Chapter 8: Alternatives

This chapter considers alternatives to the Proposed Action that were evaluated. Consistent with the requirements of the *CEQR Technical Manual* and SEQRA, an alternatives analysis examines reasonable and feasible options that may reduce, mitigate, or eliminate project-related significant adverse impacts while still substantively meeting the goals and objectives of the Proposed Action; demonstrate a reasonable range of options to the Proposed Action; and/or compare potential impacts and benefits under alternative approaches.

The alternatives evaluated in this ~~Draft~~ Final EIS included:

- No Action.
- Pressurization of the Catskill Aqueduct - Raising the hydraulic grade line of the existing Catskill Aqueduct.
- Alternative Tunnel Drive - Constructing the proposed KEC Tunnel from Kensico Campus to the KEC Eastview Site.
- Alternative Tunnel Lining - Installation of lining of the KEC Tunnel from Kensico Campus to the KEC Eastview Site or simultaneously from both the Kensico Campus and KEC Eastview Site.
- Use of a Construction Drop Pipe - Installation of an eight-inch diameter pipe at the approximate mid-point of the KEC Tunnel alignment to deliver concrete to the KEC Tunnel depth during construction.

In general, as the alternatives analysis compares each alternative's potential impacts to those of the Proposed Action, the level of detail in the analysis depends on the alternative and the potential impact associated with the Proposed Action. Where limited or no impacts due to the Proposed Action were identified, a qualitative assessment of alternatives is appropriate. Where a potential significant impact due to the Proposed Action was identified or where an alternative would result in a significant impact in an area(s) where the Proposed Action did not, it is appropriate to provide additional detail of potential impacts due to the alternative.

8.1 NO ACTION

The alternatives analysis considered the No Action Alternative. For the purposes of ~~Draft~~ Final EIS, the No Action would be the same as the Proposed Action. Pursuant to the Hillview Consent Decree and Judgment and its mandate that DEP construct the KEC Project, this ~~Draft~~ Final EIS assumed that the proposed KEC Tunnel and associated modifications and supporting structures would be built and that the system redundancy provided by a second connection between Kensico Reservoir and the CDUV Facility would be constructed. Therefore, the No Action Alternative is the same as the Proposed Action and as such would result in the same impacts and benefits as disclosed for the future with the Proposed Action.

8.2 PRESSURIZATION OF THE CATSKILL AQUEDUCT

The Catskill Aqueduct begins at the Ashokan Reservoir in Ulster County and conveys water by gravity from the Ashokan Reservoir to the Kensico and Hillview Reservoirs. The Catskill Aqueduct is primarily a grade conduit, in which water flows with a free surface[49] in either cut-and-cover or grade tunnel sections. The remainder of the length of the Catskill Aqueduct, approximately 25 percent, is comprised of pressurized sections, either inverted siphons or pressure tunnels.

The segment of the Catskill Aqueduct between the UEC and the Catskill Connection Chamber, located south of Grasslands Road, is approximately 12,500 feet long. This aqueduct segment formerly operated primarily under open-channel gravity flow conditions below the LEC with an open channel elevation of approximately 311 feet.

The Catskill Aqueduct between Kensico Reservoir and Catskill Connection Chamber was originally designed for a maximum hydraulic grade line (HGL)[50] of approximately 330 feet in anticipation of the need for future treatment at DEP's larger Eastview Site. However, once the CDUV Facility was completed and placed into operation, the section of the Catskill Aqueduct from the UEC to the inlet section of the Catskill Connection Chamber (located south of Grasslands Road within the larger DEP Eastview Site) was taken out of service. The KEC Project as described in this ~~Draft~~ Final EIS would provide an additional opportunity to provide raw water from Kensico Reservoir to the CDUV Facility while allowing DEP the ability to bypass Kensico Reservoir through the use of the Catskill Aqueduct when required.

[49] Also known as open channel flow in which the flow of a liquid has a free surface that is exposed to atmospheric pressure, such as within a pipe where the liquid flow is in contact with the bottom and sides of the pipe, but not the top of pipe.

[50] A hydraulic grade line (HGL) is the surface or profile of water flowing in an open channel or a pipe flowing partially full.

As part of a larger master planning effort, DEP evaluated a variety of options to address the HGL issue associated with the existing Catskill Aqueduct before advancing the Proposed Action. Among the options that were considered was the pressurization of the Catskill Aqueduct which is discussed within this section. Two pressurization alternatives were assessed: Baseline Pressurization which would provide a flow up to 1,035 mgd and Enhanced Pressurization which would provide a flow up to 1,335 mgd.

While the Catskill Aqueduct was designed for a maximum HGL of approximately 330 feet, rehabilitation of the aqueduct and other improvements would be required to achieve a hydraulic grade of 355 feet which would allow for the utilization of the full operating range of Kensico Reservoir to convey raw water to the CDUV Facility. A review of existing infrastructure indicated rehabilitation of certain sections of the aqueduct would be required as pressurization to a HGL of 355 feet (from the current maximum HGL of 330 feet) could potentially result in long-term integrity problems, as well as the migration of leakage to the ground surface. These aqueduct improvements would be required for both Baseline Pressurization and Enhanced Pressurization.

In addition to the rehabilitation of portions of the Catskill Aqueduct, pressurization would also require the modification of several existing structures. This would primarily be required as the proposed HGL of 355 feet would exceed the finished floor elevations of many of these structures. These modifications would be required for both Baseline Pressurization and Enhanced Pressurization. Enhanced Pressurization would also require modifications to the UEC, as well as replacement of the existing Kensico venturi located along the alignment of the Catskill Aqueduct, west of Columbus Avenue, in order to increase overall hydraulic capacity.

A new connection tunnel, the Catskill Connection Tunnel (CCT), between the Catskill Aqueduct and the CDUV Facility, would also be required to support pressurization. This tunnel would be constructed from a location directly upstream of the existing brick-lined section of the Eastview Grade Tunnel and then to the North Forebay of the CDUV Facility. Baseline Pressurization would require a tunnel diameter of approximately 17 feet, while Enhanced Pressurization would require a 20-foot diameter connection tunnel. In order to divert flows from the Catskill Aqueduct into the new CCT, a new connection tunnel chamber would also be required. This would allow diversion of water from the Catskill Aqueduct to the new chamber and the bypass of the Catskill Aqueduct from the CDUV Facility, if required. The CCT would then connect to the CDUV Facility through a new structure, the North Forebay Extension, for both pressurization alternatives. Finally, a new screen chamber would be required as the finished floor elevation of the existing Catskill Screen Chamber would be below the proposed HGL of 355 feet. The new screen chamber would be located in proximity to the LEC. The new tunnel connection chamber, North Forebay Extension, and screen chamber would be required for both pressurization options.

The Proposed Action has been designed to provide a capacity of up to 2,645 mgd of raw water through the UEC and new KEC Tunnel. This design flow is based upon a number of factors including the ability to meet future demand, address planned and unplanned shutdown of DEL Shaft 18, and to provide flexibility to manage the quality of water supplied to the CDUV Facility and the Hillview Reservoir. Baseline Pressurization was projected to provide a capacity of approximately 1,035 mgd, while Enhanced Pressurization would provide approximately 1,335 mgd. Neither of these flow capacities would provide the minimum target capacity identified in earlier studies to match the existing Delaware Aqueduct or the current design capacity for the UEC and new KEC Tunnel of 2,645 mgd. In addition, as discussed in Chapter 2, "Analytical Framework," Section 2.5, "Proposed Operation," current overall daily demand for Kensico Reservoir ranges between 1,200 and 1,400 mgd. Current summer peaks (i.e., hourly need), a period when increased water use would be expected, have generally been on the order of 1,600 mgd. Since the completion of the CDUV Facility these flows have been met by DEL Shaft 18. Pressurization of the Catskill Aqueduct would therefore not provide sufficient flows to meet targeted or current flow demands from Kensico Reservoir without DEL Shaft 18 in operation and, as a result, was therefore not considered for further advancement.

8.3 ALTERNATIVE TUNNEL DRIVE

As part of the Proposed Action and as discussed in Chapter 1, "Project Description," excavation for the new KEC Tunnel would be initiated at the KEC Eastview Site and proceed to completion at Kensico Campus. The TBM would be launched at the KEC Eastview Site and materials excavated from the KEC Tunnel would also be removed at this location. As part of the development of the overall KEC Project, constructability analyses were completed including an assessment of initiating tunnel excavation from Kensico Campus and terminating these construction activities at the KEC Eastview Site. A summary of additional construction activities that would occur at Kensico Campus, if this location was the initiation of the tunnel drive, is presented below with a discussion of the potential effects associated with this. A review of tunnel lining alternatives was also assessed as part of constructability and other studies and these alternatives are discussed in Section 8.4, "Alternative Tunnel Lining," of this chapter.

Under this alternative, tunnel initiation would occur at the Kensico Campus. The construction effort for this would be similar to the Proposed Action, but with the construction activities associated with TBM launch occurring at Kensico Campus, such as TBM delivery and assembly, removal of excavated material from the tunnel, and TBM retrieval. The TBM would be delivered to the Kensico Campus for assembly and placement within KEC Shaft 1C, a tail and starter tunnel would need to be constructed, all excavated tunnel material would be removed via KEC Shaft 1C and removed material would need to be either managed at Kensico Campus (e.g., temporary storage and/or on-site reuse if possible) or transported off site for appropriate disposal or reuse. The primary benefit identified as part of the assessment of a tunnel drive from the Kensico Campus was a reduction of overall construction duration for the Proposed Action.

This would provide additional schedule flexibility to address potential unforeseen construction delays, while meeting the requirements of the Hillview Reservoir Consent Decree and Judgment. This alternative tunnel drive was also noted to potentially reduce the overall duration of specific construction activities. Potential cost savings were also projected for this alternative as part of the constructability analysis. These cost savings were primarily associated with the potential on-site storage or reuse of materials excavated from the KEC Tunnel and the concomitant reduction in off-site transport of these materials if on-site use was possible. While a net reduction in construction cost was projected, some increase in cost would likely be associated with the implementation of potential additional measures to address dust, noise, traffic, and an increase in night work at the Kensico Campus.

In addition to an assessment of the potential schedule and cost benefits that could be associated with a Kensico Campus to KEC Eastview Site tunnel drive, a review of other potential effects of this alternative was completed. These effects were largely related to potential effects to the surrounding community due to an increase in construction activities, truck traffic, and extended construction (i.e., additional shifts). As discussed in Section 1.2.2, "Description of Surrounding Uses and Facilities," and Section 4.1, "Land Use, Zoning, and Public Policy," land use in immediate proximity to the Kensico Campus is dominated by residential and institutional uses. Residential areas are located west of Columbus Avenue and south of West Westlake Drive and to the northwest, north, and northeast consisting primarily of single-family homes. In addition, the Valhalla Middle and High Schools are located immediately north and adjacent to the Kensico Campus. Additional sensitive receptors, including but not limited to Lakeside Park and the Valhalla United Methodist Church are also located in proximity, south of the Kensico Campus. This would be in contrast to the more commercial, industrial, and institutional uses that are present near the KEC Eastview Site which generally represent less sensitive uses. As a result, the increase in construction activities associated with the initiation of the tunnel drive from Kensico Campus would result in more severe effects to nearby residential communities and potential additional effects to these uses may require the implementation of additional measures that may not adequately minimize the effects.

Potential traffic-related issues associated with this tunnel drive alternative would be related to the need to manage a significantly greater volume of excavated material at the Kensico Campus. This increase in excavation would be in addition to existing excavation activities required at the Kensico Campus related to KEC Shaft 1C, the UEC shaft, connection tunnels, and the new KEC Screen Chamber. Under this alternative, all material excavated from the KEC Tunnel would be removed through KEC Shaft 1C. This would represent a substantively larger volume of material then would be associated with the currently proposed tunnel drive from the KEC Eastview Site. As a result, a much higher number of truck trips to and from Kensico Campus would be required. Even with the potential reuse of some volume of tunnel excavation material on site, this alternative would involve more activity at and in the vicinity of KEC Shaft 1C related to the removal of materials from the tunnel, the establishment of additional

temporary storage piles for removed materials, additional construction activities associated with the on-site placement of these materials, and additional activities associated with the load out of trucks for on-site or off-site transport of these materials. Potential increases in effects to air quality (e.g., dust, construction vehicles) and noise (e.g., stationary and mobile sources) would likely also occur and require the implementation of additional measures over the duration of construction. A more detailed discussion of potential effects to visual resources, historic resources, traffic, air, and noise is presented below in Section 8.3.1 through Section 8.3.5.

The increase in excavation, storage, placement, and off-site transport of these additional materials would also all occur in proximity to Kensico Reservoir which would potentially increase risks to water quality from dust and stormwater runoff. Additional measures to ensure protection of water quality would therefore also be required for a tunnel drive from Kensico Campus.

8.3.1 URBAN DESIGN AND VISUAL RESOURCES

An anticipated increase in excavation, storage, and placement of additional fill at Kensico Campus could result in more dramatic changes in grading over the Proposed Action. This would have the potential to result in a reduction in views of the NRHP-eligible structures on the Kensico Campus that have been maintained as part of the Proposed Action. In addition, construction would involve additional nighttime work, resulting in increases in temporary construction lighting.

8.3.2 HISTORIC AND CULTURAL RESOURCES

As noted in Section 8.3.1, the potential placement of additional fill would have the potential to result in a reduction and possible elimination of views of the NRHP-eligible structures on the Kensico Campus. This alternative would require additional coordination with SHPO for potential impacts to the historic Kensico Campus NRHP-eligible structures and district.

8.3.3 TRAFFIC AND TRANSPORTATION

Under the Proposed Action, excavation of the KEC Tunnel would proceed from the KEC Eastview Site to Kensico Campus and would occur between the second quarter of 2027 (Q2 2027) and fourth quarter of 2028 (Q4 2028). Excavation of the KEC Tunnel would occur over three shifts with 190 construction workers per day (half of the workers were assumed to work during the first shift, a third of the workers during the second shift, and the remainder during the third shift). Tunnel excavation activities would result in 149 trucks per day, approximately 12 or 13 trucks per hour between 6 AM and 6 PM for approximately 18 months. During the construction traffic peak hours (6 to 7 AM, and 3 to 4 PM), excavation activities would generate approximately 80 construction worker auto trips and 24 construction truck trips to and from the KEC Eastview Site. TBM assembly would be performed over a period of

two months. TBM retrieval would be performed over a period of one month. Both TBM assembly and retrieval would generate significantly less vehicles than during the excavation of the KEC Tunnel under this tunnel drive alternative.

As part of the Proposed Action, Kensico Campus during the peak quarter in Q4 2027 (excluding the tunnel excavation activities) would have 187 workers and 18 trucks per day, primarily due to work related to the KEC Screen Chamber and UEC modifications. Assuming that tunnel excavation work at Kensico Campus would be comparable to that projected at the KEC Eastview Site (i.e., Proposed Action), a conservative assumption under this alternative would be that all materials associated with the new tunnel excavation would be removed through KEC Shaft 1C (as opposed to the KEC Eastview Site under the Proposed Action). This would represent a substantively larger volume of material being managed at the Kensico Campus. Tunnel excavation activities would result in an estimated additional 190 workers and 149 trucks per day. Under this alternative, this would result in more than a doubling of the daily vehicles at the Kensico Campus, in comparison to the Proposed Action, with a substantial increase in truck activities.

Shifting the KEC Tunnel excavation to start at the Kensico Campus would therefore result in an increase in truck activities on the road network near the Kensico Campus. Construction truck activities related to the tunnel excavation would generate at least an additional 12 to 13 trucks per hour above those identified under the Proposed Action near the Kensico Campus. These truck trips would travel along Columbus Avenue through residential neighborhoods and pass schools, religious buildings, or other sensitive receptors prior to accessing nearby highways. In contrast, truck trips traveling to and from the KEC Eastview Site, as part of the Proposed Action, would primarily use Saw Mill River Road/State Route 9A which is characterized by commercial and industrial development which is a less sensitive use.

Tunnel excavation activities would result in an additional demand of approximately 132 parking spaces during the peak hour of parking demand (2:30 to 3:30 PM when there is a shift overlap). For the Kensico Campus, the peak parking demand for the Proposed Action would occur during Q4 2027, requiring 176 spaces. If tunnel excavation would occur at the Kensico Campus, instead of the KEC Eastview Site as assumed in the Proposed Action, the resulting Kensico Campus parking demand during this peak quarter would be approximately 308 spaces which would exceed the Kensico Campus parking supply of approximately 206 spaces. Approximately 102 parking spaces would need to be accommodated at the KEC Eastview Site under this alternative, and construction workers would need to be shuttled between Kensico Campus and KEC Eastview Site, generating additional construction-related traffic.

Construction-related traffic at the KEC Eastview Site would be significantly reduced under this alternative and traffic impacts anticipated under the Proposed Action at Intersection #7, Grasslands Road (SR100C) and Walker Road / Clearbrook Road and at Intersection #15, Hillside

Avenue (SR100) and Virginia Road (CR51) may be reduced or eliminated during the duration of tunnel excavation work. However, traffic impacts at Intersection #13, Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) may worsen, and new traffic impacts could potentially result along routes to and from the Kensico Campus which are generally characterized with more sensitive uses, i.e., residences, schools, and religious buildings.

8.3.4 AIR QUALITY

Under this proposed alternative, the tunnel drive would be initiated from Kensico Campus. Additional equipment activity would therefore be required at and in the vicinity of KEC Shaft 1C to support these activities. Additional crane activity would occur at KEC Shaft 1C related to the placement of the TBM, increased removal of excavated materials associated with the construction of required tail and starter tunnels at the base of KEC Shaft 1C, and the removal of excavated materials from the KEC Tunnel as the TBM would advance towards the KEC Eastview Site. In addition, increased equipment for the removal, transport, and temporary storage of these excavated materials at Kensico Campus and for the load out of trucks removing these materials from the Kensico Campus would be required, primarily consisting of additional on-site trucks and front-end loaders. Under this alternative, these new activities would be in addition to current anticipated construction activities at the Kensico Campus (e.g., KEC Screen Chamber, connection tunnels, and UEC improvements) that would occur under the Proposed Action. Increased stationary source emissions would therefore be associated with this equipment, particularly during the period when tunnel excavation would occur under this alternative and a comparable reduction of these activities at the KEC Eastview Site as a result of the shift of the tunnel drive.

Likewise, off-site removal of new sources of excavated materials that could not be reused at Kensico Campus would be required. Excavated tunnel materials would require transport by trucks from the site to off-site management facilities. This would result in an increase in potential mobile air emissions along truck routes with sensitive receptors (e.g., residential uses) in proximity to Kensico Campus. In addition, an increase in construction worker vehicles would also occur for workers assigned to tunnel excavation and materials management activities which would also increase mobile air emissions at Kensico Campus over the duration of tunnel excavation-related construction activities.

An increase in air emissions from the additional stationary and mobile emission sources at Kensico Campus would be expected under this alternative. While the additional effects may not likely be considered significant, a larger sensitive population would potentially be exposed to these effects.

8.3.5 NOISE

As discussed in Section 8.3.4, advancement of the tunnel drive from the Kensico Campus would result in an increase in equipment use and construction vehicles traveling to and from the Kensico Campus and a comparable reduction of these activities at the KEC Eastview Site as a result of the shift of tunnel drive. Construction associated with a tunnel drive from Kensico Campus would occur during the peak quarters identified for the Proposed Action at Kensico Campus as discussed in Section 3.13, "Noise." In addition, construction associated with this tunnel drive alternative would be expected to require a third construction shift (11 PM to 7:30 AM) at Kensico Campus, based on the tunnel drive schedule under the Proposed Action for the KEC Eastview Site. New construction activities due to the tunnel drive would therefore result in an increase in noise emissions at the Kensico Campus that would potentially result in an exceedance of the CEQR construction noise screening threshold of 10 dBA above the measured existing ambient noise level at one or more receptor groups. Increased noise emissions would also extend over the anticipated duration of tunnel excavation activities (18 months). As a result, this alternative would be anticipated to result in an increase in noise levels at Receptor Groups K1, K5, and K6 which may represent a significant adverse impact to a larger sensitive population. Additional measures would therefore be required to address this potential increase in stationary and mobile noise emissions beyond those discussed in Section 3.13, "Noise." In addition, the duration and noise levels due to the construction activities associated with the Proposed Action at Kensico Campus, in conjunction with the added KEC Tunnel drive activities that would extend to the third shift with noise levels comparable to the second shift as part of this proposed alternative, would also likely result in an increase in noise levels that would not be in compliance with the current Town of Mount Pleasant Noise Code during the hours of 6:00 PM to 8:00 AM.

8.3.6 CONCLUSION

Advancement of the Kensico Campus to KEC Eastview Site tunnel drive was assessed and determined that it could potentially reduce the duration of construction which could result in a reduction in construction costs and provide flexibility in the schedule to address unforeseen construction delays in order to meet the requirements of the Hillview Reservoir Consent Decree and Judgment. However, this alternative would also be expected to result in increasing construction effects (i.e., visual resources, historic resources, air quality, traffic, and noise) identified under the Proposed Action near Kensico Campus, in areas generally characterized with more sensitive uses, i.e., residences, schools, and religious buildings, and reducing construction effects near the KEC Eastview Site, which is generally surrounded by industrial and commercial uses. As a result, the increase in construction activities associated with the initiation of the tunnel drive from Kensico Campus would result in more severe effects to nearby residential communities and potential additional effects to these uses may require the implementation of additional measures that may not adequately minimize these effects.

8.4 ALTERNATIVE TUNNEL LINING

As part of the initial designs of the KEC Project, DEP reviewed options for the lining of the newly constructed KEC Tunnel. Based on that review, the Proposed Action includes the lining of the KEC Tunnel from the KEC Eastview Site. As tunnel lining is a construction alternative, there would not be any changes to the operation of the Proposed Action with this alternative; therefore, the discussion below only addresses those impact categories associated with construction that have the potential for adverse impacts. A discussion of the two alternative approaches for the lining of the KEC Tunnel is provided within this section. This included lining of the KEC Tunnel from Kensico Campus and lining that would proceed from both the Kensico Campus and KEC Eastview Site simultaneously.

Potential traffic-related issues associated with these tunnel lining alternatives would be related to an increase in truck trips at the Kensico Campus. Potential increases in effects to air quality (e.g., dust, construction vehicles) and noise (e.g., stationary and mobile sources) would likely also occur and require the implementation of additional measures to address these over the duration of tunnel lining. A more detailed discussion of potential effects to traffic, air, and noise is presented below in Section 8.4.1.1 through Section 8.4.1.3 for the lining from Kensico Campus alternative and Section 8.4.2.1 through Section 8.4.2.3 for lining from both the Kensico Campus and KEC Eastview Site simultaneously.

8.4.1 TUNNEL LINING FROM KENSICO CAMPUS

The Proposed Action includes tunnel lining work that would commence eastward from the KEC Eastview Site with completion at Kensico Campus. Under this alternative, tunnel lining work would commence from the Kensico Campus rather than from the KEC Eastview Site. It would begin during Q4 2028 and would finish in the fourth quarter of 2029 (Q4 2029). Tunnel lining work would occur over two shifts (7 AM to 3:30 PM and 3 PM to 11:30 PM).

8.4.1.1 Traffic and Transportation

Traffic

The peak quarter of construction activities for tunnel lining commencing from the Kensico Campus would occur during Q2 2029, and construction-related activities would generate a total of 262 passenger car equivalent (PCE) trips during the weekday AM construction traffic peak hour (6 to 7 AM) and 275 PCE trips during the PM construction traffic peak hour (3 to 4 PM). The lining from Kensico Campus alternative would result in a higher number of construction vehicles at intersections near the Kensico Campus than both peak quarters analyzed for the Proposed Action (Q4 2027 and Q3 2029). **Table 8.4-1** below provides a comparison of construction trips that would be generated at the Kensico Campus and KEC Eastview Site for the

two Proposed Action peak quarters and for the lining from Kensico Campus alternative peak quarter.

Table 8.4-1. Peak Hour Trip Projections (PCEs) Comparison – Proposed Action vs. Lining from Kensico Campus Alternative

	Lining from Kensico Campus Alternative Q2 2029			Proposed Action Q4 2027			Proposed Action Q3 2029		
	Kensico Campus PCE Trips	KEC Eastview Site PCE Trips	Total PCE Trips	Kensico Campus PCE Trips	KEC Eastview Site PCE Trips	Total PCE Trips	Kensico Campus PCE Trips	KEC Eastview Site PCE Trips	Total PCE Trips
AM Construction Traffic Peak Hour	201	61	262	116	148	264	85	208	293
PM Construction Traffic Peak Hour	203	72	275	116	145	261	85	197	282
Note: PCE = Passenger Car Equivalents									

Under the lining from Kensico Campus alternative, the number of construction-related trips at seven of the 18 intersections analyzed in Section 3.10, "Traffic and Transportation," would be greater than the number of trips analyzed for the future with the Proposed Action. A detailed traffic analysis was conducted for these seven intersections to determine whether the lining from Kensico Campus alternative would result in significant traffic impacts in addition to those identified in the Proposed Action. The seven intersections included:

- Intersection #1, Columbus Avenue (CR64) and Westlake Drive
- Intersection #2, Columbus Avenue (CR64) and Lakeview Avenue
- Intersection #3, Columbus Avenue (CR64) and West Westlake Drive / Fountain Drive
- Intersection #10, Bradhurst Avenue (SR100) and Lakeview Avenue
- Intersection #11, Columbus Avenue (CR64) and Legion Drive (CR29)
- Intersection #12, Broadway (CR29) and Cleveland Street
- Intersection #13, Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A)

Traffic Volumes

During Q2 2029, the traffic peak quarter for the lining from Kensico Campus alternative, approximately 170 construction-related vehicle trips would be expected to travel along Columbus Avenue south of the Kensico Campus entrance at existing Westlake Drive during both the AM and PM construction traffic peak hours. North of Westlake Drive, Columbus Avenue volumes would be expected to increase by approximately 35 vehicles during each analysis peak hour. Traffic volumes along Grasslands Road (SR100C) at Walker Road near the KEC Eastview

Site would be expected to increase by approximately 40 vehicles and 60 vehicles during the AM and PM construction traffic peak hours, respectively. Traffic volumes under this condition are shown in **Figure 8.4-1** through **Figure 8.4-6**.

Traffic Levels of Service

The alternatives analysis determined that the lining from Kensico Campus alternative would not result in significant traffic impacts during the AM construction traffic peak hour, similar to the future with the Proposed Action. During the PM construction traffic peak hour under this alternative, potential significant traffic impacts were identified at a limited number of locations, similar to the future with the Proposed Action. Potential significant impacts under this alternative were identified at two of the seven intersections analyzed, including at Intersection #1, Columbus Avenue (CR64) and Westlake Drive which would not be significantly impacted under the future with the Proposed Action. In the future with the Proposed Action, the second intersection, Intersection #13, Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) was predicted to also result in significant impacts. Traffic movements that would be significantly impacted under the lining from Kensico Campus alternative are listed below.

- Intersection #1, Columbus Avenue (CR64) and Westlake Drive (unsignalized) – westbound Westlake Drive left turn movement (PM construction traffic peak hour)
- Intersection #13, Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) (signalized) – southbound Bradhurst Avenue through-right turn movement (PM construction traffic peak hour)

Detailed descriptions of the future with the lining from Kensico Campus alternative V/C ratios, average vehicle delays, and levels of service are provided in **Table 8.4-2** and **Table 8.4-3** below.

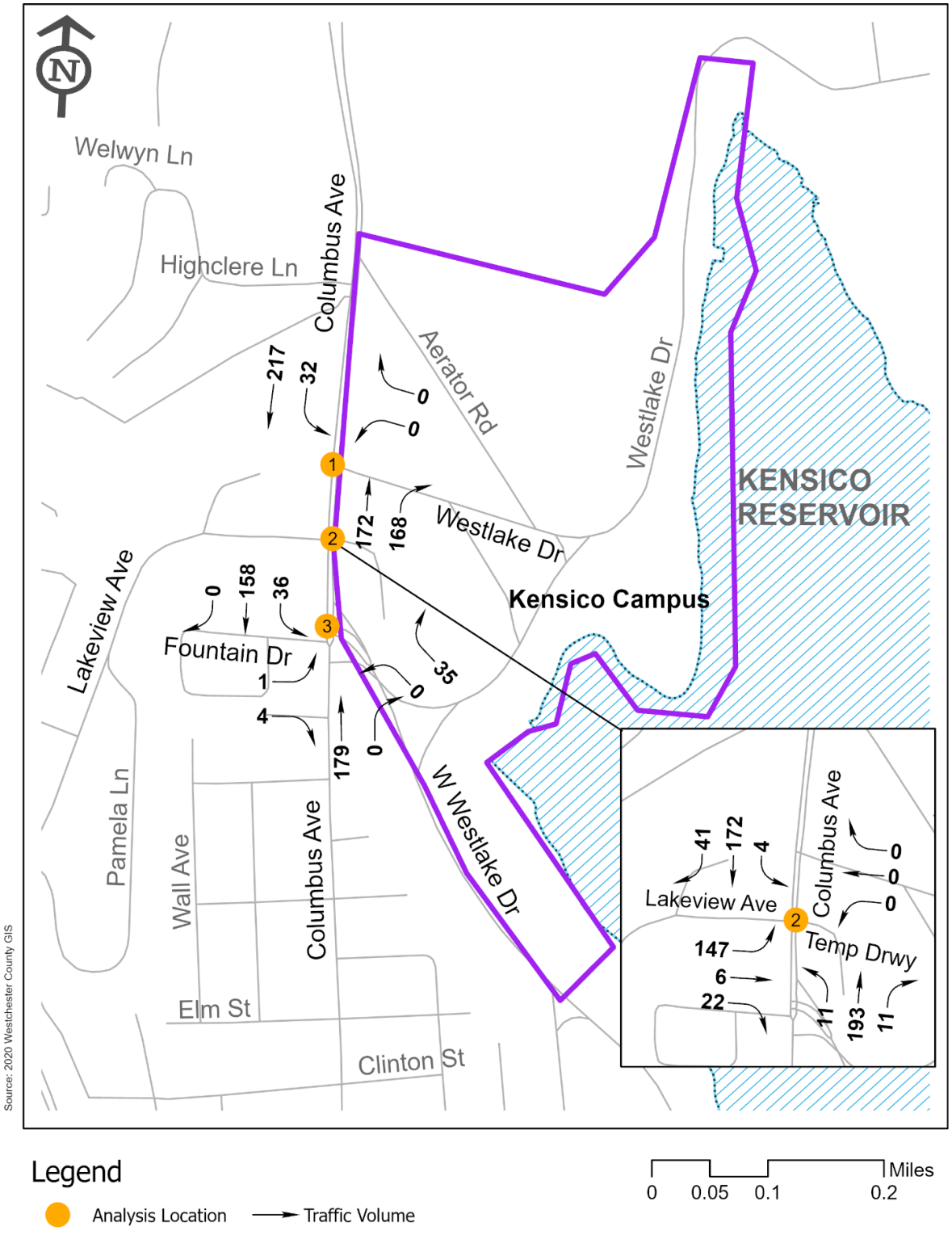

Figure 8.4-1. Future With the Lining from Kensico Campus Alternative Traffic Volumes – AM Construction Traffic Peak Hour (Intersections #1 - 3)

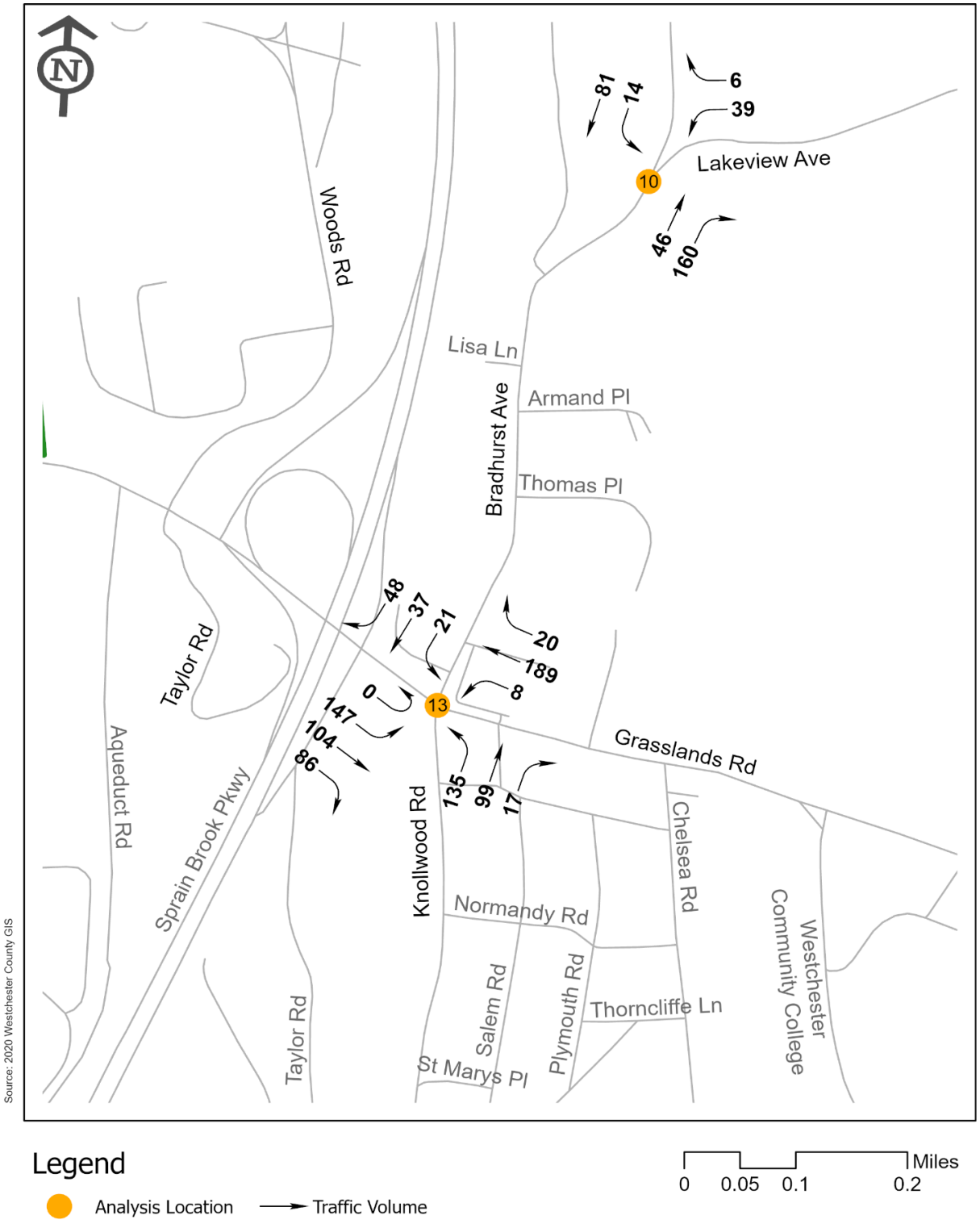

Figure 8.4-2. Future With the Lining from Kensico Campus Alternative Traffic Volumes – AM Construction Traffic Peak Hour (Intersections #10 and 13)

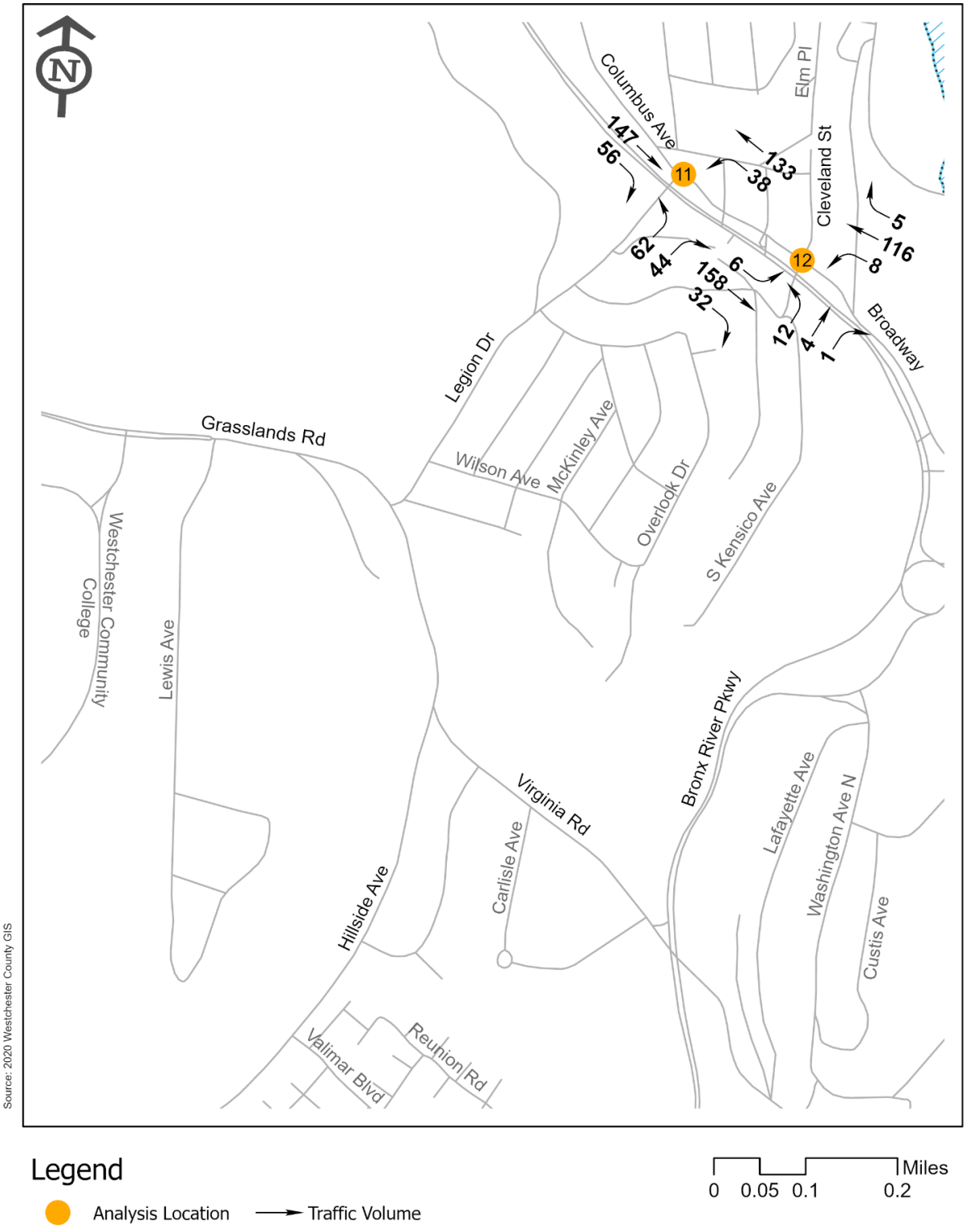

Figure 8.4-3. Future With the Lining from Kensico Campus Alternative Traffic Volumes – AM Construction Traffic Peak Hour (Intersections #11 and 12)

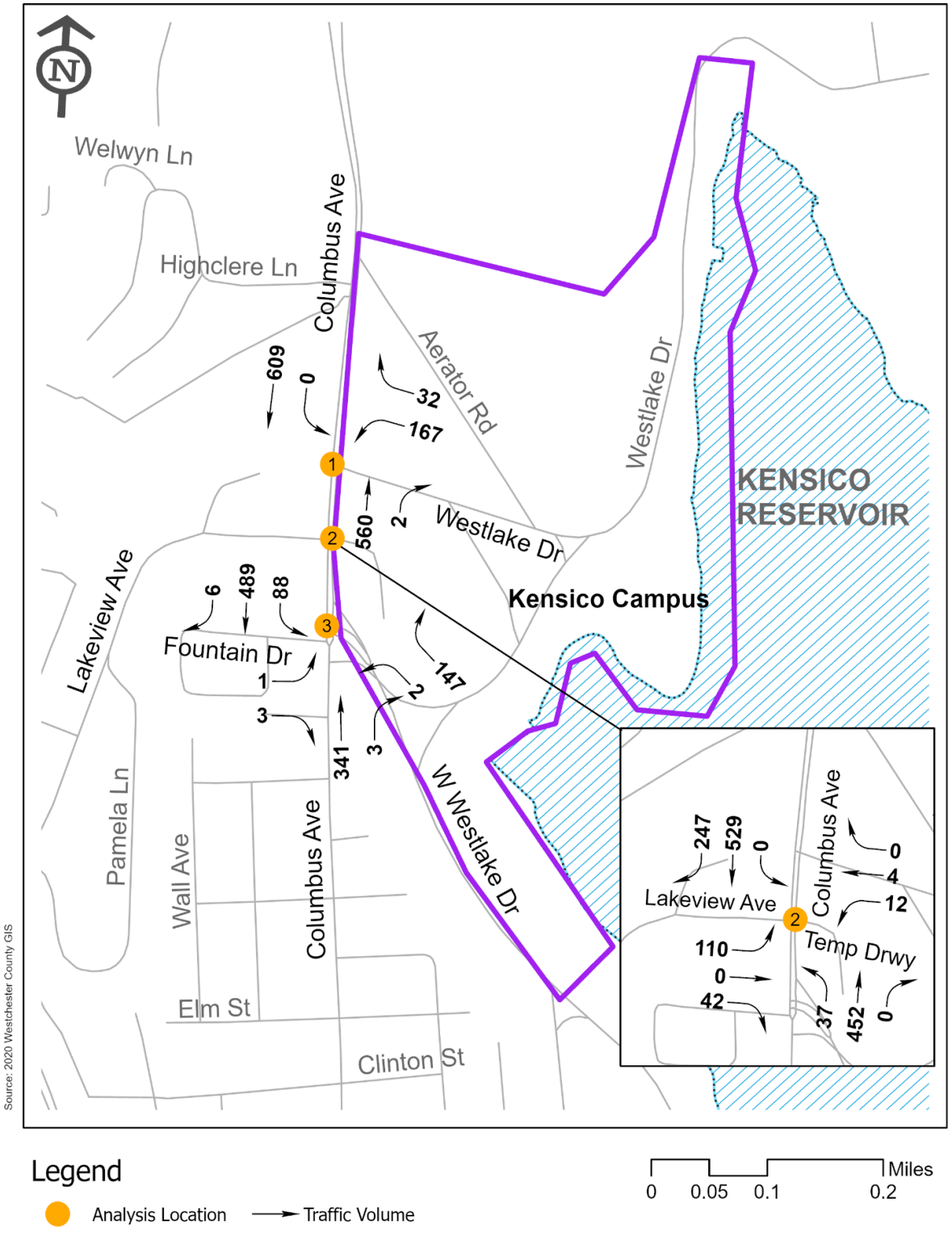

Figure 8.4-4. Future With the Lining from Kensico Campus Alternative Traffic Volumes – PM Construction Traffic Peak Hour (Intersections #1 - 3)

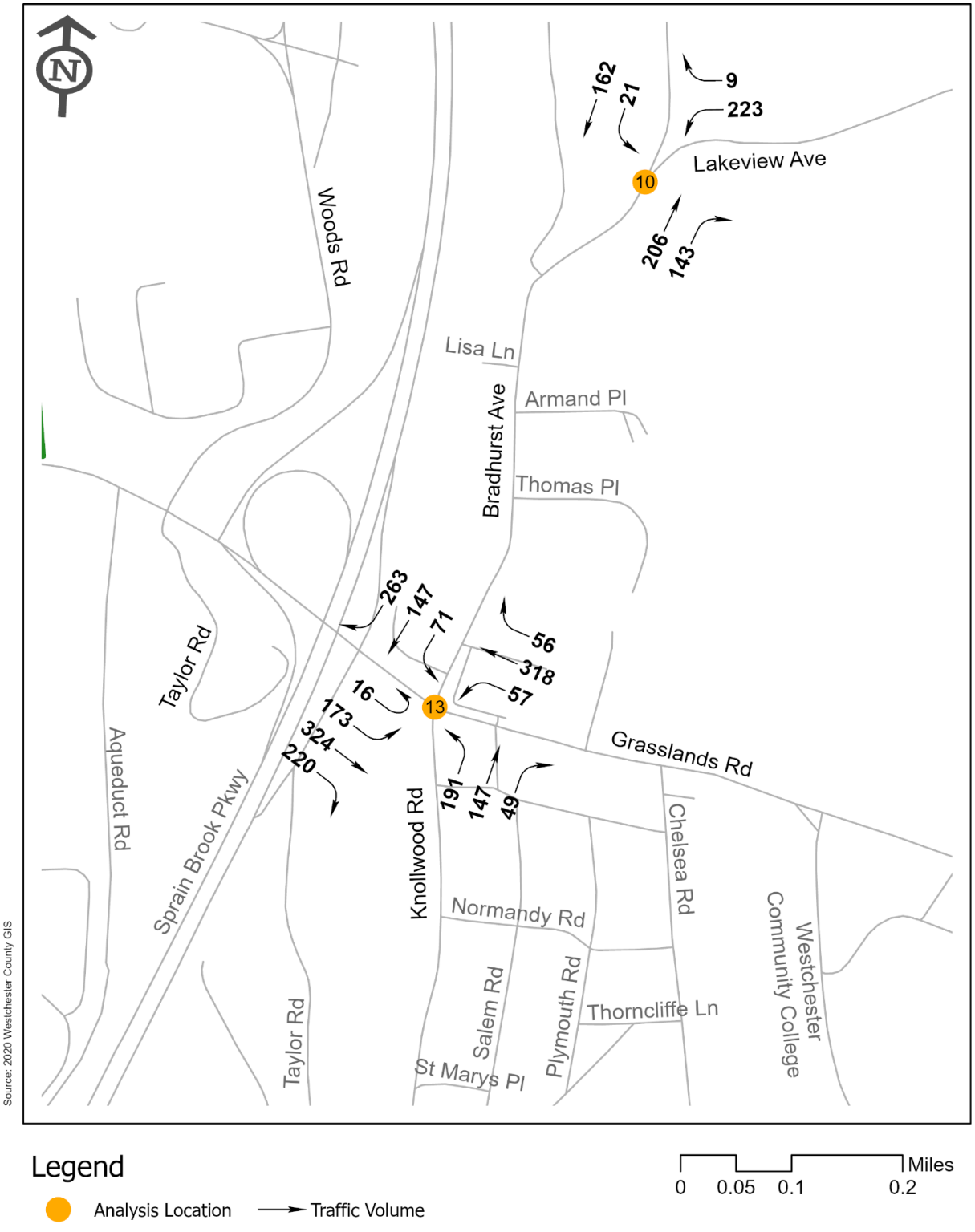

Figure 8.4-5. Future With the Lining from Kensico Campus Alternative Traffic Volumes – PM Construction Traffic Peak Hour (Intersections #10 and 13)

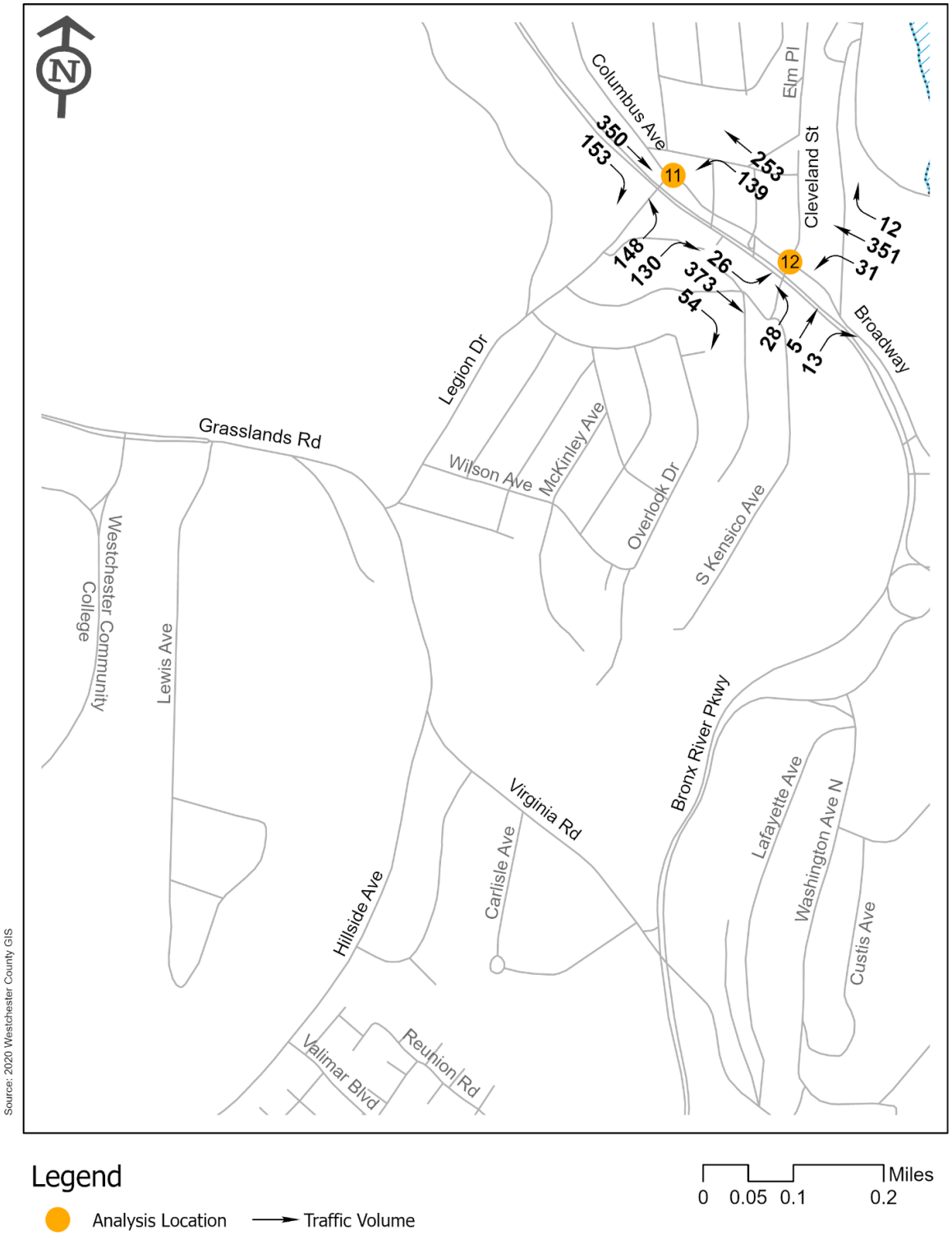

Figure 8.4-6. Future With the Lining from Kensico Campus Alternative Traffic Volumes – PM Construction Traffic Peak Hour (Intersections #11 and 12)

Table 8.4-2. 2029 Future With the Lining from Kensico Campus Alternative vs. 2029 Future Without the Lining from Kensico Campus Alternative Traffic Levels of Service – AM Construction Traffic Peak Hour[(1)]

		Future without the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative		
Approach	**Lane Group**	**V/C Ratio**	**Delay (sec)**	**LOS**	**V/C Ratio**	**Delay (sec)**	**LOS**
1. Columbus Avenue (CR64) and Westlake Drive – unsignalized							
Westlake Dr – WB	L	0.03	11.0	B	0.00	0.0	A
	R	0.00	0.0	A	0.00	0.0	A
Columbus Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Columbus Ave – SB	LT	0.00	0.2	A	0.00	1.2	A
Overall Intersection			**0.5**	**A**		**0.5**	**A**
2. Columbus Avenue (CR64) and Lakeview Avenue – signalized							
Lakeview Ave – EB	LTR	0.31	22.3	C	0.62	28.0	C
Temporary Driveway – WB	LTR	-	-	-	0.00	0.0	
Columbus Ave – NB	LTR	0.09	4.2	A	0.16	6.8	A
Columbus Ave – SB	LTR	0.12	3.6	A	0.15	6.0	A
Overall Intersection			**7.3**	**A**		**12.7**	**B**
3. Columbus Avenue (CR64) and West Westlake Drive / Fountain Drive – unsignalized							
Fountain Dr – EB	LTR	0.01	9.7	A	0.01	9.8	A
W. Westlake Dr – WB	L	0.00	0.0	A	0.00	0.0	A
	R	0.04	8.8	A	0.05	9.1	A
Columbus Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Columbus Ave – SB	L	0.03	7.5	A	0.03	7.7	A
	TR	0.00	0.0	A	0.00	0.0	A
Overall Intersection			**1.9**	**A**		**1.5**	**A**
10. Bradhurst Avenue (SR100) and Lakeview Avenue – unsignalized							
Lakeview Ave – WB	LR	0.08	10.3	B	0.08	10.7	B
Bradhurst Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Bradhurst Ave – SB	LT	0.00	1.1	A	0.00	1.1	A
Overall Intersection			**2.1**	**A**		**1.7**	**A**
11. Columbus Avenue (CR64) and Legion Drive (CR29) – signalized							
Legion Dr – EB	LR	0.42	17.3	B	0.50	20.0	C
Columbus Ave – NB	LT	0.12	3.8	A	0.17	4.4	A
Columbus Ave – SB	TR	0.20	3.7	A	0.20	4.1	A
Overall Intersection			**6.5**	**A**		**7.7**	**A**
12. Broadway (CR29) and Cleveland Street – unsignalized							
Cleveland St – EB	LTR	0.03	10.8	B	0.04	11.1	B
Broadway – NB	LTR	0.00	0.6	A	0.00	0.5	A
Broadway – SB	LTR	0.00	0.2	A	0.00	0.2	A
Overall Intersection			**0.9**	**A**		**0.9**	**A**

Table 8.4-2. 2029 Future With the Lining from Kensico Campus Alternative vs. 2029 Future Without the Lining from Kensico Campus Alternative Traffic Levels of Service – AM Construction Traffic Peak Hour(1)

		Future without the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative		
Approach	**Lane Group**	**V/C Ratio**	**Delay (sec)**	**LOS**	**V/C Ratio**	**Delay (sec)**	**LOS**
13. Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) – signalized							
Grasslands Rd – EB	UL	0.31	13.6	B	0.45	15.9	B
	T	0.21	15.3	B	0.20	14.9	B
	R	0.13	2.1	A	0.13	2.0	A
Grasslands Rd – WB	L	0.03	11.4	B	0.03	11.4	B
	TR	0.64	31.2	C	0.69	34.7	C
Knollwood Rd – NB	L	0.37	17.9	B	0.41	20.2	C
	TR	0.20	21.4	C	0.27	23.7	C
Bradhurst Ave – SB	L	0.09	16.0	B	0.09	17.7	B
	TR	0.35	19.2	B	0.38	20.7	C
Overall Intersection			**19.1**	**B**		**20.9**	**C**

Notes:
(1) Includes the seven analysis intersections (three signalized; four unsignalized).
MVT = Movement
V/C Ratio = volume-to-capacity ratio
Sec = seconds
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound.
L = Left; T = Thru; R = Right; U = U-turns
Dr = Drive; Ave = Avenue; St = Street; Rd = Road; Pkwy = Parkway

Table 8.4-3. 2029 Future With the Lining from Kensico Campus Alternative vs. 2029 Future Without the Lining from Kensico Campus Alternative – PM Construction Traffic Peak Hour[(1)]

		Future without the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative		
Approach	**Lane Group**	**V/C Ratio**	**Delay (sec)**	**LOS**	**V/C Ratio**	**Delay (sec)**	**LOS**
1. Columbus Avenue (CR64) and Westlake Drive – unsignalized							
Westlake Dr – WB	L	0.08	21.1	C	0.85	68.5	F
	R	0.00	0.0	A	0.06	10.6	B
Columbus Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Columbus Ave – SB	LT	0.00	0.0	A	0.00	0.0	A
Overall Intersection			**0.4**	**A**		**9.2**	**A**
2. Columbus Avenue (CR64) and Lakeview Avenue – signalized							
Lakeview Ave – EB	LTR	0.49	24.6	C	0.56	27.0	C
Temporary Driveway – WB	LTR	-	-	-	0.06	17.0	B
Columbus Ave – NB	LTR	0.33	6.6	A	0.35	7.6	A
Columbus Ave – SB	LTR	0.40	6.4	A	0.51	7.8	A
Overall Intersection			**8.6**	**A**		**9.9**	**A**
3. Columbus Avenue (CR64) and West Westlake Drive / Fountain Drive – unsignalized							
Fountain Dr – EB	LTR	0.01	15.2	C	0.02	16.5	C
W. Westlake Dr – WB	L	0.02	29.2	D	0.02	32.6	D
	R	0.21	10.7	B	0.21	10.7	B
Columbus Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Columbus Ave – SB	L	0.10	8.5	A	0.10	8.5	A
	TR	0.00	0.0	A	0.00	0.0	A
Overall Intersection			**2.4**	**A**		**2.2**	**A**
10. Bradhurst Avenue (SR100) and Lakeview Avenue – unsignalized							
Lakeview Ave – WB	LR	0.40	17.4	C	0.61	23.5	C
Bradhurst Ave – NB	TR	0.00	0.0	A	0.00	0.0	A
Bradhurst Ave – SB	LT	0.00	1.0	A	0.00	1.0	A
Overall Intersection			**4.3**	**A**		**7.6**	**A**
11. Columbus Avenue (CR64) and Legion Drive (CR29) – signalized							
Legion Dr – EB	LR	0.76	31.9	C	0.76	31.9	C
Columbus Ave – NB	LT	0.59	14.7	B	0.65	17.4	B
Columbus Ave – SB	TR	0.50	10.8	B	0.57	12.2	B
Overall Intersection			**17.5**	**B**		**18.7**	**B**
12. Broadway (CR29) and Cleveland Street – unsignalized							
Cleveland St – EB	LTR	0.18	19.6	C	0.20	20.9	C
Broadway – NB	LTR	0.00	0.7	A	0.00	0.7	A
Broadway – SB	LTR	0.00	0.5	A	0.00	0.5	A
Overall Intersection			**1.7**	**A**		**1.6**	**A**

Table 8.4-3. 2029 Future With the Lining from Kensico Campus Alternative vs. 2029 Future Without the Lining from Kensico Campus Alternative – PM Construction Traffic Peak Hour[(1)]

		Future without the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative		
Approach	**Lane Group**	**V/C Ratio**	**Delay (sec)**	**LOS**	**V/C Ratio**	**Delay (sec)**	**LOS**
13. Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) – signalized							
Grasslands Rd – EB	UL	0.70	26.8	C	0.70	26.8	C
	T	0.54	27.3	C	0.56	27.7	C
	R	0.29	2.4	A	0.29	2.4	A
Grasslands Rd – WB	L	0.20	14.3	B	0.20	14.4	B
	TR	0.88	51.5	D	0.88	51.5	D
Knollwood Rd – NB	L	0.77	44.2	D	0.84	54.3	D
	TR	0.53	37.7	D	0.53	37.8	D
Bradhurst Ave – SB	L	0.22	24.0	C	0.22	24.0	C
	TR	1.00	82.0	F	1.21	145.8	F
Overall Intersection			**40.4**	**D**		**55.5**	**E**

Notes:
(1) Includes the seven analysis intersections (three signalized; four unsignalized).
Gray highlighted cell denotes movement would be significantly impacted
MVT = Movement
V/C Ratio = volume-to-capacity ratio
Sec = seconds
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound.
L = Left; T = Thru; R = Right; U = U-turns
Dr = Drive; Ave = Avenue; St = Street; Rd = Road; Pkwy = Parkway

Similar to the future with the Proposed Action, all intersections with potential significant adverse traffic impacts could be fully mitigated with standard traffic capacity improvements.

- At Intersection #1, Columbus Avenue (CR64) and Westlake Drive, it would be necessary to deploy a traffic enforcement agent during the PM construction traffic peak hour to facilitate Westlake Drive traffic as described in **Table** 8.4-4 below.
- At Intersection #13, Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A), potential traffic impacts could be mitigated with signal timing modifications.

Table 8.4-4. 2029 Future With the Lining from Kensico Campus Alternative (Mitigated) vs. 2029 Future With the Lining from Kensico Campus Alternative vs. 2029 Future Without the Lining from Kensico Campus Alternative – PM Construction Traffic Peak Hour(1)

		Future without the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative			Future with the Lining from Kensico Campus Alternative (Mitigated)			Proposed Mitigation Measures
Approach	**Lane Group**	**V/C Ratio**	**Delay (secs)**	**LOS**	**V/C Ratio**	**Delay (secs)**	**LOS**	**V/C Ratio**	**Delay (secs)**	**LOS**	
1. Columbus Avenue (CR64) and Westlake Drive – unsignalized											
Westlake Dr – WB	L	0.08	21.1	C	0.85	68.5	F	0.42	28.9	C	Use traffic enforcement agents to monitor construction traffic exiting Westlake Dr and stop traffic on Columbus Ave to provide gaps for Westlake Dr traffic to exit. Install advanced signage to inform motorists of flaggers and to prepare to stop.
	R	0.00	0.0	A	0.06	10.6	B	0.01	23.2	C	
Columbus Ave – NB	TR	0.00	0.0	A	0.00	0.0	A	0.28	8.7	A	
Columbus Ave – SB	LT	0.00	0.0	A	0.00	0.0	A	0.34	8.8	A	
Overall Intersection			**0.4**	**A**		**9.2**	**A**		**11.5**	**B**	
13. Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) – signalized											
Grasslands Rd – EB	UL	0.70	26.8	C	0.70	26.8	C	0.83	46.1	D	Modify signal timing: Shift 5 seconds of green time from EB-L/WB-L phase to NB-TR/SB-TR phase.
	T	0.54	27.3	C	0.56	27.7	C	0.61	32.5	C	
	R	0.29	2.4	A	0.29	2.4	A	0.31	2.8	A	
Grasslands Rd – WB	L	0.20	14.3	B	0.20	14.4	B	0.22	16.7	B	
	TR	0.88	51.5	D	0.88	51.5	D	0.89	53.4	D	
Knollwood Rd – NB	L	0.77	44.2	D	0.84	54.3	D	0.83	51.2	D	
	TR	0.53	37.7	D	0.53	37.8	D	0.46	32.6	C	
Bradhurst Ave – SB	L	0.22	24.0	C	0.22	24.0	C	0.20	20.9	C	
	TR	1.00	82.0	F	1.21	145.8	F	1.03	82.4	F	
Overall Intersection			**40.4**	**D**		**55.5**	**E**		**45.0**	**D**	

Notes:
(1) Includes the two impacted analysis intersections (one signalized; one unsignalized).
Gray highlighted cell denotes movement would be significantly impacted.
MVT = Movement
V/C Ratio = volume-to-capacity ratio
Sec = seconds
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound.
L = Left; T = Thru; R = Right; U = U-turns
Dr = Drive; Ave = Avenue; St = Street; Rd = Road; Pkwy = Parkway

Parking

Under the future with the Proposed Action, the peak parking demand at the Kensico Campus is expected to be approximately 176 parking spaces during Q4 2027. Under the lining from Kensico Campus alternative, the peak parking demand for the Kensico Campus would be approximately 269 parking spaces under Q3 2029 and would occur between 2:30 to 3:30 PM when workers from the 7 AM to 3:30 PM shift are still on site and workers for the 3 to 11:30 PM shift are beginning to arrive. The projected parking demand at the Kensico Campus would be partially accommodated by the 206 surface parking spaces that would be provided on site. The remainder of the projected parking demand for the Kensico Campus could be accommodated at the KEC Eastview Site, which would provide sufficient parking supply to accommodate the construction activities at the KEC Eastview Site and the Kensico Campus parking overflow. However, this would generate trips between the Kensico Campus and KEC Eastview Site to shuttle workers to Kensico Campus. These trips would travel through Lakeside Avenue and Bradhurst Avenue in residential neighborhoods.

8.4.1.2 Air Quality

Stationary Sources

Under the lining from Kensico Campus alternative, additional on-site equipment that would operate at the Kensico Campus would include one above-ground crane and several concrete and dewatering pumps inside the tunnel for approximately 13 months. However, construction under the lining from Kensico alternative (Q4 2028 through Q4 2029) would have lower emissions as compared to the peak construction quarters analyzed for potential worst-case air quality impacts under the Proposed Action (Q4 2026 and Q4 2027 for short term [i.e., 1-hour, 3-hour, 8-hour, and 24-hour] and 2027 for long term [i.e., 3 month and annual]). Therefore, this alternative would not be expected to result in potential significant air quality impacts.

Mobile Sources

As discussed above, the lining from Kensico Campus alternative would result in a higher number of construction vehicles at intersections near the Kensico Campus than both peak quarters (Q4 2027 and Q3 2029) analyzed for traffic for the Proposed Action. Therefore, an air quality mobile source screening assessment was performed for the peak quarter of construction activities under the lining from Kensico Campus alternative (Q2 2029). As presented in **Table 8.4-5**, a total of two out of 35 intersections where sensitive receptors are present would exceed the CO and $PM_{2.5}$ screening thresholds.

As discussed in Section 3.11, "Air Quality," microscale analyses were performed for both of these intersections as part of the assessment of the Proposed Action. Based on the Proposed Action analysis results and the incremental construction trips due to the lining from Kensico Campus alternative, the CO and $PM_{2.5}$ concentration levels at these intersections for this

alternative are anticipated to be slightly higher during Q2 2029 (peak quarter for this alternative) when compared to the Proposed Action but would still be well below the NAAQS and CEQR *de minimis* criteria. Therefore, no significant adverse mobile source air quality impacts would result as a result of the lining from Kensico Campus alternative.

Table 8.4-5. Future with Lining from Kensico Campus Alternative – Screening Assessment Results

Screening Pollutant	Intersections Exceeding Screening Threshold
$PM_{2.5}$ and CO	Columbus Avenue (CR64) and Westlake Drive
$PM_{2.5}$ and CO	Columbus Avenue (CR64) and Lakeview Avenue

8.4.1.3 Noise

Under the lining from Kensico Campus alternative, tunnel lining activities would be performed from the Kensico Campus, as opposed to the KEC Eastview Site. As such, this alternative would reduce the construction noise effects at the KEC Eastview Site during Q4 2028 to Q4 2029 while increasing the construction noise effects at Kensico Campus during this period. Below is an assessment of the anticipated increase in noise effects at Kensico Campus.

Stationary Sources

Under the lining from Kensico Campus alternative, additional on-site equipment that would operate at the Kensico Campus would include one above-ground crane and several concrete and dewatering pumps inside the tunnel. Based on a review of the construction noise profiles prepared for the Proposed Action, the additional equipment would not be expected to result in noise levels that would exceed the CEQR construction noise screening threshold of 10 dBA above the measured existing ambient noise level under the lining from Kensico Campus alternative, with the exception of the second and third shift of construction at Receptor Group K6. Given the limited duration of tunnel lining activities (i.e., approximately 13 months), the additional effects may not likely be considered significant, but a larger sensitive population would potentially be exposed to these effects.

Mobile Sources

As discussed above, the lining from Kensico Campus alternative would result in a higher number of construction vehicles at intersections near the Kensico Campus than both peak quarters (Q4 2027 and Q3 2029) analyzed for traffic for the Proposed Action. Therefore, a mobile noise source screening assessment was performed for the peak quarter of construction activities under the lining from Kensico Campus alternative (Q2 2029). A greater number of mobile noise screening locations would experience a 100 percent increase (or doubling) in noise PCE values over existing conditions as compared to the Proposed Action. Based on the screening assessment

for the Q2 2029 construction traffic peak quarters, five of the 20 locations would exceed the CEQR screening threshold. These intersections, noted below, include M13 and M14, which also screened in for a more detailed mobile noise analysis as part of the Proposed Action, as well as M8, M11, and M12.

- M8 – Legion Drive between Wilson Avenue and Entrance Way
- M11 - Grasslands Road near Arthur Lane
- M12 - Bradhurst Avenue near Armand Place
- M13 - Lakeview Avenue near Pamela Lane
- M14 - Lakeview Avenue near Colonial Lane

Based on the screening assessment, the time periods that would require additional analyses include the Weekend AM Construction Traffic Peak Hour (6 to 7 AM), as well as the weekday midday peak hour (10 AM to 12 PM) at M8, and the nighttime hours of 10 PM to 12 AM at M14 given the slightly greater PCEs that exceed the CEQR screening threshold. Therefore, it is anticipated that the effects of construction vehicles along routes to and from the Kensico Campus and KEC Eastview Site would be greater and longer than the Proposed Action. However, given the limited duration of tunnel lining activities (i.e., approximately 13 months) and only slightly greater PCEs, the additional off-site mobile source noise effects may not likely be considered significant.

8.4.2 TUNNEL LINING FROM BOTH KENSICO CAMPUS AND KEC EASTVIEW SITE

Under this alternative, tunnel lining work would occur from both the Kensico Campus and KEC Eastview Site simultaneously. The duration of tunnel lining would occur over the course of a shorter period beginning in the fourth quarter of 2028 (Q4 2028) and ending in the third quarter of 2029 (Q3 2029). Tunnel lining work from the KEC Eastview Site would occur over three shifts (7 AM to 3:30 PM, 3 PM to 11:30 PM, and 11 PM to 7:30 AM), similar to the future with the Proposed Action. Tunnel lining work from the Kensico Site would occur over two shifts (7 AM to 3:30 PM and 3 PM to 11:30 PM), similar to the lining from Kensico Campus alternative (see Section 8.4.1).

8.4.2.1 Traffic and Transportation

The overall number of construction-related vehicles anticipated during the peak quarter under this alternative (Q3 2029) would be fewer than under the Proposed Action, and the intensity of traffic at the Kensico Campus and KEC Eastview Site intersections would be less than those under the future with the Proposed Action (where tunnel lining would occur from only the KEC Eastview Site) and the lining from Kensico Campus alternative described in Section 8.4.1. Therefore, this alternative would not be expected to result in additional significant traffic impacts.

8.4.2.2 Air Quality

Under this alternative, tunnel lining work would occur from both the Kensico Campus and KEC Eastview Site. As construction activities would be distributed between both the Kensico Campus and KEC Eastview Site, the intensity of potential mobile source air quality effects at the traffic study intersections would be less than those under the future with the Proposed Action (where tunnel lining would occur from only the KEC Eastview Site) and the lining from Kensico Campus alternative described in Section 8.4.1. Therefore, this alternative would not be expected to result in significant mobile source air quality impacts.

Under this alternative, the on-site stationary source air quality effects during tunnel lining quarters would be slightly greater than the Proposed Action but less than the lining from Kensico Campus alternative. In the KEC Eastview Site study area, the on-site stationary air quality effects would be slightly lower than the Proposed Action, but more than the lining from Kensico Campus alternative resulting in no significant impacts.

8.4.2.3 Noise

Under this alternative, construction activities would be distributed between both construction sites, the intensity of potential mobile source noise effects along routes to and from the Kensico Campus and KEC Eastview Site would be less than those under the future with the Proposed Action (where tunnel lining would occur from only the KEC Eastview Site) and the lining from Kensico Campus alternative described in Section 8.4.1. However, given the limited duration of tunnel lining activities that would occur at Kensico Campus under this alternative (i.e., approximately five months) and only slightly greater PCEs as compared to the Proposed Action, the off-site mobile source noise effects may not likely be considered significant.

The potential on-site stationary source noise effects during those quarters when tunnel lining quarters would occur would be slightly greater than the Proposed Action, but less than the lining from Kensico Campus alternative in the Kensico Campus study area. In the KEC Eastview Site study area, the on-site stationary noise effects would be slightly lower than the Proposed Action, but more than the lining from Kensico Campus alternative. Given the limited duration of tunnel lining activities (i.e., approximately five months), the additional effects may not likely be considered significant, but a larger sensitive population would potentially be exposed to these effects.

8.5 CONSTRUCTION OF A DROP PIPE

To provide flexibility during construction of the KEC Tunnel, an alternative that included a separate Construction Drop Pipe was considered. The Construction Drop Pipe would be installed on property owned by Westchester County and accessed from Bradhurst Avenue (see **Figure 8.5-1**). The Construction Drop Pipe would include the installation of an eight-inch diameter pipe

to allow for the delivery of grout or concrete and other tunnel construction and support needs from the ground surface to the tunnel depth approximately midway along the KEC Tunnel alignment. As the Construction Drop Pipe is a construction alternative, there would not be any changes to the operation of the Proposed Action with this alternative; therefore, the discussion below only includes those impact categories associated with construction. The Construction Drop Pipe would cease after construction of the Proposed Action.

The Construction Drop Pipe site is located on an irregular parcel on Bradhurst Avenue in the Town of Mount Pleasant (Tax ID: 117.9-1-8). The parcel has an area of approximately 13.2 acres and its current land use is classified as institutional and public assembly; it is owned by the County, contains a water tower, and is traversed, east-west, by a corridor of overhead powerlines and a portion of the DEP's Catskill Aqueduct (below grade).

Land use in immediate proximity to the Construction Drop Pipe is dominated by institutional uses surrounded by cemeteries, commercial/retail, residential, and rights-of-way, such as the Sprain Brook Parkway. The Construction Drop Pipe is located in an R-20 zoning district. R-20 zoning is designated for one-family residential uses at a lower density with a minimum lot size of 20,000 square feet. In addition, the Hawthorne Country Day School is located immediately north and adjacent to the Construction Drop Pipe site.

Potential effects associated with the Construction Drop Pipe alternative would be related to an increase in truck trips along Bradhurst Avenue, potential increases in effects to air quality (e.g., dust, construction vehicles), and noise (e.g., stationary and mobile sources). A more detailed discussion of potential effects to community facilities, traffic, air quality, and noise is presented below in Section 8.5.1 through Section 8.5.4.

Installation of the Construction Drop Pipe would include a construction laydown area of approximately 2.4 acres within an area that is an existing, open, grass-covered field surrounded by woods and containing scattered tree growth.

8.5.1 COMMUNITY FACILITIES

Similar to the Proposed Action and as discussed in Section 3.2, "Community Facilities and Services," the Construction Drop Pipe site is served by the Westchester Medical Center, the Valhalla Fire Department, the Hawthorne Fire Company, the Valhalla Police Department, as well as the Westchester County Department of Public Safety. There would be no adverse effects to these emergency services during the construction and use of the Construction Drop Pipe.

The Construction Drop Pipe is located adjacent to the Hawthorne Country Day School. The Hawthorne Country Day School provides educational day programs (early intervention, preschool, school age) to assist an average of approximately 240 students, ages 18 months to 21 years. A discussion of potential effects to air quality and noise adjacent to the school are provided in Section 8.5.3 and Section 8.5.4.

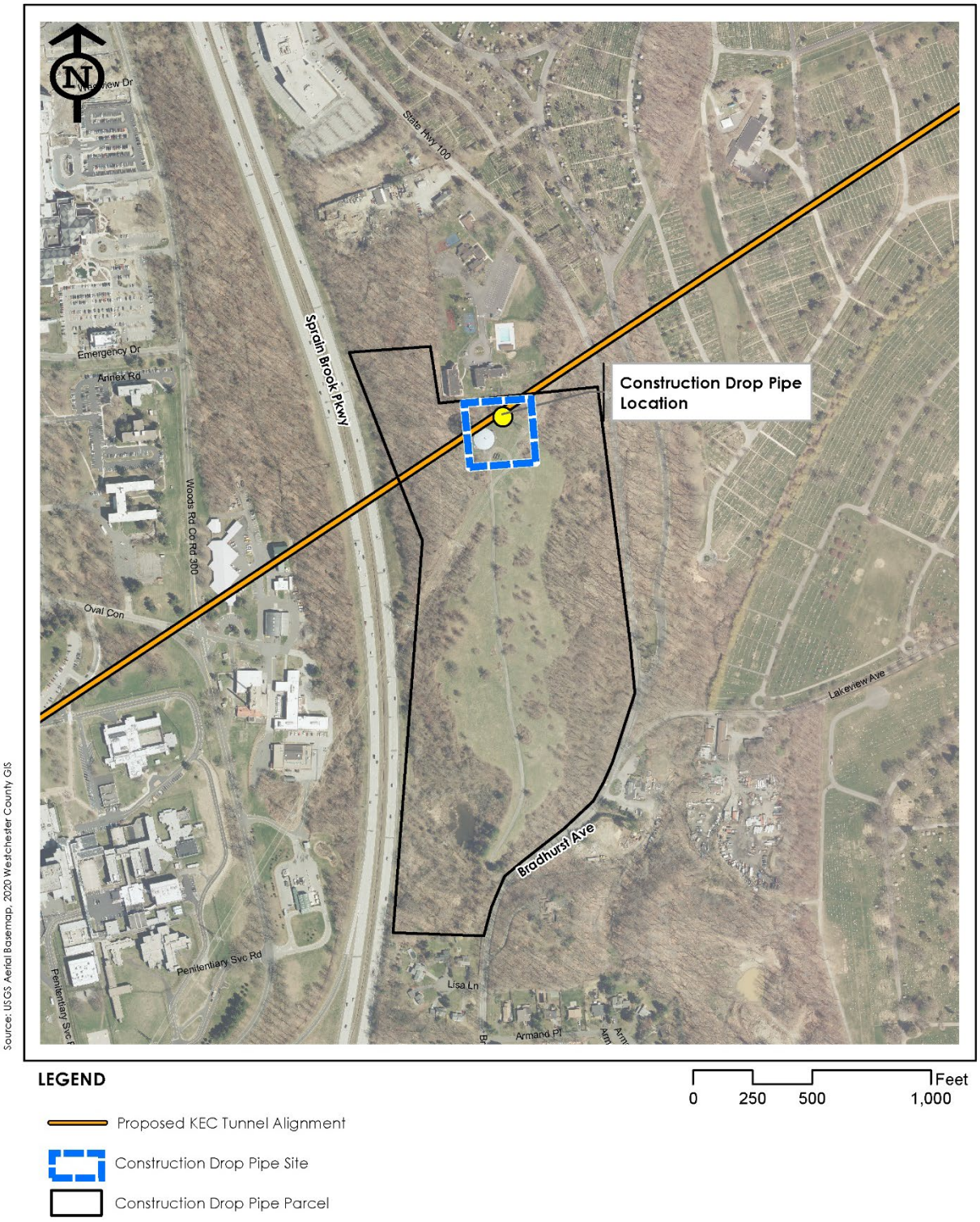

Figure 8.5-1. Construction Drop Pipe Alternative Site Location

8.5.2 TRAFFIC AND TRANSPORTATION

Construction Drop Pipe work would begin during the fourth quarter of 2028 (Q4 2028) and would finish in the fourth quarter of 2029 (Q4 2029). Construction drop pipe work would occur over one shift (7 AM to 3:30 PM) and access to the Construction Drop Pipe would be provided along Bradhurst Avenue between Lisa Lane and Lakeview Avenue.

8.5.2.1 Traffic

The peak quarter of construction activities for the Construction Drop Pipe alternative would occur during Q3 2029, and Construction Drop Pipe-related construction activities would generate a total of eight additional vehicle trips during the weekday AM and PM construction traffic peak hours above those already generated by the Proposed Action. Six out of the eight vehicle trips (all autos) would be expected to travel through Intersection #13, Grasslands Avenue (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) during the construction traffic peak hours. Although the traffic increase resulting from the Construction Drop Pipe would be modest, potential significant traffic impacts were identified at this intersection during the PM construction traffic peak hour and a detailed traffic analysis was conducted to determine whether mitigation measures proposed at this intersection for the Proposed Action (see Section 9.2, "Construction Traffic and Transportation") would be sufficient to accommodate the increase in traffic volumes related to the Construction Drop Pipe. No more than two additional vehicle (auto) trips are expected to use other study intersections and no significant traffic impacts were identified at these locations where there would be an increase in traffic due to Construction Drop Pipe activities. Additional traffic impacts would therefore not be expected at other study intersections. **Figure 8.5-2** and **Figure 8.5-3** show the traffic volumes anticipated as a result of the Construction Drop Pipe alternative during the AM and PM construction traffic peak hours, respectively.

The potential significant traffic impacts associated with this alternative could be mitigated using similar mitigation measures identified for the Proposed Action. Detailed descriptions of the future with the Construction Drop Pipe alternative V/C ratios, average vehicle delays, and levels of service are provided in **Table 8.5-1**.

8.5.2.2 Parking

The Construction Drop Pipe site would provide approximately 11 parking spaces within the site's 2.4-acre construction laydown area which would accommodate the Construction Drop Pipe parking demand of eight parking spaces. The peak parking demand at the Kensico Campus and the KEC Eastview Site would remain the same as the peak parking demand for the Proposed Action.

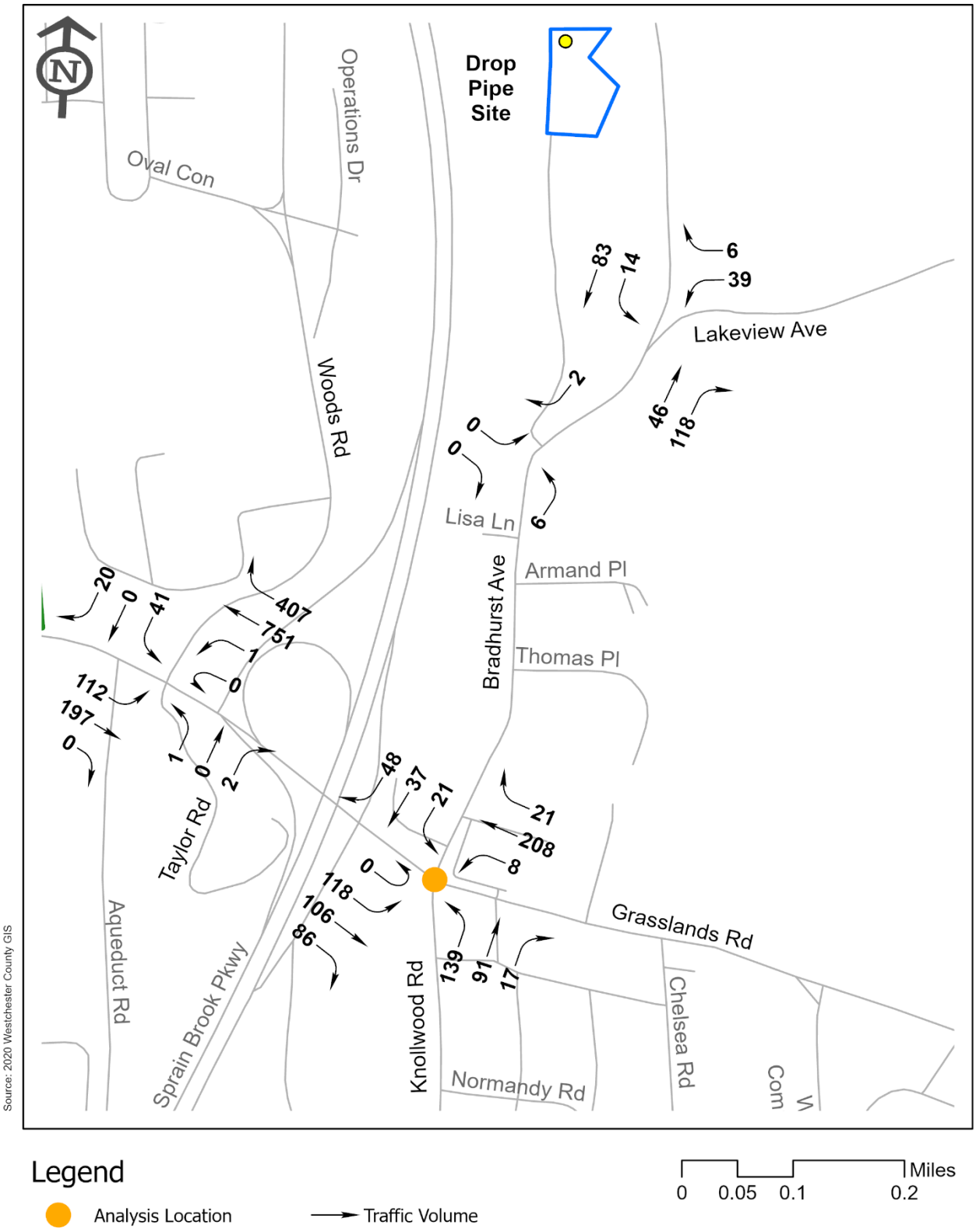

Figure 8.5-2. Future With the Construction Drop Pipe Alternative Traffic Volumes – AM Construction Traffic Peak Hour

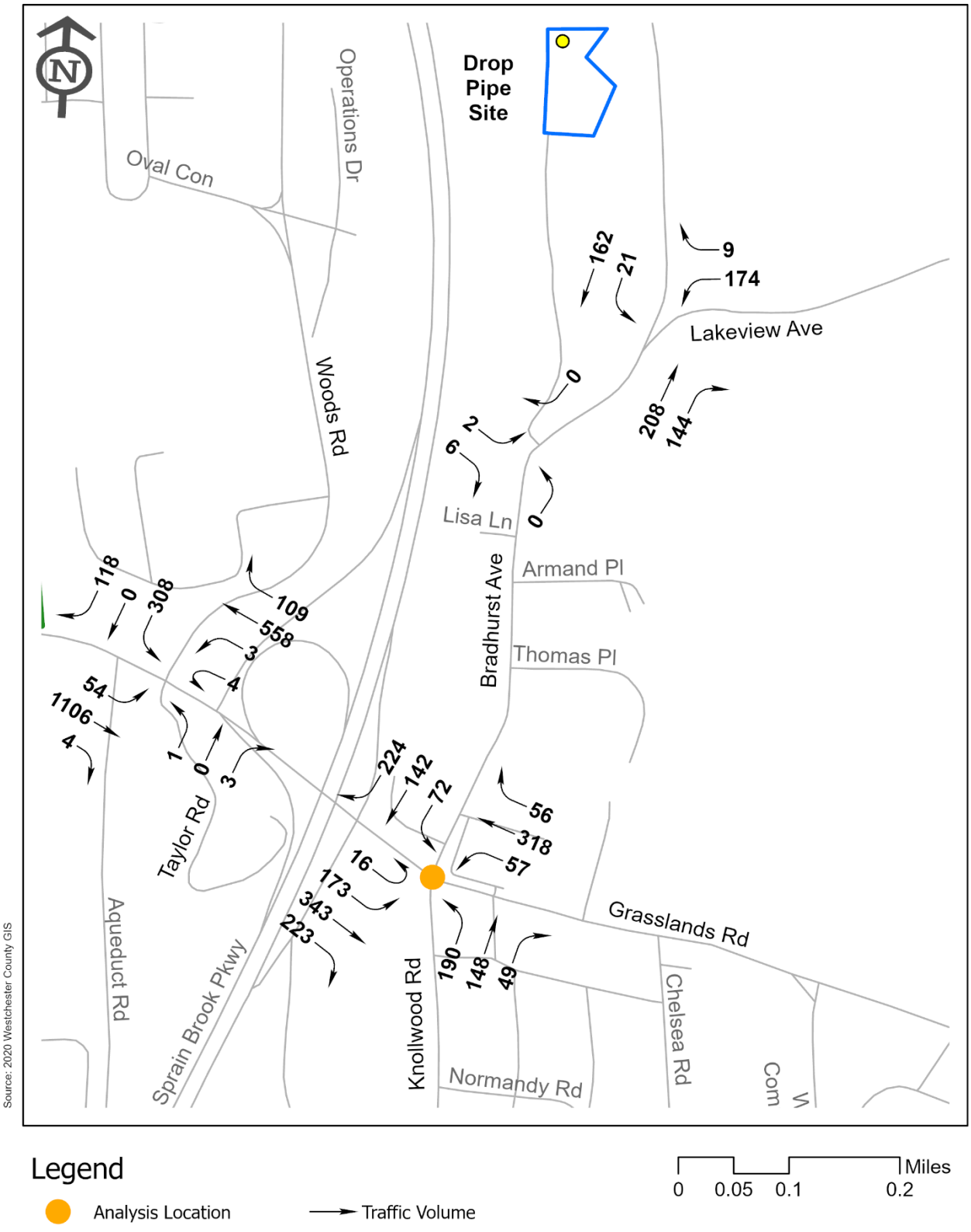

Figure 8.5-3. Future With the Construction Drop Pipe Alternative Traffic Volumes – PM Construction Traffic Peak Hour

Table 8.5-1. 2029 Future With the Construction Drop Pipe Alternative (Mitigated) vs. 2029 Future With the Construction Drop Pipe vs. 2029 Future Without the Proposed Action– PM Construction Traffic Peak Hour

		Future without the Proposed Action			Future with the Construction Drop Pipe Alternative			Future with the Construction Drop Pipe Alternative (Mitigated)			Proposed Mitigation Measures
Approach	**Lane Group**	**V/C Ratio**	**Delay (secs)**	**LOS**	**V/C Ratio**	**Delay (secs)**	**LOS**	**V/C Ratio**	**Delay (secs)**	**LOS**	
13. Grasslands Road (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) – signalized											
Grasslands Rd – EB	UL	0.70	26.8	C	0.70	26.8	C	0.74	31.6	C	Modify signal timing: Shift 2 seconds of green time from EB-L/WB-L phase to NB-TR/SB-TR phase.
	T	0.54	27.3	C	0.59	28.5	C	0.60	30.2	C	
	R	0.29	2.4	A	0.29	2.4	A	0.30	2.5	A	
Grasslands Rd – WB	L	0.20	14.3	B	0.21	14.5	B	0.22	15.4	B	
	TR	0.88	51.5	D	0.88	51.5	D	0.88	52.6	D	
Knollwood Rd – NB	L	0.77	44.2	D	0.84	53.7	D	0.81	48.2	D	
	TR	0.53	37.7	D	0.54	38.0	D	0.51	36.0	D	
Bradhurst Ave – SB	L	0.22	24.0	C	0.23	24.1	C	0.22	23.0	C	
	TR	1.00	82.0	F	1.09	106.5	F	1.02	84.7	F	
Overall Intersection			**40.4**	**D**		**46.3**	**D**		**42.6**	**D**	

Notes:
Gray highlighted cell denote movement that would be significantly impacted.
MVT = Movement
V/C Ratio = volume-to-capacity ratio
Sec = seconds
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound.
L = Left; T = Thru; R = Right; U = U-turns
Dr = Drive; Ave = Avenue; St = Street; Rd = Road; Pkwy = Parkway

8.5.3 AIR QUALITY

Based on the modest increase in traffic associated with the Construction Drop Pipe, the intersection of Grasslands Avenue (SR100C/SR100) and Bradhurst Avenue (SR100) / Knollwood Road (SR100A) during the construction traffic peak hours would not exceed *CEQR Technical Manual* screening thresholds. Therefore, the mobile source air quality emissions associated with this alternative would likely be comparable to the levels noted for the Proposed Action, resulting in no significant adverse impacts to air quality.

As noted, the Hawthorne Country Day School is adjacent to the Construction Drop Pipe site. There are no residences in close proximity to the Construction Drop Pipe site. Limited construction activities would occur at the Construction Drop Pipe site for a period of up to 13 months. Furthermore, similar to the Proposed Action, all diesel-powered equipment rated 50 horsepower or more require the use of a Tier 4 engine and various control measures would be routinely implemented to minimize construction-related emissions during construction such as dust control with a watering program, restricting on-road construction vehicles from idling more than three minutes, etc. As a result, potential stationary air quality effects due to the Construction Drop Pipe alternative would be temporary, short term in duration, and do not warrant an assessment per the *CEQR Technical Manual*.

8.5.4 NOISE

Similar to the discussion of potential air quality impacts above, the increase in traffic along Bradhurst Avenue (SR100) where mobile source location M12 is located would not exceed the CEQR screening threshold of a 100 percent increase (or doubling) in noise PCE values over existing conditions. Therefore, potential off-site mobile source noise impacts along truck routes would likely be comparable to the levels under the Proposed Action. These noise levels would result in no significant adverse impacts.

As stated above, the Hawthorne Country Day School is adjacent to the Construction Drop Pipe site and there are no residences in close proximity to the site. Limited construction activities would occur at the Construction Drop Pipe site for a period of up to 13 months. As a result, potential stationary noise effects due to the Construction Drop Pipe alternative would be temporary, short term in duration and do not warrant an assessment per the *CEQR Technical Manual.*

8.6 IMPACT REDUCTION ALTERNATIVES

The Proposed Action has incorporated measures to reduce impact where possible. Chapter 3 and Chapter 4 of this ~~Draft~~ Final EIS evaluated the potential for significant adverse impacts that are expected to result from the Proposed Action. Measures that are already incorporated into the Proposed Action to fully mitigate or lessen those impacts have been identified within applicable sections of this ~~Draft~~ Final EIS.