Appendix A
Alternatives

Metro Amherst-Buffalo Corridor

Tier I Evaluation: Long List of Alternatives

Prepared for:

Niagara Frontier Transportation Authority (NFTA)

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Table of Contents

List of Figures

List of Tables

1.0 LONG LIST OF ALTERNATIVES

Four specific corridors with several alternative routes have been identified during an iterative process that has included review of previous studies, discussion with the Project's Steering and Advisory Committees and input from the general public through two public workshops held in November 2013 and additional comments received from stakeholders. Stakeholders contributing input included:

- Town of Amherst
- University at Buffalo
- NYSDOT
- Citizens for Regional Transit
- Eggertsville Community Organization
- Western New York Environmental Alliance – Transportation Working Group
- Canisius College – Student Senate
- Town of Tonawanda
- Amherst Energy Conservation Citizens Advisory Committee (ECCAC)

The four corridors under study include:

1. Niagara Falls Boulevard with 8 route alternatives;
2. Bailey Avenue with 9 route alternatives, including the LRT 1995 alternative from Citizens for Regional Transit;
3. Millersport Highway with 2 route alternatives; and
4. Tonawanda Corridor

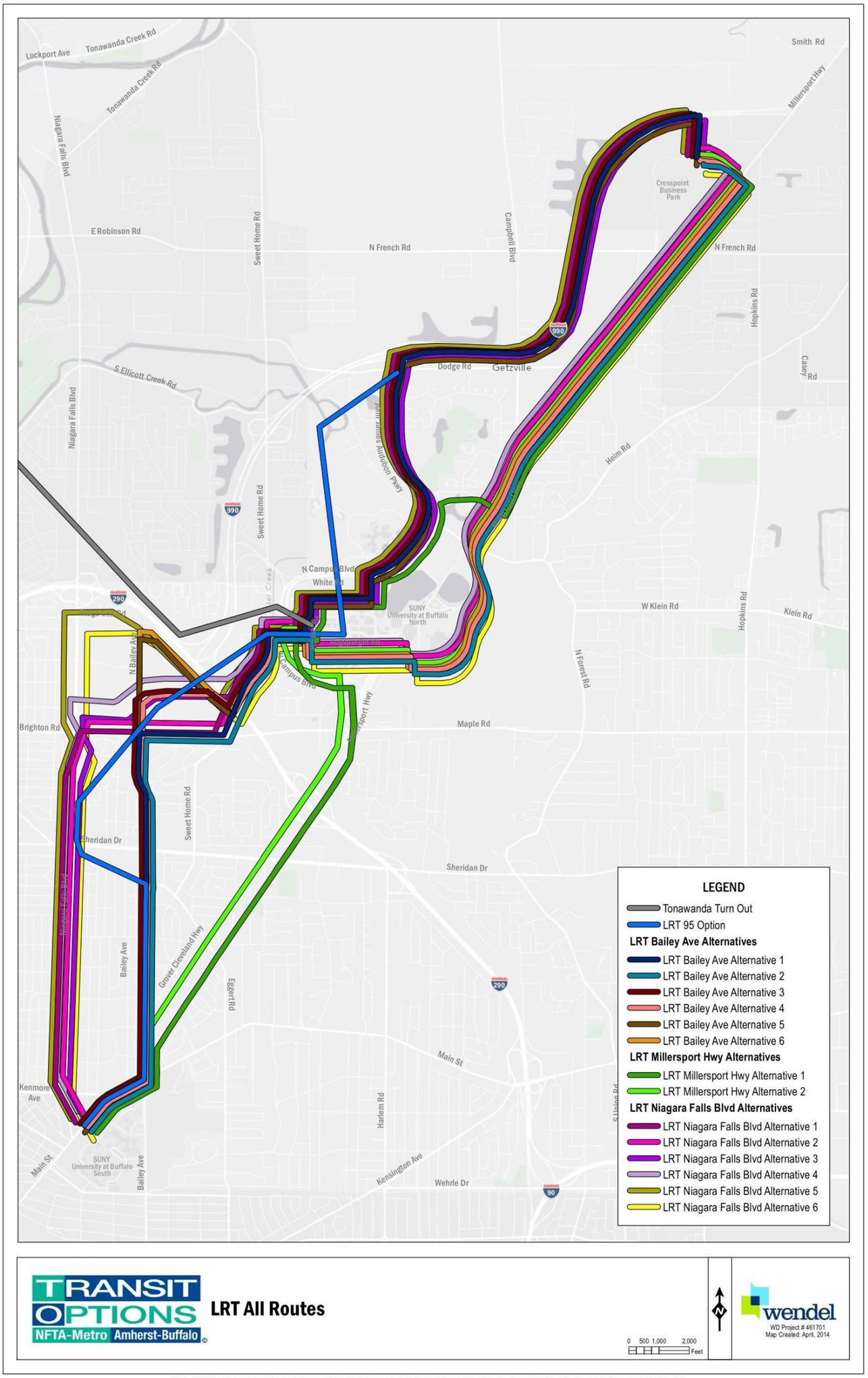
The following sections describe the current list of modal alternatives identified as the Long List of Alternatives for action. Modal alternatives consist of Bus Rapid Transit, Light Rail Transit, Modern Streetcar Transit, Bus Preferential Treatment, and Enhanced Bus.

1.1 Light Rail Transit (LRT) Options

LRT options will incorporate a combination of underground, surface and elevated segments for each route alternative. Narratives will define the location of the LRT guideway and identify activity centers served. All LRT route alternatives would utilize the existing South Campus Station as the southern terminus. Depending on the alternative, modifications or relocation of the South Campus Station may be required. The extent of modifications to that station will be evaluated during the Tier II Screening process.

Development of LRT route alternatives incorporated appropriate criteria associated with the existing system, the minimum horizontal turning radius and maximum vertical grade criteria. Alignments were developed maximizing the use of existing street rights-of-way (ROW). Figure 1 is a map of the long list of LRT alternative alignments. *Niagara Falls Boulevard Alternatives 7 and 8 and Bailey Avenue Alternatives 8 and 9 are currently under evaluation and are not yet shown in Figure 1.*

Figure 1: Long List of LRT Alternatives Map



1.1.1 Niagara Falls Boulevard LRT Alternatives

The eight Niagara Falls Boulevard LRT alternatives are presented in the following sections.

1.1.1.1 Niagara Falls Boulevard – LRT Alternative # 1

Route – Main Street - Niagara Falls Boulevard – Maple Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 1 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Maple Road on dedicated rail lanes to Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.1.2 Niagara Falls Boulevard – LRT Alternative # 2

Route – Main Street - Niagara Falls Boulevard – Maple Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 2 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Maple Road on dedicated rail lanes to Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. The LRT would continue in the median of Millersport Highway to Crosspoint Business Park utilizing a dedicated surface guideway.

1.1.1.3 Niagara Falls Boulevard – LRT Alternative # 3

Route – Main Street – Niagara Falls Boulevard – Meyer Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 3 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median. From the Boulevard Mall the alignment would continue on the east side of Niagara Falls Boulevard to Meyer Road on an elevated guideway. On Meyer Road to I-290 the guideway would transition from elevated to underground and continue beneath the I-290 and surface through a portal on Sweet Home Road. The guideway would

utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.1.4 Niagara Falls Boulevard – LRT Alternative # 4

Route – Main Street – Niagara Falls Boulevard – Meyer Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 4 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median. From the Boulevard Mall the alignment would continue on the east side of Niagara Falls Boulevard to Meyer Road on an elevated guideway. On Meyer Road to I-290 the guideway would transition from elevated to underground and continue beneath the I-290 and surface through a portal on Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. Within Millersport Highway, the guideway would transition from elevated to surface and would travel in dedicated guideway within the existing median to Crosspoint Business Park.

1.1.1.5 Niagara Falls Boulevard – LRT Alternative # 5

Route – Main Street – Niagara Falls Boulevard – Ridge Lea Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 5 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median. From the Boulevard Mall the alignment would continue on the east side of Niagara Falls Boulevard to Ridge Lea Road on an elevated guideway. On Ridge Lea Road to I-290 the guideway would transition from elevated to underground and continue beneath the I-290 and surface through a portal on Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.1.6 Niagara Falls Boulevard – LRT Alternative # 6

Route – Main Street – Niagara Falls Boulevard – Ridge Lea Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 6 would begin at the South Campus Station and utilize the existing run out tunnel to Kenmore Avenue. The route will continue underground below Kenmore Avenue and Niagara Falls Boulevard to a portal in the vicinity of Paige Street. Once at the surface, the route would utilize dedicated rail lanes in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median. From the Boulevard Mall the alignment would continue on the east side of Niagara Falls Boulevard to Ridge Lea Road on an elevated guideway. On Ridge Lea Road to I-290 the guideway would transition from elevated to underground and continue beneath the I-290 and surface through a portal on Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. Within Millersport Highway, the guideway would transition from elevated to surface and would travel in dedicated guideway within the existing median to Crosspoint Business Park.

1.1.1.7 Niagara Falls Boulevard – LRT Alternative # 7 – Segment Alternative (currently under evaluation)

Route – Main Street – Niagara Falls Boulevard – Meyer Road – Rensch Entrance

Alternative # 7 is an alternate alignment to Niagara Falls Boulevard LRT Alternatives 3 and 4 for the segment between Maple Road and UB North. Alternative 7 would use the same alignment as Alternatives 3 and 4 from South Campus Station to Maple Road, and then the alignment would be elevated north of Maple Road on Niagara Falls Boulevard. The alignment would remain elevated and curve to generally follow Meyers Road then cross I-290 and the I-990 ramps as well as the transmission line east of I-290 and the I-990 ramp. The alignment would remain elevated straight across to the Rensch Entrance to UB North. Alternative 7 could use the alignment from either Alternative 3 or 4 between UB North and Crosspoint Business Park.

1.1.1.8 Niagara Falls Boulevard – LRT Alternative # 8 – Segment Alternative (currently under evaluation)

Route – Main Street – Niagara Falls Boulevard – Ridge Lea Road – Rensch Road - Rensch Entrance

Alternative # 8 is an alternate alignment to Niagara Falls Boulevard LRT Alternatives 5 and 6 for the segment between Maple Road and UB North. Alternative 8 would use the same alignment as Alternatives 5 and 6 from South Campus Station to Maple Road, and then the alignment would be elevated north of Maple Road on Niagara Falls Boulevard. The alignment would remain elevated along Niagara Falls Boulevard, then curve and generally follow Ridge Lea Road. The alignment would be elevated to cross I-290 as well as the transmission line that bisects the highway ramps and would need to go underground beneath the I-990 ramps. The alignment would come to grade across Rensch Road to the Rensch Entrance to UB North. Alternative 8 could use the alignment from either Alternative 5 or 6 between UB North and Crosspoint Business Park.

1.1.1.9 Niagara Falls Boulevard Alternative Corridor – Subset

This Alternative Corridor LRT Option would utilize Main Street, Bailey Avenue and Eggert Road from the South Campus Station to Niagara Falls Boulevard. The alternative alignment would combine the Niagara Falls Boulevard and Bailey Avenue LRT corridor alternatives. The alternative would begin at the South Campus Station and utilize the existing run out tunnel and continue underground on Bailey Avenue to Eggert Road. The alignment would continue underground on Eggert Road to Niagara Falls Boulevard and transition to the surface in the median north of Sheridan Drive. This corridor option would be considered a subset for transitioning from South Station to Niagara Falls Boulevard corridor alternatives.

1.1.2 Bailey Avenue LRT Alternatives

The nine Bailey Avenue LRT alternatives are described in the following sections.

1.1.2.1 Bailey Avenue – LRT Alternative # 1

Route – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 1 would begin at the South Campus Station and utilize the existing run out tunnel continuing underground to Bailey Avenue then surfacing through a portal on Maple Road. Once at the surface, dedicated lanes in the center of Maple Road would be utilized to Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.2.2 Bailey Avenue –LRT Alternative # 2

Route – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 2 would begin at the South Campus Station and utilize the existing run out tunnel continuing underground to Bailey Avenue then surfacing through a portal on Maple Road. Once at the surface, dedicated lanes in the center of Maple Road would be utilized to Sweet Home Road. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. Within Millersport Highway, the guideway would transition from elevated to surface and would travel in dedicated guideway within the existing median to Crosspoint Business Park.

1.1.2.3 Bailey Avenue – LRT Alternative # 3

Route – Main Street – Bailey Avenue – Meyer Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 3 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Meyer Road adjacent to the I-290. The LRT would transition underground below I-290 to surface through a portal on Sweet Home Road north of I-290. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.2.4 Bailey Avenue – LRT Alternative # 4

Route – Main Street – Bailey Avenue – Meyer Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 4 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Meyer Road adjacent to the I-290. The LRT would transition underground below I-290 to surface through a portal on Sweet Home Road north of I-290. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. Within Millersport Highway, the guideway would transition from elevated to surface and would travel in dedicated guideway within the existing median to Crosspoint Business Park.

1.1.2.5 Bailey Avenue – LRT Alternative # 5

Route – Main Street – Bailey Avenue – Ridge Lea Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Alternative # 5 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground on Bailey Avenue and surface through a portal on Ridge Lea Road. The LRT would transition underground below I-290 to surface through a portal on Sweet Home Road north of I-290. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. The route would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The rail line would be elevated from I-990 into the Crosspoint Business Park.

1.1.2.6 Bailey Avenue – LRT Alternative # 6

Route – Main Street – Bailey Avenue – Ridge Lea Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 6 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Ridge Lea Road. The LRT would transition underground below I-290 to surface through a portal on Sweet Home Road north of I-290. The guideway would utilize dedicated rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway. Within Millersport Highway, the guideway would transition from elevated to surface and would travel in dedicated guideway within the existing median to Crosspoint Business Park.

1.1.2.7 Bailey Avenue – LRT Alternative #7 (from the Citizens for Regional Transit newsletter)

Route – Main Street – Bailey Avenue – Eggert Road – under Marion Road – over Sheridan Drive – over Bailey Avenue – over the Youngmann Highway – over the Lockport Expressway – parallel to and on the south side of UB academic buildings – parallel to the Lockwood Memorial Library – Audubon Parkway – Dodge Road

Alternative # 7 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue. The alignment would continue under Bailey Avenue in tunnel to Ruth Avenue where the alignment transitions from tunnel to aerial structure at Betina Avenue. The aerial structure curves to an alignment along the north side of Eggert Road and curves again north in Marion Road over Sheridan Drive, then descends to grade for a short distance. From Alameda Avenue the alignment transitions to an aerial structure and proceeds diagonally over the parking lots crossing over Bailey Avenue north of Maple Road where it descends to grade. After crossing Meyer Road, the alignment goes over the Youngmann Highway as well as the ramps of the Lockport Expressway. The aerial structure curves east parallel to the south side of the UB campus spine and continues east until curving north between the Lockwood Memorial Library and Clements Hall. The alignment continues on structure across the campus parking lots and over Audubon Parkway where it descends to grade. The alignment continues and passes to the northwest side of the Ellicott Complex and crosses Ellicott Creek to the west side of Audubon Parkway to a point south of Towne Center initially and eventually to Dodge Road. This alignment represents the recommended alignment that came out of the 1995 Citizens Rapid Transit Committee Planning newsletter and comments received in November 2013 from the Citizens for Regional Transit.

1.1.2.8 Bailey Avenue – LRT Alternative #8 – Segment Alternative (currently under evaluation)

Route – Main Street – Bailey Avenue – North Bailey Avenue – Meyer Road – Rensch Entrance

Alternative # 8 is an alternate alignment to Bailey Avenue LRT Alternatives 3 and 4 for the segment between Maple Road and UB North. Alternative 8 would use the same alignment as Alternatives 3 and 4 from South Campus Station to Maple Road, and then the alignment would be elevated north of Maple Road on North Bailey Avenue. The alignment would remain elevated and curve to generally follow Meyers Road then cross I-290 and the I-990 ramps as well as the transmission line east of I-290 and the I-990 ramp. The alignment would remain elevated straight across to the Rensch Entrance to UB North. Alternative 8 could use the alignment from either Alternative 3 or 4 between UB North and Crosspoint Business Park.

1.1.2.9 Bailey Avenue – LRT Alternative #9 – Segment Alternative (currently under evaluation)

Route – Main Street – Bailey Avenue – North Bailey Avenue – Ridge Lea Road – Rensch Road – Rensch Entrance

Alternative # 9 is an alternate alignment to Bailey Avenue LRT Alternatives 5 and 6 between Maple Road and UB North. Alternative 9 would use the same alignment as Alternatives 5 and 6 from South Campus Station to Maple Road, and then the alignment would be elevated north of Maple Road on North Bailey Avenue. The alignment would remain elevated along North Bailey Avenue, then curve and generally follow Ridge Lea Road. The alignment would be elevated to cross I-290 as well as the transmission line that bisects the highway ramps and would need to go underground beneath the I- 990 ramps. The alignment would come to grade across Rensch Road to the Rensch Entrance to UB North. Alternative 9 could use the alignment from either Alternative 5 or 6 between UB North and Crosspoint Business Park.

1.1.3 Millersport Highway LRT Alternatives

The two Millersport Highway LRT alternatives are described in the following sections.

1.1.3.1 Millersport Avenue – LRT Alternative # 1

Route – Main Street – Bailey Avenue – Millersport Road – Hadley Road – Putnam Way – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

Alternative # 1 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Millersport Highway. On Millersport Highway surface rail lines would be constructed in the median to the North UB campus. Along Millersport Highway at the I-290 overpass additional lanes will be added beneath the I-290 bridges by excavating the slopes adjacent to the abutments. Another option at the I-290 overpass would be to elevate the rail lines from Sheridan Drive above I-290 to the North UB campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus the rail line would travel in the median of John James Audubon Parkway to Sylvan Parkway. On Sylvan Parkway the rail line would travel in the center of the road to Millersport Highway and continue in the median of Millersport to Crosspoint Business Park.

1.1.3.2 Millersport Avenue – LRT Alternative # 2

Route – Main Street – Bailey Avenue – Millersport Road –Hadley Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Alternative # 2 would begin at the South Campus Station and utilize the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Millersport Highway. On Millersport Highway surface rail lines would be constructed in the median to the North UB campus. Along Millersport Highway at the I-290 overpass additional lanes will be added beneath the I-290 bridges by excavating the slopes adjacent to the abutments. Another option at the I-290 overpass would be to elevate the rail lines from Sheridan Drive above I-290 to the North UB campus. On the campus the route would utilize surface lanes and approximately follow Putnam Way. From the UB campus rail lines would be elevated to Millersport Highway and continue in the median of Millersport to Crosspoint Business Park.

1.2 Bus Rapid Transit (BRT) Options

This modal option will develop at-grade routes for each BRT alternative, define location of dedicated lanes, and identify activity centers served. Figure 2 is a map of the long list of BRT alternative alignments.

1.2.1 Niagara Falls Boulevard BRT Alternatives

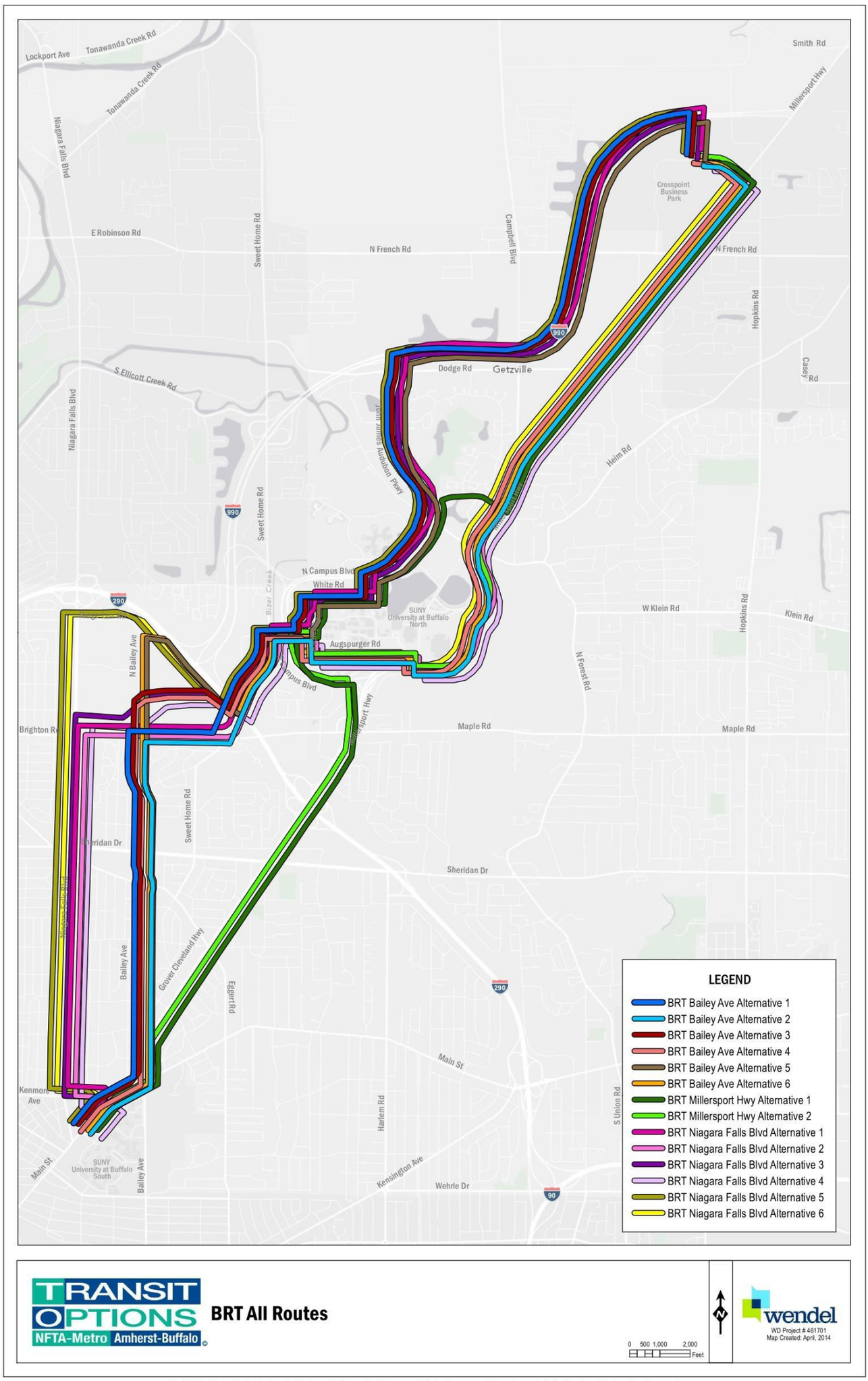
The six Niagara Falls Boulevard BRT alternatives are presented in the following sections.

1.2.1.1 Niagara Falls Boulevard – BRT Alternative # 1

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Maple Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

BRT vehicles would depart from the existing South Campus Station bus loop and run along the south side of Main Street to Kenmore Avenue on newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would turn left onto Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel north on Niagara Falls Boulevard in dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would travel east on Maple Road on dedicated bus lanes to Sweet Home Road. Buses would travel down Sweet Home Road on dedicated bus lanes to the Rensch Road Entrance on the UB North Campus. On the campus buses would utilize Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. Buses would travel down the median of I-990 on newly constructed bus lanes to Crosspoint Business Park. A new interchange would be constructed from I-990 to and from the Crosspoint Business Park.

Figure 2: Long List of BRT Alternatives Map



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1.2.1.2 Niagara Falls Boulevard – BRT Alternative # 2

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Maple Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Kenmore Avenue in newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would travel west on Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel north on Niagara Falls Boulevard in dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would travel east on Maple Road on dedicated bus lanes to Sweet Home Road. Buses would travel north on Sweet Home Road in dedicated bus lanes to the Rensch Road Entrance on the UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway on newly constructed bus lanes to Crosspoint Business Park.

1.2.1.3 Niagara Falls Boulevard – BRT Alternative # 3

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Meyer Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Kenmore Avenue in newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would travel west on Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel down Niagara Falls Boulevard in dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would travel down the east side of Niagara Falls Boulevard to Meyer Road on dedicated bus lanes. Buses would share travel lanes to the end of Meyer Road. Buses would then travel adjacent to I-290 on newly constructed dedicated lanes from Meyer Road to Sweet Home Road. Buses would travel down Sweet Home Road on dedicated bus lanes to UB North Campus. On the campus buses would operate on Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. Buses would travel down the median of I-990 on newly constructed bus lanes to Crosspoint Business Park. A new interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.1.4 Niagara Falls Boulevard – BRT Alternative # 4

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Meyer Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the UB south campus and run along the south side of Main Street to Kenmore Avenue on newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel down Niagara Falls Boulevard on dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would utilize new dedicated bus lanes in new ROW located to the east of Niagara Falls Boulevard to Meyer Road. Buses would share travel lanes to the end of Meyer Road. Buses would then travel east adjacent to I-290 ROW in newly constructed dedicated lanes from Meyer Road to a new signalized intersection with Sweet Home Road. Buses would travel north on Sweet Home Road in dedicated bus lanes to the Rensch Road entrance to the UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway in newly constructed bus lanes to Crosspoint Business Park. A new interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.1.5 Niagara Falls Boulevard – BRT Alternative # 5

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Ridge Lea Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Kenmore Avenue in newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would travel west onto Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel down Niagara Falls Boulevard in dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would share travel lanes on Niagara Falls Boulevard to Ridge Lea Road. Buses would share travel lanes to the end of Ridge Lea Road. Buses would then utilize newly constructed dedicated lanes within the I-290 ROW from Ridge Lea Road to Sweet Home Road. Buses would utilize Sweet Home Road in dedicated bus lanes to the Rensch Road Entrance on the UB North Campus. On the campus buses would operate on Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. Buses would travel down the median of I-990 on newly constructed bus lanes to Crosspoint Business Park. A new bus only interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.1.6 Niagara Falls Boulevard – BRT Alternative # 6

Route – Main Street – Kenmore Avenue - Niagara Falls Boulevard – Ridge Lea Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Kenmore Avenue in newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would utilize Kenmore Avenue and share the road to Niagara Falls Blvd. Buses then would travel north/south on Niagara Falls Boulevard in dedicated bus lanes to the Boulevard Mall. From the Boulevard Mall buses would travel north/south on Niagara Falls Boulevard to Ridge Lea Road sharing existing travel lanes. Buses would share travel lanes to the end of Ridge Lea Road. Buses would utilize newly constructed dedicated lanes within the I-290 ROW from Ridge Lea Road to a new signalized intersection on Sweet Home Road. Buses would travel on Sweet Home Road in dedicated bus lanes to the Rensch Road entrance to the UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel on the median of Millersport Highway in newly constructed bus lanes to Crosspoint Business Park.

1.2.2 Bailey Avenue BRT Alternatives

The six Bailey Avenue BRT alternatives are described in the following sections.

1.2.2.1 Bailey Avenue – BRT Alternative # 1

Route – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue in newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would utilize the existing jug handle to turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Maple Road. Buses would travel down Maple Road in dedicated bus lanes to Sweet Home Road. Buses would utilize Sweet Home Road in dedicated bus lanes to the Rensch Road entrance to the UB North Campus. On the campus buses would operate on Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. Buses would utilize the median of I-

990 in newly constructed bus lanes to Crosspoint Business Park. A new bus only interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.2.2 Bailey Avenue – BRT Alternative # 2

Route – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue on newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Maple Road. Buses would utilize Maple Road in dedicated bus lanes to Sweet Home Road. Buses would utilize Sweet Home Road in dedicated bus lanes to the Rensch Road entrance to the UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway in newly constructed bus lanes to Crosspoint Business Park.

1.2.2.3 Bailey Avenue –BRT Alternative # 3

Route – Main Street – Bailey Avenue – Meyer Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Buses would depart from the UB south campus and run along the south side of Main Street to Bailey Avenue on newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Meyer Road. Buses would share travel lanes to the end of Meyer Road. Buses would then travel adjacent to I- 290 on newly constructed dedicated lanes from Meyer Road to Sweet Home Road. Buses would travel down Sweet Home Road on dedicated bus lanes to UB North Campus. On the campus buses would operate on Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. A park and ride facility could be constructed to service developed land around Walton Wood Park. Buses would travel down the median of I- 990 on newly constructed bus lanes to Crosspoint Business Park. A new interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.2.4 Bailey Avenue – BRT Alternative # 4

Route – Main Street – Bailey Avenue – Meyer Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue on newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Meyer Road. Buses would share travel lanes to the end of Meyer Road. Buses would then travel in newly constructed dedicated lanes within the I-290 ROW from Meyer Road to Sweet Home Road. Buses would travel down Sweet Home Road on dedicated bus lanes to the Rensch Road Entrance to the UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway in newly constructed bus lanes to Crosspoint Business Park.

1.2.2.5 Bailey Avenue –BRT Alternative # 5

Route – Main Street – Bailey Avenue – Ridge Lea Road – Sweet Home Road – Putnam Way – John James Audubon Parkway – I-990 – Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue on newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Ridge Lea Road. Buses would share travel lanes to the end of Ridge Lea Road. Buses would then travel in newly constructed dedicated lanes within the I-290 ROW from Ridge Lea Road to a new signalized intersection at Sweet Home Road. Buses would travel down Sweet Home Road in dedicated bus lanes to the Rensch Road Entrance to the UB North Campus. On the campus buses would operate on Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to the I-990. Buses would utilize the median of I-990 on newly constructed bus lanes to Crosspoint Business Park. A new interchange would be constructed from I-990 to and from the Crosspoint Business Park.

1.2.2.6 Bailey Avenue – BRT Alternative # 6

Route – Main Street – Bailey Avenue – Ridge Lea Road – Sweet Home Road – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue in newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Boulevard Mall. From there buses would reenter onto Bailey Avenue and share the road to Ridge Lea Road. Buses would share travel lanes to the end of Ridge Lea Road. Buses would then travel in newly constructed dedicated lanes from Ridge Lea Road to a new signalized intersection at Sweet Home Road. Buses would travel down Sweet Home Road in dedicated bus lanes to the Rensch Road Entrance at UB North Campus. On the campus buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway on newly constructed bus lanes to Crosspoint Business Park.

1.2.3 Millersport Highway BRT Alternatives

The two Millersport Highway BRT alternatives are described in the following sections.

1.2.3.1 Millersport Avenue – BRT Alternative # 1

Route – Main Street – Bailey Avenue – Millersport Road – Hadley Road – Putnam Way – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue in newly constructed dedicated bus lanes separated from the existing travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Millersport Highway. On Millersport buses would utilize Millersport Highway in dedicated bus lanes to Maple Road. Buses would utilize the North Campus Boulevard ramp to access the North Campus and travel in dedicated bus lanes in the North Campus Boulevard median to Hadley Road. Continuing through the campus buses would share the road on Hadley Road and utilize Putnam Way. From the UB campus buses would share the road along the John James Audubon Parkway to Sylvan Parkway. On Sylvan Parkway, buses would share the travel lanes to Millersport Highway. Buses would utilize the median of Millersport Highway on newly constructed bus lanes to Crosspoint Business Park.

1.2.3.2 Millersport Avenue – BRT Alternative # 2

Route – Main Street – Bailey Avenue – Millersport Road – UB Campus Boulevard – Putnam Way – Millersport Highway - Crosspoint Business Park

Buses would depart from the South Campus Station bus loop and run along the south side of Main Street to Bailey Avenue on newly constructed dedicated bus lanes separated from the existing Main Street travel lanes. From there buses would turn left onto Bailey Avenue and share the road to the Millersport Highway. On Millersport buses would travel down Millersport Highway on dedicated bus lanes and enter the campus on Flint Road. On campus the buses would operate on Putnam Way. Buses would travel down the median of Millersport Highway on newly constructed bus lanes to Crosspoint Business Park.

1.2.4 Tonawanda Turnout LRT Alternative

Route – Existing LaSalle Station turnout – Tonawanda rail right-of-way – I-290 – High Tension Electrical Utility Rights-of-Ways – I-290/I-990 Interchange – New Aerial Structure over I-990 to Sweet Home Road – New Aerial Structure to University North Campus Academic Buildings.

This alternative would begin at the existing LaSalle Station using the existing underground track turnout previously built. A new underground transition to at-grade section would be constructed into the abandoned rail right-of-way. The new double track alignment would use the abandoned Tonawanda rail right-of-way at-grade to I-290. The alignment would parallel the I-290 heading to the east to reach a series of existing High Tension Power Utility rights-of-way (ROW) adjacent the Brighton Park Golf Course to the north east and follow the that utility ROW as it turns east at Ellicott Creek Road and then turns southeast still within the utility ROW until it reaches the I-290/I-990 Interchange. The at-grade alignment transitions to an elevated structure to cross-over I-990 and stays elevated as it passes over Sweet Home Road heading in an easterly direction. The line then comes to grade and ends at the academic buildings of the UB North Campus.

1.3 Bailey Avenue Modern Streetcar Option

Route – Main Street – Bailey Avenue – Grover Cleveland – Millersport Highway – UB North Campus Stadium – Sweet Home Road – Maple Road – Boulevard Mall.

This alternative would consist of an entirely at-grade alignment operating in mixed traffic along its entire alignment with frequent stops similar to a local bus.

1.4 Bus Preferential Treatment Alternatives

Bus preferential treatments consist of a limited number of the elements of the BRT alternatives and would be developed based upon the BRT alternatives initially considered as appropriate. Maps identifying the potential alternatives were prepared and shown to the Project Committees in October 2013. A map of the preferential bus alternatives is provided as Figure 3.

1.5 Enhanced Bus Service

These alternatives typically consist of improving existing bus routes by increasing frequencies, adjusting bus stop locations and providing route extensions. These alternatives are typically developed as part of the Transit Systems

Management (TSM) alternative when it is developed. Maps identifying the potential alternatives were prepared and shown to the Project Committees in October 2013. A map of the enhanced bus alternatives is provided as Figure 4.

Figure 3: Preferential Bus Alternatives Map

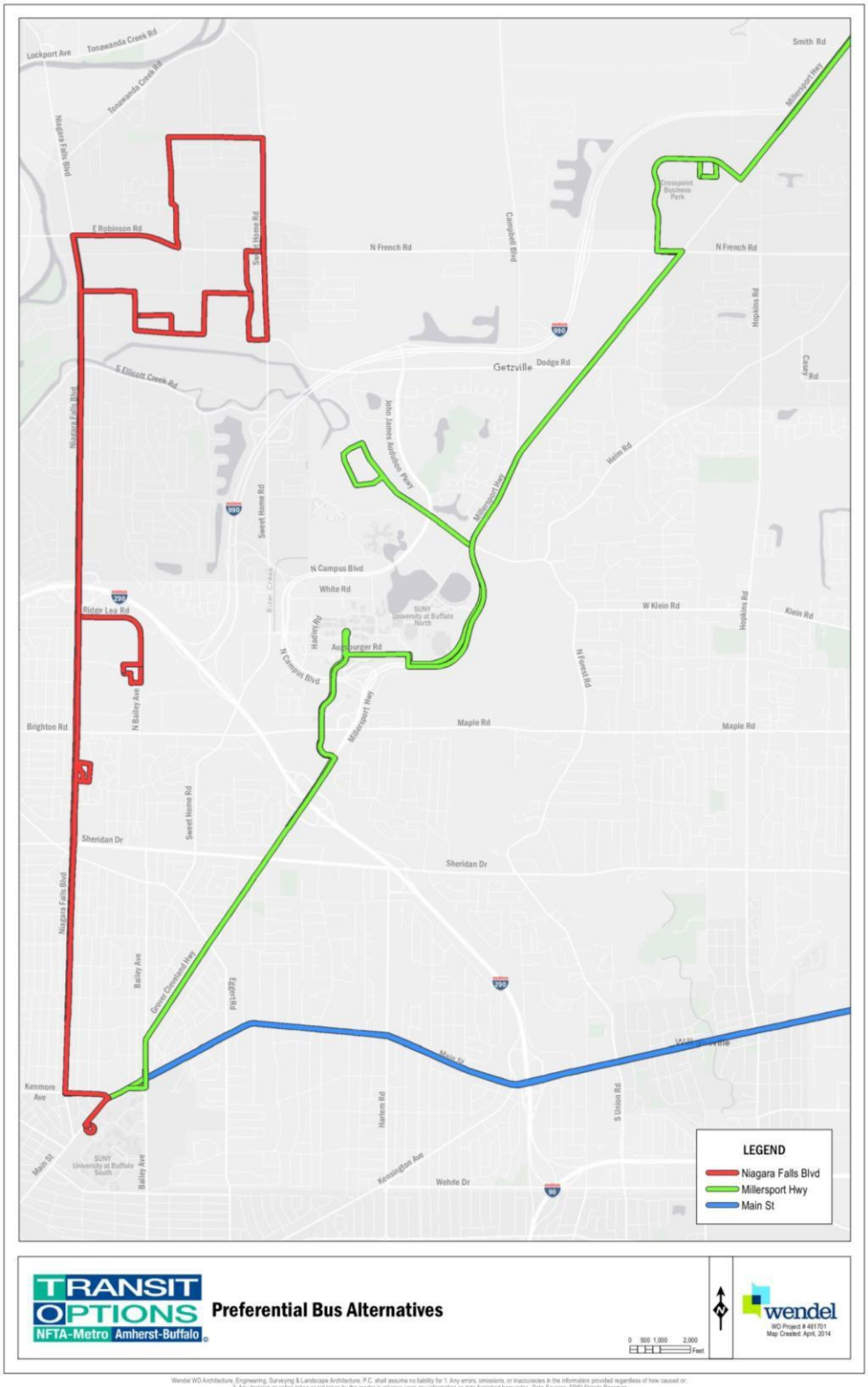
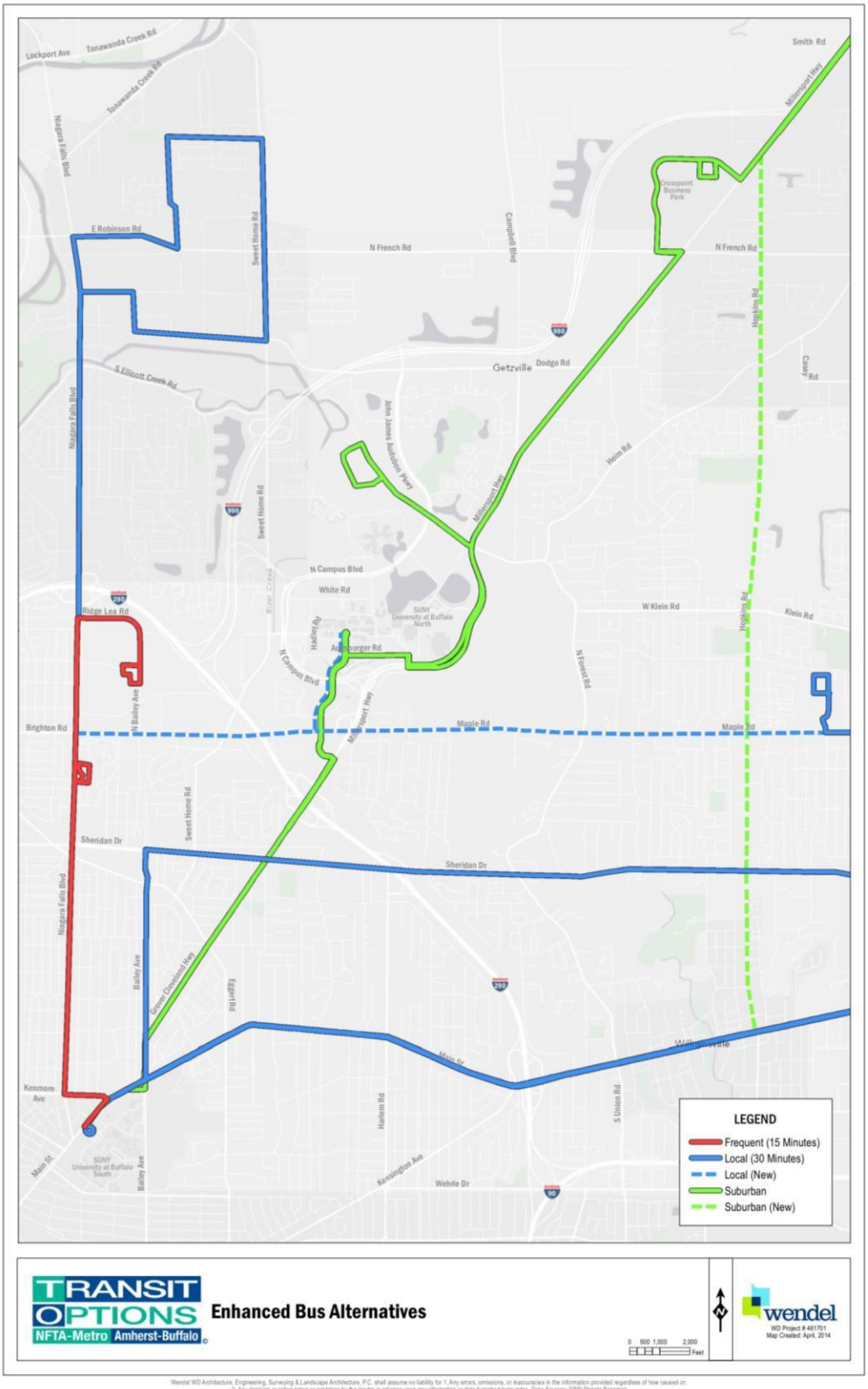


Figure 4: Enhanced Bus Alternatives Map



2.0 TIER I SCREENING PROCESS

The consultant teams from AECOM and Wendel met on February 25, 2014 in the Buffalo offices of Wendel to screen the long list of alternatives based on Tier I screening criteria. The team met via web conference again on March 18, 2014 to discuss the alternative routing through the university and north to the Crosspoint Business Park and on May 12, 2014 to discuss additional LRT alternatives that utilize North Bailey and Niagara Falls Boulevard north of Maple Road to access UB North. The purpose of the screening was to evaluate each alternative alone and in comparison to the others in order to get to a list of the most reasonable alternatives to move forward into more detailed analysis. The evaluation criteria used for Tier I screening were as follows:

- Does the alternative meet Purpose and Need? (if no, alternative fails)
- Reasonableness Test #1: Can existing right-of-way/corridor land area accommodate cross-section needed? (if no, alternative fails)
- Reasonableness Test #2: Engineering feasibility: Is the alternative reasonable to build, operate, and maintain? (as compared to other alternatives)
    - Does it have extraordinarily long or extraordinarily high and complex engineered structures relative to other alternatives? (if yes, alternative fails)
    - Does it exceed the maximum grades that the transit vehicle type can negotiate? (if yes, alternative fails)
    - Does it exceed maximum curve radii for the transit vehicle type? (if yes, alternative fails)

Each alternative was discussed and evaluated segment by segment during the screening process. Segments were color-coded to signify feasibility during discussion and analysis. Red was assigned to segments failing the reasonableness tests described above. Yellow was assigned to segments that are technically feasible, but with complications, and green was assigned to segments that pass the reasonableness tests. The results are detailed in the following section.

Enhanced bus options, which improve upon existing transit services (using Transportation Systems Management (TSM) improvement strategies to improve existing infrastructure) and Bus Preferential Treatment (based on BRT alignments moved along to Tier II) alternatives are not subject to the Tier I screening criteria. All of these alternatives will move onto the next round of analysis.

3.0 DETAILED FIXED GUIDEWAY SCREENING RESULTS

The light rail transit options and bus rapid transit options (the fixed guideway alternatives) were screened using the process described in Section 2.0. As noted, all enhanced bus and bus preferential treatment alternatives will move onto the next round of analysis. The Tonawanda Turnout alternative is located outside the study area for the project, so it will not advance to Tier II analysis. The Bailey Avenue Modern Streetcar alternative does not meet the Purpose and Need statement because it operates at low speeds with short distances between stops and would function as a circulator service. The Modern Streetcar alternative will not advance to Tier II analysis.

Alternatives are discussed by segment in the following sections as there is overlap between several alignments. The alternatives in question are listed out below each segment heading.

3.1 South Campus Station to Maple Road

Between South Campus Station and Maple Road, there are three alignments utilizing three different roadways: Niagara Falls Boulevard, Bailey Avenue and Millersport Highway. Current Metro service terminates at the underground South Campus Station on Main Street. The Metro meets buses that operate at ground level. This is the starting point for all alternatives. The Niagara Falls Boulevard alternatives exit South Campus Station and use Main Street and Kenmore Avenue to access the primary alternative roadway. The Bailey Avenue and Millersport Highway alternatives exit South Campus Station and use Main Street and Bailey Avenue to access the primary alternative roadway.

3.1.1 Niagara Falls Boulevard

Niagara Falls Boulevard LRT and BRT Alternatives 1-6

The Niagara Falls Boulevard alternatives exit South Campus Station on Main Street, then turn left onto Kenmore Avenue and right onto Niagara Falls Boulevard. Neither curve needed to make these two turns could be accomplished at-grade or on an elevated structure because the ROW is too narrow and there are too many structures immediately adjacent to the ROW. There is also not enough room to make the curves underground without acquiring a substantial number of properties. For these reasons this segment of the alignment is eliminated from further consideration for LRT service. For the BRT alternatives, there is no room for a dedicated lane in this segment so the bus would operate in traffic.

As an alternative to using Kenmore Avenue to access Niagara Falls Boulevard, there is a subset alternative in this segment that would utilize Main Street, Bailey Avenue and Eggert Road to access Niagara Falls Boulevard (as described in Section 1.1.1.9). All Niagara Falls Boulevard alternatives would use this subset alignment to access Niagara Falls Boulevard from Eggert Road. The alignment would need to be underground until the vicinity of the intersection with Sheridan Drive because of the narrow ROW on Bailey Avenue and the curves required to make the turns onto Eggert Road and Niagara Falls Boulevard.

For the BRT alternatives north of Kenmore Avenue on Niagara Falls Boulevard, a peak-period dedicated BRT lane may be possible in this segment; otherwise the bus would operate in traffic.

North of Sheridan Drive on Niagara Falls Boulevard, the ROW widens and the alignment could be brought to grade with potential median operation. Some property may need to be required (currently a parking lot) at the Niagara Falls Boulevard and Maple Road intersection in order to make the curve, but there is enough space to accommodate the curve. It would also be possible to keep the alignment elevated in this segment, through the curve at Maple Road and bring the alignment down to grade on Maple Road. Dedicated BRT lanes are possible in this segment.

3.1.2 Bailey Avenue

Bailey Avenue LRT Alternatives 1-7 and BRT Alternatives 1-6

The Bailey Avenue alternatives exit South Campus Station on Main Street and turn left onto Bailey Avenue. There is not enough room to come to grade and operate at-grade on Main Street or to make the curve to turn onto Bailey Avenue, so all Bailey Avenue alignments would need to be underground in this segment. After the turn onto Bailey Avenue, the ROW narrows so that neither elevated nor at-grade operations are possible on Bailey Avenue between Main Street and Eggert Road either. The alignment could come to grade at Eggert Road because the Bailey Avenue ROW widens, but the alignment would need to go back underground when the ROW again narrows north of Sheridan Drive.

Between Sheridan Drive and Maple Road, the Bailey Avenue ROW is narrow and curves near Emerson Road, so the alignment would need to be underground in this segment also. A complete underground alignment north to Maple Road, even with a short stretch of at-grade between Eggert Road and Sheridan Drive, requires complex engineering and would be extremely expensive. There is no room for a dedicated BRT lane either, so the rapid transit bus would operate in traffic throughout this segment, again except possibly for the small stretch between Eggert Road and Sheridan Drive.

3.1.3 Millersport Highway

Millersport Highway LRT and BRT Alternatives 1-2

The Millersport Highway alternatives exit South Campus Station on Main Street, turn left onto Bailey Avenue and turn right onto Millersport Highway (which begins as Grover Cleveland Highway). Both the turns onto Bailey Avenue and Millersport Highway would need to be underground to allow room for the necessary curve radii. Once on Millersport Highway the ROW is wide enough for at-grade operation, especially north of the Eggert Road intersection. The alignment could be operated at-grade under the I-290 bridge, though some widening may be necessary. As the alignment approaches the UB North Campus, it would follow the Audubon Parkway to Hadley Road to enter the University and follow one of the two University alignments. Elevated structures entering the university will probably be necessary. Dedicated BRT lanes are also possible in this segment, but entering the university the rapid transit bus would operate in traffic.

3.2 Maple Road to UB North

From Maple Road to the UB North campus, the Niagara Falls Boulevard and Bailey Avenue Alternatives either use Maple Road, Meyer Road, or Ridge Lea Road, then cross the I-290 and use Sweet Home Road to reach the UB North campus. The Niagara Falls Boulevard and Bailey Alternatives enter the university through the Rensch Entrance. The Millersport Highway Alternatives remain on Millersport Highway and approach the campus from the south on the Audubon Parkway and Hadley Road.

3.2.1 Maple Road to Rensch Entrance

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 1-2

The Maple Road segment between Niagara Falls Boulevard or Bailey Avenue and Sweet Home Road is wide enough to accommodate at-grade operation. As noted, the intersection of Niagara Falls Boulevard and Maple Road is wide enough for a curve, but the intersection of Bailey Avenue and Maple Road is quite narrow and the Bailey Avenue alignment would need to make the curve underground and come to grade along Maple Road.

The ROW at the intersection between Maple Road and Sweet Home Road is wide enough for an at-grade curve, though an elevated structure could also be utilized. Along Sweet Home Road, ROW is also wide enough for at-grade operation. The alignment would also need to pass under the I-290 bridge on Sweet Home Road at-grade. The alignment cannot be elevated over the I-290 without complex engineering because there is a transmission line immediately adjacent to the I-290 in this segment.

Between the I-290 and the UB North campus on Sweet Home Road, the ROW is wide enough for an at-grade alignment, though some of the sidewalks may need to be modified to accommodate it. The use of an elevated structure is also possible in this segment, though with more complex engineering and higher associated costs, at-grade operation makes more sense. The ROW is approximately 150 feet wide in this segment.

3.2.2 Meyer Road to Sweet Home Road

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 3-4, Bailey Avenue LRT Alternative 7

As an alternative to the Maple Road alignment, both the Niagara Falls Boulevard and Bailey Avenue alignments have alternatives that extend past Maple Road instead turning right down Meyer Road and across the I-290 to Sweet Home Road. Meyer Road has a narrow ROW and curves that could not be accomplished within the existing ROW. The only way the Meyer Road alternatives would work is through underground operation. The Citizens for Regional Transit alternative (Bailey Avenue LRT Alternative 7) is described as operating on an elevated structure in this segment, but as noted above, there is not enough room in the existing ROW for an elevated structure.

The Meyer Road alternatives are further complicated by the need to cross the I-290 and its ramps with no existing ROW and by the need to traverse the transmission lines adjacent to I-290 before coming into Sweet Home Road. Due to the complexity of engineering relative to other alternatives, none of the Meyer Road alternatives will progress to Tier II analysis.

3.2.3 Ridge Lea Road to Sweet Home Road

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 5-6

As an additional alternative to the Maple Road alignment, both the Niagara Falls Boulevard and Bailey Avenue alignments have alternatives that extend past Maple Road respectively and turn right down Ridge Lea Road and across the I-290 to Sweet Home Road. Ridge Lea Road has a narrow ROW and curves that could not be accomplished within the existing ROW. The Ridge Lea alignment would also need to cross the I-290 and its ramps as well as the transmissions lines like the Meyer Road alignments, but would also need to extend south to avoid the I-990/I-290 ramps located in this area. The only way the Ridge Lea Road alternatives would work is through underground operation. Due to the complexity of engineering as compared to other alternatives that would utilize existing ROW and avoid both the ramps and the transmissions lines, none of the Ridge Lea Road alternatives will progress to Tier II analysis.

3.2.4 Rensch Entrance

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 1-6, Bailey Avenue LRT Alternative 7

After crossing the I-290, all the Niagara Falls Boulevard and Bailey Avenue Alternatives follow the same alignment up Sweet Home Road. On approach to the UB North campus, the intersection of Sweet Home Road into the Rensch Entrance does not include enough space in the ROW to make the curve at-grade without losing existing turning lanes. There is, however, enough space to make the curve with an elevated structure keeping the support beams within the existing ROW as much as possible. There is open space between Sweet Home Road and the Audubon Parkway; though it is unlikely that it would be needed as the ROW on Sweet Home Road is 150 feet wide near the intersection.

3.2.5 Millersport Highway to Hadley Road

Millersport Highway LRT and BRT Alternatives 1-2

The Millersport Highway alignment would enter the university from the south, probably along the Audubon Parkway to Hadley Road where it would follow one of the two University alignments. Elevated structures entering the university would probably be necessary given varied ROW widths and the necessary curve radii requirements. Entering the university the BRT alternatives would operate in traffic.

3.3 UB North

Within the UB North campus, there are two alterative alignments that either connect to Audubon Parkway to the north/east or Millersport Highway to the south/east. While the exact alignment within the university is up for discussion, there need to be two alternative alignments to access the two possible alignments north of the UB campus. The alignments discussed below were developed based on NFTA discussion with the University during the Fall 2013 outreach effort.

3.3.1 Putnam North

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 1, 3, 5; Bailey Avenue LRT Alternative 7; Millersport Highway LRT and BRT Alternative 1

For the northern alternative within the university, alternatives would either enter the university through the Rensch entrance (Niagara Falls Boulevard and Bailey Avenue Alternatives) or via Hadley Road (Millersport Highway Alternatives). The alignment would serve the central campus buildings along the northern loop of Putnam Way and exit onto the Audubon Parkway via the Lee Entrance.

On campus, the roadways are generally not utilized regularly by the general public so the traffic volumes are less than public roadways. Putnam Way has both vehicle and pedestrian pathways. The ROW for the roadway and sidewalk along Putnam Way is wide enough for at-grade operation, though some sidewalk area and street parking may need to be utilized for LRT ROW or a BRT dedicated lane. The alignment would offer transit service to the heart of the campus.

3.3.2 Putnam South

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 2, 4, 6; Millersport Highway LRT and BRT Alternative 2

As with the northern campus alternative, the alternatives would either enter the university through the Rensch entrance (Niagara Falls Boulevard and Bailey Avenue Alternatives) or via Hadley Road (Millersport Highway Alternatives). Once on campus, the alignment would serve the central campus buildings and operate along the southern loop of Putnam Way, exiting onto Millersport Highway via Coventry Road.

As with the northern campus alternative, the roadways are generally not utilized by the general public on campus, so traffic volumes are reduced. Putnam Way has both vehicle and pedestrian pathways. The ROW for the roadway and sidewalk along Putnam Way is wide enough for at-grade operation, though some sidewalk area and street parking may need to be utilized for LRT ROW or a BRT dedicated lane. This alignment would also offer transit service to the heart of the campus.

3.4 UB North to Crosspoint Business Park

From the UB North campus to the Crosspoint Business Park, there are two alternative alignments that use the Audubon Parkway to the Lockport Expressway or Millersport Highway. In this segment, the surroundings are far less urban than along the southern end of the alignments so there is more space available and the ROWs are wider. All underground and elevated alignments north of the UB north campus are deemed unnecessary along this segment as enough space exists to operate at-grade and there is no need for complicated engineering.

3.4.1 Audubon Parkway to Lockport Expressway

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 1, 3, 5; Bailey Avenue LRT Alternative 7; Millersport Highway LRT and BRT Alternative 1

Along the Audubon Parkway and the Lockport Expressway, there is a wide grass median and the ROW is sufficiently wide to accommodate any alternative alignment. There are few signalized intersections and the necessary space for curves. Access between the campus and the Audubon Parkway and the Audubon Parkway and the Lockport Expressway could possibly involve the use of elevated structures, but there is ample space in the ROW to accommodate at-grade or elevated structures. The ROW does narrow in the vicinity of Dodge Road to the I-990 ramps and there is no grass median, but the ROW is still wide enough to accommodate the alignments. Access to the Crosspoint Business Park from the Lockport Expressway would require new construction unless the North French Road access point is utilized. The BRT alternative could also operate in traffic in this segment.

3.4.2 Millersport Highway

Niagara Falls Boulevard and Bailey Avenue LRT and BRT Alternatives 2, 4, 6; Millersport Highway LRT and BRT Alternative 2

Exiting the UB North campus, the alignments bound for Millersport Highway would exit through the southern end of campus, probably via Coventry Road. Coventry Road had a wide grass median and wide ROW, so at-grade operation would be possible. The Coventry Road intersection with Millersport Highway is also wide and has a grass median. Once the curve is made onto Millersport Highway, the median is also wide through to the bridge over Ellicott Creek, where the roadway narrows to cross the bridge. The ROW in this area is still 185 feet, so there is space to potentially widen the bridge. After the Ellicott Creek Bridge, the ROW again widens and is at least 100 feet all the way to the Crosspoint Business Park. The alignment could be operated at-grade in the median for this section. After the intersection with Stahl Road, the roadway no longer has a median, but has a wide shoulder in each direction, so the alignment could operate at- grade. In this segment, there is room for a dedicated BRT lane or the rapid transit vehicles could operate in traffic.

Entering the Crosspoint Business Park along the Crosspoint Parkway, some land at the corner may need to be utilized to make the curve, but there is space available. Once on the Crosspoint Parkway, the ROW is only about 65 feet, so there would need to be some modifications to the roadway in order to operate within the business park. There are sidewalks and grass areas between the roadway and the parking lots for the businesses along most of the Crosspoint Parkway.

4.0 SUMMARY SCREENING RESULTS

Overall screening results are presented in Table 1 and Table 2. Figure 5 through Figure 10 are maps of the alternatives advancing to Tier II analysis. They include:

- Niagara Falls Boulevard LRT and BRT Alternatives 1 and 2, including bus preferential treatment;
- Bailey Avenue LRT and BRT Alternatives 1 and 2, including bus preferential treatment;
- Millersport Highway LRT and BRT Alternatives 1 and 2, including bus preferential treatment; and
- Enhanced Bus Service Alternatives (mapped in Figure 4).

Details regarding the evaluation of each alternative are presented in Table 3 through Table 8 following the maps. All of the alternatives advancing to Tier II analysis utilize existing ROW wherever possible given the urban high density development of the study area. Use of the existing ROW minimizes the complexity of engineering and cost as compared to the acquisition of land outside the existing ROW and the construction of additional infrastructure where existing

infrastructure already exists and minimizes the direct impacts to homes, businesses, and other adjacent land uses. While alternatives that would operate outside the existing ROW were explored and evaluated, utilizing the existing transportation network base has the benefit of directly connecting activity centers and incorporating the patterns of existing and future development.

Table 1: Summary of Long List Screening by Evaluation Criteria for LRT Alternatives

Long List Alternative	Does the Alternative Meet Purpose & Need	Sufficiency of ROW/Land Area Assessed (Reasonableness Test 1)	Complex Structures, Exceeds Vehicle Maximum Grades, Curve Radii, Operational Flaws (Reasonableness Test 2)
LRT Alternatives			
Niagara Falls Boulevard			
1	yes	sufficient; but narrow ROW on Bailey Avenue	no for subset alignment; Kenmore Road curve radii fail
2	yes	sufficient; but narrow ROW on Bailey Avenue	no for subset alignment; Kenmore Road curve radii fail
3	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
4	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
5	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
6	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
7		*Alternative currently under evaluation*	
8		*Alternative currently under evaluation*	
Bailey Avenue			
1	yes	sufficient; but narrow ROW on Bailey Avenue	no
2	yes	sufficient; but narrow ROW on Bailey Avenue	no
3	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
4	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
5	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
6	yes	sufficient; but narrow ROW on Bailey Avenue	complex structure 1-290 interchange & utility corridor
7 (from Citizens for Regional Transit)	yes	narrow ROW on Bailey Avenue and utilizes extensive land outside ROW	multiple complex structures
8		*Alternative currently under evaluation*	
9		*Alternative currently under evaluation*	
Millersport Highway			
1	yes	sufficient	no
2	yes	sufficient	no
Tonawanda Turnout			
1	no, outside study area	N/A	N/A

Table 2: Summary of Long List Screening by Evaluation Criteria for BRT Alternatives

Long List Alternative	Does the Alternative Meet Purpose & Need	Sufficiency of ROW/Land Area Assessed (Reasonableness Test 1)	Complex Structures, Exceeds Vehicle Maximum Grades, Curve Radii, Operational Flaws (Reasonableness Test 2)
BRT Alternatives			
Niagara Falls Boulevard			
1	yes	sufficient	no
2	yes	sufficient	no
3	yes	sufficient	complex structure 1-290 interchange & utility corridor
4	yes	sufficient	complex structure 1-290 interchange & utility corridor
5	yes	sufficient	complex structure 1-290 interchange & utility corridor
6	yes	sufficient	complex structure 1-290 interchange & utility corridor
Bailey Avenue			
1	yes	sufficient	no
2	yes	sufficient	no
3	yes	sufficient	complex structure 1-290 interchange & utility corridor
4	yes	sufficient	complex structure 1-290 interchange & utility corridor
5	yes	sufficient	complex structure 1-290 interchange & utility corridor
6	yes	sufficient	complex structure 1-290 interchange & utility corridor
Millersport Highway			
1	yes	sufficient	no
2	yes	sufficient	no
Bailey Avenue Modern Streetcar			
1	no; circulator service with low speeds and short distances between stops	N/A	N/A

The transit service alternatives remaining following the Tier I screening will be subjected to more detailed analysis in Tier II.

Figure 5: Map of Niagara Falls Boulevard LRT Alternatives Advancing to Tier II Analysis

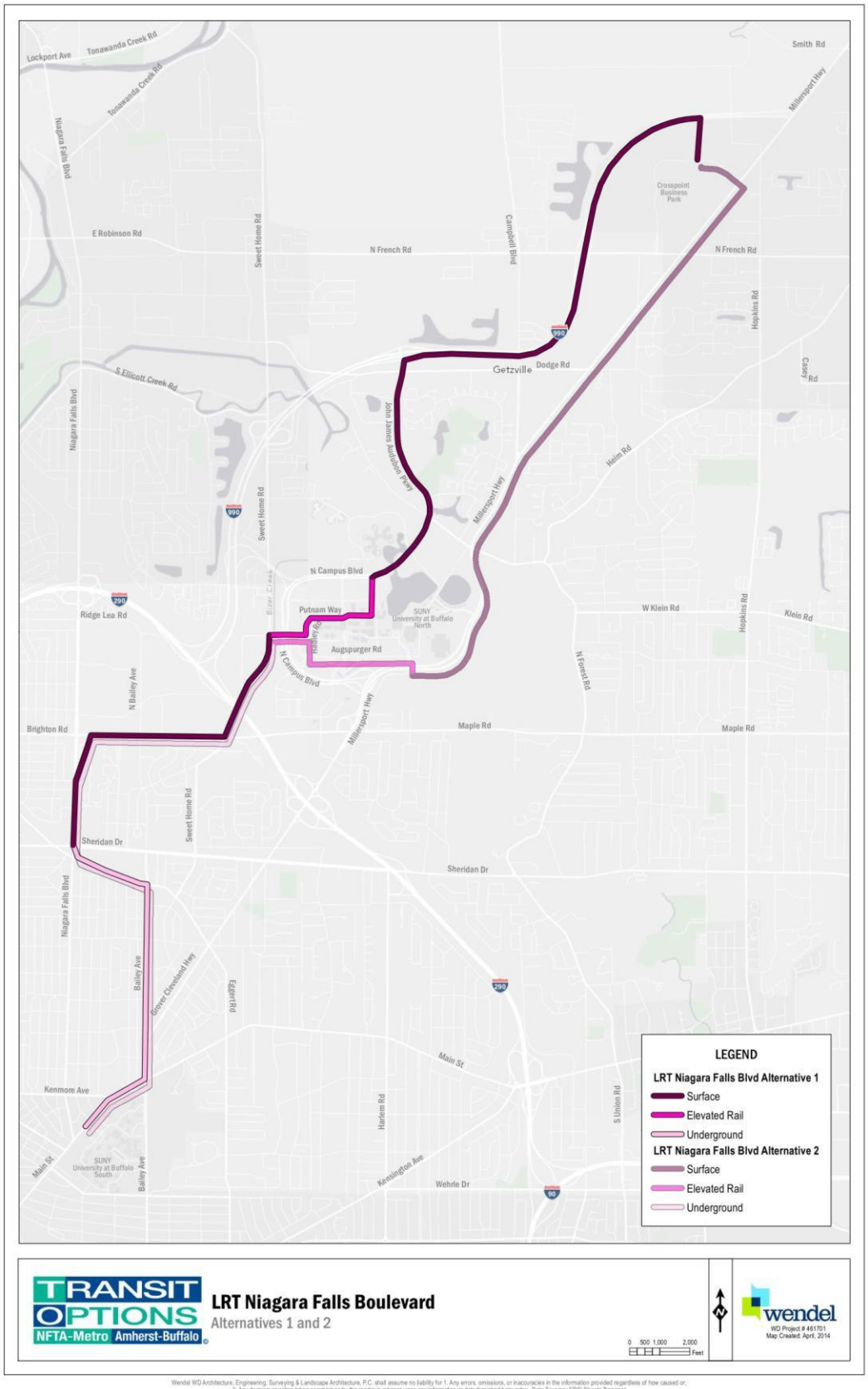


Figure 6: Map of Niagara Falls Boulevard BRT Alternatives Advancing to Tier II Analysis

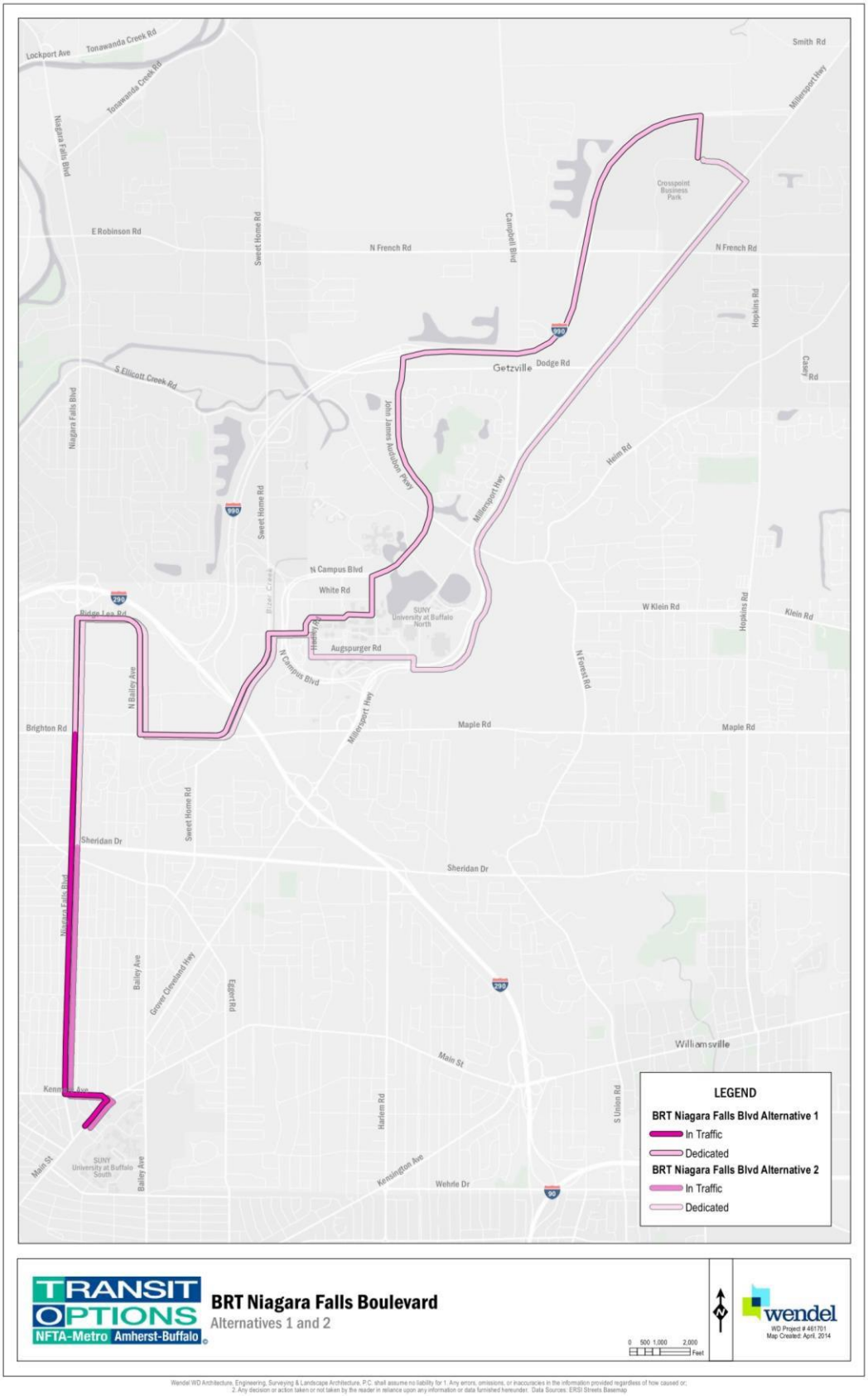


Figure 7: Map of Bailey Avenue LRT Alternatives Advancing to Tier II Analysis

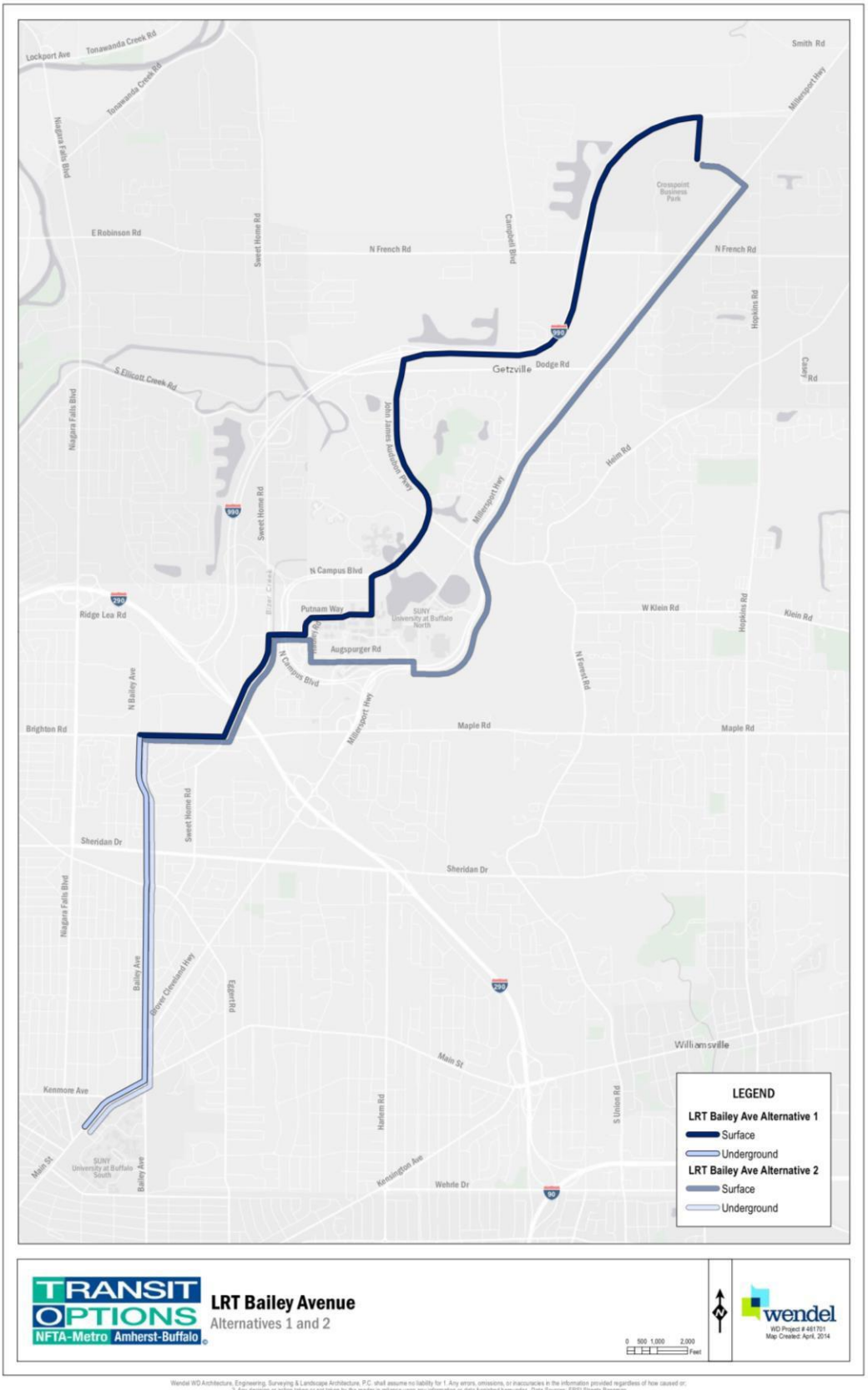


Figure 8: Map of Bailey Avenue BRT Alternatives Advancing to Tier II Analysis

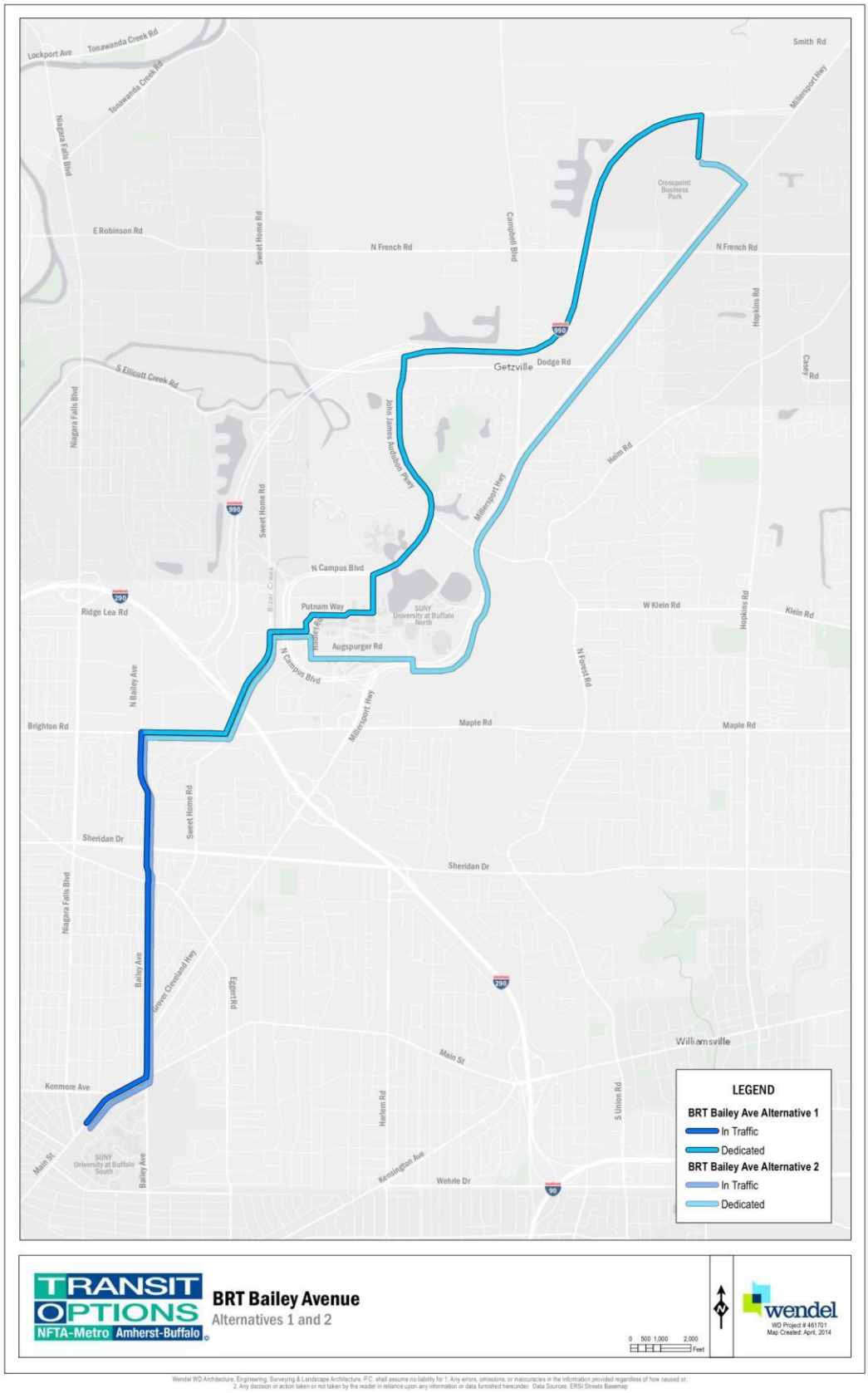


Figure 9: Map of Millersport Highway LRT Alternatives Advancing to Tier II Analysis

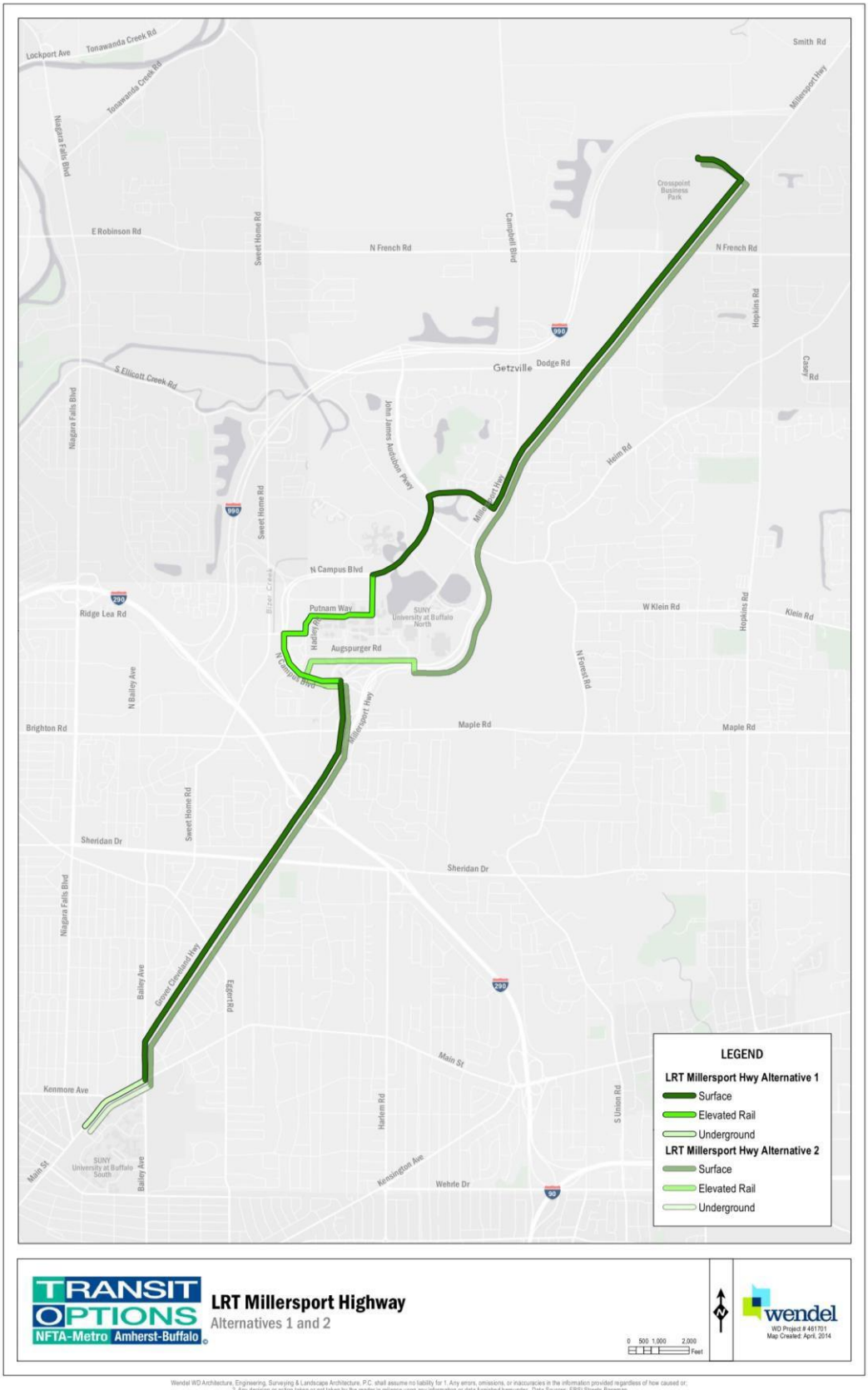


Figure 10: Map of Millersport Highway BRT Alternatives Advancing to Tier II Analysis

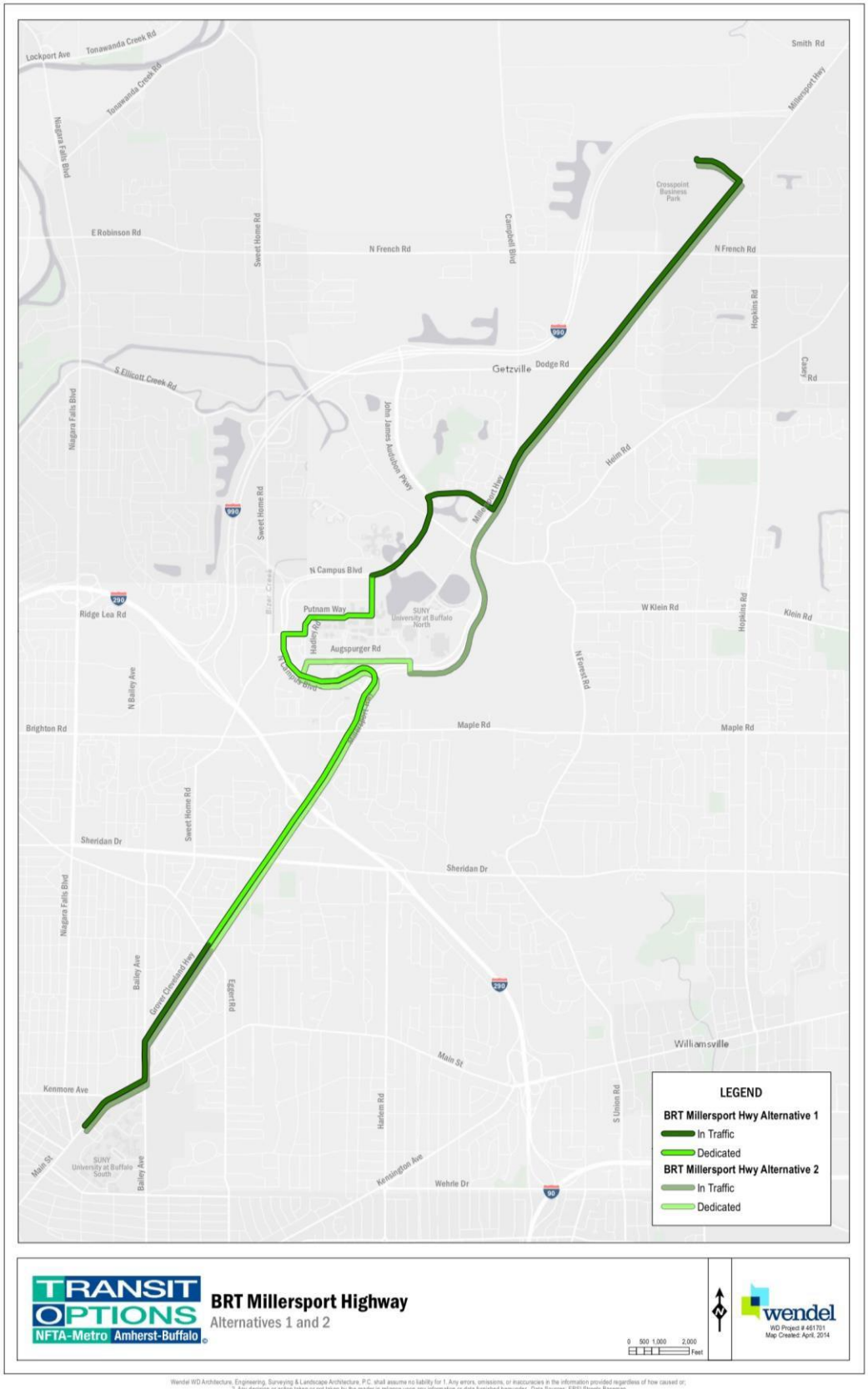


Table 3: Niagara Falls Boulevard LRT Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Niagara Falls Boulevard LRT Alternatives					
1	at-grade	Maple Road, Putnam North, Audubon Parkway	Sheridan Drive to Crosspoint	**Yes**	underground to Sheridan, at-grade beyond
	elevated		UB North		
	underground		South Campus Station, Bailey Avenue, Eggert Road, Niagara Falls Boulevard to Sheridan Drive		
2	at-grade	Maple Road, Putnam South, Millersport Highway	Sheridan Drive to Crosspoint	**Yes**	underground to Sheridan, at-grade beyond
	elevated		UB North		
	underground		South Campus Station, Bailey Avenue, Eggert Road, Niagara Falls Boulevard to Sheridan Drive		
3	at-grade	Meyer Road, Putnam North, Audubon Parkway	complex engineering at I-290 intersection including utility corridor, elevated Ford Avenue to Sheridan Drive	No	N/A
	elevated				
	underground		South Campus Station to Sheridan Drive		
4	at-grade	Meyer Road, Putnam South, Millersport Highway	complex engineering at I-290 intersection including utility corridor, elevated Ford Avenue to Sheridan Drive	No	N/A
	elevated				
	underground		South Campus Station to Sheridan Drive		
5	at-grade	Ridge Lea Road, Putnam North, Audubon Parkway	complex engineering at I-290 intersection including utility corridor, elevated Ford Avenue to Sheridan Drive	No	N/A
	elevated				
	underground		South Campus Station to Sheridan Drive		
6	at-grade	Ridge Lea Road, Putnam South, Millersport Highway	complex engineering at I-290 intersection including utility corridor, elevated Ford Avenue to Sheridan Drive	No	N/A
	elevated				
	underground		South Campus Station to Sheridan Drive		
7	at-grade	*Alternative currently under evaluation*			
	elevated				
	underground				
8	at-grade	*Alternative currently under evaluation*			
	elevated				
	underground				

Table 4: Bailey Avenue LRT Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Bailey Avenue LRT Alternatives					
1	at-grade	Maple Road, Putnam North, Audubon Parkway	ROW too narrow Bailey Avenue to Maple Road except for small sections	**Yes**	underground to Maple Road, at-grade beyond
	elevated				
	underground		South Campus Station to Maple Road		
2	at-grade	Maple Road, Putnam South, Millersport Highway	ROW too narrow Bailey Avenue to Maple Road except for small sections	**Yes**	underground to Maple Road, at-grade beyond
	elevated				
	underground		South Campus Station to Maple Road		
3	at-grade	Meyer Road, Putnam North, Audubon Parkway	ROW too narrow Bailey Avenue to Maple Road except for small sections, complex engineering at I-290 intersection including utility corridor	No	N/A
	elevated				
	underground		South Campus Station to Maple Road		
4	at-grade	Meyer Road, Putnam South, Millersport Highway	ROW too narrow Bailey Avenue to Maple Road except for small sections, complex engineering at I-290 intersection including utility corridor	No	N/A
	elevated				
	underground		South Campus Station to Maple Road		
5	at-grade	Ridge Lea Road, Putnam North, Audubon Parkway	ROW too narrow Bailey Avenue to Maple Road except for small sections, complex engineering at I-290 intersection including utility corridor	No	N/A
	elevated				
	underground		South Campus Station to Maple Road		
6	at-grade	Ridge Lea Road, Putnam South, Millersport Highway	ROW too narrow Bailey Avenue to Maple Road except for small sections, complex engineering at I-290 intersection including utility corridor	No	N/A
	elevated				
	underground		South Campus Station to Maple Road		
7 *(from the Citizens for Regional Transit)*	at-grade	Meyer Road, south side UB, Audubon Parkway, Ellicott Complex, Dodge Road	complex engineering at I-290 intersection including utility corridor, numerous aerial structures	No	N/A
	elevated				
	underground		South Campus Station to Ruth Avenue		
8	at-grade	*Alternative currently under evaluation*			
	elevated				
	underground				
9	at-grade	*Alternative currently under evaluation*			
	elevated				
	underground				

Table 5: Millersport Highway LRT, Tonawanda Turnout, and Bailey Avenue Modern Streetcar Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Millersport Highway LRT Alternatives					
1	at-grade	Millersport Highway, Putnam North, Audubon Parkway	primarily median operation	**Yes**	at-grade
	elevated		UB North		
	underground		South Campus Station run out		
2	at-grade	Millersport Highway, Putnam South, Millersport Highway	primarily median operation	**Yes**	at-grade
	elevated		UB North		
	underground		South Campus Station run out		
Tonawanda Turnout LRT Alternative					
1	at-grade	use of abandoned rail ROW and utility ROWs	outside of study area	No	N/A
	elevated				
	underground				
Bailey Avenue Modern Streetcar Alternative					
1	at-grade	circulator service	low speed, short distance between stops	No	N/A

Table 6: Millersport Highway BRT Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Millersport Highway BRT Alternatives					
1	in traffic	Millersport Highway, Putnam North, Audubon Parkway	South Campus Station to Eggert, north of UB North Campus	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		Eggert to UB North Campus, UB North Campus		
2	in traffic	Millersport Highway, Putnam South, Millersport Highway	South Campus Station to Eggert, north of UB North Campus	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		Eggert to UB North Campus, UB North Campus		

Table 7: Niagara Falls Boulevard BRT Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Niagara Falls Boulevard BRT Alternatives					
1	in traffic	Maple Road, Putnam North, Audubon Parkway	South Campus Station to Sheridan Drive	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		North of Sheridan Drive		
2	in traffic	Maple Road, Putnam South, Millersport Highway	South Campus Station to Sheridan Drive	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		North of Sheridan Drive		
3	in traffic	Meyer Road, Putnam North, Audubon Parkway	South Campus Station to Sheridan Drive	No	N/A
	dedicated lane		North of Sheridan Drive, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
4	in traffic	Meyer Road, Putnam South, Millersport Highway	South Campus Station to Sheridan Drive	No	N/A
	dedicated lane		North of Sheridan Drive, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
5	in traffic	Ridge Lea Road, Putnam North, Audubon Parkway	South Campus Station to Sheridan Drive	No	N/A
	dedicated lane		North of Sheridan Drive, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
6	in traffic	Ridge Lea Road, Putnam South, Millersport Highway	South Campus Station to Sheridan Drive	No	N/A
	dedicated lane		North of Sheridan Drive, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		

Table 8: Bailey Avenue BRT Alternatives Evaluation

#	Construction Type	Description of Alternative	Alignment Type/Issues	Move onto Tier II Analysis?	Primary Operation
Bailey Avenue BRT Alternatives					
1	in traffic	Maple Road, Putnam North, Audubon Parkway	South Campus Station to Maple Road	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		North of Maple Road		
2	in traffic	Maple Road, Putnam South, Millersport Highway	South Campus Station to Maple Road	**Yes**	mix in traffic and dedicated lanes
	dedicated lane		North of Maple Road		
3	in traffic	Meyer Road, Putnam North, Audubon Parkway	South Campus Station to Maple Road	No	N/A
	dedicated lane		North of Maple Road, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
4	in traffic	Meyer Road, Putnam South, Millersport Highway	South Campus Station to Maple Road	No	N/A
	dedicated lane		North of Maple Road, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
5	in traffic	Ridge Lea Road, Putnam North, Audubon Parkway	South Campus Station to Maple Road	No	N/A
	dedicated lane		North of Maple Road, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		
6	in traffic	Ridge Lea Road, Putnam South, Millersport Highway	South Campus Station to Maple Road	No	N/A
	dedicated lane		North of Maple Road, would need new construction to cross the 290 and utility corridor when Maple has existing ROW across		

Metro Amherst-Buffalo Corridor

TIER 2 SCREENING RESULTS
TECHNICAL MEMORANDUM

Prepared for:

Niagara Frontier Transportation Authority (NFTA)

Prepared by:

AECOM USA, Inc.
In Association with Wendel
May 2015

Table of Contents

List of Figures

List of Tables

1 INTRODUCTION

The Niagara Frontier Transportation Authority (NFTA) in coordination with the Federal Transit Administration (FTA) initiated the preparation of an Alternatives Analysis (AA) to evaluate alternative transit alignments that will connect the existing Metro Rail University Station to key destinations in Amherst to improve transit connections between downtown Buffalo and Amherst. The project is intended to provide faster, more reliable transit service, improve transit connections between major destinations in the Amherst Buffalo Corridor, better serve existing transit riders, and accommodate new transit patrons

This *Tier 2 Screening Results Working Draft Technical Memorandum* describes the second of three levels (or tiers) of alternatives screening and evaluation undertaken by NFTA in the AA process for the project. This memorandum includes a statement of the framework under which NFTA is undertaking this Alternatives Analysis, describes each alternative and the planning framework for the evaluation, summarizes the screening methodology, presents the results of the screening and evaluation, describes the input received upon sharing the results with the committees and the public, and makes recommendations for the alternatives to advance into the Tier 3 evaluation.

1.1 Overall Screening Approach

The alternatives development and evaluation process for the Metro Amherst Buffalo Corridor AA project consists of three distinct tiers of screening and evaluation. In each step, alternatives are examined and compared for their performance in terms of specific and progressively more detailed criteria along with increasingly more specific definition of alternatives. This process initially examines a large number of alternatives with the goal of reducing this “long list” of alternatives through screening and evaluation to only those that are reasonable (i.e., practical or feasible). In accordance with the Council on Environmental Quality’s (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA), this process enables FTA and NFTA to screen the full range of alternatives and arrive at a subset of reasonable alternatives to undergo detailed study in the AA. Even though this AA study is not being performed within NEPA, it is the intent of the NFTA and FTA to link this planning process with NEPA so that the full range of alternatives is analyzed so that eventually at the end of Tier 3, a Locally Preferred Alternative (LPA) can be identified and the NEPA phase of FTA’s Project Development process initiated.

Briefly, the three tiers of screening and evaluation process consist of:

- Tier 1: Preliminary Screening of the Long List of Alternatives ⟹ Preliminary Alternatives – *Tier 1 is completed and was documented in the Tier 1 Technical Memorandum.*

- Tier 2: Initial Screening of the Preliminary Alternatives ⟹ Final Build Alternatives – *the Tier 2 results are documented in this technical memorandum.*

- Tier 3: Final Screening and Evaluation of the Final Build Alternatives ⟹ Locally Preferred Alternative (LPA) – *the Tier 3 analysis will be documented in the Final AA report.*

NFTA's 2013 *Screening Methodology Technical Memorandum* for the Metro Amherst Buffalo Corridor project outlines in detail the entire screening methodology process for the AA.

2 REGULATORY SETTING

The Tier 1 and 2 screenings are elements of the AA study and were undertaken in accordance with the CEQ Regulations for Implementing NEPA (40 Code of Federal Regulations 1502.14), with federal requirements related to the environmental review (23 CFR Part 771 et seq.), and the requirements for project development and for New Starts funding (FTA Capital Investment Grant Program, 49 USC 5309). As applicable to the Tier 1 and 2 screenings, the following FTA rules and policy guidance were applied: Final Rules regarding the evaluating and rating major transit capital investments (January 9, 2013); *New and Small Starts Policy Guidance* (August, 2013); and Final Rules regarding environmental impact and related procedures (February 7, 2013). FTA recently released *Proposed Interim Policy Guidance* for their Capital Investment Grant Program in April 2015.

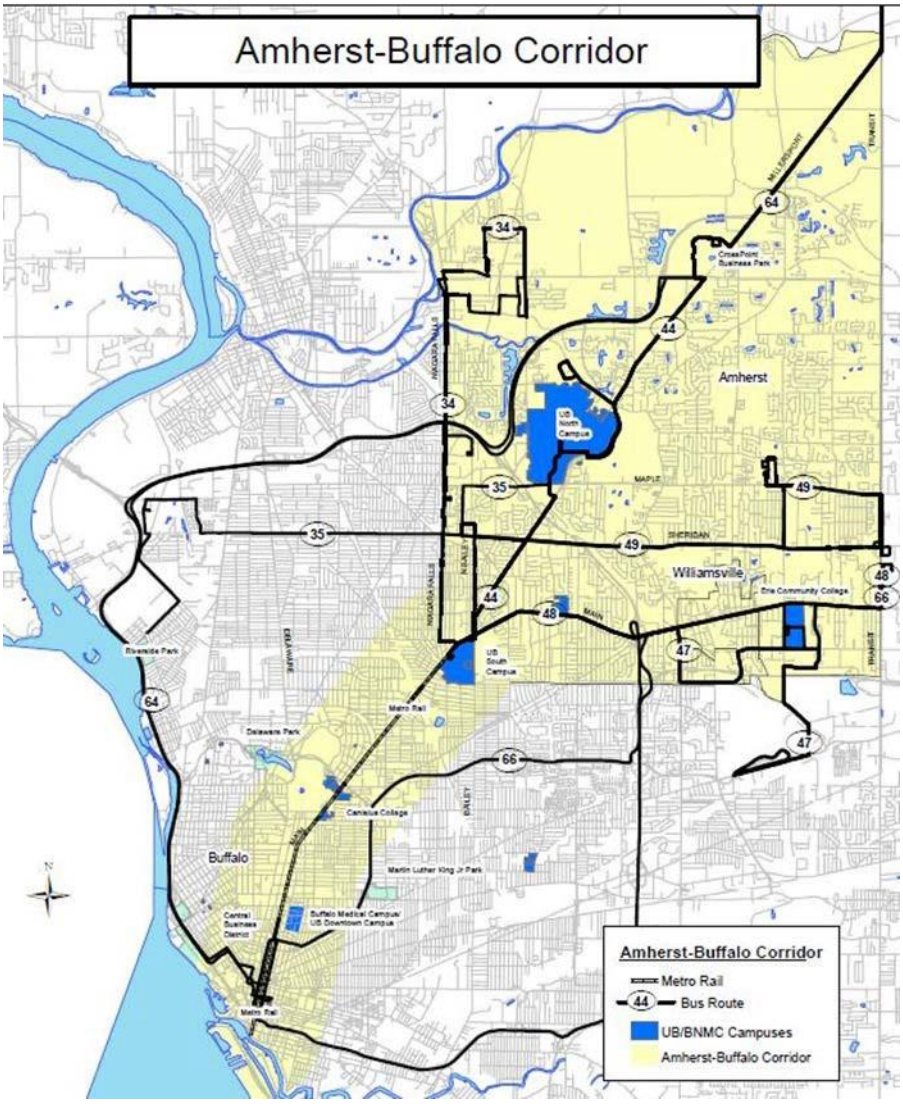
NFTA is conducting the alternatives screening and the AA to evaluate alternatives in terms of their transportation and environmental benefits and effects, and to aid in its decision- making on the course of action to take. In these activities, NFTA is complying with the Public Law 112-141 and its guidance for developing transportation projects using federal funds entitled, Moving Ahead for Progress in the 21st Century Act (MAP-21). In order to qualify for funding under the FTA New Starts program, 49 USC 5309 requires that projects be based upon the results of an environmental review. As stated early, the environmental review process (NEPA) will commence once NFTA identified an LPA. Under streamlining guidance, NFTA intends to link this AA study with the study that will occur under NEPA for study and evaluation on the LPA.

In addition, as a transportation infrastructure project for which NFTA may seek to use federal funds, the project will eventually be subject to other federal environmental review regulations during NEPA as defined by Section 4(f) and 6(f) of the Department of Transportation Act of 1966, Section 106 of the National Historic Preservation Act of 1966, the Clean Water Act and the Clean Air Act of 1970, along with other applicable federal, state and local regulations.

3 CONCEPTUAL ALTERNATIVES & PLANNING FRAMEWORK

NFTA's alternatives development and evaluation process is grounded in the project purpose and need and its goals. The overall goal of the project is to improve transit access between key activity centers in Buffalo with those in Amherst by extending the benefits of high quality transit into Amherst. It represents a way to serve a strong transit market, provide high quality transit services to existing and emerging activity centers, attract additional transit riders, provide a more efficient ride for existing transit riders between Amherst and Buffalo, help to bolster economic development, and link existing communities. The study area is depicted on the map in **Figure 1**.

Figure 1 Study Area



The purpose of the proposed project is to provide a fast, reliable, safe, and convenient transit ride in the Amherst-Buffalo Corridor linking established and emerging activity centers along the existing Metro Rail Line in the City of Buffalo with existing and emerging activity centers in the Town of Amherst. The project will better serve existing rail and bus riders, attract new transit patrons, improve connections to/from Buffalo and Amherst, and support redevelopment and other economic development opportunities. Importantly, it will serve to improve livability by increasing mobility and accessibility in communities throughout the project corridor. The project will:

- Serve increased travel demand generated by new development in downtown Buffalo and in Amherst.
- Provide high-quality transit service to and from key activity centers in the Amherst-Buffalo Corridor by providing a time-efficient transit option connecting and serving key destinations in the corridor (University at Buffalo (UB) campuses, Buffalo Niagara Medical Campus (BNMC), the Buffalo central business district (CBD), business parks, the Buffalo waterfront, among others).

- Better serve transit-dependent population segments and improve opportunities for participation of the workforce in the overall regional economy.
- Improve the system operating efficiency of the transit network.
- Support local and regional land use planning and transit-oriented design.
- Provide social benefits from transit investment that supports an array of economic and affordable housing development.
- Help meet the sustainability goals and measures as contained in state, regional, and local plans (One Region Forward-The Regional Plan for Sustainable Development, Buffalo Niagara 2050 - the Metropolitan Transportation Plan of the Greater Buffalo-Niagara Regional Transportation Council, Erie and Niagara Counties Framework for Regional Growth, the University at Buffalo 2020 Plan, the Western New York Regional Economic Development Council's (WNYREDC) Economic Development Strategic Plan , the City of Buffalo Comprehensive Plan, and the Town of Amherst Comprehensive Plan, among others).
- Help relieve parking constraints and capacity issues on the Buffalo Niagara Medical Campus and surrounding downtown area to minimize traffic and parking-related impacts on neighborhoods.

The alternatives under consideration within the AA consist of the following.

No Build Alternative: Represents future conditions in the AA analysis year of 2035 without the proposed project. The No Build Alternative includes the existing transit and transportation system in the region plus all projects in the region's fiscally constrained long range transportation plan. The No Build Alternative is included in the AA as a means of comparing and evaluating the impacts and benefits of the Build Alternatives.

Build Alternatives: Build Alternatives are future conditions in the AA analysis year of 2035 with the proposed project. The Build Alternatives are being developed through a tiered screening and alternatives definition process. The process began with a determination of a Long List of Alternatives.

NFTA developed the Long List of Alternatives from previous studies, new concepts NFTA and its engineering consultants developed, and ideas identified through agency, stakeholder and public outreach activities. Given the developed nature of the study area and an effort to avoid and minimize negative effects, the Long List of Alternatives that NFTA identified primarily use existing transportation rights of way.

Figure 2 is a map of the Long List of LRT Alternatives as displayed at the public and committee meetings. **Figure 3** is a map of the Long List of BRT Alternatives and **Figure 4** shows Preferred Bus Alternatives and **Figure 5** shows Enhanced Bus Alternatives.

The long list of alternatives consisted of thirty-seven (37) alternatives. The Tier 1 Evaluation: Long List of Alternatives report documents the results of the Tier 1 screening process. At the end of the Tier 1 screening process on the long list of alternatives, fifteen (15) alternatives were retained to take into Tier 2 alternative definition and screening (seven LRT; six BRT; Enhanced Bus; Preferred Bus).

There are two major categories of Build Alternatives under consideration in Tier 2: 1) fixed-guideway alternatives, meaning either Light Rail Transit (LRT) or Bus Rapid Transit (BRT), and 2) non-fixed guideway alternatives, meaning the alternatives that are less capital investment intensive and represent more modest improvement to transit services and are the Enhanced Bus Alternative and the Preferred Bus Alternative. Both the Enhanced Bus Alternative and the Preferred Bus Alternative are focused on improvements that are more incremental in nature and represent modest capital investment primarily employing transportation system management strategies rather than the introduction of higher quality, fixed guideway transit. These non-fixed guideway alternatives are not the subject of the Tier 2 screening process. Because of their more modest investment level, they will automatically be retained for the final Tier 3 evaluation of alternatives. This action will allow these more modest investment alternatives to be rigorously evaluated and compared and contrasted with the fixed-guideway alternatives retained for Tier 3. **Figure 6** depicts the Tier 1 and 2 screening process within the overall Alternatives Analysis study.

Figure 2 Long List of LRT Alternatives

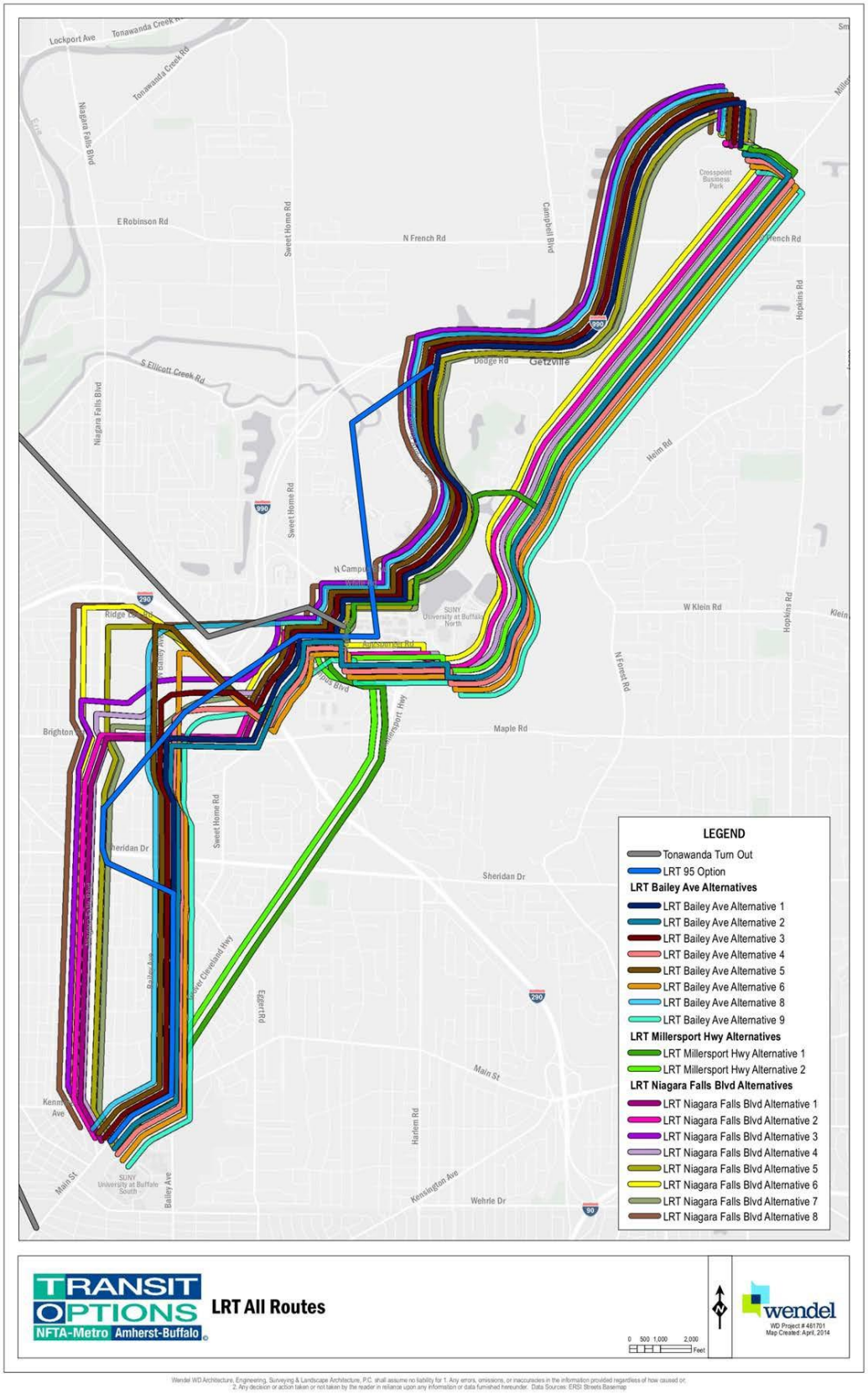


Figure 3 Long List of BRT Alternatives

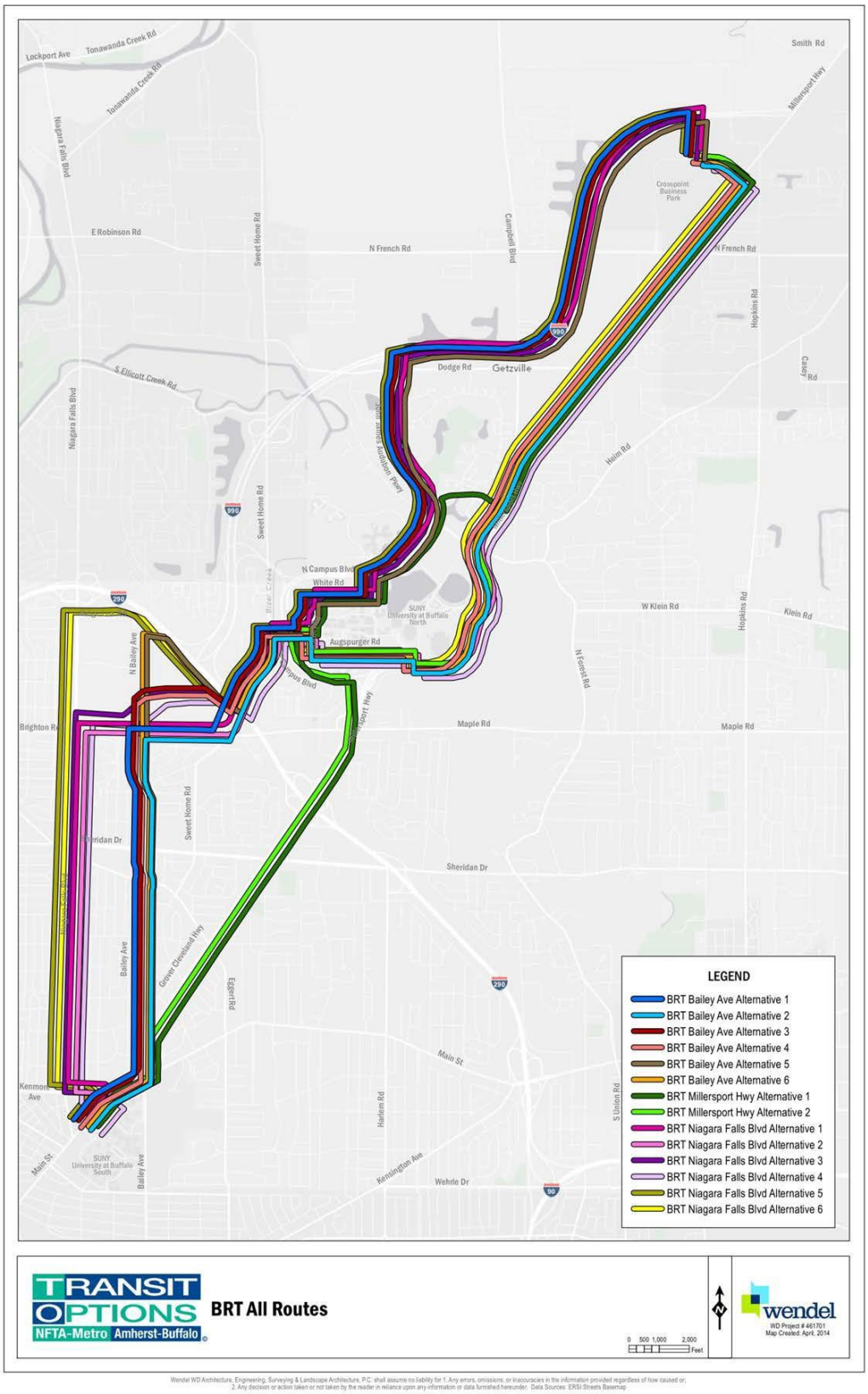


Figure 4 Preferred Bus Alternatives

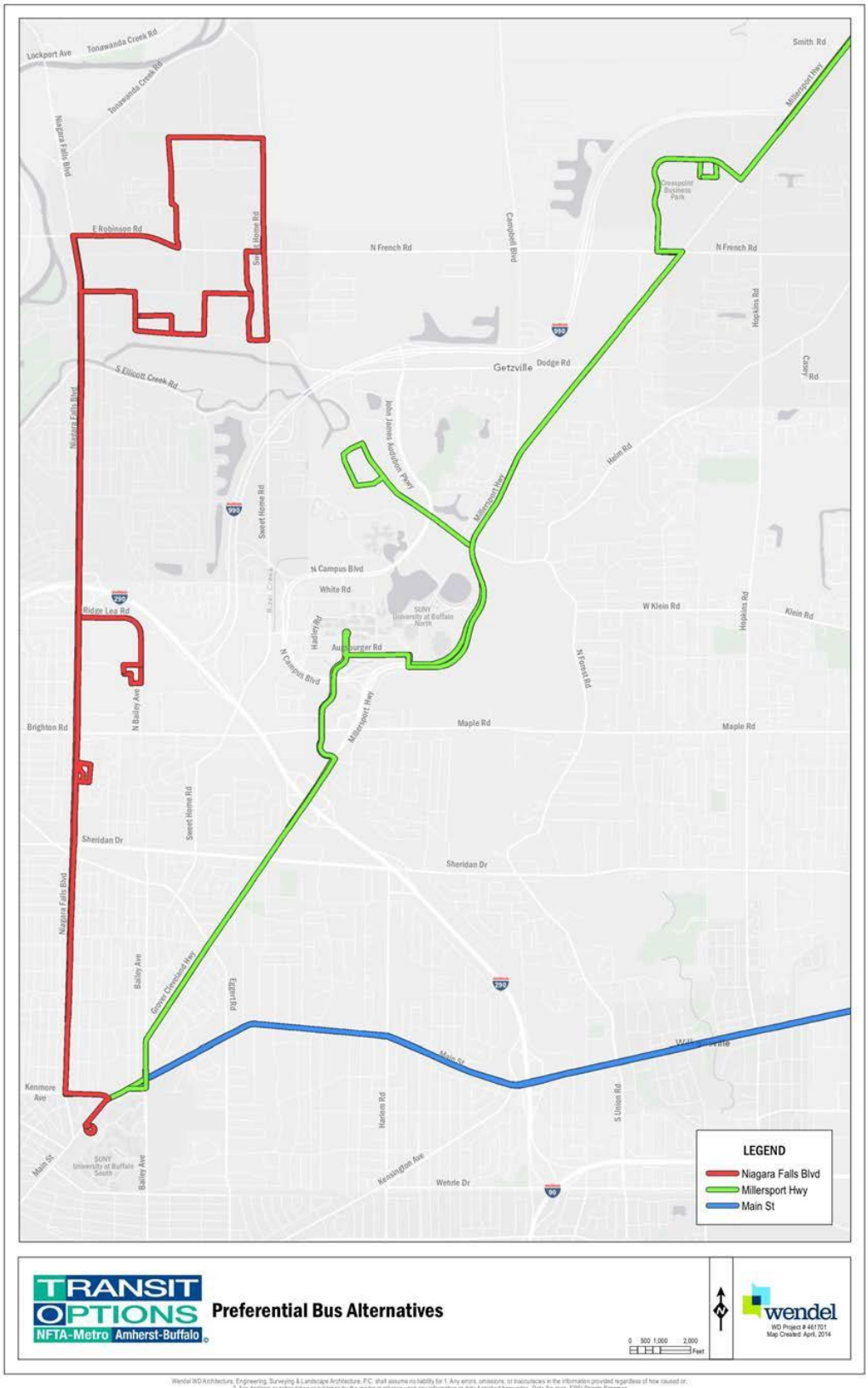


Figure 5 Enhanced Bus Alternatives

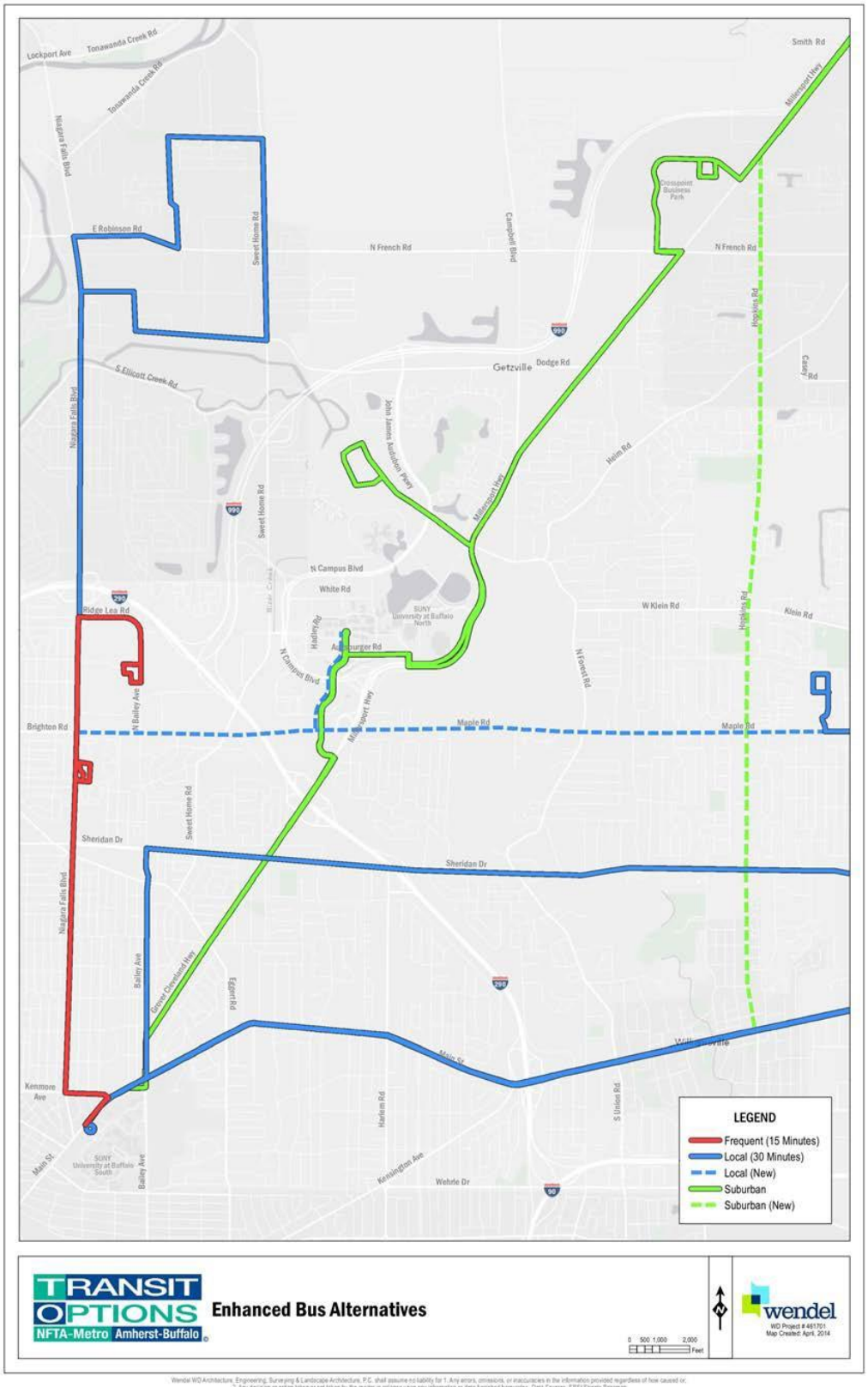
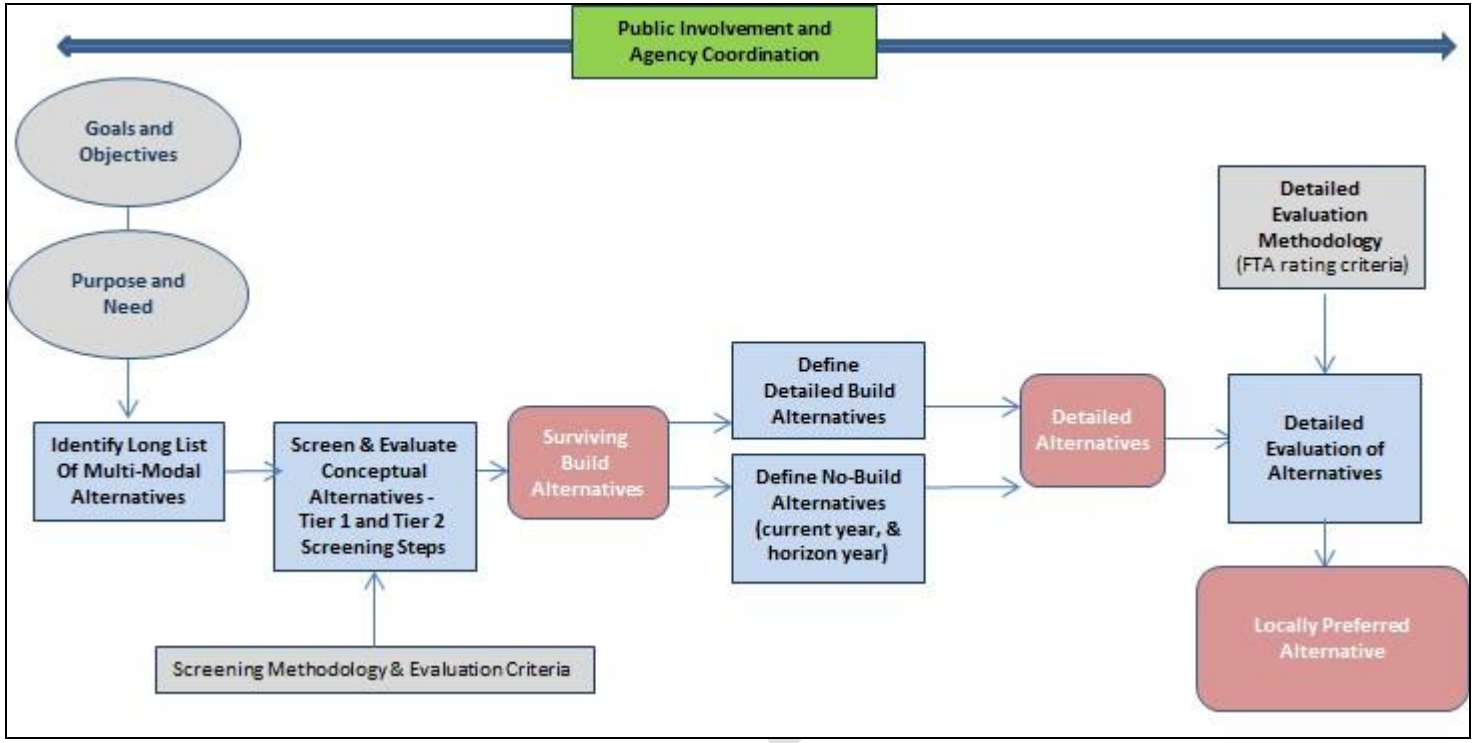


Figure 6 Alternatives Analysis Process



3.1 Preliminary Alternatives for Tier 2 Screen

In preparation for Tier 2 screening, NFTA developed the fixed-guideway (BRT and LRT) alternatives into Preliminary Alternatives by applying conceptual level engineering. The fixed-guideway alternatives were further defined, in consultation with key stakeholders and NFTA staff, to include the following elements:

- General alignments (primarily horizontal), and whether at-grade or below grade (for LRT),
- General operating speeds were determined based on alignments and conceptual level of engineering on horizontal curves,
- Preliminary stations or stop locations were identified and whether or not a station has park and ride capability and if a station is at-grade or not (thus allowing for the accounting of vertical access times where the station is below grade),
- An initial service plan with headway and station/stop level travel times was developed for each alternative (for the alternative's new transit service as well as an underlying service plan for existing (NFTA bus) transit services).

By further defining the Preliminary Alternatives, NFTA could subject them to a more rigorous and quantitative analysis in the Tier 2 screen compared to that which occurred under Tier 1. For example, conceptual level engineering enabled NFTA define an initial service strategy, and with that service strategy apply a validated travel demand model for estimating ridership forecasts.

The seven LRT alternatives advanced to Tier 2 screening include LRT alternatives using three primary travel corridors: 1) Bailey Avenue/Niagara Falls Boulevard, 2) Bailey Avenue, and 3) Millersport Highway. Initial definition of these LRT alternatives in Tier 1 (Long List of Alternatives) had more pronounced differences each alternative's alignment pathways. Similarly, the six BRT alternatives advanced to Tier 2 screening include BRT alternatives using three primary travel corridors: 1) Bailey Avenue/Niagara Falls Boulevard, 2) Bailey Avenue, and 3) Millersport Highway.

However, as a result of both the conceptual engineering conducted and on-going dialogue with key stakeholders, alignment pathways for the alternatives were refined. For example, to access Niagara Falls Boulevard using LRT from the underground Metro Rail UB South Campus University Station, conceptual engineering determined that the use of Main Street and Bailey Avenue was required as the curve radii at Kenmore Avenue could not be met and prevents direct access to Niagara Falls Boulevard from this location by light rail. Additionally, dialogue with UB officials resulted in one preferred common alignment pathway for LRT alternatives through the UB North Campus. This definition of one common LRT pathway through UB North Campus resulted in the elimination of one LRT alternative (Millersport LRT 2) as the only difference between Millersport LRT 1 and Millersport LRT 2 was how each traversed through UB North. And similarly a common alignment pathway for BRT alternatives through the UB North Campus also resulted from dialogue with UB officials. As a result, this also reduced the BRT alternatives using Millersport Highway to one.

Table 1 provides a description of the disposition of the alternatives that were carried forward from Tier 1 into Tier 2 based on dialogue with UB officials. Thirteen (13) alternatives were carried into Tier 2 with eleven (11) fixed-guideway alternatives subject to the Tier 2 screen.

Table 1 Disposition of Tier 2 Alternatives

Initial Count	Alternative	Disposition in Tier 2 per UB Dialogue	New Count
Fixed Guideway Alternatives			
Light Rail Transit			
1	Niagara Falls Blvd LRT 1	Continue Tier 2 screen	1
2	Niagara Falls Blvd LRT 2	Continue Tier 2 screen	2
3	Niagara Falls Blvd LRT 7	Continue Tier 2 screen	3
4	Bailey Avenue LRT 1	Continue Tier 2 screen	4
5	Bailey Avenue LRT 2	Continue Tier 2 screen	5
6	Millersport Hwy LRT 1	Continue Tier 2 screen	6
7	Millersport Hwy LRT 2	Removed from further analysis as only difference in Millersport Hwy LRT Alternatives 1 and 2 were their alignments thru UB North. With common alignment determination on UB, they are identical	n/a
Bus Rapid Transit			
8	Niagara Falls Blvd BRT 1	Continue Tier 2 screen	7
9	Niagara Falls Blvd BRT 2	Continue Tier 2 screen	8
10	Bailey Avenue BRT 1	Continue Tier 2 screen	9
11	Bailey Avenue BRT 2	Continue Tier 2 screen	10
12	Millersport Hwy BRT 1	Continue Tier 2 screen	11
13	Millersport Hwy BRT 2	Removed from further analysis as only difference in Millersport Hwy BRT Alternatives 1 and 2 were their alignments thru UB North. With common alignment determination, they are identical	n/a
Non-Fixed Guideway Alternatives			
14	Preferential Bus	Moves through Tier 2 for Analysis in Tier 3	12
15	Enhanced Bus	Moves through Tier 2 for Analysis in Tier 3	13

The eleven (11) resulting LRT and BRT Preliminary Alternatives are aligned along three corridors: the Niagara Falls Boulevard corridor, the Bailey Avenue corridor, and the Millersport Highway corridor. Using these similar pathways, NFTA grouped the Preliminary Alternatives by their common corridors. The eleven (11) Preliminary Alternatives retained for the Tier 2 screen are depicted on **Figures 6 and 7**. The eleven, fixed-guideway Preliminary Alternatives that will undergo the Tier 2 screen are listed in Tables 2 and 3.

Table 2 LRT Alternatives for the Tier 2 Screen

Alternative
Niagara Falls Blvd LRT 1
Niagara Falls Blvd LRT 2
Niagara Falls Blvd LRT 7
Bailey Avenue LRT 1
Bailey Avenue LRT 2
Millersport Hwy LRT 1

Table 3 BRT Alternatives for the Tier 2 Screen

Alternative
Niagara Falls Blvd BRT 1
Niagara Falls Blvd BRT 2
Bailey Avenue BRT 1
Bailey Avenue BRT 2
Millersport Hwy BRT 1

3.1.1 Development of Conceptual Alternatives for Tier 2 Screening

Engineering elements include the following:

- Establish design criteria for refinement of LRT and BRT Conceptual Alternatives.
- Develop refined horizontal alignments and typical cross section geometry for each alternative.
- Identify the location and quantity of tunnel, surface and elevated segments as well as locations for portals, bridges, transit priority signals, queue jumps and other infrastructure necessary to support LRT and BRT alternatives.
- Define locations and conceptual geometry for LRT and BRT passenger stations.
- Identify right of way needs for Conceptual Alternatives.

Conceptual engineering was used to support development of operating speed tables for the ridership forecasting and other data for use in the Tier 2 alternative evaluation matrix.

3.1.1.1 LRT and BRT Design Criteria

Conceptual design criteria were developed for LRT and BRT. This section describes the criteria.

Since the LRT vehicle will need to operate on existing and future guideway, the existing NFTA light rail vehicle was selected as the design vehicle. Design and operating parameters for the NFTA's existing LRT vehicles and system were used to develop design criteria set forth in **Table 4.**

Table 4 Light Rail Transit (LRT) Design Criteria

1. Design Vehicle - Existing NFTA light rail vehicle
2. Speeds
a. Below Ground Tunnel Segments– 50 mph
b. Above Ground Bridge Section – 50 mph
c. At Grade outside Street ROW- 50 mph
d. At Grade within Street ROW – Speed limit of adjacent roadway
e. At Grade mixed pedestrian – 15 mph
f. Yard – 5 mph
3. Horizontal Alignment
a. Minimum length of the tangent section between curves is 3 times the speed or 100 ft – whichever is larger
b. Minimum radius is governed by design speed
c. Minimum radius for yard and secondary track is 75 feet
d. Equilibrium super elevation maximum is 10 inches
e. Curvature in degrees – based on Ee of 10 inches, D = 6.1 degrees (maximum)
4. Vertical Alignment
a. Maximum grade shall be 5%
b. Changes in grade should be connected by parabolic curves
c. Minimum length of vertical curve (L) shall be larger of the following:
i. $L = 0.0134\ D\ V^2$
ii. L = 33D
L = length of curve
D = Algebraic difference of adjoining grades in percent
V = Design Speed in mph
d. Absolute minimum length (L) of vertical curve is 100 feet
e. The minimum length of constant grade between curves shall be 75 feet

These criteria were used to develop horizontal alignments and speed tables for Tier 2 LRT Preliminary Alternatives. Each LRT alternative is described further below.

Niagara Falls Boulevard – LRT Alternative # 1

Conceptual Alignment – Main Street – Bailey Avenue – Eggert Road- Niagara Falls Boulevard- Maple Road – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – I-990 – Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel to Bailey Avenue. The concept alignment will continue underground below Bailey Avenue and Eggert Road to a portal in near Alberta Drive. Once at the surface, the concept alignment would utilize a dedicated guideway in the center of Niagara Falls Boulevard ROW to the

Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Maple Road to Sweet Home Road. The concept alignment would utilize dedicated guideway rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The guideway would be elevated on a new structure from the I-990 median into the Crosspoint Business Park.

Niagara Falls Boulevard – LRT Alternative # 2

Conceptual Alignment – Main Street – Bailey Avenue – Eggert Road- Niagara Falls Boulevard- Maple Road – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel to Bailey Avenue. The concept alignment will continue underground below Bailey Avenue and Eggert Road to a portal in near Alberta Drive. Once at the surface, the concept alignment would utilize a dedicated guideway in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Maple Road to Sweet Home Road. The concept alignment would utilize dedicated guideway rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway and Sylvan Parkway to Millersport Highway. The LRT would continue in the median of Millersport Highway to Crosspoint Business Park utilizing a dedicated surface guideway.

Niagara Falls Boulevard – LRT Alternative # 7

Conceptual Alignment – Main Street – Bailey Avenue – Eggert Road- Niagara Falls Boulevard- Meyers Road- I-290 Crossing – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – I-990 Median – Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel to Bailey Avenue. The concept alignment will continue underground below Bailey Avenue and Eggert Road to a portal in near Alberta Drive. Once at the surface, the concept alignment would utilize a dedicated guideway in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Meyer Road. A shallow cut and cover tunnel would be used to provide a grade-separated, below grade crossing of the I-290 to Sweet Home Road. The concept alignment would utilize dedicated guideway in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The

guideway would be elevated on a new structure from the I-990 median into the Crosspoint Business Park.

Bailey Avenue – LRT Alternative # 1

Conceptual Alignment – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – I-990 Median – Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel continuing underground to Bailey Avenue then surfacing through a portal on Maple Road. Once at the surface, dedicated lanes in the center of Maple Road would be utilized to Sweet Home Road. The concept alignment would utilize dedicated guideway in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The guideway would be elevated on a new structure from the I-990 median into the Crosspoint Business Park.

Bailey Avenue –LRT Alternative # 2

Conceptual Alignment – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel continuing underground to Bailey Avenue then surfacing through a portal on Maple Road. Once at the surface, dedicated lanes in the center of Maple Road would be utilized to Sweet Home Road. The concept alignment would utilize dedicated guideway in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway and Sylvan Parkway to Millersport Highway. The LRT would continue in the median of Millersport Highway to Crosspoint Business Park utilizing a dedicated surface guideway.

Millersport Avenue – LRT Alternative # 1

Conceptual Alignment – Main Street – Bailey Avenue – Grover Cleveland Highway – Millersport Highway – Flint Road – UB North Campus Alignment – Putnam Way – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

The concept alignment would begin at the South Campus Station utilizing the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Millersport Highway near Westfield Road. On Millersport Highway surface guideway would be constructed in the median to the intersection of Flint Road. A shallow cut and cover tunnel would be used to provide a grade separated crossing of the Maple Road and the UB North Campus circulatory road to a point south of Augsburger Road. On the campus the concept alignment would utilize

surface guideway and approximately follow Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway and Sylvan Parkway to Millersport Highway. The LRT would continue in the median of Millersport Highway to Crosspoint Business Park utilizing a dedicated surface guideway.

Design criteria for BRT were developed based on guidance set forth in the American Association of State Highway and Transportation Officials (AASHTO) *Guide for Geometric Design of Transit Facilities on Highways and Streets*, AASHTO *Geometric Design of Highways and Streets* and New York State Department of Transportation *Highway Design Manual*. These documents provide criteria relative to horizontal and vertical alignment geometry, travel lane widths as well as geometry for intersections, queue jumps and other BRT design elements.

A standard low floor articulated bus was selected as the design vehicle. Geometric operating characteristics associated with that bus are illustrated in **Figure 7.** BRT design criteria are set forth in **Table 5.**

Table 5 Bus Rapid Transit (BRT) Design Criteria

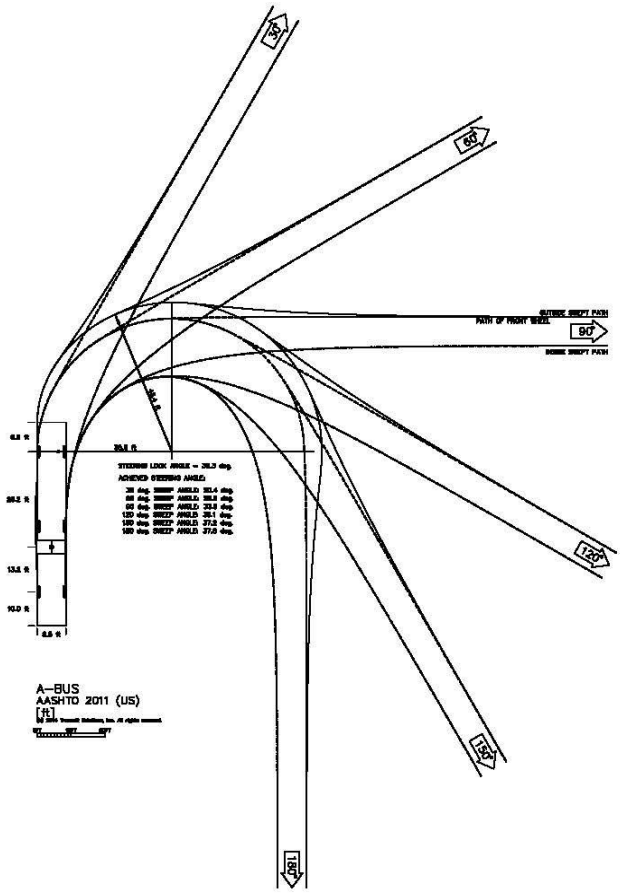
1. Design Vehicle – Articulated Bus
2. Speeds
a. At Grade outside Street ROW- 55 mph
b. At Grade within Street ROW – Speed limit of adjacent roadway
c. Above Ground Bridge Section – 45 mph
d. At Grade Mixed Pedestrian Section – 15 mph
3. Horizontal Alignment
a. Minimum radius is governed by design speed per AASHTO Geometric Design of Highways and Streets
b. Minimum radius at intersections is 20 feet based on Design Vehicle Turning Geometry
c. Maximum super elevation maximum is 4%
4. Vertical Alignment
a. Maximum grade shall be 5%
b. Changes in grade should be connected by simple curves
c. Minimum length of vertical curve (L) shall be 100 feet

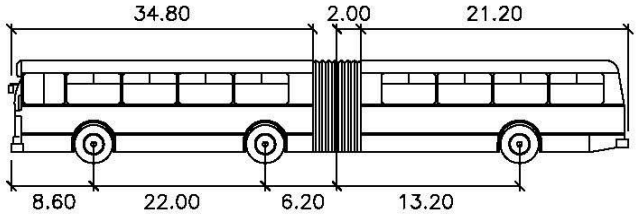
These criteria were used to develop horizontal alignments and speed tables for Tier 2 BRT Conceptual Alternatives. Each BRT alternative is described further below.

Niagara Falls Boulevard – BRT Alternative # 1

Conceptual Alignment – Main Street – Kenmore Avenue - Niagara Falls Boulevard –Ridge Lee Road – North Bailey Avenue – Maple Road – Sweet Home Road –Rensch Road – UB North Campus Alignment – John James Audubon Parkway – I-990 Expressway – Crosspoint Business Park

Figure 7 Articulated Bus Geometric Operating Characteristics





A–BUS
feet

Width	: 8.50	Lock to Lock Time	: 6.0
Track	: 8.50	Steering Angle	: 38.3
		Articulating Angle	: 50.0

TRANSIT OPTIONS NFTA-Metro Amherst-Buffalo ARTICULATED BUS TEMPLATE NOT TO SCALE wendel

BRT vehicles would arrive and depart from the existing South Campus Station bus loop and travel on Main Street, Kenmore Avenue and Niagara Falls Boulevard. BRT vehicles would operate in mixed use travel lanes to Niagara Falls Boulevard. BRT Vehicles then would travel north on Niagara Falls Boulevard in dedicated bus lanes past the Boulevard Mall to Ridge Lee Road and return south on North Bailey Avenue. From North Bailey Avenue BRT vehicles would travel east on Maple Road in dedicated bus lanes to Sweet Home Road. BRT vehicles would travel down Sweet Home Road in part time dedicated bus lanes to the Rensch Road Entrance at the UB North Campus. On campus, BRT vehicles would utilize Putnam Way and dedicated surface lanes running parallel to and south of Putnam Way. From the UB North Campus BRT vehicles would operate in dedicated outside lanes along the John James Audubon Parkway to the I-990. BRT vehicles would operate improved dedicated lanes constructed in the existing shoulder of I-990 to Crosspoint Business Park. A new interchange would be constructed from I-990 to provide access into the Crosspoint Business Park.

Niagara Falls Boulevard – BRT Alternative # 2

Conceptual Alignment – Main Street – Kenmore Avenue - Niagara Falls Boulevard –Ridge Lee Road – North Bailey Avenue – Maple Road – Sweet Home Road –Rensch Road – UB North Campus Alignment – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

BRT vehicles would arrive and depart from the existing South Campus Station bus loop and travel on Main Street, Kenmore Avenue and Niagara Falls Boulevard. BRT vehicles would operate in mixed use travel lanes to Niagara Falls Boulevard. BRT vehicles then would travel north on Niagara Falls Boulevard in dedicated bus lanes past the Boulevard Mall to Ridge Lee Road and return south on North Bailey Avenue. From North Bailey Avenue BRT vehicles would travel east on Maple Road in dedicated outside lanes to Sweet Home Road. BRT vehicles would travel down Sweet Home Road in part time dedicated lanes to the Rensch Road Entrance at the UB North Campus. On campus, BRT vehicles would utilize Putnam Way and dedicated surface lanes running parallel to and south of Putnam Way. From the UB campus BRT vehicles would operate in dedicated outside lanes along the John James Audubon Parkway and Sylvan Parkway to Millersport Highway. BRT Vehicles would travel down the median of Millersport Highway in newly constructed dedicated lanes into Crosspoint Business Park.

Bailey Avenue – BRT Alternative # 1

Conceptual Alignment – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Sweet Home Road – Rensch Road – UB North Campus Alignment – John James Audubon Parkway – I-990 Expressway – Crosspoint Business Park

BRT vehicles would arrive and depart from the existing South Campus Station bus loop and travel on Main Street to Bailey Avenue. From there, BRT vehicles would utilize the existing jug handle to turn left onto Bailey Avenue and continue past the Boulevard Mall to Maple Road. BRT vehicles would operate in mixed use travel lanes to Maple Road. BRT vehicles would travel down Maple Road in dedicated outside lanes to Sweet Home Road. BRT vehicles would utilize Sweet Home Road in part time dedicated outside lanes to the Rensch Road entrance to the UB North Campus. On the UB North Campus, BRT vehicles would utilize Putnam Way and dedicated surface lanes running parallel to and south of Putnam Way. From the UB North Campus BRT vehicles would operate in dedicated outside lanes along the John James

Audubon Parkway to the I-990. BRT vehicles would operate in improved dedicated lanes constructed in the existing shoulder of I-990 into Crosspoint Business Park. A new interchange would be constructed from I-990 to provide access in
to Crosspoint Business Park.

Bailey Avenue – BRT Alternative # 2

Conceptual Alignment – Main Street – Bailey Avenue – Maple Road – Sweet Home Road – Sweet Home Road – Rensch Road – UB North Campus Alignment – John James Audubon Parkway – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

BRT vehicles would arrive and depart from the existing South Campus Station bus loop and travel on Main Street to Bailey Avenue. From there, BRT vehicles would utilize the existing jug handle to turn left onto Bailey Avenue and continue past the Boulevard Mall to Maple Road. BRT vehicles would operate in mixed use travel lanes to Maple Road. BRT vehicles would travel down Maple Road in dedicated outside lanes to Sweet Home Road. BRT vehicles would utilize Sweet Home Road in part time dedicated outside lanes to the Rensch Road entrance to the UB North Campus. On the UB North Campus, BRT vehicles would utilize Putnam Way and dedicated surface lanes running parallel to and south of Putnam Way. From the UB North Campus BRT Vehicles would operate in dedicated outside lanes along the John James Audubon Parkway and Sylvan Parkway to Millersport Highway. BRT vehicles would travel down the median of Millersport Highway in newly constructed dedicated lanes into Crosspoint Business Park.

Millersport Avenue – BRT Alternative # 1

Conceptual Alignment – Main Street – Bailey Avenue – Millersport Road – Hadley Road – Putnam Way – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

BRT vehicles would arrive and depart from the existing South Campus Station bus loop and travel on Main Street to Bailey Avenue. From there, BRT vehicles would utilize the existing jug handle to turn left onto Bailey Avenue then turn right and continue on Grover Cleveland and Millersport Highway. BRT vehicles would operate in mixed use travel lanes to Sheridan Drive. North of Sheridan Drive, BRT vehicles would utilize dedicated median lanes to Flint Road. BRT vehicles would share the UB North Campus circulatory road ramps to access the UB North Campus on Flint Road. On campus, BRT vehicles would utilize Flint Road, Putnam Way and dedicated surface lanes running parallel to and south of Putnam Way. From the UB North Campus BRT vehicles would operate in dedicated outside lanes along the John James Audubon Parkway and Sylvan Parkway to Millersport Highway. BRT vehicles would travel down the median of Millersport Highway in newly constructed dedicated lanes to Crosspoint Business Park.

3.1.1.2 LRT and BRT Conceptual Cross Sections and ROW Determination

As part of the Tier 2 alternatives definition and evaluation process, conceptual cross sections were developed for both LRT and BRT Preliminary Alternatives. Conceptual cross section development is necessary to identify future ROW needs for development of each conceptual alternative.

LRT Alternatives

LRT vehicles would operate within dedicated guideways that are located in underground tunnels, within existing streets or at-grade surface off-street guideways. Representative cross sections were developed for LRT alternatives using the following criteria.

- All surface segments of LRT Preliminary Alternatives would operate in dedicated guideways. Vehicle traffic would be precluded from operating within LRT guideways.
- Within existing street rights-of-way, existing travel lanes and pedestrian facilities would be retained. Detailed traffic analysis would need to be performed to determine if travel lanes could be eliminated.
- Within existing street rights-of-way, existing turn lanes would be eliminated with turns being restricted to street intersections. Available snow storage as well as parkway and green space will be reduced to required minimum widths based on AASHTO and NYSDOT design criteria.
- In areas where guideway is located outside of existing street rights-of-way, the guideway width shall be 60 feet. This width will accommodate the LRT guideway as well as areas outside the guideway for construction and future maintenance.
- In tunnel sections, the minimum width for inbound and outbound tunnels shall be 100 feet. This width will accommodate the LRT tunnels as well as areas outside the tunnels for construction and future maintenance.
- In portal sections the maximum width of the portal shall be 50 feet. This width will accommodate the LRT guideway as well as areas outside the guideway for emergency egress, construction and future maintenance.

Conceptual cross sections have been developed using these criteria and representative cross sections for existing streets within the Bailey Avenue, Millersport Highway and Niagara Falls Boulevard corridors. Conceptual LRT cross sections are illustrated in **Figures 8 thru 15** and described below.

- **LRT CONCEPT SECTION 1**– The existing street includes four travel lanes and a center turn lane. This section represents an at-grade guideway located in the center of the travel lanes. The existing center turn lane would be eliminated and left turns now would be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound trains. The additional width required for LRT development is 35 feet.
- **LRT CONCEPT SECTION 2** - The existing street includes three travel lanes and a center landscaped median. This section represents an at-grade guideway located outside of the travel lanes. The existing median would be eliminated and left turns would continue to be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound trains. The additional width required for LRT development is 35 feet.
- **LRT CONCEPT SECTION 3-** The existing street includes four travel lanes and a center landscaped median. This section represents an at-grade guideway located in the center of the travel lanes. The existing median would be eliminated and left turns would continue to be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound trains. The additional width required for LRT development is 35 feet.
- **LRT CONCEPT SECTION 4**– The existing street includes two travel lanes. This section represents an at-grade guideway located in the center of the travel lanes. Left turns now

would be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound trains. The additional width required for LRT development is 35 feet.

- **LRT CONCEPT SECTION 5** – The existing street includes four travel lanes and a center turn lane. This section represents an at-grade guideway located in the center of the travel lanes. The existing center turn lane would be eliminated and left turns now would be restricted to cross street intersections. Surface stations would incorporate a center platform for use by both inbound and outbound trains. The additional width required for LRT development is 38 feet.
- **LRT CONCEPT SECTION 6 -** The existing street includes four travel lanes and a center landscaped median. This section represents an at-grade guideway located in the center of the travel lanes. The existing median would be eliminated and left turns would continue to be restricted to cross street intersections. Surface stations would incorporate a center platform for use by both inbound and outbound trains. The additional width required for LRT development is 38 feet.
- **LRT CONCEPT SECTION 7** –This section represents a below grade tunnel guideway that would be located in the center of the existing street ROW. Since this is a tunnel section, minimal modifications would be required to surface streets to accommodate station access. Below grade stations would have adjacent separate outside platforms for inbound and outbound trains. The overall width required for this cross section is dependent solely on the width necessary for tunnel and station construction. Therefore, the required width is 100 feet.
- **LRT CONCEPT SECTION 8** –This section represents a below grade tunnel guideway without a station. The tunnel would be located in the center of the existing street ROW. Since this is a tunnel section, minimal modifications would be required to surface streets. The overall width required for this cross section is dependent solely on the width necessary for tunnel construction. Therefore, the required width is 60 feet.

Concept cross sections were used to determine the ROW required for each segment of the LRT Preliminary Alternatives. Within each segment, the additional guideway width was added to the width of existing streets to determine the overall ROW width required for LRT development. Results of this determination were used for the Right of Way needs criteria of the Tier 2 Alternative Evaluation Matrix.

Results of these calculations are presented in Appendix A.

Figure 8 LRT Concept Section 1

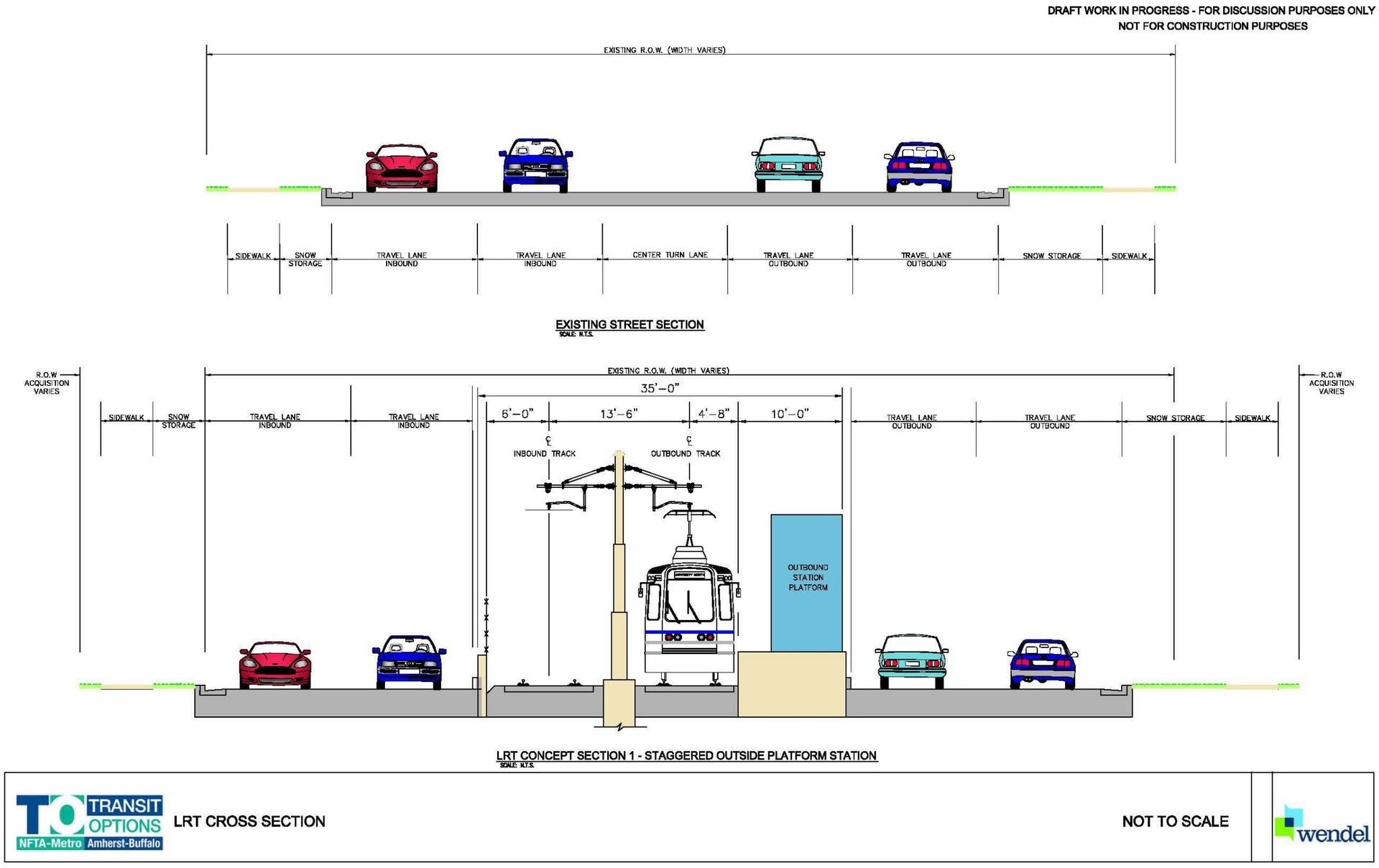


Figure 9 LRT Concept Section 2

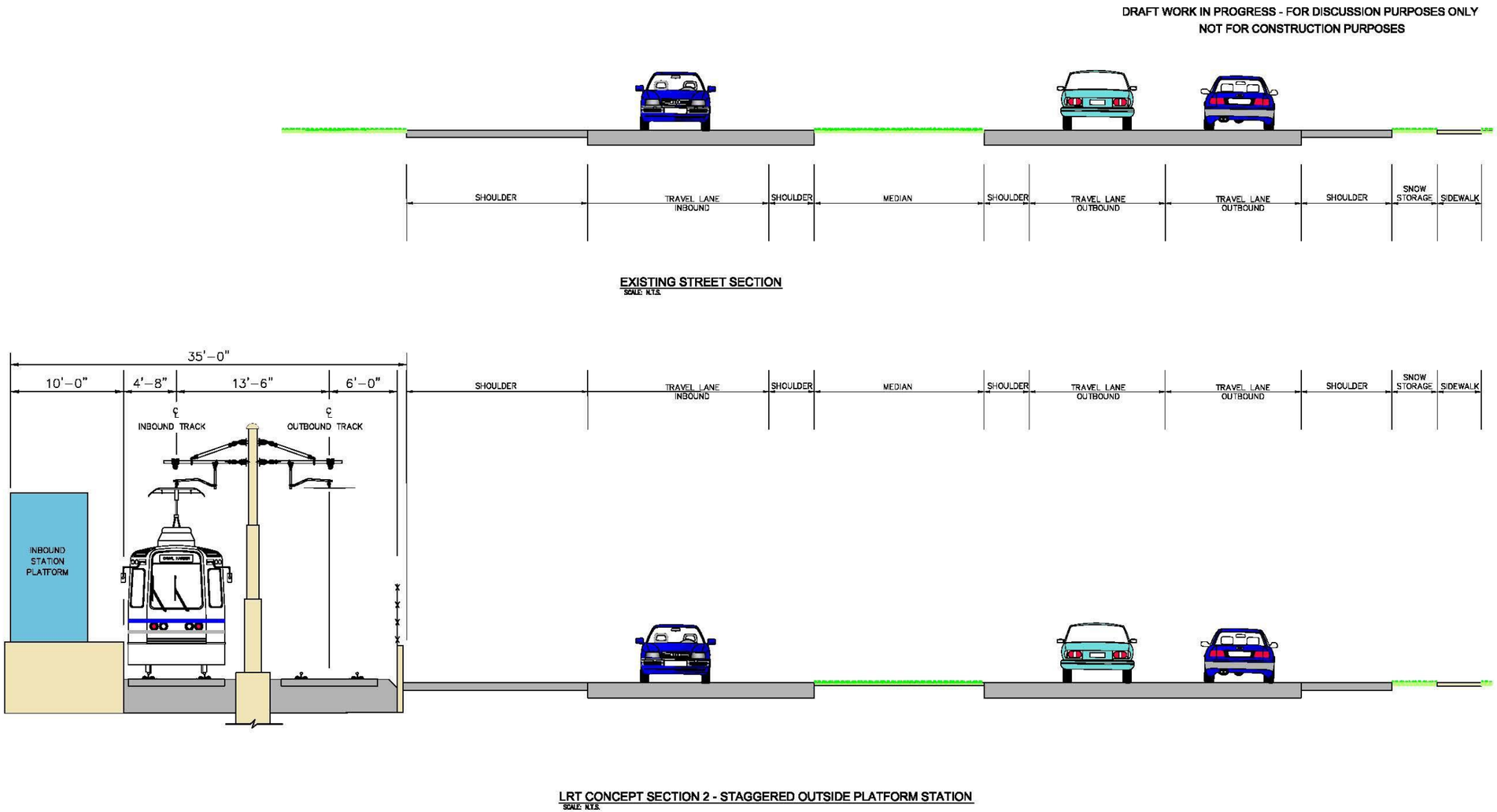


Figure 10 LRT Concept Section 3

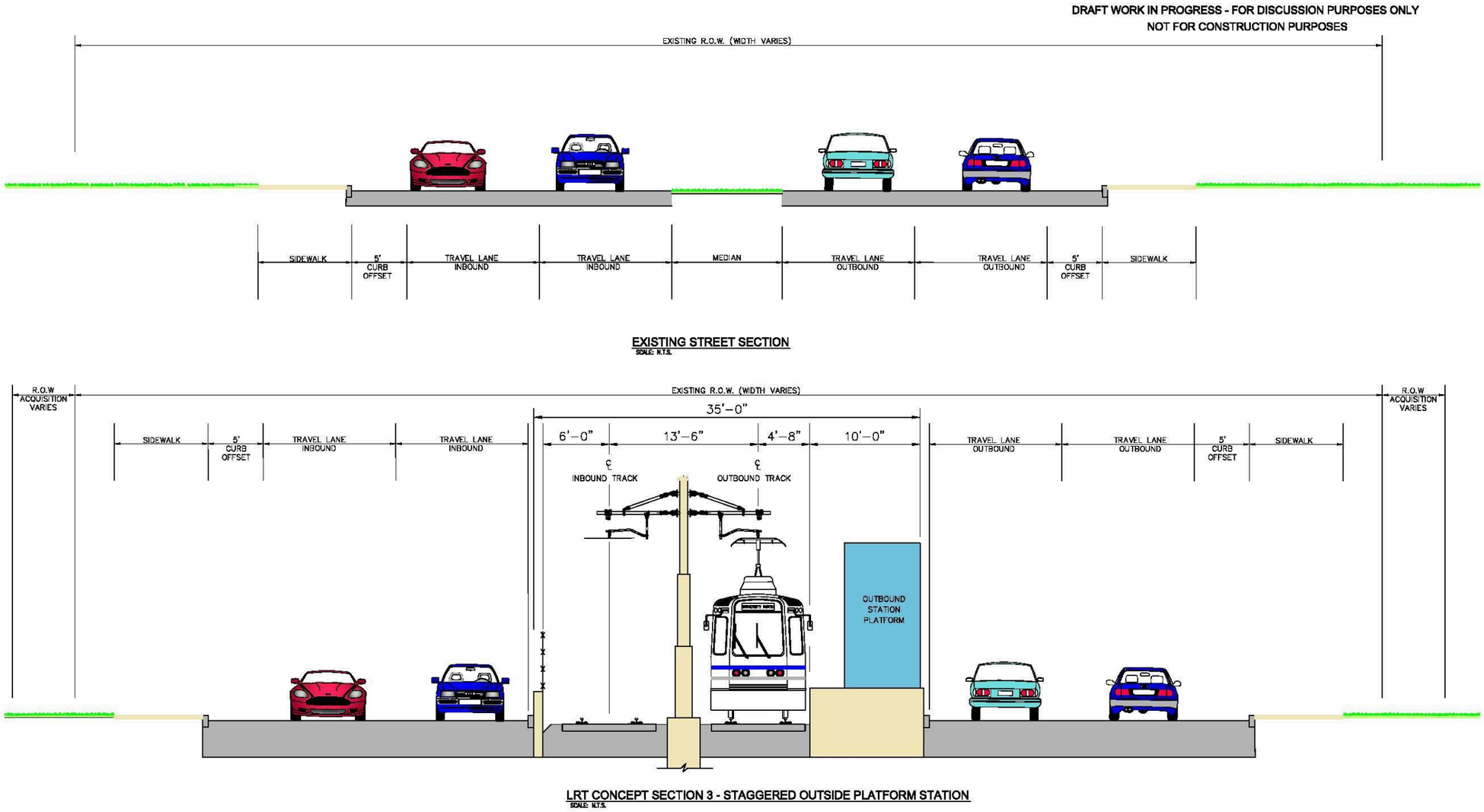


Figure 11 LRT Concept Section 4

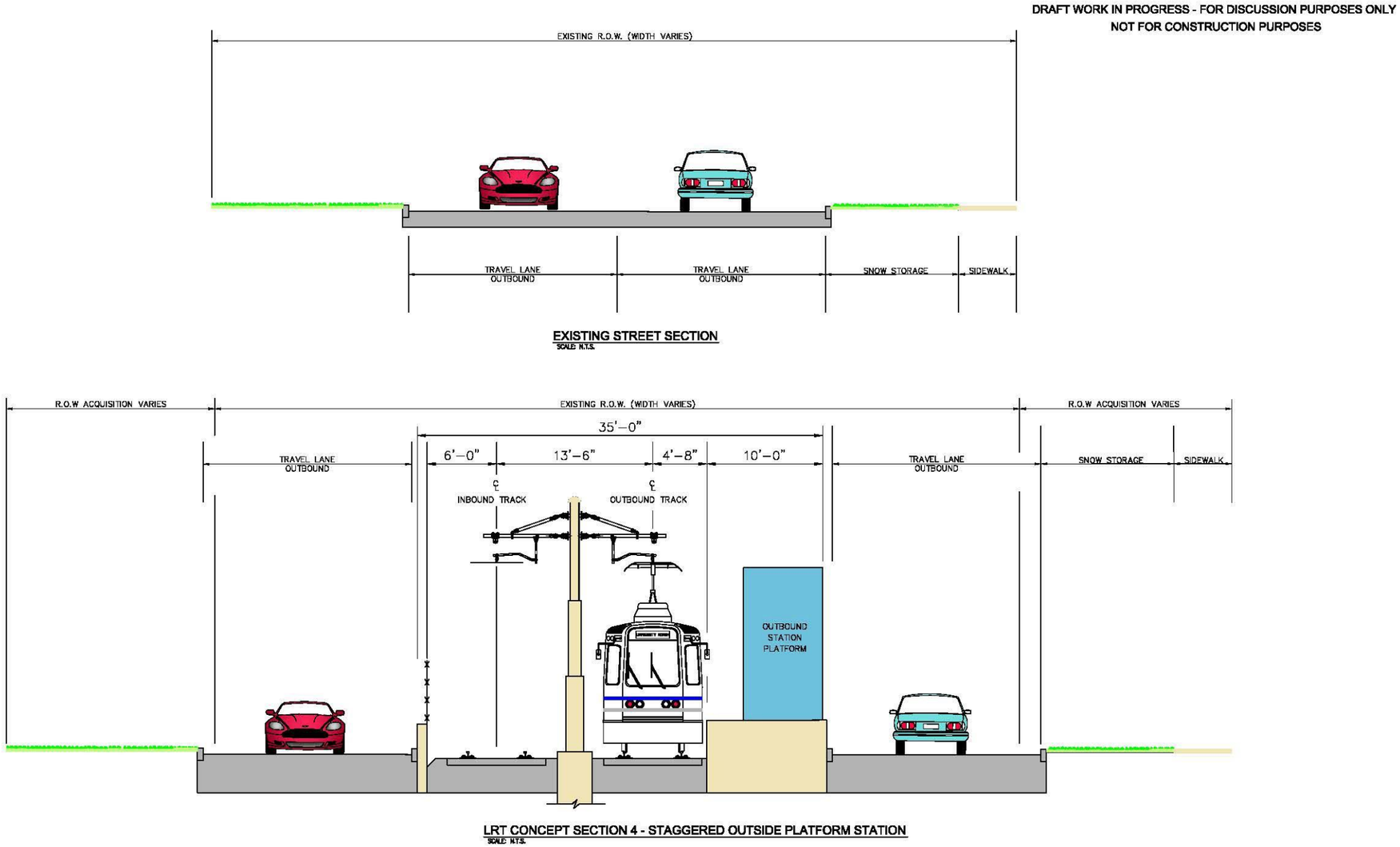


Figure 12 LRT Concept Section 5

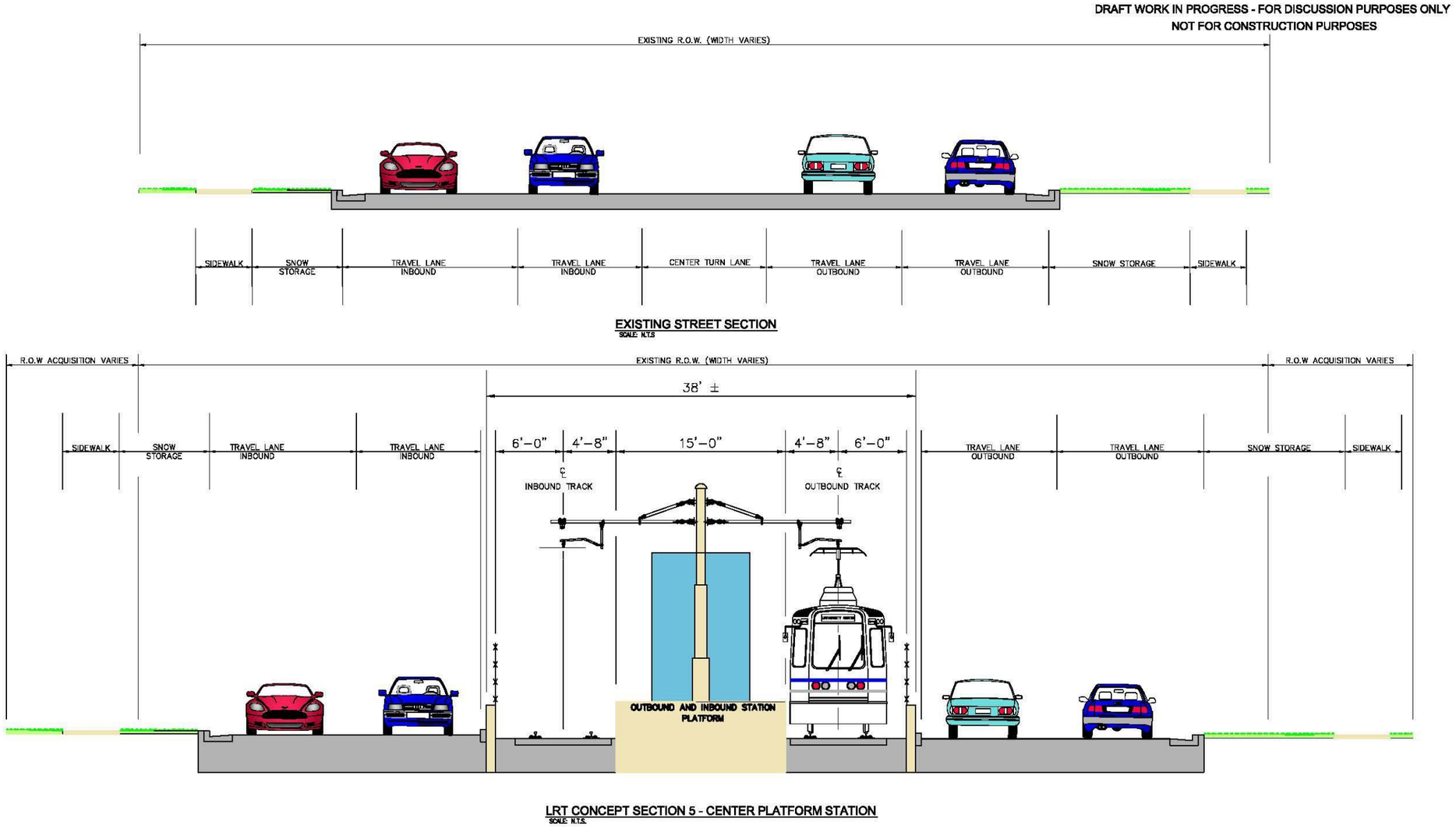


Figure 13 LRT Concept Section 6

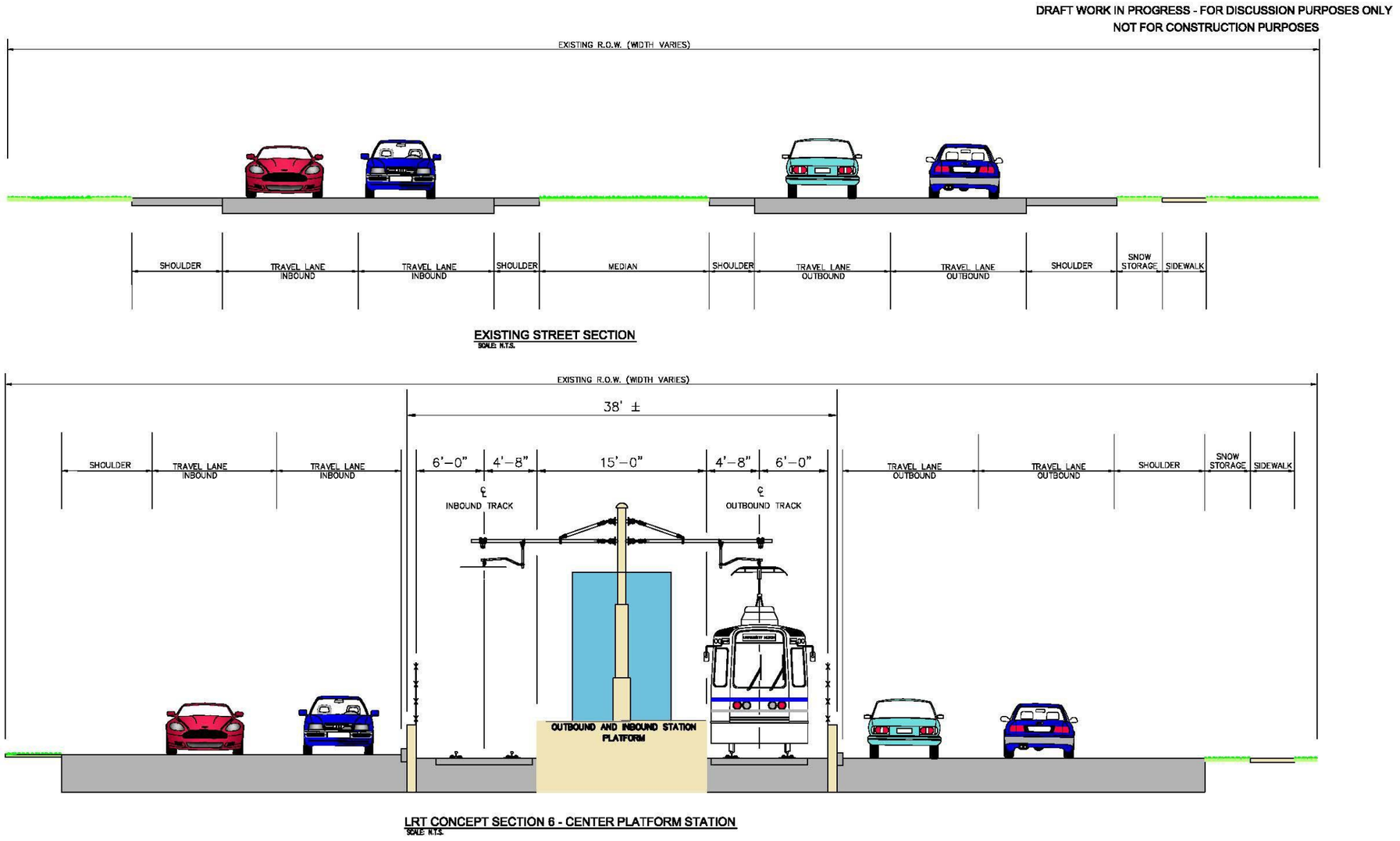


Figure 14 LRT Concept Section 7

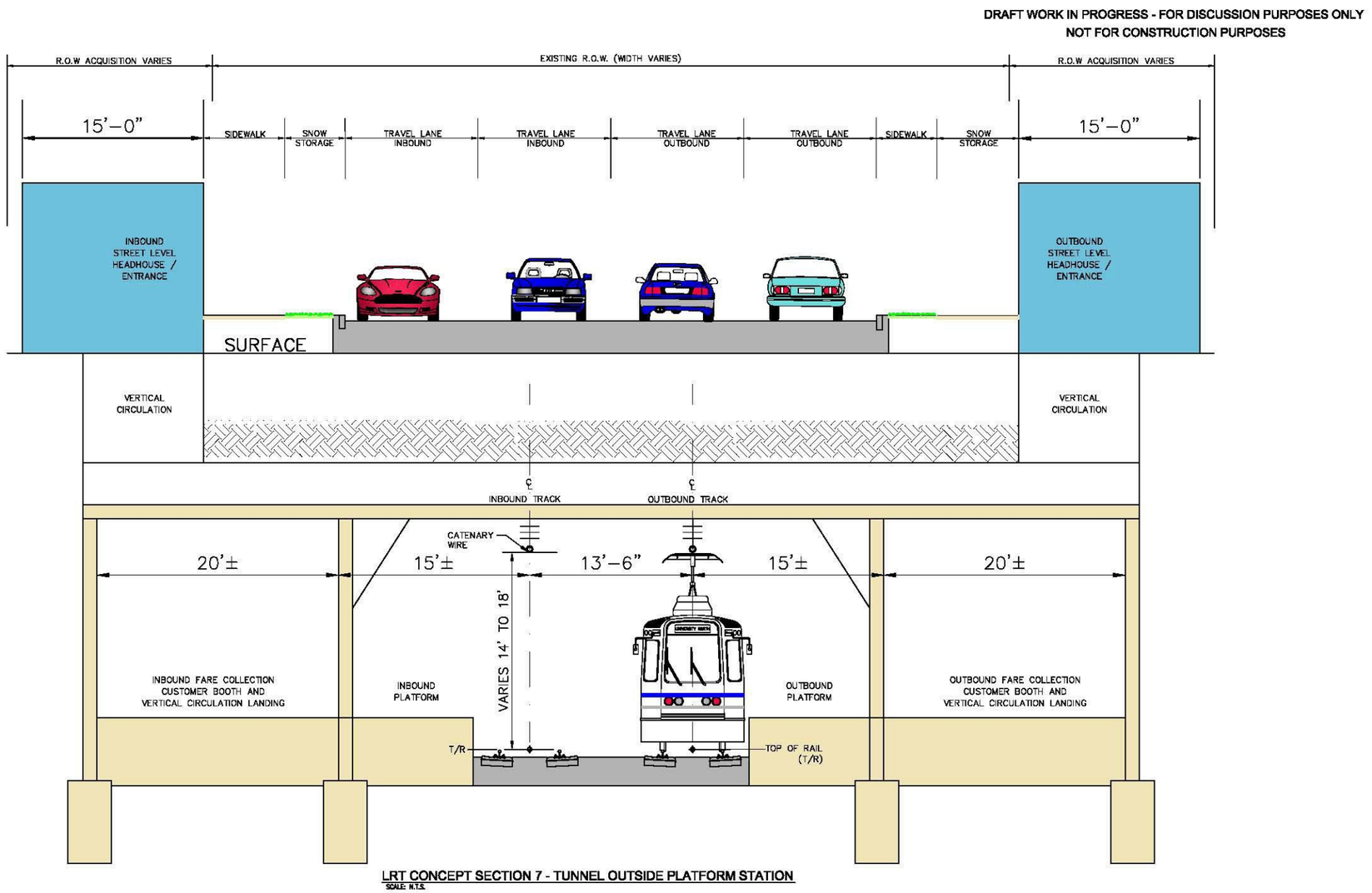


Figure 15 LRT Concept Section 8

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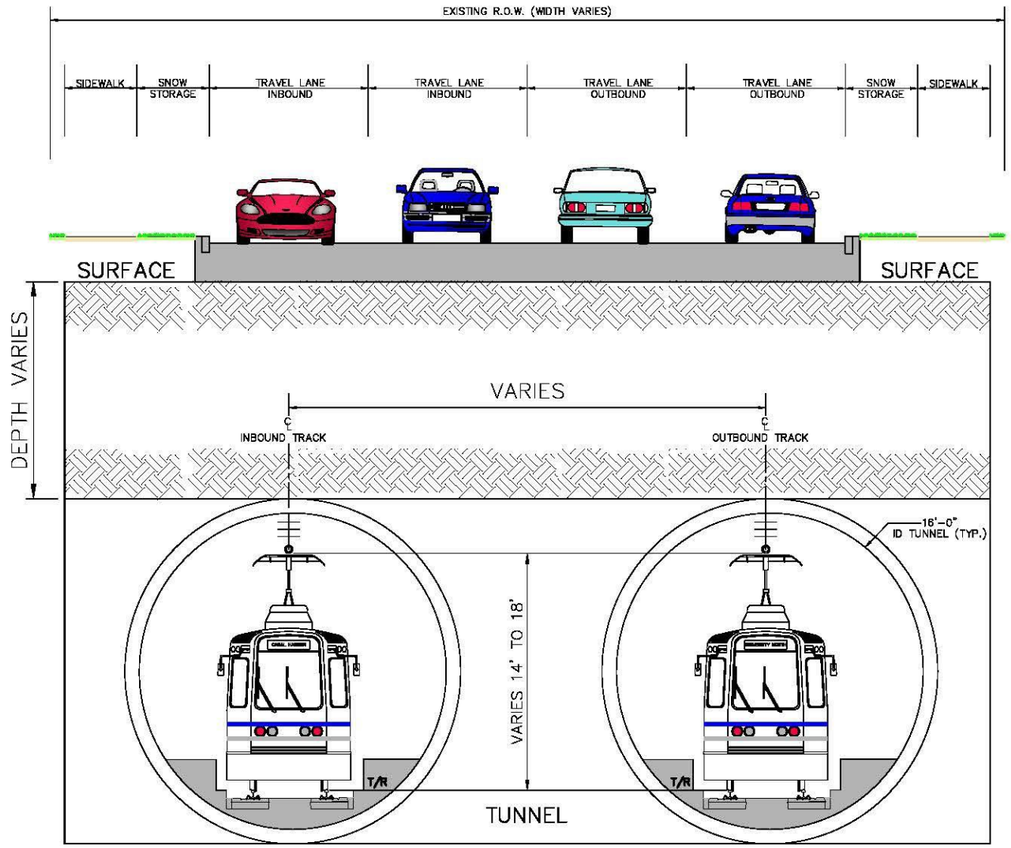
NOT FOR CONSTRUCTION PURPOSES



LRT CONCEPT SECTION 8 - TUNNEL NO STATION
SCALE: N.T.S.

TRANSIT OPTIONS NFTA-Metro Amherst-Buffalo	LRT CROSS SECTION	NOT TO SCALE	wendel

BRT Alternatives

BRT vehicles would operate within existing travel lanes as mixed traffic, in dedicated travel lanes within existing streets or on dedicated off-street guideways.

Representative cross sections were developed for BRT alternatives using the following criteria.

- Within existing street rights-of-way, the number of existing travel and turn lanes as well as pedestrian facilities would be retained. Detailed traffic analysis would need to be performed to determine if travel lanes could be eliminated.
- Within existing street rights-of-way, available snow storage as well as parkway and green space will be reduced to accommodate dedicated BRT travel lanes. AASHTO and NYSDOT design criteria were used to determine minimum widths for snow storage and green space.
- In areas where the guideway is located outside of existing street rights-of-way, the guideway width shall be 34 feet. At stations, this guideway width would increase to 64 feet. This width will accommodate the BRT guideway as well as areas outside the guideway for construction and future maintenance.
- Stations would consist of level boarding platforms and be located adjacent to the BRT travel lane. The minimum station platform width would be 15 feet. For streets with parking lanes, the station would be located within the parking lane with BRT vehicles dwelling in the travel lane.
- Transit priority signals would be provided at all non-signalized intersections that have all-way stop sign control and at signalized intersections.
- Queue jumps would be provided at all major signalized intersections.

Conceptual cross sections have been developed using these criteria and representative cross sections for existing streets within the Bailey Avenue, Millersport Highway and Niagara Falls Boulevard corridors. Conceptual BRT cross sections are illustrated in **Figures 16 thru 19** and described below.

- **BRT CONCEPT SECTION 1**– The existing street includes two travel lanes. BRT vehicles would operate in mixed traffic within existing travel lanes. Existing parking lanes would be used to accommodate stations. Inbound and outbound stations would be staggered and incorporate level boarding platforms for service.
- **BRT CONCEPT SECTION 2**– The existing street includes four travel lanes and center turn lane. BRT vehicles would operate in dedicated BRT only travel lanes located at the outside of existing travel lanes. The existing center turn lane would be retained. Inbound and outbound stations would be staggered and incorporate level boarding platforms for service.
- **BRT CONCEPT SECTION 3**– The existing street includes two travel lanes and shoulders. BRT vehicles would operate in dedicated BRT only travel lanes located at the outside of existing travel lanes in the shoulder area. Inbound and outbound stations would be staggered and incorporate level boarding platforms for service.
- **BRT CONCEPT SECTION 4**– The existing street includes four travel lanes and center turn lane. BRT vehicles would operate in dedicated BRT only travel lanes located in the center of the existing street ROW. The existing center turn lane would be eliminated and left turns now would be restricted to cross street intersections. Inbound and outbound stations would be staggered and incorporate level boarding platforms for service.

Additional ROW needs for BRT development has been determined using concept sections on a segment by segment basis. Additional ROW is dependent on the existing ROW width. If the existing ROW width is greater than the minimum width necessary for BRT development, the more conservative existing width was used for the Right of Way Needs criteria of the Tier 2 Alternative Evaluation Matrix. Results of these calculations are presented in Appendix B.

3.1.1.3 Speed Limit Table Development

As part of the Tier 2 alternative development and evaluation process, speed limit tables were developed for both LRT and BRT Conceptual Alternatives. Speed limit tables reflect anticipated operating speeds for both LRT and BRT vehicles as they progress along the conceptual alignment through the corridor. This operating speed information was used as input to the development of running times in order to develop ridership forecasts.

LRT Alternatives

LRT vehicles would operate within dedicated guideways that are located in underground tunnels, within existing streets or at-grade surface off-street guideways. Factors that affect operating speeds for LRT vehicles include the following.

- Maximum operating speeds for the transit vehicle: NFTA's present LRT vehicles have a maximum operating speed limitation of 50 mph.
- Maximum operating speed limitations associated with horizontal and vertical curves.
- For surface guideway segments located in existing streets, the speed limit of the adjacent roadway.
- For surface guideway segments located in pedestrian corridors, the maximum operating speed has been established as 15 mph.
- For entry and exit to stations, a stop has been identified.

These factors were utilized to establish an operating speed limit for discrete segments along the conceptual LRT alignments. Results of this analysis were used to develop a speed limit table for each Preliminary Alternative. This information was then used as input into the ridership forecasting effort. These tables can be found in Appendix A.

BRT Alternatives

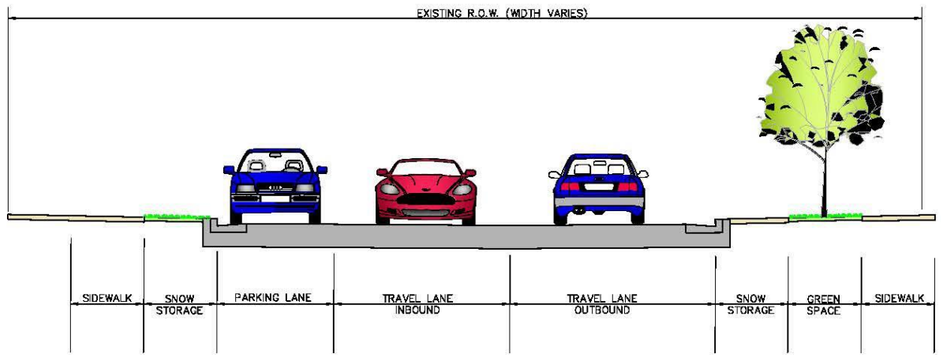
BRT vehicles would operate within existing travel lanes as mixed traffic, in dedicated travel lanes within existing streets or on dedicated off-street guideways. Factors that affect operating speeds for BRT vehicles include the following.

- Maximum operating speed limitations associated with horizontal and vertical curves.
- For operations in mixed traffic segments and segments located in existing streets, the speed limit of the adjacent roadway.
- For segments located in pedestrian corridors, the maximum operating speed has been established as 15 mph.
- For entry and exit to stations, a stop has been identified.

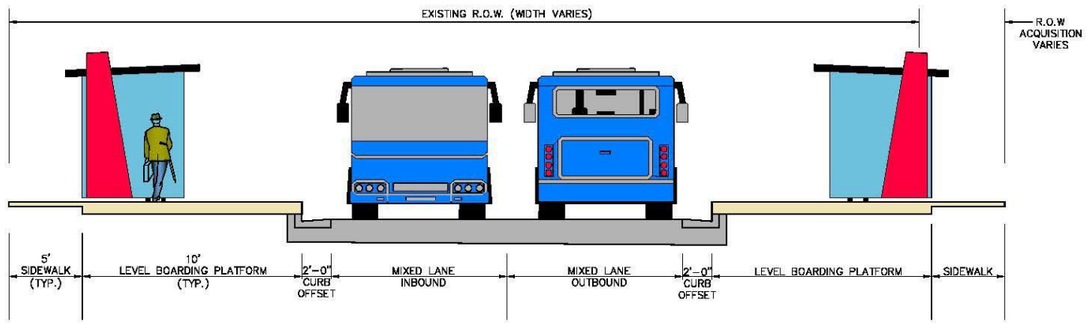
These factors were utilized to establish an operating speed limit for discrete segments along the BRT conceptual alignments. Results of this analysis were used to develop a speed limit table for each Preliminary Alternative. This information was then used as input into ridership forecasting effort. These tables can be found in Appendix B.

Figure 16 BRT Concept Section 1

DRAFT WORK IN PROGRESS - FOR DISCUSSION PURPOSES ONLY
NOT FOR CONSTRUCTION PURPOSES



EXISTING STREET SECTION
SCALE: N.T.S.



BRT CONCEPT SECTION 1 - MIXED TRAFFIC OPERATION
SCALE: N.T.S.

TRANSIT OPTIONS NFTA-Metro Amherst-Buffalo

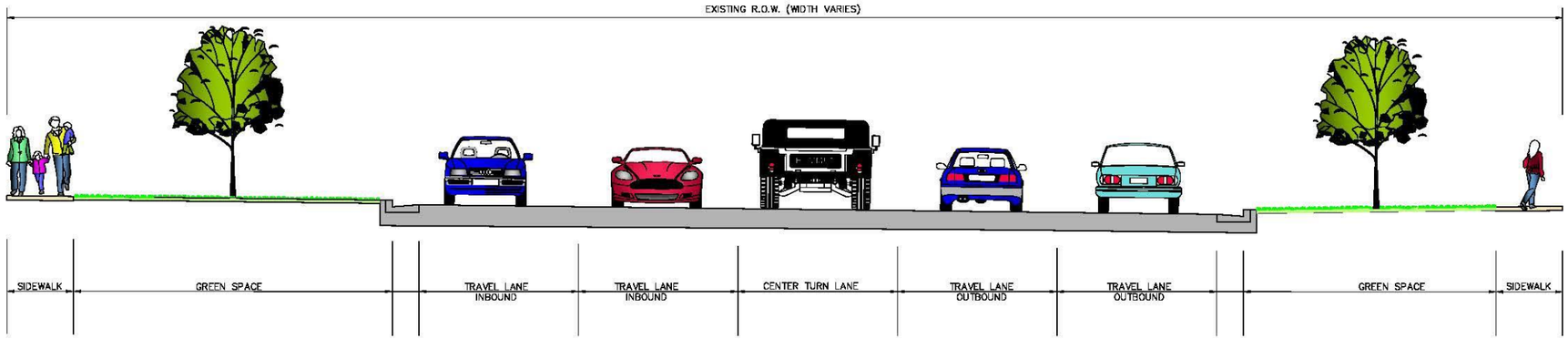
BRT CROSS SECTION

NOT TO SCALE

wendel

Figure 17 BRT Concept Section 2

DRAFT WORK IN PROGRESS - FOR DISCUSSION PURPOSES ONLY
NOT FOR CONSTRUCTION PURPOSES



EXISTING STREET SECTION
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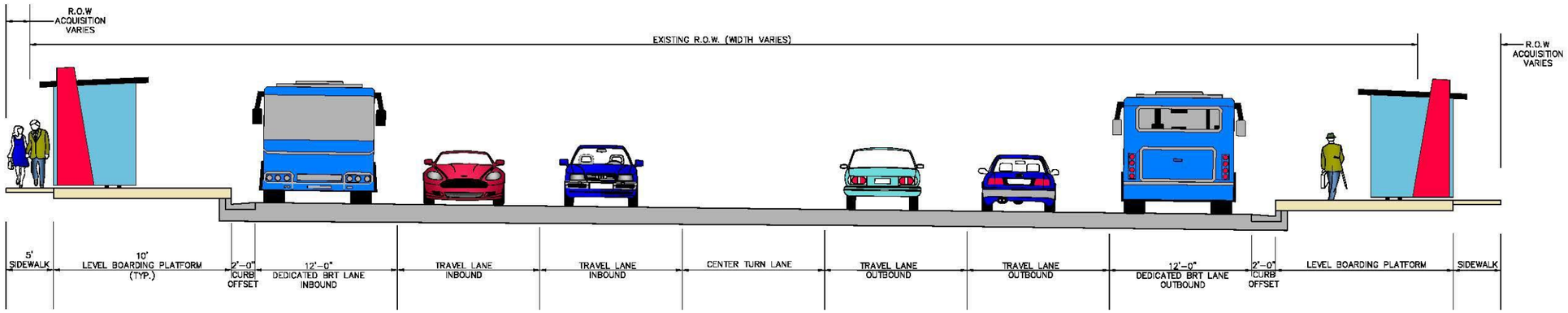

BRT CONCEPT SECTION 2 - DEDICATED OUTSIDE LANE
SCALE: N.T.S.

TRANSIT OPTIONS NFTA-Metro Amherst-Buffalo

BRT CROSS SECTION

NOT TO SCALE

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Figure 18 BRT Concept Section 3

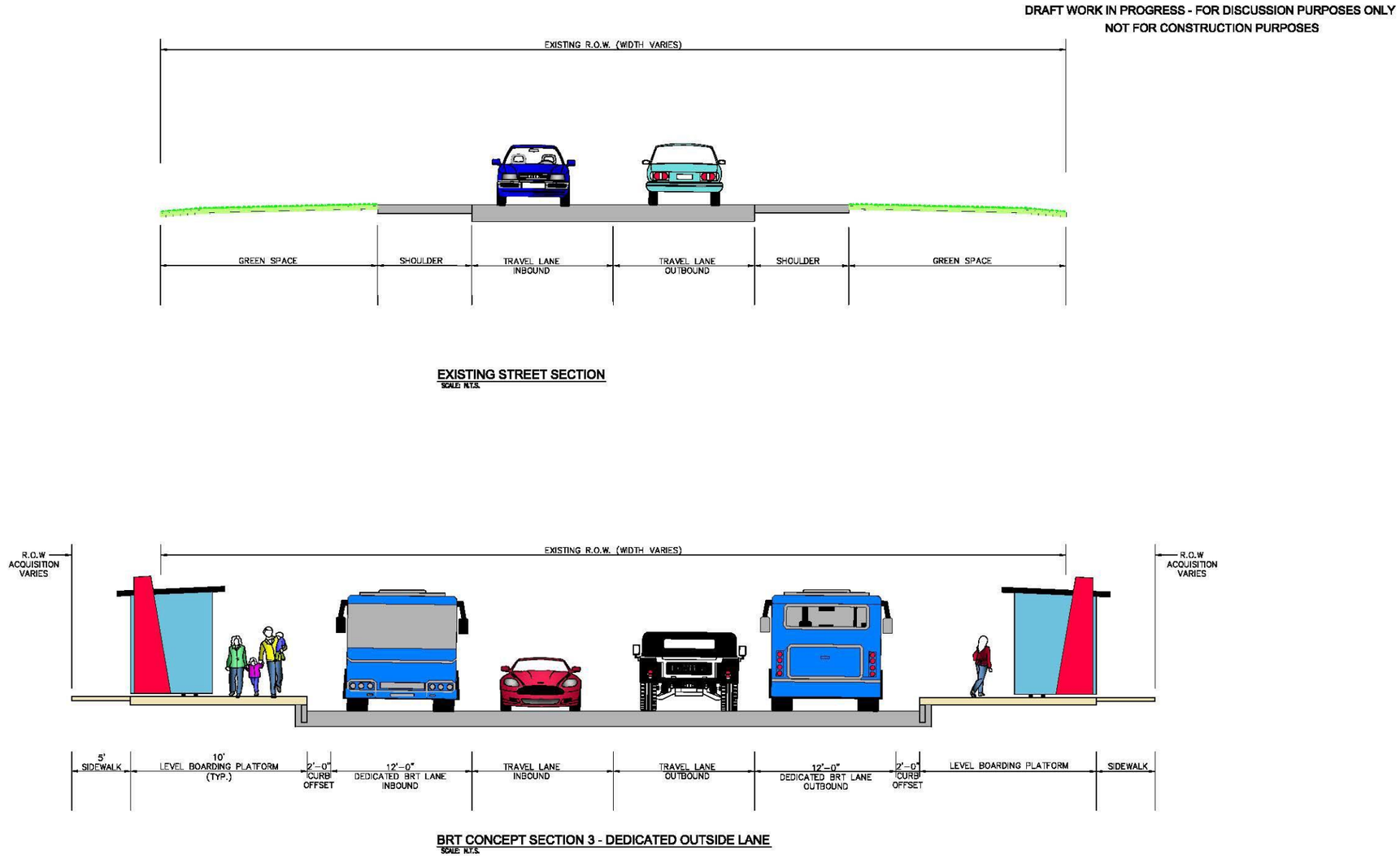
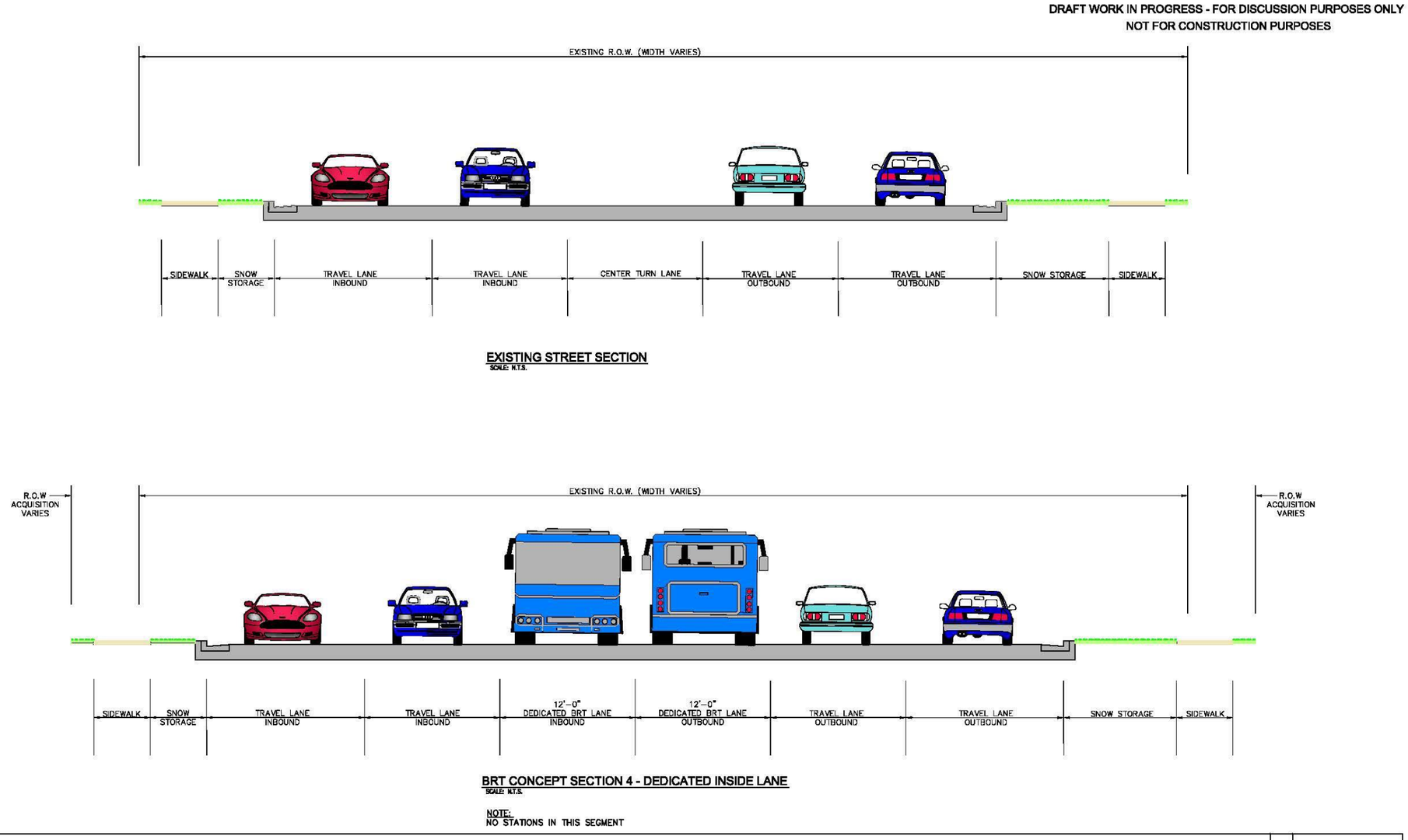


Figure 19 BRT Concept Section 4



3.2 Planning Framework

NFTA's Tier 2 screening criteria reflect FTA's framework for evaluating and rating major transit capital investments in FTA's New Starts program. New Starts projects are evaluated and rated according to criteria set forth in FTA's 2013 Final Rules and *New and Small Starts Policy Guidance*. As noted FTA recently released *Proposed Interim Policy Guidance* for their Capital Investment Grant Program in April 2015.The statutory project justification criteria and their associated measures include:

- *Mobility improvements* – total number of linked trips using the project with extra weight given to trips made by transit dependent persons (estimated annual trips);

- *Environmental benefits* – dollar value of anticipated direct and indirect benefits to human health, safety, energy, and the air quality environment scaled by the cost of the project and computed based on the change in vehicle miles traveled (VMT) resulting from the implementation of the proposed project (as calculated from estimates of change in automobile and transit vehicle miles traveled);

- *Congestion relief* – as per the recently released guidance (April 2015), FTA is proposing to use new transit trips resulting from implementation of the project. FTA proposed to calculate new transit trips by comparing total transit trips for the no-build alternative with total transit trips once the proposed project is implemented.

- *Economic development effects* – the extent to which a proposed project is likely to enhance additional, transit supportive development in the future is based on a qualitative examination of local plans and policies to support economic development proximate to the project;

- *Land use* – an examination of existing corridor and station area development; development character; existing station area pedestrian facilities; existing corridor and station area parking supply; and affordable housing in the corridor and station areas; and

- *Cost-effectiveness* – annual capital and operating cost per trip on the project.

The statute also requires FTA to examine the following when evaluating and rating a *local financial commitment*:

- Availability of reasonable contingency amounts;

- Availability of stable and dependable capital and operating funding sources; and

- Availability of local resources to recapitalize, maintain, and operate the overall existing and proposed public transportation system without requiring a reduction in existing services.

The statute requires FTA to give "comparable, but not necessarily equal" weight to their evaluation criteria. In the Guidance, FTA will give each of the project justification criteria equal weight. Because of changes made by MAP-21, the FTA's Final Rules do not address how FTA will develop overall New Starts project ratings. Instead, FTA has indicated that this will be the

subject of future, subsequent rulemaking. As an interim approach until that rulemaking process is complete, FTA has proposed to give 50 percent weight to the summary project justification rating and 50 percent to the summary local financial commitment rating to arrive at an overall rating. FTA also has proposed to continue requiring at least a medium rating on both project justification and local financial commitment to obtain a medium or better rating overall.

In the Tier 2 screen, NFTA developed criteria to measure the effectiveness of the Preliminary Alternatives at achieving the project purpose, need and goals. In doing so, NFTA considered several factors. First NFTA's Tier 2 screening criteria reflect FTA's statutory project justification criteria for which sufficient engineering and environmental detail has been developed to yield meaningful results. Second, some criteria were shaped by the planning, community involvement and stakeholder collaboration activities undertaken to date. Third, NFTA's criteria include other engineering and environmental factors that could be determined by the conceptual engineering undertaken to date.

By applying these several factors, NFTA examined the following five criteria categories in Tier 2: engineering/right-of-way needs; system connectivity; support for transit-oriented development; ridership/market served; and community and environmental impact assessment. **Table 6** lists the criteria for each category, and provides a description of the screening methodology for each criterion. Shaded criteria are reflective of FTA's statutory project justification criteria.

Table 6 Tier 2 Screening Criteria Matrix

Category	Criteria	Unit(s) of Measure(s)	Description of Methodology
Engineering / Right of Way Needs	Estimated right-of-way needs	Private area affected by guideway (acres)	Calculated from GIS analysis of the location of the proposed guideway for each alternative, and the Corridor Right of Way tables contained in Appendix A and B, relative to the location of individual parcels and the ownership of these parcels. Area includes properties other than those owned by public entities.
	Mixed traffic operations	Percentage of alternative operating in mixed traffic	Percentage of alternative's length where it would NOT operate in a dedicated guideway (NOT operating either full time or part-time during peak-periods in a special dedicated lane) compared to total alternative length.
	Signalized intersections	Percentage of signalized intersections to total intersections on alternative's alignment	Percentage of intersections that are signalized or would be signalized along an alternative compared to total intersections.
Ridership / Market Served	Ridership	Number of forecasted 2035 average weekday project boardings	From AECOM ridership forecasts using FTA STOPS model and UB ridership forecasting tool developed by AECOM.
	Transit Dependent Ridership	Number of forecasted 2035 average weekday project boardings by individuals in zero car households	From AECOM ridership forecasts using FTA STOPS model and UB ridership forecasting tool developed by AECOM.
	Travel Time between UB campuses	Estimated travel time from University Station at UB South Campus to northern most station (Greiner Hall) on UB North Campus	Based on station to station running times estimated by AECOM for use as input to the ridership forecasting work.
	Park and Ride Ridership	Number of forecasted 2035 park-and-ride boardings	From AECOM ridership forecasts using FTA STOPS model and UB ridership forecasting tool developed by AECOM.
	Commercial/retail area served	Number of acres zoned for commercial/retail use	Quantify the land area in acres within ½-mile station areas that is zoned for commercial and retail use for each alternative.
System Connectivity	Interface with other transit service	Number of potential bus route connections	Prepare map of alternatives and NFTA bus routes; determine how many connections can be potentially achieved.
	Access to parks, open space and recreational resources	Number of existing parks, and recreational areas potentially served	Prepare map of alternatives and these resources, determine how many resources lie within each ½-mile station area, and add station area totals for each alternative.
Support for Transit-Oriented Development (TOD)	Consistency with regional plans	Extent to which each alternative serves planned growth locations	Using the Amherst Comprehensive Plan and the New Way to Plan for Buffalo Niagara plan (referred to as the RPSD, for Regional Plan for Sustainable Development) tallied and summed the number of growth locations that an alternative would serve under each of these two plans.
	Existence of transit supportive land use adjacencies at station areas	Number of station areas with transit supportive zoning	Identify zoning classifications and identify high-density zones, use GIS to delineate ½-mile station areas, calculate the area of high-density zoning in each area, determine the high-density percentage of each station area, rate each area H-M-L, and count number of H-M areas.
Environmental and Community Impacts	Water resource impacts	Area of floodplains affected (in acres) Area of wetlands affected (in acres) Impacts to streams (in linear feet)	Calculated by GIS analysis of the location of the proposed guideway and ROW need relative to the location of 100-year floodplains, State and Federal wetlands, and DEC streams.
	Park impacts	Impacts to parks, recreation, and open space (in acres)	Calculated by GIS analysis of the location of the proposed guideway and ROW need relative to the location of parks, recreation, and open space resources (codes 500 – Recreation and Entertainment and 900 – Wild, Forested, Conservation Lands & Public Parks).
	Property impacts	Number of properties affected	Calculated from GIS analysis of the location of the proposed guideway and ROW need for each alternative relative to the location of individual parcels.

Note: Gray shading indicates reflection of FTA "New Starts" project justification criteria.

4 DETAILED TIER 2 RATING & CRITERIA METHODOLOGY

This section summarizes the Tier 2 rating and criteria methodology, focusing on the criteria NFTA applied to measure the effectiveness of each Preliminary Alternative in achieving the project purpose, needs and goals and which served as a primary step in the decision-making process to determine which alternatives should advance into Tier 3. The criteria are organized by category as shown in the matrix in **Table 4**; each criterion is described and the resulting data is presented.

Descriptive data about the alternatives under consideration for Tier 2 screening is provided first in the matrix when read left to right. The name of the alternative and a brief, shortened description of the alignment pathway is provided. The length of each alternative is then provided in miles and ranges from a low of 8.2 miles for Millersport LRT 1 followed closely by Millersport BRT 1 at 8.5 miles to the top of the range at 11.5 miles for Niagara Falls Blvd BRT 1.

4.1 Engineering/Right of Way Needs

4.1.1 Criteria: Estimated Right-of-way Needs

Measure: Private area affected by guideway

The measure, private area affected by right-of-way needs, quantifies the approximate area in acres of privately-owned property the guideway would directly impact. The analysis assumed a consistently applied guideway width and ROW need based on the data contained in Appendix A and B that were developed for the BRT and LRT alternatives. NFTA's consultant team calculated these land area values using GIS analysis of the location of the proposed guideway and ROW need for each BRT and LRT alternative relative to the location of privately owned land parcels and existing right-of-way. **Table 7** reports the approximate acreage of private land area required for each alternative. Publicly owned properties were excluded from the calculations (i.e., municipal and county owned land).

Table 7 Private Land Area Affected by Guideway

Alternative	Private Land Area Affected (Acres)
Niagara Falls Blvd LRT 1	11.0
Niagara Falls Blvd LRT 2	11.2
Niagara Falls Blvd LRT 7	10.7
Bailey Ave LRT 1	7.0
Bailey Ave LRT 2	8.3
Millersport Hwy LRT 1	4.7
Niagara Falls Blvd BRT 1	25.7
Niagara Falls Blvd BRT 2	25.8
Bailey Ave BRT 1	7.4
Bailey Ave BRT 2	6.8
Millersport Hwy BRT 1	4.1

The range is from a high of 25.8 acres for Niagara Falls Boulevard BRT 2, which was followed closely by 25.7 acres for Niagara Falls Boulevard BRT 1, to a low of 4.1 acres for Millersport Highway BRT 1.

4.1.2 Criteria: Percent of Mixed Traffic Operations

Measure: Percent Mixed Traffic Operations to Total Corridor Length
Percentage of alternative's length where it would not operate within a dedicated guideway (where it is operating in the traffic stream and is not in a special, dedicated lane either full time or part-time during peak-periods) was calculated compared to total alternative length. This is a critical factor for BRT operations as FTA's new Interim Guidance for Capital Investment indicates at least 50% of the corridor length of a BRT must be dedicated lanes to be considered eligible for federal funds. LRT is always operated within a dedicated guideway condition. **Table 8** presents the data.

Table 8: Percent Mixed Traffic Operations

Alternative	Percent Mixed Traffic
Niagara Falls Blvd LRT 1	0%
Niagara Falls Blvd LRT 2	0%
Niagara Falls Blvd LRT 7	0%
Bailey Ave LRT 1	0%
Bailey Ave LRT 2	0%
Millersport Hwy LRT 1	0%
Niagara Falls Blvd BRT 1	17%
Niagara Falls Blvd BRT 2	19%
Bailey Ave BRT 1	27%
Bailey Ave BRT 2	30%
Millersport Hwy BRT 1	35%

All the BRT alternatives will operate within some mixed traffic. The greatest percent is found on the Millersport Hwy BRT 1 at 35% and the lowest is Niagara Falls Blvd BRT 1 at 17%.

4.1.3 Criteria: Percent of Signalized Intersections to Total Intersections

Measure: Percent Signalized Intersections to Total Intersections
Percent of signalized intersections of total intersections along the length of the alternatives corridor is also provided in **Table 19.** This is an important measure to help understand potential traffic impacts from operations of the alternative. The higher the share of signalized intersections the better for the operation of the alternative and for the management of crossing traffic (unsignalized intersections along LRT would become T-intersections; unsignalized intersections along BRT would increase side friction thus potentially reducing BRT speeds and decreasing reliability of operations). Where an alternative crosses a signalized intersection at-grade, an impact on intersection operations would occur and may require mitigating improvements. LRT operations would pre-empt the traffic signal providing for the exclusive movement of LRT trains through the intersection. BRT vehicles would be equipped with

transponders that would provide for a green phase when a BRT vehicle is approaching.For BRT alternatives, it ranges from a low of 33 % to a high of 39% and for the LRT alternatives, a low of 28% to a high of 44%.

Table 9: Percent Signalized Intersections to Total Intersections

Alternative	Percent Signalized
Niagara Falls Blvd LRT 1	44%
Niagara Falls Blvd LRT 2	39%
Niagara Falls Blvd LRT 7	39%
Bailey Ave LRT 1	43%
Bailey Ave LRT 2	36%
Millersport Hwy LRT 1	28%
Niagara Falls Blvd BRT 1	35%
Niagara Falls Blvd BRT 2	33%
Bailey Ave BRT 1	39%
Bailey Ave BRT 2	36%
Millersport Hwy BRT 1	35%

4.2 Ridership/Markets Served

4.2.1 Criteria: Ridership

Measure: Number of Forecasted 2035 Project Boardings

The measure, number of forecasted 2035 average weekday project boardings, quantifies the forecasted ridership for each alternative for horizon year 2035. AECOM derived the forecasts using the FTA STOPS ridership forecasting model and the UB ridership forecasting tool developed by AECOM. **Table 10** presents the 2035 average daily project boardings.

Table 10 Forecasted 2035 Average Daily Project Boardings

Alternative	Number of Forecasted 2035 Average Daily Project Boardings
Niagara Falls Blvd LRT 1	24,000
Niagara Falls Blvd LRT 2	23,200
Niagara Falls Blvd LRT 7	24,100
Bailey Ave LRT 1	23,500
Bailey Ave LRT 2	22,800
Millersport Hwy LRT 1	22,900
Niagara Falls Blvd BRT 1	21,100
Niagara Falls Blvd BRT 2	20,800
Bailey Ave BRT 1	20,400
Bailey Ave BRT 2	20,400
Millersport Hwy BRT 1	17,800

4.2.2 Criteria: Transit Dependent Ridership

Measure: Number of Forecasted 2035 Project Boardings from Zero Car Households

The measure, number of 2035 average weekday project boardings from zero car households, quantifies the forecasted ridership from these types of households for each alternative for horizon year 2035. AECOM derived the forecasts using the FTA STOPS ridership forecasting model and the UB ridership forecasting tool developed by AECOM. **Table 11** presents the average daily project boardings in 2035 for each alternative from zero car households, as forecasted by AECOM. This measure demonstrates the attractiveness of the alternative for serving transportation disadvantaged households. Ridership generated from transportation disadvantaged households is weighted more heavily (2 times) by the FTA when evaluating projects for potential capital investment grants.

Table 11 Forecasted 2035 Average Daily Project Boardings From Zero Car Households

Alternative	Number of Forecasted 2035 Average Daily Project Boardings from Zero Car Households
Niagara Falls Blvd LRT 1	14,700
Niagara Falls Blvd LRT 2	14,700
Niagara Falls Blvd LRT 7	14,700
Bailey Ave LRT 1	14,600
Bailey Ave LRT 2	14,100
Millersport Hwy LRT 1	13,500
Niagara Falls Blvd BRT 1	13,800
Niagara Falls Blvd BRT 2	13,600
Bailey Ave BRT 1	13,300
Bailey Ave BRT 2	12,900
Millersport Hwy BRT 1	11,500

4.2.3 Criteria: Travel Time between UB Campuses

Measure: Travel Time between UB Campuses

As major activity centers in the study area, it is relevant to purpose and need to examine the time it is estimated to take to travel between the two campuses by each alternative. This measure is the estimated travel time from University Station at UB South Campus to northern most station (Greiner Hall) on UB North Campus. It is based on station to station running times estimated by AECOM's BRT and LRT service planners for use as input to the ridership forecasting work.

Table 12 Travel Time between UB Campuses (South Campus to North Campus)

Alternative	Travel Time (min)
Niagara Falls Blvd LRT 1	16
Niagara Falls Blvd LRT 2	16
Niagara Falls Blvd LRT 7	15
Bailey Ave LRT 1	15
Bailey Ave LRT 2	15
Millersport Hwy LRT 1	13
Niagara Falls Blvd BRT 1	30
Niagara Falls Blvd BRT 2	34
Bailey Ave BRT 1	23
Bailey Ave BRT 2	23
Millersport Hwy BRT 1	18

4.2.4 Criteria: Park and Ride Ridership

Measure: Projected Park-and-Ride Boardings in 2035
This is a measure of park-and-ride demand as forecasted for each alternative. It is the forecasted number of 2035 park-and-ride boardings. It is developed from AECOM ridership forecasts using FTA STOPS model and the UB ridership forecasting tool developed by AECOM.

Table 13 Projected Park-and-Ride Boardings, 2035

Alternative	Number 2035 Park and Ride Boardings
Niagara Falls Blvd LRT 1	343
Niagara Falls Blvd LRT 2	178
Niagara Falls Blvd LRT 7	357
Bailey Ave LRT 1	556
Bailey Ave LRT 2	407
Millersport Hwy LRT 1	976
Niagara Falls Blvd BRT 1	132
Niagara Falls Blvd BRT 2	167
Bailey Ave BRT 1	135
Bailey Ave BRT 2	266
Millersport Hwy BRT 1	251

4.2.5 Criteria: Commercial Areas Served

Measure: Commercial/Retail Area Served
The measure, commercial areas potentially served, quantifies the land area in acres within ½-mile station areas that is zoned for commercial and retail use for each alternative. NFTA's consultant team calculated the values for this measure using GIS to identify the acreage of land zoned for commercial or retail uses within ½ radius of stations. The process involved using GIS mapping to delineate a ½-mile radius around station areas and determine the amount acres zoned for these uses within that radius at each station area. For each alternative, the station area sub-totals were added together to obtain the total existing commercial/retail area potentially served by each alternative. **Table 14** displays the data.

Table 14 Commercial/Retail Areas Served

Alternative	Commercial Areas Served (acres)
Niagara Falls Blvd LRT 1	821
Niagara Falls Blvd LRT 2	786
Niagara Falls Blvd LRT 7	860
Bailey Ave LRT 1	825
Bailey Ave LRT 2	790
Millersport Hwy LRT 1	398
Niagara Falls Blvd BRT 1	961
Niagara Falls Blvd BRT 2	958
Bailey Ave BRT 1	846
Bailey Ave BRT 2	844
Millersport Hwy BRT 1	432

4.3 System Connectivity

4.3.1 Criteria: Access to Parks and Recreational Resources

Measure: Number of existing parks and recreational areas potentially served
The measure, number of existing parks and recreational areas potentially served, quantifies the number of these resources within ½ mile of a proposed station area. The total number of these resources is summed. NFTA's consultant team calculated the values for this measure by delineating the ½-mile radius around proposed station areas, tabulating the number of existing resources within each station area radius, and adding the station area sub-totals to calculate the total for each alternative. **Table 15** displays the data. This measure included access to resources at more than one station area along the same alternative.

Table 15 Number of Existing Parks and Recreational Resources Served

Alternative	Number of Parks
Niagara Falls Blvd LRT 1	6
Niagara Falls Blvd LRT 2	5
Niagara Falls Blvd LRT 7	5
Bailey Ave LRT 1	6
Bailey Ave LRT 2	5
Millersport Hwy LRT 1	7
Niagara Falls Blvd BRT 1	5
Niagara Falls Blvd BRT 2	5
Bailey Ave BRT 1	5
Bailey Ave BRT 2	5
Millersport Hwy BRT 1	7

4.3.2 Criteria: Interface with Other Transit Services

Measure: Number of bus connections

This measure quantifies the number of intersecting bus services at the proposed station areas along each alternative. NFTA's consultant team understands that when the project is operational, modifications to existing bus routes will be made to reduce redundancy, particularly where routes parallel the selected alternative alignment. NFTA's consultant team used GIS mapping showing the alignment of each alternative relative to the location of the bus routes, counted the number of routes that intersect each alternative at each station area, and totaled the station area numbers. **Table 16** displays the data.

Table 16 Number of Bus Connections

Alternative	Number of Bus Connections
Niagara Falls Blvd LRT 1	16
Niagara Falls Blvd LRT 2	14
Niagara Falls Blvd LRT 7	17
Bailey Ave LRT 1	16
Bailey Ave LRT 2	13
Millersport Hwy LRT 1	8
Niagara Falls Blvd BRT 1	17
Niagara Falls Blvd BRT 2	17
Bailey Ave BRT 1	23
Bailey Ave BRT 2	23
Millersport Hwy BRT 1	21

Available mapping shows NFTA Bus Routes (34, 35, 44, 47, 48, 49, and 64) that serve the study area. This measure shows the total number of bus route connections at all proposed stations along each alternative. A connection is assumed if the bus route is within¼ mile of a station. The tabulation assumes future modifications to Route 44 if Millersport Hwy LRT 1 is implemented or modifications to Route 34 if Niagara Falls Blvd BRT 1 or 2 are implemented.

4.4 Support for Transit-Oriented Development (TOD)

4.4.1 Criteria: Consistency with Regional Plans

Measure: Plan Consistency

This measure quantifies the extent to which each alternative serves planned growth locations. Using the Amherst Comprehensive Plan and the New Way to Plan for Buffalo Niagara plan (referred to as the RPSD, for Regional Plan for Sustainable Development), the consultant team tallied and summed the number of growth locations that an alternative would serve under each of these two plans. **Table 17** displays the data.

Table 17 Consistency with Regional Plans

Alternative	Consistent with # of Plans
Niagara Falls Blvd LRT 1	6
Niagara Falls Blvd LRT 2	6
Niagara Falls Blvd LRT 7	6
Bailey Ave LRT 1	6
Bailey Ave LRT 2	6
Millersport Hwy LRT 1	5
Niagara Falls Blvd BRT 1	4
Niagara Falls Blvd BRT 2	6
Bailey Ave BRT 1	4
Bailey Ave BRT 2	6
Millersport Hwy BRT 1	5

Criteria: Existence of Transit Supportive Land Use Adjacencies to Station Areas

Measure: Number of station areas with transit-supportive zoning

The measure, number of station areas with transit-supportive zoning, quantifies the number of station areas that occur within areas currently zoned to support transit service. NFTA's consultant team assessed the Township of Amherst's zoning ordinance for transit-supportive provisions, including allowable density, provisions for pedestrians, and parking policies; these provisions reflect FTA's evaluation process in their "New Starts" guidelines related to transit-oriented development. Using GIS analysis, the amount of each station area within the ½-mile radius having high-density zoning was identified and converted to a percentage of the total station area. On the basis of this percentage of high-density zoning, each station area was rated high (over 60%), medium (30-60%), or low (below 30%). **Table 18** reports the number of station areas with high and medium ratings.

Table 18 Number of Station Areas with Transit Supportive Zoning

Alternative	Number of Stations with Transit Supportive Zoning (Sum of High and Medium Ratings)
Niagara Falls Blvd LRT 1	12
Niagara Falls Blvd LRT 2	10
Niagara Falls Blvd LRT 7	12
Bailey Ave LRT 1	12
Bailey Ave LRT 2	10
Millersport Hwy LRT 1	7
Niagara Falls Blvd BRT 1	17
Niagara Falls Blvd BRT 2	16
Bailey Ave BRT 1	14
Bailey Ave BRT 2	13
Millersport Hwy BRT 1	8

4.5 Community and Environmental Impact Assessment

4.5.1 Criteria: Impacts to Water Resources

Measure: Areas of floodplains and wetlands affected; impacts to streams

The measure, areas of floodplains and wetlands affected and impacts to streams, quantifies the amounts of floodplains, wetlands and streams that would potentially be directly impacted by each alternative. NFTA's consultant team calculated the values of these measures using GIS analysis of the location of each alternative guideway and ROW need relative to the location of floodplains, wetlands, and streams, relative to the location of 100-year floodplains, State and Federal wetlands, and DEC streams. **Table 19** presents the impacts to water resources. The areas of floodplains and wetlands are the acres of each resource within the footprint of an alternative using the cross-section established and ROW need. The linear feet of streams, or longitudinal impact, were measured by the parallel overlapping distances of an alternative's alignment and ROW need and a stream's alignment.

Table 19 Impacts to Water Resources

Alternative	Water Resources Impacts		
	Floodplains (acres)	Wetlands (acres)	Streams (linear feet)
Niagara Falls Blvd LRT 1	13.8	1.3	419.0
Niagara Falls Blvd LRT 2	21.1	1.4	495.9
Niagara Falls Blvd LRT 7	11.7	0.8	398.8
Bailey Ave LRT 1	11.0	0.7	385.8
Bailey Ave LRT 2	20.4	1.4	462.8
Millersport Hwy LRT 1	21.2	1.5	629.4
Niagara Falls Blvd BRT 1	15.3	2.2	782.1
Niagara Falls Blvd BRT 2	21.3	1.9	854.3
Bailey Ave BRT 1	15.6	1.9	559.8
Bailey Ave BRT 2	21.3	1.5	632.1
Millersport Hwy BRT 1	21.2	1.5	564.0

4.5.2 Criteria: Impacts to Parks

Measure: Impacts to parks, recreation areas and open space

The measure, impacts to parks, recreation areas, and open space, quantifies the amounts of these resources, in acres, that would be potentially directly impacted by each alternative. NFTA's consultant team calculated the values of this measure using GIS analysis, based on the location of the resources as identified by mapping provided for the Township of Amherst. It is based the location of the proposed guideway and ROW need relative to the location of parks, recreation, and open space resources (codes 500 – Recreation and Entertainment and 900 – Wild, Forested, Conservation Lands & Public Parks). It measures the areas of parks, recreational land and open space in terms of total number of acres of these resources within the footprint (guideway and ROW need) of an alternative. **Table 20** presents the impacts to parks, recreation areas, and open space.

Table 20 Impacts to Parks, Recreation Areas and Open Space

Alternative	Impacts to Parks, Recreation Areas and Open Space (acres)
Niagara Falls Blvd LRT 1	0.0
Niagara Falls Blvd LRT 2	0.0
Niagara Falls Blvd LRT 7	0.1
Bailey Ave LRT 1	0.0
Bailey Ave LRT 2	0.0
Millersport Hwy LRT 1	0.0
Niagara Falls Blvd BRT 1	0.4
Niagara Falls Blvd BRT 2	0.4
Bailey Ave BRT 1	0.0
Bailey Ave BRT 2	0.0
Millersport Hwy BRT 1	0.0
Niagara Falls Blvd LRT 1	0.0

4.5.3 Criteria: Property Impacts

Measure: Number of properties affected

The measure, number of properties affected, quantifies the number of properties potentially directly impacted by each alternative. NFTA's consultant team calculated this number in GIS by overlaying each alternative and ROW need on parcel maps and calculating the number of individual parcels within the footprint of each alternative. **Table 21** presents the number of properties affected.

Table 21 Number of Properties Affected

Alternative	Number of Properties Affected
Niagara Falls Blvd LRT 1	211
Niagara Falls Blvd LRT 2	254
Niagara Falls Blvd LRT 7	244
Bailey Ave LRT 1	189
Bailey Ave LRT 2	232
Millersport Hwy LRT 1	194
Niagara Falls Blvd BRT 1	305
Niagara Falls Blvd BRT 2	366
Bailey Ave BRT 1	207
Bailey Ave BRT 2	262
Millersport Hwy BRT 1	201

5 TIER 2 SCREENING RESULTS & DECISION METHODOLOGY

The results of the Tier 2 screening are described in this section, beginning with a presentation of the analysis findings. This section then details the decision process employed to identify the subset of alternatives to retain for detailed evaluation in Tier 3 and to be documented in the AA and concludes with the recommendation of the alternatives to advance to Tier 3.

5.1 Tier 2 Screening Results

The quantified data for each criteria measure and each alternative are presented in the tables in Section 4 of this technical memorandum. This data and the Tier 2 screening process are based on the current understanding by NFTA's consultant team of the transportation needs within the study area, the data that was available at the time of the screening including the level of engineering undertaken, and relies on guidance provided by the FTA regarding the analysis of alternatives, on NEPA environmental review, and the FTA New Starts program evaluation and rating processes.

The consultant team scored each the data within each measure using color-coded scoring of high (**green**), moderate (**yellow**) and low (**red**) in terms of relative performance of a measure within each mode (meaning scores developed for BRT alternatives and scores developed for LRT alternatives). The team calculated terciles for how the scoring (within a measure) should be allocated—meaning what data values are high, medium or low. Most measures had data values in each tercile. However not all measures have representation in each tercile—for a few there are only high and low scores as no values fell within the middle tercile. The scored data appear on **Table 22.**

Table 22 Scored Results of the Tier 2 Evaluation Matrix

NFTA Tier 2 Alternatives Evaluation Matrix

Scored by Color within each Mode for LRT and BRT Preliminary Alternatives

		DESCRIPTIVE		ENGINEERING / RIGHT OF WAY NEEDS			RIDERSHIP / MARKET					SYSTEM CONNECTIVITY		SUPPORT FOR TOD		ENVIRONMENTAL / COMMUNITY IMPACTS				
																IMPACTS TO WATER RESOURCES				
	ALTERNATIVE	LENGTH OF ALT (miles)	PRIVATE LAND AREA AFFECTED BY GUIDEWAY (acres)	Percent Mixed Traffic Operations	Percent Signalized Intersections of Total Intersections	2035 Total Project Boardings (Average Weekday)	2035 Total Boardings by 0 Car HH (Average Weekday)	Travel Time between UB Campuses (UB South - UB North), min.	Projected Park-and-Ride Patrons, 2035	COMMERCIAL / RETAIL AREA SERVED (acres) - 1/2 mile station radius	# OF PARK AND RECREATION AREAS SERVED	CONNECTING NFTA BUS ROUTES	Consistency with local and regional plans and strategies	# OF STATIONS WITH TRANSIT SUPPORTIVE ZONING - 1/2 mile station radius - total of high and medium stations	Flood-plains (acres)	Wet-lands (acres)	Streams (feet)	IMPACTS TO PARKS / RECREATION / OPEN SPACE (acres)	# OF PROPERTIES AFFECTED
LIGHT RAIL	**Niagara Falls Blvd LRT 1 (via Bailey, Eggert, Niagara Falls Blvd, Maple and I-990)**	10.2	11.0	0%	44%	24,000	14,700	16	343	821	6	16	6	12	13.8	1.3	419.0	0.0	211
	Niagara Falls Blvd LRT 2 (via Bailey, Eggert, Niagara Falls Blvd, Maple, John James Audubon Parkway and Millersport)	9.6	11.2	0%	39%	23,200	14,700	16	178	786	5	14	6	10	21.1	1.4	495.9	0.0	254
	Niagara Falls Blvd LRT 7 (via Bailey, Eggert, Niagara Falls Blvd, Meyer Rd, under I-290, I-990)	10.2	10.7	0%	39%	24,100	14,700	15	357	860	5	17	6	12	11.7	0.8	398.8	0.1	244
	Bailey Ave LRT 1 (via Bailey, Maple, I-990)	9.3	7.0	0%	43%	23,500	14,600	15	556	825	6	16	6	12	11.0	0.7	385.8	0.0	189
	Bailey Ave LRT 2 (via Bailey, Maple, John James Audubon Parkway and Millersport)	8.7	8.3	0%	36%	22,800	14,100	15	407	790	5	13	6	10	20.4	1.4	462.8	0.0	232
	Millersport Hwy LRT 1 (via Bailey, Grover Cleveland, Millersport, Flint, John James Audubon Parkway, Millersport)	8.2	4.7	0%	28%	22,900	13,500	13	976	398	7	8	5	7	21.2	1.5	629.4	0.0	194
BUS RAPID TRANSIT	**Niagara Falls Blvd BRT 1 (via Niagara Falls Blvd, Maple, I-990)**	11.5	25.7	17%	35%	21,100	13,800	30	132	961	5	17	4	17	15.3	2.2	782.1	0.4	305
	Niagara Falls Blvd BRT 2 (via Niagara Falls Blvd, Maple, John James Audubon Parkway, Millersport)	10.9	25.8	19%	33%	20,800	13,600	34	167	958	5	17	6	16	21.3	1.9	854.3	0.4	366
	Bailey Ave BRT 1 (via Bailey, Maple, I-990)	9.8	7.4	27%	39%	20,400	13,300	23	135	846	5	23	4	14	15.6	1.9	559.8	0.0	207
	Bailey Ave BRT 2 (via Bailey, Maple, John James Audubon Parkway, Millersport)	9.0	6.8	30%	36%	20,400	12,900	23	266	844	5	23	6	13	21.3	1.5	632.1	0.0	262
	Millersport Hwy BRT 1 (via Bailey, Grover Cleveland, Millersport, Flint, John James Audubon Parkway, Millersport)	8.5	4.1	35%	35%	17,800	11,500	18	251	432	7	21	5	8	21.2	1.5	564.0	0.0	201

5.2 Recommendations for Advancement into Tier 3 Screening

In this section, the consultant team provides its recommendations regarding the alternatives considered in the Tier 2 screening. Its recommendations take into consideration the quantified results of the Tier 2 screening shown in the matrix in **Table 22** along with consideration given to achieving geographic balance of corridors under study for detailed evaluation in Tier 3. This process is consistent with input that NFTA has received since the start of the AA study from the study's committees, project stakeholders, and the public. The following section provides additional details on the decision-making process and resulting recommendations.

5.2.1 Tier 2 Decision Methodology and Results

The main steps in the decision-making process were the following:

- Identify the top performing BRT alternatives based upon the individual criteria measures in the matrix.
- Determine if these BRT alternatives encompass all main travel corridors in the study area, and, if not, revise the selected alternatives.
- Identify the top performing LRT alternative based upon the individual criteria measures in the matrix.
- Determine the selected LRT alternative is consistent with the selected BRT alternatives.

Step 1: Tier 2 Rating/Criteria Assessment for BRT Alternatives

The preliminary alternatives were subject to a quantitative assessment, using five evaluation categories and the individual criteria measures as described in previous sections. The evaluation categories are Engineering/Right-of-Way Needs, Ridership/Markets Served, System Connectivity, Support for TOD, and Environmental/Community Impacts. .

This quantitative screening analysis enabled NFTA to compare clearly the differences among the alternatives. Specific scores were determined for each criterion for each alternative. The results of the screening showed that several preliminary alternatives had a high number of superior performing measures in each of the criteria compared to the other alternatives.

The team organized the process to evaluate all BRT alternatives compared to each other and all LRT alternatives compared to each other. The first step was to evaluate the BRT alternatives. For BRT, the assessment identified the highest-performing alternatives as Bailey Avenue 1, Bailey Avenue 2, and Millersport Highway 1.

Step 2: Review for Geographic Balance – Main Travel Corridors

The team decided to retain a diversity of BRT alternatives that cover all travel corridors, as the study advances to Tier 3 analysis. This approach will enrich the comparative evaluation process and provide NFTA with flexibility in future decision-making. By taking this step, NFTA will have a reasonable range of alternatives and corridors retained for detailed analysis in Tier 3. Doing so allows multiple travel corridors to remain under study. Further study under Tier 3 could reveal fatal flaws or significant issues in a particular corridor; thus keeping a wide range under study for Tier 3 is prudent and reasonable. For example, there is a need to conduct a more detailed traffic impact assessment in Tier 3. The results of that traffic assessment in Tier 3 may lead NFTA to abandon any further consideration of a particular corridor. Thus retaining representation of all corridors for detailed study in Tier 3 is prudent.

In reviewing the results of the quantitative assessment for the BRT Preliminary Alternatives, the consultant team examined the results by looking at how well the top alternatives encompass the

main travel corridors in the study area. Between UB-South and UB-North, the three main corridors are Niagara Falls Boulevard, Bailey Avenue, and Millersport Highway; and between UB-North and points farther north, the two main corridors are Millersport Highway and I-990.

Based upon this review, the team decided to replace the Bailey Avenue BRT 2 alternative with the Niagara Falls Boulevard BRT 1 alternative as the third BRT alternative to advance to Tier 3 screening. Thus, the three advancing BRT alternatives (Niagara Falls Boulevard 1, Bailey Avenue 1, and Millersport Highway 1) will cover all the main travel corridors. Since BRT is technically a "new" mode to NFTA, having representation of all corridors in the more rigorous and detailed Tier 3 work is prudent and reasonable.

Step 3: Tier 2 Rating/Criteria Assessment for LRT Alternatives

The next step was to review the results of the quantitative Tier 2 screening process for the LRT Preliminary Alternatives. Due to the high cost of LRT compared to BRT, it is prudent to recommend that only one LRT alternative advance to Tier 3. The quantitative assessment found that the highest performing alternative is Niagara Falls Boulevard LRT 1.

Step 4: LRT Consistency with BRT Alternatives

The final step in the process was to compare the top performing LRT alternative with the selected BRT alternatives. NFTA intends that an LRT alignment should be consistent with a BRT counterpart, so that it has a potential long-term opportunity to phase a BRT alternative into an LRT alternative. A BRT alternative possibly could evolve into an LRT system if more funding is available and if transit-oriented development continues to occur and a market grows for high-quality transit. Thus it is recommended for this reason as well that the Niagara Falls Boulevard LRT 1 alternative is advanced to Tier 3 because it was also recommended that the Niagara Falls Boulevard BRT 1 alternative is advanced.

Table 23 provides a summary of the recommended decision-making process.

Table 23 Summary of Decision Assessment Process

Mode	Alternative	Screening Assessment - BRT	Review for Geographic Balance	Screening Assessment - LRT	Consistency with BRT Alternatives	Alternatives to Advance to Tier 3
BUS RAPID TRANSIT	Niagara Falls Blvd 1			N/A		Niagara Falls Blvd 1
	Niagara Falls Blvd 2		Eliminated	N/A		
	Bailey Ave 1			N/A		Bailey Ave 1
	Bailey Ave 2		Eliminated	N/A		
	Millersport Hwy 1			N/A		Millersport Hwy 1
LIGHT RAIL TRANSIT	Niagara Falls Blvd 1					Niagara Falls Blvd 1
	Niagara Falls Blvd 2				Eliminated	
	Niagara Falls Blvd 7				Eliminated	
	Bailey Ave 1				Eliminated	
	Bailey Ave 2				Eliminated	
	Millersport Hwy 1				Eliminated	

APPENDIX A

LIGHT RAIL TRANSIT

LRT BAILEY AVENUE - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Light Rail Vehicle Speed Limit (mph.)
University At Buffalo - South Campus Station	**N/A**	**2372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	2372+000	2372+738	Tunnel	N/A	Horizontal Curve BL1-1	45
N/A	2372+738	2373+635	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	2373+635	2374+926	Tunnel	N/A	Horizontal Curve BL1-2	45
N/A	2374+926	2375+500	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
Bailey At Grover Cleveland Highway Station	**2375+500**	**2375+825**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2375+825	2380+911	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2380+911	2381+100	Tunnel	Bailey Ave.	Horizontal Curve BL1-6	30
Bailey At Eggert/Sheridan	**2381+100**	**2381+425**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2381+425	2381+622	Tunnel	Bailey Ave.	Horizontal Curve BL1-7	30
N/A	2381+622	2383+570	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2383+570	2384+649	Tunnel	Bailey Ave.	Both Curves BL1-10 and BL1-11	25
N/A	2384+649	2384+900	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2384+900	2385+375	At-Grade	Adjacent to Bailey Ave.	LRV Maximum Operating Speed	50
Bailey At Maple Station	**2385+375**	**2385+700**	**At-Grade**	**Adjacent to Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2385+700	2385+932	At-Grade	Maple Road	Horizontal Curve BL1-12	10
N/A	2385+932	2388+563	At-Grade	Maple Road	Roadway Speed Limit	45mph 35mph M-F 7A to 6P
N/A	2388+563	2388+719	At-Grade	Maple Road	Horizontal Curve BL1-14	10
Maple At Sweet Home Station	**2388+719**	**2389+044**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	2389+044	2390+277	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	2390+277	2390+791	At-Grade	Sweet Home Road	Horizontal Curve BL1-15	40
N/A	2390+791	2391+145	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	2391+145	2391+960	At-Grade	Sweet Home Road	Horizontal Curve BL1-16	40
Sweet Home At Rensch Road	**2391+960**	**2392+285**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	2392+285	2392+474	At-Grade	Rensch Road	Horizontal Curve BL1-17	10
N/A	2392+474	2393+186	At-Grade	Rensch Road	Roadway Speed Limit	30
N/A	2393+186	2393+572	At-Grade	Rensch Road	Both Curves BL1-18 and BL1-19	10
N/A	2393+572	2394+740	At-Grade	N/A	Campus At-Grade Speed	15
UB North Campus - Capen Hall Station	**2394+740**	**2395+065**	**At-Grade**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	2395+065	2396+100	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**2396+100**	**2396+425**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2396+425	2396+449	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	2396+449	2396+880	At-Grade	Putnam Way	Both Horizontal Curves BL1-24 and BL1-25	10
UB North Campus - Commons Building Station	**2396+880**	**2397+205**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2397+205	2397+681	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	2397+681	2398+100	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve BL1-26	20
N/A	2398+100	2398+309	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve BL1-27	10
UB North Campus - Greiner Hall Station	**2398+309**	**2398+634**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2398+634	2399+278	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL1-28	15
N/A	2399+278	2399+692	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2399+692	2400+837	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL1-29	40
N/A	2400+837	2400+900	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL1-30	25
J.J.A. Parkway At Sylvan Parkway Station	**2401+075**	**2401+400**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2401+400	2401+822	At-Grade	J.J. Audubon Pkwy.	Horizontal Curve BL1-30	25
N/A	2401+822	2405+680	At-Grade	J.J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2405+680	2406+060	At-Grade	J.J. Audubon Pkwy.	Horizontal Cuve BL1-34	25
I-990 Interchange Station	**2406+060**	**2406+385**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2406+385	2406+632	At-Grade	I-990 Median	Horizontal Curve BL1-35	10
N/A	2406+632	2414+500	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
North French Road Station	**2414+500**	**2414+825**	**At-Grade**	**I-990 Median**	**325' Long Station Platform**	**STATION STOP**
N/A	2414+825	2420+140	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
N/A	2420+140	2421+100	Tunnel	N/A	Horiztonal Curve BL1-40	25
N/A	2421+100	2421+628	At-Grade	N/A	Horiztonal Curve BL1-40	25
N/A	2421+628	2421+809	At-Grade	N/A	Coming into station	40
Crosspoint Business Park Station	**2421+809**	**2422+134**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

LRT BAILEY AVE - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Vertical Location Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1,2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
2372+000	2374+500	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the NW corner of private property at Main and Bailey	Property Owned by the State of New York	No Station: 100'	100ft ROW width is required to connect to the existing South Campus Station
2374+500	2380+800	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW	66' ±	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2380+800	2382+340	North Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW - With some deviance from center of ROW to smooth out curves and increase operating speed.	75' ±	Station: 100' No Station: 75'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2382+340	2384+300	North Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW - With some deviance from center of ROW to smooth out curves and increase operating speed.	66' ±	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2384+300	2384+900	N/A	Tunnel	In this corridor: Tracks would be inside the green space immediately west of N. Bailey Ave. Climbing to Grade at 3.33% for 900'. Portal near Sta. 2384+900	66' ±	No Station: 100'	Proposed tunnel section would be constructed outside of the existing ROW.
2384+900	2385+800	N/A	At-Grade	In this corridor: Tracks would be inside the green space immediately west of N. Bailey.	66' ±	No Station: 96'	Additional 30ft of ROW required for portal construction
2385+800	2388+650	Maple Road	At-Grade	In this corridor: Tracks would be in the center of the street	100' to 115' ±	No Station: 115' Staggered Station:135'	Additional ROW required for Station Construction. Reduce existing snow storage width from a total of 30ft wide to 10ft. Balance of existing ROW (20ft) gained is put towards reducing the proposed ROW width.
2388+650	2392+370	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
2392+370	2393+183 = 9396+900	Rensch Entrance Rd.	At-Grade	In this corridor: Tracks would be in center of street, jogging to just north of the street - Alignment terminates prior to entering University at Buffalo North	Property Owned by the State of New York	No Station: 27'	A Transfer of Juridiction would be required between the two State Agencies.
2393+183 = 9396+900	9399+800	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way on the south side of the street and along the south side of the Flint loop and Jacobs Center building.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9399+800	9400+051= 2397+183	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9400+051= 2397+183	2398+100	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
2398+100	2399+100	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies. New bridge structure required
2399+100	2406+566	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	Station: 160' No Station: 160'	Existing median utilized and snow storage decreased to accommodate rail
2406+566	2420+140	I-990	At-Grade	In this corridor: The tracks would run in the median of I-990. Portal at Station 2420+140	Varies- 270' to 750' ±	No Station: 27'	No additional ROW required
2420+140	2421+100	N/A	Tunnel	In this corridor: The tracks would run in a tunnel beneath I-990. Portals at Station 2420+140 and 2421+100	Varies-600' to Variance to property	No Station: 27'	No additional ROW required
2421+100	2422+134	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run at-grade through undeveloped land.	TBD - Variance of property ROW	No Station: 27' Staggered Station: 35'	Additional ROW Required for Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.
4. UB Alignment Stationing equality- begins at: 2393+183 (BL1) = 6396+900 (UB), ends at 9400+051 (UB) = 2397+183 (BL1)

LRT BAILEY AVENUE - ALTERNATIVE 2

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS AND DEIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Light Rail Vehicle Speed Limit (mph.)
University At Buffalo - South Campus Station	**N/A**	**2372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	2372+000	2372+738	Tunnel	N/A	Horizontal Curve BL2-1	45
N/A	2372+738	2373+635	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	2373+635	2374+926	Tunnel	N/A	Horizontal Curve BL2-2	45
N/A	2374+926	2375+500	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
Bailey At Grover Cleveland Highway Station	**2375+500**	**2375+825**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2375+825	2380+911	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2380+911	2381+100	Tunnel	Bailey Ave.	Horizontal Curve BL2-6	30
Bailey At Eggert/Sheridan	**2381+100**	**2381+425**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2381+425	2381+622	Tunnel	Bailey Ave.	Horizontal Curve BL2-7	30
N/A	2381+622	2383+570	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2383+570	2384+649	Tunnel	Bailey Ave.	Both Curves BL2-10 and BL2-11	25
N/A	2384+649	2384+900	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	2384+900	2385+375	At-Grade	Adjacent to Bailey Ave.	LRV Maximum Operating Speed	50
Bailey At Maple Station	**2385+375**	**2385+700**	**At-Grade**	**Adjacent to Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	2385+700	2385+932	At-Grade	Maple Road	Horizontal Curve BL2-12	10
N/A	2385+932	2388+563	At-Grade	Maple Road	Roadway Speed Limit	45mph 35mph M-F 7A to 6P
N/A	2388+563	2388+719	At-Grade	Maple Road	Horizontal Curve BL2-14	10
Maple At Sweet Home Station	**2388+719**	**2389+044**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	2389+044	2390+277	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	2390+277	2390+791	At-Grade	Sweet Home Road	Horizontal Curve BL2-15	40
N/A	2390+791	2391+145	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	2391+145	2391+960	At-Grade	Sweet Home Road	Horizontal Curve BL2-16	40
Sweet Home At Rensch Road	**2391+960**	**2392+285**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	2392+285	2392+474	At-Grade	Rensch Road	Horizontal Curve BL2-17	10
N/A	2392+474	2393+186	At-Grade	Rensch Road	Roadway Speed Limit	30
N/A	2393+186	2393+572	At-Grade	Rensch Road	Both Curves BL2-18 and BL2-19	10
N/A	2393+572	2394+740	At-Grade	N/A	Campus At-Grade Speed	15
UB North Campus - Capen Hall Station	**2394+740**	**2395+065**	**At-Grade**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	2395+065	2395+810	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**2395+810**	**2396+135**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2396+135	2396+449	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	2396+449	2396+710	At-Grade	Putnam Way	Both Horizontal Curves BL2-24 and BL2-25	10
UB North Campus - Commons Building Station	**2396+710**	**2397+035**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2397+035	2397+681	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	2397+681	2398+100	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve BL2-26	20
N/A	2398+100	2398+309	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve BL2-27	10
UB North Campus - Greiner Hall Station	**2398+309**	**2398+634**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2398+634	2399+278	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL2-28	15
N/A	2399+278	2399+692	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2399+692	2400+837	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL2-29	40
N/A	2400+837	2400+900	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve BL2-30	25
J.J.A. Parkway At Sylvan Parkway Station	**2401+075**	**2401+400**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	2401+400	2401+561	At-Grade	J. J. Audubon Pkwy. / Sylvan	Horizontal Curve BL2-31	10
N/A	2401+561	2401+700	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	2401+700	2401+898	At-Grade	Sylvan Parkway	Horizontal Curve BL2-32	15
N/A	2401+898	2402+570	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	2402+570	2402+982	At-Grade	Sylvan Parkway	Horizontal Curve BL2-33	25
N/A	2402+982	2403+662	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	2403+662	2403+866	At-Grade	Sylvan Parkway / Millersport	Horizontal Curve BL2-34	10
N/A	2403+866	2404+222	At-Grade	Millersport Hwy.	Horizontal Curve BL2-35	30
N/A	2404+222	2405+365	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	2405+365	2406+102	At-Grade	Millersport Hwy.	Horizontal Curve BL2-36	35
N/A	2406+102	2409+400	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	2409+400	2413+900	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
North French Road Station	**2413+900**	**2414+225**	**At-Grade**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	2414+225	2417+264	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
N/A	2417+264	2417+463	At-Grade	Millersport / Crosspoint Pkwy.	Horizontal Curve BL2-38	10
N/A	2417+463	2418+012	At-Grade	Crosspoint Parkway	Roadway Speed Limit	30
N/A	2418+012	2418+756	At-Grade	Crosspoint Parkway	Horizontal Curve BL2-39	30
Crosspoint Business Park Station	**2418+756**	**2419+081**	**At-Grade**	**Crosspoint Parkway**	**Terminal Station**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

LRT BAILEY AVE - ALTERNATIVE 2

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Vertical Location Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1,2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
2372+000	2374+500	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the NW corner of private property at Main and Bailey	Property Owned by the State of New York	No Station: 100'	100ft ROW width is required to connect to the existing South Campus Station
2374+500	2380+800	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW	66' ±	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2380+800	2382+340	North Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW - With some deviance from center of ROW to smooth out curves and increase operating speed.	75' ±	Station: 100' No Station: 75'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2382+340	2384+300	North Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW - With some deviance from center of ROW to smooth out curves and increase operating speed.	66' ±	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
2384+300	2384+900	N/A	Tunnel	In this corridor: Tracks would be inside the green space immediately west of N. Bailey Ave. Climbing to Grade at 3.33% for 900'. Portal near Sta. 2384+900	66' ±	No Station: 100'	Proposed tunnel section would be constructed outside of the existing ROW.
2384+900	2385+800	N/A	At-Grade	In this corridor: Tracks would be inside the green space immediately west of N. Bailey.	66' ±	No Station: 96'	Additional 30ft of ROW required for portal construction
2385+800	2388+650	Maple Road	At-Grade	In this corridor: Tracks would be in the center of the street	100' to 115' ±	No Station: 115' Staggered Station:135'	Additional ROW required for Station Construction. Reduce existing snow storage width from a total of 30ft wide to 10ft. Balance of existing ROW (20ft) gained is put towards reducing the proposed ROW width.
2388+650	2392+370	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
2392+370	2393+183 = 9396+900	Rensch Entrance Rd.	At-Grade	In this corridor: Tracks would be in center of street, jogging to just north of the street - Alignment terminates prior to entering University at Buffalo North	Property Owned by the State of New York	No Station: 27'	A Transfer of Juridiction would be required between the two State Agencies.
2393+183 = 9396+900	9399+800	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way on the south side of the street and along the south side of the Flint loop and Jacobs Center building.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9399+800	9400+051= 2397+183	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9400+051= 2397+183	2398+100	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
2398+100	2399+100	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies. New bridge structure required
2399+100	2401+500	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	Station: 160' No Station: 160'	Existing median utilized and snow storage decreased to accommodate rail
2401+500	2403+800	Sylvan Parkway	At-Grade	In this corridor: The tracks would run in the center of Sylvan Parkway.	100'	No Station: 100' Staggered Station: 100'	Existing snow storage area decreased to accommodate rail
2403+800	2405+540	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100' ±	No Station: 100'	No additional ROW required
2405+540	2417+340	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100'	No Station: 100' Staggered Station: 100'	No additional ROW required
2417+340	2419+081	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run in the center of Crosspoint Parkway	75'	Station: 110' No Station: 102'	Additional ROW required

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.
4. UB Alignment Stationing equality- begins at: 2393+183 (BL1) = 6396+900 (UB), ends at 9400+051 (UB) = 2397+183 (BL1)

LRT MILLERSPORT HIGHWAY - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*						
Station Stop Name	**Speed Limit Begin Stationing**	**Speed Limit End Stationing**	**Vertical Location Within Corridor**	**Streetname (Where Applicable)**	**Speed Controlling Element**	**Light Rail Vehicle Speed Limit (mph.)**
University At Buffalo - South Campus	**N/A**	**5372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	5372+000	5372+738	Tunnel	N/A	Horizontal Curve MH1-1	45
N/A	5372+738	5373+680	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	5373+680	5374+887	Tunnel	N/A	Horizontal Curve MH1-2	45
N/A	5374+887	5375+156	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
N/A	5375+156	5376+135	Tunnel	Bailey / G. Cleveland	Horizontal Curve MH1-3	45
Bailey At Grover Cleveland Highway	**5376+135**	**5376+460**	**Tunnel**	**G. Cleveland Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5376+460	5379+400	Tunnel	G. Cleveland Hwy.	LRV Maximum Operating Speed	50
Eggert At Millersport Highway	**5379+400**	**5379+725**	**Tunnel**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5379+725	5380+900 (Portal)	Tunnel	Millersport Hwy.	LRV Maximum Operating Speed	50
N/A	5380+900 (Portal)	5382+400	At-Grade	Millersport Hwy.	Roadway Speed Limit	35
Sheridan Drive At Millersport Highway	**5382+400**	**5382+725**	**At-Grade**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5382+725	5386+441	At-Grade	Millersport Hwy.	Roadway Speed Limit	35
Millersport Highway At Flint Road	**5386+441**	**5386+766**	**At-Grade**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5386+766	5386+988	At-Grade	N/A	Both Curve MH1-8 and MH1-9	10
N/A	5386+988	5387+845	At-Grade / Tunnel	N/A	Horizontal Curve MH1-10	40
N/A	5387+845	5389+645	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	5389+645	5390+173	Tunnel / At-Grade	Flint Entrance	Horizontal Curve MH1-11	15
N/A	5390+173	5390+404	At-Grade	Flint Entrance	Horizontal Curve MH1-12	10
N/A	5390+404	5390+775	At-Grade	Flint Entrance	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**5390+775**	**5391+100**	**At-Grade**	**Flint Entrance / Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	5391+100	5392+400	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**5392+400**	**5392+725**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	5392+725	5392+741	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	5392+741	5393+180	At-Grade	Putnam Way	Both Horizontal Curves MH1-16 and MH1-17	10
UB North Campus - Commons Building Station	**5393+180**	**5393+505**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	5393+505	5393+973	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	5393+973	5394+400	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve MH1-18	20
N/A	5394+400	5394+602	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve MH1-19	10
UB North Campus - Greiner Hall Station	**5394+602**	**5394+927**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	5394+927	5395+570	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve MH1-20	15
N/A	5395+570	5395+984	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	5395+984	5397+129	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve MH1-21	40
N/A	5397+129	5397+200	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve MH1-22	25
Sylvan Parkway Station	**5397+200**	**5397+525**	**At-Grade**	**J. J. Audubon Pkwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5397+525	5397+853	At-Grade	J. J. Audubon Pkwy. / Sylvan	Horizontal Curve MH1-23	10
N/A	5397+853	5397+992	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	5397+992	5398+190	At-Grade	Sylvan Parkway	Horizontal Curve MH1-24	15
N/A	5398+190	5398+862	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	5398+862	5399+274	At-Grade	Sylvan Parkway	Horizontal Curve MH1-25	25
N/A	5399+274	5399+955	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	5399+955	5400+159	At-Grade	Sylvan Parkway / Millersport	Horizontal Curve MH1-26	10
N/A	5400+159	5400+514	At-Grade	Millersport Hwy.	Horizontal Curve MH1-27	30
N/A	5400+514	5401+657	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	5401+657	5402+394	At-Grade	Millersport Hwy.	Horizontal Curve MH1-28	35
N/A	5402+394	5405+700	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	5405+700	5410+700	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
North French Road Station	**5410+700**	**5411+025**	**At-Grade**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	5411+025	5413+556	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
N/A	5413+556	5413+756	At-Grade	Millersport / Crosspoint Pkwy.	Horizontal Curve MH1-30	10
N/A	5413+756	5414+304	At-Grade	Crosspoint Parkway	Roadway Speed Limit	30
N/A	5414+304	5414+967	At-Grade	Crosspoint Parkway	Horizontal Curve MH1-31	30
Crosspoint Business Park Station	**5414+967**	**5415+374**	**At-Grade**	**Crosspoint Parkway**	**Terminal Station**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

LRT MILLERSPORT HIGHWAY - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Vertical Location Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1, 2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
5372+000	5374+500	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the NW corner of private property at Main an Bailey	Property Owned by the State of New York	No Station: 100'	100ft ROW width is required to connect to the existing South Campus Station
5374+500	5375+500	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW	66' ±	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
5375+500	5379+500	Grover Cleveland Highway	Tunnel	In this corridor: Tracks would be beneath street in center of ROW.	100' ±	Station: 100' No Station: 100'	Existing ROW width is adequate. The snow storage area within this corridor can be reduced by 30ft (15ft each side) to locate street level entrance
5379+500	5380+900	Millersport Highway	Tunnel	In this corridor: Tracks would be beneath the street in the center of the ROW. Tracks would climb at 4.0% from tunnel to at-grade with a portal near Station 5380+900.	100' ±	Station: 100' No Station: 100'	Existing ROW width is adequate. The snow storage area within this corridor can be reduced by 30ft (15ft each side) to locate street level entrance
5380+900	5382+900	Millersport Highway	At-Grade	In this corridor: Tracks would be in the center of the street.	100' ±	Center Station: 115' No Station: 107'	Additional ROW required for Station Construction. The snow storage area within this corridor can be reduced by 20ft. No Station: ((100'+27')-20'=107'),Station ((100'+35')-20'=115')
5382+900	5386+900	Millersport Highway	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 94'±, 88'±, 100'±, 110'±	Center Station: 145' No Station: 137'	Additional ROW required for Construction.
5386+900	5387+440	Not in Any Roadway	At-Grade	In this corridor: Tracks would first run adjacent to Millersport Highway in greenfield. Tracks would decline at 4.0% down into a tunnel with the portal near Station 5387+440.	TBD - Variance of property ROW	No Station: 27' Staggered Station: 35'	Additional ROW required for Construction.
5387+440	5389+960	Not in Any Roadway	Tunnel	In this corridor: Tracks would proceed northward in a tunnel, and climb to grade at 4.0% with a portal near Station 5389+96 after clearing beneath the access ramps between Maple Road and Millersport Highway and after clearning beneath the John James Audubon Parkway.	TBD - Variance of property ROW	No Station: 45'	Additional ROW required for Construction.
5389+960	5390+173	Flint Entrance	At-Grade	In this corridor: Tracks would run in the median of the Flint Entrance	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5390+173	5390+172= 5390+172	Flint Entrance	At-Grade	In this corridor: Tracks would run in the median of the Flint Entrance.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5390+172= 5390+172	5391+900	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run in along the south side of the Jacobs Center building	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5391+900	5392+177-5392+595	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5392+177-5392+595	5393+040	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5393+040	5394+340	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street ma be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
5394+340	5395+100	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	New bridge structure required
5395+100	5397+760	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	No Station: 160' Center Station: 160'	Existing median utilized and snow storage area decreased to accommodate rail
5397+760	5400+060	Sylvan Parkway	At-Grade	In this corridor: The tracks would run in the center of Sylvan Parkway.	100'	No Station: 100' Staggered Station: 100'	Existing snow storage area decreased to accommodate rail
5400+060	5401+800	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100' ±	No Station: 100'	No additional ROW required
5401+800	5413+600	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100'	No Station: 100' Staggered Station: 100'	No additional ROW required
5413+600	5415+374	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run in the center of Crosspoint Parkway	75'	Station: 110' No Station: 102'	Additional ROW required

2. ROW dimensions are typical, and vary in specific locations along the roadways.

3. All ROW Needed as noted refers to Tangent running sections.

4. UB Alignment Stationing equality- begins at: 2393+183 (BL1) = 6396+900 (UB), ends at 9400+051 (UB) = 2397+183 (BL1)

LRT NIAGARA FALLS BLVD. - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Light Rail Vehicle Speed Limit (mph.)
University At Buffalo - South Campus	**N/A**	**6372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6372+000	6372+740	Tunnel	N/A	Horizontal Curve NFB1-1	45
N/A	6372+740	6373+635	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	6373+635	6374+930	Tunnel	Bailey Ave.	Horizontal Curve NFB1-2	45
N/A	6374+930	6375+575	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
Bailey Ave At Grover Cleveland Highway	**6375+575**	**6375+900**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	6375+900	6381+145	Tunnel	Bailey Ave and Eggert Road	Both Curves NFB1-6 and NFB1-7	10
N/A	6381+145	6381+700	Tunnel	Eggert Road	LRV Maximum Operating Speed	10
Eggert and Carmen Road	**6381+700**	**6382+005**	At-Grade	**Eggert Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6382+005	6383+336	At-Grade	Eggert Road	Roadway Speed Limit	35
N/A	6383+336	6383+500	At-Grade	Eggert Rd and Niagara Falls Blvd.	Horizontal Curve NFB1-8	10
N/A	6383+500	6387+000	At-Grade	Niagara Falls Blvd.	Roadway Speed Limit	40
Boulevard Mall	**6387+000**	**6387+325**	At-Grade	**Niagara Falls Blvd.**	**325' Long Station Platform**	**STATION STOP**
N/A	6387+325	6387+580	At-Grade	Niagara Falls Blvd. and Maple Rd.	Horizontal Curve NFB1-10	10
N/A	6387+580	6388+300	At-Grade	Maple Rd.	Roadway Speed Limit	45
N/A	6388+300	6391+875	At-Grade	Maple Rd.	Roadway Speed Limit	45mph 35mph M-F 7A to 6P
Maple At Sweet Home Station	**6391+875**	**6392+200**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6392+200	6392+440	At-Grade	Sweet Home Road	Horizontal Curve NFB1-13	10
N/A	6392+440	6393+990	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	6393+990	6395+668	At-Grade	Sweet Home Road	Both Horizontal Curves NFB1-14 and NFB1-15	40
Sweet Home At Rensch Road	**6395+668**	**6395+993**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6395+993	6396+191	At-Grade	Rensch Road	Horizontal Curve NFB1-15	10
N/A	6396+191	6396+904	At-Grade	Rensch Road	Roadway Speed Limit	30
N/A	6396+904	6397+290	At-Grade	Rensch Road	Both Curves NFB1-17 and NFB1-18	10
N/A	6397+290	6398+500	At-Grade	N/A	Campus At-Grade Speed	15
UB North Campus - Capen Hall Station	**6398+500**	**6398+825**	**At-Grade**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6398+825	6399+800	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**6399+800**	**6400+125**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6400+125	6400+160	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	6400+160	6400+625	At-Grade	Putnam Way	Both Horizontal Curves NFB1-23 and NFB1-24	10
UB North Campus - Commons Building Station	**6400+625**	**6400+950**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6400+950	6401+390	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	6401+390	6401+800	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB1-25	20
N/A	6401+800	6402+030	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB1-26	10
UB North Campus - Greiner Hall Station	**6402+030**	**6402+355**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6402+355	6402+996	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-27	15
N/A	6402+996	6403+410	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	6403+410	6404+555	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-28	40
N/A	6404+555	6404+805	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-29	25
J.J.A. Parkway At Sylvan Parkway Station	**6404+805**	**6405+130**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6405+130	6405+540	At-Grade	J.J. Audubon Pkwy.	Horizontal Curve NFB1-30	25
N/A	6405+540	6409+395	At-Grade	J.J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	6409+395	6409+740	At-Grade	J.J. Audubon Pkwy.	Horizontal Cuve NFB1-33	25
I-990 Interchange Station	**6409+740**	**6410+075**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6410+075	6410+350	At-Grade	I-990 Median	Horizontal Curve NFB1-34	10
N/A	6410+350	6418+220	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
North French Road Station	**6418+220**	**6418+545**	**At-Grade**	**I-990 Median**	**325' Long Station Platform**	**STATION STOP**
N/A	6418+545	6423+860	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
N/A	6423+860	6424+820	Tunnel	N/A	Horiztonal Curve NFB1-39	25
N/A	6424+820	6425+345	At-Grade	N/A	Horiztonal Curve NFB1-39	25
N/A	6425+345	6425+520	At-Grade	N/A	Coming into station	40
Crosspoint Business Park Station	**6425+520**	**6425+850**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**
N/A	6425+850	6426+050	At-Grade	Crosspoint Parkway	Horizontal Cuve NFB1-40	10
N/A	6426+050	6426+930	At-Grade	Crosspoint Parkway	Horizontal Cuve NFB1-41	30
Millersport Highway Terminal Station	**6426+930**	**6427+522**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

LRT NIAGARA FALLS BLVD. - ALTERNATIVE 1

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	**Corridor Ending Station**	**Street Name of Corridor** (if applicable)	**Vertical Location Within Corridor**	**Horizontal Location Within Corridor**	**Existing Right-of-Way (ROW) Width** [1, 2]	**Proposed Right-of-Way (ROW) Width**[3]	**Notes/ Assumptions**
6372+000	6374+220	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the corner of private property at Main and Bailey	Property Owned by the State of New York	No Station: 100	100ft ROW width is required to connect to the existing South Campus Station
6374+220	6380+800	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW and beneath private property at the corner of Main and Bailey	66'	Station: 100' No Station: 60'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6380+800	6381+700	Eggert Road	Tunnel	In this corridor: Tracks would be beneath street in center of ROW. Tracks would climb at 4.0% up to grade with a portal near Station 6381+700	66'	Station: 100' No Station: 60'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6381+700	6383+430	Eggert Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 66 to 85'	Station:123' No Station:112'	Additional ROW Required for Construction
6383+430	6387+500	Niagara Falls Blvd.	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 85 to 125'	Station:163' No Station:152'	Additional ROW Required for Construction
6387+500	6388+300	Maple Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 100'±	No Station: 127'	Additional ROW Required for Construction
6388+300	6392+370	Maple Road	At-Grade	In this corridor: The tracks remain at-grade running in the center/median of the street.	Varies: 97'±, 100'± to 115' ±	No Station: 115' Staggered Station:135'	Reduce existing snow storage width from a total of 30ft wide to 10ft. Balance of existing ROW (20ft) gained is put towards reducing the proposed ROW width.
6392+370	6396+116	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
6396+116	6396+900 = 9396+900	Rensch Entrance Road	At-Grade	In this corridor: Tracks would be in center of street - Alignment terminates prior to entering University at Buffalo North	Property Owned by the State of New York	No Station: 27'	A Transfer of Juridiction would be required between the two State Agencies.
6396+900 = 9396+900	9399+800	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way on the south side of the street and along the south side of the Flint loop and Jacobs Center building.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9399+800	9400+051= 6400+000	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6400+000	6401+900	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6401+900	6402+600	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies. New bridge structure required
6402+600	6410+300	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	Station: 160' No Station: 160'	Existing median utilized and snow storage decreased to accommodate rail
6410+300	6423+800	I-990	At-Grade	In this corridor: The tracks would run in the median of I-990. Portal at Station 6423+800	Varies- 270' to 750' ±	No Station: 27'	No additional ROW required
6423+800	6424+800	N/A	Tunnel	In this corridor: The tracks would run in a tunnel beneath I-990. Portals at Station 6423+800 and 6424+800	Varies-600' to Variance to property	No Station: 27'	No additional ROW required
6424+800	6425+850	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run at-grade through undeveloped land.	TBD - Variance of property ROW	No Station: 27' Staggered Station: 35'	Additional ROW Required for Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.
4. UB Alignment Stationing equality- begins at: 6396+900 (NFB1) = 6396+900 (UB), ends at 9400+051 (UB) = 6400+900 (NFB1)

LRT NIAGARA FALLS BLVD. - ALTERNATIVE 2

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS AND DEIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*						
Station Stop Name	**Speed Limit Begin Stationing**	**Speed Limit End Stationing**	**Vertical Location Within Corridor**	**Streetname (Where Applicable)**	**Speed Controlling Element**	**Light Rail Vehicle Speed Limit (mph.)**
University At Buffalo - South Campus	**N/A**	**6372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6372+000	6372+740	Tunnel	N/A	Horizontal Curve NFB2-1	45
N/A	6372+740	6373+635	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	6373+635	6374+930	Tunnel	Bailey Ave.	Horizontal Curve NFB2-2	45
N/A	6374+930	6375+575	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
Bailey Ave At Grover Cleveland Highway	**6375+575**	**6375+900**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	6375+900	6381+145	Tunnel	Bailey Ave and Eggert Road	Both Curves NFB2-6 and NFB2-7	10
N/A	6381+145	6381+700	Tunnel	Eggert Road	LRV Maximum Operating Speed	10
Eggert and Carmen Road	**6381+700**	**6382+005**	At-Grade	**Eggert Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6382+005	6383+336	At-Grade	Eggert Road	Roadway Speed Limit	35
N/A	6383+336	6383+500	At-Grade	Eggert Rd and Niagara Falls Blvd.	Horizontal Curve NFB1-8	10
N/A	6383+500	6387+000	At-Grade	Niagara Falls Blvd.	Roadway Speed Limit	40
Boulevard Mall	**6387+000**	**6387+325**	At-Grade	**Niagara Falls Blvd.**	**325' Long Station Platform**	**STATION STOP**
N/A	6387+325	6387+580	At-Grade	Niagara Falls Blvd. and Maple Rd.	Horizontal Curve NFB2-10	10
N/A	6387+580	6388+300	At-Grade	Maple Rd.	Roadway Speed Limit	45
N/A	6388+300	6391+875	At-Grade	Maple Rd.	Roadway Speed Limit	45mph 35mph M-F 7A to 6P
Maple At Sweet Home Station	**6391+875**	**6392+200**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6392+200	6392+440	At-Grade	Sweet Home Road	Horizontal Curve NFB2-13	10
N/A	6392+440	6393+990	At-Grade	Sweet Home Road	Roadway Speed Limit	45
N/A	6393+990	6395+668	At-Grade	Sweet Home Road	Both Horizontal Curves NFB2-14 and NFB2-15	40
Sweet Home At Rensch Road	**6395+668**	**6395+993**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6395+993	6396+191	At-Grade	Rensch Road	Horizontal Curve NFB2-15	10
N/A	6396+191	6396+904	At-Grade	Rensch Road	Roadway Speed Limit	30
N/A	6396+904	6397+290	At-Grade	Rensch Road	Both Curves NFB2-17 and NFB2-18	10
N/A	6397+290	6398+500	At-Grade	N/A	Campus At-Grade Speed	15
UB North Campus - Capen Hall Station	**6398+500**	**6398+825**	**At-Grade**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6398+825	6399+530	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**6399+530**	**6399+865**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6399+865	6400+160	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	6400+160	6400+415	At-Grade	Putnam Way	Both Horizontal Curves NFB2-23 and NFB2-24	10
UB North Campus - Commons Building Station	**6400+415**	**6400+750**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6400+750	6401+390	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	6401+390	6401+800	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB2-25	20
N/A	6401+800	6402+030	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB2-26	10
UB North Campus - Greiner Hall Station	**6402+030**	**6402+355**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6402+355	6402+996	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB2-27	15
N/A	6402+996	6403+410	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	6403+410	6404+555	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB2-28	40
N/A	6404+555	6404+805	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB2-29	25
J.J.A. Parkway At Sylvan Parkway Station	**6404+805**	**6405+130**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6405+130	6405+278	At-Grade	J. J. Audubon Pkwy. / Sylvan	Horizontal Curve NFB2-30	10
N/A	6405+278	6405+417	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	6405+417	6405+615	At-Grade	Sylvan Parkway	Horizontal Curve NFB2-31	15
N/A	6405+615	6406+287	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	6406+287	6406+699	At-Grade	Sylvan Parkway	Horizontal Curve NFB2-32	25
N/A	6406+699	6407+379	At-Grade	Sylvan Parkway	Roadway Speed Limit	30
N/A	6407+379	6407+583	At-Grade	Sylvan Parkway / Millersport	Horizontal Curve NFB2-33	10
N/A	6407+583	6407+939	At-Grade	Millersport Hwy.	Horizontal Curve NFB2-34	30
N/A	6407+939	6409+082	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	6409+082	6409+819	At-Grade	Millersport Hwy.	Horizontal Curve NFB2-35	35
N/A	6409+819	6413+100	At-Grade	Millersport Hwy.	Roadway Speed Limit	45
N/A	6413+100	6418+100	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
North French Road Station	**6418+100**	**6418+425**	**At-Grade**	**Millersport Hwy.**	**325' Long Station Platform**	**STATION STOP**
N/A	6418+425	6420+981	At-Grade	Millersport Hwy.	LRV Maximum Operating Speed	50
N/A	6420+981	6421+180	At-Grade	Millersport / Crosspoint Pkwy.	Horizontal Curve NFB2-37	10
N/A	6421+180	6421+729	At-Grade	Crosspoint Parkway	Roadway Speed Limit	30
N/A	6421+729	6422+473	At-Grade	Crosspoint Parkway	Horizontal Curve NFB2-38	30
Crosspoint Business Park Station	**6422+473**	**6422+798**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

LRT NIAGARA FALLS BLVD. - ALTERNATIVE 2

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	**Corridor Ending Station**	**Street Name of Corridor** (if applicable)	**Vertical Location Within Corridor**	**Horizontal Location Within Corridor**	**Existing Right-of-Way (ROW) Width** [1, 2]	**Proposed Right-of-Way (ROW) Width**[3]	**Notes/ Assumptions**
6372+000	6374+220	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the corner of private property at Main and Bailey	Property Owned by the State of New York	No Station: 100	100ft ROW width is required to connect to the existing South Campus Station
6374+220	6380+800	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW and beneath private property at the corner of Main and Bailey	66'	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6380+800	6381+700	Eggert Road	Tunnel	In this corridor: Tracks would be beneath street in center of ROW. Tracks would climb at 4.0% up to grade with a portal near Station 6381+700	66'	Station: 100' No Station: 60'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6381+700	6383+430	Eggert Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 66 to 85'	Station:123' No Station:112'	Additional ROW Required for Construction
6383+430	6387+500	Niagara Falls Blvd.	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 85 to 125'	Station:163' No Station:152'	Additional ROW Required for Construction
6387+500	6388+300	Maple Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 100'±	No Station: 127'	Additional ROW Required for Construction
6388+300	6392+370	Maple Road	At-Grade	In this corridor: The tracks remain at-grade running in the center/median of the street.	Varies: 97'±, 100'± to 115' ±	No Station: 115' Staggered Station:135'	Reduce existing snow storage width from a total of 30ft wide to 10ft. Balance of existing ROW (20ft) gained is put towards reducing the proposed ROW width.
6392+370	6396+116	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
6396+116	6396+900 = 9396+900	Rensch Entrance Road	At-Grade	In this corridor: Tracks would be in center of street - Alignment terminates prior to entering University at Buffalo North	Property Owned by the State of New York	No Station: 27'	A Transfer of Juridiction would be required between the two State Agencies.
6396+900 = 9396+900	9399+800	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way on the south side of the street and along the south side of the Flint loop and Jacobs Center building.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9399+800	9400+051= 6400+000	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6400+000	6401+900	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6401+900	6402+600	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies. New bridge structure required
6402+600	6405+200	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	Station: 160' No Station: 160'	Existing median utilized and snow storage decreased to accommodate rail
6405+200	6407+500	Sylvan Parkway	At-Grade	In this corridor: The tracks would run in the center of Sylvan Parkway.	100'	No Station: 100' Staggered Station: 100'	Existing snow storage area decreased to accommodate rail
6407+500	6409+240	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100' ±	No Station: 100'	No additional ROW required
6409+240	6421+040	Millersport Highway	At-Grade	In this corridor: The tracks would run in the center of Millersport Highway	100'	No Station: 100' Staggered Station: 100'	No additional ROW required
6421+040	6422+798	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run in the center of Crosspoint Parkway	75'	Station: 110' No Station: 102'	Additional ROW required

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.
4. UB Alignment Stationing equality- begins at: 6396+900 (NFB2) = 6396+900 (UB), ends at 9400+051 (UB) = 6400+900 (NFB2)

LRT NIAGARA FALLS BLVD. - ALTERNATIVE 7

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

LIGHT RAIL VEHICLE - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Light Rail Vehicle Speed Limit (mph.)
University At Buffalo - South Campus	**N/A**	**6372+000**	**Tunnel**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6372+000	6372+740	Tunnel	N/A	Horizontal Curve NFB1-1	45
N/A	6372+740	6373+635	Tunnel	N/A	LRV Maximum Operating Speed	50
N/A	6373+635	6374+930	Tunnel	Bailey Ave.	Horizontal Curve NFB1-2	45
N/A	6374+930	6375+575	Tunnel	Bailey Ave.	LRV Maximum Operating Speed	50
Bailey Ave At Grover Cleveland Highway	**6375+575**	**6375+900**	**Tunnel**	**Bailey Ave.**	**325' Long Station Platform**	**STATION STOP**
N/A	6375+900	6381+145	Tunnel	Bailey Ave and Eggert Road	Both Curves NFB1-6 and NFB1-7	10
N/A	6381+145	6381+700	Tunnel	Eggert Road	LRV Maximum Operating Speed	10
Eggert and Carmen Road	**6381+700**	**6382+005**	At-Grade	**Eggert Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6382+005	6383+336	At-Grade	Eggert Road	Roadway Speed Limit	35
N/A	6383+336	6383+500	At-Grade	Eggert Rd and Niagara Falls Blvd.	Horizontal Curve NFB1-8	10
N/A	6383+500	6387+000	At-Grade	Niagara Falls Blvd.	Roadway Speed Limit	40
Boulevard Mall	**6387+000**	**6387+325 (NFB7)**	At-Grade	**Niagara Falls Blvd.**	**325' Long Station Platform**	**STATION STOP**
N/A	6387+325 (NFB7)	6388+037 (NFB7)	At-Grade	Niagara Falls Blvd.	Roadway Speed Limit	45
N/A	6388+037 (NFB7)	6388+242 (NFB7)	At-Grade	Niagara Falls Blvd. and Meyer Rd.	Horizontal Curve NFB7-1	10
N/A	6388+242 (NFB7)	6389+508 (NFB7)	At-Grade	Meyer Rd.	Roadway Speed Limit	30
N/A	6389+508 (NFB7)	6389+782 (NFB7)	At-Grade	Meyer Rd.	Horizontal Curve NFB7-2	10
N/A	6389+782 (NFB7)	6389+840(NFB7)	At-Grade	Meyer Rd.	LRV Operating Speed	10
Meyer at N. Bailey Station	**6389+840(NFB7)**	**6390+165 (NFB7)**	**At-Grade**	**Meyer Rd.**	**325' Long Station Platform**	**STATION STOP**
N/A	6390+165 (NFB7)	6390+681 (NFB7)	At-Grade	Meyer Rd.	Roadway Speed Limit	30
N/A	6390+681 (NFB7)	6390+920 (NFB7)	At-Grade	Meyer Rd.	Horizontal Curve NFB7-3	10
N/A	6390+920 (NFB7)	6391+206 (NFB7)	At-Grade	Meyer Rd.	Roadway Speed Limit	30
N/A	6391+206 (NFB7)	6391+300 (NFB7)	At-Grade	Meyer Rd.	Horizontal Curve NFB7-4	30
N/A	6391+300 (NFB7)	6391+514 (NFB7)	Tunnel	Meyer Rd.	Horizontal Curve NFB7-4	30
N/A	6391+514 (NFB7)	6393+280 (NFB7)	Tunnel	Meyer Rd.	LRV Maximum Operating Speed	55
N/A	6393+280 (NFB7)	6393+942 (NFB7)	Tunnel	Meyer Rd. and Sweet Home Rd.	Horizontal Curve NFB7-5	30
N/A	6393+942 (NFB7)	6394+784 (NFB7)	Tunnel	Sweet Home Road	LRV Maximum Operating Speed	55
N/A	6394+784 (NFB7)	6395+400 (NFB7)	Tunnel	Sweet Home Road	Horizontal Curve NFB7-6	35
N/A	6395+400 (NFB7)	6395+586 (NFB&7) = 6395+668 (NFB1)	At-Grade	Sweet Home Road	Horizontal Curve NFB7-6/ NFB1-15	35
Sweet Home At Rensch Road	**6395+586 (NFB&7) = 6395+668 (NFB1)**	**6395+993**	**At-Grade**	**Sweet Home Road**	**325' Long Station Platform**	**STATION STOP**
N/A	6395+993	6396+191	At-Grade	Rensch Road	Horizontal Curve NFB1-16	10
N/A	6396+191	6396+904	At-Grade	Rensch Road	Roadway Speed Limit	30
N/A	6396+904	6397+290	At-Grade	Rensch Road	Both Curves NFB1-17 and NFB1-18	10
N/A	6397+290	6398+500	At-Grade	N/A	Campus At-Grade Speed	15
UB North Campus - Capen Hall Station	**6398+500**	**6398+825**	**At-Grade**	**N/A**	**325' Long Station Platform**	**STATION STOP**
N/A	6398+825	6399+800	At-Grade	Putnam Way	Campus At-Grade Speed	15
UB North Campus - Library Station	**6399+800**	**6400+125**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6400+125	6400+160	At-Grade	Putnam Way	Campus At-Grade Speed	15
N/A	6400+160	6400+625	At-Grade	Putnam Way	Both Horizontal Curves NFB1-23 and NFB1-24	10
UB North Campus - Commons Building Station	**6400+625**	**6400+950**	**At-Grade**	**Putnam Way**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6400+950	6401+390	At-Grade	Lee Entrance	Roadway Speed Limit	30
N/A	6401+390	6401+800	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB1-25	20
N/A	6401+800	6402+030	At-Grade	Lee / J. J. Audubon Pkwy.	Horizontal Curve NFB1-26	10
UB North Campus - Greiner Hall Station	**6402+030**	**6402+355**	**At-Grade**	**N/A**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6402+355	6402+996	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-27	15
N/A	6402+996	6403+410	At-Grade	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	6403+410	6404+555	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-28	40
N/A	6404+555	6404+805	At-Grade	J. J. Audubon Pkwy.	Horizontal Curve NFB1-29	25
J.J.A. Parkway At Sylvan Parkway Station	**6404+805**	**6405+130**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6405+130	6405+540	At-Grade	J.J. Audubon Pkwy.	Horizontal Curve NFB1-30	25
N/A	6405+540	6409+395	At-Grade	J.J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	6409+395	6409+740	At-Grade	J.J. Audubon Pkwy.	Horizontal Cuve NFB1-33	25
I-990 Interchange Station	**6409+740**	**6410+075**	**At-Grade**	**J.J. Audubon Pkwy.**	**325' Long Station - Low Level Platform**	**STATION STOP**
N/A	6410+075	6410+350	At-Grade	I-990 Median	Horizontal Curve NFB1-34	10
N/A	6410+350	6418+220	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
North French Road Station	**6418+220**	**6418+545**	**At-Grade**	**I-990 Median**	**325' Long Station Platform**	**STATION STOP**
N/A	6418+545	6423+860	At-Grade	I-990 Median	LRV Maximum Operating Speed	50
N/A	6423+860	6424+820	Tunnel	N/A	Horiztonal Curve NFB1-39	25
N/A	6424+820	6425+345	At-Grade	N/A	Horiztonal Curve NFB1-39	25
N/A	6425+345	6425+520	At-Grade	N/A	Coming into station	40
Crosspoint Business Park Station	**6425+520**	**6425+850**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**
N/A	6425+850	6426+050	At-Grade	Crosspoint Parkway	Horizontal Cuve NFB1-40	10
N/A	6426+050	6426+930	At-Grade	Crosspoint Parkway	Horizontal Cuve NFB1-41	30
Millersport Highway Terminal Station	**6426+930**	**6427+522**	**At-Grade**	**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.
3. NFB7 Alignement Stationing equality- begins at: 6387+300 (NFB1) = 6387+300 (NFB7), ends at 6395+822 (NFB7) = 6395+900 (NFB1)

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LRT NIAGARA FALLS BLVD. - ALTERNATIVE 7

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data

Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Vertical Location Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1, 2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
6372+000	6374+220	Main Street at Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath University at Buffalo South Campus and the corner of private property at Main and Bailey	Property Owned by the State of New York	No Station: 100	100ft ROW width is required to connect to the existing South Campus Station
6374+220	6380+800	Bailey Ave.	Tunnel	In this corridor: Tracks would be beneath street in center of ROW and beneath private property at the corner of Main and Bailey	66'	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6380+800	6381+700	Eggert Road	Tunnel	In this corridor: Tracks would be beneath street in center of ROW. Tracks would climb at 4.0% up to grade with a portal near Station 6381+700	66'	Station: 100' No Station: 66'	Additional ROW required for Station Construction. Proposed tunnel section can be constructed in the existing ROW.
6381+700	6383+430	Eggert Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 66 to 85'	Station:123' No Station:112'	Additional ROW Required for Construction
6383+430	6387+300 (NFB1) = 6387+300 (NFB7)	Niagara Falls Blvd.	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 85 to 125'	Station:163' No Station:152'	Additional ROW Required for Construction
6387+300 (NFB1) = 6387+300 (NFB7)	6388+160 (NFB7)	Niagara Falls Blvd.	At-Grade	In this corridor: Tracks would be in the center of the street	125'	No Station: 152'	Additional ROW Required for Construction
6388+160 (NFB7)	6391+300 (NFB7)	Meyer Road	At-Grade	In this corridor: Tracks would be in the center of the street	Varies: 50'± to 66'	No Station: 93' Staggered Station:101'	Additional ROW Required for Construction
6391+300 (NFB7)	6392+900 (NFB7)	Meyer Road	Tunnel	In this corridor: Tracks would be beneath street in center of ROW. Tracks would climb at 4.0% down to with a portal near Station 6391+300 (NFB7)	50'	No Station: 60'	Additional ROW Required for Construction. A transfer of jurisdication would be required for tunnel under I-290
6392+900 (NFB7)	6394+200 (NFB7)	I-290	Tunnel	In this corridor: Tracks would be beneath the I-290	Varies	No Station: 60'	A Transfer of Juridiction would be required between the two State Agencies.
6394+200 (NFB7)	6395+400 (NFB7)	Sweet Home Road	Tunnel	In this corridor: Tracks would be beneath street in center of ROW. Tracks would climb at 4.0% up to with a portal near Station 6395+400 (NFB7)	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
6395+400 (NFB7)	6395+822 (NFB7)= 6395+900 (NFB1)	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
6395+900	6396+116	Sweet Home Road	At-Grade	In this corridor: Tracks would be in the center of the street	150' MIN.	No Station: 150' Staggered Station: 185'	Additional ROW required for Station Construction. Proposed at-grade section can be constructed in the existing ROW.
6396+116	6396+900 = 9396+900	Rensch Entrance Road	At-Grade	In this corridor: Tracks would be in center of street - Alignment terminates prior to entering University at Buffalo North	Property Owned by the State of New York	No Station: 27'	A Transfer of Juridiction would be required between the two State Agencies.
6396+900 = 9396+900	9399+800	Putnam Way (East-West)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way on the south side of the street and along the south side of the Flint loop and Jacobs Center building.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
9399+800	9400+051= 6400+000	Putnam Way (North-South)	At-Grade	In this corridor: Tracks would run adjacent to Putnam way or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6400+000	6401+900	Lee Entrance	At-Grade	In this corridor: Tracks would run adjacent to the Lee Entrance or in the Center of the street. Some realignment of the street may be needed to accommodate the LRV curvature.	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies.
6401+900	6402+600	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run adjacent to (and just north of) the John James Audubon Parkway	Property Owned by the State of New York	No Station: 27' Staggered Station: 35'	A Transfer of Juridiction would be required between the two State Agencies. New bridge structure required
6402+600	6410+300	John James Audubon Parkway	At-Grade	In this corridor: The tracks would run in the median of the John James Audubon Parkway	Varies-Variance to 160' MIN	Station: 160' No Station: 160'	Existing median utilized and snow storage decreased to accommodate rail
6410+300	6423+800	I-990	At-Grade	In this corridor: The tracks would run in the median of I-990. Portal at Station 6423+800	Varies- 270' to 750' ±	No Station: 27'	No additional ROW required
6423+800	6424+800	N/A	Tunnel	In this corridor: The tracks would run in a tunnel beneath I-990. Portals at Station 6423+800 and 6424+800	Varies-600' to Variance to property	No Station: 27'	No additional ROW required
6424+800	6425+850	Crosspoint Parkway	At-Grade	In this corridor: The tracks would run at-grade through undeveloped land.	TBD - Variance of property ROW	No Station: 27' Staggered Station: 35'	Additional ROW Required for Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.
4. NFB7 Alignment Stationing equality- begins at: 6387+300 (NFB1) = 6387+300 (NFB7), ends at 6395+822 (NFB7) = 6395+900 (NFB1)

APPENDIX A

BUS RAPID TRANSIT

BRT BAILEY AVENUE - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

BUS - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Traffic Signal Modifications	Streetname (Where Applicable)	Speed Controlling Element	Bus Speed Limit (mph.)
University At Buffalo - South Campus Station	**N/A**	**2372+000**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2372+000	2374+150		Main St	Roadway Speed Limit	30
Bailey At Loop Station	**2374+150**	**2374+280**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2374+280	2374+550	1 queue jump- Bailey Rd	Bailey Ave.	Horizontal Curve BL1-2	10
N/A	2374+550	2376+250		Bailey Ave.	Roadway Speed Limit	35
Bailey At Grover Cleveland Highway Station	**2376+250**	**2376+380**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2376+380	2377+550		Bailey Ave.	Roadway Speed Limit	35
Bailey At Cambridge Rd Station	**2377+550**	**2377+680**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2377+680	2381+325	1 new priority signal- Longmeadow Rd (Sta 2379+400)	Bailey Ave.	Roadway Speed Limit	35
Bailey At Eggert Station	**2381+325**	**2381+455**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2381+455	2382+650	1 queue jump	Bailey Ave.	Roadway Speed Limit	35
Bailey At Sheridan Station	**2382+650**	**2382+780**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2382+780	2384+530	1 new priority signal- Henel Rd (Sta 2383+200) 1 new priority signal- Emerson Rd (Sta 2384+400)	Bailey Ave.	Roadway Speed Limit	35
Bailey At Emerson Dr Station	**2384+530**	**2384+660**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2384+660	2386+050		Bailey Ave.	Roadway Speed Limit	35
N/A	2386+050	2386+255		Maple Road	Horizontal Curve BBx-xx	10
N/A	2386+255	2386+325		Maple Road	Roadway Speed Limit	10
Bailey at Maple Station	**2386+325**	**2386+455**	**1 queue jump at Maple**	**Maple Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2386+455	2388+650	1 queue jump- Bowmart Pkwy Rd (Sta 2386+900) 1 queue jump- Hill Crest Dr (Sta 2387+400)	Maple Road	Roadway Speed Limit	45
N/A	2388+650	2389+100	1 queue jump- Sweet Home Rd	Sweet Home Road	Horizontal Curve BBx-xx	10
N/A	2389+100	2389+250		Sweet Home Road	Roadway Speed Limit	10
Maple At Sweet Home Station	**2389+250**	**2389+380**		**Sweet Home Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2389+380	2392+600		Sweet Home Road	Roadway Speed Limit	45
N/A	2392+600	2392+925	1 queue jump- Rensch	Sweet Home Road	Horizontal Curve BBx-xx	10
Sweet Home at Rensch Station	**2392+925**	**2393+055**		**Rensch**	**130' Long Station Platform**	**STATION STOP**
N/A	2393+055	2393+500	1 queue jump- N. Campus Blvd 1 priority signal Rensch	Rensch	Roadway Speed Limit	30
N/A	2393+500	2393+900		Rensch	Horizontal Curves BBx-xx	25
N/A	2393+900	2395+025		Putnam Way	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**2395+025**	**2395+155**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2395+155	2396+150		Putnam Way	Roadway Speed Limit	10
UB North Campus - Library Station	**2396+150**	**2396+280**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+280	2396+780		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Commons Building Station	**2396+780**	**2396+910**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+910	2398+200		Lee Entrance	Roadway Speed Limit	30
N/A	2398+200	2398+400		Lee / J. J. Audubon Pkwy.	Horizontal Curve BBx-xx	10
N/A	2398+400	2398+450		Lee / J. J. Audubon Pkwy.	Roadway Speed Limit	10
UB North Campus - Greiner Hall Station	**2398+450**	**2398+580**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2398+580	2401+925	1 priority signal Frontier Rd 1 priority signal- N. Forest Rd	J. J. Audubon Pkwy.	Roadway Speed Limit	45
J.J.A. Parkway At Sylvan Parkway Station	**2401+925**	**2402+055**		**J.J. Audubon Pkwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2402+055	2406+500	1 priority signal- Town Hall 1 priority signal Dodge Rd	J.J. Audubon Pkwy.	Roadway Speed Limit	45
I-990 Interchange Station	**2406+500**	**2406+630**		**J.J. Audubon Pkwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2406+630	2406+800		I-990	Horizontal Curve BBx-xx	10
N/A	2406+800	2415+200		I-990	BRT Maximum Operating Speed	50
North French Road Station	**2415+200**	**2415+330**	**1 priority signal- N. French**	I-990	**130' Long Station Platform**	**STATION STOP**
N/A	2415+330	2420+140		I-990	BRT Maximum Operating Speed	50
N/A	2420+140	2421+625		N/A	Horizontal Curve BBx-xx	30
N/A	2421+625	2422+550		N/A	Roadway Speed Limit	30
Crosspoint Business Park Station	**2422+550**	**2422+680**		**Crosspoint Parkway**	**325' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

BRT BAILEY AVE - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	**Corridor Ending Station**	**Street Name of Corridor (if applicable)**	**Traffic Signal Locations With Queue Jumps Within Corridor**	**Horizontal Location Within Corridor**	**Existing Right-of-Way (ROW) Width[1, 2]**	**Proposed Right-of-Way (ROW) Width[3]**	**Notes/ Assumptions**
2372+000	2374+550	Main Street at Bailey Ave.	1 queue jump- Bailey Rd	Mixed - In Traffic	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2374+550	2382+400	Bailey Ave.	1 new priority signal- Longmeadow Rd (Sta 2379+400)	Mixed - In Traffic	66' ±	Station: 71' No Station: 66'	The additional 5ft of ROWis required at the outbound Station side only
2382+400	2386+200	North Bailey Ave.	1 queue jump, 1 new priority signal - Henel Rd (Sta 2383+200), 1 new priority signal- Emerson Rd (Sta 2384+400)	Mixed - In Traffic	75' ±	Station: 139' No Station: 75'	Additional ROW required for Station Construction
2386+200	2389+000	Maple Road	1 queue jump at Maple, 1 queue jump- Bowmart Pkwy Rd (Sta 2386+900), 1 queue jump- Hill Crest Dr (Sta 2387+400), 1 queue jump- Sweet Home Rd	Full Time Dedicated- Outside lane	100' to 115' ±	Station:153' No Station: 123'	Additional ROW required. The snow storage area within this corridor can be reduced by 20ft. No Station: ((115'+ 28')-20'=123'),Station ((115'+28+30')-20'=153')
2389+000	2392+750	Sweet Home Road	1 queue jump- Rensch	Part Time Dedicated (AM and PM peak)	150' MIN.	Station: 180' No Station: 150'	Additional ROW required for Station Construction
2392+750	2393+519= 2393+519	Rensch Entrance Rd.	1 queue jump- N. Campus Blvd, 1 priority signal Rensch	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2393+519= 2393+519	2396+300	Putnam Way (East-West)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+300	2396+572= 2396+378	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+378	2396+800	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+800	2398+500	Lee Entrance	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2398+500	2406+700	John James Audubon Parkway	1 priority signal- Town Hall 1 priority signal Dodge Rd	Full Time Dedicated- Outside lane	Varies-Variance to 160' MIN	Station: 190' No Station: 160'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2406+700	2420+140	I-990	1 priority signal- N. French	Full Time Dedicated - shoulder	Varies- 270' to 750' ±	Station: 64' No Station: 34'	No additional ROW required for running lanes. ROW would likely be required for Station at N. French
2420+140	2423+805	Crosspoint Parkway	none	Full Time Dedicated- Outside lane	Varies- 60 to 70'	Station: 134' No Station: 70'	Additional ROW required for Station Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.

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BRT BAILEY AVENUE - ALTERNATIVE 2 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

BUS - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Traffic Signal Modifications	Streetname (Where Applicable)	Speed Controlling Element	Bus Speed Limit (mph.)
University At Buffalo - South Campus Station	**N/A**	**2372+000**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2372+000	2374+150		Main St	Roadway Speed Limit	30
Bailey At Loop Station	**2374+150**	**2374+280**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2374+280	2374+550	1 queue jump- Bailey Rd	Bailey Ave.	Horizontal Curve BL1-2	10
N/A	2374+550	2376+250		Bailey Ave.	Roadway Speed Limit	35
Bailey At Grover Cleveland Highway Station	**2376+250**	**2376+380**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2376+380	2377+550		Bailey Ave.	Roadway Speed Limit	35
Bailey At Cambridge Rd Station	**2377+550**	**2377+680**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2377+680	2381+325	1 new priority signal- Longmeadow Rd (Sta 2379+400)	Bailey Ave.	Roadway Speed Limit	35
Bailey At Eggert Station	**2381+325**	**2381+455**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2381+455	2382+650	1 queue jump	Bailey Ave.	Roadway Speed Limit	35
Bailey At Sheridan Station	**2382+650**	**2382+780**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2382+780	2384+530	1 new priority signal- Henel Rd (Sta 2383+200) 1 new priority signal- Emerson Rd (Sta 2384+400)	Bailey Ave.	Roadway Speed Limit	35
Bailey At Emerson Dr Station	**2384+530**	**2384+660**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2384+660	2386+050		Bailey Ave.	Roadway Speed Limit	45
N/A	2386+050	2386+255		Maple Road	Horizontal Curve BBx-xx	10
N/A	2386+255	2386+325		Maple Road	Roadway Speed Limit	10
Bailey at Maple Station	**2386+325**	**2386+455**	**1 queue jump**	**Maple Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2386+455	2388+650	1 queue jump- Bowmart Pkwy Rd (Sta 2386+900) 1 queue jump- Hill Crest Dr (Sta 2387+400)	Maple Road	Roadway Speed Limit	45
N/A	2388+650	2389+100	1 queue jump- Sweet Home Rd	Sweet Home Road	Horizontal Curve BBx-xx	10
N/A	2389+100	2389+250		Sweet Home Road	Roadway Speed Limit	10
Maple At Sweet Home Station	**2389+250**	**2389+380**		**Sweet Home Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2389+380	2392+600		Sweet Home Road	Roadway Speed Limit	30
N/A	2392+600	2392+925	1 queue jump- Rensch	Sweet Home Road	Horizontal Curve BBx-xx	10
Sweet Home at Rensch Station	**2392+925**	**2393+055**		**Rensch**	**130' Long Station Platform**	**STATION STOP**
N/A	2393+055	2393+500	1 queue jump- N. Campus Blvd 1 priority signal Rensch	Rensch	Roadway Speed Limit	30
N/A	2393+500	2393+900		Rensch	Horizontal Curves BBx-xx	25
N/A	2393+900	2395+025		Putnam Way	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**2395+025**	**2395+155**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2395+155	2396+150		Putnam Way	Roadway Speed Limit	10
UB North Campus - Library Station	**2396+150**	**2396+280**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+280	2396+780		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Commons Building Station	**2396+780**	**2396+910**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+910	2398+200		Lee Entrance	Roadway Speed Limit	30
N/A	2398+200	2398+400		Lee / J. J. Audubon Pkwy.	Horizontal Curve BBx-xx	10
N/A	2398+400	2398+450		Lee / J. J. Audubon Pkwy.	Roadway Speed Limit	10
UB North Campus - Greiner Hall Station	**2398+450**	**2398+580**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2398+580	2401+780	1 priority signal Frontier Rd 1 priority signal- N. Forest Rd	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2401+780	2401+900		Sylvan Parkway	Horizontal Curve BBx-xx	10
J.J.A. Parkway At Sylvan Parkway Station	**2401+900**	**2402+030**	1- priority signal- Sylvan	Sylvan Parkway	**130' Long Station Platform**	**STATION STOP**
N/A	2402+030	2404+050		Sylvan Parkway	Roadway Speed Limit	30
N/A	2404+050	2404+325	new priority signal- Millersport Hwy	Sylvan Parkway	Horizontal Curve BBx-xx	10
Millersport Hwy Station	**2404+325**	**2404+455**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2404+455	2409+800	1- priority signal- Campbell	Millersport Hwy.	Roadway Speed Limit	45
N/A	2409+800	2414+850	2- priority signals	Millersport Hwy.	Roadway Speed Limit	50
North French Road Station	**2414+850**	**2414+980**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2414+980	2417+750		Millersport Hwy.	Roadway Speed Limit	50
N/A	2417+750	2417+850	1 queue jump- Crosspoint Pkwy	Crosspoint Parkway	Horizontal Curve BL2-39	10
N/A	2417+850	2419+600		Crosspoint Parkway	Roadway Speed Limit	30
Crosspoint Business Park Station	**2419+600**	**2419+730**		**Crosspoint Parkway**	**Terminal Station**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

BRT BAILEY AVE - ALTERNATIVE 2 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Traffic Signal Locations Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width[1, 2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
2372+000	2374+550	Main Street at Bailey Ave.	1 queue jump- Bailey Rd	Mixed - In Traffic	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2374+550	2382+400	Bailey Ave.	1 new priority signal- Longmeadow Rd (Sta 2379+400)	Mixed - In Traffic	66' ±	Station: 71' No Station: 66'	The additional 5ft of ROWis required at the outbound Station side only
2382+400	2386+200	North Bailey Ave.	1 queue jump, 1 new priority signal- Henel Rd (Sta 2383+200), 1 new priority signal- Emerson Rd (Sta 2384+400)	Mixed - In Traffic	75' ±	Station: 139' No Station: 75'	Additional ROW required for Station Construction
2386+200	2389+000	Maple Road	1 queue jump at Maple, 1 queue jump- Bowmart Pkwy Rd (Sta 2386+900), 1 queue jump- Hill Crest Dr (Sta 2387+400), 1 queue jump- Sweet Home Rd	Full Time Dedicated- Outside lane	100' to 115' ±	Station:153' No Station: 123'	Additional ROW required. The snow storage area within this corridor can be reduced by 20ft. No Station: ((115'+ 28')-20'=123'),Station ((115'+28+30')-20'=153')
2389+000	2392+750	Sweet Home Road	1 queue jump- Rensch	Part Time Dedicated (AM and PM peak)	150' MIN.	Station: 180' No Station: 150'	Additional ROW required for Station Construction
2392+750	2393+519= 2393+519	Rensch Entrance Rd.	1 queue jump- N. Campus Blvd, 1 priority signal Rensch	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2393+519= 2393+519	2396+300	Putnam Way (East-West)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+300	2396+572= 2396+378	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+378	2396+800	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+800	2398+500	Lee Entrance	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2398+500	2401+850	John James Audubon Parkway	1 priority signal- Town Hall 1 priority signal Dodge Rd	Full Time Dedicated- Outside lane	Varies-Variance to 160' MIN	Station: 190' No Station: 160'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2401+850	2404+00	Sylvan Pkwy	1 priority signal Sylvan Pkwy	Full Time Dedicated- Outside lane	100'	Station: 130' No Station: 100'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2404+00	2417+850	Millersport Hwy	new priority signal- Millersport Hwy, 1- priority signal- Campbell, 2- priority signals, 1 queue jump- Crosspoint Pkwy	Full Time Dedicated- Outside lane	100' ±	Station: 130' No Station: 100'	BRT assumed to run on reconstructed shoulders. Additional ROW required for Station Construction.
2417+850	2419+750	Crosspoint Pkwy	none	Full Time Dedicated- Outside lane	75'	Station: 139' No Station: 75'	Additional ROW required for Station Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.

2. ROW dimensions are typical, and vary in specific locations along the roadways.

3. All ROW Needed as noted refers to Tangent running sections.

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BRT MILLERSPORT HIGHWAY - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

BUS - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Bus Speed Limit (mph.)
University At Buffalo - South Campus Station	**N/A**	**2372+000**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2372+000	2374+140		Main St	Roadway Speed Limit	30
Bailey At Loop Station	**2374+140**	**2374+270**		**Bailey Ave.**	**130' Long Station Platform**	**STATION STOP**
N/A	2374+270	2374+525	1 queue jump- Bailey Rd	Bailey Ave.	Horizontal Curve MHX-X	10
N/A	2374+525	2376+000		Bailey Ave.	Roadway Speed Limit	35
N/A	2376+000	2376+140		Bailey / G. Cleveland	Horizontal Curve MHX-X	10
Bailey At Grover Cleveland Highway	**2376+140**	**2376+270**		**G. Cleveland Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2376+270	2378+410	1 queue jump	Millersport Hwy.	Roadway Speed Limit	35
Rosedale Blvd. At Millersport Highway	**2378+410**	**2378+540**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2378+540	2379+600	1 queue jump- Eggert Rd	Millersport Hwy.	Roadway Speed Limit	35
Eggert At Millersport Highway	**2379+600**	**2379+730**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2379+730	2382+900		Millersport Hwy.	Roadway Speed Limit	35
Sheridan Drive At Millersport Highway	**2382+900**	**2383+030**	**1 queue jump**	**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2383+030	2387+370		Millersport Hwy.	Roadway Speed Limit	45
Millersport Highway At Flint Road	**2387+370**	**2387+500**	**1 queue jump- Flint Rd**	**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2387+500	2389+500		Millersport Hwy.	Roadway Speed Limit	45
N/A	2389+500	2391+800		Millersport Hwy. fly over	Horizontal Curve MHX-X	30
N/A	2391+800	2392+350		Flint Entrance	Horizontal Curve MHX-X	25
N/A	2392+350	2393+400	1 priority signal	Flint Entrance	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**2393+400**	**2393+530**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2393+530	2394+450		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Library Station	**2394+450**	**2394+580**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2394+580	2395+075		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Commons Building Station	**2395+075**	**2395+205**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2395+205	2396+500		Lee Entrance	Roadway Speed Limit	30
N/A	2396+500	2396+700		Lee / J. J. Audubon Pkwy.	Horizontal Curve MHx-xx	10
N/A	2396+700	2396+750		Lee / J. J. Audubon Pkwy.	Roadway Speed Limit	10
UB North Campus - Greiner Hall Station	**2396+750**	**2396+880**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+880	2400+075		J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2400+075	2400+175		J. J. Audubon Pkwy.	Horizontal Curve MHx-xx	10
J.J.A. Parkway At Sylvan Parkway Station	**2400+175**	**2400+305**		**Sylvan Parkway**	**130' Long Station Platform**	**STATION STOP**
N/A	2400+305	2402+375	1 priority signal- Frontier Rd 1 priority signal- N. Forest Rd 1 priority signal- Sylvan Pkwy.	Sylvan Parkway	Roadway Speed Limit	30
N/A	2402+375	2402+625	new priority signal- Millersport Hwy	Sylvan Parkway	Horizontal Curve MHx-xx	10
Millersport Hwy Station	**2402+625**	**2402+755**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2402+755	2408+100	1- priority signal- Campbell	Millersport Hwy.	Roadway Speed Limit	45
N/A	2408+100	2413+150	2- priority signals	Millersport Hwy.	Roadway Speed Limit	50
North French Road Station	**2413+150**	**2413+280**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2413+280	2416+000		Millersport Hwy.	Roadway Speed Limit	50
N/A	2416+000	2416+125	1 queue jump- Crosspoint Pkwy	Crosspoint Parkway	Horizontal Curve MHx-xx	10
N/A	2416+125	2417+900		Crosspoint Parkway	Roadway Speed Limit	30
Crosspoint Business Park Station	**2417+900**	**2418+030**		**Crosspoint Parkway**	**Terminal Station**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

BRT MILLERSPORT HIGHWAY - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Traffic Signal Locations With Queue Jumps Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1, 2]	Proposed Right-of-Way (ROW) Width [3]	Notes/ Assumptions
2372+000	2374+550	Main Street at Bailey Ave.	1- Bailey Ave.	Mixed - In Traffic	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2374+550	2376+100	Bailey Ave.	1- Millersport Hwy.	Mixed - In Traffic	66' ±	Station: 71' No Station: 66'	The additional 5ft of ROWis required at the outbound Station side only
2376+100	2383+300	Millersport Hwy	2 New Priority Signals 1 queue jump at Eggert Rd. 1 queue jump at Sheridan Dr.	Mixed - In Traffic	100' ±	Station: 100' No Station: 100'	The snow storage area within this corridor can be reduced by 30ft. Therefore no additional ROW required.
2383+300	2387+200	Millersport Hwy	none	Full Time Dedicated- Center	Varies: 94'±, 88'±, 100'±, 110'±	No Station: 140'	Additional ROW required for Construction
2387+200	2391+800	Millersport Hwy/ Flint fly-over	1- Flint Rd.	Mixed - In Traffic	Variance of property ROW	Varies	No additional ROW required
2391+800	2393+111= 2393+111	Flint/ Putnam	1- Flint Rd. Entrance	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2393+111= 2393+111	2394+426= 2396+670	Flint/ Putnam	1- Flint Rd. Entrance	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+670	2400+100	J. J. Audubon Pkwy	1 priority signal- Frontier Rd 1 priority signal- N. Forest Rd 1 priority signal- Sylvan Pkwy.	Full Time Dedicated- Outside lane	Varies-Variance to 160' MIN	Station: 190' No Station: 160'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2400+100	2402+300	Sylvan Pkwy	1 New Priority Signal Millersport Hwy.	Full Time Dedicated- Outside lane	100'	Station: 130' No Station: 100'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2402+300	2416+125	Millersport Hwy	5 signals	Full Time Dedicated- Outside lane	100' ±	Station: 130' No Station: 100'	No additional ROW required for running lanes. ROW would likely be required for Station at N. French
2416+125	2417+050	Crosspoint Pkwy	none	Full Time Dedicated- Outside lane	75'	Station: 139' No Station: 75'	Additional ROW required for Station Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.

2. ROW dimensions are typical, and vary in specific locations along the roadways.

3. All ROW Needed as noted refers to Tangent running sections.

BRT MILLERSPORT HIGHWAY - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

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BRT NIAGARA FALLS BLVD. - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

BUS - SPEED LIMIT TABLE*

Station Stop Name	Speed Limit Begin Stationing	Speed Limit End Stationing	Vertical Location Within Corridor	Streetname (Where Applicable)	Speed Controlling Element	Bus Speed Limit (mph.)
University At Buffalo - South Campus	**N/A**	**2372+000**		**Main St**	**130' Long Station Platform**	**STATION STOP**
N/A	2372+000	2373+000	1 queue jump- Main St	N/A	Roadway Speed Limit	15
N/A	2373+000	2373+350		Kenmore Ave	Horizontal Curve NFB1x-xx	15
N/A	2373+350	2374+600		Kenmore Ave	Roadway Speed Limit	30
N/A	2374+600	2374+750	1 queue jump- Kenmore Ave	Kenmore Ave	Horizontal Curve NFB1x-xx	10
Niagara Falls Blvd at Kenmore ave	**2374+750**	**2374+880**		**Niagara Falls Blvd**	**130' Long Station Platform**	**STATION STOP**
N/A	2374+880	2376+550		Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd at Cambridge Ave	**2376+550**	**2376+680**		Niagara Falls Blvd	**130' Long Station Platform**	**STATION STOP**
N/A	2376+680	2378+700	1 queue jump- Decatur Rd	Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd at Decatur Rd	**2378+700**	**2378+830**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2378+830	2382+250	1 queue jump- Longmeadow Rd.	Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd At Eggert Rd Station	**2382+250**	**2382+380**		**Niagara Falls Blvd. and Eggert Rd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2382+380	2385+000		Niagara Falls Blvd	Roadway Speed Limit	40
N/A	2385+000	2385+300	1 queue jump	Niagara Falls Blvd	Horizontal Curve NFB1x-xx	10
Niagara Falls Blvd At Mall 1	**2385+300**	**2385+430**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2385+430	2386+350		Niagara Falls Blvd	Roadway Speed Limit	40
Niagara Falls Blvd At Mall 2	**2386+350**	**2386+480**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2386+480	2386+625	1 queue jump- Maple Rd	Niagara Falls Blvd	Horizontal Curve NFB1x-xx	10
N/A	2386+625	2389+075	1 queue jump- Romney Rd	Niagara Falls Blvd	Roadway Speed Limit	40
Niagara Falls Blvd at Romney Rd	**2389+075**	**2389+205**		**Romney Rd**	**130' Long Station Platform**	**STATION STOP**
N/A	2389+205	2390+350	1 queue jump- Plaza Entrance	Niagara Falls Blvd	Roadway Speed Limit	40
N/A	2390+350	2390+450	1 queue jump- Ridge Lea	Niagara Falls Blvd and Ridge Lea	Horizontal Curve NFB1x-xx	10
N/A	2390+450	2390+950		Ridge Lea	Roadway Speed Limit	35
Ridge Lea Station	2390+950	**2391+080**		**Ridge Lea**	**130' Long Station Platform**	**STATION STOP**
N/A	2391+080	2394+100		Ridge Lea	Roadway Speed Limit	35
Ridge Lea at Meyer Rd Station	**2394+100**	**2394+230**		**Ridge Lea**	**130' Long Station Platform**	**STATION STOP**
N/A	2394+230	2395+700	1 queue jump- Meyer Rd	Ridge Lea	Roadway Speed Limit	35
N/A	2395+700	2396+000		Ridge Lea at Maple Rd	Horizontal Curve NFB1x-xx	10
N/A	2396+000	2396+125		Maple Road	Roadway Speed Limit	10
Bailey at Maple	**2396+125**	**2396+255**	**1 queue jump**	**Maple Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+255	2398+750	1 queue jump- Bowmart Pkwy Rd (Sta 2386+900) 1 queue jump- Hill Crest Dr (Sta 2387+400)	Maple Road	Roadway Speed Limit	45
N/A	2398+750	2398+900	1 queue jump- Sweet Home Rd	Sweet Home Road	Horizontal Curve BBx-xx	10
N/A	2398+900	2399+050		Sweet Home Road	Roadway Speed Limit	10
Maple At Sweet Home Station	**2399+050**	**2399+180**		**Sweet Home Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2399+180	2402+520		Sweet Home Road	Roadway Speed Limit	45
N/A	2402+520	2402+725	1 queue jump- Rensch	Sweet Home Road	Horizontal Curve BBx-xx	10
Sweet Home at Rensch Station	**2402+725**	**2402+855**		**Rensch**	**130' Long Station Platform**	**STATION STOP**
N/A	2402+855	2403+300	1 queue jump- N. Campus Blvd 1 priority signal Rensch	Rensch	Roadway Speed Limit	30
N/A	2403+300	2403+700		Rensch	Horizontal Curves BBx-xx	25
N/A	2403+700	2404+825		Putnam Way	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**2404+825**	**2404+955**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2404+955	2405+955		Putnam Way	Roadway Speed Limit	15
UB North Campus - Library Station	**2405+955**	**2406+085**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2406+085	2406+575		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Commons Building Station	**2406+575**	**2406+705**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2406+705	2408+000		Lee Entrance	Roadway Speed Limit	30
N/A	2408+000	2408+200		Lee / J. J. Audubon Pkwy.	Horizontal Curve BBx-xx	10
N/A	2408+200	2408+260		Lee / J. J. Audubon Pkwy.	Roadway Speed Limit	10
UB North Campus - Greiner Hall Station	**2408+260**	**2408+390**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2408+390	2411+725	1 priority signal Frontier Rd 1 priority signal- N. Forest Rd	J. J. Audubon Pkwy.	Roadway Speed Limit	45
J.J.A. Parkway At Sylvan Parkway Station	**2411+725**	**2411+855**		**J.J. Audubon Pkwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2411+855	2416+300	1 priority signal- Town Hall 1 priority signal- Dodge Rd	J.J. Audubon Pkwy.	Roadway Speed Limit	45
I-990 Interchange Station	**2416+300**	**2416+430**		**J.J. Audubon Pkwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2416+430	2416+560		I-990	Horizontal Curve BBx-xx	10
N/A	2416+560	2425+000		I-990	BRT Maximum Operating Speed	50
North French Road Station	**2425+000**	**2425+130**	**1 priority signal- N. French**	I-990	**130' Long Station Platform**	**STATION STOP**
N/A	2425+130	2430+850		I-990	BRT Maximum Operating Speed	50
N/A	2430+850	2431+425		N/A	Horizontal Curve BBx-xx	30
N/A	2431+425	2432+350		N/A	Roadway Speed Limit	30
Crosspoint Business Park Station	**2432+350**	**2432+480**		**Crosspoint Parkway**	**130' Long Station Platform**	**STATION STOP**

*Notes:

1. This speed limit table is conceptual in nature and does not present speed limits imposed by vertical/profile elements.
2. This speed limit table is intended for use in running time models and is not intended for detailed operations analysis or finalized operations plans.

BRT NIAGARA FALLS BLVD. - ALTERNATIVE 1 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data							
Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Traffic Signal Locations With Queue Jumps Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1, 2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
2372+000	2373+300	Main St. at Kenmore Ave.	1 - Main St	Mixed - In Traffic	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2373+300	2374+700	Kenmore Ave	1- Niagara Falls Blvd	Mixed - In Traffic	80' ±	Station: 85' No Station: 80'	The additional 5ft of ROW is required at the inbound Station side only
2374+700	2377+900	Niagara Falls Blvd	2 New	Mixed - In Traffic	83' ±	Station: 88' No Station: 83'	Additional 5ft of ROW is required at the inbound Station side only from Kenmore Ave to Chalmers Ave (Sta 2377+900).
2377+900	2382+301	Niagara Falls Blvd	1- Longmeadow Rd	Mixed - In Traffic	Varies: 83 to 100'	No Station: 100'	No additional ROW required
2382+301	2390+400	Niagara Falls Blvd	1- Eggert Rd, 1- Sheridan Dr. 6 New	Full Time Dedicated- Outside lane	Varies: 100 to 125'	Station: 189' No Station: 159'	Additional ROW required. ROW width from 2385+100 to 2386+500 (Boulevard Mall property) 64'
2390+400	2395+900	Ridge Lea	1- Meyer Rd	Full Time Dedicated- Outside lane	Varies: 50 to 100'	Station: 188' No Station: 134'	Additional ROW required
2395+900	2398+900	Maple Road	1- Sweet Home Rd bypass	Full Time Dedicated- Outside lane	100' to 115' ±	Station:153' No Station: 123'	Additional ROW required. The snow storage area within this corridor can be reduced by 20ft. No Station: ((115'+ 28')-20'=123'),Station ((115'+28+30')-20'=153')
2398+900	2402+550	Sweet Home Road	1- Rensch Rd bypass	Part Time Dedicated (AM and PM peak)	150' MIN.	Station: 214' No Station: 150'	Additional ROW required for Station Construction
2402+550	2403+319= 2393+519	Rensch Entrance Rd.	1- Campus Rd bypass	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2403+319= 2393+519	2396+300	Putnam Way (East-West)	1- Campus Rd bypass	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+300	2396+572= 2406+183	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2406+183	2406+700	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2406+700	2408+300	Lee Entrance	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2408+300	2416+500	John James Audubon Parkway	4 signals	Full Time Dedicated- Outside lane	Varies-Variance to 160' MIN	Station: 190' No Station: 160'	Additional ROW required for Station Construction
2416+500	2431+340	I-990	none	Full Time Dedicated - shoulder	Varies- 270' to 750' ±	Station: 64' No Station: 34'	BRT assumed to run on reconstructed shoulders Additional ROW required for Station Construction
2431+340	2432+475	Crosspoint Parkway	none	Full Time Dedicated- Outside lane	Varies- 60 to 70'	Station: 134' No Station: 70'	Additional ROW required for Station Construction

NOTES:

1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.
2. ROW dimensions are typical, and vary in specific locations along the roadways.
3. All ROW Needed as noted refers to Tangent running sections.

BRT NIAGARA FALLS BLVD. - ALTERNATIVE 2 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

BUS - SPEED LIMIT TABLE*						
Station Stop Name	**Speed Limit Begin Stationing**	**Speed Limit End Stationing**	**Vertical Location Within Corridor**	**Streetname (Where Applicable)**	**Speed Controlling Element**	**Bus Speed Limit (mph.)**
University At Buffalo - South Campus	**N/A**	**2372+000**		**Main St**	**130' Long Station Platform**	**STATION STOP**
N/A	2372+000	2373+000	1 queue jump- Main St	N/A	Roadway Speed Limit	15
N/A	2373+000	2373+350		Kenmore Ave	Horizontal Curve NFB1x-xx	15
N/A	2373+350	2374+600		Kenmore Ave	Roadway Speed Limit	30
N/A	2374+600	2374+750	1 queue jump- Kenmore Ave	Kenmore Ave	Horizontal Curve NFB1x-xx	10
Niagara Falls Blvd at Kenmore Ave	**2374+750**	**2374+880**		**Niagara Falls Blvd**	**130' Long Station Platform**	**STATION STOP**
N/A	2374+880	2376+550		Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd at Cambridge Ave	**2376+550**	**2376+680**		Niagara Falls Blvd	**130' Long Station Platform**	**STATION STOP**
N/A	2376+680	2378+700	1 queue jump- Decatur Rd	Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd at Decatur Rd	**2378+700**	**2378+830**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2378+830	2382+250	1 queue jump- Longmeadow Rd.	Niagara Falls Blvd	Roadway Speed Limit	35
Niagara Falls Blvd At Eggert Rd Station	**2382+250**	**2382+380**		**Niagara Falls Blvd. and Eggert Rd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2382+380	2385+000		Niagara Falls Blvd	Roadway Speed Limit	40
N/A	2385+000	2385+300	1 queue jump	Niagara Falls Blvd	Horizontal Curve NFB1x-xx	10
Niagara Falls Blvd At Mall 1	**2385+300**	**2385+430**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2385+430	2386+350		Niagara Falls Blvd	Roadway Speed Limit	40
Niagara Falls Blvd At Mall 2	**2386+350**	**2386+480**		**Niagara Falls Blvd.**	**130' Long Station Platform**	**STATION STOP**
N/A	2386+480	2386+625	1 queue jump- Maple Rd	Niagara Falls Blvd	Horizontal Curve NFB1x-xx	10
N/A	2386+625	2389+075	1 queue jump- Romney Rd	Niagara Falls Blvd	Roadway Speed Limit	40
Niagara Falls Blvd at x ave	**2389+075**	**2389+205**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2389+205	2390+350	1 queue jump- Mall Entrance	Niagara Falls Blvd	Roadway Speed Limit	40
N/A	2390+350	2390+450	1 queue jump- Ridge Lea	Niagara Falls Blvd and Ridge Lea	Horizontal Curve NFB1x-xx	10
	2390+450	2390+950		Ridge Lea	Roadway Speed Limit	35
Ridge Lea Station	2390+950	**2391+080**		**Ridge Lea**	**130' Long Station Platform**	**STATION STOP**
N/A	2391+080	2394+100		Ridge Lea	Roadway Speed Limit	35
Ridge Lea at Meyer Rd Station	**2394+100**	**2394+230**		**Ridge Lea**	**130' Long Station Platform**	**STATION STOP**
N/A	2394+230	2395+700	1 queue jump- Meyer Rd	Ridge Lea	Roadway Speed Limit	35
N/A	2395+700	2396+000		Ridge Lea at Maple Rd	Horizontal Curve NFB1x-xx	10
N/A	2396+000	2396+125		Maple Road	Roadway Speed Limit	10
Bailey at Maple	**2396+125**	**2396+255**	**1 queue jump**	**Maple Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2396+255	2398+750	1 queue jump- Bowmart Pkwy Rd (Sta 2386+900) 1 queue jump- Hill Crest Dr (Sta 2387+400)	Maple Road	Roadway Speed Limit	45
N/A	2398+750	2398+900	1 queue jump- Sweet Home Rd	Sweet Home Road	Horizontal Curve BBx-xx	10
N/A	2398+900	2399+050		Sweet Home Road	Roadway Speed Limit	10
Maple At Sweet Home Station	**2399+050**	**2399+180**		**Sweet Home Road**	**130' Long Station Platform**	**STATION STOP**
N/A	2399+180	2402+520		Sweet Home Road	Roadway Speed Limit	45
N/A	2402+520	2402+725	1 queue jump- Rensch	Sweet Home Road	Horizontal Curve BBx-xx	10
Sweet Home at Rensch Station	**2402+725**	**2402+855**		**Rensch**	**130' Long Station Platform**	**STATION STOP**
N/A	2402+855	2403+300	1 queue jump- N. Campus Blvd 1 priority signal Rensch	Rensch	Roadway Speed Limit	30
N/A	2403+300	2403+700		Rensch	Horizontal Curves BBx-xx	25
N/A	2403+700	2404+825		Putnam Way	Roadway Speed Limit	30
UB North Campus - Capen Hall Station	**2404+825**	**2404+955**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2404+955	2405+955		Putnam Way	Roadway Speed Limit	15
UB North Campus - Library Station	**2405+955**	**2406+085**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2406+085	2406+575		Putnam Way	Horizontal Curves/ Roadway Speed Limit	10
UB North Campus - Commons Building Station	**2406+575**	**2406+705**		**Putnam Way**	**130' Long Station Platform**	**STATION STOP**
N/A	2406+705	2408+000		Lee Entrance	Roadway Speed Limit	30
N/A	2408+000	2408+200		Lee / J. J. Audubon Pkwy.	Horizontal Curve BBx-xx	10
N/A	2408+200	2408+260		Lee / J. J. Audubon Pkwy.	Roadway Speed Limit	10
UB North Campus - Greiner Hall Station	**2408+260**	**2408+390**		**N/A**	**130' Long Station Platform**	**STATION STOP**
N/A	2408+390	2411+575	1 priority signal Frontier Rd 1 priority signal- N. Forest Rd	J. J. Audubon Pkwy.	Roadway Speed Limit	45
N/A	2411+575	2411+680		J. J. Audubon Pkwy.	Horizontal Curve BBx-xx	10
J.J.A. Parkway At Sylvan Parkway Station	**2411+680**	**2411+810**	**1- priority signal- Sylvan**	**Sylvan Parkway**	**130' Long Station Platform**	**STATION STOP**
N/A	2411+810	2413+875		Sylvan Parkway	Roadway Speed Limit	30
N/A	2413+875	2414+125	new priority signal- Millersport Hwy	Sylvan Parkway	Horizontal Curve BBx-xx	10
Millersport Hwy Station	**2414+125**	**2414+255**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2414+255	2419+600	1- priority signal- Campbell	Millersport Hwy.	Roadway Speed Limit	45
N/A	2419+600	2424+650	2- priority signals	Millersport Hwy.	Roadway Speed Limit	50
North French Road Station	**2424+650**	**2424+780**		**Millersport Hwy.**	**130' Long Station Platform**	**STATION STOP**
N/A	2424+780	2427+550		Millersport Hwy.	Roadway Speed Limit	50
N/A	2427+550	2427+650	1 queue jump- Crosspoint Pkwy	Crosspoint Parkway	Horizontal Curve BBx-xx	10
N/A	2427+650	2429+400		Crosspoint Parkway	Roadway Speed Limit	30
Crosspoint Business Park Station	**2429+400**	**2429+530**		**Crosspoint Parkway**	**Terminal Station**	**STATION STOP**

*Notes:

BRT NIAGARA FALLS BLVD. - ALTERNATIVE 2 (NORTHBOUND)

METRO AMHERST - BUFFALO CORRIDOR: ALTERNATIVES ANALYSIS

CORRIDOR: Right-of-Way Data

Corridor Beginning Station	Corridor Ending Station	Street Name of Corridor (if applicable)	Traffic Signal Locations With Queue Jumps Within Corridor	Horizontal Location Within Corridor	Existing Right-of-Way (ROW) Width [1, 2]	Proposed Right-of-Way (ROW) Width[3]	Notes/ Assumptions
2372+000	2373+300	Main St. at Kenmore Ave.	1 - Main St	Mixed - In Traffic	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2373+300	2374+700	Kenmore Ave	1- Niagara Falls Blvd	Mixed - In Traffic	80' ±	Station: 144' No Station: 80'	The additional 5ft of ROW is required at the inbound Station side only
2374+700	2377+900	Niagara Falls Blvd	2 New 1- Eggert Rd	Mixed - In Traffic	83' ±	Station: 147' No Station: 83'	Additional 5ft of ROW is required at the inbound Station side only from Kenmore Ave to Chalmers Ave (Sta 2377+900).
2377+900	2382+301	Niagara Falls Blvd	1- Longmeadow Rd	Mixed - In Traffic	Varies: 83 to 100'	No Station: 100'	No additional ROW required
2377+900	2390+400	Niagara Falls Blvd	1- Sheridan Dr. 6 New	Full Time Dedicated- Outside lane	Varies: 100 to 125'	Station: 189' No Station: 159'	Additional ROW required. ROW width from 2385+100 to 2386+500 (Boulevard Mall property) 64'
2390+400	2395+900	Ridge Lea	1- Meyer Rd	Full Time Dedicated- Outside lane	Varies: 50 to 100'	Station: 188' No Station: 134'	Additional ROW required
2395+900	2398+900	Maple Road	1- Sweet Home Rd bypass	Full Time Dedicated- Outside lane	100' to 115' ±	Station:153' No Station: 123'	Additional ROW required. The snow storage area within this corridor can be reduced by 20ft. No Station: ((115'+ 28')-20'=123'),Station ((115'+28+30')-20'=153')
2398+900	2402+550	Sweet Home Road	1- Rensch Rd bypass	Part Time Dedicated (AM and PM peak)	150' MIN.	Station: 214' No Station: 150'	Additional ROW required for Station Construction
2402+550	2403+319= 2393+519	Rensch Entrance Rd.	1- Campus Rd bypass	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2403+319= 2393+519	2396+300	Putnam Way (East-West)	1- Campus Rd bypass	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2396+300	2396+572= 2406+183	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2406+183	2406+700	Putnam Way (North-South)	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2406+700	2408+300	Lee Entrance	none	Full Time Dedicated- Outside lane	Property Owned by the State of New York	Station: 64' No Station: 34'	Minimum ROW widths assumed
2408+300	2411+650	John James Audubon Parkway	2 signals	Full Time Dedicated- Outside lane	Varies-Variance to 160' MIN	Station: 190' No Station: 160'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2411+650	2413+850	Sylvan Pkwy	none	Full Time Dedicated- Outside lane	100'	Station: 130' No Station: 100'	No additional ROW required for running lanes- Utilize existing outside lanes. Additional ROW required for Station Construction
2413+850	2427+650	Millersport Hwy	5 signals	Full Time Dedicated- Outside lane	100' ±	Station: 130' No Station: 100'	No additional ROW required for running lanes. ROW would likely be required for Station at N. French
2427+650	2429+550	Crosspoint Pkwy	none	Full Time Dedicated- Outside lane	75'	Station: 139' No Station: 75'	Additional ROW required for Station Construction

NOTES: 1. Right-of-way (ROW) dimensions are approximate and are measured from back of sidewalk to back of sidewalk using aerial photography.

Metro Amherst-Buffalo Corridor

TIER 3 SCREENING RESULTS

Version 1.2

TECHNICAL MEMORANDUM

Prepared for:

Niagara Frontier Transportation Authority (NFTA)

Prepared by:

AECOM USA, Inc.
In Association with Wendel
December 2015

Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

The Niagara Frontier Transportation Authority (NFTA) in coordination with the Federal Transit Administration (FTA) initiated the preparation of an Alternatives Analysis (AA) to evaluate alternative transit alignments that will connect the existing Metro Rail University Station to key destinations in Amherst to improve transit connections between downtown Buffalo and Amherst. The project is intended to provide faster, more reliable transit service, improve transit connections between major destinations in the Amherst Buffalo Corridor, better serve existing transit riders, accommodate new transit patrons, and encourage economic development.

This *Tier 3 Screening Results Working Draft Technical Memorandum* describes the third of three levels (or tiers) of alternatives screening and evaluation undertaken by NFTA in the AA process for the project. This memorandum includes a statement of the framework under which NFTA is undertaking this Alternatives Analysis, describes each alternative and the planning framework for the evaluation, summarizes the screening methodology, presents the results of the screening and evaluation, describes the input received upon sharing the results with the committees and the public, and presents the results of the third screening for use by NFTA in selecting a Locally Preferred Alternative (LPA).

1.1 Overall Screening Approach

The alternatives development and evaluation process for the Metro Amherst Buffalo Corridor AA project consists of three distinct tiers of screening and evaluation. In each step, alternatives are examined and compared for their performance in terms of specific and progressively more detailed criteria along with increasingly more specific definition of alternatives. This process initially examines a large number of alternatives with the goal of reducing this “long list” of alternatives through screening and evaluation to only those that are reasonable (i.e., practical or feasible). In accordance with the Council on Environmental Quality’s (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA), this process enables FTA and NFTA to screen the full range of alternatives and arrive at a subset of reasonable alternatives to undergo detailed study in the AA. Even though this AA study is not being performed within NEPA, it is the intent of the NFTA and FTA to link this planning process with NEPA as well as the related New York State Environmental Quality Review (SEQR) so that the full range of alternatives is analyzed. The intent is that at the end of Tier 3, an LPA can be identified and the NEPA phase of FTA’s Project Development process initiated.

Briefly, the three tiers of screening and evaluation process consist of:

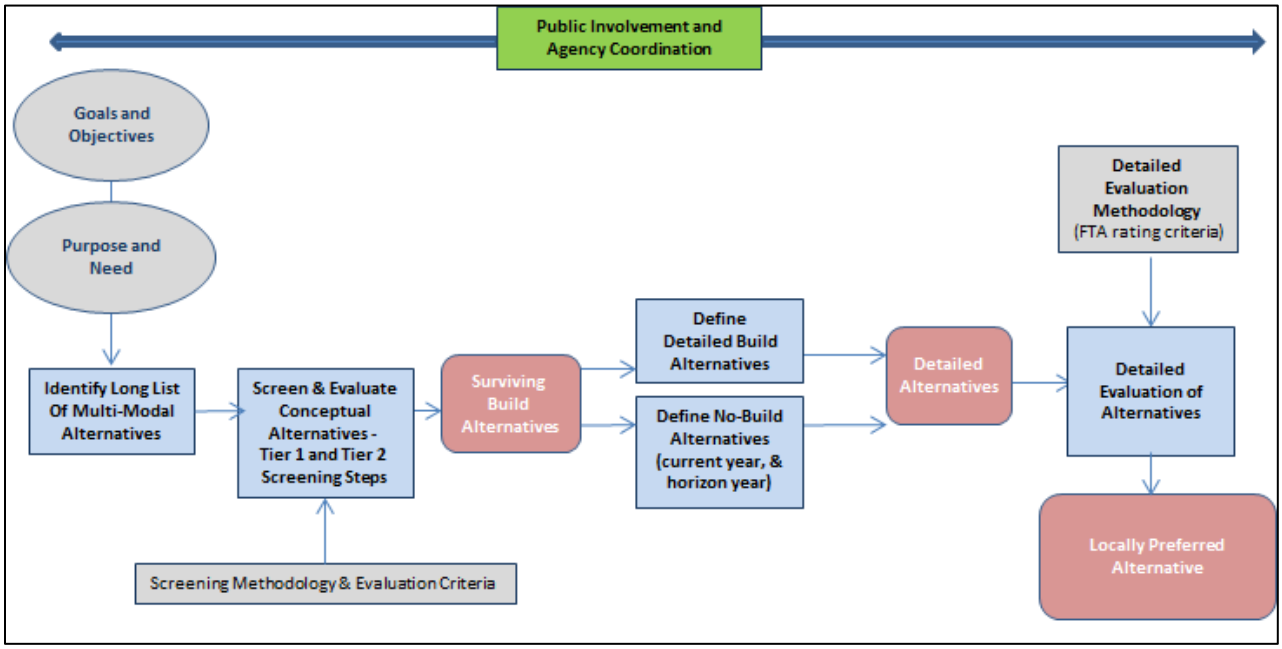
- Tier 1: Preliminary Screening of the Long List of Alternatives ⇨ Preliminary Alternatives – Tier 1 is completed and was documented in the *Tier 1 Technical Memorandum* (May 2014).

- Tier 2: Initial Screening of the Preliminary Alternatives ⇨ Final Build Alternatives – Tier 2 is completed and was documented in the *Tier 2 Technical Memorandum* (May 2015).

- Tier 3: Final Screening and Evaluation of the Final Build Alternatives ⇨LPA – the Tier 3 analysis is documented in this technical memorandum.

NFTA's 2013 *Screening Methodology Technical Memorandum* for the Metro Amherst-Buffalo Corridor Project outlines in detail the entire screening methodology process for the AA and **Figure 1** depicts the screening process within the overall Alternatives Analysis study.

Figure 1 Alternatives Analysis Process



2. REGULATORY SETTING

The Tier 1, 2 and 3 screenings are elements of the AA study and were undertaken in accordance with the CEQ Regulations for Implementing NEPA (40 Code of Federal Regulations 1502.14), with federal requirements related to the environmental review (23 CFR Part 771 et seq.), and the requirements for project development and for New Starts funding (FTA Capital Investment Grant Program, 49 USC 5309). As applicable to the Tier 1, 2 and 3 screenings, the following FTA rules and policy guidance were applied: Final Rules regarding the evaluating and rating major transit capital investments (January 9, 2013); *New and Small Starts Policy Guidance* (August, 2013); and Final Rules regarding environmental impact and related procedures (February 7, 2013). FTA released *Proposed Interim Policy Guidance* for their Capital Investment Grant Program in April 2015 and Final Interim Policy Guidance was recently released in August 2015.

NFTA is conducting the alternatives screening and the AA to evaluate alternatives in terms of their transportation and environmental benefits and effects, and to aid in its decision- making on the course of action to take. In these activities, NFTA is complying with the Public Law 112-141 and its guidance for developing transportation projects using federal funds entitled, Moving Ahead for Progress in the 21st Century Act (MAP-21). In order to qualify for funding under the FTA New

Starts program, 49 USC 5309 requires that projects be based upon the results of an environmental review. As stated early, the environmental review process (NEPA/SEQR) will commence once NFTA identifies an LPA. Under streamlining guidance, NFTA intends to link this AA study with the study that will occur under NEPA for environmental review and evaluation of the LPA.

In addition, as a transportation infrastructure project for which NFTA may seek to use federal funds, the project will eventually be subject to other federal environmental review regulations during NEPA as defined by Section 4(f) and 6(f) of the Department of Transportation Act of 1966, Section 106 of the National Historic Preservation Act of 1966, the Clean Water Act and the Clean Air Act of 1970, along with other applicable federal, state and local regulations.

3. CONCEPTUAL ALTERNATIVES & PLANNING FRAMEWORK

NFTA's alternatives development and evaluation process is grounded in the project purpose and need and its goals. The overall goal of the project is to improve transit access between key activity centers in Buffalo with those in Amherst by extending the benefits of high quality transit into Amherst. It represents a way to serve a strong transit market, provide high quality transit services to existing and emerging activity centers, attract additional transit riders, provide a more efficient ride for existing transit riders between Amherst and Buffalo, help to bolster economic development, and link existing communities. The study area is depicted on the map in **Figure 2**.

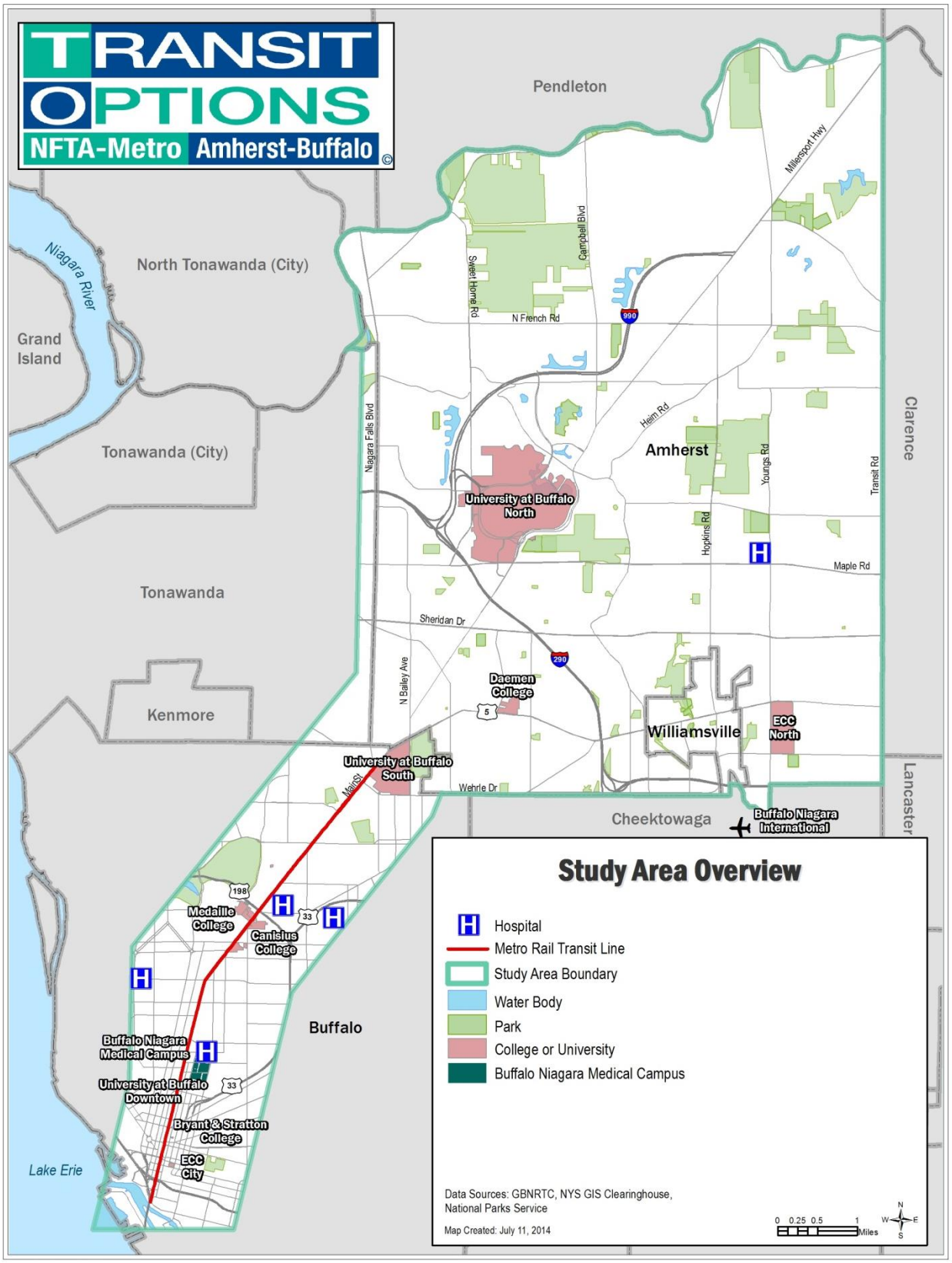
The purpose of the proposed project is to provide a fast, reliable, safe, and convenient transit ride in the Amherst-Buffalo Corridor linking established and emerging activity centers along the existing Metro Rail Line in the City of Buffalo with existing and emerging activity centers in the Town of Amherst. The project will better serve existing rail and bus riders, attract new transit patrons, improve connections to/from Buffalo and Amherst, and support redevelopment and other economic development opportunities. Importantly, it will serve to improve livability by increasing mobility and accessibility in communities throughout the project corridor. The project will:

- Serve increased travel demand generated by new development in downtown Buffalo and in Amherst.
- Provide high-quality transit service to and from key activity centers in the Amherst-Buffalo Corridor by providing a time-efficient transit option connecting and serving key destinations in the corridor (University at Buffalo (UB) campuses, Buffalo Niagara Medical Campus (BNMC), the Buffalo central business district (CBD), business parks, the Buffalo waterfront, among others).
- Better serve transit-dependent population segments and improve opportunities for participation of the workforce in the overall regional economy.
- Improve the system operating efficiency of the transit network.
- Support local and regional land use planning and transit-oriented design.
- Provide social benefits from transit investment that supports an array of economic and affordable housing development.
- Help meet the sustainability goals and measures as contained in state, regional, and local plans (One Region Forward-The Regional Plan for Sustainable Development, Buffalo Niagara 2050 - the Metropolitan Transportation Plan of the Greater Buffalo-Niagara Regional Transportation Council, Erie and Niagara Counties Framework for Regional

Growth, the University at Buffalo 2020 Plan, the Western New York Regional Economic Development Council's (WNYREDC) Economic Development Strategic Plan , the City of Buffalo Comprehensive Plan, and the Town of Amherst Comprehensive Plan, among others).

- Help relieve parking constraints and capacity issues on the Buffalo Niagara Medical Campus and surrounding downtown area to minimize traffic and parking-related impacts on neighborhoods.
- Stabilize property values in real estate markets where values have been falling and increase property values for residential and commercial land in already stable real estate markets.

Figure 2 Study Area



The alternatives under consideration within the AA consist of the following:

- **No Build Alternative:** Represents future conditions in the AA analysis year of 2035 without the proposed project. The No Build Alternative includes the existing transit and transportation system in the region plus all projects in the region's fiscally constrained long range transportation plan. The No Build Alternative is included in the AA as a means of comparing and evaluating the impacts and benefits of the Build Alternatives.

- **Build Alternatives**: Build Alternatives are future conditions in the AA analysis year of 2035 with the proposed project. The Build Alternatives are being developed through a tiered screening and alternatives definition process.

The process began with a determination of a Long List of Alternatives. There were two major categories of Build Alternatives under consideration: 1) fixed-guideway alternatives, meaning either Light Rail Transit (LRT) or Bus Rapid Transit (BRT), and 2) non-fixed guideway alternatives, meaning the alternatives that are less capital investment intensive and represent more modest improvement to transit services and are the Enhanced Bus Alternative and the Preferred Bus Alternative.

NFTA developed the Long List of Alternatives from previous studies, new concepts NFTA and its engineering consultants developed, and ideas identified through agency, stakeholder and public outreach activities. Given the developed nature of the study area and an effort to avoid and minimize negative effects, the Long List of Alternatives that NFTA identified primarily used existing transportation rights of way.

The Long List of Alternatives was screened in the Tier 1 evaluation process and the remaining Alternatives were developed in more detail and evaluated in the Tier 2 screening process. From the Tier 2 screening process, the following Build Alternatives are being further evaluated as part of the Tier 3 process: Niagara Falls Boulevard LRT 1, Millersport Highway LRT 1, Niagara Falls Boulevard BRT 1, Millersport Highway BRT 1, Niagara Falls Boulevard Preferred Bus, Millersport Highway Preferred Bus, and Enhanced Bus.

3.1 Feedback Received on Tier 2 Alternatives

A public open house meeting was held on Thursday June 11th and also on Tuesday, June 23rd at two separate locations. Participants had the opportunity to speak with study team members and complete comment forms to provide input about the four recommended alternatives that are proposed to advance to Tier 3 analysis.

Common themes received as feedback include the following:

- LRT was clearly the preferred mode over BRT with roughly 85% of those who commented favoring LRT.
- Most favor the light rail alternative via Niagara Falls Boulevard as it was perceived to have the most available right of way and was perceived that it would have less direct impacts on properties along the alignment.
- LRT was seen as the best mode for lessening impacts on the environment, for speed of travel, for the potential for offering a one-seat ride (meaning requiring fewer transfers), for serving disadvantaged and transit-dependent populations, and for providing convenient connections among destinations as well as to other modes of travel.

- BRT was generally perceived as too slow, requiring many transfers and less easy to use and as a sample the following comment was made: *"All the Bus "Rapid Transit alternatives are anything but rapid. Buses stuck in mixed traffic and 35MPH on Millersport, Bailey or Niagara Falls Blvd doesn't attract ridership."*
- Strong support for making any new transit investment bicycle-friendly and LRT was seen as better option for bicyclists bringing a bike on-board transit than BRT.

The above common themes were also echoed by NFTA's advisory committees established for the study. The committees suggested that there appeared to be a lack of LRT alternatives being recommended as moving forward into Tier 3 with only one LRT alternative being considered for advancement into Tier 3. The committees stated that as a result if these recommendations hold, the focus in Tier 3 will be too centered on BRT alternatives and that this suggests that NFTA had already identified a preferred mode and that it was BRT. The committees strongly favored advancing a more equitable balance in modes for the alternatives moving forward in Tier 3.

Additionally, the committees recognized that BRT could be developed in a corridor as a precursor, high-quality transit service that then lends to eventual construction and transit service by LRT and as a result, the committees indicated that both LRT and BRT alternatives should be examined in the same corridor in Tier 3. The committees also recognized the existing constrained environment (only 2 travel lanes; limited setbacks from the existing roadway of residential properties; probable high impacts to private property in implementing BRT) on Bailey Avenue and that BRT on Bailey would need to operate in mixed traffic, thus, would not offer any speed differential or improved reliability and suggested that the BRT Alternative on Bailey does not merit further consideration in Tier 3 and should be dropped.

From a technical view, the Bailey BRT alternative as a precursor to eventually upgrading the corridor to LRT was not a reasonable alternative to continue to pursue in Tier 3. Prior work completed in Tier 2, identified that the Baily LRT alternatives were inferior from an engineering perspective to either of the LRT alternatives on Niagara Falls Boulevard or Millersport Highway due to the significant increase in the length of underground construction including underground stations and the greater level of impacts then either of the LRT alternatives in the other corridors under consideration. Equally important was that the location of the Bailey LRT alignments was essentially duplicating the ridership capture area provided by the Niagara Falls Boulevard LRT and BRT alignments with fewer impacts.

The addition of the Millersport Highway LRT alternative into the set of recommended alternatives to be carried forward into Tier 3 is consistent with the public and committee desires to consider the potential that if BRT alternatives are selected that they provide the opportunity to build transit ridership for future consideration of LRT. The Millersport Highway LRT alignment provides that opportunity for potential upgrading of the alignment if warranted from BRT service to LRT service at some future date.

Reflecting public and committee feedback that demonstrates a preference for LRT over BRT as a mode, the concerns offered by the public and committees that it would benefit the study to advancing more LRT alternatives into Tier 3, and the recognition by the committees that BRT could be implemented as a precursor transit service to LRT in a corridor and that Bailey represents a constrained corridor for BRT, the AECOM team recommended to NFTA that the following fixed guideway alternatives were advanced into Tier 3:

LRT Alternatives

- Niagara Falls Boulevard 1
- Millersport Highway 1

BRT Alternatives

- Niagara Falls Boulevard 1
- Millersport Highway 1

3.2 Refinement of Alternatives

As a result of both the conceptual engineering conducted and on-going dialogue with key stakeholders, alignment pathways for the alternatives were also refined. For example, to access Niagara Falls Boulevard using LRT from the existing underground Metro Rail at UB South Campus University Station, conceptual engineering determined that the use of Main Street and Bailey Avenue in an underground environment was required as the curve radii at Kenmore Avenue could not be met and prevents direct access to Niagara Falls Boulevard from this location by light rail. Conceptual level options, opportunities, and constraints associated with the horizontal alignment and vertical profile configurations to bring the existing Light Rail Transit (LRT) to the surface at the UB South Campus University Station were explored. See the *South Campus Conceptual Profile Analysis Technical Memorandum* dated February 2015 for additional detail.

Additionally, dialogue with UB officials resulted in one preferred common alignment pathway for LRT alternatives through the UB North Campus. This definition of one common LRT pathway through UB North Campus resulted in the elimination of one LRT alternative (Millersport LRT 2) as the only difference between Millersport LRT 1 and Millersport LRT 2 was how each traversed through UB North. And similarly a common alignment pathway for BRT alternatives through the UB North Campus also resulted from dialogue with UB officials. As a result, this also reduced the BRT alternatives using Millersport Highway to one. Also, on the I-990, there will be ballasted track and also safety walls/barriers separating LRT operating area from highway operating since LRT will be in the median.

Table 1 provides general information on the alignment pathways and service plans for the alternatives being evaluated in Tier 3. The alternatives are described in more detail in the *Operations and Maintenance Cost Estimation Report (December 2015).*

Table 1 Tier 3 Alternatives

Alternative	Alignment Pathway	ROW	Span of Service	Frequency of Service
Niagara Falls Blvd LRT 1	Main St, Bailey Ave, Eggert Rd, Niagara Falls Blvd, Maple Rd, Sweet Home Rd, UB North Campus, Audubon Pkwy, I-990, Crosspoint	fixed guideway	Weekdays 5 AM – 1 AM; Saturdays 7 AM – 1 AM; Sundays 8 AM – 12 AM	10 minutes peak; 12 minutes transitional; 15 minutes off-peak and Saturdays; 20 minutes Sundays
Millersport Hwy LRT 1	Main St, Bailey Ave, Grover Cleveland Hwy, Millersport Hwy, Flint Rd, UB North Campus, Audubon Pkwy, Sylvan Pkwy, Millersport Hwy, Crosspoint	fixed guideway		10 minutes peak; 12 minutes transitional; 15 minutes off-peak and Saturdays; 20 minutes Sundays
Niagara Falls Blvd BRT 1	Main St, Kenmore Ave, Niagara Falls Blvd, Ridge Lee Rd, North Bailey Ave, Maple Rd, Sweet Home Rd, Rensch Rd, UB North Campus, Audubon Pkwy, I-990, Crosspoint	partial fixed guideway		10 minutes peak; 15 minutes off-peak, Saturdays and Sundays
Millersport Hwy BRT 1	Main St, Bailey Ave, Grover Cleveland Hwy, Millersport Hwy, Flint Rd, UB North Campus, Audubon Pkwy, Sylvan Pkwy, Millersport Hwy, Crosspoint	partial fixed guideway		10 minutes peak, 15 minutes off-peak, Saturdays and Sundays
Niagara Falls Blvd Preferred Bus	Main St, Kenmore Ave, Niagara Falls Blvd, Ridge Lee Rd, North Bailey Ave, Maple Rd, Sweet Home Rd, Rensch Rd, UB North Campus, Audubon Pkwy, I-990, Crosspoint	mixed traffic		10 minutes peak; 15 minutes off-peak, Saturdays and Sundays
Millersport Hwy Preferred Bus	Main St, Bailey Ave, Grover Cleveland Hwy, Millersport Hwy, Flint Rd, UB North Campus, Audubon Pkwy, Sylvan Pkwy, Millersport Hwy, Crosspoint	mixed traffic		10 minutes peak; 15 minutes off-peak, Saturdays and Sundays
Enhanced Bus	Frequency/span/coverage improvements to Routes 34, 35, 44, 47, 48, 49, 64	mixed traffic	Varies by route; mostly 17 hours per day	15-45 minutes peak; 45-60 minutes off-peak; 60-120 minutes Saturdays and Sundays

3.3 Alternate Alignments

During the process of refining the Tier 2 alternatives for Tier 3 analysis, two alternate alignment schemes were also analyzed. First, a minimum operating segment (MOS) that terminated all alternatives just north of UB North was analyzed. Second, the feasibility of operating the BRT alternatives in the median along the LRT alignments was evaluated.

3.3.1 Minimum Operable Segment (MOS)

The team reviewed the alignments for each of the LRT and fixed-guideway BRT alternatives for each of the remaining two corridors – Niagara Falls Blvd and Millersport Highway. Based on the review of capital costs and ridership by station, it was determined that any truncation/or phased construction of a minimum operable segment (MOS) would only be to the intersection of Audubon Parkway and the I-990 for both corridors. At that location a Park and Ride station would be identified for determining resulting ridership for the MOS for each of the LRT and fixed-guideway BRT alternatives. Thus, north of the University's North Campus, all truncated alternatives would use a common alignment to a I-990 Park and Ride station.

Based on the land use along Millersport Highway north of the UB North Campus and the lack of a Millersport Highway connection with the I-990 in the near vicinity of UB North, an MOS does not exist along Millersport Highway that would potentially capture the I-990 trips. Potential linkages along Millersport Highway with the I-990 would require extensive extensions in the area of French Road requiring increased miles of guideway, defeating the purpose of the truncated alignment or MOS. Accordingly, all fixed-guideway BRT and LRT truncated or MOS alternatives, including those for Millersport Highway would terminate at Audubon Parkway and the I-990. **Table 2** includes projected 2035 total daily boardings and subset figures for UB and park and ride boardings for the MOS Alternatives.

Table 2 Projected 2035 MOS Ridership

Alternative	Daily Boardings	UB Boardings	PnR Boardings
Niagara Falls Blvd LRT 1	22,000	13,300	461
Millersport Hwy LRT 1	19,000	12,600	720
Niagara Falls Blvd BRT 1	20,600	12,700	297
Millersport Hwy BRT 1	15,700	11,400	266

3.3.2 Feasibility of BRT Center Running Alignment

As part of the more in depth analysis of Tier 3 Alternatives, the potential for using LRT alignments and center running cross sections for BRT operations was evaluated. This evaluation was performed to identify modifications to the LRT alignments and cross sections (presented in the Tier 2 Report) that would be necessary to accommodate BRT operations. In addition, this evaluation would ascertain whether future Right-of-Way (ROW) needs for BRT Alternatives could be reduced. This would be utilized for implementing BRT and later replacing the BRT with LRT using the same alignment.

3.3.2.1 Alternatives Evaluated

The LRT alignments, retained for Tier 3 screening, were evaluated for initial use of BRT operation including the following Tier 3 Alternatives. The discussion presented in this section was originally

developed for the *Feasibility of BRT Center Running Alignment Technical Memorandum* dated September 2015.

Niagara Falls Boulevard – LRT Alternative 1

Conceptual Alignment – Main Street – Bailey Avenue – Eggert Road- Niagara Falls Boulevard-Maple Road – Sweet Home Road – Rensch Road- UB North Campus Alignment – John James Audubon Parkway – I-990 – Crosspoint Business Park

The concept alignment would begin at the South Campus Station and utilize the existing run out tunnel to Bailey Avenue. The concept alignment will continue underground below Bailey Avenue and Eggert Road to a portal in near Alberta Drive. Once at the surface, the concept alignment would utilize a dedicated guideway in the center of Niagara Falls Boulevard ROW to the Boulevard Mall. North of Sheridan Drive, the guideway would be constructed within the existing Niagara Falls Boulevard median and would continue in the center of Maple Road to Sweet Home Road. The concept alignment would utilize dedicated guideway rail lines in the center of Sweet Home Road to a point near the Rensch Road Entrance to the UB North Campus. On the campus the concept alignment would utilize surface lanes running parallel to and south of Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway to the I-990. The LRT alignment would be located in the median of I-990 on newly constructed guideway to Crosspoint Business Park. New or widened bridges would be utilized at existing grade crossings. The guideway would be elevated on a new structure from the I-990 median into the Crosspoint Business Park.

BRT center running alignment was considered from the portal north to the Crosspoint Business Park. South of the portal, BRT service would operate as presented in the Tier 3 BRT Alternative.

Millersport Highway – LRT Alternative 1

Conceptual Alignment – Main Street – Bailey Avenue – Grover Cleveland Highway – Millersport Highway – Flint Road – UB North Campus Alignment – Putnam Way – John James Audubon Parkway – Sylvan Parkway – Millersport Highway - Crosspoint Business Park

The concept alignment would begin at the South Campus Station utilizing the existing run out tunnel and continue underground to Bailey Avenue and surface through a portal on Millersport Highway near Westfield Road. On Millersport Highway surface guideway would be constructed in the median to the intersection of Flint Road. A shallow cut and cover tunnel would be used to provide a grade separated crossing of the Maple Road and the UB North Campus circulatory road to a point south of Augsburger Road. On the campus the concept alignment would utilize surface guideway and approximately follow Putnam Way. The concept alignment would exit the UB campus utilizing a surface guideway and travel in the median of John James Audubon Parkway and Sylvan Parkway to Millersport Highway. The LRT would continue in the median of Millersport Highway to Crosspoint Business Park utilizing a dedicated surface guideway.

BRT center running alignment was considered from the portal north to the Crosspoint Business Park. South of the portal, BRT service would operate as presented in the Tier 3 BRT Alternative.

3.3.2.2 LRT and BRT Design Criteria

Conceptual design criteria were developed for LRT and BRT Alternatives in Tier 2. These criteria are summarized below and were used to determine the potential for BRT center running on LRT alignments.

Design and operating parameters for the NFTA's existing LRT vehicles and system were used to develop design criteria set forth in **Table 3.**

Table 3 LRT Design Criteria

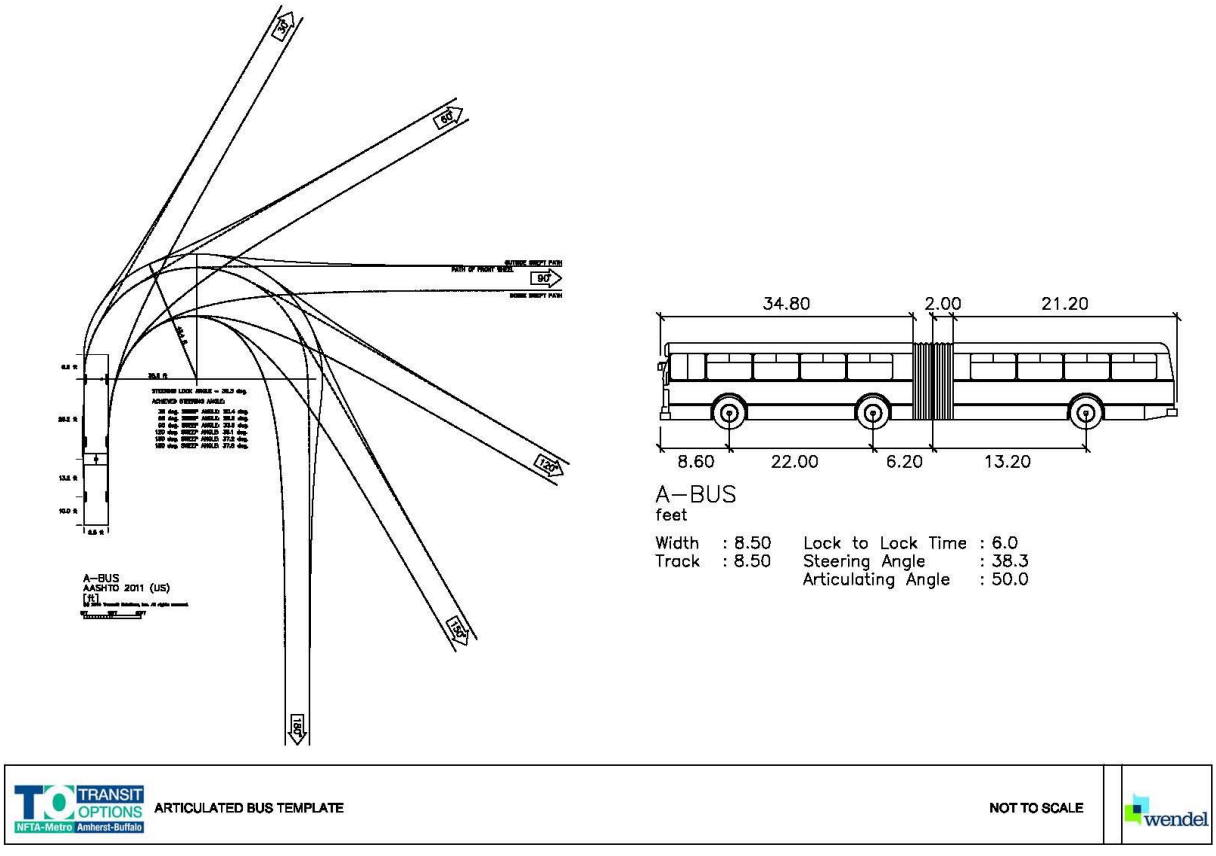
1. Design Vehicle - Existing NFTA light rail vehicle
2. Speeds
a. Below Ground Tunnel Segments– 50 mph
b. Above Ground Bridge Section – 50 mph
c. At Grade outside Street ROW- 50 mph
d. At Grade within Street ROW – Speed limit of adjacent roadway
e. At Grade mixed pedestrian – 15 mph
f. Yard – 5 mph
3. Horizontal Alignment
a. Minimum length of the tangent section between curves is 3 times the speed or 100 ft – whichever is larger
b. Minimum radius is governed by design speed
c. Minimum radius for yard and secondary track is 75 feet
d. Equilibrium super elevation maximum is 10 inches
e. Curvature in degrees – based on Ee of 10 inches, D = 6.1 degrees (maximum)
4. Vertical Alignment
a. Maximum grade shall be 5%
b. Changes in grade should be connected by parabolic curves
c. Minimum length of vertical curve (L) shall be larger of the following:
i. $L = 0.0134\ D\ V^2$
ii. $L = 33D$
L = length of curve
D = Algebraic difference of adjoining grades in percent
V = Design Speed in mph
d. Absolute minimum length (L) of vertical curve is 100 feet
e. The minimum length of constant grade between curves shall be 75 feet

Design criteria for BRT provide criteria relative to horizontal and vertical alignment geometry, travel lane widths as well as geometry for intersections, queue jumps and other BRT design elements. A standard low floor articulated bus was selected as the design vehicle. Geometric operating characteristics associated with that bus are illustrated in **Figure 3**. BRT design criteria are set forth in **Table 4**.

Table 4 BRT Design Criteria

1. Design Vehicle – Articulated Bus
2. Speeds
a. At Grade outside Street ROW- 55 mph
b. At Grade within Street ROW – Speed limit of adjacent roadway
c. Above Ground Bridge Section – 45 mph
d. At Grade Mixed Pedestrian Section – 15 mph
3. Horizontal Alignment
a. Minimum radius is governed by design speed per AASHTO Geometric Design of Highways and Streets
b. Minimum radius at intersections is 20 feet based on Design Vehicle Turning Geometry
c. Maximum super elevation maximum is 4%
4. Vertical Alignment
a. Maximum grade shall be 5%
b. Changes in grade should be connected by simple curves
c. Minimum length of vertical curve (L) shall be 100 feet

Figure 3 Articulated Bus Geometric Operating Characteristics



3.3.2.3 LRT Cross Sections

LRT vehicles would operate within dedicated guideways that are located in underground tunnels, within existing streets or in at-grade surface off-street guideways. Tunnel or existing street segments were not considered for BRT operations. Co-location of LRT/BRT operations was only considered for segments where LRT operations would occur within at-grade surface guideways.

Surface guideway cross sections for Niagara Falls Boulevard LRT 1 and Millersport Highway LRT 1 were developed using the following criteria.

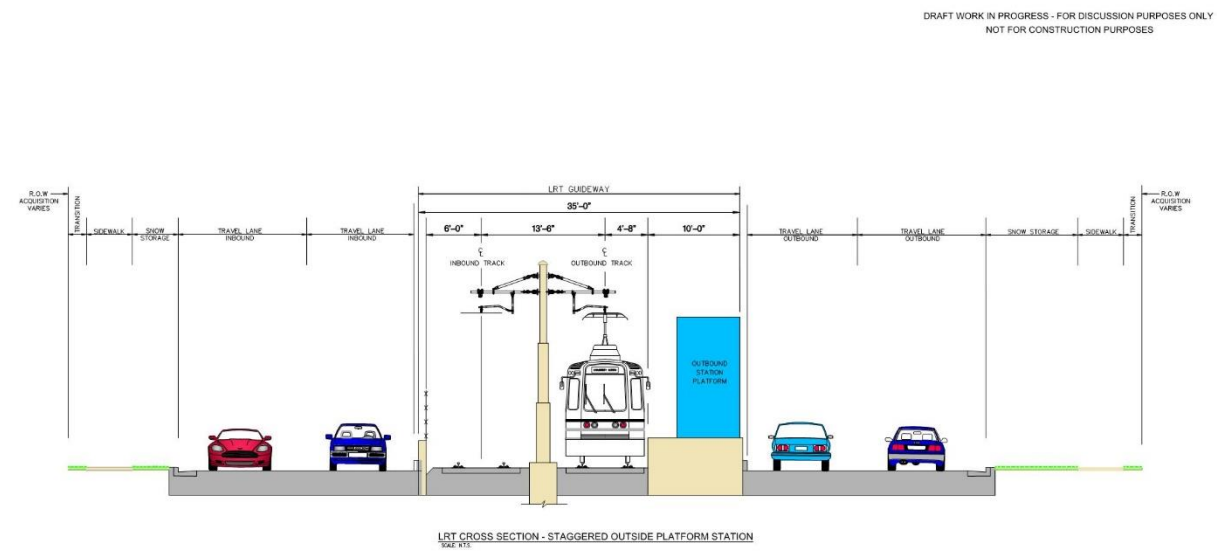
- All surface segments of LRT Preliminary Alternatives would operate in dedicated guideways. Vehicle traffic would be precluded from operating within LRT guideways.
- Within existing street rights-of-way, existing turn lanes would be eliminated with turns being restricted to street intersections. Available snow storage as well as parkway and green space will be reduced to required minimum widths based on AASHTO and NYSDOT design criteria.
- The guideway width in segments would be 35 feet and includes stations. Stations would consist of offset raised boarding platform and be located adjacent to the BRT travel lane. The minimum station platform width would be 10 feet.
- In areas where guideway is located outside of existing street rights-of-way, the guideway width shall be 60 feet. This width will accommodate the LRT guideway as well as areas outside the guideway for construction and future maintenance.

A representative cross section for the Niagara Falls Boulevard and Millersport Highway corridors is illustrated in **Figure 4** and described below.

- **LRT Cross Section**–This section represents an at-grade guideway located in the center of the travel lanes. The existing center turn lane or median would be eliminated and left turns now would be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound trains. The additional width required for LRT development is 35 feet.

This cross section was used to determine modifications required for BRT operations.

Figure 4 LRT Surface Cross Section



3.3.2.4 BRT Cross Sections

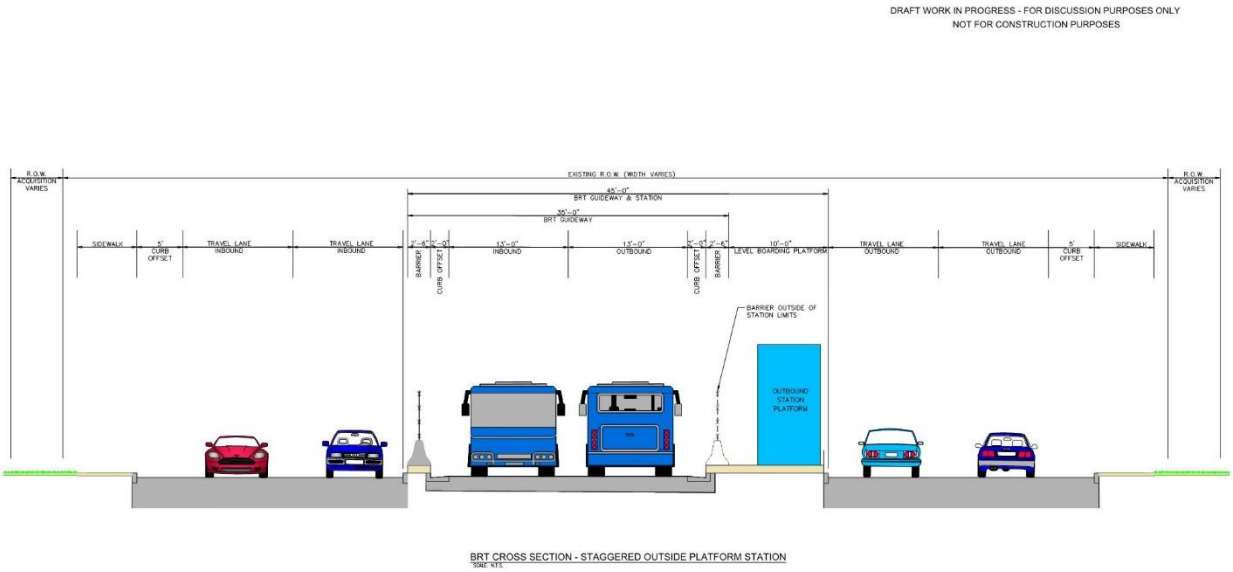
For the purposes of this co-location analysis, BRT vehicles would operate within the LRT dedicated guideways that are located within existing streets or off-street. Accordingly, a single representative cross section was developed for BRT operating within the LRT cross section using the following criteria.

- The guideway width in segments between stations would be 35 feet.
- At stations, this guideway width would increase to 45 feet. Stations would consist of offset level boarding platforms and be located adjacent to the BRT travel lane. The minimum station platform width would be 10 feet.

A single cross section have been developed using these criteria and representative cross sections for the Niagara Falls Boulevard and Millersport Highway corridors. The BRT cross section is illustrated in **Figure 5** and described below.

- **BRT Cross Section**–This section represents an at-grade guideway located in the center of the travel lanes. The existing center turn lane or median would be eliminated and left turns now would be restricted to cross street intersections. Surface stations would incorporate separate staggered outside platforms for inbound and outbound buses. The additional width required for BRT development is 35 feet.

Figure 5 BRT Center Running Cross Section



3.3.2.5 LRT and BRT Alignment Analysis Results

LRT and BRT cross sections presented above were compared to determine if BRT operations generally could be accommodated within the LRT cross section. As demonstrated by Figures 2 and 3, within non-station on-roadway segments both BRT and LRT guideways will require approximately 35 feet. In those segments that are located off roadway, the proposed guideway cross section of 60 feet would be wide enough to accommodate BRT or LRT operations including stations. Therefore with the exception of passenger boarding stations associated with the BRT Alternatives, BRT vehicles could operate within the proposed LRT cross section.

At BRT stations, an additional 10 feet would be required to accommodate the station consisting of the level boarding passenger platform and shelter. Accordingly, the proposed cross section would be widened to accommodate staggered station locations. Tapered transitions would be utilized to shift adjacent traffic lanes before and after the station. Typically, the overall length of the station including approach and departure transitions would be approximately 780 LF. This would consist of the 80 LF platform, 400 LF approach transition and 300 LF departure transition.

In addition to cross section width, the other issue that would potentially impact BRT operations within the proposed LRT corridor is the use of bypass lanes to “skip" BRT stations. The use of bypass lanes to skip BRT stations would not be feasible. Additional cross section width would be required to create separate inbound and outbound pull off lanes at designated bypass stations. The additional cross section width to accommodate bypass lanes is approximately 14 feet. In addition, the length of tapered transitions to shift adjacent travel lanes would be increased to 1,170 LF approach transition and 1,040 LF departure transition. This would make the overall length of the station greater than 2,290 LF.

A detailed analysis of the ROW impacts of this change has not been assessed. However, we would envision that this change to co-locate BRT within the LRT alignment would bring the ROW acquisition requirements for BRT more in line with LRT Alternatives.

3.3.2.6 Conclusion - Center Running BRT

The shift to center-running BRT would occur beginning near the portals where tunnel segments transition to surface segments. Between the existing South Campus Station and these LRT tunnel portals, the BRT alignment would follow the original proposed BRT Alternative alignment.

The center running BRT option could reduce the amount of initial ROW needed for future LRT operations and would avoid impacting the same properties twice. The option also provides a basis for establishing a transit ROW for use in future development planning and land use regulation (see Section 4.4 for more information on this concept).

Based on the analysis presented herein, it is feasible to shift BRT operations to the center running LRT alignments for Niagara Falls Boulevard 1 and Millersport Highway 1. However, the study team is not advocating for the implementation of BRT on Bailey Avenue as a precursor to LRT as BRT operations were not deemed feasible on Bailey Avenue during the Tier 2 evaluation process and the only LRT option to access Niagara Falls Boulevard is to use Bailey Avenue through an underground alignment. The use of BRT as a precursor to LRT for the Niagara Falls Boulevard 1 alignment is only feasible north of the portal. Thus, for Niagara Falls Boulevard, the BRT precursor to LRT would be on Niagara Falls Boulevard, not Bailey Avenue.

3.4 Definition of Tier 3 Alternatives

In preparation for the Tier 3 evaluation process, the remaining Build Alternatives are defined as follows:

- Niagara Falls Boulevard
  - LRT
  - BRT
  - Preferred Bus
- Millersport Highway
  - LRT
  - BRT
  - Preferred Bus
- Enhanced Bus

The fixed guideway alternative alignments were described in detail in the Tier 2 report and any refinements were noted earlier in this section as well as in the *Operations and Maintenance Cost Estimation Report (December 2015).* Maps of each of the alignments are provided on the following pages and include type of operations, running ways, stations/stops and locations of queue jumps and transit signal priority (TSP) as appropriate.

Preferred Bus and Enhanced Bus alternatives were not evaluated in the Tier 2 report. Preferred Bus alternatives follow the same alignment as the BRT alternatives, except that they operate in mixed traffic rather than within a designated ROW. They have the same stations as the BRT alternatives. The Preferred Bus alternatives are described in detail in the *Operations and*

Maintenance Cost Estimation Report (December 2015). The Preferred Bus alternatives are shown on the maps with the BRT alternatives on the following pages.

The Enhanced Bus alternative includes improvements to existing NFTA bus routes operating within the study area (see Figure 10):

- 34, 35, 44, 47, 48, 49, and 64

Improvements to the existing routes that are part of the Enhanced Bus alternative include: better frequency, longer span of service on weekdays and/or weekends, and extension to cover more area. The Enhanced Bus improvements are described in detail in the *Operations and Maintenance Cost Estimation Report (December 2015).*

Figure 6 Niagara Falls Boulevard LRT 1 Map

Figure 7 Millersport Highway LRT 1 Map

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Figure 8 Niagara Falls Boulevard BRT 1 and Preferred Bus Map

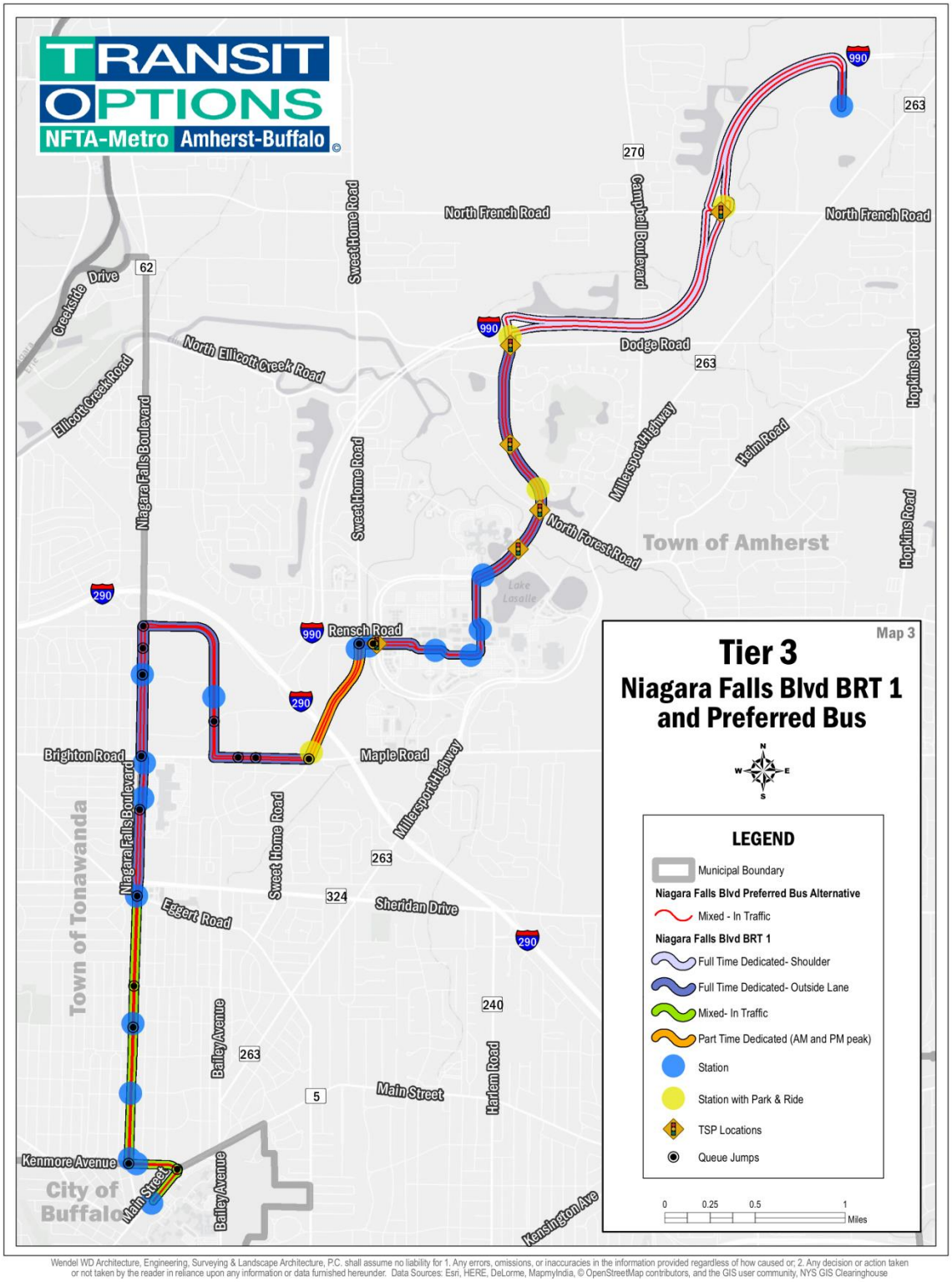

Figure 9 Millersport Highway BRT 1 and Preferred Bus Map

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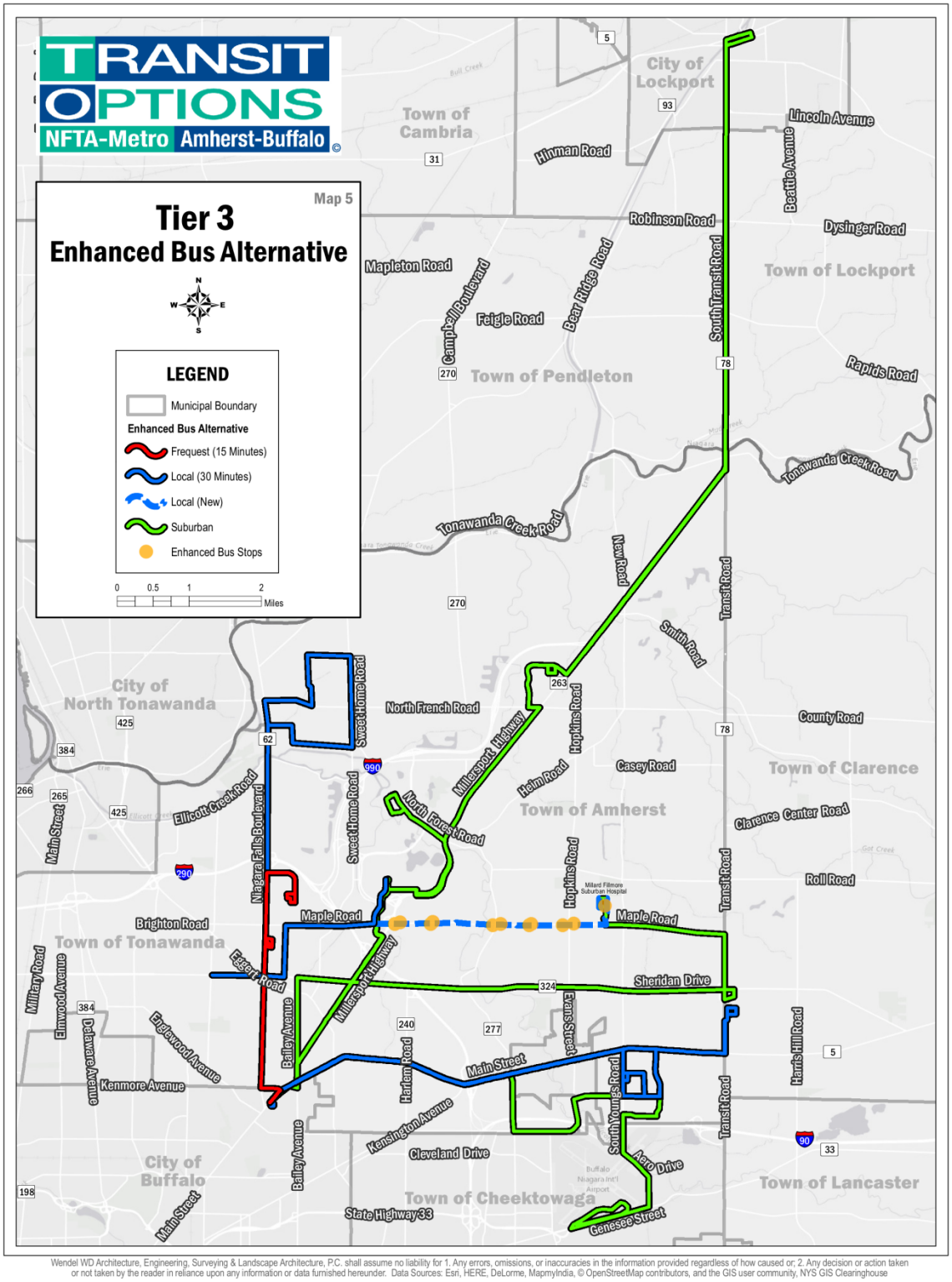
Figure 10 Enhanced Bus Map



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3.5 Planning Framework

NFTA's Tier 2 screening criteria reflect FTA's framework for evaluating and rating major transit capital investments in FTA's New Starts program. New Starts projects are evaluated and rated according to criteria set forth in FTA's 2013 Final Rules and *New and Small Starts Policy Guidance*. As noted FTA recently released *Proposed Interim Policy Guidance* for their Capital Investment Grant Program in April 2015.The statutory project justification criteria and their associated measures include:

- *Mobility improvements* – total number of linked trips using the project with extra weight given to trips made by transit dependent persons (estimated annual trips);
- *Environmental benefits* – dollar value of anticipated direct and indirect benefits to human health, safety, energy, and the air quality environment scaled by the cost of the project and computed based on the change in vehicle miles traveled (VMT) resulting from the implementation of the proposed project (as calculated from estimates of change in automobile and transit vehicle miles traveled);
- *Congestion relief* – as per the recently released guidance (April 2015), FTA is proposing to use new transit trips resulting from implementation of the project. FTA proposed to calculate new transit trips by comparing total transit trips for the no-build alternative with total transit trips once the proposed project is implemented.
- *Economic development effects* – the extent to which a proposed project is likely to enhance additional, transit supportive development in the future is based on a qualitative examination of local plans and policies to support economic development proximate to the project;
- *Land use* – an examination of existing corridor and station area development; development character; existing station area pedestrian facilities; existing corridor and station area parking supply; and affordable housing in the corridor and station areas; and
- *Cost-effectiveness* – annual capital and operating cost per trip on the project.

The statute also requires FTA to examine the following when evaluating and rating a *local financial commitment*:

- Availability of reasonable contingency amounts;
- Availability of stable and dependable capital and operating funding sources; and
- Availability of local resources to recapitalize, maintain, and operate the overall existing and proposed public transportation system without requiring a reduction in existing services.

The statute requires FTA to give "comparable, but not necessarily equal" weight to their evaluation criteria. In the Guidance, FTA will give each of the project justification criteria equal weight. Because of changes made by MAP-21, the FTA's Final Rules do not address how FTA will develop overall New Starts project ratings. Instead, FTA has indicated that this will be the subject of future, subsequent rulemaking. As an interim approach until that rulemaking process is complete, FTA has proposed to give 50 percent weight to the summary project justification rating and 50 percent to the summary local financial commitment rating to arrive at an overall rating. FTA also has proposed to continue requiring at least a medium rating on both project justification and local financial commitment to obtain a medium or better rating overall.

In the Tier 2 screening, NFTA developed criteria to measure the effectiveness of the Preliminary Alternatives at achieving the project purpose, need and goals. In doing so, NFTA considered several factors. First NFTA's Tier 2 screening criteria reflected FTA's statutory project justification criteria for which sufficient engineering and environmental detail has been developed to yield meaningful results. Second, some criteria were shaped by the planning, community involvement and stakeholder collaboration activities undertaken to date. Third, NFTA's criteria included other engineering and environmental factors that could be determined by the conceptual engineering undertaken to date.

In the Tier 3 screening, the alternatives were defined in greater detail. NFTA examined the following five criteria categories in Tier 3: cost parameters/operations/right-of-way needs; ridership/market served; system connectivity; support for transit-oriented development; and community and environmental impacts. **Table 5** lists the criteria for each category, and provides a description of the screening measures for each criterion.

Table 5 Tier 3 Screening Criteria

Criteria	Measures
Cost Parameters, Operations, and Right of Way Needs	Private Land Area Affected by Guideway
	Capital Cost
	Operating and Maintenance Cost ($M annual)
	Comparative Revenue (annual)
	Percent Mixed Traffic Operations
	Percent Signalized Intersections of Total Intersections
Ridership and Market	2035 Project Boardings (Average Weekday)
	2035 Total Boardings by Zero Car HH (Average Weekday)
	UB Ridership Forecast (Average Weekday)
	Forecasted Park and Ride Patrons, 2035
	VMT Change from No-Build
	2035 Employment Served - 1/2 mile station radius
	2035 Population Served - 1/2 mile station radius
	Commercial Retail Area Served (acres) - 1/2 mile station radius
System Connectivity	Access to Activity Centers (number served)
	Number of Park and Recreation Areas Served
	Minimum Number of Transfers Required
	Connecting NFTA Bus Routes
	Travel Time between UB Campuses (UB South - UB North), min
	Travel Time Savings (between key station pairs v. No Build)
Support for TOD/ Redevelopment/ Land Use	Consistency with Local and Regional Plans and Strategies
	Number of Stations with Transit Supportive Zoning (area within 1/2 mi. station radius; total of high and medium rated stations)
Environmental and Community Impacts	Floodplains (acres)
	Wetlands (acres)
	Streams (feet)
	Impacts to Parks, Recreation Areas, Open Space (acres)
	Number of Affected Properties

4. DETAILED TIER 3 RATING & CRITERIA METHODOLOGY

This section summarizes the Tier 3 rating and criteria methodology, focusing on the criteria NFTA applied to measure the effectiveness of each Conceptual Alternative in achieving the project purpose, needs and goals and which served as a primary step in the decision-making process to determine the LPA. The criteria are organized by category as shown in the matrix in **Table 5**; each criterion is described and the resulting data is presented.

4.1 Engineering/Right of Way Needs

The engineering and right of way needs criteria are related to the measures used in FTA's New Starts Project Justification Criteria, specifically cost effectiveness. Further project development under NEPA and SEQR will provide NFTA with further opportunities to refine the LPA to avoid, minimize, and mitigate negative effects on private property.

Mixed traffic operations can negatively affect the on-time performance and relatability of transit service. Because the LRT and BRT alternatives operate within a designated ROW (for the BRT Alternatives, at least some portion of the alternatives' length is in a dedicated ROW) and outside of mixed traffic, they have both higher reliability and shorter travel times than the Preferred and Enhanced Bus alternatives. Additionally, because the BRT alternatives do not operate 100% within a fixed guideway and are sometimes operating in mixed traffic, they have lower reliability and higher travel times than the LRT alternatives that operate 100% within a designated ROW.

Similarly, the larger the number of intersections, the greater the adverse impact to transit operations. The alternatives with fewer intersections have shorter travel times and increased reliability. Signalized intersections provide the opportunity to prioritize transit vehicle movement through the corridor.

4.1.1 Criteria: Estimated Right-of-way Needs

Measure: Private area affected

The measure, private area affected by ROW needs, quantifies the approximate area in acres of privately-owned property the alternative running way would directly impact. The analysis assumed a consistently applied guideway width and ROW need. NFTA's consultant team calculated these land area values using GIS analysis of the location of the proposed guideway and ROW need for each BRT and LRT alternative relative to the location of privately owned land parcels and existing ROW. Publicly owned properties were excluded from the calculations (i.e., municipal and county owned land). The tables below describe the rating scale, acres of private land, and rating for each alternative.

Table 6 Private Land Area Rating Scale

Rating Category	Acres
High	0 – 9.9
Medium-High	10 – 19.9
Medium-Low	20 – 29.9
Low	30+

Table 7 Private Land Area Affected

Alternative	Private Land Area Affected (Acres)	Rating
Niagara Falls Blvd LRT 1	11.0	Medium-High
Millersport Hwy LRT 1	4.7	High
Niagara Falls Blvd BRT 1	25.7	Medium-Low
Millersport Hwy BRT 1	4.1	High
Niagara Falls Blvd Preferred Bus	16	Medium-High
Millersport Hwy Preferred Bus	2.8	High
Enhanced Bus	0	High

4.1.2 Criteria: Capital Cost

Measure: Capital cost estimates

This indicator shows the estimates of the capital costs, excluding ROW acquisition that would be required to construct each alternative. These estimates are expressed in terms of current (2015) dollars, assuming a 3% future annual escalation in costs. The estimates do not include bike paths or sidewalk additions or renovations. New parking lots are assumed to be at-grade with 100 spaces each. The estimates for the BRT alternatives include an allowance of $40 / route foot for existing roadway / curb-related work. Bus maintenance facility cost[1] estimates are based upon an average cost per bus and a set base cost for two bus facilities.

Other assumptions include the following:

- Cooperation between stakeholders will occur
- State of the art construction technology will be utilized
- Adequate experienced craft labor will be available
- Normal productivity rates as historically experienced will be realized
- Compatible trade agreements exist
- No strike impacts will be experienced
- Sufficient experience contractors are available
- Normal weather will affect the construction schedule

The table below shows the rating system (showing that a higher rating corresponds with lower costs), along with the capital cost estimates and rating for each alternative.

[1] The estimated cost for additional storage and maintenance needed for larger vehicles required for BRT and additional LRT vehicles is included. However, the impact on storage and maintenance from the larger number of vehicles and larger size of vehicles will require further study and development after the LPA is determined and the project development phase advances (especially for BRT as NFTA does not currently house or maintain this type of vehicle).

Table 8 Capital Cost Estimate Rating Scale

Rating Category	Cost ($ millions)
High	$ 0 – 99.9
Medium-High	$ 100 – 499.9
Medium-Low	$ 500 – 999.9
Low	$ 1,000+

Table 9 Capital Cost Estimate

Alternative	Capital Cost ($ millions)	Rating
Niagara Falls Blvd LRT 1	$ 1,594	Low
Millersport Hwy LRT 1	$ 1,538	Low
Niagara Falls Blvd BRT 1	$ 430	Medium-High
Millersport Hwy BRT 1	$ 238	Medium-High
Niagara Falls Blvd Preferred Bus	$ 94	High
Millersport Hwy Preferred Bus	$ 63	High
Enhanced Bus	$ 18	High

4.1.3 Criteria: Operating and Maintenance Cost

Measure: Operating and maintenance cost estimates

This indicator reflects estimates of the annual operating and maintenance (O&M) costs for each alternative. These costs are based upon constant year 2014 dollars.

These estimates were based upon two models based upon the different cost structures of light rail and BRT operations, along with another model to estimate costs for revising existing NFTA bus service to complement the alternatives. Each of these models utilized a 3-variable O&M cost model, which follows a structure that FTA recommends. The three variables are operator cost per vehicle hour, maintenance and operator cost per vehicle mile, and cost per peak vehicle.

Once the models were established, operating plans for each alternative were used to estimate the O&M costs. The operating plans included the following characteristics: service frequency, span of service, route distance, run time, fleet requirements, and modifications to existing service.

The following tables show the rating system for O&M costs (showing that a higher rating corresponds with lower costs), along with the costs and ratings for each alternative.

Table 10 O&M Cost Estimate Rating Scale

Rating Category	Costs ($ millions)
High	$ 0 – 4.9
Medium-High	$ 5 – 9.9
Medium-Low	$ 10 – 14.9
Low	$ 15+

Table 11 O&M Cost Estimate

Alternative	O&M Cost ($ millions)	Rating
Niagara Falls Blvd LRT 1	$ 15.8	Low
Millersport Hwy LRT 1	$ 12.5	Medium-Low
Niagara Falls Blvd BRT 1	$ 9.5	Medium-High
Millersport Hwy BRT 1	$ 7.3	Medium-High
Niagara Falls Blvd Preferred Bus	$ 15.2	Low
Millersport Hwy Preferred Bus	$ 11.4	Medium-Low
Enhanced Bus	$ 14.2	Medium-Low

4.1.4 Criteria: Comparative Revenue

Measure: Comparative revenue estimate

This indicator assessed the amount of increased annual operating revenue that each alternative would generate in 2035. The calculations were based upon the projected total boardings multiplied by the average revenue per passenger. The average revenue was calculated based upon available NFTA ridership and revenue data for FY 2014.

The current standard fare for Metro Rail or Bus service is $2. (No zonal charges apply, except that Route 64, Lockport Express, does apply a $.50 surcharge.) The average revenue is less than $2, however, because of discounted fares for children, senior citizens, and disabled persons, as well as other patrons who realize discounts by purchasing passes. The total operating revenue is slightly higher than fare revenue due to miscellaneous revenue, particularly advertising.

Based upon the available data, the average operating revenue per rail passenger is $1.27 and per bus passenger is $1.41. For purposes of these calculations, it was assumed that this rail passenger rate would apply to ridership on the LRT alternatives and this bus passenger rate would apply to the BRT, preferential bus, and enhanced bus alternatives.

The following tables show the rating system (showing that a higher rating corresponds with greater revenue), along with the increased revenue (in millions of dollars) and the rating for each alternative.

Table 12 Comparative Revenue Rating Scale

Rating Category	Revenue ($ millions)
High	$ 6+
Medium-High	$ 5 – 5.9
Medium-Low	$ 4 – 4.9
Low	$ 0 – 3.9

Table 13 Comparative Revenue Estimate

Alternative	Annual Boardings (millions)	Average Revenue per Passenger	Total Operating Revenue ($ millions)	Rating
Niagara Falls Blvd LRT 1	4.9	$1.27	$ 6.2	High
Millersport Hwy LRT 1	4.4	$1.27	$ 5.6	Medium-High
Niagara Falls Blvd BRT 1	4.1	$1.41	$ 5.8	Medium-High
Millersport Hwy BRT 1	3.5	$1.41	$ 5.0	Medium-High
Niagara Falls Blvd Preferred Bus	3.7	$1.41	$ 5.2	Medium-High
Millersport Hwy Preferred Bus	3.3	$1.41	$ 4.7	Medium-Low
Enhanced Bus	0.9	$1.41	$ 1.2	Low

4.1.5 Criteria: Percent of Mixed Traffic Operations

Measure: Percent Mixed Traffic Operations to Total Corridor Length

The extent to which the operations of an alternative are interspersed with vehicular traffic on the roadway system is an important indicator because it reflects the propensity for the transit service to be subject to the same congestion and delay as vehicular traffic. The light rail alternatives will operate on a dedicated fixed transit guideway and thus will have no operations in mixed traffic, while the preferential and enhanced bus alternatives will operate completely in mixed traffic. The BRT alternatives will operate mostly on a dedicated guideway, but a portion of the operations will be in mixed traffic.

The following tables show the rating system for mixed traffic operations (showing that a higher rating corresponds with a lower percentage of mixed traffic operations), along with the percentage and rating for each alternative.

Table 14 Percent Mixed Traffic Operations Rating Scale

Rating Category	%
High	0 – 24.9
Medium-High	25 – 49.9
Medium-Low	50 – 74.9
Low	75+

Table 15 Percent Mixed Traffic Operations

Alternative	Percent Mixed Traffic	Rating
Niagara Falls Blvd LRT 1	0%	High
Millersport Hwy LRT 1	0%	High
Niagara Falls Blvd BRT 1	17%	High
Millersport Hwy BRT 1	35%	Medium-High
Niagara Falls Blvd Preferred Bus	100%	Low
Millersport Hwy Preferred Bus	100%	Low
Enhanced Bus	100%	Low

4.1.6 Criteria: Percent of Signalized Intersections to Total Intersections

Measure: Percent Signalized Intersections to Total Intersections

The extent of signalized intersections along an alternative alignment is an important indicator because it reflects the potential to utilize technology (such as signal pre-emption and queue jumps) that will expedite travel on the travel service. The project team identified the total number of intersections and the number and percentage of signalized intersections along each alternative.

The following tables show the rating system for signalized intersections (showing that a higher rating corresponds with a higher percentage of signalized intersections), along with the percentage and rating for each alternative.

Table 16 Percent Signalized Intersections to Total Intersections Rating Scale

Rating Category	%
High	45+
Medium-High	30 – 44.9
Medium-Low	15 – 29.9
Low	0 – 14.9

Table 17 Percent Signalized Intersections to Total Intersections

Alternative	Percent Signalized	Rating
Niagara Falls Blvd LRT 1	44%	Medium-High
Millersport Hwy LRT 1	28%	Medium-Low
Niagara Falls Blvd BRT 1	35%	Medium-High
Millersport Hwy BRT 1	35%	Medium-High
Niagara Falls Blvd Preferred Bus	35%	Medium-High
Millersport Hwy Preferred Bus	35%	Medium-High
Enhanced Bus	N/A	N/A

4.2 Ridership/Markets Served

The ridership and markets served measures are related to the measures used in the FTA's New Starts Project Justification Criteria, specifically those related to land use/economic development (2035 population and employment in station areas), forecasted ridership and VMT change.

Ridership forecasts for park and ride patrons represent a reduction in the overall automobile travel in the region, despite the minimal effect shown on VMT. In general, transit service can lead to development patterns that are not dependent on single occupancy vehicle usage, which can in turn open opportunities for more sustainable development patterns. Such sustainable development patterns can improve air quality and reduce energy use.

Quality transit service is also important in providing mobility options for residents, students, and employees in the region, particularly those who are transportation disadvantaged. Transportation disadvantaged people in the region include individuals and families with low incomes, households without vehicles, college students, and environmental justice populations. Using transit service to serve employment locations and businesses improves access to jobs for area residents and delivers both employees and customers to businesses. Maps of population and employment within station areas are used to highlight concentrations of people and jobs in this section.

Projected ridership, as calculated by the STOPS model, version 1.5, provides various indicators for the assessment. Projections for 2035 show total average weekday boardings, boardings by zero-vehicle households, University at Buffalo (UB) boardings, park-and-ride patrons, and the reduction in vehicle miles traveled (VMT) between the alternative and the No-Build condition. The following table presents these data for each alternative.

Table 18 Projected Ridership Summary

Alternative	2035 Total Project Boardings (Average Weekday)	2035 Total Boardings by 0 Car HH (Average Weekday)	UB Boardings (Average Weekday)	Park and Ride Patrons (Average Weekday)	VMT change from No-build
Niagara Falls Blvd LRT 1	22,600	12,400	13,300	521	21,900
Millersport Hwy LRT 1	20,900	11,600	12,700	721	19,140
Niagara Falls Blvd BRT 1	20,000	11,700	12,900	350	13,628
Millersport Hwy BRT 1	17,800	10,900	12,600	399	16,969
Niagara Falls Blvd Preferred Bus	18,200	10,900	12,100	355	9,498
Millersport Hwy Preferred Bus	16,700	10,200	11,700	399	15,416
Enhanced Bus	5,200	4,100	5,000	N/A	1,488

4.2.1 Criteria: Ridership

Measure: Number of Forecasted 2035 Project Boardings

The following tables show the rating system (showing that a higher rating corresponds with higher ridership), along with the projected 2035 total boardings and rating for each alternative.

Table 19 Projected Daily Boardings Rating Scale

Rating Category	Boardings
High	20,000+
Medium-High	15,000 – 19,999
Medium-Low	10,000 – 14,999
Low	0 – 9,999

Table 20 Projected Daily Boardings

Alternative	Number of Forecasted 2035 Average Daily Project Boardings	Rating
Niagara Falls Blvd LRT 1	22,600	High
Millersport Hwy LRT 1	20,900	High
Niagara Falls Blvd BRT 1	20,000	High
Millersport Hwy BRT 1	17,800	Medium-High
Niagara Falls Blvd Preferred Bus	18,200	Medium-High
Millersport Hwy Preferred Bus	16,700	Medium-High
Enhanced Bus	5,200	Low

4.2.2 Criteria: Transit Dependent Ridership

Measure: Number of Forecasted 2035 Project Boardings from Zero Car Households
The following tables show the rating system (showing that a higher rating corresponds with higher ridership), along with the projected 2035 total boardings by 0-car households and rating for each alternative.

Table 21 Boardings From Zero Car Households Rating Scale

Rating Category	Boardings
High	12,000+
Medium-High	8,000 – 11,999
Medium-Low	4,000 – 7,999
Low	0 – 3,999

Table 22 Forecasted 2035 Average Daily Project Boardings From Zero Car Households

Alternative	Number of Forecasted 2035 Average Daily Project Boardings from Zero Car Households	Rating
Niagara Falls Blvd LRT 1	12,400	High
Millersport Hwy LRT 1	11,600	Medium-High
Niagara Falls Blvd BRT 1	11,700	Medium-High
Millersport Hwy BRT 1	10,900	Medium-High
Niagara Falls Blvd Preferred Bus	10,900	Medium-High
Millersport Hwy Preferred Bus	10,200	Medium-High
Enhanced Bus	4,100	Medium-Low

4.2.3 Criteria: UB Ridership

Measure: Projected UB Boardings in 2035
The following tables show the rating system (showing that a higher rating corresponds with higher ridership), along with the projected 2035 UB boardings and rating for each alternative.

Table 23 Projected UB Boardings Rating Scale

Rating Category	Boardings
High	12,000+
Medium-High	8,000 – 11,999
Medium-Low	4,000 – 7,999
Low	0 – 3,999

Table 24 Projected UB Boardings, 2035

Alternative	Number 2035 UB Boardings	Rating
Niagara Falls Blvd LRT 1	13,300	High
Millersport Hwy LRT 1	12,700	High
Niagara Falls Blvd BRT 1	12,900	High
Millersport Hwy BRT 1	12,600	High
Niagara Falls Blvd Preferred Bus	12,100	High
Millersport Hwy Preferred Bus	11,700	Medium-High
Enhanced Bus	5,000	Medium-Low

4.2.4 Criteria: Park and Ride Ridership

Measure: Projected Park-and-Ride Boardings in 2035
The following tables show the rating system (showing that a higher rating corresponds with higher ridership), along with the projected 2035 park and ride patrons and rating for each alternative. The enhanced bus alternative will not have any park and ride facilities associated with it.

Table 25 Park and Ride Boardings Rating Scale

Rating Category	Patrons
High	600+
Medium-High	500 - 599
Medium-Low	400 - 499
Low	0 - 399

Table 26 Projected Park-and-Ride Boardings, 2035

Alternative	Number 2035 Park and Ride Boardings	Rating
Niagara Falls Blvd LRT 1	521	Medium-High
Millersport Hwy LRT 1	721	High
Niagara Falls Blvd BRT 1	350	Low
Millersport Hwy BRT 1	399	Low
Niagara Falls Blvd Preferred Bus	355	Low
Millersport Hwy Preferred Bus	399	Low
Enhanced Bus	N/A	N/A

4.2.5 Criteria: VMT Change

Measure: VMT Change from No Build

The following tables show the rating system (showing that a higher rating corresponds with a greater reduction in VMT), along with the projected decrease in VMT and rating for each alternative.

Table 27 VMT Change Rating Scale

Rating Category	VMT Reduction
High	18,000+
Medium-High	12,000 – 17,999
Medium-Low	6,000 – 11,999
Low	0 – 5,999

Table 28 VMT Change, 2035

Alternative	VMT Change	Rating
Niagara Falls Blvd LRT 1	21,900	High
Millersport Hwy LRT 1	19,140	High
Niagara Falls Blvd BRT 1	13,628	Medium-High
Millersport Hwy BRT 1	16,969	Medium-High
Niagara Falls Blvd Preferred Bus	9,498	Medium-Low
Millersport Hwy Preferred Bus	15,416	Medium-High
Enhanced Bus	1,488	Low

4.2.6 Criteria: Station Area Population and Employment

Measure: 2035 Population and Employment

This indicator assesses the levels of population and employment located within the station areas for each alternative. The methodology and calculations followed the process that FTA proposes in its Reporting Instructions for the Section 5309 New Starts Criteria and New Starts Spreadsheet Template.

- Overlay ½-mile radius station areas over Traffic Analysis Zones (TAZs)
- Merge overlapping station areas
- Calculate the percentage of the zone area that lies within the station area and apply that percentage to the zonal totals to estimate the demographics only for the station area portion of the zone
- Add all the zonal sub-totals to calculate the demographics for the station area
- Add all station area sub-totals to calculate the demographics for the entire alternative

The initial step in the process was to prepare GIS mapping of the station locations and calculate a ½-mile radius area around each station. Since most of the station areas are overlapping, this resulted in merged station areas for ease of calculation and display. The project team then used the TAZ-based 2035 demographic projections from GNBRTC as the basis for the calculations.

The following is the rating system (showing that a higher rating corresponds with higher population or employment), along with the projected 2035 station-area population and rating for each alternative, followed by the projected 2035 station-area employment and rating for each alternative. Figures 11-14 show the 2035 projected population and employment density by TAZ for each of the alternatives.

Table 29 Station Area Population and Employment Rating Scale

Rating Category	Number
High	40,000+
Medium-High	30,000 – 39,999
Medium-Low	20,000 – 29,999
Low	0 – 19,999

Table 30 Population Served

Alternative	Population Served (2035)	Rating
Niagara Falls Blvd LRT 1	27,768	Medium-Low
Millersport Hwy LRT 1	22,762	Medium-Low
Niagara Falls Blvd BRT 1	35,390	Medium-High
Millersport Hwy BRT 1	25,067	Medium-Low
Niagara Falls Blvd Preferred Bus	35,390	Medium-High
Millersport Hwy Preferred Bus	25,067	Medium-Low
Enhanced Bus	N/A	N/A

Table 31 Employment Served

Alternative	Employment Served (2035)	Rating
Niagara Falls Blvd LRT 1	31,755	Medium-High
Millersport Hwy LRT 1	18,992	Low
Niagara Falls Blvd BRT 1	37,377	Medium-High
Millersport Hwy BRT 1	23,825	Medium-Low
Niagara Falls Blvd Preferred Bus	37,377	Medium-High
Millersport Hwy Preferred Bus	23,825	Medium-Low
Enhanced Bus	N/A	N/A

Figure 11 2035 Population Density – LRT Alternatives

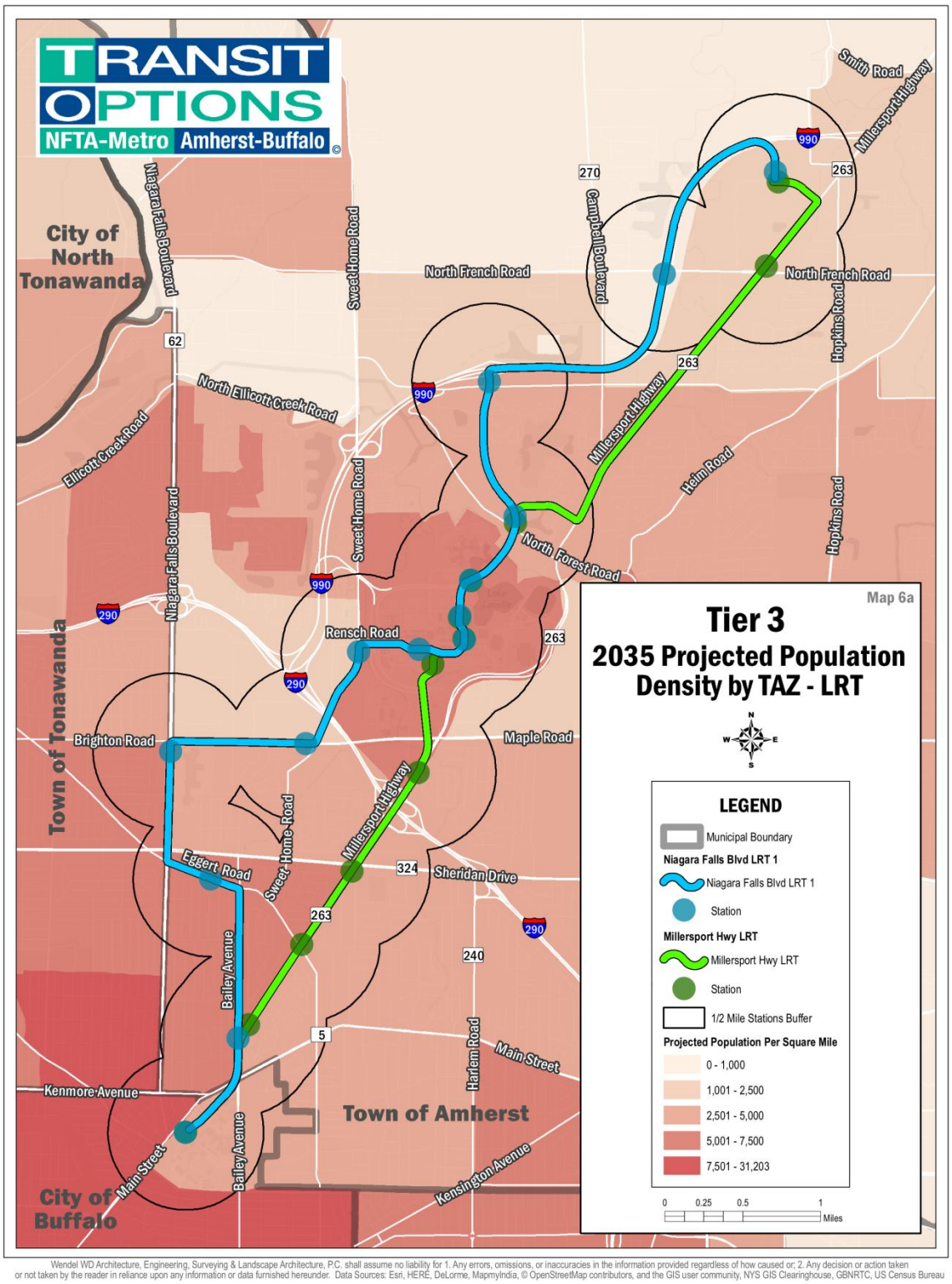

Figure 12 2035 Population Density – BRT/Preferred Bus Alternatives

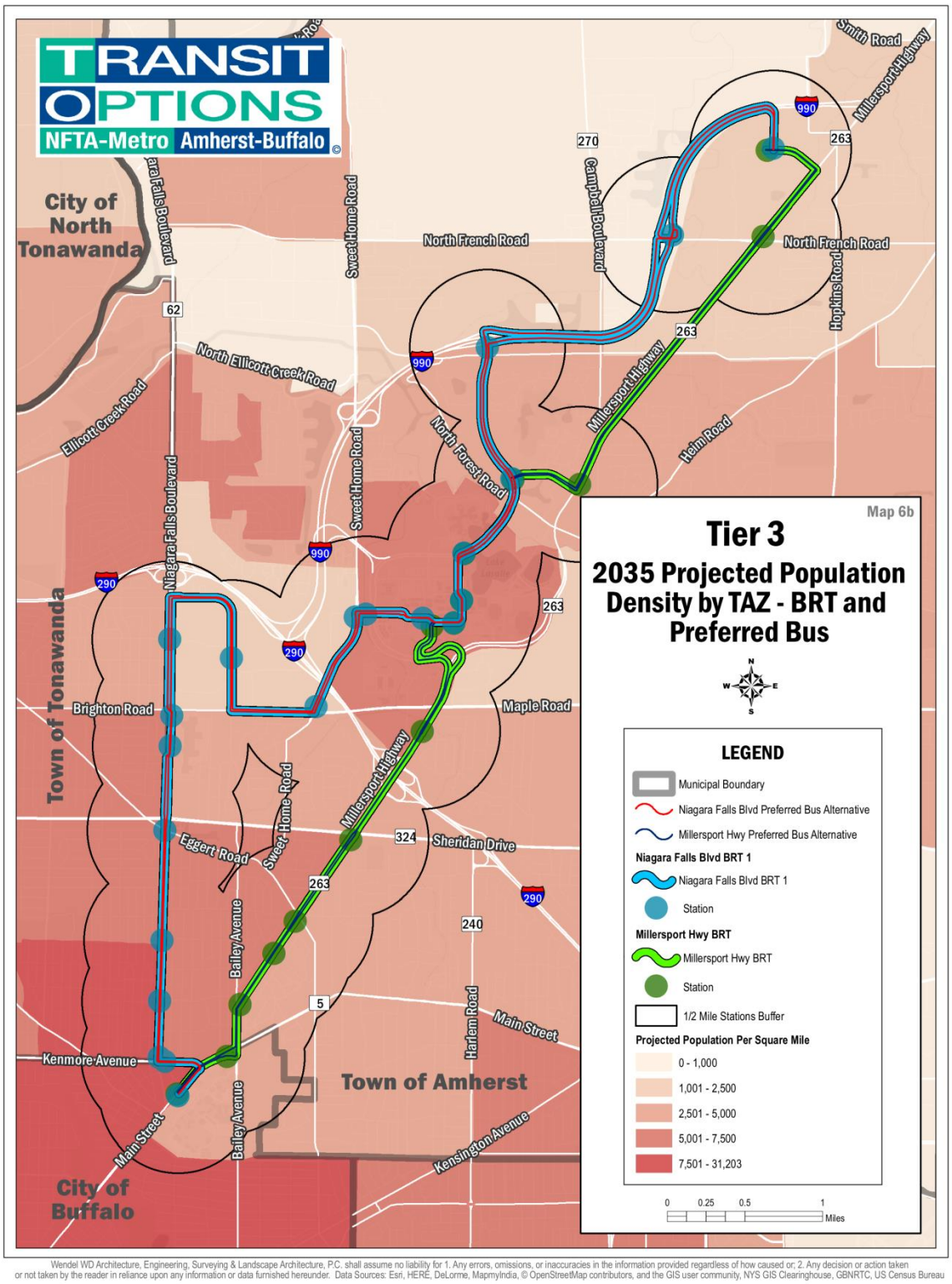

Figure 13 2035 Employment Density – LRT Alternatives

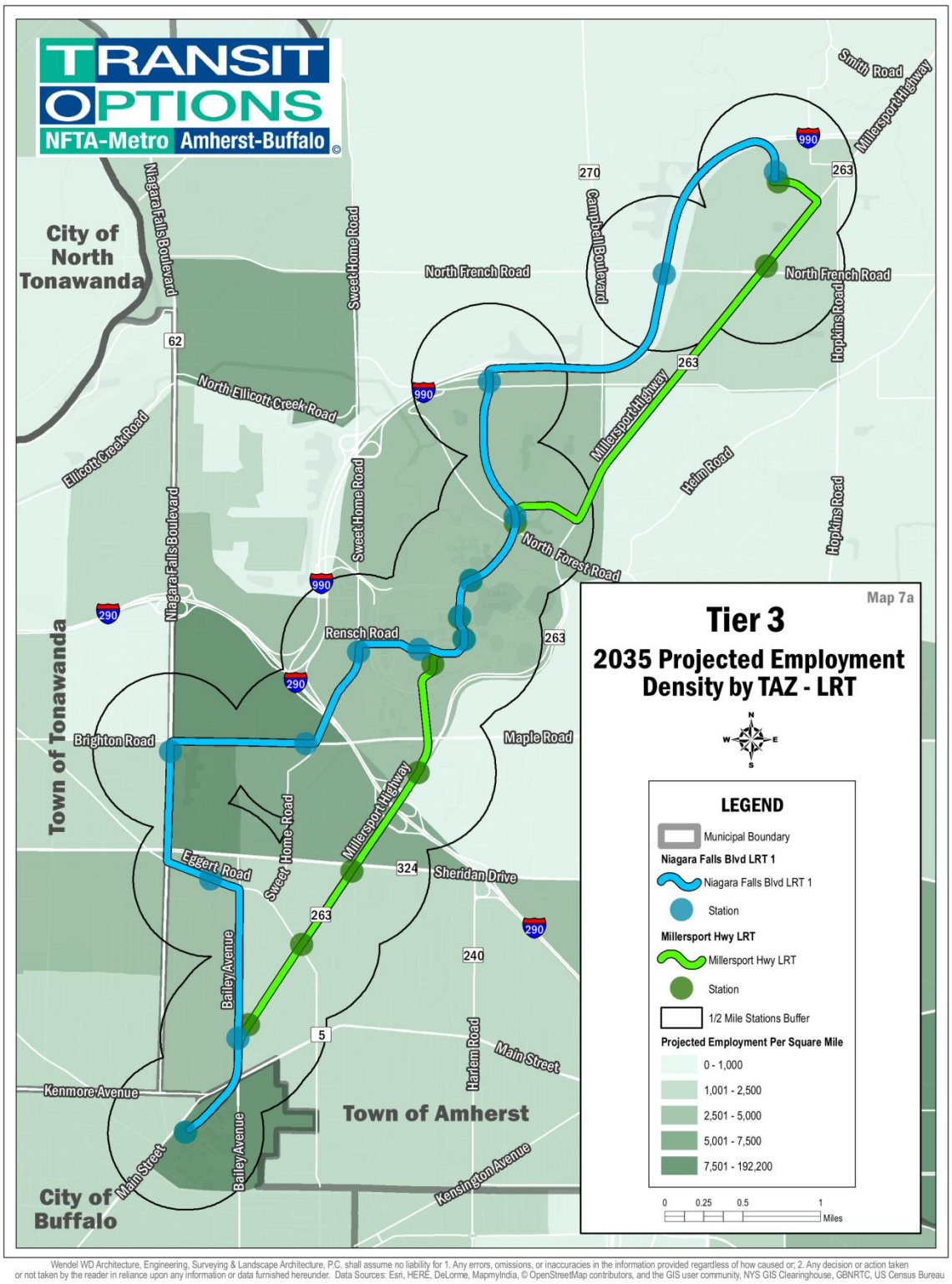

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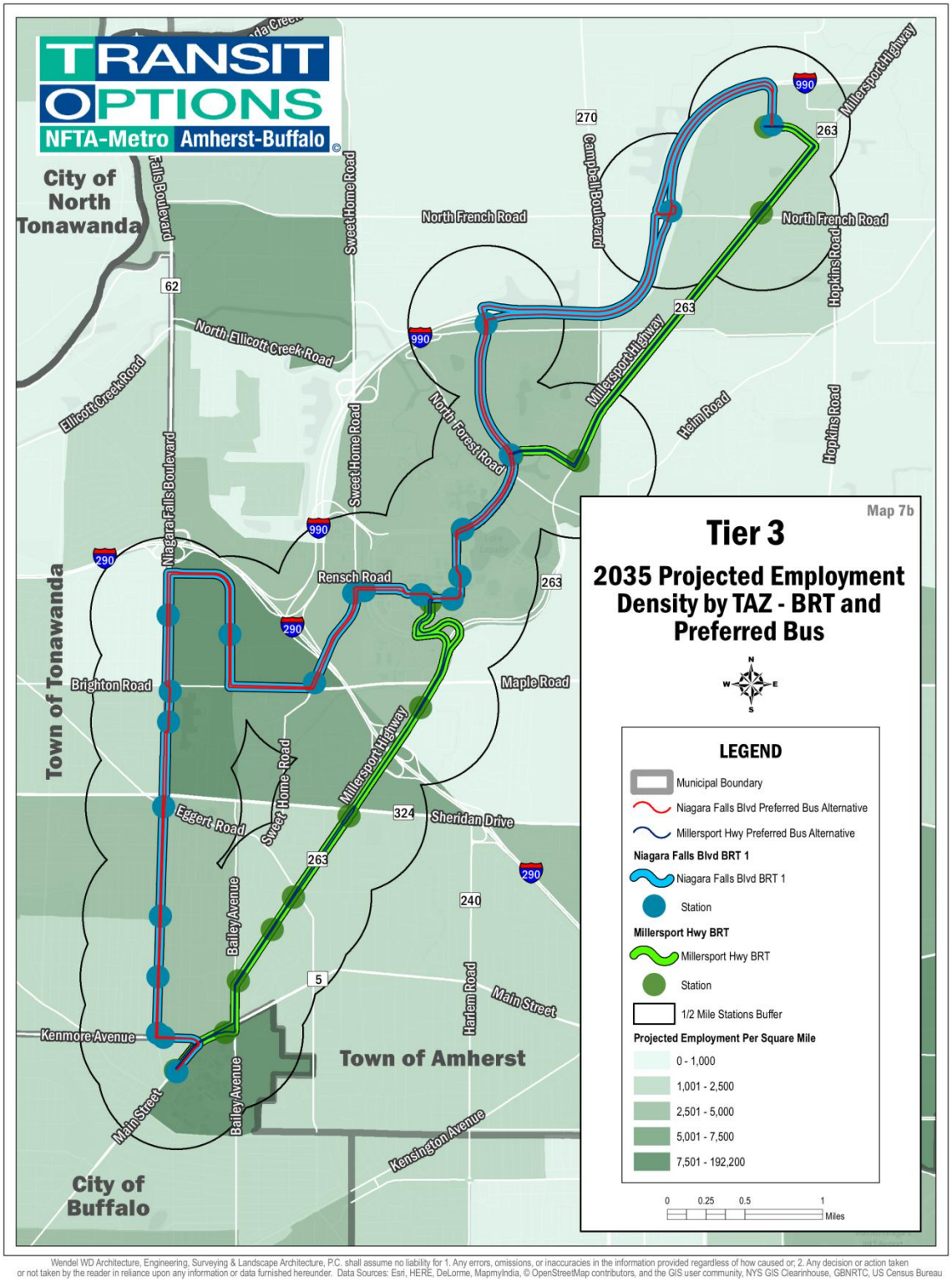
Figure 14 2035 Employment Density – BRT/Preferred Bus Alternatives



4.2.7 Criteria: Commercial Areas Served

Measure: Commercial/Retail Area Served

This indicator reflects the amount of commercial land use area (in acres) within the ½-mile station areas for each alternative. The calculation methodology used the following steps:

- Delineate ½-mile station areas based upon proposed alternative alignments.
- Merge the individual station areas to create a GIS layer of the aggregate station area for each alternative.
- Overlay the aggregate station area for each alternative on top of the available 2012 land use files for Amherst, Tonawanda, and Buffalo.
- Determine what land uses are "Commercial" as defined by the land use files
- Calculate the total amount of commercial land use area within each aggregate station area for each alternative.

The following tables show the rating system (showing that a higher rating corresponds with a greater area), along with the commercial area and rating for each alternative. Figures 15 and 16 show commercial areas served for each alternative.

Table 32 Commercial/Retail Areas Served Rating Scale

Rating Category	Acres
High	900+
Medium-High	600 - 899
Medium-Low	300 - 599
Low	0 – 299

Table 33 Commercial/Retail Areas Served

Alternative	Commercial Areas Served (acres)	Rating
Niagara Falls Blvd LRT 1	821	Medium-High
Millersport Hwy LRT 1	398	Medium-Low
Niagara Falls Blvd BRT 1	961	High
Millersport Hwy BRT 1	432	Medium-Low
Niagara Falls Blvd Preferred Bus	961	High
Millersport Hwy Preferred Bus	432	Medium-Low
Enhanced Bus	N/A	N/A

Figure 15 Commercial Area – LRT Alternatives

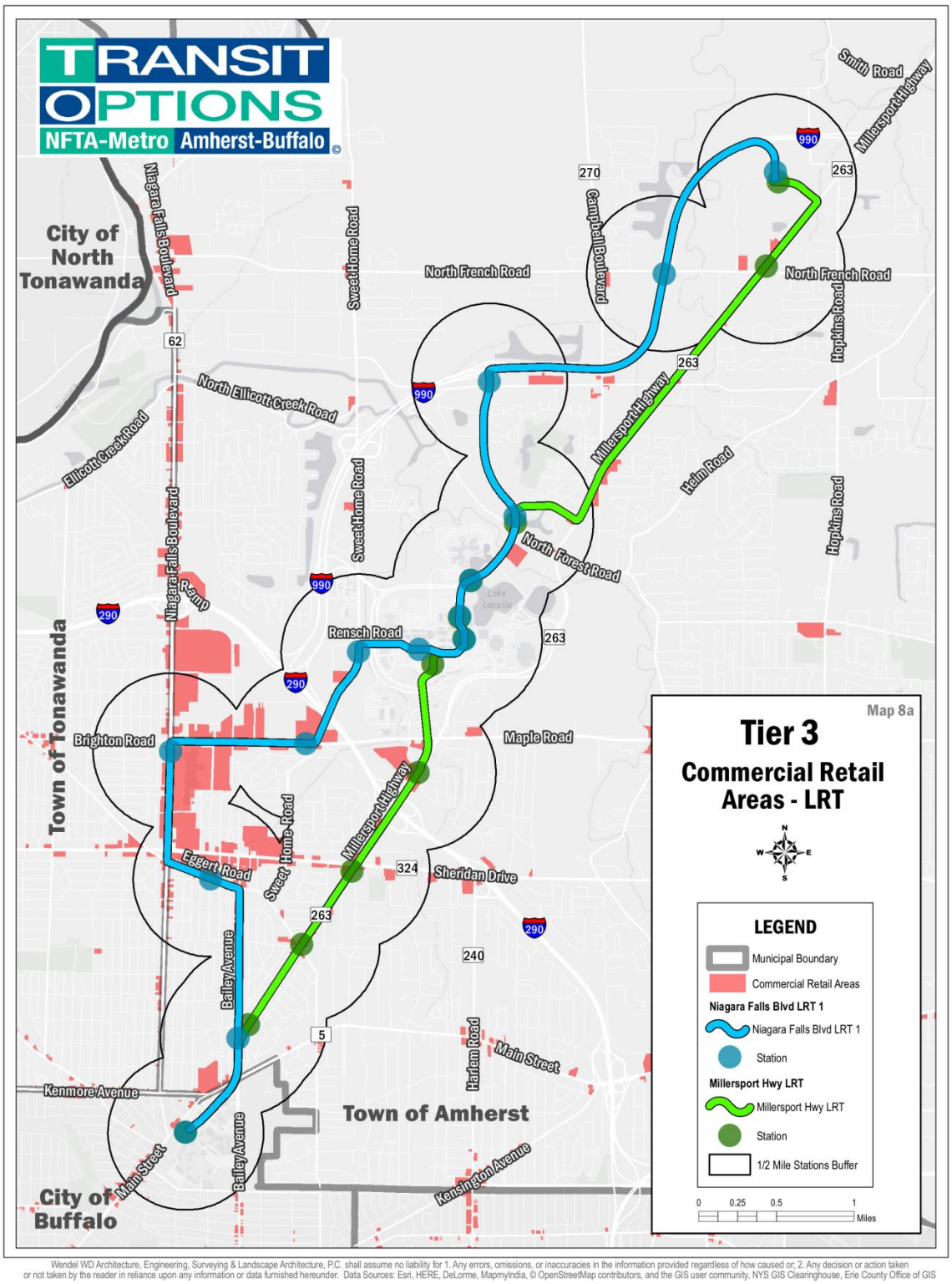
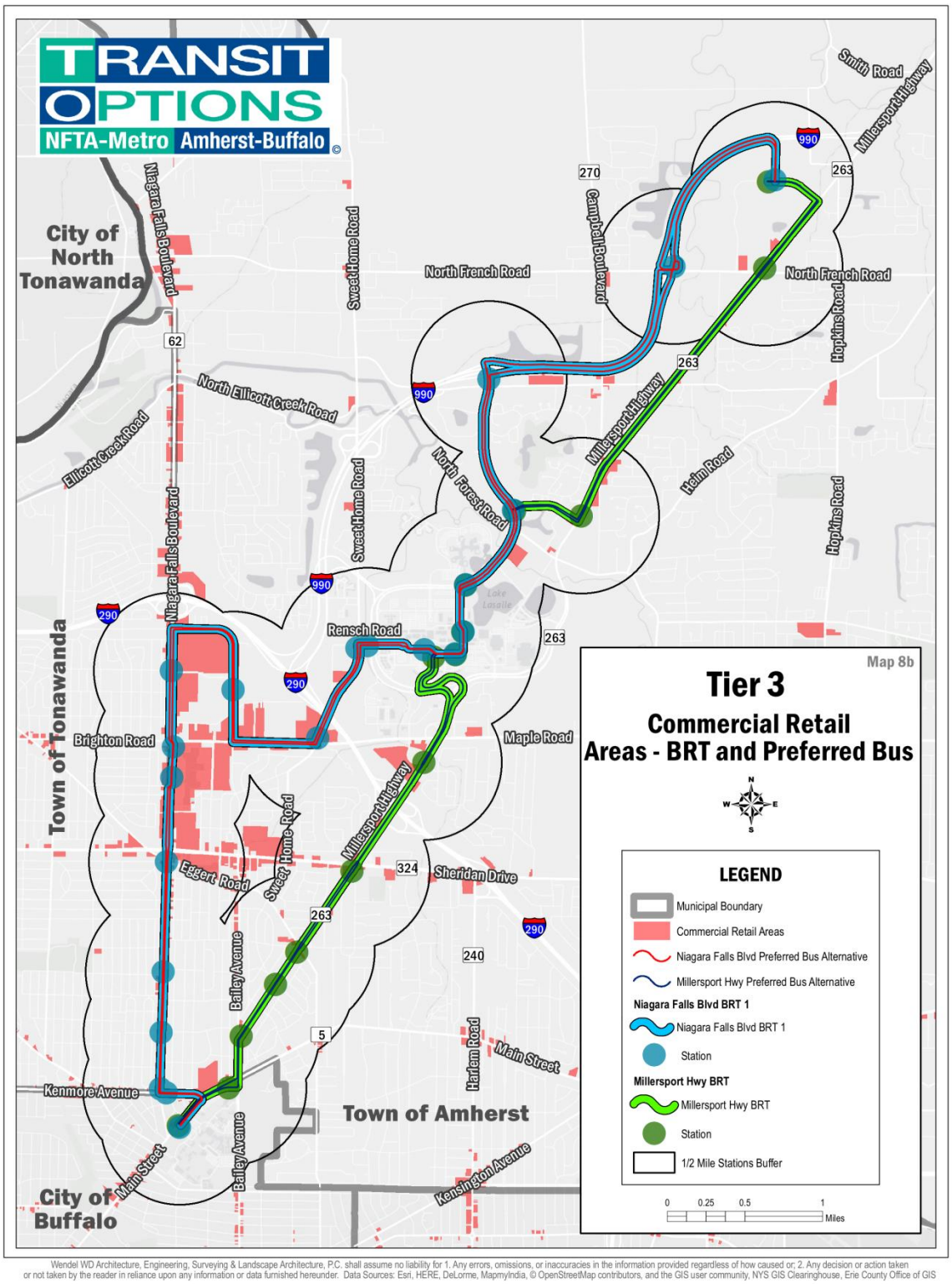


Figure 16 Commercial Area – BRT/Preferred Bus Alternatives



4.3 System Connectivity

System connectivity measures describe how easily and quickly a patron is able to navigate throughout a region using transit. The fewer times a patron is required to transfer from one service to another or from one route to another, the more likely the patron is to use public transit for a trip, and to continue using public transit for a given trip. This is because there is no travel time lost to waiting to transfer and no inconvenience of having to pack up and move multiple times during a given trip. A one-seat ride (no transfers) is more convenient for patrons in general and more attractive to choice riders. Further project development under NEPA and SEQR will provide NFTA with additional opportunities to refine the LPA to improve connections to major destinations, to connecting services, and to realign existing transit services to improve coordinated service.

4.3.1 Criteria: Access to Activity Centers

Measure: Number of activity centers potentially served

NFTA identified several major activity centers for the purpose of determining the level of access that each alternative would provide to these activity centers. Many of these activity centers are in Buffalo and would be served similarly by each alternative through connecting with the existing MetroRail service. The following tables show the major activity centers located outside Buffalo and that would be served differently by each alternative.

Table 34 Activity Centers

Activity Center	LRT		BRT		Preferred Bus		Enhanced Bus
	Niagara Falls Blvd 1	Millersport Hwy 1	Niagara Falls Blvd 1	Millersport Hwy 1	Niagara Falls Blvd	Millersport Hwy	
Boulevard Mall	x		x		x		x
Northtown Plaza	x		x		x		
Sweet Home Middle School	x		x		x		x
Amherst Town Center	x	x	x	x	x	x	
CrossPoint	x	x	x	x	x	x	

The following is the rating system (showing that a higher rating corresponds with a greater number), along with the number of activity centers served and the rating for each alternative.

Table 35 Activity Centers Rating Scale

Rating Category	Number
High	7+
Medium-High	5 - 6
Medium-Low	3 - 4
Low	0 – 2

Table 36 Number of Activity Centers Served

Alternative	Number of Activity Centers	Rating
Niagara Falls Blvd LRT 1	5	Medium-High
Millersport Hwy LRT 1	2	Low
Niagara Falls Blvd BRT 1	5	Medium-High
Millersport Hwy BRT 1	2	Low
Niagara Falls Blvd Preferred Bus	5	Medium-High
Millersport Hwy Preferred Bus	2	Low
Enhanced Bus	2	Low

4.3.2 Criteria: Access to Parks and Recreational Resources

Measure: Number of existing parks and recreational areas potentially served

This indicator measured the level of access that each alternative would provide to parks and recreation facilities. Based upon reviewing available information, it was determined that eleven facilities are located within ½ mile of a station area for one of the alternatives. The following table identifies these facilities and which alternatives provide access to them.

Table 37 Parks and Recreation Areas

Park	LRT		BRT		Preferred Bus		Enhanced Bus
	Niagara Falls Blvd 1	Millersport Hwy 1	Niagara Falls Blvd 1	Millersport Hwy 1	Niagara Falls Blvd	Millersport Hwy	
Sattler Field		x		x		x	
Dellwood Park		x		x		x	
Garnet Playground		x		x		x	
Cindy Drive Play Area		x		x		x	
Eggertsville Community Park	x		x		x		
Mel Ott Baseball Complex	x		x		x		x
Northtown Center (Pepsi Center)	x	x	x	x	x	x	x
Amherst Audubon		x	x	x	x	x	x
Walton Woods Park	x	x	x	x	x	x	
Getzville Fire Dept. Park	x	x		x		x	
North French Rec Area	x						

The following is the rating system (showing that a higher rating corresponds with a greater number), along with the number of parks and recreation facilities served and the rating for each alternative.

Table 38 Parks and Recreation Areas Rating Scale

Rating Category	Number
High	10+
Medium-High	7 - 9
Medium-Low	4 - 6
Low	0 – 3

Table 39 Number of Existing Parks and Recreational Resources Served

Alternative	Number of Parks	Rating
Niagara Falls Blvd LRT 1	6	Medium-Low
Millersport Hwy LRT 1	8	Medium-High
Niagara Falls Blvd BRT 1	5	Medium-Low
Millersport Hwy BRT 1	8	Medium-High
Niagara Falls Blvd Preferred Bus	5	Medium-Low
Millersport Hwy Preferred Bus	8	Medium-High
Enhanced Bus	3	Low

4.3.3 Criteria: Interface with Other Transit Services

Measure: Minimum Number of Transfers

The number of transfers required to utilize the potentially-expanded transit services between Buffalo and a new terminus in Amherst will be an important factor in the attractiveness of new service, as well as its operating efficiency.

The LRT alternatives will provide a minimum of 0 transfers, since these alternatives will be a continuation of the existing MetroRail system from University Station. All other alternatives will require at least one transfer since they involve providing a new type of transit infrastructure or technology (bus rapid transit or conventional bus) that connects with MetroRail.

The following tables show the rating system for the minimum number of transfers (showing that a higher rating corresponds with a lower number), along with the number and rating for each alternative.

Table 40 Transfer Rating Scale

Rating Category	Number
High	0
Medium-High	1
Medium-Low	2
Low	3+

Table 41 Minimum Number of Transfers

Alternative	Minimum Number of Transfers	Rating
Niagara Falls Blvd LRT 1	0	High
Millersport Hwy LRT 1	0	High
Niagara Falls Blvd BRT 1	1	Medium-High
Millersport Hwy BRT 1	1	Medium-High
Niagara Falls Blvd Preferred Bus	1	Medium-High
Millersport Hwy Preferred Bus	1	Medium-High
Enhanced Bus	1	Medium-High

4.3.4 Criteria: Interface with Other Transit Services

Measure: Number of bus connections

Another important indicator is the level of access between the alternatives and other transit service in the study area. Available mapping indicates that seven current and projected future NFTA bus routes serve the study area. The project team calculated the total number of bus route connections at all proposed stations along the route of each alternative. A connection was assumed if the bus route is within ¼ mile of a station on one of the alternatives. The tabulations assumed future modifications to the current Route 44 if the Millersport LRT alternative is implemented and modifications to the current Route 34 if the NFB BRT alternative is implemented.

The following tables show the rating system (showing that a higher rating corresponds with a greater number), along with the number of routes served and the rating for each alternative.

Table 42 Number of Bus Connections Rating Scale

Rating Category	Number
High	19+
Medium-High	13 - 18
Medium-Low	7 - 12
Low	0 – 6

Table 43 Number of Bus Connections

Alternative	Total Stations	Stations with Bus Service	Number of Routes Serving Stations	Rating
Niagara Falls Blvd LRT 1	14	12	16	Medium-High
Millersport Hwy LRT 1	11	7	8	Medium-Low
Niagara Falls Blvd BRT 1	20	15	17	Medium-High
Millersport Hwy BRT 1	14	13	21	High
Niagara Falls Blvd Preferred Bus	20	15	17	Medium-High
Millersport Hwy Preferred Bus	14	13	21	High
Enhanced Bus	N/A			

4.3.5 Criteria: Travel Time Between UB Key Destinations

Measure: Travel Time between Destinations

These indicators are measures of the projected 2035 transit travel time between key destination pairs. The calculations were based upon preliminary alternative alignment configurations and service templates, which included station locations and estimated running times between stations. The STOPS model, version 1.5, generated the final projected travel times for these three destination pairs:

- UB-South (existing MetroRail University Station) and UB-North (proposed Capen Hall Station)
- Existing Allen Medical Campus MetroRail Station and UB-North (proposed Capen Hall Station)
- Existing Utica MetroRail Station and proposed CrossPoint Business Park Station

The following tables show the rating system (a higher rating corresponds with a lower travel time), along with the travel time between UB-South and UB-North and the rating for each alternative.

Table 44 Travel Time Rating Scale (UB South – UB North)

Rating Category	Time
High	0 – 14.9
Medium-High	15 – 24.9
Medium-Low	20 – 34.9
Low	35+

Table 45 Travel Time Between UB Campuses (UB South – UB North)

Alternative	Travel Time Between Campuses	Rating
Niagara Falls Blvd LRT 1	17	Medium-High
Millersport Hwy LRT 1	11	High
Niagara Falls Blvd BRT 1	29	Medium-Low
Millersport Hwy BRT 1	17	Medium-High
Niagara Falls Blvd Preferred Bus	32	Medium-Low
Millersport Hwy Preferred Bus	19	Medium-High
Enhanced Bus	36	Low

The following table shows the rating system (a higher rating corresponds with a lower travel time), along with the travel time between Allen Medical Campus and UB-North and the rating for each alternative.

Table 46 Travel Time Rating Scale (Allen Medical – UB North)

Rating Category	Time
High	0 – 29.9
Medium-High	30 – 39.9
Medium-Low	40 – 49.9
Low	50+

Table 47 Travel Time Between UB Campuses (Allen Medical – UB North)

Alternative	Travel Time Between Campuses	Rating
Niagara Falls Blvd LRT 1	25	High
Millersport Hwy LRT 1	25	High
Niagara Falls Blvd BRT 1	45	Medium-Low
Millersport Hwy BRT 1	35	Medium-High
Niagara Falls Blvd Preferred Bus	46	Medium-Low
Millersport Hwy Preferred Bus	34	Medium-High
Enhanced Bus	48	Medium-Low

The following table shows the rating system (a higher rating corresponds with a lower travel time), along with the travel time between Utica Station and CrossPoint Business Park and the rating for each alternative.

Table 48 Travel Time Rating Scale (Utica Station and CrossPoint)

Rating Category	Time
High	0 – 39.9
Medium-High	40 – 49.9
Medium-Low	50 – 59.9
Low	60+

Table 49 Travel Time Between Utica Station and CrossPoint

Alternative	Travel Time Between Destinations	Rating
Niagara Falls Blvd LRT 1	36	High
Millersport Hwy LRT 1	32	High
Niagara Falls Blvd BRT 1	59	Medium-Low
Millersport Hwy BRT 1	48	Medium-High
Niagara Falls Blvd Preferred Bus	68	Low
Millersport Hwy Preferred Bus	54	Medium-Low
Enhanced Bus	62	Low

4.3.6 Criteria: Travel Time Savings

Measure: Travel time savings

This measure quantifies the projected travel time savings between major destinations for each alternative. The table below shows major destinations in each study corridor along with projected travel time savings resulting from each alternative.

Table 50 Travel Time Savings

Station Pairs	Niagara Falls Blvd LRT 1	Millersport LRT 1	Niagara Falls Blvd BRT 1	Millersport BRT 1	Niagara Falls Blvd Preferred Bus	Millersport Preferred Bus
Utica Station - Boulevard Mall	31		20		16	
Allen Medical Campus - Maple / Sweet Home	24		6		0	
Erie Canal Harbor - Maple / Sweet Home	22		7		1	
Allen Medical Campus - I-990	31		9		1	
Erie Canal Harbor - I-990	37		14		6	
Allen Medical Campus - Millersport / Sheridan		30		16		21
Erie Canal Harbor - Millersport / Sheridan		27		16		20
Allen Medical Campus - Audubon / Sylvan		21		1		3
Erie Canal Harbor - Audubon / Sylvan		24		4		6

4.4 Support for Transit-Oriented Development (TOD)

Land use and economic development are two of the measures used in FTA's New Starts Project Justification Criteria. These two criteria fall exclusively in the realm of local land use controls. The focus of the FTA measures in these two areas is on demonstrating progress on comprehensive plans supporting transit and introducing new transit supportive zoning and development regulations, as well as the effect of these new plans and ordinances in station areas. Such effects include affordable housing programs, parking reductions, and pedestrian amenities within station areas.

Quality transit service supports economic development and supports redevelopment opportunities, which in turn increases land values and raises the tax base. NFTA and local governments will need to work together to plan and develop ordinances that support TOD. To that end, the property needed for an LRT ROW can be reserved over time through redevelopment by land use regulation. A *Transit Overlay Zone* can be created to accomplish this gradual accumulation of ROW property[2].

[2] Related, the development of BRT in a corridor does not necessarily need to precede the development of LRT in a corridor. The property needed for a LRT ROW does not need to be reserved through the implementation of BRT operations in the same area; this can also be accomplished through land use regulations.

4.4.1 Criteria: Consistency with Local and Regional Plans and Strategies

Measure: Plan Consistency

Based upon FTA guidance, the approach to conducting this type of assessment involved the following steps:

- Identify and obtain the main regional and local land use plans
- Review the plans and identify the locations that they have identified specifically for future concentrated development
- Assess the extent to which each alternative serves these planned growth locations.

The project team identified available plans and determined that two plans, the *Amherst Comprehensive Plan* and the *New Way to Plan for Buffalo Niagara* plan (referred to as the RPSD, for Regional Plan for Sustainable Development), provide geographically-specific growth locations to use in this assessment. For each alternative, the project team identified the growth locations that it would serve for each of these two plans, as indicated in the following table.

Table 51 Consistency with Regional Plans

Alternative	Amherst Comprehensive Plan					RPSD		
	Main / Bailey	UB / Millersport	Audubon Parkway	Millersport & French		NFB	UB-N	Cross Point
Niagara Falls Blvd LRT 1	x		x	x		x	x	x
Millersport Hwy LRT 1	x		x	x			x	x
Niagara Falls Blvd BRT 1	x		x			x	x	
Millersport Hwy BRT 1	x		x	x			x	x
Niagara Falls Blvd Preferred Bus	x		x			x	x	
Millersport Hwy Preferred Bus	x		x	x			x	x
Enhanced Bus		x				x	x	

The following tables show the rating system (showing that a higher rating corresponds with a greater number), along with the number of growth locations served and the rating for each alternative.

Table 52 Growth Locations Rating Scale

Rating Category	Number
High	6+
Medium-High	5
Medium-Low	4
Low	0 – 3

Table 53 Growth Locations

Alternative	Growth Locations	Rating
Niagara Falls Blvd LRT 1	6	High
Millersport Hwy LRT 1	5	Medium-High
Niagara Falls Blvd BRT 1	4	Medium-Low
Millersport Hwy BRT 1	5	Medium-High
Niagara Falls Blvd Preferred Bus	4	Medium-Low
Millersport Hwy Preferred Bus	5	Medium-High
Enhanced Bus	3	Low

4.4.2 Criteria: Existence of Transit Supportive Zoning to Station Areas

Measure: Number of station areas with transit-supportive zoning

This indicator assessed the "transit-supportiveness" of the alternatives, based upon the zoning of the areas surrounding the proposed stations. The first step was to prepare mapping of the proposed stations for each alternative and ½-mile areas around each station. The next main step was to prepare mapping of the current zoning for each stop area. The project team used available zoning shapefiles (from Amherst, Buffalo, and Tonawanda) and prepared mapping layouts that show the composite zoning classifications in colored thematic maps for all the station areas.

This process included reviewing the text of the zoning codes to identify the permitted densities / intensities for each classification in order to determine which classifications to designate as transit-supportive. In general, most non-residential zones are transit-supportive (most zones allow buildings up to 65' high), while most residential zones are not transit-supportive (only a few zones allow density of over 12 du / acre).

Upon establishing the zoning for the station areas, the next step was to calculate in GIS the total area of all transit-supportive zoning classifications within each stop area. Each station area's transit-supportiveness then was classified as High, Medium, or Low, based upon the following ranges of transit-supportive zoning classification areas:

- Over 300 acres = High
- 150-300 acres = Medium
- Under 150 acres = Low

The following tables show the rating system (a higher rating corresponds with a greater number), along with the number of stations with "medium" and "high" transit-supportiveness and the rating for each alternative.

Table 54 Transit Supportive Zoning Rating Scale

Rating Category	Number
High	16+
Medium-High	11 -15
Medium-Low	6 - 10
Low	0 – 5

Table 55 Number of Station Areas with Transit Supportive Zoning

Alternative	Sum of Low Ratings	Sum of Medium Ratings	Sum of High Ratings	Sum of High and Medium Ratings	Rating
Niagara Falls Blvd LRT 1	3	5	7	12	Medium-High
Millersport Hwy LRT 1	5	2	5	7	Medium-Low
Niagara Falls Blvd BRT 1	4	8	9	17	High
Millersport Hwy BRT 1	6	3	5	8	Medium-Low
Niagara Falls Blvd Preferred Bus	4	8	9	17	High
Millersport Hwy Preferred Bus	6	3	5	8	Medium-Low
Enhanced Bus	N/A				

4.5 Community and Environmental Impact Assessment

During Project Development under NEPA and SEQR, NFTA will have further opportunities avoid, minimize, and mitigate any negative environmental or community impacts. This is true regardless of next steps (Environmental Impact Statement (EIS), Environmental Assessment (EA), or Categorical Exclusion (CE). The general concept developed for the LPA in this AA will be refined with more engineering in continued coordination with local, county, state, and federal government; regulatory agencies; affected property owners; and the public.

4.5.1 Criteria: Impacts to Water Resources

Measure: Areas of floodplains and wetlands affected; impacts to streams

The measure, areas of floodplains and wetlands affected and impacts to streams, quantifies the amounts of floodplains, wetlands and streams that would potentially be directly impacted by each alternative. NFTA's consultant team calculated the values of these measures using GIS analysis of the location of each alternative guideway and ROW need relative to the location of floodplains, wetlands, and streams, relative to the location of 100-year floodplains, State and Federal wetlands, and DEC streams. The areas of floodplains and wetlands are the acres of each resource within the footprint of an alternative using the cross-section established and ROW need. The linear feet of streams, or longitudinal impact, were measured by the parallel overlapping distances of an alternative's alignment and ROW need and a stream's alignment. The tables below describe the rating scale for each water resource as well as the impact values and evaluation ratings.

Table 56 Water Resources Rating Scale

Rating Category	Floodplains (acres)	Wetlands (acres)	Streams (linear feet)
High	0-9.9	0-0.9	0-499.9
Medium-High	10-14.9	1-1.9	500-599.9
Medium-Low	15-19.9	2-2.9	600-699.9
Low	20+	3+	700+

Table 57 Impacts to Water Resources

Alternative	Water Resource Impacts			Rating		
	Floodplains (acres)	Wetlands (acres)	Streams (linear feet)	Floodplains	Wetlands	Streams
Niagara Falls Blvd LRT 1	13.8	1.3	419.0	Medium-High	Medium-High	High
Millersport Hwy LRT 1	21.2	1.5	629.4	Low	Medium-High	Medium-Low
Niagara Falls Blvd BRT 1	15.3	2.2	782.1	Medium-Low	Medium-Low	Low
Millersport Hwy BRT 1	21.2	1.5	564.0	Low	Medium-High	Medium-High
Niagara Falls Blvd Preferred Bus	15.3	1.2	632.0	Medium-Low	Medium-High	Medium-Low
Millersport Hwy Preferred Bus	21.2	1.5	564.0	Low	Medium-High	Medium-High
Enhanced Bus	N/A			N/A		

4.5.2 Criteria: Impacts to Parks

Measure: Impacts to parks, recreation areas and open space

The measure, impacts to parks, recreation areas, and open space, quantifies the amounts of these resources, in acres, that would be potentially directly impacted by each alternative. NFTA's consultant team calculated the values of this measure using GIS analysis, based on the location of the resources as identified by mapping provided for the Township of Amherst. It is based the location of the proposed guideway and ROW need relative to the location of parks, recreation, and open space resources (codes 500 – Recreation and Entertainment and 900 – Wild, Forested, Conservation Lands & Public Parks). It measures the areas of parks, recreational land and open space in terms of total number of acres of these resources within the footprint (guideway and ROW need) of an alternative. The tables below describe the parks rating scale as well as the impact calculations and ratings.

Table 58 Parks Rating Scale

Rating Category	Number
High	16+
Medium-High	11 -15
Medium-Low	6 - 10
Low	0 – 5

Table 59 Impacts to Parks, Recreation Areas and Open Space

Alternative	Impacts to Parks, Recreation Areas and Open Space (acres)	Rating
Niagara Falls Blvd LRT 1	0.0	High
Millersport Hwy LRT 1	0.0	High
Niagara Falls Blvd BRT 1	0.4	Medium-High
Millersport Hwy BRT 1	0.0	High
Niagara Falls Blvd Preferred Bus	0.2	Medium-High
Millersport Hwy Preferred Bus	1.0	Medium-High
Enhanced Bus	N/A	

4.5.3 Criteria: Property Impacts

Measure: Number of properties affected

The measure, number of properties affected, quantifies the number of properties potentially directly impacted by each alternative. NFTA's consultant team calculated this number in GIS by overlaying each alternative and ROW need on parcel maps and calculating the number of individual parcels within the footprint of each alternative. The tables below describe the rating scale for property impacts as well as the calculated values and ratings.

Table 60 Affected Properties Rating Scale

Rating Category	Number
High	16+
Medium-High	11 -15
Medium-Low	6 - 10
Low	0 – 5

Table 61 Number of Properties Affected

Alternative	Number of Properties Affected	Rating
Niagara Falls Blvd LRT 1	211	Medium-Low
Millersport Hwy LRT 1	194	Medium-High
Niagara Falls Blvd BRT 1	305	Low
Millersport Hwy BRT 1	201	Medium-Low
Niagara Falls Blvd Preferred Bus	299	Medium-Low
Millersport Hwy Preferred Bus	184	Medium-High
Enhanced Bus	N/A	

5. TIER 3 SCREENING RESULTS & DECISION METHODOLOGY

The results of the Tier 3 screening are described in this section.

5.1 Tier 3 Screening Results

The quantified data for each criteria measure and each alternative are presented in the tables in Section 4 of this technical memorandum. This data and the Tier 3 screening process are based on the current understanding by NFTA's consultant team of the transportation needs within the study area, the data that was available at the time of the screening including the level of engineering undertaken, and relies on guidance provided by the FTA regarding the analysis of alternatives, on NEPA environmental review, and the FTA New Starts program evaluation and rating processes.

The consultant team scored the data within each measure using color-coded scoring of high (**green**), medium-high (**blue**), medium-low (**yellow**) and low (**red**) in terms of relative performance of a measure. The team calculated quartiles for how the scoring (within a measure) should be allocated—meaning what data values are high, medium-high, medium-low or low. The scored data appear in **Table 62** and the symbols used to representing the rating scale are shown below:

High

Medium-High

Medium-Low

Low

Table 62 Scored Results of the Tier 3 Evaluation Matrix

Criteria	Measures	Tier 3 Alternatives						
		Niagara Falls Blvd LRT	Millersport LRT	Niagara Falls Blvd BRT	Millersport BRT	Niagara Falls Blvd Preferred Bus	Millersport Preferred Bus	Enhanced Bus
Cost Parameters, Operations, and Right of Way Needs	Private Land Area Affected by Guideway (acres)	●	◎	□	◎	●	◎	◎
	Capital Cost ($M)	△ $1,594	△ $1,538	● $430	● $238	◎ $94	◎ $63	◎ $18
	Operating and Maintenance Cost ($M annual)	△ $15.8	□ $12.5	● $ 9.5	● $7.3	△ $15.2	□ $11.4	□ $14.2
	Comparative Revenue ($M annual)	◎	●	●	●	●	□	△
	Percent Mixed Traffic Operations	◎	◎	◎	●	△	△	△
	Percent Signalized Intersections of Total Intersections	●	□	●	●	●	●	N/A
Ridership and Market	2035 Project Boardings (Average Weekday)	◎	◎	◎	●	●	●	△
	2035 Total Boardings by Zero Car HH (Average Weekday)	◎	●	●	●	●	●	□
	UB Ridership Forecast (Average Weekday)	◎	◎	◎	◎	◎	●	□
	Forecasted Park and Ride Patrons, 2035	●	◎	△	△	△	△	N/A
	VMT Decrease from No-Build	◎	◎	●	●	□	●	△
	2035 Employment Served - 1/2 mile station radius	●	△	●	□	●	□	N/A
	2035 Population Served - 1/2 mile station radius	□	□	●	□	●	□	N/A
	Commercial Retail Area Served (acres) - 1/2 mile station radius	●	□	◎	□	◎	□	N/A
System Connectivity	Access to Activity Centers (number served)	●	△	●	△	●	△	△
	Number of Park and Recreation Areas Served	□	●	□	●	□	●	△
	Minimum Number of Transfers Required	◎	◎	●	●	●	●	●
	Connecting NFTA Bus Routes	●	□	●	◎	●	◎	N/A
	Travel Time between UB South - UB North (min)	●	◎	□	●	□	●	△
	Travel Time between Allen Medical Campus and UB-North (min)	◎	◎	□	●	□	●	□
	Travel Time between Utica Station and CrossPoint (min)	◎	◎	□	●	△	□	△
Support for TOD/Redevelopment/Land Use	Consistency with Local and Regional Plans and Strategies	◎	●	□	●	□	●	△
	Number of Stations with Transit Supportive Zoning (area within 1/2 mi. station radius; total of high and medium rated stations)	●	□	◎	□	◎	□	N/A
Environmental and Community Impacts	Floodplains (acres)	●	△	□	△	□	△	N/A
	Wetlands (acres)	●	●	□	●	●	●	N/A
	Streams (feet)	◎	□	△	●	□	●	N/A
	Impacts to Parks, Recreation Areas, Open Space (acres)	◎	◎	●	◎	●	●	N/A
	Number of Affected Properties	□	●	△	□	□	●	N/A

5.2 Selection of Locally Preferred Alternative

The next step in the Alternatives Analysis process is for NFTA to use the evaluation matrix in conjunction with agency goals and objectives and public input to decide upon on a Locally Preferred Alternative.

Metro Rail Expansion Project

LOCALLY PREFERRED ALTERNATIVE REFINEMENT TECHNICAL REPORT

January 2019

NFTA-METRO

Contents

Figures

Tables

Appendix

1. Introduction

The Niagara Frontier Transportation Authority (NFTA) completed an Alternatives Analysis (AA) in the fall of 2012 along with study partner, the Greater Buffalo Niagara Regional Transportation Council (GBNRTC). The overall goal of the Transit Options Amherst-Buffalo project was to evaluate a range of high quality transit service alternatives to improve transit access between key activity centers in Buffalo and Amherst and provide enough information to support the recommendation of a locally preferred alternative (LPA) and enable the local Metropolitan Planning Organization (MPO) to adopt the LPA as part of the long-range transportation plan.

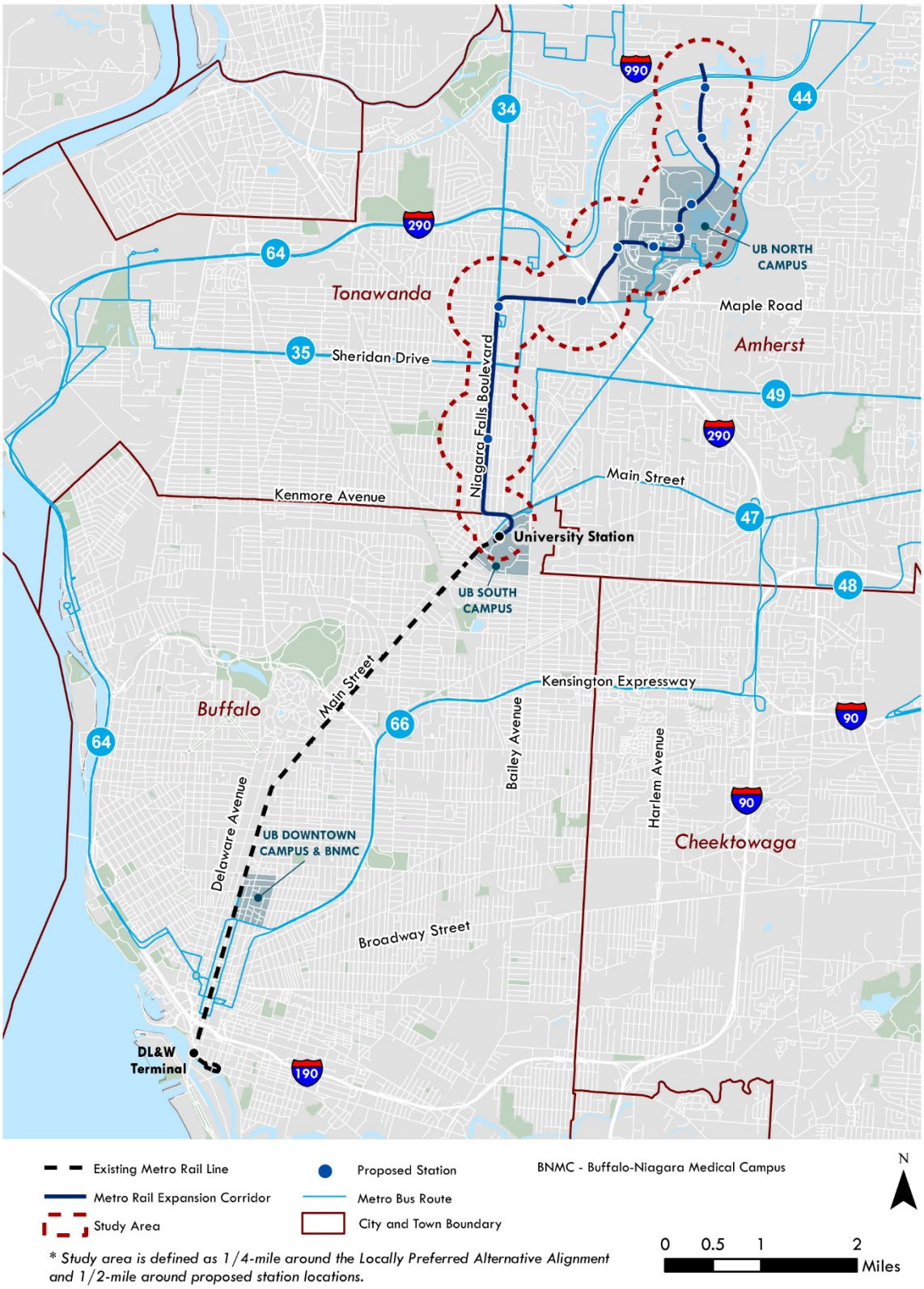
The Metro Rail line is depicted in **Figure 1**. The Metro Rail Expansion study area includes an existing street network and transit service network. The transportation system in the corridor serves a diversity of land uses and activities ranging from the waterfront to the urban center of Downtown Buffalo and the Buffalo Niagara Medical Campus (BNMC), to sporting and entertainment venues, to the large and expanding UB campuses and other colleges, to older established residential neighborhoods and emerging commercial and employment centers.

The AA involved a three-tiered approach which established screening methodology and selection criteria. A Project Steering Committee (PSC) and Project Advisory Committee (PAC) and a robust public participation plan were established to help guide the study and provide input and feedback from community stakeholders. During the study, four public information meetings were held as well as over 75 staff level meetings and presentations to community organizations and stakeholders.

At the onset of the study, thirty-six alternatives were identified as part of a long list for evaluation in Tier 1. The long list consisted of four modes, Light Rail, Bus Rapid Transit, Preferential Bus and Enhanced Bus along with three main alignments south of UB North along Niagara Falls Boulevard, Bailey Avenue, and Millersport Highway. The thirty-six alternatives were narrowed down based on those that could be reasonably built and would not have a significant impact on the community or environment. The result of Tier 1 was fifteen remaining alternatives to be refined and evaluated in more detail in Tier 2.

During the second tier of the AA, conceptual level engineering was applied to the remaining alternatives. The alternatives were also subjected to quantitative assessment and compared across modes to determine the best performing. The result of the Tier 2 analysis was seven alternatives to advance to the third and final evaluation tier.

Figure 1: Metro Rail Expansion Study Area



The third tier of the AA applied measurable categories of evaluation including land use, mobility and cost effectiveness to the remaining seven alternatives. Measurable criteria for each category included travel time, employments served, number of activity centers, operating and maintenance costs, capital cost, growth locations served, projected ridership including University at Buffalo boardings, and operating revenue. The 2015 AA recommended the "Niagara Falls Blvd Alternative 1" from University Station to Crosspoint, as the LPA. Prior to the completion of the AA, the final LPA identified that the I-990 (Lockport Expy)/Audubon Parkway interchange would be the logical termini.

After reviewing the technical results of the AA and considering feedback from the Project Committees and the public, NFTA recommended the Niagara Falls Boulevard LRT alternative as the strongest alternative to advance as the LPA for the Metro Rail Expansion project. The LPA was generally defined as extending light rail from the existing Metro Rail terminus at University Station, extending underground along Bailey Avenue to a portal on Eggert Road where it would continue at grade on Niagara Falls Boulevard to Maple to Sweet Home Road, onto and through UB North Campus to Audubon Parkway where it would terminate near the I-990 interchange.

The GBNRTC initiated a Comprehensive Transit-Oriented Development (TOD) planning effort in the Fall of 2016 as a complement to the AA work. Due to public and local agency feedback during the TOD study, NFTA decided to re-evaluate the southern portion of the LPA alignment. Specifically, two options are being considered. From University Station, the LPA could travel along Bailey Avenue to Eggert Road or along Kenmore Avenue and Niagara Falls Boulevard to a common point at the intersection of Eggert Road and Niagara Falls Boulevard, where the alignment would follow the adopted LPA to the interchange of I-990 and Audubon Parkway. These two alignment options (Bailey Avenue as the LPA and Kenmore Avenue as the refined LPA) are presented in Figure 2 and Figure 3, respectively.

1.1 DOCUMENT PURPOSE

This technical report outlines the evaluation of the LPA options (Bailey Avenue versus Kenmore Avenue). Section 2 outlines the evaluation methodology including the evaluation criteria and metrics. Sections 3 and 4 describe each of the LPA refinement options, outlining opportunities and constraints of each alignment option along with an overall discussion of how the alignment options fared against evaluation criteria/ metric. Section 5 presents the evaluation results and recommendation. The refined LPA will be further evaluated in comparison to a No Build Alternative under the National Environmental Policy Act (NEPA) and State Environmental Quality Review Act (SEQRA).

Figure 2: Bailey Avenue Alignment Option

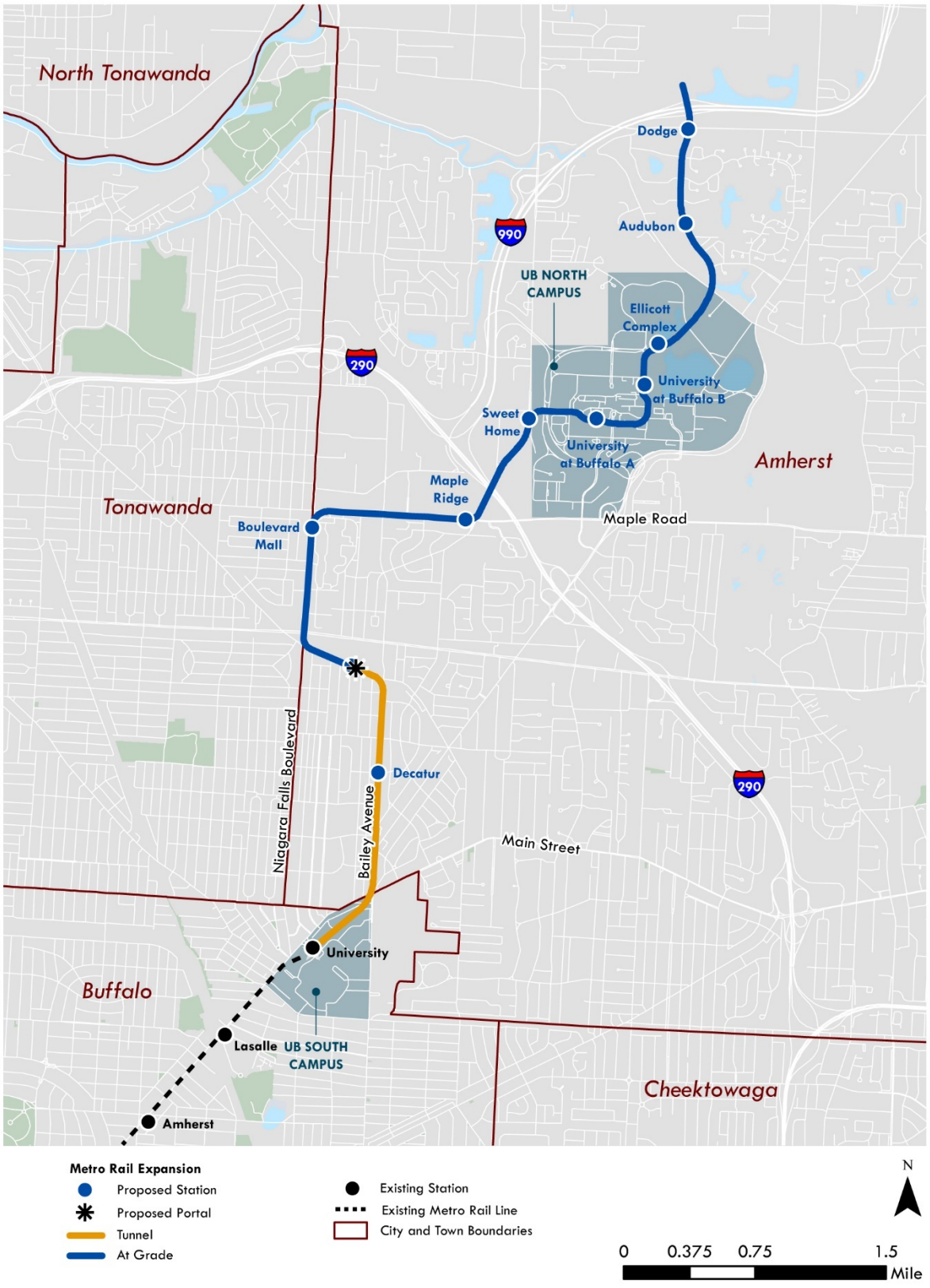
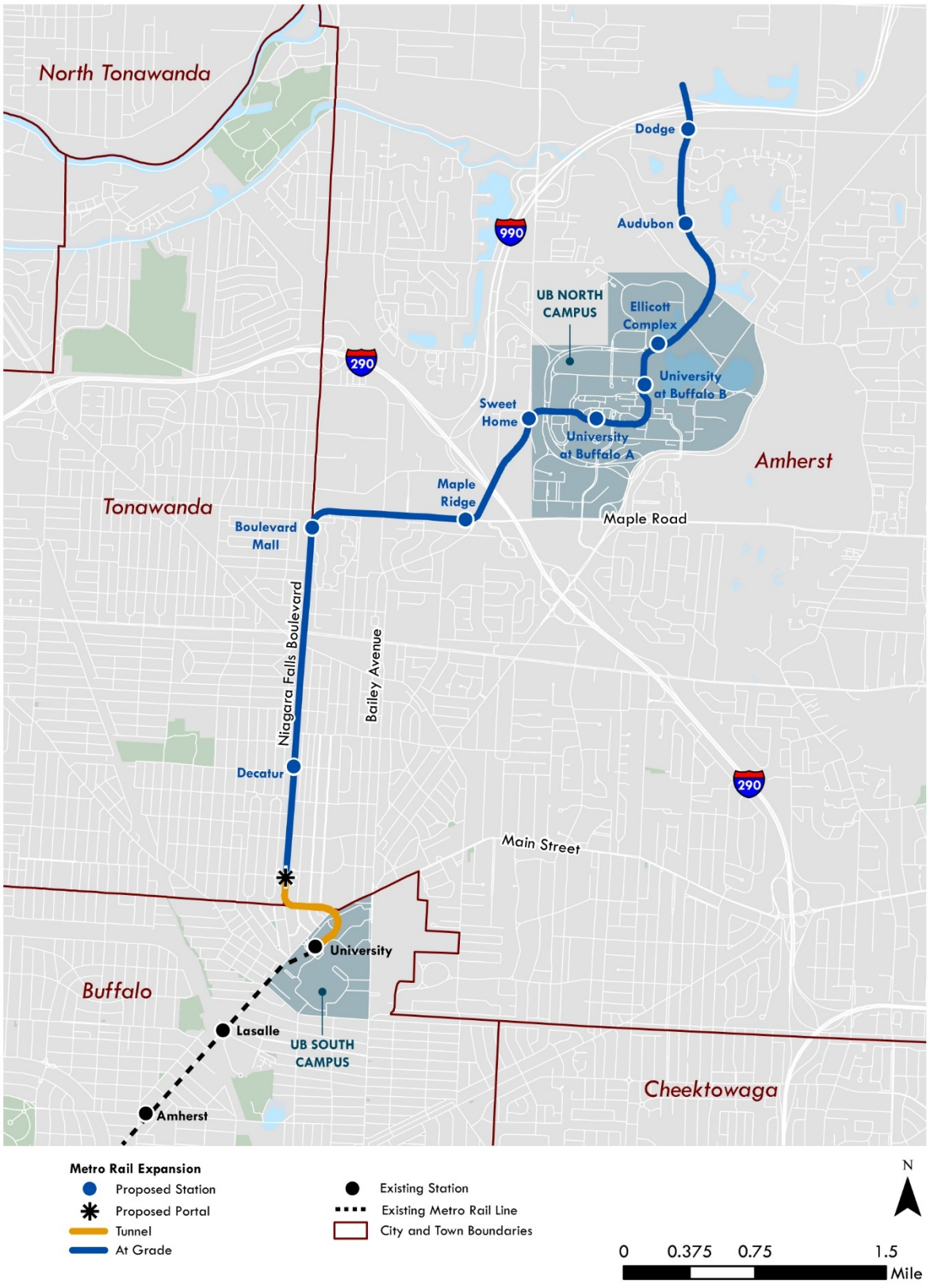


Figure 3: Kenmore Avenue Alignment Option



2. Refinement Methodology

A series of evaluation criteria and metrics were developed for the evaluation of the two alignment options. These evaluation criteria/metrics are in line with the Purpose and Need for the project. The Technical Advisory Committee (TAC), consisting of NFTA staff, key stakeholders, and municipal entities provided input in the decision-making process, which was led by the Steering Committee of internal staff from NFTA and GBNRTC.

2.1 EVALUATION CRITERIA AND METRICS

NFTA, with guidance from the TAC, established evaluation criteria and metrics to evaluate the two alignment options. Data sources for the evaluation metrics were derived from available GIS data, the Alternatives Analysis, and NFTA produced data, as well as stakeholder input. Table 1 presents these evaluation criteria metrics, based on cost, constructability, travel time, community and economic development, municipal coordination, ridership, accessibility traffic, environmental, safety, and connectivity. The alignment options were evaluated based on the evaluation matrix to determine the best alignment to move forward – Bailey Avenue or Kenmore Avenue. A fully complete evaluation matrix is found in Attachment A.

Table 1: Evaluation Criteria and Metrics

Category	Evaluation Criteria	Evaluation Metrics
Order of Magnitude Costs	Difference in tunneling length	Minimize the cost of tunneling (based on linear feet of tunneling)
	Number of underground stations	Minimize cost of station (based on number of at-grade and underground stations)
	Purchase of ROW	Minimize cost of right-of-way (ROW) needed for purchase to accommodate Metro Rail running outside of ROW (based on acres of ROW easement)
		Minimize cost for easements to accommodate Metro Rail running outside of ROW (based on acres of ROW easement)
		Minimize cost of ROW needed for easement to accommodate Metro Rail running inside ROW to account for station areas and/or intersection widenings (based on acres of ROW easement)
	O&M Costs	Minimize cost of Operations & Maintenance
Overall Constructability	Availability of contractors	Availability of local contractors that can perform work
	Schedule / Length of construction	Minimize construction schedule
	Impacts to traffic and business operations	Minimize temporary street and/or driveway closures
	Utility conflicts	Minimize utility relocations and reconstruction

Category	Evaluation Criteria	Evaluation Metrics
	ROW impacts	Amount of private property impacted (either by purchase or easement) to accommodate project
Travel Time	Length of time Metro Rail travels from I-990 to University Station	Minimize travel time (in minutes)
Community / Economic Development	Transit-supportive elements in place or can be put in place (zoning, policy, community support, plans, etc.)	Maximize existing transit supportive zoning
	Opportunity for Transit Oriented Development	Opportunity for TOD zoning to be approved
Municipal Coordination	Local and regional stakeholder preference / acceptance	Preferred alignment option of Town of Amherst
		Preferred alignment option of Town of Tonawanda
		Preferred alignment option of other regional, municipal, or other stakeholder entities
Ridership	Maximizes ridership	Maximizes ridership
Accessibility	Impacts to adjacent property (acres)	Minimize number of driveways closed
		Minimize number of driveways experiencing reduced accessibility (in-ability to make a left turn)
	Accessibility by transit supportive populations	Number of transit dependent population within ½ mile radius of station areas
Traffic	Change to existing travel patterns	Minimize in travel distance or durations for local trips
	Impact to AM/PM Peak period volumes	Minimize increases in Peak period daily volumes (comparing no-build to build)
	Impact to Level of Service	Minimize reductions in LOS of project in build versus no-build
	Impacts to intersection LOS	Minimize reductions of intersection LOS in build versus no-build
Environmental	Minimizes impact on natural and human environments	Minimize acres of environmentally sensitive areas impacted by project
	Ability to reduce auto-dependency	Reduces vehicle miles travelled based on regional travel demand model

Category	Evaluation Criteria	Evaluation Metrics
	Noise sensitive land uses within proximity to alignment	Minimizes impact to noise and vibration sensitive land uses
Safety	Passenger access to station	Minimize distance to station platform from nearest sidewalk
	LRT/vehicular traffic intermixing	Minimize the conflicts of LRT intermixing with general vehicles
Connectivity	Connections with Metro Bus	Improve connectivity to Metro Bus
	Multi-modal opportunities	Improve Metro Bus route transfers
	Increase pedestrian and bicycle connectivity	Improve walkability within ¼ mile of proposed stations
		Improves bicycle lanes within ¼ mile of proposed stations
		Improve pedestrian and bicycle usage-ability to provide connectivity with multi-modal

2.2 QUALITATIVE SCORING

Using a 5-tier system, as presented in Table 2, each alignment option was qualitatively evaluated based upon the evaluation metrics. This process did not provide a total numerical score, but rather portrays which alignment options conform best to the evaluation metric. The Steering Committee reviewed these results and decided on a refined LPA, based on the alignment option that best meets all of the evaluation metrics.

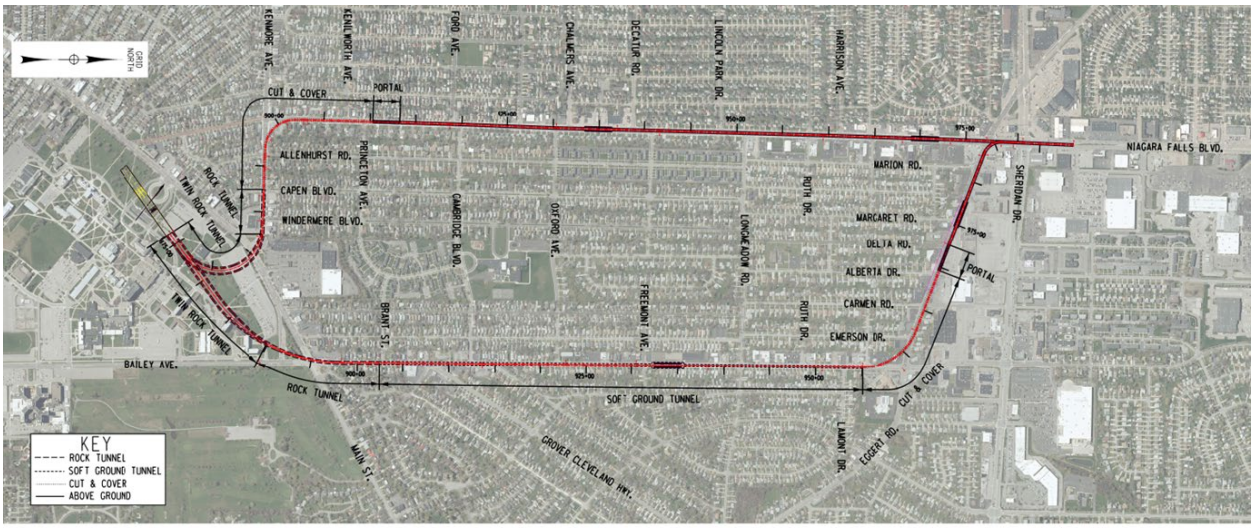
Table 2: 5-tier ranking

	Alignment option fully conforms to criteria/ metric
	Alignment option mostly conforms to criteria/ metric
	Alignment option partially conforms to criteria/ metric
	Alignment option minimally conforms to criteria/ metric
	Alignment option does not conform to criteria/ metric

3. Refinement of LPA

Utilizing efforts from the 2012 Alternatives Analysis, conceptual designs were developed to provide input for the evaluation criteria/metrics. The conceptual analysis utilized known geotechnical data relating to soil/ground conditions in order to locate the existing rock line to have an understanding of the type of tunnel construction (rock or soil) needed. Figure 4 depicts the plan view of the two options that conceptual engineering was conducted on.

Figure 4: Alignment Options Constructability



3.1 BAILEY AVENUE ALIGNMENT OPTION

Figure 5 depicts the alignment exiting the existing underground University Station, as two individual tunnels, utilizing the existing two tail tunnel, and merging into one larger tunnel with a center dividing wall in a 50mph design curve.

Figure 5: University Station / Bailey Avenue Curve

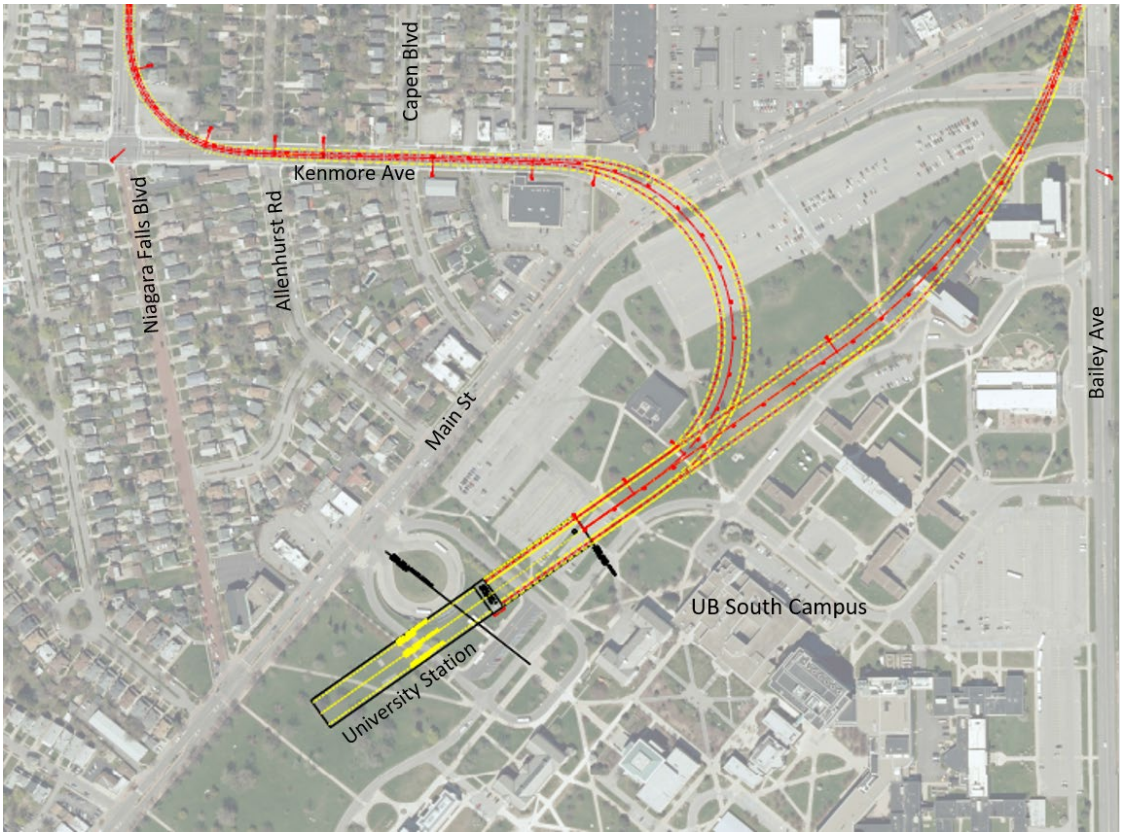


Figure 6 depicts how the single tunnel would be located underneath Bailey Avenue. This segment of the alignment would be constructed utilizing rock tunneling. As the alignment crosses Brant Street, the rock line would end and soft tunneling would be utilized until the alignment nears Eggert Road. Figure 7 depicts the geotechnical profile along the alignment, identifying how the rock line drops at Brant Street. An underground station would be located near Freemont Avenue, which would require purchasing a property for the station facility and providing bicycle and pedestrian connections.

Figure 6: Bailey Avenue Tunnel

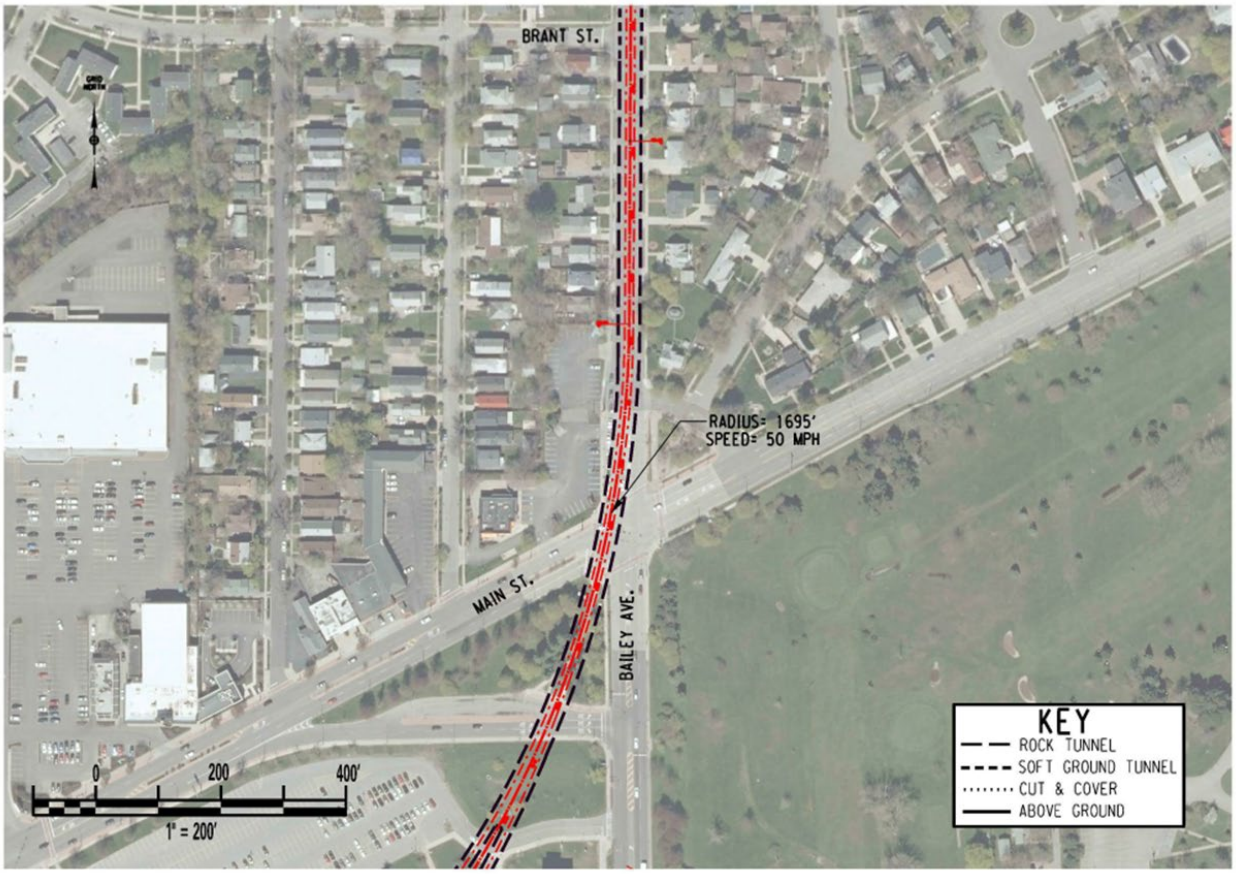
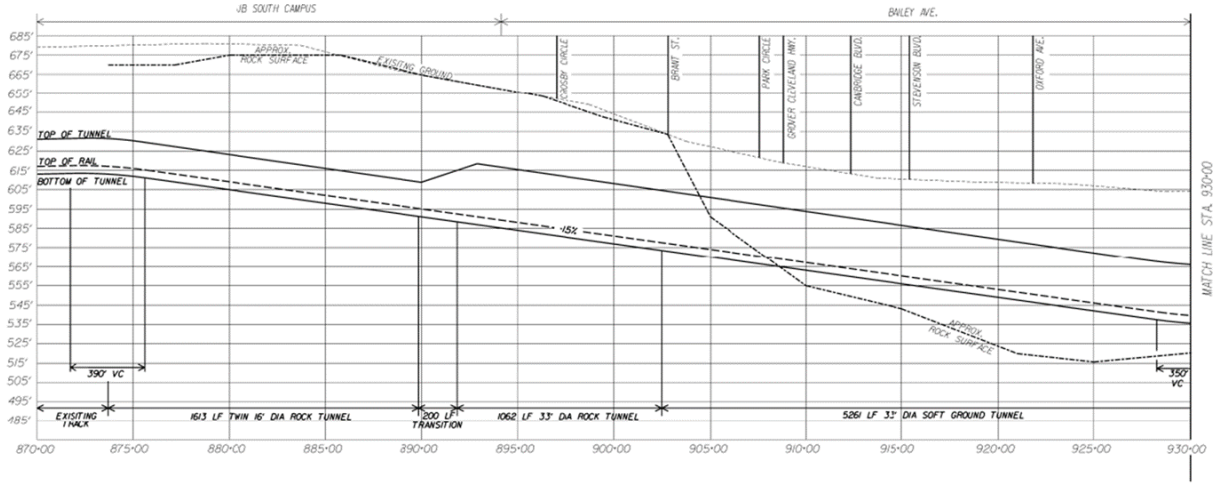


Figure 7: Bailey Avenue Geotechnical Profile



Vertical access to the underground platforms would be located within the station facility. In addition, tunnel ventilation would be required at the underground platforms and throughout the tunnel segment, along with vertical emergency egress between stations.

Just south of the intersection of Bailey Avenue and Betina Avenue, as the tracks begin the rise to the surface at the portal, the construction method would switch from soft ground tunneling to cut and cover construction. Figure 8 depicts two design curves, a 50-mph curve and a 40-mph curve, both requiring cut and cover construction. Under the 50-mph curve, multiple properties would be impacted, whereas the 40-mph curve would only impact two properties. With the alignment entering or exiting the proposed at-grade station on Eggert Road, the light rail vehicle would be required to either slow down or begin accelerating, thus not being able to maximize its operating speed. Therefore, a 10-mph difference does not drastically affect travel times. Utilizing a 40-mph curve would reduce impacts and still provide fast and reliable transit service. With the portal location being near Alberta Drive, the LRT system will need to begin ascending at an approximately 4% grade, as shown in Figure 9.

Figure 8:Bailey Avenue / Eggert Road Curve

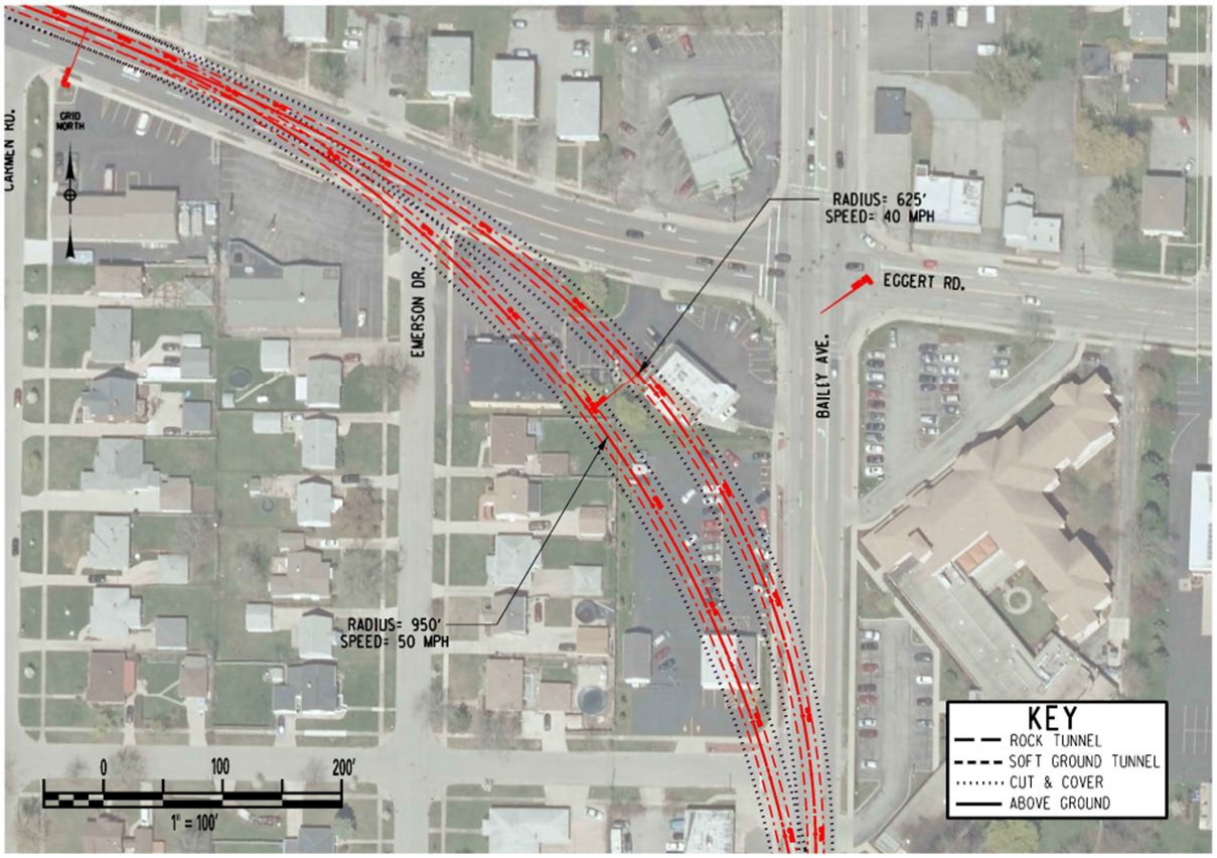
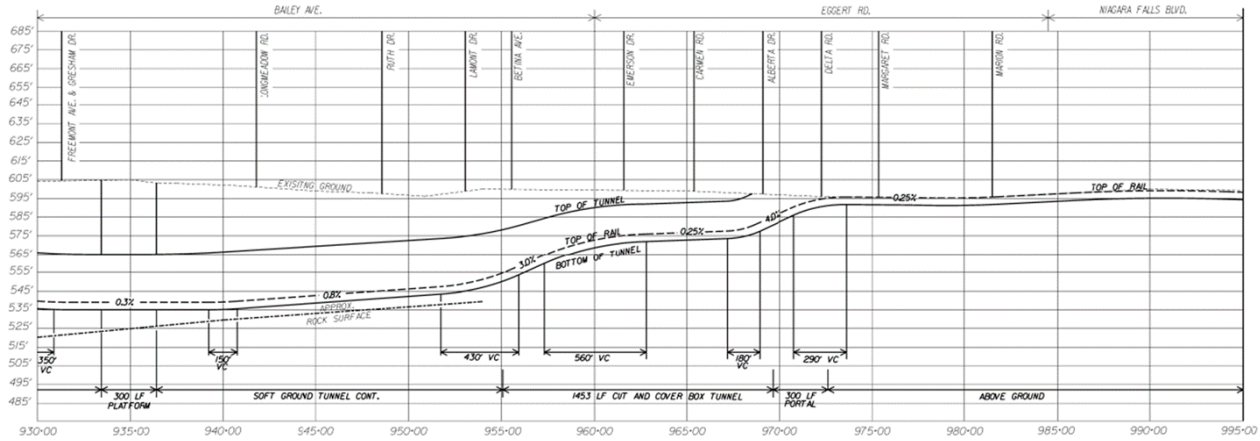
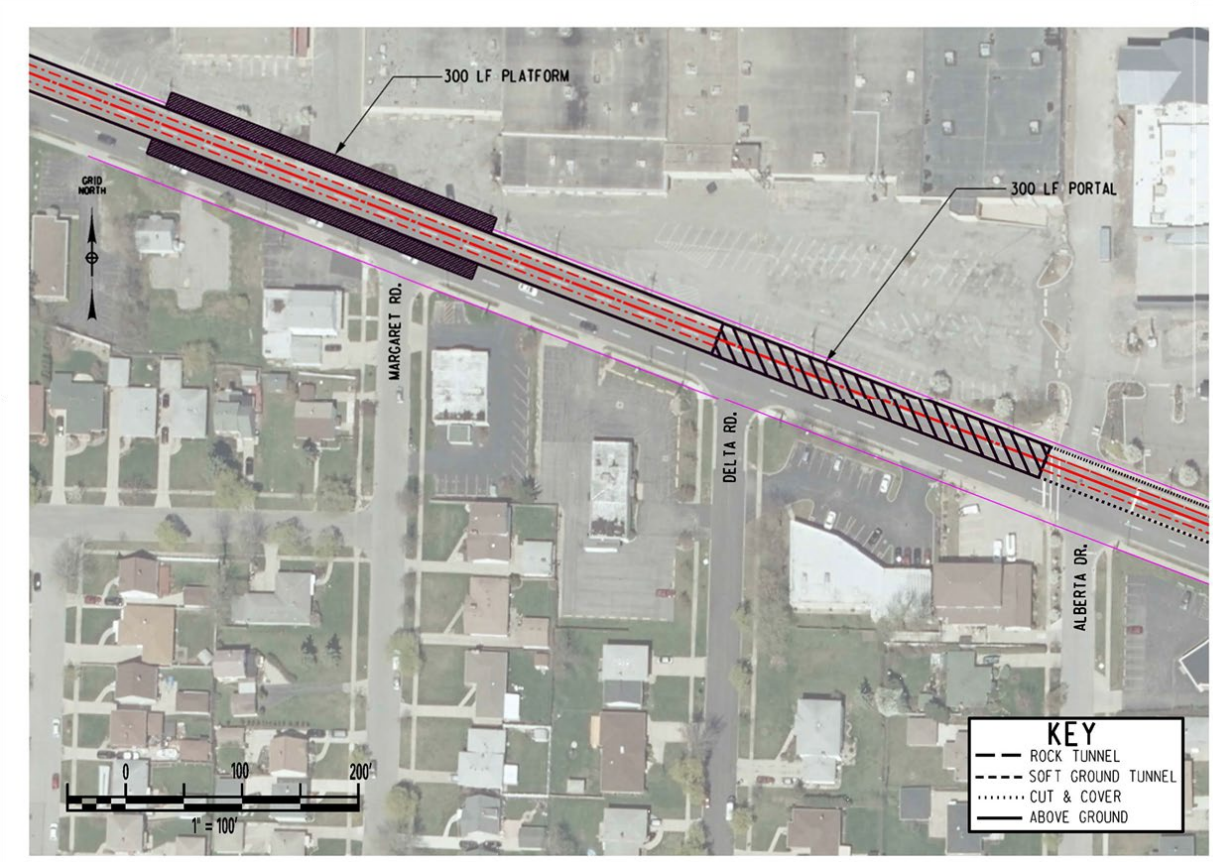


Figure 9: Eggert Road Geotechnical Profile



The portal would be located between Alberta Drive and Delta Drive, with a proposed at-grade station at Margaret Road, as depicted in Figure 10.

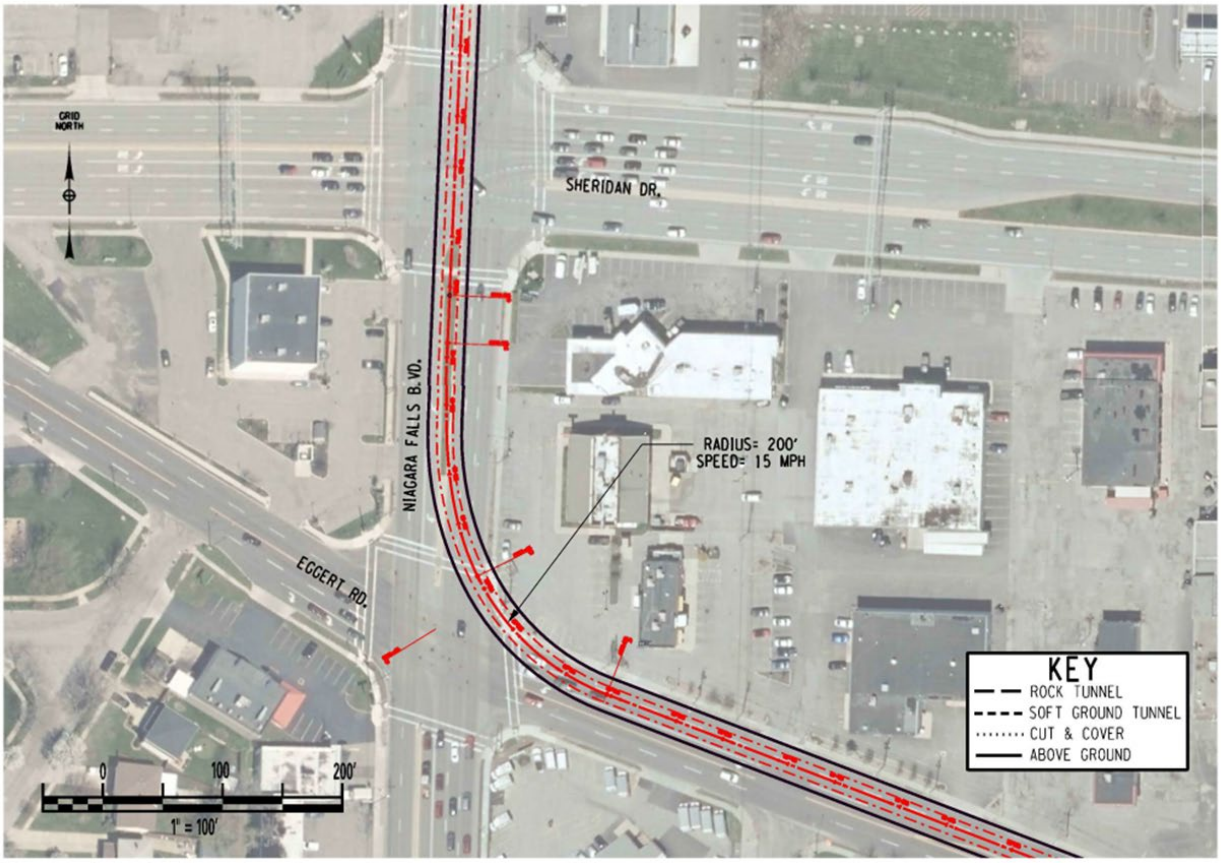
Figure 10: Eggert Road Portal and At-Grade Station



As the alignment transitions from Eggert Road to Niagara Falls Boulevard at-grade, there are physical constraints on the northeast corner, as well as an increase in travel lanes on Niagara Falls

Boulevard. The corridor north of Eggert Road changes in both land use types and vehicular volumes. In order to minimize property impacts, the at-grade alignment would need to operate on a 15-mph curve as shown in Figure 11, which is not very conducive for light rail operations. This tight curve would impact travel times and increase the cost for operations and maintenance, as well as introduces wheel squeal concerns. Current NFTA design criteria prohibits curves on mainline revenue track with design speeds less than 40 mph. Under this design scenario, a design exception would be required.

Figure 11: Eggert Road / Niagara Falls Boulevard Curve



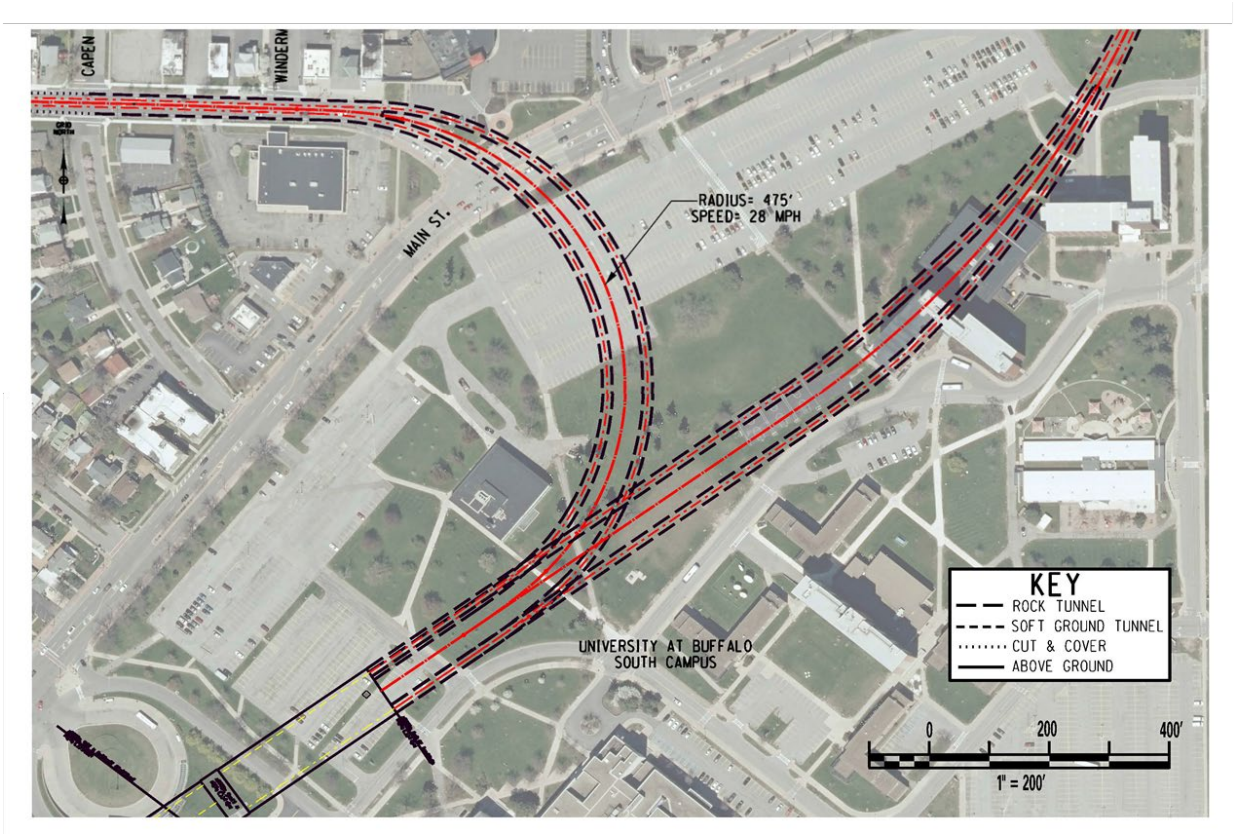
Once the alignment enters the median of Niagara Falls Boulevard north of Eggert, the alignment would be located along Maple Road, Sweet Home Road, through the University at Buffalo North Campus, and along Audubon Parkway to the end of line at I-990.

3.2 KENMORE AVENUE ALIGNMENT OPTION

Based on stakeholder input, analysis of an alignment option that exits the University Station and enters Niagara Falls Boulevard earlier than Eggert Road was requested to be investigated. As with the Bailey Avenue alignment option transitioning from Eggert Road to Niagara Falls Boulevard, the curve exiting the University Station would require a design exception since the curve would need to be a 28-mph curve in order to traverse under Kenmore Avenue; as shown in Figure 12. However, the benefit to a tighter curve at this location, compared to the curve from Eggert Road to Niagara Falls

Boulevard, would be the proximity to a station. As the vehicle travels southbound towards the University Station, the vehicle would normally have to decelerate as it nears the station to stop at the station. Therefore, the vehicle would begin decelerating earlier to enter the curve and continue to decelerate as it continues through the curve and enters the station. For the northbound route, as a vehicle exits a station it needs to accelerate to achieve normal operating speeds. Under this situation, the vehicle will accelerate at a lower rate to traverse through the curve.

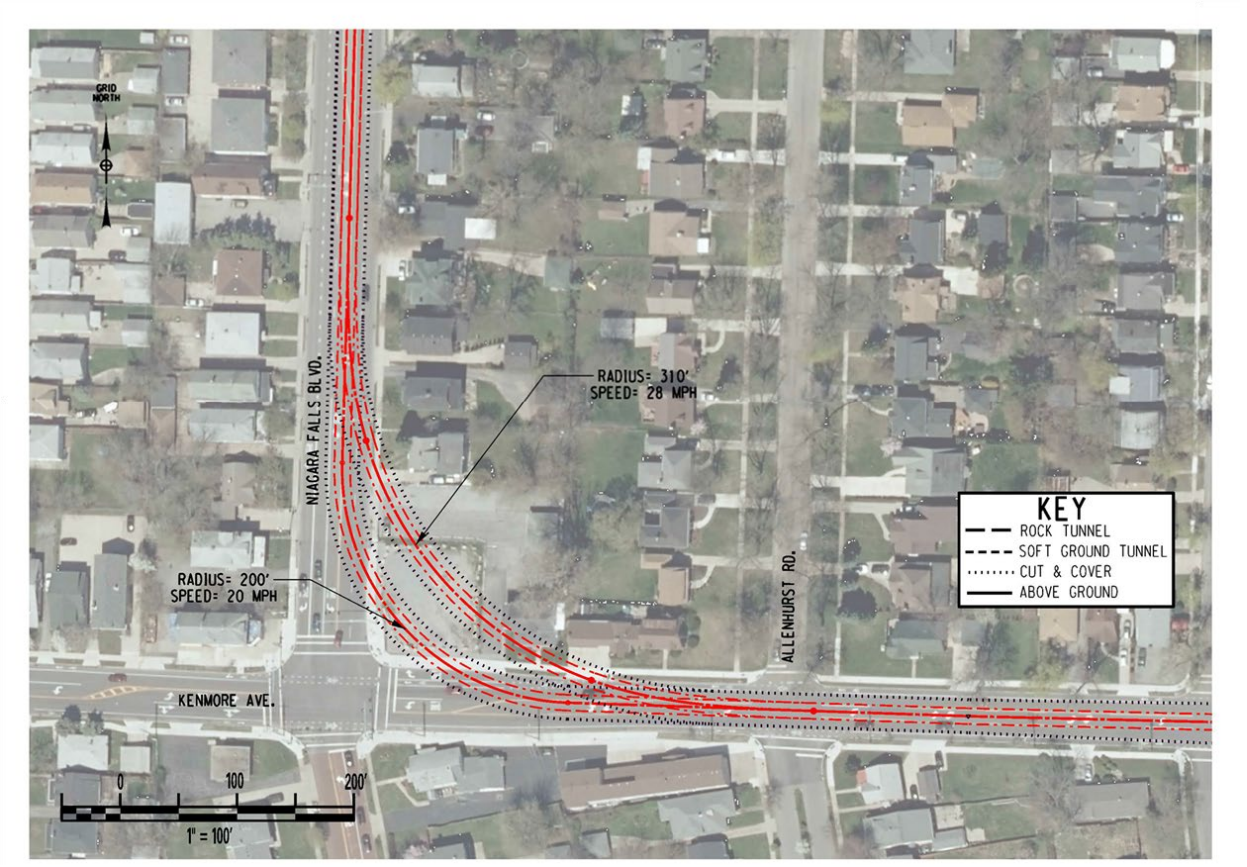
Figure 12: University Station / Kenmore Avenue Curve



Since this alignment traverses for approximately 3,400 linear feet underground, the construction method would be a combination of traditional underground rock excavation (blasting) and shallow cut and cover construction. Due to a shorter length of rock tunneling required (the location of the rock line is between Capen Boulevard and Allenhurst Road) and the need to merge the two tunnels into a single tunnel at the transition to cut and cover, a boring construction method would not be applicable and traditional mining methods would be more cost efficient. Once past Allenhurst Road, traditional cut and cover construction would occur along both Kenmore Avenue and Niagara Falls Boulevard.

As the alignment traverses onto Niagara Falls Boulevard, via cut and cover, the preferred curve would again be a 28-mph design curve. This curve would impact two to three properties, as shown in Figure 13. Two of the properties on the northeast corner could be acquired by the Town of Amherst to provide access for temporary construction, and then providing community space or development opportunities once construction is complete.

Figure 13: Kenmore Avenue / Niagara Falls Boulevard Curve



The location of the portal on Niagara Falls Boulevard would be just north of Kenilworth Avenue and Princeton Avenue, as shown in Figure 14. The reason for this location is that there is an emergency response station on Kenilworth Avenue and it is highly preferable for that intersection to operate as a full access intersection.

Figure 15 depicts the profile of the alignment, the location of the rock line, and portal location. From this point north, the alignment would operate in the median of Niagara Falls Boulevard. Under this scenario, it is assumed that one travel lane in each direction along Niagara Falls Boulevard could be eliminated in order to account for median running light rail, as shown in Figure 16 and Figure 17. Further traffic analysis will be conducted as part of the environmental documentation process to determine impacts and mitigation measures as well as assist with further design work.

Figure 14: Niagara Falls Boulevard Portal Location

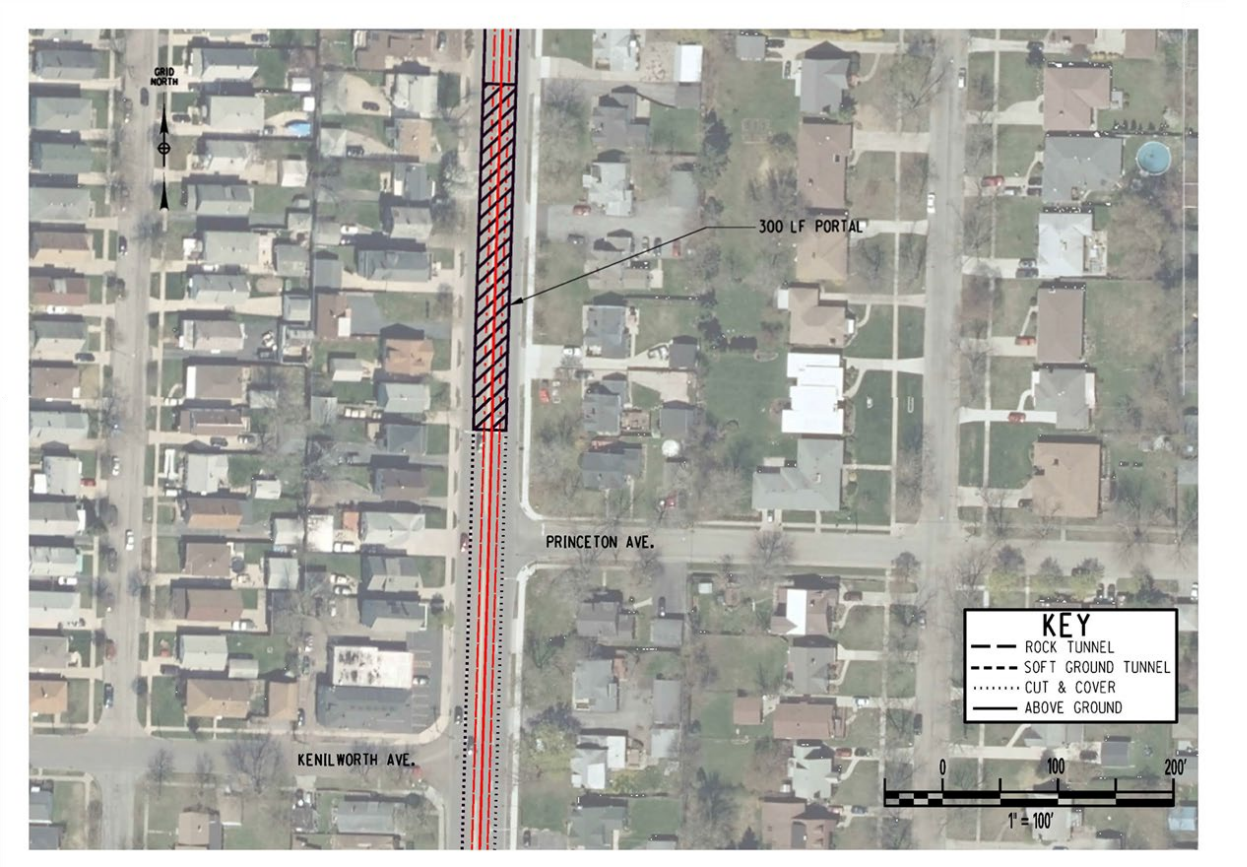
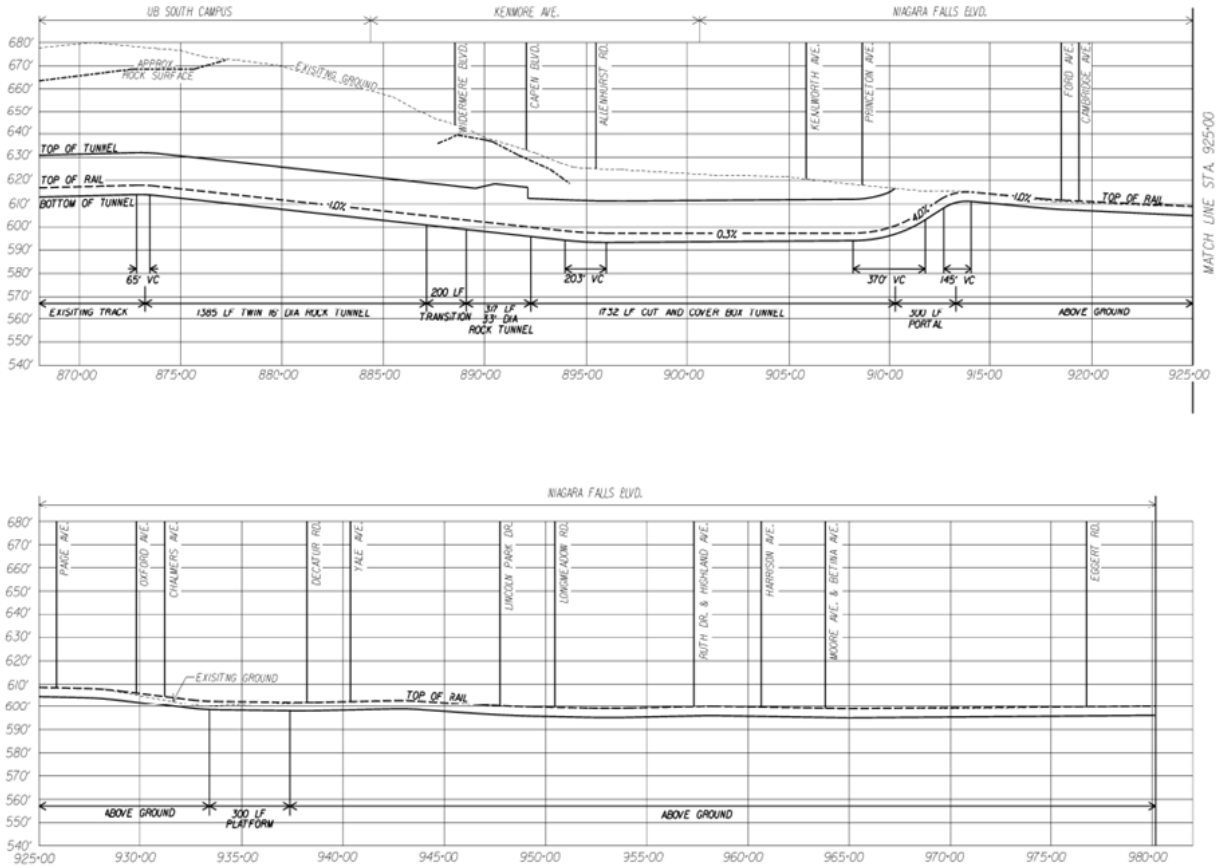


Figure 15: Niagara Falls Boulevard Profile



4. Evaluation Results

4.1 RESULTS FROM ALIGNMENT EVALUATION

The evaluation discussed in Section 2 above concluded that the Kenmore Avenue to Niagara Falls Boulevard option has more benefits with fewer impacts than the originally identified LPA. Many of the evaluation criteria categories resulted in similar grades between the two alignment options. Results per category are as follows:

Order of Magnitude Costs

The 2015 AA LPA was estimated to cost $1.206 billion (in 2014 dollars).

Bailey Avenue Alignment Option: this alignment would contain approximately 10,000 linear feet of underground tunneling, require one underground station, and potentially impact up to four parcels (underground station, location of portal on Eggert Road, and the need for constructing the alignment curve at the intersection of Bailey Avenue and Eggert Road)

Kenmore Avenue Alignment Option: this alignment would contain approximately 4,000 linear feet of underground tunneling, and potentially impact up to three parcels (the need for constructing the alignment curve at the intersection of Kenmore Avenue and Niagara Falls Boulevard). The construction cost utilizing this option is estimated to be about $200 million less (2014 dollars), primarily due to the reduced tunneling and the replacement of the underground station with a surface station.

Overall Constructability

Bailey Avenue Alignment Option: this alignment would require the use of a boring machine due to the length of the tunnel in soft ground beneath the roadway. This would most likely require national contractors due to the need for specialized equipment. Tunnel construction and the underground station would also lengthen the construction duration.

Kenmore Avenue Alignment Option: since this alignment would contain much less of an underground segment, traditional construction methods would be utilized, thus reducing the length of construction and increasing the opportunities for local contractors. There would be an increase in potential utility relocations since cut/cover construction would be utilized for a majority of the alignment, thus impacting utilities since they are normally no deeper than six feet below ground level.

Travel Time

Bailey Avenue Alignment Option: Operating within a tunnel segment would provide the LRT vehicle to operate at maximum speed of 50mph, and 40mph through the Bailey Avenue/Eggert Road curve; however, the operating speed through the Eggert Road/Niagara Falls Boulevard curve would be

limited to 28mph or less in order to reduce ROW impacts. The alignment is also longer in length. Travel times from I-990 to University Station would be just over 22 minutes.

Kenmore Avenue Alignment Option: Due to the tight curves required for exiting University Station through Kenmore Avenue and onto Niagara Falls Boulevard, LRT would have to operate at 28mph, but once at-grade along Niagara Falls Boulevard could operate at 40mph. Due to the alignment being shorter, the travel time from I-990 to University Station would be just over 21 minutes.

Community / Economic Development

Bailey Avenue Alignment Option: The current zoning along this alignment provides approximately 13M sq. ft. of transit supportive uses. During the GBNRTC TOD Study, the Towns of Amherst and Tonawanda were concerned about possible supported for TOD development along Bailey Avenue due to the existing development patterns.

Kenmore Avenue Alignment Option: The current zoning along this alignment provides approximately 15M sq. ft. of transit supportive uses. During the GBNRTC TOD Study, the Towns of Amherst and Tonawanda support the need for TOD development, updating zoning ordinances, and expanding TOD opportunities along the entire length of Niagara Falls Boulevard. Since the completion of the TOD study, both Towns are engaging in reviewing and updating zoning to enhance TOD opportunities within the corridor.

Municipal Support

Bailey Avenue Alignment Option: The alignment has received limited support since the Alternatives Analysis was completed.

Kenmore Avenue Alignment Option: The alignment has received strong support and is the preferred alignment to move forward with through the environmental documentation process.

Ridership

Bailey Avenue Alignment Option: The FTA ridership model is currently being updated to incorporate recent NFTA and UB ridership to utilize a more recent update to the STOPS model. Within the GBNRTC Metropolitan Transportation Plan, there are approximately 33,800 people residing within ½ mile of the alignment in 2015 with very minimal growth projected by 2040.

Kenmore Avenue Alignment Option: Within the GBNRTC Metropolitan Transportation Plan, there are approximately 33,700 people residing within ½ mile of the alignment in 2015 with a slight increase to 34,000 projected by 2040.

Accessibility

Bailey Avenue Alignment Option: Since a majority of this alignment would be underground, the small segment that would operate along Eggert Road could potentially impact approximately 27 driveways. With the alignment operating within the median of Eggert Road, those driveways would not be closed, but drivers would need to conduct a U-turn at a signalized intersection for access. There are approximately 1,815 zero car households within a ¼ mile of the alignment.

Kenmore Avenue Alignment Option: Since this alignment operates at-grade along Niagara Falls Boulevard, there could potential be impacts to approximately 205 driveways. With the alignment operating within the median of Niagara Falls Boulevard, those driveways would not be closed, but drivers would need to conduct a U-turn at a signalized intersection for access. There are approximately 1,920 zero car households within a ¼ mile of the alignment.

Traffic

Bailey Avenue Alignment Option: In sections where the LRT would operate underground along Bailey Avenue, there would be no post construction impact to existing travel patterns, level of service (LOS) along Bailey Avenue, nor intersection operations other than providing pedestrian access to the underground station. In sections where the LRT would operate within the median of Eggert Road, there could be potential reduction of LOS at intersections along Eggert Road, left turn movements would need be protected movements at signalized intersections, with signal phasing adjusted to account for longer left turn movements. Prohibiting left turn movements along a corridor would require drivers to travel further, go around the block, or wait at signalized intersections to make a U-turn.

Kenmore Avenue Alignment Option: With the alignment along Kenmore Avenue operating underground, there would be no post construction impact to existing travel patterns, LOS along Kenmore Avenue, or intersection operations. As the alignment enters the median of Niagara Falls Boulevard near Kenilworth Avenue, there could be potential reduction of LOS at intersections along Niagara Falls Boulevard, and left turn movements would need be protected movements at signalized intersections, with signal phasing adjusted to account for longer left turn movements. Prohibiting left turn movements along a corridor would require drivers to travel further, go around the block, or wait at signalized intersections to make a U-turn.

Environmental

Bailey Avenue Alignment Option: There were no critical environmental areas, habitat areas, or surface/ ground water features found along this alignment.

Kenmore Avenue Alignment Option: There were no critical environmental areas, habitat areas, or surface/ ground water features found along this alignment.

Safety

Bailey Avenue Alignment Option: Some passengers accessing the underground station would be required to cross both travel lanes on Bailey since the entrance would be located on the western side of the street with a below grade mezzanine level. With an underground operation, there would be no conflicts with the general vehicles along Bailey Avenue. The station on Eggert Road would be at-grade and most likely within the median. Passengers would have to cross one direction of traffic to access the median station. Since the alignment operates at-grade for a portion of Eggert Road, the median operation would limit the conflict points with general vehicles to specific signalized intersections, which would contain gates, signals, and pre-emption to eliminate conflicts.

Kenmore Avenue Alignment Option: With an underground operation along Kenmore Avenue, there would be no conflicts with the general vehicles. The station on Niagara Falls Boulevard would be at-

grade and most likely within the median. Passengers would have to cross one direction of traffic to access the median station. Since the alignment operates at-grade for a major portion of Niagara Falls Boulevard, the median operation would limit the conflict points with general vehicles to specific signalized intersections, which would contain gates, signals, and pre-emption to eliminate conflicts.

Connectivity

Bailey Avenue Alignment Option: Connections to existing NFTA fixed bus routes would continue, and bicycle and pedestrian connections would be enhanced to access stations.

Kenmore Avenue Alignment Option: Connections to existing NFTA fixed bus routes would continue, and bicycle and pedestrian connections would be enhanced to access stations.

4.2 ALIGNMENT CONFIGURATION ASSESSMENT

A key element of where and how the alignment would operate and establish high-quality transit is the location within the roadway right-of-way (ROW). An important aspect of LRT operations is to provide exclusive guideway (i.e. not sharing lanes with other traffic) for rail. This goal may be achieved by:

- Widening the roadway cross-section to accommodate a transit guideway in addition to the existing travel lanes;
- Removing existing travel lanes to provide exclusive space for transit; or
- Utilizing existing right-of-way alongside the proposed corridor to provide an exclusive transit guideway.

To understand the most appropriate way to fit light rail in the Niagara Falls Boulevard, Maple Road, and Sweet Home Road corridors, an alignment assessment was conducted to determine the impacts of the potential alignment configurations.

4.2.1 Alignment Configuration Options

Light rail can achieve short travel time and reliable service when it operates in an exclusive or semi-exclusive guideway separated from vehicular traffic. The semi-exclusive guideway can be incorporated in a number of different configurations as shown in Figure 16 and described as follows:

Center-Running

- A center-running configuration is a semi-exclusive guideway located in the median of a roadway.
- Center-running guideway is separated from potential driveway conflicts.
- Left-turns across the center transit lanes are either restricted or accommodated at signalized intersections with separate phases to prevent conflicts with light rail vehicles.
- Stations with center-running guideway are easily accessed by pedestrians on both sides of the roadway using crosswalks.

- Examples of this configuration are in Charlotte, NC: Charlotte Area Transit System (CATS) LYNX Blue Line; Minneapolis, MN: METRO Green Line; Salt Lake City, UT: TRAX Red Line.

Parallel

- A parallel configuration is exclusive guideway fully separated but adjacent to the roadway.
- Stations in parallel guideway are easier to access from one side of the roadway than the other.
- Right-turning general vehicular traffic into driveways have potential conflicts with light rail vehicles running in exclusive guideway.
- Accommodations for bicycles should be designed to prevent conflicts with light rail vehicles.
- Example of this configuration is the TRAX Red Line in Salt Lake City, UT.

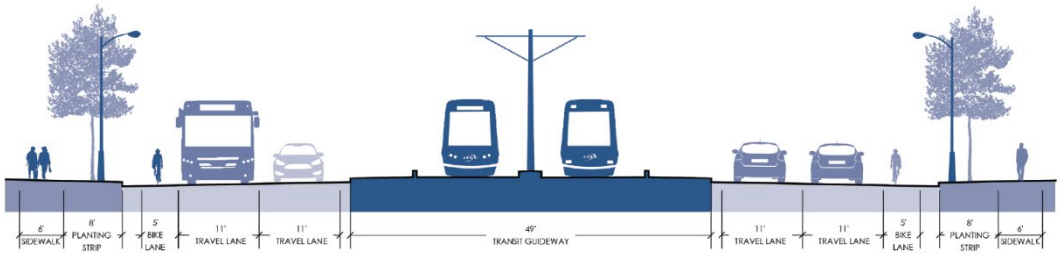
Independent

- An independent corridor is an exclusive guideway that is apart from a roadway and/or incorporated into a development.
- Accommodations for pedestrian and bicycle can be achieved with an adjacent multi-use path.

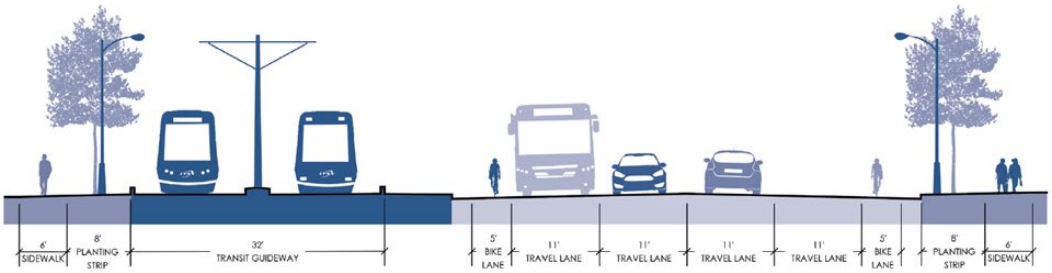
There are some examples of side-running (also referred to as curbside) configuration, which is an exclusive guideway located adjacent to both outside travel lanes. This configuration is typically seen in downtown environments, such as in Denver, CO with the RTD Routes D, F, H and L; Metro Rapid in Austin, TX; and TriMet in Portland, OR. Given the character and number of driveways on Niagara Falls Boulevard and Maple Road, side-running configuration was deemed inconsistent and removed from further consideration. Further traffic analysis will be conducted as part of the environmental documentation process to determine impacts and mitigation measures as well as assist with further design work.

Figure 16: Cross-Section Configurations

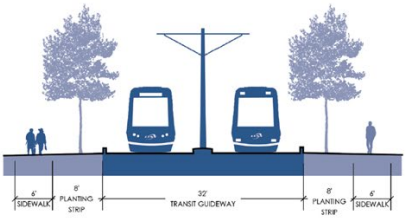
Center-Running



Parallel



Independent



4.2.2 Configuration Assessment

Consideration was given to the light rail configuration options to quantify the impacts and determine the most appropriate way for light rail to "fit" into the Niagara Falls Boulevard, Maple Road, and Sweet Home Road corridors.

Table 3: Configuration Assessment

Pros	Center-Running	Parallel	Independent
	• Separated from potential driveway conflicts in the subarea with the most driveways. • Stations with center-running guideway are easily accessed by pedestrians on both sides of the roadway through enhanced pedestrian crosswalks. • Encourages TOD development on both sides of the corridors.	• Separated from potential driveway conflicts on one side of the roadway.	• Opportunities for enhanced development within large parcels (such as Boulevard Mall). • Separated from vehicular traffic; stations can be located in pedestrian and bicycle friendly environments. • Dependent on project timeline and property buyers, could potentially have opportunity for incorporating LRT into development.
Cons	• Addition of left-turns restrictions are needed to prevent conflicts resulting in modified access to residence and businesses along the corridors.	• Modified driveway access is needed to prevent potential right-turn conflicts. • Addition of left-turn restrictions are needed to prevent conflicts resulting in modified access to businesses. • Focuses TOD development on only one side of corridors. • The roadway creates a potential barrier to pedestrians walking to the stations from the opposite side. • Potential for property and building impacts due to the setback requirements for parallel operations.	• Need for purchasing property to construct independent alignment. • Cost for project could increase due to need to purchase property.

There will be fewer impacts to the adjacent parcels if the cross-section does not require to be widened to accommodate light rail. For the Metro Rail Expansion, a decision was made to eliminate both the parallel and independent options and operate within the median of Niagara Falls Boulevard, Maple Road, and Sweet Home Road. This configuration provides the least amount of direct impacts to parcels and driveways, provides equal access to stations from either side of the roadways, and maximizes the TOD development potential along the corridor.

4.3 RECOMMENDATION

As a result of the evaluation, the alignment utilizing Kenmore Avenue and Niagara Falls Boulevard was recommended as the Locally Preferred Alignment. This was due to the following factors:

- Cost savings of reducing the length of the underground tunnel portion by approximately 2/3 of the length
- Creating a greater opportunity for local contractors
- Meeting desired travel times along the entire LRT line
- Maximizing mobility and TOD opportunities for both the Town of Tonawanda and Town of Amherst
- Minimizing potential private property impacts due to ROW needs

This option of the LPA would meet the goals and objectives of the project. Figure 17 and Figure 18 depict how LRT could be implemented along Niagara Falls Boulevard in the median while conforming LRT operations into the existing ROW.

Figure 17: Niagara Falls Boulevard Cross-Section

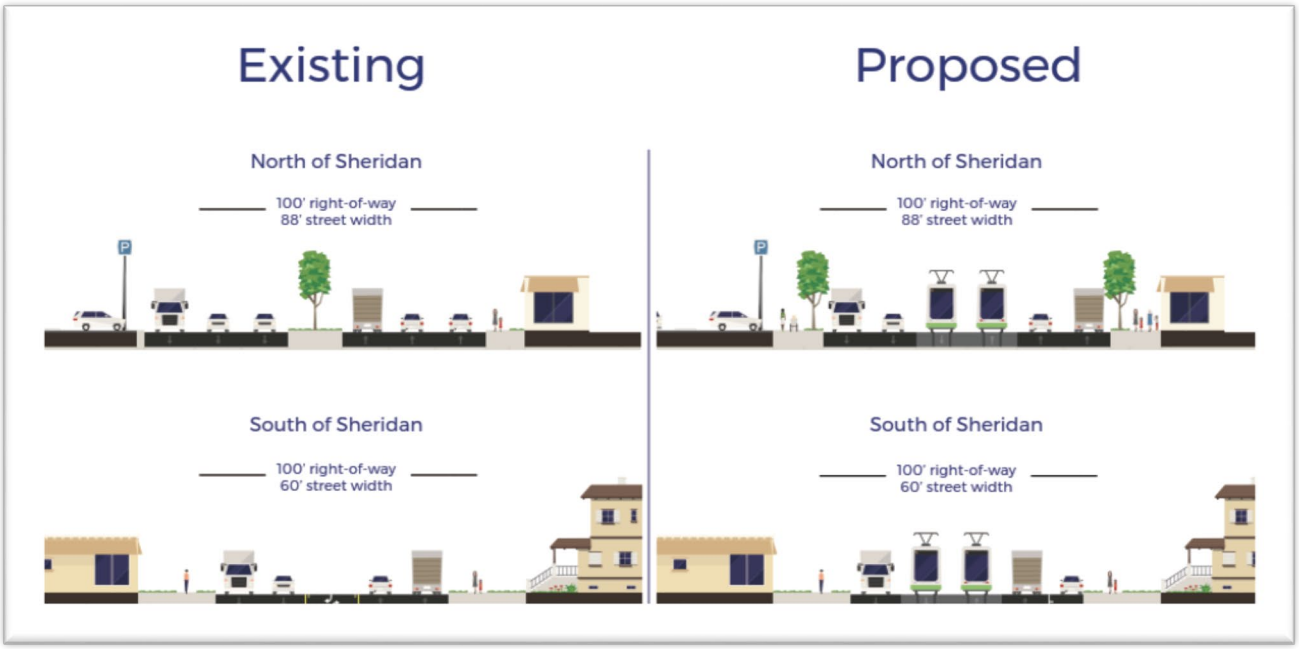


Figure 18: Niagara Falls Boulevard Rendering

ATTACHMENT A

Key/ Legend

●	Alignment option fully conforms to criteria/ metric
◕	Alignment option mostly conforms to criteria/ metric
◑	Alignment option partially conforms to criteria/ metric
◔	Alignment option minimally conforms to criteria/ metric
○	Alignment option does not conform to criteria/ metric

Metro Rail Expansion Project

LPA Alignment Evaluation Criteria/ Metrics

Evaluating LPA alignment from University Station to the intersection of Niagara Falls Boulevard and Eggert Road

Category	Evaluation Criteria	Evaluation Metrics	Alignment Option "Bailey Ave" (LPA)	Alignment Option "Niagara Falls Blvd"
Order of Magnitude Cost	Difference in tunneling length	Minimize the cost of tunneling (based on linear feet of tunneling)	○	◕
	Number of underground Stations	Minimize cost of stations (based on number of at-grade and underground stations)	○	◕
	Purchase of ROW	Minimize cost of ROW needed for purchase to accommodate Metro Rail running outside of ROW (based on acres of ROW purchase)	◑	◕
		Minimize cost for easements to accommodate Metro Rail running outside of ROW (based on acres of ROW easement)	◑	◑
		Minimize cost of ROW needed for easement to accommodate Metro Rail running inside ROW to account for station areas and/or intersection widenings (based on acres of ROW easement)	◑	◕
	O&M costs	Minimize cost of Operations & Maintenance	◔	◕
Overall Constructability	Availability of contractors	Availability of local contractors that can perform work		
	Schedule/ length of construction	Minimize construction schedule	◑	◕
	Impacts to traffic and business operations	Minimize temporary street and/or driveway closures	◑	◑
	Utility conflicts	Minimize utility reconstruction/ relocation	◑	◔
	ROW Impacts	Amount of private property impacted (either by purchase or easement) to accommodate project	◑	◕
Travel Time	Length of time Metro Rail travels between UB North (either Ellicott Complex station or Lee Road station) and University Station	Minimize travel time (in minutes)	●	●
Community/ Economic Development	Transit-supportive elements in place or can be put in place (zoning, policy, community support, plans, etc.)	Maximize existing transit-supportive zoning	◕	◑
	Opportunity for Transit-Oriented Development	Opportunity for TOD zoning to be approved	◑	●
Municipal Coordination	Local and regional stakeholder preference/ acceptance	Preferred alignment option of Town of Amherst (based on input from town officials or passage of a resolution or MOU)	◔	●
		Preferred alignment option of Town of Tonawanda (based on input from town officials or passage of a solution or MOU)		
		Preferred alignment option of other regional, municipal, or other stakeholder entities (based on input from officials or identified in plans)		
Ridership	Maximizes ridership	Maximizes ridership	●	●
Accessibility	Impacts to adjacent property access	Minimize number of driveways closed	●	●
	Accessibility by transit supportive populations	Minimize number of driveways experiencing reduced accessibility (in ability to make a LT)	◕	◔
		Number of transit dependent population within ½ mile radius of station areas	◑	◕
Traffic	Change to Existing Travel Patterns	Minimize in travel distance or durations for local trips	◕	◑
	Impact to AM/PM Peak Period Volumes	Minimize increases to peak period daily volumes year compared to no-build project based on traffic model	●	●
	Impacts to Level of Service	Minimize reductions in LOS of project in build year compared to future year no-build project based on traffic model	◕	◑
	Impacts to intersection LOS	Minimize reductions of intersection LOS of project in build year compared to no-build	◔	◔
Environmental	Minimizes impact on natural and human environments	Minimize acres of environmentally sensitive areas impacted by project	◕	◕
	Ability to reduce auto-dependency	Reduces vehicle miles travelled, based on regional traffic model	◕	◕
	Noise sensitive land uses within proximity to alignment	Minimize impact to noise or vibration-sensitive land uses	◕	◑
Safety	Passenger access to stations	Minimize distance to station platform from nearest sidewalk	●	●
	LRT/ vehicular traffic intermixing	Minimize the conflicts of LRT intermixing with general vehicles	◕	◔
Connectivity	Connections with Metro Bus	Improve connectivity to Metro Bus routes		
	Multi-modal opportunities	Improve Metro Bus routes transfers	●	●
	Increase pedestrian and bicycle connectivity	Improve walkability within 1/8 mile of proposed stations	●	●
		Improve bicycle lanes within 1/8 mile of proposed stations	●	●
		Improve pedestrian and bicycle usage- ability to provide connectivity with multimodal	●	●