Buffalo-Amherst-Tonawanda Corridor Transit Expansion, Erie County, New York

Supplemental Background Research

SHPO Project Review Number: 19PR01900

Prepared for:

WSP, USA

And

Federal Transit Administration and Niagara Frontier Transportation Authority

Prepared by:

AKRF, Inc.
440 Park Avenue South
New York, NY 10016
212-696-0670

APRIL 2025

Supplemental Background Research

A. INTRODUCTION

The Federal Transit Administration (FTA), as lead Federal agency, and the Niagara Frontier Transit Metro System, Inc. (Metro), as the local Project Sponsor and joint lead agency, are preparing an Environmental Impact Statement (EIS) to evaluate potential benefits and impacts of expanding Metro's Metro Rail system in Buffalo, NY to Amherst and Tonawanda, NY (the Project) (see **Figure 1**). The purpose of the Project is to connect established and emerging activity centers along the existing Metro Rail line in Buffalo with existing and emerging activity centers in Amherst and Tonawanda to provide a fast, reliable, safe, and convenient transit ride. The Project would serve existing Metro riders, attract new transit patrons, improve regional connections between Buffalo, Amherst, and Tonawanda, and support redevelopment and other economic development opportunities. Additionally, the Project would improve livability by increasing mobility and accessibility in communities throughout the region.

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies, in consultation with stakeholders, to take into account the potential effects of their actions on historic properties within "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties [the Area of Potential Effect or APE], if such properties exist" (36 CFR § 800.16[d]). Historic properties consist of National Register-listed or eligible buildings, structures, sites, objects, or districts and include historic resources and archaeological resources ("cultural resources"). In accordance with Section 106 of NHPA, a Phase 1A Archaeological Documentary Study was prepared in 2023 for the Office of Parks, Recreation and Historic Preservation (OPRHP) to assist in the identification of potential archaeological resources that could be affected by the Project.

The Phase 1A identified four general areas of archaeological potential along the Project alignment that are sensitive for the presence of precontact and/or historic period resources (AKRF 2023). The Phase 1A recommended supplemental background research and/or fieldwork in portions of the Project alignment identified as having archaeological sensitivity that have not been previously disturbed. OPRHP subsequently requested preparation of a Work Plan, which was reviewed and approved by the OPRHP in June 2024. The present document presents the results of the supplemental background research portion, prepared in support of the Work Plan.

B. PROJECT DESCRIPTION

The Project is an extension of the existing Metro Rail Light Rail Transit (LRT) from its current terminus, at University Station on the University at Buffalo (UB) South Campus, an additional seven miles, through the UB North Campus to Interstate 990 (I 990) (**Figure 1**). Though the Locally Preferred Alternative for the Project is for the extension to run on an additional 7 miles of LRT, the EIS also considers the effects of a Bus Rapid Transit (BRT) alternative. Both the LRT and BRT alternatives would occur within the same Project corridor, but the LRT would require construction of tracks and other features, including tunnel work, while the BRT would use the existing roadways and not require tunneling.

BUILD ALTERNATIVES

The LRT Build Alternative would be primarily at-grade, except for a 0.8-mile underground segment from the existing Metro Rail University Station to Niagara Falls Boulevard and at the intersection of Maple Road and Sweet Home Road (**Figure 2**). Ten stations are proposed, two with park & ride facilities, and an overnight storage and light maintenance facility located near the end of the line. The trackway would be configured with two tracks – one for northbound service and one for southbound service. **Figure 2** presents the LRT Build Alternative alignment, including the underground (tunnel) and at-grade alignment, portal locations,

ten stations, two park & ride facilities, and the light maintenance/storage facility. The LRT Build Alternative would generally be within existing roadway right-of-way, except for portions along Niagara Falls Boulevard and Maple Road and north of I-990, where there is insufficient right-of-way width.

The BRT Build Alternative would provide transit service north from the existing Metro Rail University Station for approximately seven miles along the same at-grade alignment as the LRT Build Alternative except for the underground portion from University Station along Kenmore Avenue and onto Niagara Falls Boulevard and the grade separation at the intersection of Maple and Sweet Home Roads (**Figure 3**). The BRT Build Alternative would have the same number of stations in the same locations; however, a transfer would be required between the existing Metro Rail operations at University Station to the BRT service. A new BRT vehicle storage and maintenance facility would also be required at the end of the line just north of the I-990 station.

GROUND DISTURBING IMPACTS: LRT BUILD ALTERNATIVE

Construction activities for the LRT Build Alternative would include dedicated median running light-rail tracks, tunnel and emergency exit stair shafts, ventilation shafts, overhead contact system, vehicle power substations, signal bungalows, traffic signal and safety systems, platforms, and ancillary facilities. The portions of the tunnels along Kenmore Avenue will be constructed through mined excavation and cut and cover tunneling methods and the intersection of Maple Road and Sweet Home Road will be constructed through cut and cover methods. Widening of roadway facilities to account for median running light-rail tracks, along with relocation of underground utilities and storm drainage would also occur along the corridor. Construction would also include temporary works to maintain vehicular and pedestrian traffic. The Phase 1A report includes detailed information and mapping on ground disturbing impacts associated with this alternative.

GROUND DISTURBING IMPACTS: BRT BUILD ALTERNATIVE

Construction of the BRT Build Alternative would include dedicated running BRT travel lanes, traffic signal priority, platforms, and ancillary facilities. Widening of roadway facilities to account for median running BRT lanes, along with relocation of underground utilities and storm drainage would also occur along the corridor. Construction would also include temporary works to maintain vehicular and pedestrian traffic. The Phase 1A report includes detailed information and mapping on ground disturbing impacts associated with this alternative.

CHANGES IN PROJECT SINCE PHASE 1A

Since preparation of the Phase 1A in 2023, there have been two significant Project changes:

1. The shaft and staging area originally proposed for the parking lot at the north end of UB South Campus near Main Street for the LRT Build Alternative has been eliminated. Instead, the tunnel will be extended through tunnel boring from its current terminus northeastward beneath campus to Kenmore Avenue and the segment along Kenmore Avenue and up a portion of Niagara Boulevard will be constructed through cut and cover methods within the existing street bed.
2. Current Project plans provide additional detail regarding the replacement of sidewalks on both sides of Niagara Falls Boulevard. In some locations the new sidewalk will align closely with the existing sidewalk. In other locations, the new sidewalk will be located up to approximately 40 feet beyond the current outer sidewalk edge, into the yard areas of residences or the parking lots in front of commercial operations. The following table provides a summary of the extent of these impacts from south to north along the approximately one-mile-long residential portion of Niagara Falls Boulevard (see **Table 1**). (Sidewalks will also be shifted along the remainder of Niagara Falls Boulevard, but this portion is lined with intensive commercial development and has no archaeological potential.)

Table 1
Extent of Impacts to Lawns Along Residential Portion of Niagara Falls Boulevard

Portion of Niagara Falls Blvd	Impacts Beyond Current Outer Sidewalk Edge	
	West Side	East Side
Princeton Avenue to Cambridge Blvd	Minimal	Minimal to 20 feet
Ford Ave/Cambridge Blvd to Chalmers/Oxford Ave	Minimal to 10 feet	Minimal to 20 feet
Chalmers/Oxford Ave to Decatur Rd/Yale Ave	Minimal to 40 feet (in commercial areas)	Minimal to 20 feet
Decatur Rd/Yale Ave to Longmeadow Road	20 to 40 feet	Minimal to 20 feet
Longmeadow Road to Moore/Betina Ave	Minimal to 20 feet	Minimal to 10 feet

C. RESEARCH METHODS

Since preparation of the Phase 1A, WSP, USA (WSP) completed three studies that provide substantive additional information regarding previous disturbance and ground cover along the Project corridor: a geotechnical survey including soil borings (McMahon & Mann Consulting Engineering and Geology, P.C., 2023), a survey of subsurface utilities (Fisher Associates, 2024), and a topographical survey. For each area of archaeological potential, AKRF systematically reviewed the results of these surveys as well as aerial photographs and historic maps to develop a more specific understanding of archaeological potential of the previously identified areas of sensitivity. This research also includes information on subsurface conditions beneath Kenmore Avenue, which was not previously expected to be affected by the Project.

The geotechnical survey included an overview of the Project's surficial geology, bedrock, and soils, and the soil logs of the 75 borings performed along the corridor. Of particular interest were the borings performed along the John James Audubon Parkway, an area identified in the Phase 1A as potentially sensitive for deeply-buried, habitable precontact ground surfaces associated with the area's streams. However, as the focus of the geotechnical survey was on the structural, load-bearing qualities of the soils and bedrock and other engineering issues, the upper soil levels are only described generally, limiting the utility of the associated soil logs for assessing archaeological potential.

The subsurface utility survey involved both a review of utility records (from Verizon, National Grid, the City of Buffalo, etc.), which can be inaccurate or incomplete, and geophysical techniques, which are considered more accurate. Utilities identified through geophysical techniques are marked with the abbreviation QLB on the survey maps. Specific objects, such as inverts and manholes, are provided on the utility maps with elevations. However, in most cases, depths of utilities are not provided and can only be estimated. For example, sewer lines are typically placed at a greater depth than communication lines. In addition, the width of disturbance associated with the trenches excavated to install specific types of utilities are assumed to be related to their depth. For example, a deep 36-inch diameter sewer line would be expected to have a much wider area of disturbance than a shallow communication line. For this review, utilities present within the front yard areas of residences fronting Niagara Falls Boulevard that will be affected by the Project and areas of archaeological sensitivity on the UB North Campus were of particular interest. The topographical survey provides detailed information on the current ground cover, paved surfaces, and vegetation types along the Project corridor.

D. SUMMARY OF GEOTECHNICAL SURVEY

The McMahon & Mann Consulting Engineering and Geology, P.C. (McMahon & Mann) Geotechnical Data Report was conducted to support Project design decisions. It provides background data, a summary of previously conducted geotechnical surveys, and the findings of their subsurface explorations. Of particular interest to the present research were the results of soil borings performed along the John James Audubon Parkway portion of the Project. The following is a summary of the report's findings.

BEDROCK STRATIGRAPHY

The Project corridor's bedrock comprises Upper Silurian to Middle Devonian-age sedimentary rock. From top to bottom (youngest to oldest), the bedrock formations are as follows:

- Onondaga Limestone (only present along the southern edge of UB Campus South).

- Akron Dolostone (only present along the remainder of UB Campus South).
- Bertie Formation (only present along Kenmore Avenue). The Bertie Formation includes the four following members:
    - Williamsville Member
    - Scajaquada Member
    - Falkirk Member
    - Oatka Member
- Camillus Shale (present across the remainder of the Project corridor from the southern end of Niagara Falls Boulevard to the north).

SURFICIAL GEOLOGY AND TOPOGRAPHY

The geotechnical report explains the implications of bedrock geology the development of surficial geology and topography. The northern edge of the Onondaga Limestone Escarpment, which has an elevation approximately 50-feet higher than the region to the north, is highly resistant to weathering. This formation protected the underlying units from glacial erosion. To the north, where the escarpment is absent, the more easily eroded Camillus Shale forms the low-lying Huron Plain. Elevations along the Project range from 680 to 650 on UB Campus South, 645 to 625 along Kenmore Avenue, 625 to 580 along Niagara Falls Boulevard, 580 to 590 at UB Campus North, and 580 to 570 along John James Audubon Parkway (North American Vertical Datum 1988).

Most of the Project corridor is located within the Huron Plain, which consists of glacial soils over the Camillus Shale. These soils were mostly deposited between 10,000 and 15,000 years ago during the Wisconsin Glaciation. The following are the major soil deposits above the underlying bedrock.

GLACIAL TILL

Glacial till was deposited directly from the glacial ice sheet in an unsorted mixture of clay, silt, sand, and gravel. It is typically massive in structure and may be referred to as “fine-grained” or “coarse-grained” depending on the percent of clay and silt (i.e., fines) (ibid). Glacial till is present along Niagara Falls Boulevard and Maple Road.

LACUSTRINE SILT AND CLAY (LAKE SEDIMENT)

Glacial lakes typically form at the foot of a retreating glacier and are fed from the glacial meltwater. Lake Tonawanda formed across this region from glacial melt as the Wisconsin glacial icesheet receded to the north. Over time, fine sediments drop to the lake bottom and form thick layers of thinly laminated silt and clay that. Lacustrine (lake deposited) silt and clay is present across UB South and John James Audubon Parkway.

GLACIAL TILL MORAINE

Moraines are created by the movement of glaciers and comprise water deposited sand and gravel outwash sediments. They are typically coarser and are bedded or stratified. The surficial geology of Sweet Home Road and UB North consist of glacial till moraine.

HYDROLOGY ALONG JOHN JAMES AUDUBON PARKWAY

ELLICOTT CREEK

Ellicott Creek flows westward through the Build Alternatives’ alignment at the John James Audubon Parkway bridge between Frontier Road and North Forest Road. Ellicott Creek was realigned (straightened) in this area when the John James Audubon Parkway bridge was built in 1983. The Ellicott Creek drainage basin upstream of its intersection with the Build Alternatives’ alignment is approximately 91 square miles in size.

BIZER CREEK

Bizer Creek has a drainage area of approximately 6 square miles upstream of the Build Alternatives’ alignment. The creek flows northward through a culvert across the Build Alternatives’ alignment at Rensch

Road between Sweet Home Road and John James Audubon Parkway and outlets to Ellicott Creek west of the Build Alternatives' alignment. The walls and bottom of the creek are concrete lined and relatively straight in the area where the Build Alternatives' alignment would cross. Bizer Creek was realigned in the late 1960s to allow for the construction of the UB North Campus. Bizer Creek formerly meandered through the land now used as UB North Campus and outlets into Ellicott Creek approximately 3/4 miles southeast of its current outlet to Ellicott Creek.

LAKE LASALLE

Lake LaSalle is an artificial lake that was constructed as part of the UB North Campus in the late 1960s. Much of Lake LaSalle was constructed on the former alignment of Bizer Creek. Lake LaSalle has several outlet structures to Ellicott Creek that are believed to be plugged or closed off. The outlet that John James Audubon Parkway travels over is hard walled with large riprap, is approximately 50 feet wide, and connects the eastern and western ends of Lake LaSalle.

SUMMARY OF SOIL BORING LOGS ALONG JOHN JAMES AUDUBON PARKWAY

A total of 17 borings were excavated along John James Audubon Parkway from the northeast corner of UB North Campus to Muir Woods. **Figure 4** provides a cross-section of soil profiles in this area based on the soil boring results. **Table 2** below provides a summary of the boring logs for select borings completed in this area. The soil logs of these borings describe thick layers of "fill" on top of clayey lake sediment. Through personal communication with Andrew J. Klettke, P.E. of McMahon & Mann, the term fill was used to describe soil levels that were not naturally deposited or that were disturbed.

E. SUMMARY OF UTILITIES SURVEY

The Project area ranges from urban to densely residential and is supported by an extensive series of subsurface utilities. The installation and maintenance of these utilities would have required significant disturbance to the upper two to over five feet of the original ground surface. **Table 3** provides a summary of the types of utilities identified along the Project corridor and assumptions regarding associated horizontal and vertical disturbance.

UB SOUTH CAMPUS

Relatively few utilities were identified in the upper ground surface along the alignment of the bored tunnel through UB Campus South. These utilities consist of storm and sanitation lines, catch basins extending over 40 feet below ground surface, manholes, and a wide variety of communication and electrical lines. The tunnel will be extended through tunnel boring well below the depths of these utilities.

KENMORE AVENUE

The tunnel will be extended along Kenmore Avenue through cut and cover excavation within the street bed. A dense and complicated series of utilities are present along this roadway, particularly near its intersection with Main Street. These utilities were identified both through records and geophysical methods. As can be seen on **Figures 5** and **6**, some of these utilities extend along the center of the roadway (electrical duct banks and water lines), some extend along the north and south edges (water, electric, and gas), and some crisscross the road at various angles (electric, traffic signaling, communication, and gas).

Table 2
Summary of Select Boring Logs Along John James Audubon Parkway

Soil Boring	Location	Depth Below Ground Surface	Soil Description
BH55	John James Audubon Pkwy at Lake LaSalle	0-10.6 feet	Distinct layers of silty, sandy, and clayey fill with gravel
		10.6-24.5 feet	Clayey lake sediment
		24.5-26 feet	Silty glacial drift
		26-27 feet	Clayey lake sediment
		27-38 feet	Sandy glacial till with some silt and gravel
		38 feet	Shale bedrock
BH57	John James Audubon Pkwy at Lake LaSalle	0-13.2 feet	Distinct layers of silty, sandy, and clayey fill with gravel
		13.2-27.5 feet	Clayey lake sediment
		27.5-30.8 feet	Silty glacial drift with some clay
		30.8-35 feet	Coarse silty glacial till
		35-36.9 feet	Water sorted and deposited sand and shale fragments
		36.9 feet	Shale bedrock
BH59	John James Audubon Pkwy at Ellicott Creek	0-22 feet	Distinct layers of silty, sandy, and clayey fill with gravel and asphalt in the upper few feet
		22-24.2 feet	Water sorted and deposited sand with trace silt and gravel
		24.2- 30 feet	Clayey lake sediment with sand and gravel
		30-63 feet	Silty to clayey to coarse silty glacial till
		63 feet	Shale bedrock
BH63	John James Audubon Pkwy at Sylvan Pkwy	0-2.2 feet	Silty fill with some sand and gravel
		2.2-3 feet	Clayey lake sediment
		3-5 feet	Coarse silty slackwater sediment
		5-35.5 feet	Clayey lake sediment with trace sand
		35.5-48.2 feet	Sandy glacial till with some clay and silt
		48.2 feet	Shale bedrock
BH66	John James Audubon Pkwy at Partridge Run	0-6 feet	Sand and gravel fill and silty fill
		6-16 feet	Clayey lake sediment

Sources: McMahon & Mann Consulting Engineering and Geology, P.C., 2023
Note: The term “fill” is used in the boring logs to describe soils that were not naturally deposited or were disturbed. See Figure 4 for boring locations.

Table 3
Summary of Subsurface Disturbances from Utility Survey

Subsurface Disturbance Type	Abbreviation	Width of Horizontal Disturbance	Depth of Vertical Disturbance
Cable TV Line	CA	1-2 feet	1-3 feet
Communication Line	COMM	1-2 feet	1-3 feet
Electric Line	UE	1-2 feet	1-3 feet
Gas Line	G	1-2 feet	1-3 feet
Sanitation/Sewer Line	SAN	2-5 feet	2-10 feet
Storm Water Line	ST	2-5 feet	2-10 feet
Combined Sewer Line	CS	2-5 feet	>5 feet
Unknown Line	-	Variable	Variable
Water Line	W	1-3 feet	>5 feet
Hot Water Supply Line	HW		
Catch Basin	CB	4-40+ feet	3-6+ feet
Drainage/Sanitary Manhole	DMH/SMH	4-6 feet	3-6 feet
Utility Poles	Indicated with Symbols	2 feet	2-3 feet
Utility Box/Valve/Junction	Indicated with Symbols	Variable	2-3 feet

Notes: The utility survey was based on both existing utility records and a geophysical survey. Figures 5 through 8 provide representative examples for select portions of the Project. Utilities identified through geophysical equipment are identified on Figures 5 through 8 with the abbreviation QLB. Horizontal and vertical disturbance are approximate.

As summarized in **Table 3** above, the widths and depths of disturbances associated with the installation and maintenance of these various lines are expected to have a wide range. Some are indicated as having a diameter of two to four inches (fiberoptic lines and gas and water connections) and some with a diameter of one to two feet (sanitary and storm water lines). There are also numerous catch basins and manholes, which would be expected to have greater disturbance. Due to the number and density of these utilities, Kenmore Avenue is considered highly disturbed.

NIAGARA FALLS BOULEVARD

After emerging from the tunnel at Princeton Avenue, the Project extends along an approximately one-mile-long stretch of Niagara Falls Boulevard with high density residential development and occasional businesses such as a church or market. Beyond this residential portion to the north, Niagara Falls Boulevard is lined with commercial development and parking lots. The structures along the residential portion of this stretch of road appear to be single family homes. The road is lined with sidewalks extending approximately ten feet from the road curb. Lawns extend from 20 to 50 feet beyond the outer edge of the sidewalks. Each home has a paved driveway and walkway leading from the front door to the road or to the driveway. The road is lined with streetlights, those on the west side connected by overhead wires, and there are several intersections with traffic lights.

In comparison to Kenmore Avenue, utilities along Niagara Falls Boulevard are more consistent and extend north-south in line with the roadway. Utilities such as traffic signaling, communication lines, and storm water lines are occasionally indicated as crossing the roadway from east to west.

Storm water lines extend north-south along both the west and east curblines. A sanitary line is indicated extending along the western edge of the sidewalk on the east side of the road, sometimes extending a few feet into the lawn area. Beginning at Decatur Road, a separate sanitary line extends northward through the lawns lining the west side of the road. The storm water and sanitary lines are indicated as ranging in diameter from 12 to 36 inches and as composed of corrugated metal or polyethylene pipes (see **Figures 7 and 8** for a representative example of this portion of the Project). As summarized in **Table 3** above, the widths and depths of disturbances associated with the installation and maintenance of storm water and sanitary lines are expected to have been substantial. Therefore, the existing sidewalk areas lining Niagara Falls Boulevard are considered highly disturbed.

No connections from individual residences to the sanitary line are indicated on the survey map. However, it is assumed that each residence would have a separate east-west line connecting to the sanitary line. It

is unclear if the residences on the west side of Niagara Falls Boulevard would have connections to this sanitary line (which would extend across the roadway), or if they connect to a different line to their west. Sewer manholes and catch basins are present periodically along the sanitary and storm water lines.

In addition to the substantial disturbance from the storm water and sanitary lines, the following utilities are present that have smaller diameters and would have involved more limited ground surface disturbance (see **Figures 7 and 8** for a representative example of these utilities):

- Water and gas lines with diameters of one to eight inches extend along both sides of the road, varying from beneath the sidewalk to a few feet into the front yards. The water line also appears to connect to fire hydrants, which extend along the edge of the sidewalk on the west side of the road.
- Each individual residence has an east-west oriented connection for both water and gas. These connections cross the yards or are beneath paved front walks or driveways and would be expected to have smaller diameters than the main line.
- There are two lines labeled “Elec – Unknown” on the east side of the road, one along curb line.
- There is another line labeled “2” STL ELEC Unknown” located several feet into the front yards on the east side of the road.
- There is a north-south line identified through records and not geophysical techniques extending several feet into the front yards on the east side of the road. A note on the maps states “Unknown matches up to AIP per records but unable to verify.” This line extends to Cambridge Boulevard.
- A “Clay Telecom Duct Bank” is present below the north bound lane until Yale Avenue, where it shifts to the sidewalk on the east side of the road and then further east several feet into the adjacent front yards about halfway between Yale Avenue and Longmeadow Road.
- The Telecom Duct Bank crosses to the west side at Longmeadow Road and continues beneath the sidewalk lining the west side of Niagara Falls Boulevard where it continues into the commercial area. No connections are indicated between individual residences and the telecom line.
- There are lines labeled “Unknown” along portions of the road around the curbs on both the east and west sides.

Though ground surface disturbance from individual lines of small diameter would be limited, the cumulative effect of the installation and maintenance of this many lines has likely caused significant disturbance. This disturbance extends as much as several feet into the yards of many residences along Niagara Falls Boulevard (see **Figure 8**).

UB NORTH CAMPUS

A variety of utilities are present along the Project alignment through the UB Campus North. At the western campus entrance at Rensch Road there are traffic, water, and gas lines along the road edge and grassy median. The gas and electric lines continue along Rensch Road and there are numerous electric lines beneath the roadway at the intersection to the east of the entrance. Several stormwater lines are also present beneath Rensch Road.

Three 12- to 24-inch-diameter metal water lines, an 8-inch diameter tile sanitary line, and a 24-inch diameter stormwater line extend east west along the Project alignment through the fields south of the Jacobs Management Center. These lines are all located within an approximately 35-foot-wide corridor that would have likely been significantly disturbed during construction and maintenance.

Only a single utility line is present along the grassy field lining the east side of Lee Road, a north-south oriented 6-inch gas line. There is also a single electrical line along the south side of John James Audubon Parkway as it leaves the campus and crosses Lake LaSalle.

JOHN JAMES AUDUBON PARKWAY

Development immediately along John James Audubon Parkway is sparser than the remainder of the corridor but includes several high-density residential complexes and large businesses set back from the road. Perhaps due to this development pattern and the presence of large grassy medians, numerous utilities line the roadway. A significant portion of these utilities are communication lines. North of Ellicott Creek, these communication lines are somewhat chaotically oriented across a width of 30 to over 40 feet and

consist of as many as six lines on each side's median. Along the northern approximately 2,000 feet of the roadway the communication lines appear more neatly organized and are clustered together.

Additional utilities along the roadway consist of electric, gas, water, sanitary, and stormwater. These utilities are parallel to the road's edge along the grassy median and sometimes cross beneath the road. Construction and maintenance of this concentration of utilities would have caused significant disturbance to the upper several feet of ground surface, much of which is modern fill.

F. UPDATED ARCHAEOLOGICAL SENSITIVITY ASSESSMENT AND RECOMMENDATIONS

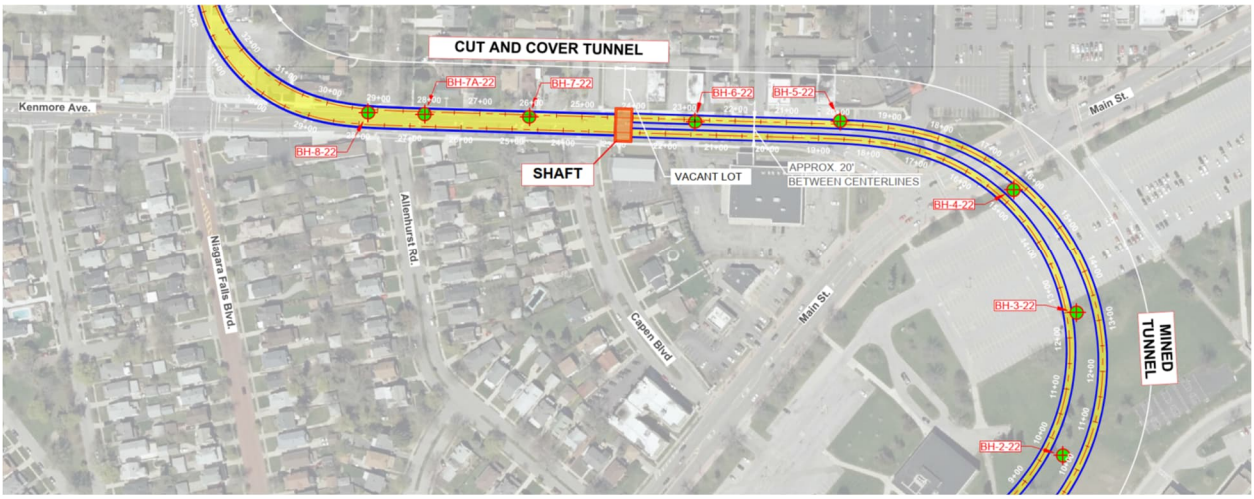
Based on the results of the Phase 1A, archaeological surveys previously completed by other consultants (e.g., Montague 2012), and the recently available geotechnical, utility, and topographical survey data, portions of the Project alignment that have been considered sensitive for the presence of precontact and historic archaeological resources have been refined.

Upon review of the additional information, intensive modern development such as road construction and the installation of utilities along the Project alignment has likely disturbed or destroyed most of the original ground surface. This appears to be the case for much of the UB Campus South, Kenmore Avenue, Niagara Falls Boulevard, Maple Road, Sweet Home Road, much of UB Campus North, and John James Audubon Parkway. The four portions of the Project alignment that were determined to retain archaeological sensitivity, are as follows (from south to north):

UB SOUTH CAMPUS

As summarized in the Phase 1A, UB Campus South was previously the subject an archaeological sensitivity assessment (Montague 2012). That survey identified unpaved or minimally disturbed areas within the UB South Campus such as the grassy areas and parking lots along the campus' northwestern edge as archaeologically sensitive. In addition, human remains associated with the Erie County Poorhouse Burial Ground (USN 02940.024949) have been documented in a number of locations along the east side of campus, several hundred feet southeast of the Project alignment.

Due to Project changes, no areas of archaeological sensitivity will be affected by the Project on the UB Campus South (see **tunnel excavation below)**. No further research is recommended.



NIAGARA FALLS BOULEVARD

The southern one mile of this portion of the Project beginning at the tunnel's end at Princetown Avenue consists of high-density residential development. The road is lined with sidewalks extending a distance of approximately ten feet from the road curb on both sides. Residences have lawns extending from 20 to 50 feet from the outer edge of the sidewalks. Each residence has a 10- to 20-foot-wide driveway and most appear to have walkways leading from the front door to the driveway and/or road. The 50- to 60-foot-wide road has four travel lanes and central turning lanes. It is lined with streetlights and there are several

intersections with traffic lights. Fire hydrants line the eastern edge of the sidewalk along the west side of the road.

Due to the presence of numerous utilities and typical construction methods, the upper several feet of soil beneath the roadway and sidewalks on both sides of the roadway are considered disturbed and have no archaeological potential. As detailed in **Table 1** above, relocation of the sidewalks and utility connections from individual residences by the Project will impact yard areas for a distance of 10 to 40 feet beyond the outer edge of the existing sidewalks. Many of these yard areas have also been impacted by utility construction and maintenance. For example, between Longmeadow and Yale Avenue, in the vicinity of Lincoln Park Drive, the utility survey indicates utility disturbance up to 20 feet east of the outer edge of the sidewalk on the east side of the road. Project impacts in this area will extend 25 feet beyond the eastern edge of the curb. Therefore, there is little likelihood that an archaeologically sensitive resource could be identified in this marginal strip of potentially undisturbed yard area. However, in other stretches of the residential portion of Niagara Falls Boulevard, utility impacts are located beneath or within a couple feet of the sidewalk and 10 to 20 feet of yard areas will be impacted by realignment of the sidewalks and utilities.

For those limited portions of the residential area along Niagara Falls Boulevard where sidewalk reconstruction will impact at least 10 feet of yard areas (from east to west) not previously disturbed by utility construction, subsurface testing is recommended to determine the presence or absence of archaeological resources. Approximately 600 feet of yard areas meeting these criteria will be impacted along the east side of Niagara Falls Boulevard and approximately 340 feet of yard areas will be impacted on the west side. It is expected that these yard areas will require the excavation of 15 to 20 shovel test pits to determine the presence or absence of archaeological resources.

UB NORTH CAMPUS

As summarized in the Phase 1A, UB Campus North was previously the subject an archaeological sensitivity assessment (Montague 2012). That survey identified dozens of previously documented archaeological sites on the UB North Campus, three of which are located along the Project alignment:

- UB196, an unidentified precontact site, is located on the south side of John James Audubon Parkway, on the west side of Lake LaSalle;
- UB260, also an unidentified precontact site, is located on the south side of John James Audubon Parkway east of the bridge crossing Lake LaSalle; and
- UB2039, a post 1900 foundation known as “Dickson’s Nightmare”, is located on the south side of John James Audubon Parkway on the west bank of Ellicott Creek.

In addition, that survey identified dozens of Map Documented Structures (MDS), five of which are located along the alignment on this campus. Two of these former structures were located at the campus’s west entrance and three were located within the grass-covered fields south of the Jacobs Management Center. The 2012 assessment concluded that certain grassy areas and minimally to moderately disturbed areas such as sidewalks and parking lots within the UB North Campus have moderate or high archaeological potential for both precontact and historic period resources, depending on the extent of previous ground surface disturbance.

The following portions of the Project alignment through UB Campus North are recommended for further study.

WESTERN CAMPUS ENTRANCE AND GRASSY AREAS AROUND GOVENORS A LOT

This approximately 2,000-foot-long area has been impacted by road, parking lot, and utility construction. However, the grassy margins beyond utility lines may be less disturbed and are sensitive for historic resources. Subsurface testing is recommended along these grassy areas. It is expected that this area will require the excavation of 30 to 40 shovel test pits to determine the presence or absence of archaeological resources.

FIELDS SOUTH OF JACOB MANAGEMENT CENTER

Review of utility mapping for the large fields located south of the Jacob Management Center indicates significant ground surface disturbance along the length of the Project alignment. Specifically, this area is crossed by several utilities having diameters of 12 to 24 inches. Trenches excavated to install these lines

would have been a foot or two wider. Despite these impacts, given this 600-foot wide area's archaeological sensitivity for both precontact and historic resources, and the potential for long strips of undisturbed soils between and outside of the area disturbed by utilities, subsurface testing in these fields is recommended. It is expected that this area will require the excavation of 10 to 20 shovel test pits to determine the presence or absence of archaeological resources.

LEE ROAD AND JOHN JAMES AUDUBON BOULEVARD TO ELLICOTT CREEK

Utility disturbance along Lee Road and the portion of John James Audubon Parkway up to Ellicott Creek are limited. Therefore, this approximately 1,900-foot-long portion of the alignment retains sensitivity and subsurface testing is recommended. It is expected that this area will require the excavation of 30 to 40 shovel test pits to determine the presence or absence of archaeological resources.

JOHN JAMES AUDUBON PARKWAY

Numerous precontact sites have been identified across the broad area of creeks crossed by the John James Audubon Parkway. In this area, elevated well-drained landforms adjacent to the creeks have been identified as having archaeological sensitivity (for example, see KTA Preservation Specialists/ Archaeological Survey 2011). Such landforms would have been attractive locations for habitation, hunting and resource gathering, and various food processing activities during the precontact period and may been left intact beneath fill layers deposited during development of this roadway.

The boring logs do not identify buried intact organic deposits indicative of a stable ground surface exposed to the air and available for such activities during the precontact period. Instead, the borings identified soils described as fill to as deep as 30 feet below ground surface, though most often to between 10 and 20 feet, and occasionally much shallower. As indicated in **Table 2** and the soil boring profile included as **Figure 4**, the thickness of the soil layers lying on top of post glacial clayey lake sediments vary from a few feet to over 10 feet in the vicinity of Lake LaSalle and Ellicott Creek. Variability within this deposit suggests redeposition and reworking over time. Through personal communication with Andrew J. Klettke, P.E. of McMahon & Mann Consulting Engineering and Geology, P.C., the term fill was generally used to describe soil levels that have been altered or deposited by recent human actions. Layers identified as fill are particularly thick in the vicinity of the artificial Lake LaSalle and Ellicott Creek. Directly below the fill deposits, the soil borings describe clayey lake sediment, glacial drift, or glacial till, layers that would have predated the precontact period when exposed to the air or not been suitable for human habitation.

It is important to qualify these observations with the acknowledgement that the soil borings describe soils for engineering purposes, and it is possible that soil horizons habitable during the precontact period may be present in the area. However, based on the available information, no additional archaeological research or fieldwork is recommended for this portion of the Project corridor.

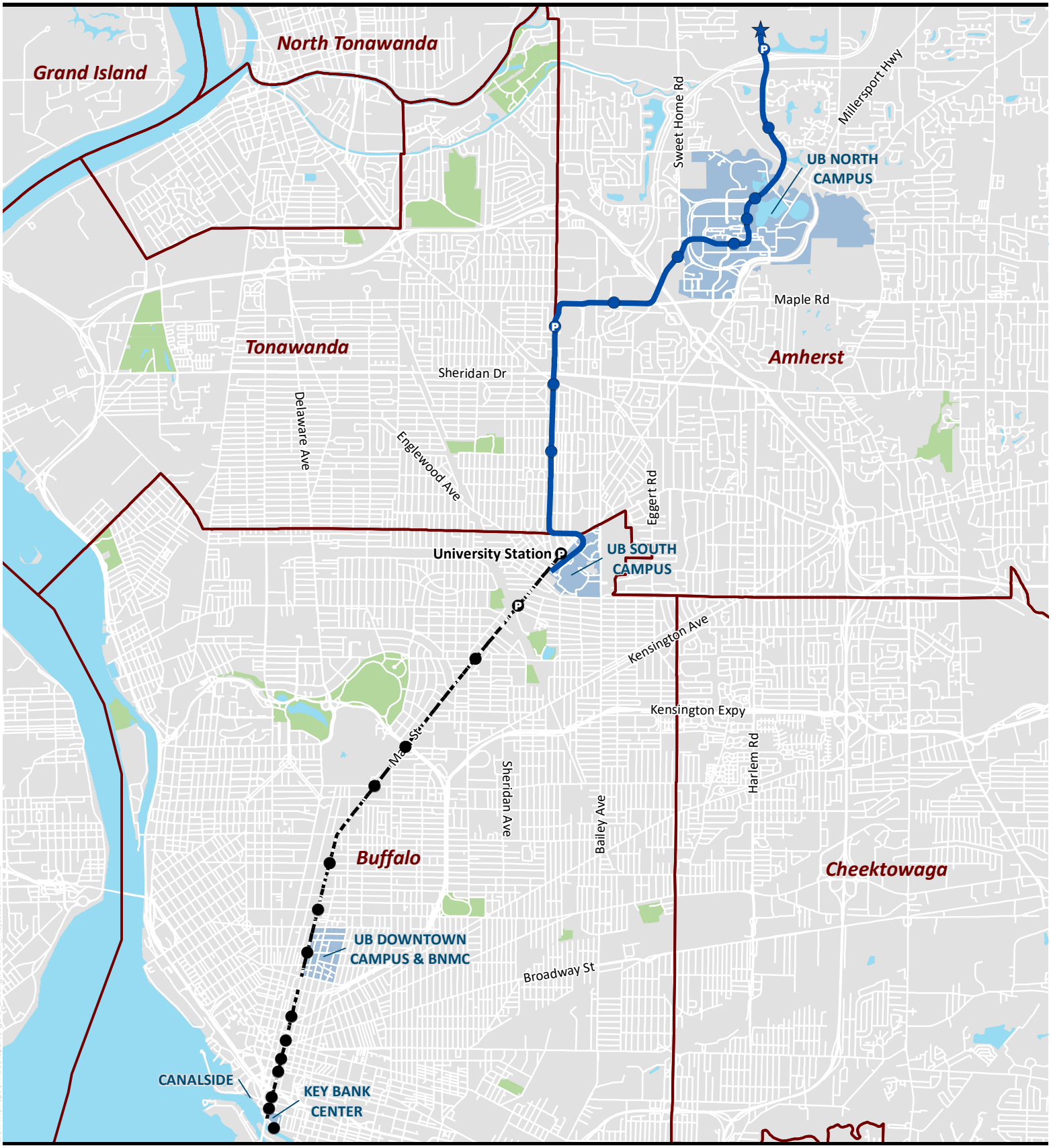
G. REFERENCES

Fisher Associates
2024 NFTA Proposed Light Rail Utility Survey, City of Buffalo, New York.

KTA Preservation Specialists/Archaeological Survey
2011 Updated Reconnaissance Level Survey of Historic Resources, Town of Amherst, Erie County, New York (accessed at https://www.amherst.ny.us).

McMahon & Mann Consulting Engineering and Geology, P.C.
2023 Geotechnical Data Report NFTA Light Rail Rapid Transit Extension, Erie County, New York.

Montague, Nathan
2012 Phase 1A Archaeological Resources Sensitivity Assessment University at Buffalo's Comprehensive Physical Plan: North, South, and Downtown Campus, Town of Amherst and City of Buffalo, Erie County, NY.



N

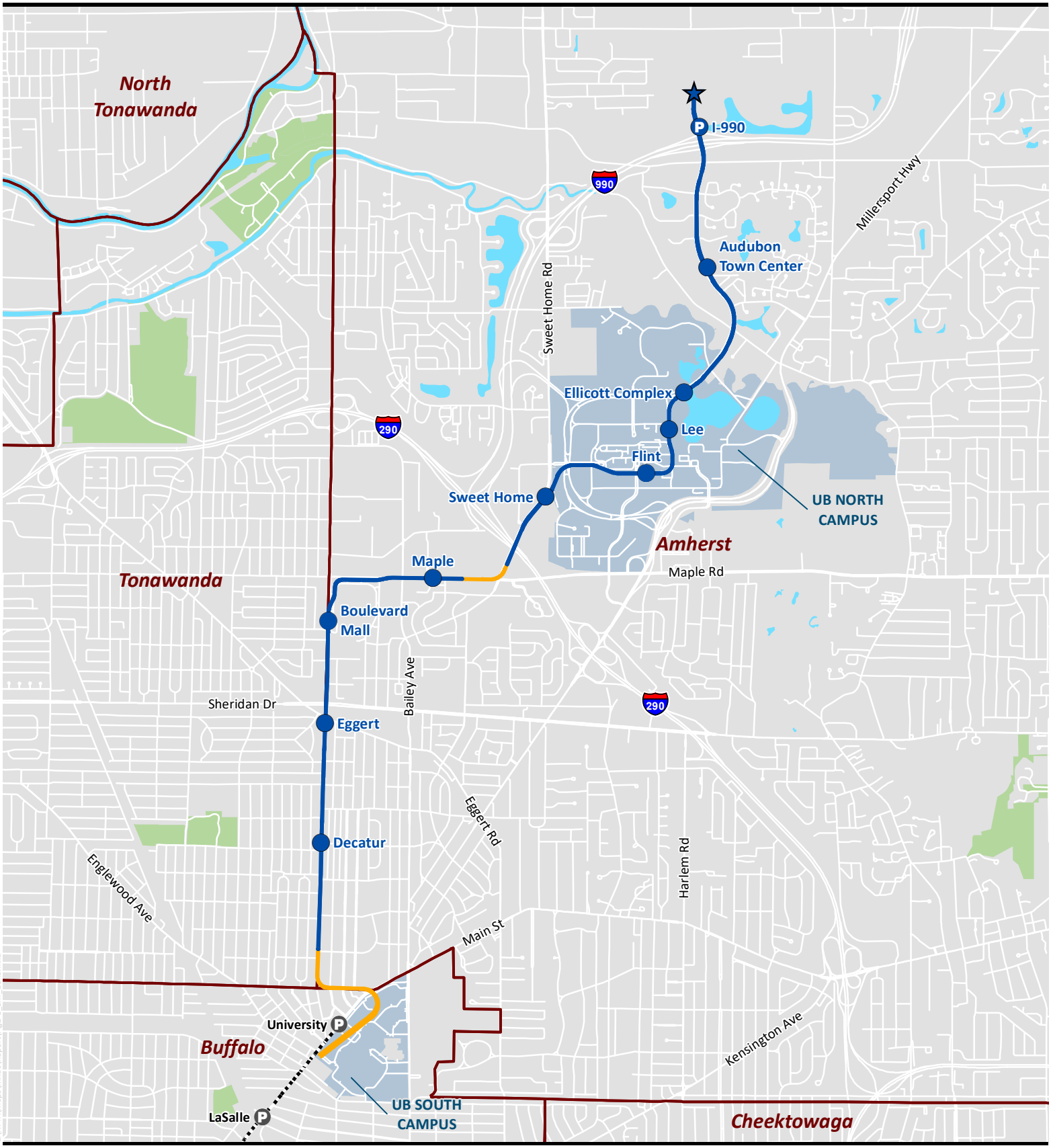
Proposed Station
Proposed Station with Park & Ride
Proposed Storage / Light Maintenance Facility
Proposed Alignment
Existing Station
Existing Station with Park & Ride
Existing Metro Rail Line
City/Town Boundary

Existing Metro Rail and Project Corridor

Sources: Erie County 2023

0 1 2
Miles

Buffalo-Amherst-Tonawanda Corridor Transit Expansion



N

Proposed Station

Proposed Station with Park & Ride

Proposed Storage / Light Maintenance Facility

Track Alignment, At Grade

Track Alignment, Below Grade

Existing Station with Park & Ride

Existing Metro Rail Line

City/Town Boundary

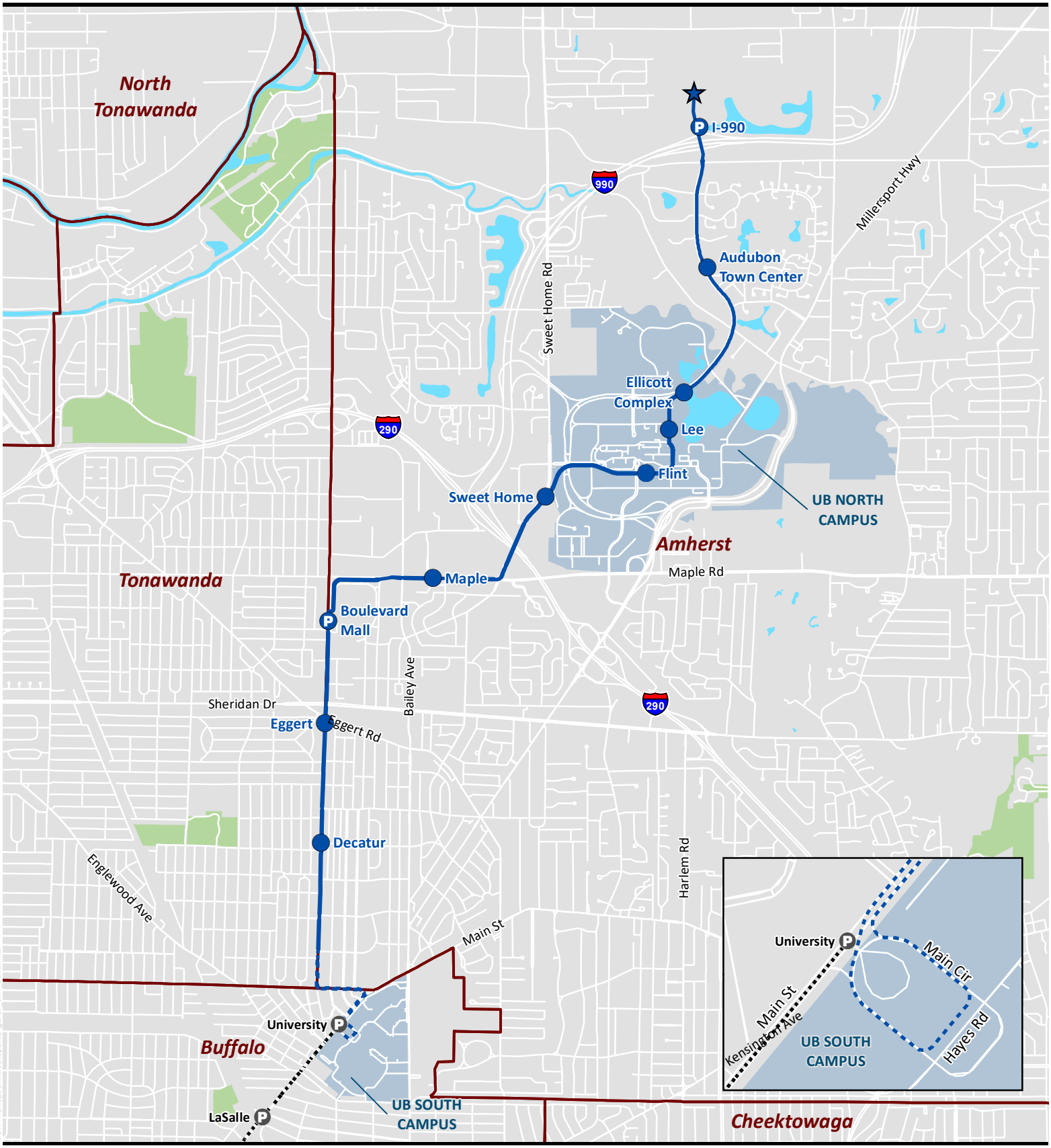
LRT Build Alternative Alignment

Sources: Erie County 2023

0 0.5 1

Miles

Buffalo-Amherst-Tonawanda
Corridor Transit Expansion



N

Proposed Station

Proposed Station with Park & Ride

Proposed Storage / Light Maintenance Facility

Dedicated Busway

Mixed-Traffic

Existing Station with Park & Ride

Existing Metro Rail Line

City/Town Boundary

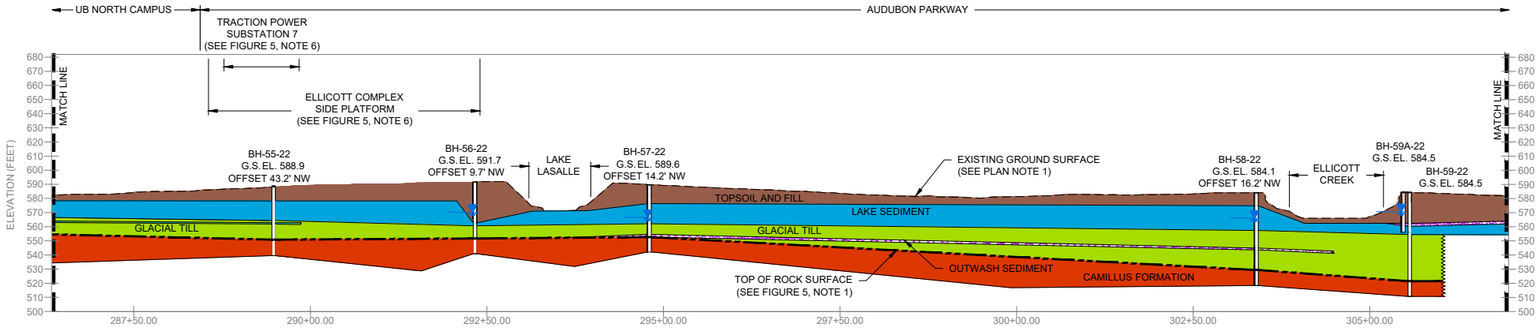
BRT Build Alternative Alignment

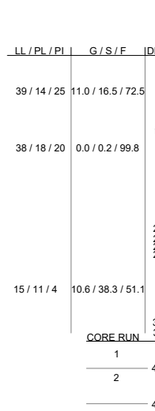
Sources: Erie County 2023

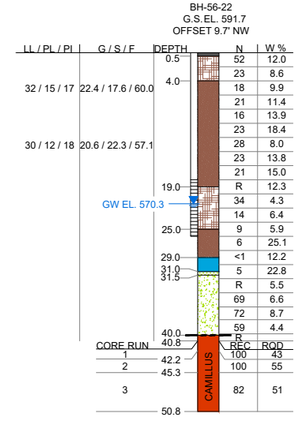
0 0.5 1

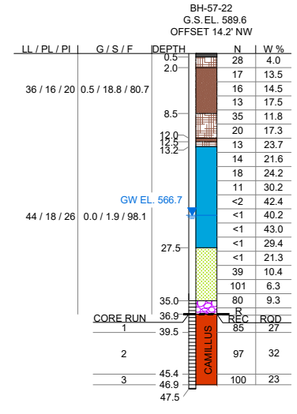
Miles

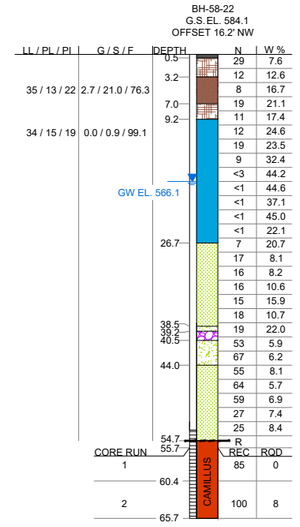
Buffalo-Amherst-Tonawanda
Corridor Transit Expansion

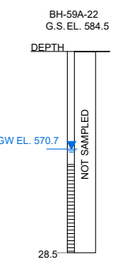


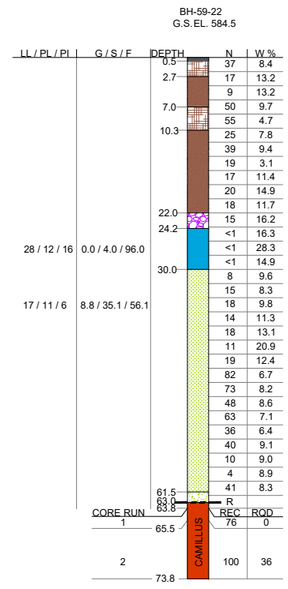


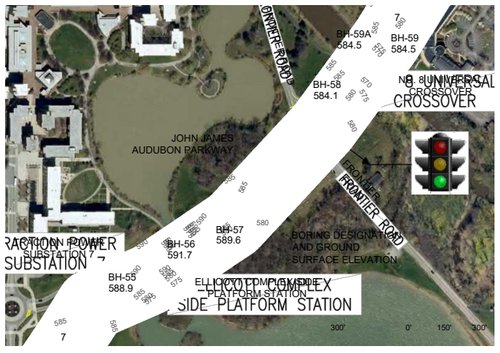












PLAN NOTES:

1. Existing contours adapted from drawing titled "NFTA - LRRT" from Foit-Albert Associates Architecture, Engineering and Surveying, P.C., received on December 7, 2022.
2. Base map adapted from file titled "Light Rail Extension" provided by WSP USA Inc., dated July 15, 2020.

REV 1

REV 2

NOTE:
UNAUTHORIZED ALTERATION OR ADDITION TO ANY SURVEY, DRAWING, DESIGN, SPECIFICATION, PLAN, OR REPORT IS A VIOLATION OF SECTION 7209 PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

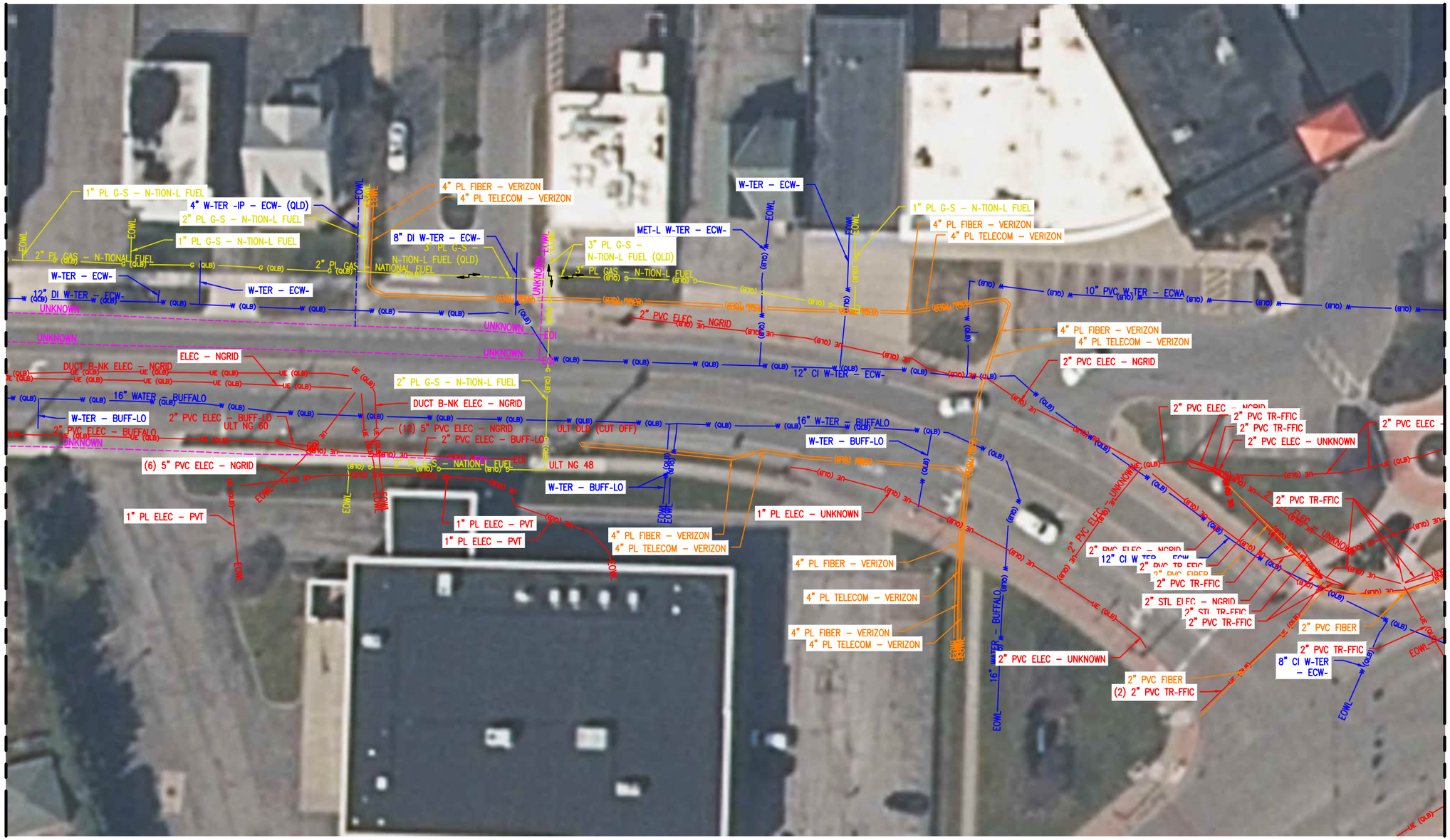
McMahon & Mann
Consulting Engineering and Geology, P.C.
2495 Main Street, Suite 432
Buffalo, NY 14214
(716) 834-8932
www.mmce.net

NFTA LIGHT RAIL RAPID TRANSIT EXTENSION SEGMENT PROFILE 7

ERIE COUNTY NEW YORK

DRAWN BY:	R.J.S.
DESIGNED BY:	R.J.S.
CHECKED BY:	D.T.L.
SCALE:	AS SHOWN
DATE:	APRIL 2023
JOB NO.	18-020
FIGURE	17 OF 20
DWG. NO.	18020-004I
REVISION NUMBER -	0

S:\CAD\DRAWING\PROJECT\WSP\Amherst St. Light Rail Extension\18020-004.dwg



TRUE NORTH -T THE 78°35'
MERIDI-N OF WEST LONGITUDE

0 20' 40' 80'

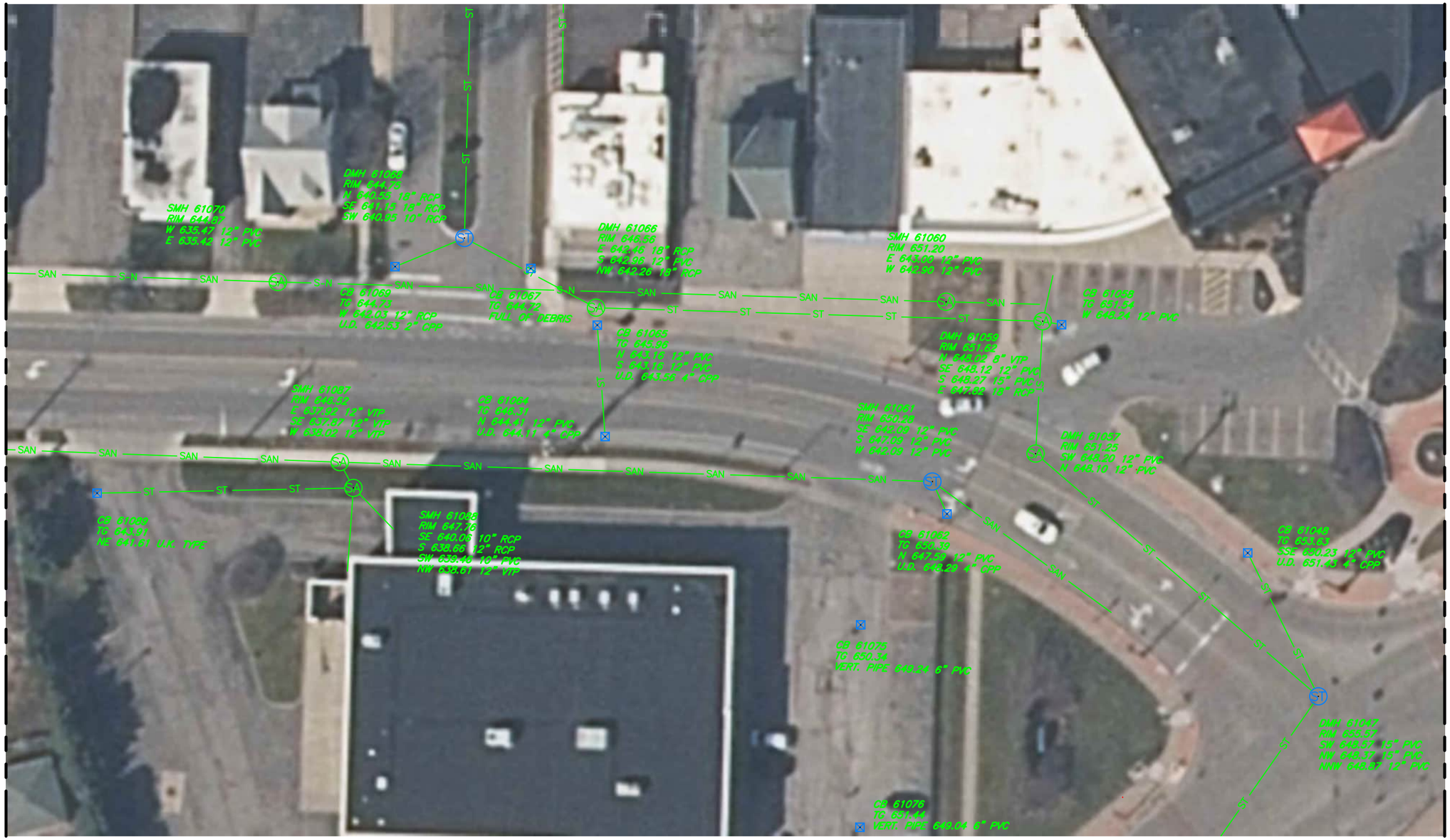
1 INCH = 40 FEET

V-XPTOPO_Print.DWG
S. SHEPHERD
M. POHL
1"=40'

TOPOGRAPHIC SURVEY

V-107

7



TRUE NORTH -T THE 78°35'
MERIDI-N OF WEST LONGITUDE

0 20' 40' 80'

1 INCH = 40 FEET

V-XPTOPO_Print.DWG
S. SHEPHERD
M. POHL
1"=40'

TOPOGRAPHIC SURVEY

V-107

V-XPTOPO_Print.DWG
S. SHEPHERD
M. POHL
1"=40'

TRUE NORTH -T THE 78°35'
MERIDI-N OF WEST LONGITUDE

0 20' 40' 80'

1 INCH = 40 FEET

TOPOGRAPHIC SURVEY

V-114

14

V-XPTOPO_Print.DWG
S. SHEPHERD
M. POHL
1"=40'

TRUE NORTH -T THE 78°35'
MERIDI-N OF WEST LONGITUDE

0 20' 40' 80'

1 INCH = 40 FEET

TOPOGRAPHIC SURVEY

V-114