD & 18TH STREET														
Astoria Boulevard	EB	-	-	-	-	-	-	-	-	T	0.41	23.1	C	Install a traffic signal with a 120-second cycle length and two phases. [EB/WB phase green time is 55 s; SB phase green time is 55 s; all phases have 3 s of amber and 2 s of all red time. **[Measures reflect improvements needed for the AM and PM peak periods.]**
	WB	-	-	-	-	-	-	-	-	T	0.41	22.8	C	
18th Street	SB	LR	-	15.1	C	LR	-	20.8	C	LR	0.39	23.5	C	
Overall Intersection		**-**	**-**	**3.8**	**A**	**-**	**-**	**5.4**	**A**	**-**	**0.40**	**23.1**	**C**	
24. ASTORIA BOULEVARD & 28TH STREET														
28th Street	NB	LR	-	24.3	C	LR	-	31.5	D					Mitigation not required
Overall Intersection		**-**	**-**	**2.2**	**A**	**-**	**-**	**2.6**	**A**					
25. ASTORIA BOULEVARD & 30TH STREET														
Astoria Boulevard	WB	LT	-	9.8	A	LT	-	10.4	B					Mitigation not required
Overall Intersection		**-**	**-**	**0.8**	**A**	**-**	**-**	**0.8**	**A**					

Table 22-4

2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

SIGNALIZED INTERSECTIONS														
1. 27TH AVENUE & 8TH STREET														
27th Avenue	EB	TR	0.64	19.9	B	TR	1.05	70.2	E	T	0.42	14.1	B	**Partially Mitigated** Install "No Standing Anytime" regulations along the EB approach for 100 feet to daylight the approach. Restripe the EB approach from one 11-foot wide travel lane, one 5-foot wide bike lane, and one 9-foot wide parking lane to one 11-foot wide through lane, and one 14-foot wide right turn lane with "share the road" bike provisions for 100 feet. (Geometric changes are similar to measures identified for the weekday AM peak hour).
		-	-	-	-	-	-	-	-	R	0.61	21.4	C	
	WB	LT	0.49	16.9	B	LT	1.20	130.4	F	LT	1.03	67.9	E	
8th Street	NB	L	0.47	25.6	C	L	0.60	29.0	C	L	0.60	29.0	C	
		R	0.66	39.1	D	R	0.73	45.4	D	R	0.73	45.4	D	
Overall Intersection		**-**	**0.65**	**23.2**	**C**	**-**	**1.01**	**80.6**	**F**	**-**	**0.91**	**31.4**	**C**	
2. VERNON BOULEVARD/MAIN AVENUE & 8TH STREET/WELLING COURT														
Vernon Boulevard	EB	LT	1.20	127.2	F	LT	1.41	218.3	F					**Unmitigatable Impact**
Main Street	WB	TR	0.06	21.3	C	TR	0.06	21.3	C					
Welling Court	NB	LTR	0.12	28.7	C	LTR	0.12	28.7	C					
8th Street	SB	R	0.63	33.8	C	R	0.76	39.7	D					
Overall Intersection		**-**	**0.47**	**88.4**	**F**	**-**	**0.54**	**144.2**	**F**					
3. ASTORIA BOULEVARD & 8TH STREET														
Astoria Boulevard	EB	LR	0.28	29.1	C	LR	0.72	42.9	D	LR	0.74	44.8	D	Modify signal timing: Shift 1 s of green time from the EB/WB phase to the NB/SB phase [EB/WB phase green time shifts from 43 s to 42 s; NB/SB phase green time shifts from 67 s to 68 s].
	WB	L	0.25	28.6	C	L	0.25	28.6	C	L	0.26	29.4	C	
		TR	0.17	27.2	C	TR	0.44	32.3	C	TR	0.46	33.3	C	
8th Street	NB	LT	0.50	17.0	B	LT	0.99	45.4	D	LT	0.97	39.7	D	
	SB	TR	0.36	15.8	B	TR	0.45	17.3	B	TR	0.45	16.6	B	
Overall Intersection		**-**	**0.41**	**20.3**	**C**	**-**	**0.88**	**34.9**	**C**	**-**	**0.88**	**33.5**	**C**	

Table 22-4 (cont'd)
2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

4. ASTORIA BOULEVARD & 21ST STREET														
Astoria Boulevard	EB	L	0.48	31.4	C	L	0.58	38.0	D	L	0.52	34.1	C	Install "No Standing Anytime" regulations along the NB approach for 165 feet, along the NB receiving side for 135 feet, along the SB approach for 340 feet, and along the SB receiving side for 125 feet to allow for thee moving lanes at the NB and SB approaches. Shift the NB approach centerline 3 feet to the west and restripe the NB approach from one 11-foot wide travel lane, one 20-foot wide travel lane with parking, one 12-foot wide receiving lane, and one 18-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 12-foot wide receiving lane, and one 15-foot wide receiving lane for 125 feet from the intersection. Shift the SB approach centerline 4 feet to the east and restripe the SB approach from one 11-foot wide travel lane, one 19-foot wide travel lane with parking, one 11-foot wide receiving lane, and one 19-foot wide receiving lane with parking to two 11-foot wide travel lanes, one 12-foot wide right turn lane, one 11-foot wide receiving lane, and one 15-foot wide receiving lane for 135 feet from the intersection. Modify signal phasing: Allow SBR movement during the EBL/WBL phase. Modify signal timing: Shift 3 s of green time from the NB/SB phase to the EBL/WBL phase [EBL/WBL phase green time shifts from 10 s to 13 s; NB/SB phase green time shifts from 56 s to 53 s; EB/WB phase green time remains the same]. (Geometric changes are similar to measures identified for the weekday AM peak hour).
		TR	0.66	37.1	D	TR	0.83	43.0	D	TR	0.83	43.0	D	
	WB	L	0.81	49.4	D	L	0.93	68.1	E	L	0.83	52.8	D	
		TR	0.50	33.6	C	TR	0.62	35.8	D	TR	0.62	35.8	D	
21st Street	NB	LTR	1.38	203.2	F	LTR	1.92	445.5	F	LTR	1.26	149.4	F	
		-	-	-	-	-	-	-	-	-	0.55	25.2	C	
	SB	LTR	1.06	68.2	E	LTR	1.33	184.3	F	LTR	0.80	31.1	C	
		-	-	-	-	-	-	-	-	-	0.85	25.8	C	
Overall Intersection		**-**	**1.15**	**98.4**	**F**	**-**	**1.45**	**202.8**	**F**	**-**	**1.08**	**60.4**	**E**	

Table 22-4 (cont'd)
2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

5. ASTORIA BOULEVARD & 23RD STREET														
Astoria Boulevard	EB	LT	0.84	26.7	C	LT	1.00	46.9	D	LT	0.99	42.8	D	Modify signal timing: Shift 1 s of green time from the NB phase to the EB/WB phase [EB/WB phase green time shifts from 67 s to 68 s; NB phase green time shifts from 43 s to 42 s].
	WB	TR	0.74	20.7	C	TR	0.87	24.4	C	TR	0.85	23.3	C	
23rd Street	NB	LTR	0.59	36.1	D	LTR	0.59	36.1	D	LTR	0.61	37.3	D	
Overall Intersection		**-**	**0.74**	**26.5**	**C**	**-**	**0.84**	**36.8**	**D**	**-**	**0.84**	**34.7**	**C**	
6. ASTORIA BOULEVARD & CRESCENT STREET														
Astoria Boulevard	EB	TR	0.98	48.3	D	TR	1.16	106.3	F					**Unmitigatable Impact**
	WB	LT	1.29	158.9	F	LT	1.63	309.2	F					
Crescent Street	SB	LTR	1.04	62.4	E	LTR	1.04	62.4	E					
Overall Intersection		**-**	**1.19**	**84.8**	**F**	**-**	**1.40**	**156.5**	**F**					
7. ASTORIA BOULEVARD & 31ST STREET														
Astoria Boulevard	EB	LTR	1.15	112.2	F	LTR	1.37	207.1	F	LTR	0.81	36.2	D	Install "No Standing Anytime" regulations along the EB approach for 200 feet to allow for two moving lanes at the approach. Restripe the EB approach from one 25-foot wide travel lane with parking to one 12-foot wide through lane, and one 13-foot wide through-right lane for 200 feet. (Geometric changes are similar to measures identified for the weekday AM peak hour).
31st Street	NB	T	0.51	41.5	D	T	0.51	41.5	D	T	0.51	41.5	D	
		R	0.83	24.0	C	R	0.83	24.0	C	R	0.83	24.0	C	
	SB	T	0.69	22.7	C	T	0.69	22.7	C	T	0.56	22.7	C	
		R	0.31	15.1	B	R	0.31	15.1	B	R	0.56	15.1	B	
Overall Intersection		**-**	**0.87**	**50.1**	**D**	**-**	**0.96**	**84.4**	**F**	**-**	**0.74**	**28.4**	**C**	
8. ASTORIA PARK SOUTH/ HOYT AVE SOUTH & 21ST STREET														
Astoria Park South/ Hoyt Ave South	EB	LTR	0.51	35.2	D	LTR	0.58	36.6	D	LTR	0.62	38.7	D	Install "No Standing 4 PM - 7 PM Mon - Fri" regulations along the NB approach for 175 feet to daylight the approach. Modify signal timing: Shift 2 s of green time from the EB phase to the NB/SB phase [EB phase green time shifts from 37 s to 35 s; NB/SB phase green time shifts from 73 s to 75 s].
21st Street	NB	LTR	1.04	51.2	D	LTR	1.16	101.0	F	LT	0.73	17.2	B	
		-	-	-	-	-	-	-	-	R	0.50	13.1	B	
	SB	LTR	1.05	58.4	E	LTR	1.24	136.3	F	LTR	1.03	50.1	D	
Overall Intersection		**-**	**0.87**	**52.0**	**D**	**-**	**1.02**	**108.0**	**F**	**-**	**0.90**	**36.2**	**D**	
9. HOYT AVENUE SOUTH & RFK BRIDGE OFF-RAMP/29TH STREET														
Hoyt Avenue South	EB	TR	0.58	26.0	C	TR	0.61	26.6	C					Mitigation not required
RFK Bridge Off-Ramp	SB	T	0.55	26.9	C	T	0.62	28.9	C					
Overall Intersection		**-**	**0.56**	**26.3**	**C**	**-**	**0.61**	**27.5**	**C**					
10. HOYT AVENUE SOUTH & 31ST STREET														
Hoyt Avenue South	EB	T	0.82	38.4	D	T	0.84	39.4	D					Mitigation not required
		R	0.33	30.3	C	R	0.33	30.3	C					
31st Street	NB	TR	0.28	36.3	D	TR	0.28	36.3	D					
	SB	T	0.43	16.1	B	T	0.43	16.1	B					
Overall Intersection		**-**	**0.59**	**31.2**	**C**	**-**	**0.59**	**31.9**	**C**					

Table 22-4 (cont'd)
2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

11. HOYT AVENUE SOUTH/ASTORIA BOULEVARD & 33RD STREET														
Hoyt Avenue South	EB	LT	0.78	36.4	D	LT	0.81	37.1	D	LT	0.87	41.3	D	Modify signal timing: Shift 3 s of green time from the EB Hoyt Avenue S phase to the EB Astoria Boulevard phase [EB Astoria Boulevard phase green time shifts from 31 s to 34 s; EB Hoyt Avenue S phase green time shifts from 43 s to 40 s; NB phase green time remains the same].
Astoria Boulevard	EB	LT	1.20	136.2	F	LT	1.32	191.1	F	LT	1.21	137.8	F	
33rd Street	NB	TR	1.08	84.9	F	TR	1.08	84.9	F	TR	1.08	84.9	F	
		R	1.07	83.3	F	R	1.07	83.3	F	R	1.07	83.3	F	
Overall Intersection		**-**	**0.99**	**82.7**	**F**	**-**	**1.04**	**103.3**	**F**	**-**	**1.04**	**86.4**	**F**	
12. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.09	41.8	D	L	0.09	41.8	D	L	0.11	43.9	D	**Partially Mitigated** Modify signal timing: Shift 2 s of green time from the EB/WB phase to the NB/SB phase [EB/WB phase green time shifts from 22 s to 20 s; NB/SB phase green time shifts from 45 s to 47 s; WB lag phase green time remains the same].
		R	0.17	43.1	D	R	0.17	43.1	D	R	0.19	45.3	D	
	WB	L	0.79	42.3	D	L	1.04	75.6	E	L	1.04	75.6	E	
		TR	0.29	15.7	B	TR	0.29	15.7	B	TR	0.30	16.9	B	
21st Street	NB	L	0.18	26.2	C	L	0.18	26.3	C	L	0.17	24.7	C	
		T	1.13	106.7	F	T	1.17	124.3	F	T	1.13	103.8	F	
	SB	TR	0.79	40.4	D	TR	0.81	41.6	D	TR	0.78	38.2	D	
Overall Intersection		**-**	**0.81**	**59.4**	**E**	**-**	**0.92**	**77.3**	**E**	**-**	**0.92**	**70.9**	**E**	
13. HOYT AVENUE NORTH & 29TH STREET														
Hoyt Avenue North	WB	L	0.44	12.6	B	L	0.45	12.7	B					Mitigation not required
		LT	0.66	15.7	B	LT	0.77	18.2	C					
29th Street	SB	R	0.83	52.5	D	R	0.86	54.8	D					
Overall Intersection		**-**	**0.71**	**20.4**	**C**	**-**	**0.79**	**21.9**	**C**					
14. HOYT AVENUE NORTH & 31ST STREET														
Hoyt Avenue North	WB	L	0.44	16.2	B	L	0.44	16.2	B					Mitigation not required
		T	0.78	22.6	C	T	0.88	26.4	C					
		R	0.71	26.6	C	R	0.71	26.6	C					
31st Street	NB	LT	0.29	28.3	C	LT	0.29	28.3	C					
	SB	T	0.15	26.6	C	T	0.15	26.6	C					
		R	0.49	33.8	C	R	0.49	33.8	C					
Overall Intersection		**-**	**0.66**	**22.8**	**C**	**-**	**0.72**	**25.1**	**C**					
15. HOYT AVENUE NORTH & 32ND STREET														
Hoyt Avenue North	WB	T	0.32	9.2	A	T	0.32	9.2	A					**Unmitigatable Impact**
Grand Central Parkway Off-Ramp	WB	T	1.02	46.8	D	T	1.16	97.1	F					
32nd Street	NB	L	0.55	38.8	D	L	0.56	39.0	D					
	SB	R	0.02	33.3	C	R	0.02	33.3	C					
Overall Intersection		**-**	**0.88**	**36.8**	**D**	**-**	**0.99**	**69.1**	**E**					
16. 24TH AVENUE & 21ST STREET														
24th Avenue	EB	LTR	0.05	29.3	C	LTR	0.05	29.3	C	LTR	0.05	30.7	C	Modify signal timing: Shift 2 s of green time from the EB/WB phase to the NB/SB phase [EB/WB phase green time shifts from 37 s to 35 s; NB/SB phase green time shifts from 73 s to 75 s].
	WB	LTR	0.42	36.0	D	LTR	0.42	36.0	D	LTR	0.45	38.2	D	
21st Street	NB	LTR	1.08	66.9	E	LTR	1.12	81.9	F	LTR	1.09	67.8	E	
	SB	LTR	0.50	15.2	B	LTR	0.52	15.5	B	LTR	0.50	14.2	B	
Overall Intersection		**-**	**0.86**	**48.3**	**D**	**-**	**0.88**	**57.3**	**E**	**-**	**0.88**	**48.9**	**D**	

Table 22-4 (cont'd)
2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

17. 24TH AVENUE & 29TH STREET														
24th Avenue	EB	TR	0.78	19.8	B	TR	0.81	21.5	C					Mitigation not required
	WB	LT	0.34	9.5	A	LT	0.34	9.6	A					
29th Street	SB	LTR	0.44	18.8	B	LTR	0.44	18.8	B					
Overall Intersection		**-**	**0.65**	**16.9**	**B**	**-**	**0.67**	**17.9**	**B**					
18. BROADWAY & VERNON BOULEVARD/11TH STREET														
Broadway	EB	LTR	0.03	33.2	C	LTR	0.03	33.2	C	LTR	0.03	33.2	C	Install "No Standing 7 AM - 10 AM, 4 PM - 7 PM Mon - Fri" regulations along the WB approach for 100 feet to daylight the approach. Modify signal timing: Shift 3 s of green time from the NB 11th Street phase to the NB/SB Vernon Boulevard phase [NB/SB Vernon Boulevard phase green time shifts from 45 s to 48 s; NB 11th Street phase green time shifts from 25 s to 22 s; EB/WB phase green time remains the same].
	WB	LTR	1.00	77.0	E	LTR	1.10	108.2	F	LT	0.82	50.5	D	
		-	-	-	-	-	-	-	-	R	0.25	35.9	D	
Vernon Boulevard	NB	LT	0.49	9.6	A	LT	0.53	10.3	B	LT	0.53	10.3	B	
		R	0.18	6.7	A	R	0.18	6.7	A	R	0.18	6.7	A	
	SB	LTR	0.70	32.4	C	LTR	0.96	58.2	E	LTR	0.87	42.9	D	
11th Street	NB	LTR	0.33	38.3	D	LTR	0.33	38.3	D	LTR	0.38	41.9	D	
Overall Intersection		**-**	**0.91**	**30.5**	**C**	**-**	**1.06**	**44.2**	**D**	**-**	**0.94**	**31.2**	**C**	
19. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.37	211.5	F	LTR	1.45	247.0	F					**Unmitigatable Impact**
	WB	LTR	1.23	150.2	F	LTR	1.33	195.5	F					
21st Street	NB	LTR	0.99	38.1	D	LTR	1.02	45.9	D					
	SB	LTR	0.79	23.6	C	LTR	0.81	24.6	C					
Overall Intersection		**-**	**1.12**	**65.6**	**E**	**-**	**1.16**	**78.8**	**E**					
UNSIGNALIZED INTERSECTIONS														
20. 27TH AVENUE & 1ST STREET														
27th Avenue	WB	LR	-	8.8	A	LR	-	14.1	A					Mitigation not required
1st Street	NB	TR	-	7.4	A	TR	-	8.7	B					
	SB	LT	-	8.3	A	-	-	-	-					
Overall Intersection		**-**	**-**	**8.3**	**A**	**-**	**-**	**13.0**	**B**					
21. 27TH AVENUE & 2ND STREET														
27th Avenue	EB	LT	-	7.8	A	-	-	-	-	T	0.17	11.7	B	Restripe the SB approach from one 35-foot wide travel lane with parking on both sides to one 22-foot wide travel lane with parking, one 5-foot wide buffer, and one 8-foot wide parking lane. Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 47 s; SB phase green time is 33 s; all phases have 3 s of amber and 2 s of all red time. (Geometric changes are similar to measures identified for the weekday AM peak hour).
	WB	-	-	-	-	-	-	-	-	T	0.71	17.7	B	
2nd Street	SB	LR	-	12.7	B	LR	-	62.1	F	LR	0.81	43.0	D	
Overall Intersection		**-**	**-**	**2.1**	**A**	**-**	**-**	**19.3**	**C**	**-**	**0.75**	**24.8**	**C**	

Table 22-4 (cont'd)
2022 Mitigation Traffic Levels of Service Comparison – Weekday PM Peak Hour

22. 27TH AVENUE & 4TH STREET														
27th Avenue	EB	LT	-	10.5	B	LT	-	22.6	C	LT	0.57	15.1	B	Install a traffic signal with a 90-second cycle length and two phases. [EB/WB phase green time is 51 s; SB phase green time is 29 s; all phases have 3 s of amber and 2 s of all red time.
	WB	TR	-	13.6	B	TR	-	120.4	F	TR	0.99	44.2	D	
4th Street	SB	LR	-	10.7	B	LR	-	13.4	B	LR	0.40	26.5	C	
Overall Intersection		**-**	**-**	**12.0**	**B**	**-**	**-**	**74.1**	**F**	**-**	**0.78**	**32.1**	**C**	
23. ASTORIA BOULEVARD & 18TH STREET														
Astoria Boulevard	EB	-	-	-	-	-	-	-	-	T	0.74	30.6	C	Install a traffic signal with a 120-second cycle length and two phases. [EB/WB phase green time is 55 s; SB phase green time is 55 s; all phases have 3 s of amber and 2 s of all red time.
	WB	-	-	-	-	-	-	-	-	T	0.39	21.6	C	
18th Street	SB	LR	-	19.6	C	LR	-	48.9	E	LR	0.41	23.6	C	
Overall Intersection		**-**	**-**	**4.2**	**A**	**-**	**-**	**9.8**	**A**	**-**	**0.57**	**26.8**	**C**	
24. ASTORIA BOULEVARD & 28TH STREET														
28th Street	NB	LR	-	23.5	C	LR	-	35.3	E					Mitigation not required
Overall Intersection		**-**	**-**	**1.7**	**A**	**-**	**-**	**2.3**	**A**					
25. ASTORIA BOULEVARD & 30TH STREET														
28th Street	WB	LT	-	11.8	B	LT	-	13.6	B					Mitigation not required
Overall Intersection		-	-	**1.5**	**A**	-	-	**1.5**	**A**					

= Denotes a significant impact.

27TH AVENUE/ASTORIA BOULEVARD

Nine of the 12 intersections analyzed along 27th Avenue and along Astoria Boulevard would be significantly impacted during the weekday AM and PM peak hours. Four of the intersections would be significantly impacted during the weekday midday peak hour. Impacts at five intersections could be fully mitigated with traffic capacity improvements and impacts at four intersections could not be mitigated or could only be partially mitigated during one or more peak hours.

27th Avenue and 2nd Street

Impacts on the southbound 2nd Street approach would occur during the weekday AM and PM peak hours. These impacts could be mitigated by installing a traffic signal at the intersection and restriping the southbound approach from one 35-foot wide roadway with parking on both sides to one 14-foot wide shared left-turn/right-turn lane with 8-foot wide parking lanes on both sides, and a one 5-foot wide buffer which serves as a traffic calming treatment. A preliminary analysis shows that the intersection would meet the peak hour criteria of the Manual of Uniform Traffic Control Devices' (MUTCD) signal warrant analysis. Should this analysis indicate that a traffic signal is not warranted, other mitigation measures would need to be identified or the significant impacts may only be partially mitigated or remain unmitigated.

27th Avenue and 4th Street

Impacts on the eastbound 27th Avenue approach would occur during the weekday AM peak hour. Impacts on the westbound 27th Avenue approach would occur during the weekday AM and PM peak hours. These impacts could be mitigated by installing a traffic signal at the intersection. A preliminary analysis shows that the intersection would meet the peak hour criteria of the MUTCD's signal warrant analysis. Should this analysis indicate that a traffic signal is not warranted, other mitigation measures would need to be identified or the significant impacts may only be partially mitigated or remain unmitigated.

27th Avenue and 8th Street

Impacts on the eastbound and westbound 27th Avenue approaches would occur during all weekday peak hours. Impacts on the northbound 8th Street right-turn movement would occur during the weekday midday and PM peak hours.

Impacts during all three peak hours could be partially mitigated by the following measures: modifying the signal timing during the weekday AM peak hour; installing "No Standing Anytime" regulations along eastbound 27th Avenue for 100 feet from the intersection (a loss of approximately five parking spaces) to "daylight" the approach; and restriping the eastbound approach from one 11-foot wide shared through/right-turn lane, one 5-foot wide bike lane, and one 9-foot wide parking lane to one 11-foot wide through lane, and one 14-foot wide right-turn lane with "share the road" bike provisions for a distance of 100 feet back from the intersection.

This intersection could be partially mitigated during all peak hours since some, but not all, movements can be mitigated—impacts on the westbound approach could not be mitigated during the AM and PM peak hours, and impacts on the northbound right-turn movement could not be mitigated during the weekday midday and PM peak hours.

Astoria Boulevard and 8th Street

Impacts on the eastbound Astoria Boulevard approach and northbound 8th Street approach would occur during the weekday AM and PM peak hours, respectively, and could be mitigated by modifying the signal timing.

Astoria Boulevard and 18th Street

Impacts on the southbound 18th Street approach would occur during the weekday AM and PM peak hours and could be mitigated by installing a traffic signal at the intersection. A preliminary analysis shows that the intersection would meet the peak hour criteria of the MUTCD's signal warrant analysis. Should this analysis indicate that a traffic signal is not warranted, other mitigation measures would need to be identified or the significant impacts may only be partially mitigated or remain unmitigated.

Astoria Boulevard and 21st Street

Impacts were identified on the eastbound Astoria Boulevard left-turn movement and shared through/right-turn movement during the weekday AM peak hour, the westbound Astoria Boulevard left-turn movement during all weekday peak hours, the northbound 21st Street approach during the weekday AM and PM peak hours, and the southbound 21st Street approach during the weekday AM and PM peak hours.

Weekday AM peak hour impacts could be partially mitigated and the midday, and PM peak hour impacts could be fully mitigated, as follows:

- Modifying the signal phasing to allow southbound right turns to occur during the eastbound left-turn/westbound left-turn lag phase.
- Installing "No Standing Anytime" regulations along the northbound 21st Street approach for 165 feet from the intersection (a loss of approximately six parking spaces), along the northbound receiving side for 135 feet from the intersection (a loss of approximately two parking spaces), along the southbound 21st Street approach for 340 feet from the intersection (a loss of approximately 13 parking spaces) and along the southbound receiving side for 125 feet from the intersection (a loss of approximately one parking space), to allow for three moving lanes northbound and southbound.
- Shifting the northbound approach centerline three feet to the west and restriping the northbound approach from one 11-foot wide shared left-turn/through lane and one 20-foot wide shared through/right-turn lane with parking (with one 12-foot wide lane and one 18-foot wide lane with parking on the southbound "receiving" side) to two 11-foot wide general travel lanes and one 12-foot wide right turn lane (with one 12-foot wide lane and one 15-foot wide lane on the "receiving" side) for a distance of 125 feet back from the intersection.
- Shifting the southbound approach centerline four feet to the east and restriping the southbound approach from one 11-foot wide shared left-turn/through lane and one 19-foot wide shared through/right-turn lane with parking (with one 11-foot wide lane, and one 19-foot wide lane with parking on the northbound "receiving" side) to two 11-foot wide general travel lanes and one 12-foot wide right turn lane (with one 11-foot wide lane and one 15 foot wide lane on the "receiving" side) for a distance of 135 feet back from the intersection.

The intersection could be partially mitigated during the weekday AM peak hour because the eastbound approach and the westbound left-turn movement could not be mitigated during that peak hour.

Astoria Boulevard and 23rd Street

Impacts on the eastbound Astoria Boulevard approach would occur during the weekday AM and PM peak hours and could be mitigated for the weekday PM peak hour by modifying the signal timing. The weekday AM peak hour impact could not be mitigated.

Astoria Boulevard and Crescent Street

Impacts on the eastbound Astoria Boulevard approach would occur during the weekday AM and PM peak hours and impacts on the westbound Astoria Boulevard approach would occur during all peak hours. These impacts could not be mitigated.

Astoria Boulevard and 31st Street

Impacts on the eastbound Astoria Boulevard approach would occur during all weekday peak hours. These impacts could be mitigated by installing "No Standing Anytime" regulations along eastbound Astoria Boulevard for 200 feet from the intersection (a loss of one parking space during the weekday midday peak hour), and restriping that approach from one 25-foot wide roadway with one travel lane and parking, to one 12-foot wide through lane and one 13-foot wide shared through-right lane for a distance of 200 feet back from the intersection to allow for two moving lanes at the approach.

HOYT AVENUE NORTH/HOYT AVENUE SOUTH

Six of the eight intersections analyzed along Hoyt Avenue South and Hoyt Avenue North would be significantly impacted during the weekday AM peak hour, three intersections would be significantly impact during the weekday midday peak hour, and five intersections would be significantly impacted during the weekday PM peak hour.

Astoria Park South/Hoyt Avenue South and 21st Street

Impacts on the northbound 21st Street approach would occur during the weekday PM peak hour. Impacts on the southbound 21st Street approach would occur during the weekday AM and PM peak hours. These impacts could be mitigated by modifying the signal timing and installing "No Standing 4 PM to 7 PM Monday through Friday" regulations along northbound 21st Street for 175 feet from the intersection (a loss of approximately four parking spaces) to "daylight" the approach. The weekday midday peak hour signal timing would be modified as well to maintain signal coordination with the intersection of Hoyt Avenue North and 21st Street.

Hoyt Avenue South and 31st Street

Impacts on the eastbound Hoyt Avenue South approach would occur during the weekday AM peak hour and could be mitigated by modifying the signal timing.

Hoyt Avenue South/Astoria Boulevard and 33rd Street

Impacts on the eastbound Astoria Boulevard approach would occur during all weekday peak hours. The impacts during the weekday AM peak hour could not be mitigated but the impacts during the weekday midday and PM peak hours could be mitigated by modifying the signal timing.

Hoyt Avenue North and 21st Street

Impacts on the westbound Hoyt Avenue North left-turn movement would occur during all peak hours. Impacts on the northbound 21st Street through movement would occur during the

weekday AM and PM peak hours. Impacts during the weekday AM peak hour could not be mitigated. Weekday midday peak hour impacts could be fully mitigated. Weekday PM peak hour impacts could be partially mitigated by modifying the signal timing; the westbound left-turn movement could not be mitigated.

Hoyt Avenue North and 29th Street

Impacts on the southbound 29th Street approach would occur during the weekday AM peak hour and could be mitigated by modifying the signal timing.

Hoyt Avenue North and 32nd Street

Impacts on the westbound Grand Central Parkway off-ramp would occur during all peak hours and could not be mitigated.

OTHER INTERSECTIONS

Five other intersections were analyzed and four of them are projected to experience significant impacts during one or more peak hours analyzed. One intersection could be fully mitigated but the remaining three intersections could not be mitigated or could only be partially mitigated during one or more peak hours.

Vernon Boulevard/Main Avenue and 8th Street/Welling Court

Impacts on the eastbound Vernon Boulevard approach would occur during all weekday peak hours. Impacts on the southbound 8th Street approach would occur during the weekday AM peak hour. Weekday AM peak hour impacts could be partially mitigated; the eastbound approach could be mitigated by modifying the signal timing but the southbound approach could not be mitigated. Impacts during the weekday midday peak hour could be fully mitigated by modifying the signal timing. Impacts during the weekday PM peak hour could not be mitigated.

Broadway and Vernon Boulevard/11th Street

Impacts on the westbound Broadway approach would occur during all peak hours. Impacts on the southbound Vernon Boulevard approach would occur during the weekday AM and PM peak hours. These impacts could be partially mitigated during the weekday AM peak hour, but could be fully mitigated during the weekday midday and PM peak hours by installing "No Standing 7 AM to 10 AM, 4 PM to 7 PM Monday through Friday" regulations along westbound Broadway for 100 feet from the intersection (a loss of approximately five parking spaces) to "daylight" that approach, and by modifying the signal timing at the intersection during the weekday midday and PM peak hours. The intersection could be partially mitigated during the weekday AM peak hour because the southbound approach could not be fully mitigated.

Broadway and 21st Street

Impacts were identified on the eastbound and westbound Broadway approaches during all weekday peak hours, the northbound 21st Street approach during the weekday PM peak hour, and the southbound 21st Street approach during the weekday AM peak hour. The weekday AM and PM peak hour impacts could not be mitigated. The weekday midday peak hour impacts could be mitigated by modifying the signal timing.

24th Avenue and 21st Street

Impacts on the northbound 21st Street approach would occur during the weekday PM peak hour and could be mitigated by modifying the signal timing.

IMPLEMENTATION

Each of the traffic capacity improvements described above fall within the jurisdiction of NYCDOT for implementation. An analysis will be performed between the DEIS and FEIS to determine if the proposed mitigation measures would be needed before project completion in 2022 and, if so, when they would be needed. Also, additional analysis would be performed between the DEIS and FEIS along the Astoria Boulevard and 27th Avenue corridors. This analysis may lead to the modification of traffic improvements proposed in the DEIS and may result in new or additional mitigation for locations identified as partially mitigated or unmitigated in this DEIS.

As noted in Chapter 15, "Transportation", other analysis modifications will be done for the FEIS that could affect the mitigation findings presented in this chapter. Analysis assumptions made for the proposed Astoria Cove project and analysis findings documented in the *Cornell NYC Tech FEIS* may change and such changes, when available, may affect the mitigation measures and findings in this (Halletts Point) project's FEIS. This may result in either fewer impacts or greater impacts and could potentially result in one or more additional unmitigated impacts. The two additional intersections that would be addressed in the FEIS may also result in significant adverse impacts and could require the same types of mitigation measures as described earlier in the chapter or could result in a newly identified unmitigated significant adverse impact if suitable mitigation is not available. All of these assessments will be documented in the FEIS.

The Applicant would be responsible for the costs associated with the design and implementation of the traffic signals proposed as mitigation and, should the analysis of the two additional signalized intersections identify significant adverse traffic impacts that also require traffic signals, for those two as well. As the analyses of the Astoria Boulevard and the 27th Avenue corridors undergo further study for the FEIS, discussions will be held with representatives of NYCDOT and the prospective developer of the Astoria Cove project regarding a sharing of the new traffic signal costs to the extent that each project contributes to the impacts generating the need for these traffic signals.

The implementation of these measures would result in the loss of approximately 32 parking spaces during the weekday AM peak hour, 28 parking spaces in the weekday midday peak hour, and 36 parking spaces during the weekday PM peak hour, primarily due to capacity improvements needed at the intersection of Astoria Boulevard and 21st Street.

27th Avenue would lose approximately five parking spaces between 4th Street and 8th Street, Astoria Boulevard would lose one parking space between 30th Street and 31st Street, 21st Street would lose approximately 22 to 26 parking spaces between 27th Road and Astoria Park South/Hoyt Avenue South, and Broadway would lose up to five spaces between 11th Street and 12th Street. No designated truck loading/unloading zones or bus layover space would be affected by the proposed parking modifications for mitigation. If it is determined that on-street parking should be retained at locations where such mitigation was assumed, additional significant unmitigated traffic impacts could result.

EFFECTS OF TRAFFIC MITIGATION MEASURES ON MOBILE SOURCE AIR QUALITY

Chapter 16, "Air Quality," showed that under the Build condition, with the development of the proposed project, impacts of carbon monoxide (CO) would be well below ambient air quality standards and the City's *de minimis* criteria, while impacts of PM_{10} and $PM_{2.5}$ would be well below ambient air quality standards and the City's $PM_{2.5}$ interim guidance criteria, respectively. The proposed traffic mitigation measures, which include new roadway configurations, signalization and signal timing measures, were evaluated to determine the potential effects on air quality in the study area. Because the proposed traffic mitigation measures seek to avoid or reduce the levels of congestion and delays at an intersection, an overall improvement in traffic conditions would occur for the study area as compared to the Build condition. Based on the traffic mitigation analysis presented above, the proposed changes in delays through the network would result in similar predicted pollutant concentrations under the Build with Mitigation condition.

The proposed traffic mitigation measures would not affect the stationary or industrial source analyses provided in Chapter 16, which determined that there would be no significant air quality impacts resulting from the proposed project.

TRANSIT

As discussed in Chapter 15, "Transportation," the proposed project would result in potential significant adverse bus line haul impacts on the Q18, Q102, and Q103 bus routes during both the AM and PM peak periods. Potential measures to mitigate these impacts are described below.

BUS LINE HAUL

The proposed project would result in potential significant adverse bus line haul impacts on the Q18, Q102, and Q103 bus routes as the projected passenger volumes in the future with the proposed project condition would exceed the NYCT guideline capacity during the following peak periods:

- Eastbound and westbound Q18 bus routes during the AM and PM peak periods;
- Eastbound and westbound Q102 bus routes during the AM and PM peak periods;
- Northbound Q103 during the PM peak period; and
- Southbound Q103 during the AM and PM peak periods.

Table 22-5 provides a comparison of existing service and the number of buses required to fully mitigate the identified potential significant adverse line haul impacts along the Q18, Q102, and Q103 bus routes. While NYCT and MTA Bus routinely monitors changes in bus ridership and would make the necessary service adjustments where warranted, these service adjustments are subject to the agencies' fiscal and operational constraints and, if implemented, are expected to take place over time.

Table 22-5
2022 Mitigated Bus Line Haul Levels

Route	Direction	Buses per Hour	
		Existing	Mitigation
AM Peak Hour			
Q18	East	7	14 (+7 buses)
	West	4	6 (+2 buses)
Q102	East	4	11 (+7 buses)
	West	4	5 (+1 bus)
Q103	North	3	3 (no impact)
	South	3	8 (+5 buses)
PM Peak Hour			
Q18	East	7	9 (+2 buses)
	West	7	14 (+7 buses)
Q102	East	3	6 (+3 buses)
	West	4	10 (+6 buses)
Q103	North	3	8 (+5 buses)
	South	3	5 (+2 buses)

Notes: All bus routes operate standard buses with a guideline capacity of 54 passengers per bus.

EFFECTS OF TRAFFIC MITIGATION ON PEDESTRIAN OPERATIONS

As described above, intersection operations would alter pedestrian conditions with the implementation of the recommended traffic mitigation measures. These measures would include installation of traffic signals and changes to existing signal timings and lane utilizations. A review of the effects of these changes on pedestrian circulation and service levels at intersection corners and crosswalks showed that the addition of a traffic signal at 27th Avenue and 2nd Street would result in a significant adverse pedestrian impact at the north crosswalk during the PM peak period (LOS D, 18.6 SFP). Restriping the width of this crosswalk from its existing width of 13 feet to 16.5 feet would be required to fully mitigate the projected significant adverse crosswalk impact. The mitigated conditions are summarized in **Table 22-6**. Implementation of this additional pedestrian mitigation measure would be subject to review and approval by NYCDOT.

Table 22-6
2022 Mitigated Pedestrian Levels of Service

Location	Pedestrian Mitigation Measures	PM Peak Period			
		2022 With Traffic Mitigation		2022 With Further Pedestrian Mitigation	
		SFP	LOS	SFP	LOS
27th Avenue and 2nd Street – North Crosswalk	Widening crosswalk by 3.5 feet from 13 feet to 16.5 feet	18.6	D+	24.9	C

Note: SFP = square feet per pedestrian; LOS = level of service
+ Denotes a significant adverse traffic impact

CONSTRUCTION

TRAFFIC

The highest amount of construction traffic associated with construction of the proposed project is anticipated in the first quarter of 2021 under the reasonable worst-case construction schedule analyzed in Chapter 20, "Construction." The total number of project generated (construction-related and operational) vehicle trips generated during the peak construction period would be

approximately 49 percent less than the total number of vehicle trips generated by the completed development project during the weekday AM peak hour and 31 percent lower during the PM peak hour. Nevertheless, a detailed analysis of traffic conditions was completed for seven key intersections near the project sites, and this analysis indicated that potential significant adverse traffic impacts would occur at five locations during construction, but generally at lesser magnitudes than impacts identified under the Build condition. Where impacts during construction may occur, measures similar to the ones recommended to mitigate impacts of the proposed project (described above) could be implemented early to alleviate congested traffic conditions.

TRANSIT

As discussed in Chapter 20, "Construction," bus line-haul impacts identified for the 2022 Build condition may also occur during peak construction in 2021 during the commuter peak hours. Similar mitigation measures as those described above for the 2022 Build condition (i.e., bus frequency increase) are expected to also address the potential impacts during construction.

NOISE

Construction of the proposed project would be required to include measures to reduce noise levels during construction as required by the New York City Noise Control Code. Even with these measures, an analysis based on a conceptual worst-case construction activity and equipment schedule determined that noise levels due to construction activities would result in potential significant adverse noise impacts at some sensitive receptors (i.e., residential buildings) immediately adjacent to some of the proposed development sites. Based on the conservative analysis provided in Chapter 20, "Construction," construction activities would be expected to result in substantially elevated noise levels that would exceed CEQR impact criteria at fifty-one (51) existing locations within the study area. Therefore, should the proposed project be developed and constructed as conservatively presented in that analysis, up to fifty-one (51) existing locations could experience significant adverse noise impacts for certain limited periods during construction. Between the DEIS and FEIS, a refined construction noise analysis will be undertaken to more precisely determine the magnitude and duration of the elevated noise levels resulting from construction at these locations.

Most of those locations, however, have double-glazed windows and an alternate means of ventilation. For buildings with double-glazed windows and window air conditioners, interior noise levels would be approximately 20 to 25 dBA less than exterior noise levels, and for buildings with double-glazed windows and well-sealed through-the-wall/sleeve/packaged terminal air conditioners (PTAC) interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels. The typical attenuation provided by double-glazed windows and the alternate ventilation outlined above would be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). Given the building attenuation provided by these existing structures, additional receptor controls would be unlikely to fully mitigate the construction noise impacts. Although these structures have double-glazed windows and alternate ventilation, during some limited time periods construction activities may result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses.

A visual survey was performed to identify which existing locations may not currently have a means of alternate ventilation; six residential locations were identified. At these locations, typical attenuation provided by the building facade would be 5 dBA for an open window condition. This

level of attenuation would not be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria).

Some potential receptor controls that could be used to mitigate the impacts at residential locations where interior L_{10} values would be expected to exceed the value considered acceptable by CEQR criteria could include the provision of air-conditioning so that the impacted structures can maintain a closed-window condition, the installation of operable storm windows, and/or improvements in the sealing of existing windows. As noted above, many receptor locations already have double-glazed windows and an alternate means of ventilation, and additional receptor controls would be unlikely to fully mitigate the construction noise impacts. Such mitigation measures may affect the ability to achieve project goals with regard to the development of affordable housing; however, further exploration of the measures will be conducted between DEIS and FEIS to determine the practicability and feasibility of implementing these measures to minimize or avoid the potential significant adverse impacts, taking into account the practicability relative to project goals. Should it be determined that there are no practicable mitigation measures, taking into account project goals, and should the proposed project be developed and constructed as conservatively presented in this conceptual construction schedule, up to fifty-one (51) existing locations would be expected to experience an unmitigated significant adverse impact at various times.

Additionally, because of very high levels of construction noise from construction on buildings attached to them, Buildings 6A/6B and 7A/7B would have the potential to experience significant adverse noise impacts during construction if either segment of either building is occupied during the construction of the other segment of the building. These buildings would be required to provide at least 20 dBA of window/wall attenuation and an alternate means of ventilation. In addition, as with the construction noise impacts on existing receptors, a refined construction noise analysis will be undertaken between the DEIS and FEIS, and the potential for implementing other appropriate and feasible noise attenuation mitigation measures will be explored.

It should be noted that these projected noise levels and corresponding significant adverse construction noise impacts are based on a conservative analysis of the construction procedures, including peak quarterly (i.e., three month) levels assumed to represent each year of construction, a maximum amount of construction equipment assumed to be operational on each development site and at locations closest to nearby receptors, and peak hour construction equipment and truck delivery operations occurring simultaneously. Anticipated construction schedule and durations were developed by Lend Lease (US) Construction LMB, Inc., an experienced New York City construction manager, and are representative of the reasonable worst-case conditions for assessing potential impacts. The conceptual construction schedule includes a reasonable worst-case assumption for the number of development sites that would be expected to be under construction simultaneously.

Between the DEIS and FEIS, a refined construction noise analysis will be undertaken to more precisely determine the magnitude and duration of the elevated noise levels resulting from construction at the receptors predicted to experience significant noise level increases for an extended period of time. The refined analysis will examine the practicability and feasibility of relocating some equipment within the construction sites to add distance and/or shielding between the equipment and the adjacent receptors. It will also analyze in detail additional time periods throughout the construction period to determine whether the analysis results in the DEIS are conservatively overstated as a result of representing each year during the construction period based on peak

construction quarters that include the greatest amount of construction activity according to the conceptual construction schedule.

Construction activities would produce $L_{10(1)}$ noise levels at open space areas (Whitey Ford Field and Hallet's Cove Playground) which would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas exceed CEQR recommended values for existing and No Action conditions.) These open spaces would experience temporary significant adverse noise impacts during construction. While this is not desirable, there is no effective practical mitigation [1] that could be implemented to avoid these levels during construction. Noise levels in many parks and open space areas throughout the city, which are located near heavily trafficked roadways and/or near construction sites, experience comparable and sometimes higher noise levels.

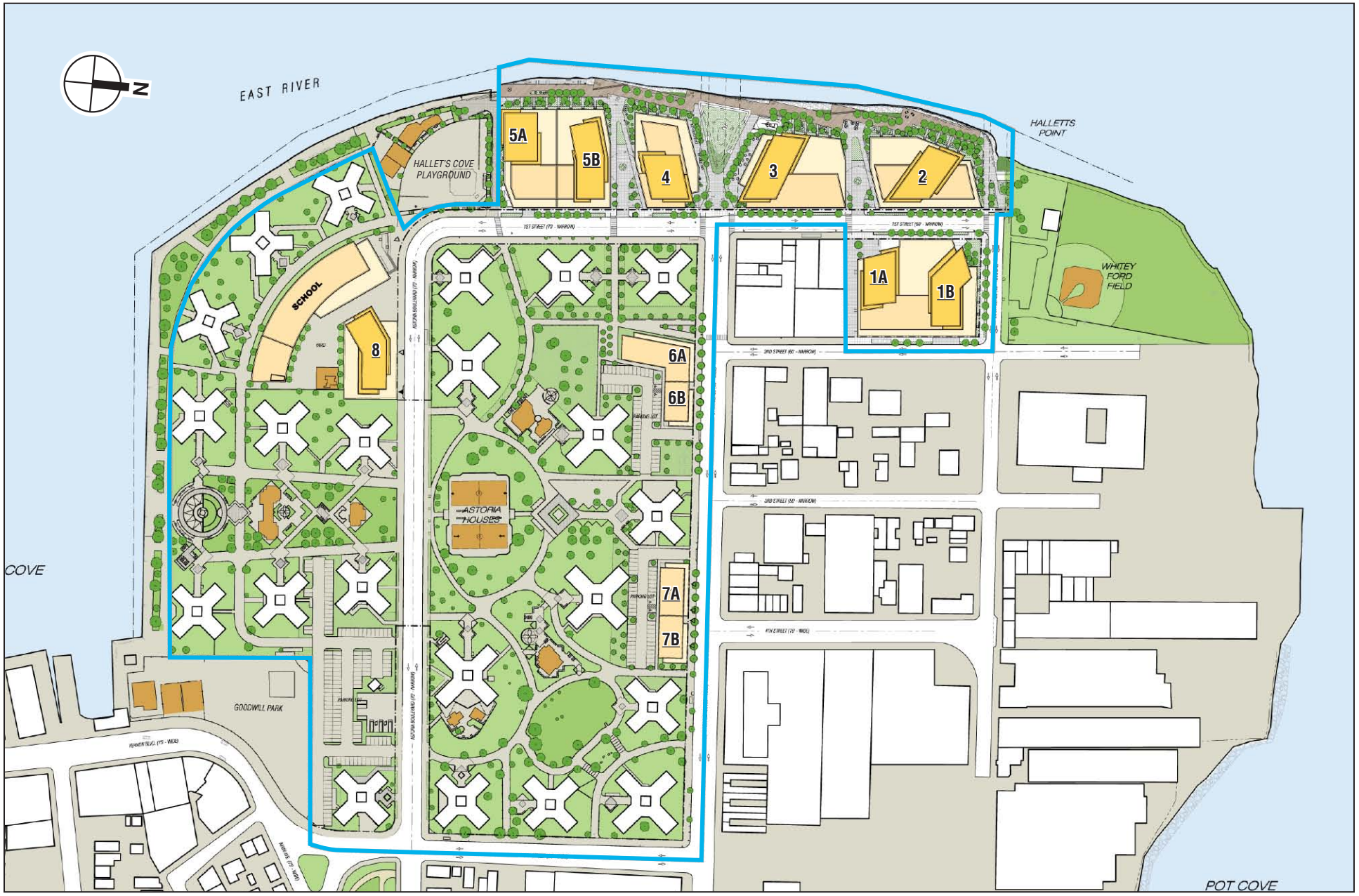
E. POTENTIAL ENVIRONMENTAL IMPACTS OF PUBLIC SCHOOL MITIGATION

As discussed above, preliminary discussions have been held among the Applicant, NYCHA, DCP, and the SCA with regard to the provision of a new school building serving kindergarten through grade 8 within the NYCHA Astoria Houses Campus. The conceptual plan for the proposed public school has been developed in consultation with SCA, DCP, and NYCHA. The proposed school would serve both elementary and intermediate school grades, even though the proposed project would not result in a significant adverse impact to public intermediate schools.

As shown in **Figure 22-1**, the school would be located adjacent to Building 8, with a potential schoolyard between the proposed school and Building 8. Based on preliminary discussions, it is expected that this school building would be approximately 130,000 gross square feet (gsf) and would accommodate 1,057 elementary and intermediate school students. As noted above, the proposed project's school seat demand would materialize over time as the proposed project is completed.

As shown in **Figure 22-2**, the proposed school would be approximately 5 stories (75 feet) tall (the zoning envelope would allow a maximum height of approximately 90 feet). It is expected that a school playground would be developed in the area between the proposed school and Building 8. The proposed school location is currently occupied by a parking lot with approximately 34 spaces, two "tot lot" play areas for use by NYCHA residents, and landscaping features. The displaced tot lots would be replaced elsewhere on the NYCHA Astoria Houses Campus. The displaced parking spaces would also be replaced elsewhere on the campus as part of the overall development of the proposed project, such that there would be no net loss of parking within the NYCHA Astoria Houses Campus. In addition, the site of the proposed school contains subsurface utilities that would be relocated as part of the development of the proposed school. The tot lots and subsurface utilities located on the site of the proposed school would be relocated by the future developer of Building 8 or by the Applicant if the SCA elects to move forward with development of the proposed school before the selection of a developer for Building 8. A MOU will be entered into between Applicant, NYCHA, and the SCA that sets forth the cost, timing and duration of the disposition of the school site from NYCHA to SCA and

[1] Noise barriers would not be practical because of security concerns.



Large Scale General Development Area

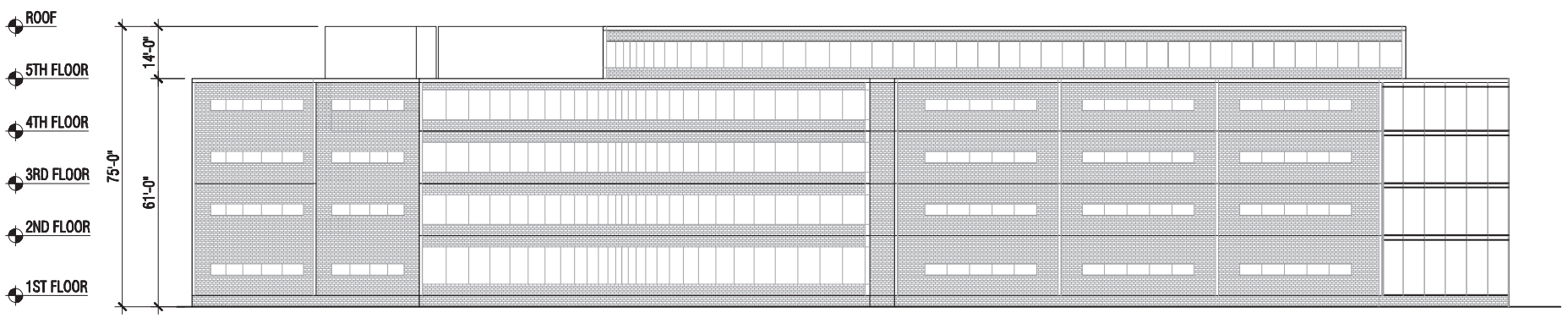
SITE PLAN SOURCE: Studio V Architects

Illustrative Development Site Plan With Proposed Public School

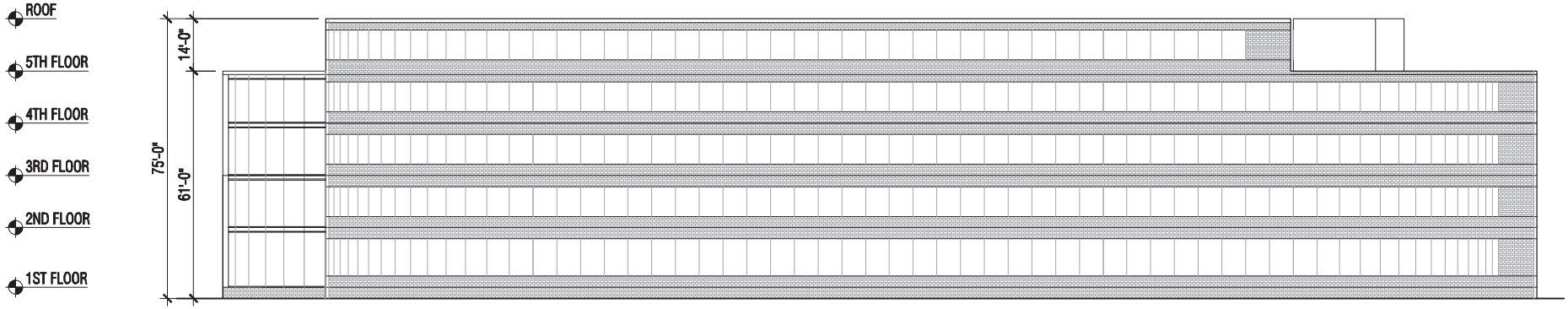
HALLETTS POINT

Figure 22-1

3.28.13



Northeast Elevation



Southwest Elevation

SOURCE: Studio V Architects

NOTE: The proposed zoning envelope would allow a maximum building height of 90 ft.

Illustrative Elevations of Proposed Public School

Figure 22-2

addresses responsibility for relocating the tot lots and subsurface utilities on the proposed school site.

The disposition of the NYCHA property to the SCA would be subject to a Section 18 approval by HUD. Based on the preliminary design, the proposed school would also require waivers to certain zoning bulk regulations governing the site, which are being requested as part of this ULURP application.

Because the school proposed as mitigation could result in impacts different from the proposed project, this section provides a qualitative discussion of the possible impacts of locating a public school on the NYCHA Astoria Houses Campus, adjacent to Building 8. This discussion is provided in for each analysis area where the school could have potential impacts: land use, community facilities, open space, shadows, urban design and visual resources, natural resources, hazardous materials, water and sewer infrastructure, solid waste and sanitation services, energy, transportation, air quality, noise, neighborhood character, construction, and public health. The proposed school would not have the potential to alter the conclusions of the socioeconomic conditions, historic and cultural resources, and greenhouse gas emissions analyses.

LAND USE, ZONING, AND PUBLIC POLICY

Although the proposed school use would change the land use on this portion of the NYCHA Astoria Houses Campus, the proposed school use would be compatible with the predominantly residential character of the NYCHA Astoria Houses Campus and the proposed project. The proposed school use would not have an adverse effect on the surrounding community. Under the New York City Zoning Resolution, schools are a compatible use in residential areas and therefore are permitted as-of-right in all residential zoning districts. As such, the proposed project would be in conformance with the use regulations of the school site's R6 zoning designation. However, based on the preliminary design, the proposed school would require waivers of certain zoning bulk regulations governing the site. As such, the overall floor area, massing, and height of the proposed school would be governed by the proposed Large-Scale General Development (LSGD) Plan, if approved. The waivers through the LSGD would apply only to the proposed project and there would be no change to the site's or surrounding area's underlying zoning designations. The proposed school would not alter the conclusion that the proposed project would be consistent with the public policies that currently govern the site and the surrounding area, including the city's waterfront goals, as outlined in the *Comprehensive Waterfront Plan* and the city's Waterfront Revitalization Program policies.

COMMUNITY FACILITIES

The proposed school would not create any additional demands on other community facilities or services. With the additional capacity in the proposed school, elementary and intermediate schools within the study area would have lower utilization rates and elementary schools would operate with a smaller shortfall of seats.

OPEN SPACE

The proposed school would result in a modest increase in open space demand in the study area by introducing new teachers and school staff to the project site. The student population of the school would not be expected to increase demand for open spaces in the study area because the students would be drawn from the project site and surrounding area and would be present in the

study area population even if the school was not built at this location. They would also have access to a newly-created on-site schoolyard for recreational use during school hours.

With respect to direct effects, the proposed school would displace two tot lot play areas currently available for use by NYCHA residents. As noted above, these tot lots would be relocated within the NYCHA Astoria Houses Campus. The proposed school would not result in any other significant adverse direct impacts to open space related to shadows, noise, or air quality. The proposed school would not affect the publicly accessible open space that would be provided by the proposed project. Overall, the provision of a public school on the project site would not change the conclusions of the open space analysis.

SHADOWS

As discussed above, the zoning envelope of the proposed school would allow a maximum height of 90 feet. As a result, the proposed school could cast new shadows on Hallet's Cove Playground, Hallet's Cove Esplanade, and a small seating area within the NYCHA Astoria Houses Campus directly across Astoria Boulevard during certain analysis days. However, these new shadows would not be of an extent or duration that would have the potential to result in significant adverse shadows impacts to these resources, and therefore the proposed school would not alter the conclusions of the shadows analysis.

URBAN DESIGN AND VISUAL RESOURCES

The proposed school would result in an additional building within the NYCHA Astoria Houses Campus, but it would not result in significant adverse impacts related to urban design within the project site or study area. The proposed school would not alter the arrangement, appearance, or functionality of the project site such that the alteration would negatively affect a pedestrian's experience of the area. Rather, the proposed school would contribute to the overall enlivening of the project site in general and Astoria Boulevard and 1st Street in particular. **Figure 22-3** shows an illustrative view of the proposed school and Building 8 from Hallet's Cove Playground. Views to the East River and Manhattan skyline available across the NYCHA Parcel could be obstructed by the proposed school; however, these views would still be available along the Hallet's Cove esplanade and new views would be created along the proposed project's esplanade. Overall, the proposed school would not result in any significant adverse impacts to urban design and visual resources.

NATURAL RESOURCES

As noted above, the site of the proposed school is currently occupied by a parking lot and two tot lots with small areas of landscaping that have limited natural resources. Construction of the proposed school would require minimal additional tree removal beyond that which was evaluated in Chapter 10, "Natural Resources," and would not eliminate or degrade valuable wildlife habitats or ecological communities. No threatened or endangered terrestrial species occur on or in the vicinity of this site, and no wetlands are present. As discussed in Chapter 10, "Natural Resources," for construction within the project site, construction of the proposed school would comply with NYSDEC's technical standard for erosion and sediment control. Similar to Buildings 6, 7, and 8 on the NYCHA Parcel, stormwater management Best Management Practices (BMPs) would be required as part of the New York City Department of Environmental Protection (DEP) site approval process to control the rate at which stormwater is discharged to the City sewer from the proposed public school site. Therefore, discharge of runoff during land-

4.18.13



SOURCE: Studio V Architects and James Corner Field Operations

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY

Illustrative View of Building 8 and Proposed School
Mitigation from Hallet's Cove Playground

disturbing activities, and operation of the school would not result in significant adverse impacts to littoral zone tidal wetlands and aquatic resources of the East River. Discharge of stormwater at the DEP allowable rate for the proposed school site would not be expected to contribute to street flooding due to sewer capacity exceedances. Although the site of the proposed school is within the 100-year floodplain, flooding in the area is affected by coastal flooding rather than local or fluvial flooding, and the proposed school would not increase flood risk on or adjacent to the site. The design and construction of the proposed school would comply with the current and any future changes in the New York City Building Code requirements for construction within the 100-year floodplain for the applicable building category, and any future changes in the floodplain zones designated by FEMA. With the implementation of a construction health and safety plan and remedial action plan, there would be no significant adverse impacts to groundwater quality. Therefore, the construction and operation of the proposed school would not result in significant adverse impacts to natural resources and would not alter the conclusions of the natural resources assessment.

HAZARDOUS MATERIALS

A *Phase I Environmental Site Assessment* (ESA) was prepared for the location of the proposed school. It identified potential hazardous material concerns, including fill materials of unknown origin. Since construction of the proposed school would occur following disposition approval from HUD under Section 18 of the U.S. Housing Act of 1937, HPD (acting as Responsible Entity for NYCHA) would require preparation of a Phase II Subsurface Investigation, followed by a site-specific RAP and CHASP (including the design of vapor controls to be incorporated into the new school building) for this site. The Phase II Investigation would follow SCA protocols for soil, groundwater, and soil gas testing. Written approval of the investigation protocol and RAP/CHASP by HPD, DEP, and SCA would be required prior to HPD's submission of environmental clearance documentation to HUD for the Section 18 disposition. Implementation of the approved RAP/CHASP would occur as part of construction. To ensure these measures occur, they would be made binding through a Development Agreement between NYCHA and the SCA or a Restrictive Declaration.

INFRASTRUCTURE

The proposed school would be an additional new use that would change the project site's water consumption, sewage generation, and stormwater runoff as compared to conditions analyzed in Chapter 12, "Water and Sewer Infrastructure." It should be noted that the proposed school would be designed and constructed in accordance with the NYC Green Schools Guide which, among other sustainability measures, includes measures to limit water consumption of new school buildings.

WATER SUPPLY

The proposed school would generate an additional water demand of 32,670 gallons per day (gpd).[1] This would represent a negligible increase in demand on the New York City water supply system and it is expected that there would be adequate water service to meet the proposed

[1] Based on the rates in Table 13-2 of the *CEQR Technical Manual* (10 gpd per seat for domestic water demand and 0.17 gpd per sf for air conditioning).

project's incremental water demand with the proposed school. Therefore, the proposed school would not result in any significant adverse impacts on the city's water supply.

SANITARY (DRY WEATHER) FLOWS

The proposed school would generate an additional 10,570 gpd of sanitary sewage. This incremental volume in sanitary flow would represent a negligible increase in the average daily flow to the Bowery Bay Wastewater Treatment Plant (WWTP) which serves the project site. This volume would not result in an exceedance of the Bowery Bay WWTP's capacity, and therefore would not create a significant adverse impact on the city's sanitary sewage conveyance and treatment system. As with proposed Building Site 8, the proposed school is expected to discharge sanitary sewage flows directly to an interceptor sewer and would therefore not contribute to combined sewer overflow (CSO) events. The proposed school would not change the new sanitary sewer infrastructure that would be constructed as part of the proposed project.

STORMWATER (WET WEATHER) FLOWS

The proposed school would generally increase the overall volume of stormwater runoff and the peak stormwater runoff rate from its site due to the replacement of surface parking areas, tot lots, and landscaping with a new school building and paved schoolyard. Like Building Site 8, the proposed school would directly discharge stormwater to the East River by connecting to a CSO pipe after the regulator chamber. The proposed school would comply with DEP and/or DEC regulations for water quality treatment and quantity management. Stormwater management Best Management Practices (BMPs) would be required as part of the DEP site approval process to control the rate at which stormwater is discharged to the City sewer from the proposed public school site. With these measures, the stormwater runoff volumes from the proposed school would not result in any significant adverse impacts to the city's stormwater conveyance system.

SOLID WASTE AND SANITATION

The proposed school could accommodate approximately 740 elementary students and 317 intermediate students. Using a solid waste generation rate of 3 pounds per week per student (from Table 14-1 of the *CEQR Technical Manual*), the school would generate approximately 3,171 pounds of solid waste per week during the school year, which would be in addition to the solid waste generation associated with the proposed project. To comply with the city's recycling plan, the school would be required to accommodate the source separation of recyclable materials. Disposable wastes and recyclable materials from the school would be collected by the City of New York Department of Sanitation (DSNY). The school-generated waste would be negligible compared with the 12,000 tons per day handled by DSNY, and would not have a significant impact on New York City's solid waste disposal system.

ENERGY

Based on energy use rates in the *CEQR Technical Manual* (Table 15-1), institutional uses have a source energy demand of 250.7 Thousand BTUs/sf/year. The additional consumption of a school use over the proposed project would be very small compared with the existing energy demands of New York City. This additional demand would not overburden the energy generation, transmission, and distribution system and would not result in a significant adverse energy impact. It should be noted that the proposed school would be designed and constructed in

accordance with the NYC Green Schools Guide which, among other sustainability measures, includes measures related to energy efficiency in new school buildings.

TRANSPORTATION

As discussed above in Section D, "Transportation," the transportation analyses were prepared based on a slightly smaller version of the development program than the proposed project. Accordingly, although the proposed school based on the development program addressed in this DEIS would accommodate 1,057 seats, the analysis below pertains to 1,029 seats, which, based on typical SCA standards, correspond to approximately 94 employees, consisting of teachers, administrators, and general staff. Between the DEIS and FEIS, the transportation and transportation-related analyses will be updated to reflect the proposed project's programming changes, as well as background changes associated with other projects and the addition of new study area traffic intersections. These changes could result in new, different, or worsened significant adverse impacts, all of which will be further detailed in the FEIS. For mitigation, it is expected that the same menu of improvement options will be used to address these impacts. However, if the updated analyses identify new, different, or worsened impacts that could not be fully mitigated, they would be identified as such in the FEIS.

School employees would travel to the school both from the surrounding area and from afar, while school students are expected to primarily originate from the surrounding area. In total, the proposed school is estimated to generate 92, 2, and 8 vehicle trips during the weekday AM, midday, and PM peak hours, respectively, the majority of which are from parents dropping off or picking up their children. Travel by transit is expected to be minimal, with negligible subway trips and up to 52 peak hour bus trips. The remainder of the trip making is expected to encompass walk-only trips from the surrounding neighborhood, approximately 929 during the AM peak hour and 46 during the PM peak hour.

TRAFFIC

As discussed above, approximately 92 vehicle trips (48 in and 44 out) were estimated for the proposed school during the weekday AM peak hour analyzed for the proposed project and a negligible amount of vehicle trips would be generated during the midday and PM peak hours analyzed for the proposed project (2 and 8, respectively). An analysis of traffic conditions with the proposed school in place was conducted for the weekday AM peak hour to determine if there would be any change in findings as compared to the proposed project (without a school). School-related vehicle trips were assigned to the street network for only the weekday AM peak hour. Most of these trips would be student drop-offs, and would be generated from various residential streets within Halletts Point and immediate surrounding neighborhoods. Based on this assignment, school vehicle trip increments were developed and then added to the AM peak hour Build volumes to represent Build with School Mitigation traffic volumes.

Based on these volumes, a traffic level of service analyses was performed for the weekday AM peak hour and determined that no new or different significant impacts would occur as compared to the Build condition. Additionally, a testing of the mitigation measures proposed for the project indicated that there would be no change in mitigatability at any of the significantly impacted locations with the proposed school in place as compared to the Mitigated Build condition. However, the following additional mitigation measures would be needed at two already impacted locations:

Astoria Boulevard and 8th Street

- Shift five seconds of green time from northbound/southbound phase to the eastbound/westbound phase (an additional one second shift compared to the Build mitigation); and
- Prohibit parking along the eastbound approach for 75 feet from the intersection and shift the eastbound centerline to the north by one foot, and restripe the eastbound approach from one 20-foot wide travel lane with parking to one 10-foot wide left turn lane and one 11-foot wide shared through/right-turn lane for 75 feet from the intersection.

Hoyt Avenue South and 21st Street

- Prohibit parking along the northbound approach for 175 feet from the intersection to allow for three moving lanes at the approach (this is already proposed in the Build mitigation for the PM peak hour).

Therefore, with the proposed school in place, the number of significant traffic impacts would remain the same and the mitigatability of the impacts would also remain the same (i.e., no new unmitigatable impacts) as with the proposed project. However, additional mitigation would be needed at two already impacted intersections in the AM peak hour.

TRANSIT

With negligible trip-making by subway expected to be generated by the proposed school, station elements at both the 30th Avenue (N/Q) and 21st Street-Queensbridge (F) subway stations are expected to continue to operate at acceptable levels. For the area bus routes (Q18, Q102, Q103), the proposed project is expected to result in potential significant adverse line-haul impacts that can be mitigated with increased service, subject to NYCT and MTA Bus's fiscal and operational constraints. These service increases are expected to similarly address the nominally additional bus trips (up to 52 during peak hour) attributed to the proposed school.

All bus trips associated with the proposed school are assumed to originate outside of the immediate project area. When applied to the bus line-haul analysis, the addition of these nominal bus trips (up to 52 during the AM peak hour) would require the same number of buses to fully mitigate potential significant adverse line haul impacts along the Q18, Q102, and Q103 bus routes as outlined above for the proposed project (see **Table 22-5**).

PEDESTRIANS

As discussed above, approximately 929 walk-only trips would be generated by the proposed school during the weekday AM peak hour. These trips would be dispersed to the area's sidewalks, corner reservoirs, and crosswalks. It is expected that the majority of the walk-only school trips would be originating from the project building sites, with a small remainder from elsewhere in the surrounding area. Furthermore, walk-only trips associated with the school that are linked on one end to the proposed project's residential units would be part of the overall residential trip generation, as analyzed for the proposed project, rather than incremental trips added to the surrounding pedestrian network. As a result, only a small amount of new pedestrian trips would be expected to be added to the surrounding transportation network. **Table 22-7** provides a comparison of the total projected trips for the proposed school and those that have been conservatively considered as incremental trips in this analysis of potential transportation-related impacts associated with the proposed school.

Table 22-7
SCA Public School Trip Generation Comparison

Total Projected Trips

Person Trips by Mode and Distribution

Peak	Auto		Taxi		Subway		Bus		Walk Only		Total		
Hour	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total
AM	56	0	0	0	1	0	52	0	929	0	1038	0	1038
MD	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	0	6	0	0	0	1	0	3	0	46	0	56	56

Vehicle Trips by Mode and Distribution

Peak	Auto		Taxi		Delivery		Total		
Hour	In	Out	In	Out	In	Out	In	Out	Total
AM	47	43	0	0	1	1	48	44	92
MD	0	0	0	0	1	1	1	1	2
PM	3	5	0	0	0	0	3	5	8

Incremental Trips Considered for Analysis

Person Trips by Mode and Distribution

Peak	Auto		Taxi		Subway		Bus		Walk Only		Total		
Hour	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total
AM	56	0	0	0	1	0	52	0	46	0	155	0	155
MD	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	0	6	0	0	0	1	0	3	0	2	0	12	12

Vehicle Trips by Mode and Distribution

Peak	Auto		Taxi		Delivery		Total		
Hour	In	Out	In	Out	In	Out	In	Out	Total
AM	47	43	0	0	1	1	48	44	92
MD	0	0	0	0	1	1	1	1	2
PM	3	5	0	0	0	0	3	5	8

As summarized in Chapter 15, Transportation, all pedestrian elements near the project site are expected to continue to operate at favorable levels with the completion of the proposed project. And in connection with one of the traffic mitigation measures (signal installation at 27th Avenue and 2nd Street), a crosswalk widening has also been recommended to maintain acceptable pedestrian flow. With the school-generated walk trips primarily linked to trip-making from the adjacent residential uses and taking place primarily in the opposite direction of other pedestrian trips made during the AM peak hour and gravitated to the school site away from most project-generated commuters, it is expected that the additional pedestrian trips attributed to the proposed school would not result in any significant adverse pedestrian impacts. Furthermore, the SCA would be expected to consult with NYCDOT during the planning and construction of the proposed school to incorporate the necessary safety measures. The Department of Education may also be consulted on the likely zones from which the students may travel to identify, where appropriate, “safe routes to school” and the need for additional school crosswalks.

PARKING

Based on the trip generation calculations, a parking demand of approximately 45 spaces would be generated by the school staff. This parking demand is expected to regularly occur between 7 AM and 5 PM (accounting for afterschool programming). Based on Table 15-50 in Chapter 15, there would be 42 available parking spaces to accommodate most of this demand in off-street parking facilities within Buildings 1-5 of the proposed project during the 7 AM to 5 PM period.

Otherwise, school staff would need to rely on available on-street parking in the area. Also, starting from 8 AM, there would be enough capacity in project parking facilities to fully satisfy this demand. An existing NYCHA permit parking facility on the proposed school site would be closed by the proposed school and 34 spaces would be displaced; however, these spaces (along with those displaced by Buildings 6, 7, and 8 under the proposed project) would be replaced by 178 new parking spaces in new and reconfigured parking facilities throughout the Astoria Houses Campus, resulting in no net change of parking supply for the Astoria Houses Campus.

AIR QUALITY

The proposed school would generate slightly higher vehicular trips than the proposed project. However, it is not expected that the additional traffic would result in potential for significant air quality impacts given that maximum predicted concentrations with the proposed project are well below applicable air quality standards.

Potential stationary source emissions from the proposed school were analyzed. **Table 22-8** shows maximum overall predicted concentrations for NO_2 and PM_{10} from the proposed school's heating and hot water systems, which were predicted to occur on elevated locations on proposed Building 8. The results of the analysis determined that emissions of criteria pollutants would not result in any significant adverse impacts.

Table 22-8
Future Maximum Modeled Pollutant Concentrations (μg /m^3)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	1-Hour[1]			185.8	188
	Annual[2]	0.9	43	43.9	100
PM_{10}	24-hour	2.8	44	46.8	150

Notes:
[1] The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
[2] Annual NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.75 as per EPA guidance.

However, to ensure that there are no significant adverse impacts related to $PM_{2.5}$ from the proposed school's heating and hot water emissions, certain restrictions would be required regarding fuel type and exhaust stacks. A summary of these restrictions follows:

- Proposed School

  Any new development on the above-referenced property must ensure that fossil fuel-fired heating and hot water equipment utilize only natural gas, and that heating and hot water equipment exhaust stack(s) are located at least 125 feet away from any operable windows or air intakes on the tallest portion of the approved massing envelope for proposed Building 8, to avoid any potential significant air quality impacts.

As shown in **Table 22-9**, the maximum 24-hour incremental impacts at any discrete receptor location would be less than the applicable interim guidance criterion of 5 μg/m^3. On an annual basis, the projected $PM_{2.5}$ impacts are predicted to be well below the interim guidance criteria.

Table 22-9
Future Maximum Modeled $PM_{2.5}$ Concentrations (in $\mu g/m^3$)

Pollutant	Averaging Period	Maximum Concentration	Interim Guidance Threshold
$PM_{2.5}$	24-Hour	2.82	5/2[(1)]
	Annual	0.07	0.3/0.1[(2)]

Note:
[(1)] 24-hour $PM_{2.5}$ interim guidance criterion, > 2 $\mu g/m^3$ (5 $\mu g/m^3$ not-to-exceed value), depending on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations.
[(1)] Annual PM2.5 interim guidance criterion, > 0.3 µg/m3 at any discrete receptor location for localized impacts and >0.1 µg/m3 averaged over a 1km by 1km ground level receptor grid for neighborhood-scale impacts.

The 24-hour average $PM_{2.5}$ concentration increments with the proposed school were compared to the 24-hour average interim guidance criterion of 2 $\mu g/m^3$ for discrete receptor locations (see Section D, *Air Quality Standards, Regulations, Benchmarks* of Chapter 16, "Air Quality" for a description of the City's $PM_{2.5}$ interim guidance criteria). The assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 $\mu g/m^3$ threshold averaged over a 24-hour period could occur.

The maximum 24-hour average incremental $PM_{2.5}$ concentration from the proposed school, 2.82 $\mu g/m^3$ was predicted on the west facade of Building 8 at a height of 85 feet. At the location where the maximum 24-hour average concentration was predicted, the maximum annual frequency of concentrations greater than 2 $\mu g/m^3$ was three times per year, with the average frequency of less than twice per year, over five years. At the same elevation and façade of the building, there were three locations (representing the width of the façade at this elevation) with incremental concentrations exceeding 2 $\mu g/m^3$. At these locations, 24-hour average incremental concentrations from the proposed school were predicted to exceed 2 $\mu g/m^3$ at a maximum frequency of four times per year, with an average frequency of less than twice per year.

With these restrictions, emissions from proposed school would not result in any potential significant adverse air quality impacts.

It should be noted that pollutant concentrations from the proposed school were predicted based on a conceptual school design and program and CEQR Technical Manual energy use assumptions, which yields conservative results. Detailed designs would be developed at a future date when SCA intends to proceed with construction of the proposed school.

NOISE

The proposed school would be located adjacent to the proposed project's Building 8 and is currently occupied by surface parking lots and two playground areas. This section contains a qualitative discussion of mobile source noise levels due to the increased trips associated with the proposed school, examines the noise levels from the proposed school's at-grade play area, and assesses the level of window/wall attenuation required for the proposed school.

MOBILE SOURCE NOISE ANALYSIS

As discussed above, approximately 92 vehicle trips (48 in and 44 out) were estimated for the proposed school during the weekday AM peak hour and a negligible amount of vehicle trips would be generated during the midday and PM peak hours (2 and 8, respectively). School-related vehicle trips were assigned to the street network for only the weekday AM peak hour. Most of these trips would be student drop-offs, and would be generated from various residential

streets within Halletts Point and immediate surrounding neighborhoods. Based on this assignment, the level of traffic increases to any particular street would be minor except along 27th Avenue and Astoria Boulevard west of 8th Street where vehicle traffic would funnel to and from the school site. Assuming all of these vehicles would be traveling any street adjacent to the project site (a worst case scenario), and accounting for traffic generated by the other components of the proposed project, noise levels at those locations would increase by a maximum of 1.3 dBA based on proportional modeling. Increases of this magnitude would be imperceptible and would therefore not result in a significant adverse noise impact.

Assuming all of the vehicles would be traveling on the newly remapped portion of Astoria Boulevard and accounting for traffic generated by the other components of the proposed project, noise level at this location would increase by a maximum of 8.7 dBA based on the Traffic Noise Model (TNM). This increase would constitute a readily noticeable change in noise levels and a significant noise increase. However, as noted in Chapter 18, "Noise," the increase in noise levels is due to the unique circumstances of the project site and the fact that the proposed project would reopen Astoria Boulevard to traffic through the NYCHA Astoria Houses Campus. Although the predicted increase in $L_{eq(1)}$ noise levels at this receptor exceed the 5 dBA CEQR impact threshold, noise levels in this area are very low in existing conditions and will continue to be low in the future with the proposed project. Even with the reopening of Astoria Boulevard through the NYCHA Astoria Houses Campus, the existing buildings in close proximity would be expected to have acceptable interior noise levels under both HUD and CEQR noise criteria. In addition, according to the *CEQR Technical Manual*, if any part of a proposed project would be financially assisted by HUD, such as is the case for the proposed project, analysis methodologies, significant impact thresholds, and reporting of noise information should be in accordance with HUD noise regulations. As noted above, interior L_{dn} noise levels at receptors along the reopened Astoria Boulevard would meet the HUD interior noise level guideline for residential use. Therefore, although this would be a noticeable increase in noise levels, it would not constitute a significant adverse noise impact requiring mitigation.

NOISE FROM THE PROPOSED SCHOOL PLAYGROUND

CEQR Impact Definition

The determination of significant adverse noise impacts in this analysis is informed by the use of both absolute noise level limits and relative impact criteria. The 2012 *CEQR Technical Manual* states that "it is reasonable to consider 65 dBA $L_{eq(1)}$ as an absolute noise level that should not be significantly exceeded." Therefore, the determination of impacts first considers whether a projected noise increase would result in noise levels exceeding 65 dBA $L_{eq(1)}$. Where appropriate, this study also consults the following relative impact criteria to define a significant adverse noise impact, as recommended in the *CEQR Technical Manual*:

- An increase of 5 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the No Build condition, if the No Build levels are less than 60 dBA Leq(1) and the analysis period is not a nighttime period.
- An increase of 4 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.

- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are greater than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10 PM and 7 AM).

HUD Development Guidelines

HUD sets exterior noise standards for housing construction projects based on Day-Night Sound Level (i.e., L_{dn}) values (see **Table 22-10**). The L_{dn} refers to a 24-hour average noise level with a 10 dB penalty applied to the noise levels during the hours between 10 PM and 7 AM, due to increased sensitivity to noise levels during these hours. Noise attenuation values are designed to maintain an interior L_{dn} value of 45 dBA or lower for residential uses.

Table 22-10
HUD Exterior Noise Standards

	Acceptable	Normally Unacceptable	Unacceptable
Noise Level With Proposed Project	$L_{dn} \leq 65$	$65 < L_{dn} \leq 75$	$75 < L_{dn}$
Source: U.S. Department of Housing and Urban Development			

For this analysis, L_{dn} levels were calculated using the following equation:

10*LOG[Energy sum of the 24 hourly equivalent sound levels with 10dB added between the hours of 10PM and 7AM] – 13.8

The equation listed above is used to calculate the L_{dn} when performing a continuous 24-hour measurement at the project site is feasible. First, 10 dB is added to the A-weighted sound levels measured between the hours of 10 PM and 7 AM (i.e., nighttime). The L_{dn} sound level is then computed from the adjusted nighttime sound levels along with the unadjusted daytime (i.e., 7 AM to 10 PM) values.

Playground Noise Analysis

Table 22-11 shows the maximum hourly playground boundary noise levels for various noise levels for various types of schools. These values are based upon measurements made at a series of New York City school playgrounds for the New York City School Construction Authority (SCA).

Table 22-11
Maximum Hourly Playground Boundary $L_{eq(1)}$ Noise Levels (dBA)

School Type	$L_{eq(1)}$ At Playground Boundary
Early Childhood Center	71.5
Elementary School	71.4
Intermediate School	71.0
High School	68.2
Sources: SCA Playground Noise Study, AKRF, Inc., October 23, 1992.	

It is anticipated that the proposed school would contain one outdoor schoolyard/playground area. This area would be located at-grade on the northeast corner of the site immediately south of the proposed project's Building Site 8. Since the proposed school will include both elementary and

intermediate school students, the maximum noise level of 71.4 dBA (see **Table 22-11**) was conservatively assumed at the boundary of the proposed playground.

Geometric spreading and the consequent dissipation of sound energy with increasing distance from the playground decreases noise levels at varying distances from the playground boundary. Based upon measurements and acoustical principles, hourly noise levels were assumed to decrease by the following values at the specified distances from the playground boundary: 4.8 dBA at 20 feet, 6.8 dBA at 30 feet, and 9.1 dBA at 40 feet. For all distances between 40 and 300 feet, a 4.5 dBA drop-off per doubling of distances from the playground boundary was assumed.

The residences east of the site (within the existing NYCHA building at 2-06 Astoria Boulevard) on the building façade facing the school would have the greatest potential for noise level increases due to playground noise.

Table 22-12 shows the results of the playground noise analysis at this receptor with a line of sight to the playground.

Table 22-12
Noise Levels due to the School Playground (dBA)

Analysis Location	Time	2022 Traffic Build L_{eq}[3]	Approximate Distance (feet)	Playground L_{eq} at Receptor	Combined L_{eq}	Predicted L_{10}[1]	Noise Level Increase (Combined L_{eq} Compared to 2022 No Build L_{eq})
2-06 Astoria Boulevard	AM	62.4	30[2]	64.6	66.6	69.4	12.5
	MD	62.4		64.6	66.6	69.4	12.1
	PM	60.4		64.6	66.0	68.8	10.4

Note:
[1] Predicted L_{10} is calculated based on SCA Playground Noise Study, AKRF, Inc., October 23, 1992.
[2] The proposed school playground would be required to be setback 10 feet from the property line, which would provide a total of 30 feet between the edge of the playground and 2-06 Astoria Boulevard.
[3] L_{eq} levels are from Receptor Site 9 presented in Chapter 18, "Noise."

In order to minimize noise level increases at the nearest residence at 2-06 Astoria Boulevard, active use areas of the school playground would be required to be setback 10 feet from the property line, which would provide a total of 30 feet between the edge of the playground and 2-06 Astoria Boulevard. The area between the edge of the playground and the property line could be landscaped or could include aesthetic fencing to further reduce noise levels.

With the proposed school, the change in noise levels at the residences in the existing NYCHA building at 2-06 Astoria Boulevard (the nearest NYCHA building) on the façade facing the school would be 12.5 dBA or less during those times when the playground is being used. These noise level increases would exceed the CEQR 5 dBA impact threshold and would constitute a readily noticeable change in noise levels and a significant noise increase. However, the noise levels presented in this analysis would occur only when the playground is in use, which would likely be only during the school day. Heavy usage of the school playground, and the associated noise increases, would occur less frequently or not at all during weekends, after school hours, and during the summer. Therefore, these noise increases would not occur at all times. In addition, nearby residences, including the existing NYCHA building at 2-06 Astoria Boulevard, have double glazed windows and alternate means of ventilation, and predicted interior noise levels

associated with the proposed playground would be expected to be less than the CEQR 45 dBA $L_{10(1)}$ interior noise level guideline. As a result, the noise level increases at this location would not constitute a significant adverse noise impact.

Currently, two tot lot play areas exist on the site where the proposed school is expected to be constructed and would be relocated within the NYCHA campus. It is not known specifically where the tot lots would be relocated. Noise levels for the residences adjacent to the relocated tot lots would increase due to playground activities but would remain consistent with noise levels adjacent to the existing tot lots. As noted above, the NYCHA buildings have double glazed windows and alternate means of ventilation, and predicted interior noise levels associated with the relocated tot lots would be expected to be less than the CEQR 45 dBA $L_{10(1)}$ interior noise level guideline. As a result, the noise level increases where the tot lots would be relocated would not constitute a significant adverse noise impact.

NOISE ATTENUATION MEASURES

CEQR Building Attenuation Requirements

The New York City *CEQR Technical Manual* has set noise attenuation requirements based on exterior $L_{10(1)}$ noise levels in order to maintain interior noise levels of 45 dBA or lower for academic and residential uses. Noise levels at facades of the proposed school and the proposed project's Building 8 were calculated using the above SCA playground analysis.

The results of the building attenuation analysis are summarized in **Table 22-13**.

Table 22-13
CEQR Building Attenuation Requirements

Project Building	Façade	Maximum Predicted L_{10} (in dBA)[3]	CEQR Minimum Attenuation Required (in dBA)
Building 8	South (facing school playground)	72.1[2]	28
	North, East, and West	59.6	NA[1]
Proposed School	North (facing school playground)	72.1[2]	28
	South, East, and West	59.6	NA[1]

Notes:
[1] "NA" indicates that the maximum measured L_{10} is below 70 dBA. The *CEQR Technical Manual* does not address noise levels this low, therefore there is no minimum attenuation guidance.
[2] Adjusted from the analysis for Receptor Site 4 presented in Chapter 18, "Noise," to account for playground use using the above described methodology.

As shown in **Table 22-13**, the north façade of the proposed school would require 28 dBA of attenuation. In addition, the south façade of Building 8 would require 28 dBA of attenuation. Implementation of the required building attenuation for Building 8 would be required through a Development Agreement between NYCHA and the applicant/developer or a Restrictive Declaration. In the analysis presented in Chapter 18, "Noise," which did not include the proposed school, Building 8 did not require any attenuation to achieve the *CEQR Technical Manual* interior noise level guidelines of 45 dBA L_{10}.

HUD Building Attenuation Requirements

HUD guidelines state that buildings must provide sufficient window/wall attenuation to result in L_{dn} values less than 45 dBA. Based on measured exterior noise levels and HUD criteria, the necessary attenuation for each façade of the proposed school and the proposed project's Building 8 were calculated using the above SCA playground analysis.

The results of the building attenuation analysis are summarized in **Table 22-14**.

As shown in **Table 22-14**, the north façade of the proposed school would require 23 dBA of attenuation, and the other facades would require 19 dBA of attenuation. In addition, the south façade of Building 8 would require 23 dBA of attenuation, and the other facades would require 19 dBA of attenuation. In the analysis presented in Chapter 18, "Noise," which did not include the proposed school, Building 8 required 19 dBA of attenuation on all facades in order to achieve the HUD interior noise level guidelines of 45 dBA L_{dn}.

Table 22-14
HUD Building Attenuation Requirements

Project Building	Façade	Maximum Predicted L_{dn}[1]	HUD Minimum Attenuation Required (in dBA)[2]
Building 8	South (facing school playground)	68.0	23
	North, East, and West	63.3	19
Proposed School	North (facing school playground)	68.0	23
	South, East, and West	63.3	19

Notes:
[1] Adjusted from the analysis of Receptor Site 4 presented in Chapter 18, "Noise," to account for playground use using the above described methodology.
[2] HUD attenuation requirements would not apply to commercial uses.

Building Attenuation Implementation

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Normally, a building façade is composed of the wall, glazing, and any vents or louvers for HVAC systems in various ratios of area. The proposed project buildings would be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in **Table 22-13** and **Table 22-14**. The OITC classification is defined by ASTM International (ASTM E1332-10a) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing, and combinations thereof. The OITC rating is designed to evaluate building elements by their ability to reduce the overall loudness of ground and air transportation noise.

By adhering to these design specifications, the proposed project would provide sufficient attenuation to achieve the *CEQR Technical Manual* interior noise level guidelines of 45 dBA L_{10} for academic and residential uses and to achieve the HUD interior noise level guideline of 45 dBA L_{dn} for residential use.

Noise Exposure During Construction of the Proposed Project

The proposed school would be completed and occupied while construction is completed at other project building sites, and would consequently be exposed to noise from construction on those other sites. During construction of Building 8, which would be located immediately adjacent to the proposed school, the proposed school would be expected to experience noise levels due to construction of other project buildings of up to the high 70s dBA on its façade that faces Building 8. During construction at more distant building sites included in the proposed project, the proposed school would be expected to experience noise levels in the low to mid 70s dBA. These predicted noise levels are based on modeling calculated noise levels at receptor sites 73A and 73D presented as part of the construction noise analysis in Chapter 20, "Construction," because those sites are

located immediately adjacent to the proposed Building 8 construction site at a distance comparable to the distance between the Building 8 site and the proposed school. The specific noise levels calculated at these locations are shown in **Appendix E**. The calculated noise levels represent the worst-case hour of the worst-case quarters of construction, based on a conceptual schedule of equipment and activity provided by the construction managers. The predicted noise levels would likely not persist at such a high level throughout the day or throughout the year.

As described above, the proposed school's façades will be constructed to provide 19 – 28 dBA of window/wall attenuation, and alternate means of ventilation (i.e., air conditioners) that does not degrade the acoustical performance of the façade. During the time period when the proposed school would be occupied, and loud construction activities would be underway at the immediately adjacent Building Site 8 (less than two years according to the conceptual construction schedule on which the construction noise analysis is based), interior noise levels would, during some times, exceed 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria for classroom uses). Such exceedances may be intrusive, but would be only temporary and of limited duration. Consequently, they would not result in any significant adverse noise impacts. In addition, NYCHA would, to the extent practicable and feasible, seek to limit excavation and foundation work for Building 8 to summer months to minimize the potential effects of construction noise on the school.

Therefore, the proposed school would not result in any significant adverse noise impacts related to building attenuation requirements.

NEIGHBORHOOD CHARACTER

The proposed school would not result in significant adverse impacts to neighborhood character. Like the proposed project, the proposed school would be compatible with adjacent land uses and would contribute to the overall enlivening of the project site in general and Astoria Boulevard and 1st Street in particular.

CONSTRUCTION

Construction of the proposed school would be similar to construction of other schools in the city, and would follow the same general construction practices and same basic construction stages, employ similar construction methods, and be subject to the same governmental coordination and oversight, as described for the other proposed project buildings in Chapter 20, "Construction." The proposed school site would be adjacent to the proposed project's Building Site 8, on the Astoria Houses campus (see **Figure 22-1**, above), currently occupied by surface parking lots and two tot lots. Therefore, construction of the proposed school has the potential for significant traffic, air quality and noise construction-related impacts on surrounding existing residential buildings and the project area, from construction-related traffic, and air and noise emissions from on-site construction equipment. Additionally, as the school would need to be operational in advance of many of the proposed project buildings, the proposed school would also have the potential to experience construction-related impacts from construction of other parts of the proposed project that would be built after the school is open, most notably Building 8, which is on a building site adjacent to the proposed school site. This section examines the potential for construction-related traffic, air quality, and noise impacts from the construction of the proposed school, as well as the potential for construction-related traffic, air quality, and noise impacts on the new school from construction of other project buildings. The proposed school would not alter the conclusions of the construction analysis with respect to historic and cultural resources,

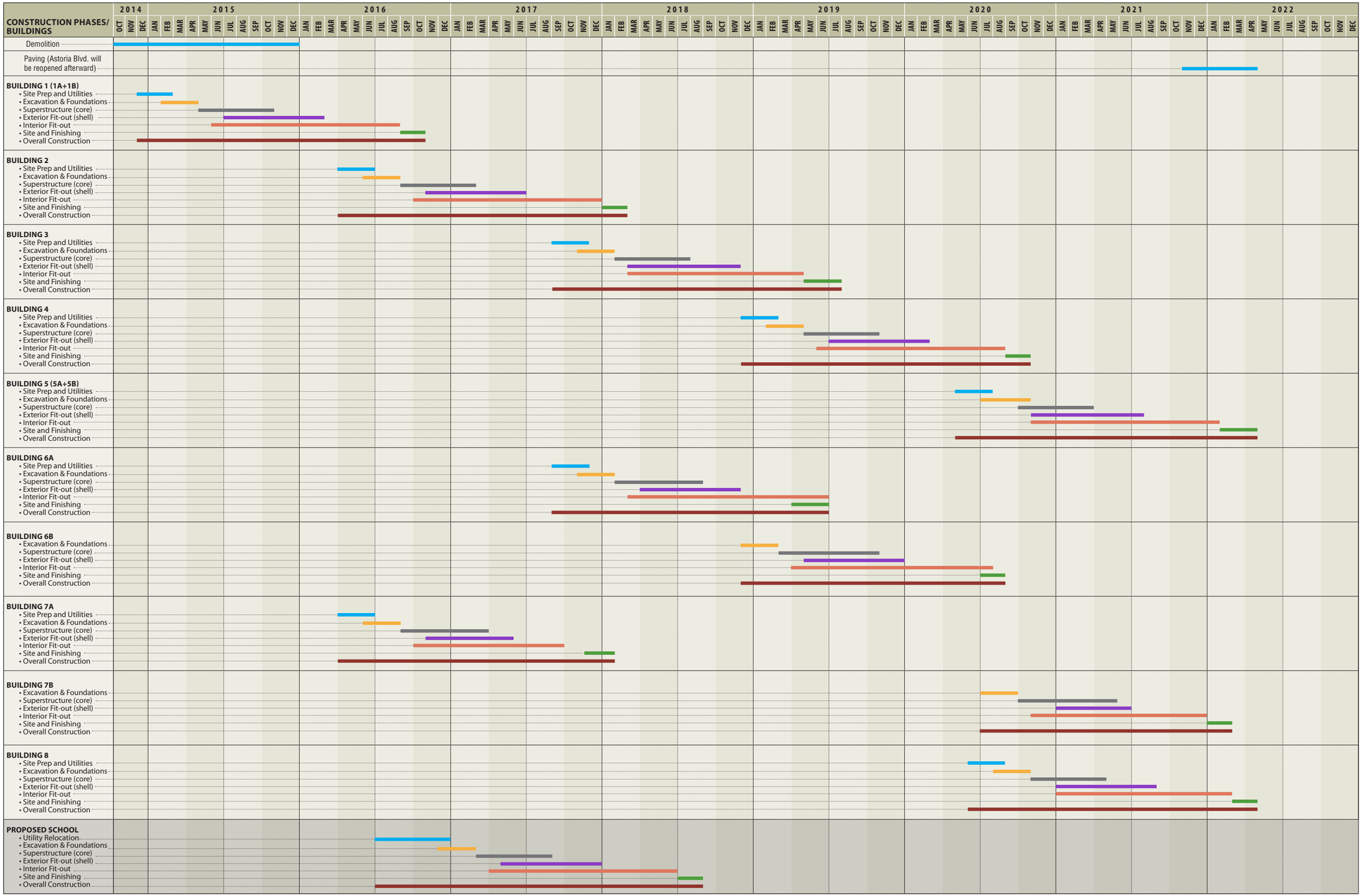
hazardous materials, open space, socioeconomic conditions, community facilities, natural resources, or land use and neighborhood character.

CONCEPTUAL CONSTRUCTION PHASING AND SCHEDULE

The proposed school would need to be open and available for use, as a mitigation measure, to address the potential impact on elementary schools which could occur when the proposed project completes construction of 942 residential units that could introduce public elementary school children. Based on the reasonable worst-case conceptual construction schedule developed for the proposed project, this would be anticipated to occur when Building 3 is complete and is operational. It is assumed that the proposed school would be complete and open by the fall of 2018. This completion date has been assumed because it would be prior to the school impact threshold of 942 residential units, thus allowing the school to be open in time to meet the school seat demand from the proposed project, and would coincide with the beginning of a school year. Based on the conceptual construction schedule for the proposed project, the school could be completed as late as 2019 to be prior to the school impact threshold of 942 residential units. However, regardless of whether the proposed school is assumed to be constructed to open for the beginning of the 2018 or 2019 school years, overlaying the construction activity from the proposed school with the construction activity anticipated for the proposed project would not result in peak construction activity (workers and trucks) exceeding the peak for the proposed project, which is anticipated to occur in the first quarter of 2021, based on the reasonable worst-case conceptual construction schedule.

It is anticipated that the proposed school would require an overall construction duration of approximately 26 months to complete, including the substantial relocation of existing utilities at the site (water lines, sanitary and storm sewers, gas lines, and steam pipes), in addition to all of the activities normally associated with construction of a new building, including, excavation and foundations, core and shell, interior finishing, and site work (including landscaping and construction of outdoor play areas). **Figure 22-4** and **Table 22-15** present a conceptual schedule of construction for the proposed project, including the proposed school, based on the reasonable worst-case construction schedule analyzed in Chapter 20, "Construction." The conceptual construction schedule including the proposed school assumes that construction activities begin in the last quarter of 2014, with the onset of area-wide demolition and remediation activities on the project site; complete build-out of the proposed project would occur over time, with the project estimated to be completed in 2022.

As discussed above, development of the proposed public school would be subject to the confirmation that the need for a new school exists and the allocation of sufficient capital funding for design and construction of the new school facility in the Department of Education's Five-Year Capital Plan. As such, construction of the proposed public school could occur later than contemplated in the schedule above. Therefore, between the DEIS and FEIS, the construction analysis for the proposed public school will be supplemented to examine the potential cumulative impacts of the proposed school's construction activities undertaken concurrently with the proposed project's peak construction period in 2021. It is anticipated that this supplemental analysis would identify similar construction traffic, noise, and air quality impacts as those already disclosed in Chapter 20, "Construction," and that any significant adverse impacts could be mitigated with similar measures as discussed in this chapter.



Overall Construction Schedule/Phasing
Including New School Mitigation

Figure 22-4

Table 22-15
Conceptual Construction Schedule
(Including Construction of the Proposed School)

Proposed Project Building Sites and Associated Project Elements	Start Month	Finish Month	Approximate duration (months)
Area-wide Demolition of Existing Structures	October 2014	December 2015	15
Building Site 1 (Buildings 1A & 1B)	December 2014	October 2016	21
Building Site 2	April 2016	February 2018	23
Proposed School Building (Mitigation)	July 2016	August 2018	26
Building Site 3	September 2017	July 2019	23
Building Site 4	December 2018	October 2020	23
Building Site 5 (Buildings 5A & 5B)	May 2020	April 2022	24
Building Site 6: Building 6A	September 2017	June 2019	22
Building Site 6: Building 6B	December 2018	August 2020	21
Building Site 7: Building 7A	April 2016	January 2018	22
Building Site 7: Building 7B	July 2020	February 20221	20
Building Site 8 [1]	June 2020	April 2022	23
Astoria Boulevard Roadway Paving [2]	November 2021	April 2022	6

Notes:
Construction of the proposed Waterfront Esplanade and associated upland connections is included in the construction durations and estimates for the construction of Buildings 2 through 5, as each of these building sites will also involve the construction of the corresponding portion of the esplanade and upland connections.
[1] Building Site 8 would be developed as part of a future request for proposals (RFP) by NYCHA. While the actual timeline for construction of Building Site 8 is not known at this time, it has been conservatively assumed to occur within the overall 9 year construction period anticipated for the proposed project.
[2] The roadway paving indicated is for the new connecting street segment between existing mapped portions of Astoria Boulevard on the NYCHA parcel, which would be constructed as part of the proposed project.
Source: Lend Lease (US) Construction LMB, Inc.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 22-16 shows the estimated numbers of workers and deliveries to the project area by calendar quarter for all construction, including the construction of the proposed school. Compared with the proposed project construction described in Chapter 20, without the school, the average number of workers including construction of the proposed school would increase from about 230 per day to about 250 per day, throughout the construction period. Including the construction of the proposed school, the peak average number of workers for the proposed project's construction would remain about 628 per day, occurring in the first quarter of 2021. Similarly, for truck trips, including the construction of the proposed school, the average number of trucks would be 31 per day (compared to the average without the construction of the school of 26 trucks per day); the peak average number of trucks including construction of the proposed school would occur in the fourth quarter of 2016, with an average of 90 trucks per day, in contrast to the peak period of construction for the proposed project, which would occur in the first quarter of 2021 with 67 trucks per day. Regardless, the peak construction period for the proposed project, including construction of the proposed school would still occur during the first quarter of 2021.

Table 22-16
Average Number of Daily Workers and Trucks by Quarter
(Including Construction of the Proposed School)

Year	2014				2015				2016				2017			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	-	-	-	19	94	154	354	298	199	213	170	279	328	313	301	257
Trucks	-	-	-	3	24	31	37	23	11	24	85	**90**	41	22	23	33
Year	**2018**				**2019**				**2020**				**2021**			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	233	387	297	207	233	183	218	182	125	115	153	373	**628**	476	366	290
Trucks	32	40	25	17	28	29	27	18	12	14	45	61	67	31	24	23
Year	**2022**												**Average**		**Peak**	
Quarter	1st	2nd	3rd	4th												
Workers	116	47	-	-									250		628	
Trucks	11	5	-	-									31		90	

Notes: Construction assumed to begin in the fourth quarter of 2014.
Sources: Lend Lease (US) Construction LMB, Inc. and AKRF, Inc.

TRAFFIC

In terms of the additional construction-related traffic that would be generated during construction of the proposed school, compared to projected construction traffic without the school shown in Chapter 20, "Construction," in Table 20-3, the construction of the school would add an average of between 14 and 141 workers, and between 1 and 60 trips, each quarter between the third quarter of 2016 and the third quarter of 2018. These additional trips would not increase project-generated construction traffic to levels beyond those already analyzed in Chapter 20, which represented the peak construction activities for the proposed project. Therefore, the potential impacts associated with the construction of the proposed school would be within the envelope of the impacts disclosed for the peak period 2021 analysis presented in Chapter 20, "Construction."

AIR QUALITY

The construction air quality analysis reported in Chapter 20, "Construction," was reviewed to determine if the school proposed as mitigation could result in significant adverse air quality impacts not identified for the proposed project. Based on the worst-case construction period analysis results for the proposed project, a qualitative analysis was conducted to address the potential construction impacts of the proposed school on nearby sensitive receptor locations and the potential construction impacts of project buildings on the proposed school.

Maximum predicted pollutant concentrations at nearby sensitive receptors from construction of the proposed school were estimated based on the concentration levels during construction of Building 8, which would be located immediately adjacent to the proposed school and would include similar construction equipment as the proposed school. Based on these estimates, during the construction of the proposed school, the maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are not expected to exceed the applicable NAAQS at nearby sensitive receptor locations. The maximum predicted 24-hour average $PM_{2.5}$ concentration would likely exceed 2 $\mu g/m^3$ at the walkway and open space locations immediately surrounding the proposed school. However, as discussed in Chapter 20, "Construction," based on the limited and extent of these predicted exceedances, the low frequency of occurrence, and the limited potential for exposure, this would not result in significant adverse air quality impacts.

Maximum predicted pollutant concentrations at the proposed school from construction of the proposed project were also estimated based on the concentration levels during construction of Building 8, which would be the nearest project building to the proposed school. Based on these estimates, during the construction of the adjacent Building 8, the maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are not expected to exceed the NAAQS at the proposed school. The maximum predicted 24-hour average $PM_{2.5}$ concentration would exceed $2\mu g/m^3$ at the school playground area immediately southwest of the construction of Building 8. However, as discussed in Chapter 20, "Construction," based on the limited and extent of these predicted exceedances, the low frequency of occurrence, and the limited potential for exposure, this would not result in significant adverse air quality impacts.

As described above in "Transportation", the peak daily construction workforce and truck trip projections with the proposed school would be similar to those for the proposed project. Therefore, since the maximum predicted mobile sources concentrations with the proposed project are well below the applicable air quality standards, there would be no significant adverse impact on air quality from construction vehicle trips associated with the proposed school.

Therefore, as with the proposed project, the proposed school would not result in significant adverse construction impacts with respect to air quality.

NOISE

Construction of the school would not result in any additional significant adverse impacts due to construction noise. The locations most affected by this construction would be receptors 55A-D, 62A-D, 63A-D, 64A-D, 65A-D, 67A-D, 70A-D, 71A-D, 72A-D, 73A-D, and 74A-D (see Table 20-19 in Chapter 20, "Construction"). Many of these receptors have already been identified to experience significant increases in noise level for two years or longer based on the conceptual worst-case construction schedule analyzed in Chapter 20, "Construction." Noise levels at these receptors during construction of the proposed school were estimated based on noise levels at these receptors during construction of Building 8, which would be located immediately adjacent to the location of the proposed school and would include similar construction equipment to the equipment necessary to construct the school. However, construction of the proposed school may occur earlier during the construction period and is assumed to be complete by 2018. Based on these estimates, with the construction of the proposed school occurring simultaneously to the construction of the proposed project, the duration of significant noise exceedances at receptors 62C, 62D, 64D, 70A, 71A-D, 72A-D, and 74B-D could occur earlier and for an extended duration due to noise associated with construction of the proposed school. However, the buildings represented by these receptors have double glazed windows and an alternate means of ventilation (e.g. air conditioning). These measures provide approximately 25 dBA of window/wall attenuation (see Chapter 20), and would result in interior noise levels during much of the time that are below 45 dBA L_{10}. Consequently, construction of the proposed school would not have the potential to result in any significant adverse construction noise impacts beyond those already identified for construction of the proposed project. Potential construction effects on the school from construction occurring at other project building sites, most notably Building 8, adjacent to the proposed school site, is discussed under the heading, "Noise Attenuation Measures," above.

Between the DEIS and FEIS, a refined construction noise analysis will be undertaken to more precisely determine the magnitude and duration of the elevated noise levels resulting from construction at these locations, including construction of the proposed school. The refined analysis

will examine the practicability and feasibility of relocating some equipment within the construction sites to add distance and/or shielding between the equipment and the adjacent receptors. It will also analyze in detail additional time periods throughout the construction period to determine whether the analysis results in the DEIS are conservatively overstated as a result of representing each year during the construction period based on peak construction quarters that include the greatest amount of construction activity according to the conceptual construction schedule.

PUBLIC HEALTH

The proposed school would not have the potential to result in any additional unmitigated adverse impacts in the areas of air quality, water quality, hazardous materials, or noise. Therefore, the proposed school would not result in significant adverse public health impacts. ✷