Metro Amherst-Buffalo Corridor

TIER 3 SCREENING RESULTS

Version 1.2

TECHNICAL MEMORANDUM

Prepared for:

Niagara Frontier Transportation Authority (NFTA)

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In Association with Wendel
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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:

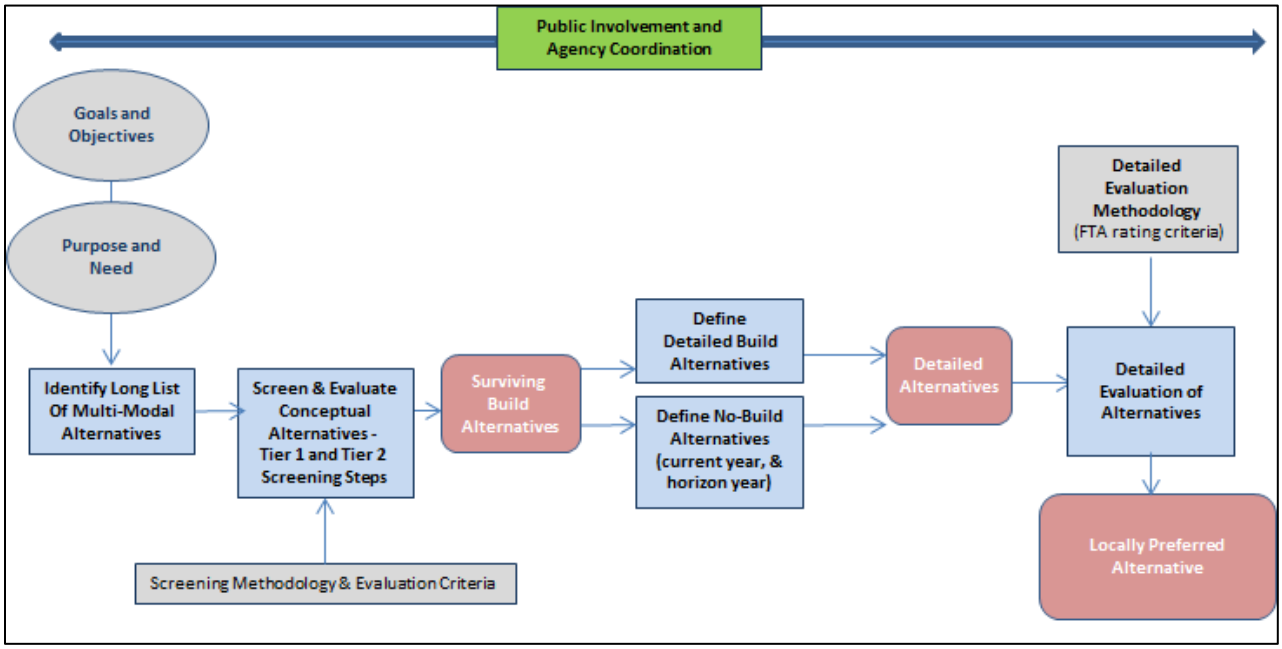
- Tier 1: Preliminary Screening of the Long List of Alternatives ⟹ Preliminary Alternatives – Tier 1 is completed and was documented in the *Tier 1 Technical Memorandum* (May 2014).

- 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**.

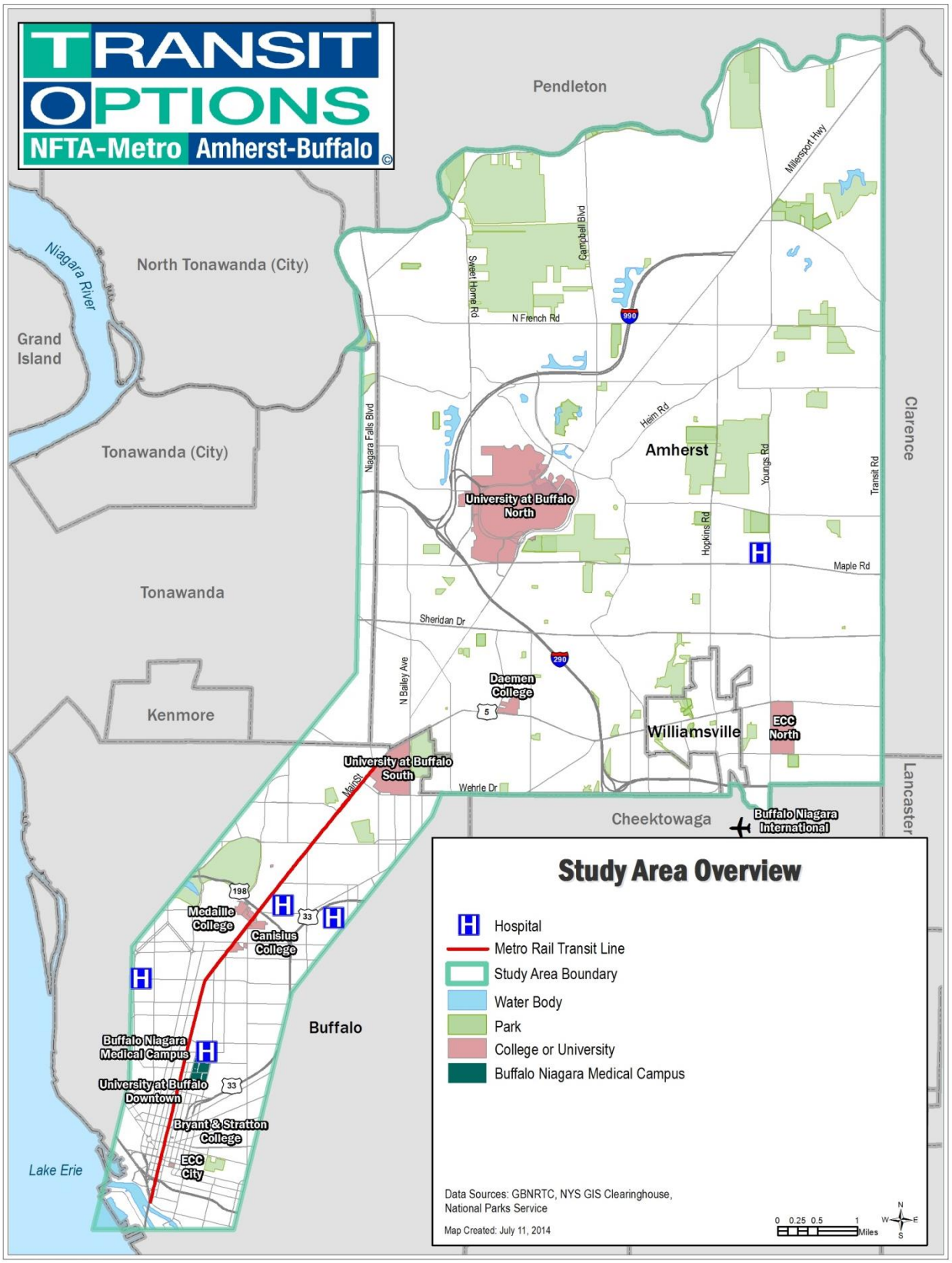
The purpose of the proposed project is to provide a fast, reliable, safe, and convenient transit ride in the Amherst-Buffalo Corridor linking established and emerging activity centers along the existing Metro Rail Line in the City of Buffalo with existing and emerging activity centers in the Town of 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

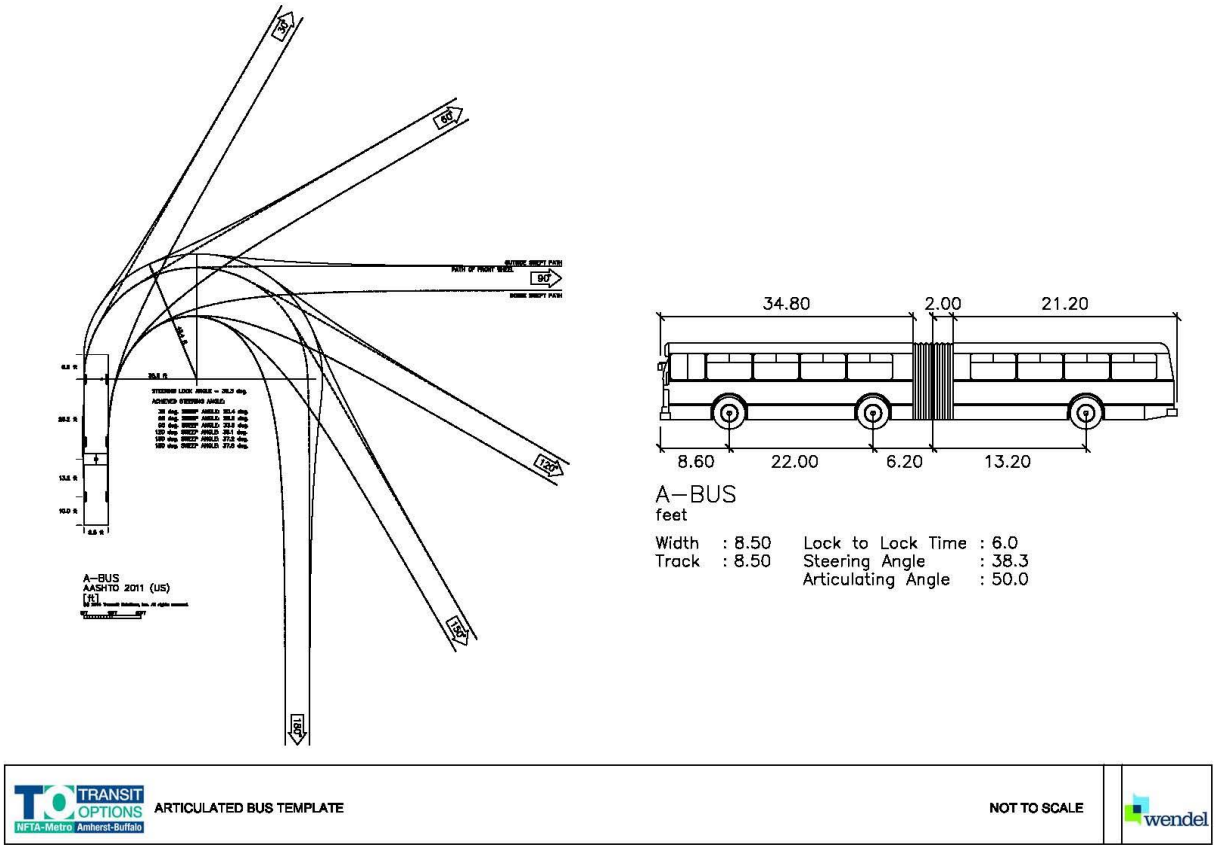
1. Design Vehicle - Existing NFTA light rail vehicle
2. Speeds
a. Below Ground Tunnel Segments– 50 mph
b. Above Ground Bridge Section – 50 mph
c. At Grade outside Street ROW- 50 mph
d. At Grade within Street ROW – Speed limit of adjacent roadway
e. At Grade mixed pedestrian – 15 mph
f. Yard – 5 mph
3. 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.

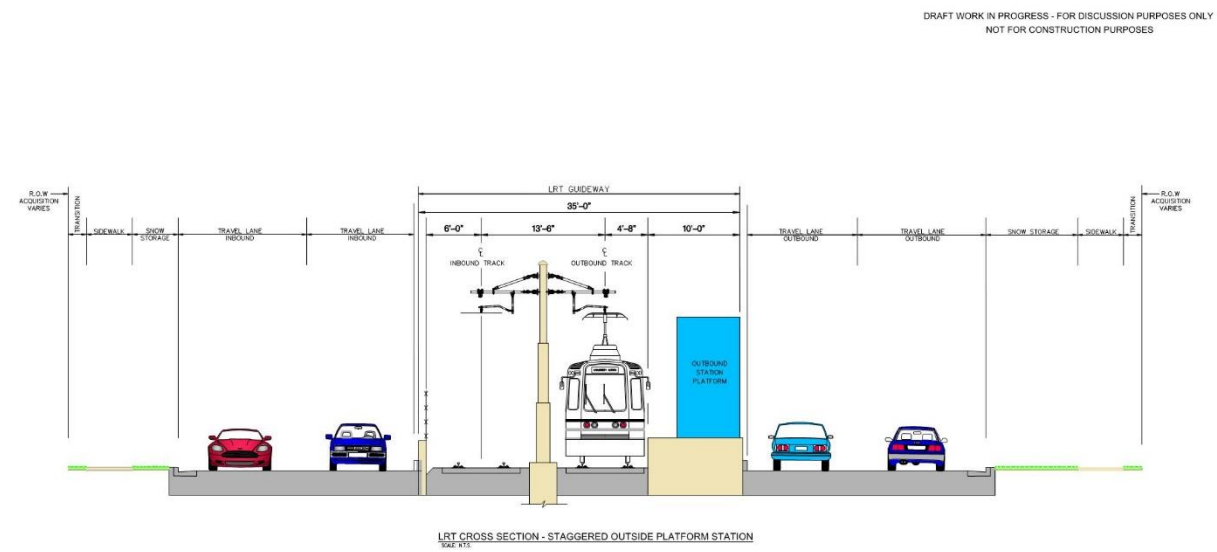
- All surface segments of LRT Preliminary Alternatives would operate in dedicated guideways. Vehicle traffic would be precluded from operating within LRT guideways.
- Within existing street rights-of-way, existing turn lanes would be eliminated with turns being restricted to street intersections. Available 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

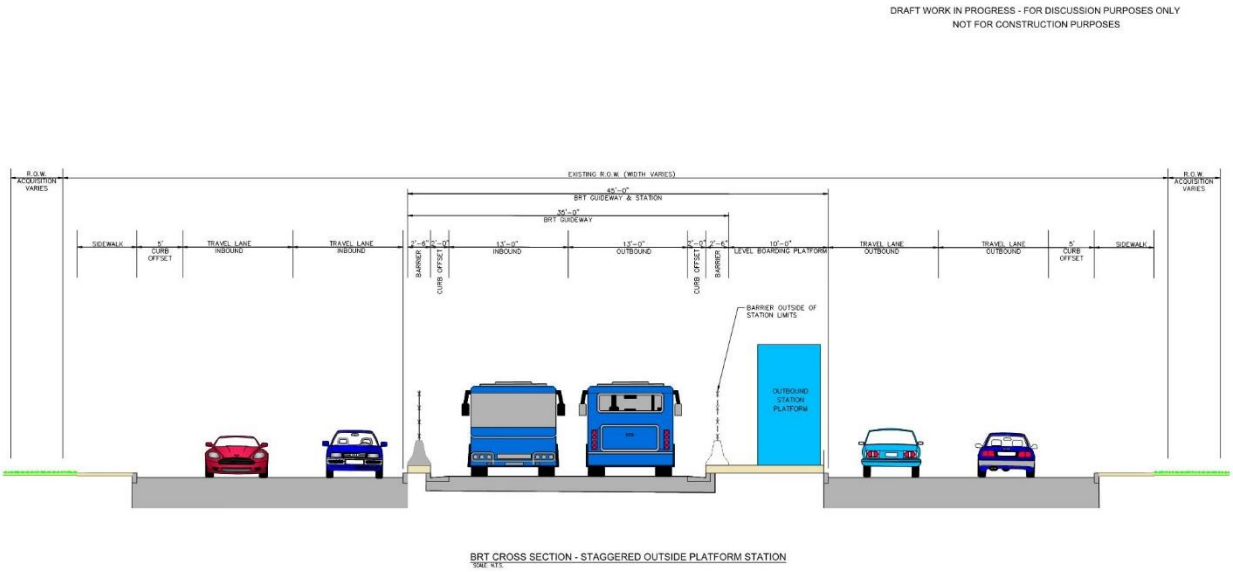
For the purposes of this co-location analysis, BRT vehicles would operate within the LRT dedicated guideways that are located within existing streets or off-street. Accordingly, a single representative cross section was developed for BRT operating within the LRT cross section using the following criteria.

- 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

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Figure 7 Millersport Highway LRT 1 Map

Figure 8 Niagara Falls Boulevard BRT 1 and Preferred Bus Map

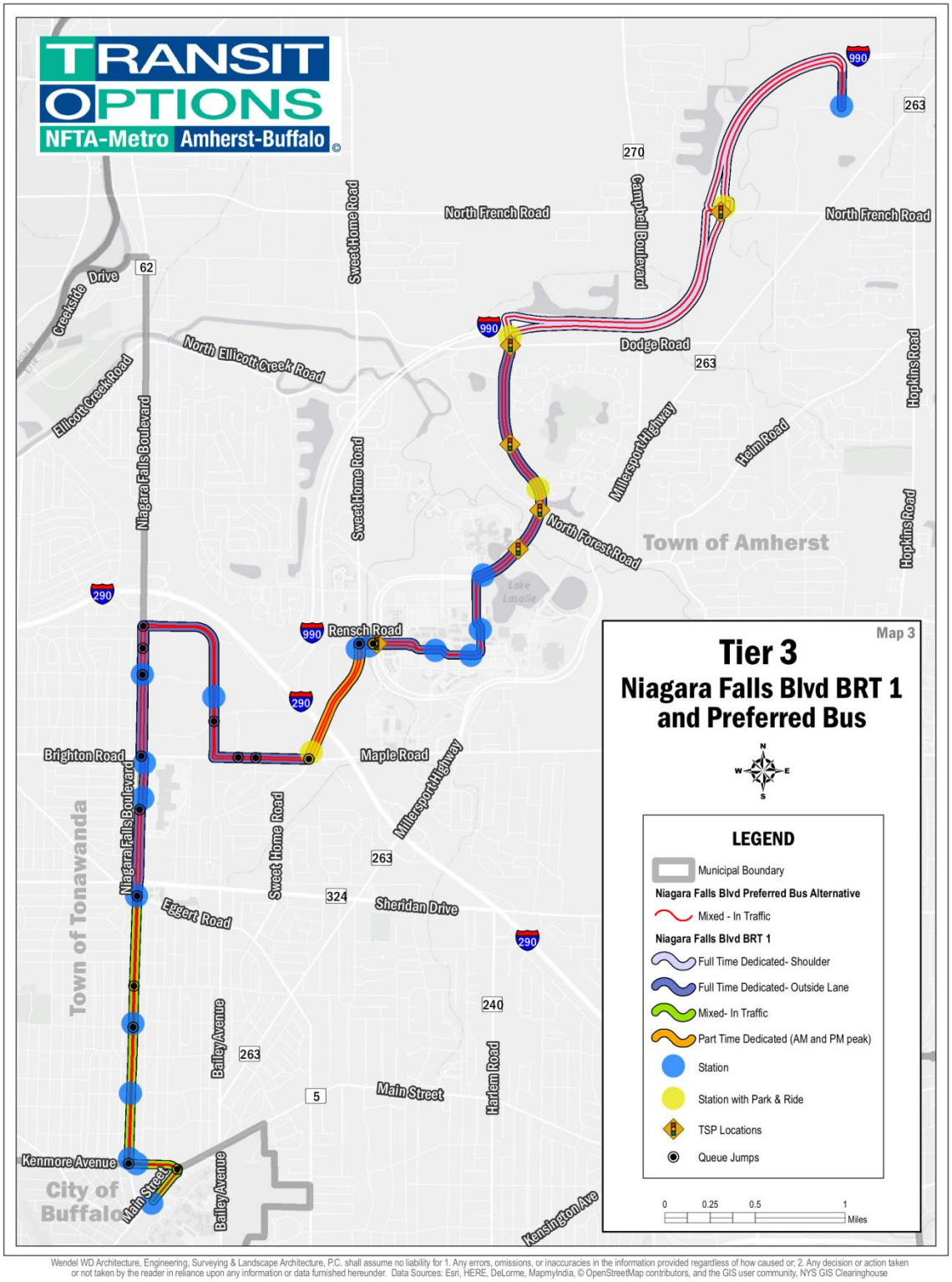

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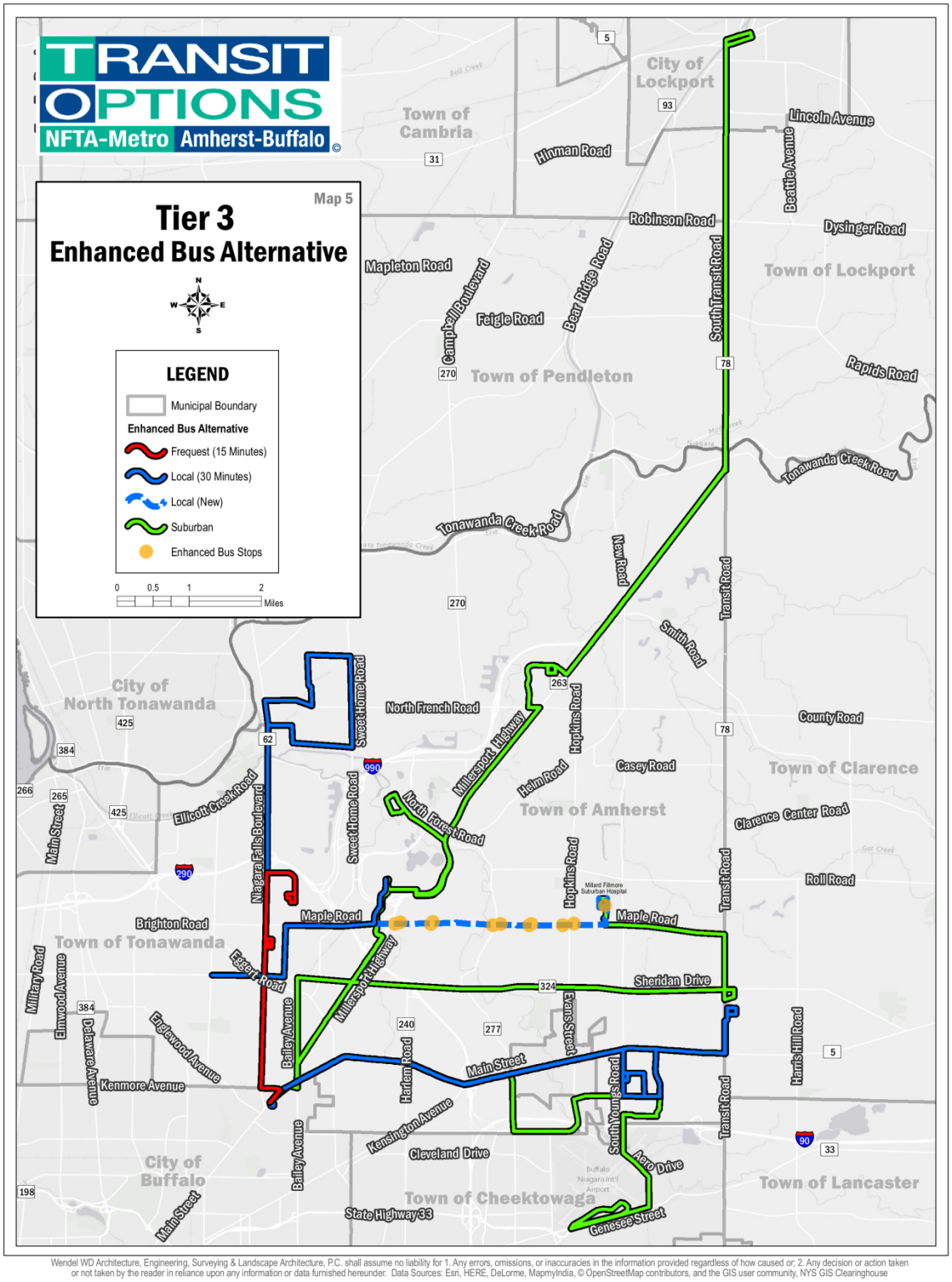
Figure 9 Millersport Highway BRT 1 and Preferred Bus Map

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

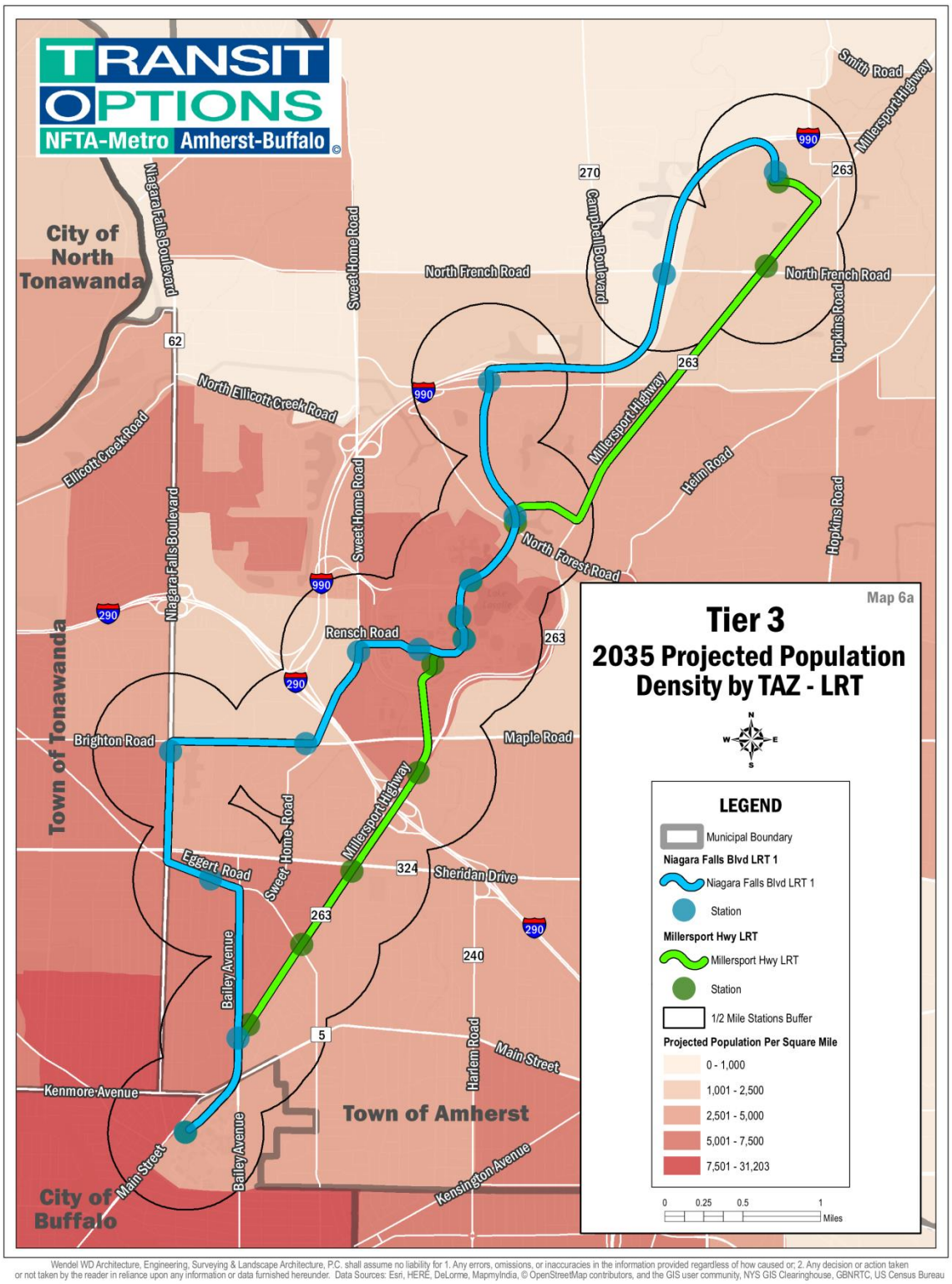


Figure 12 2035 Population Density – BRT/Preferred Bus Alternatives

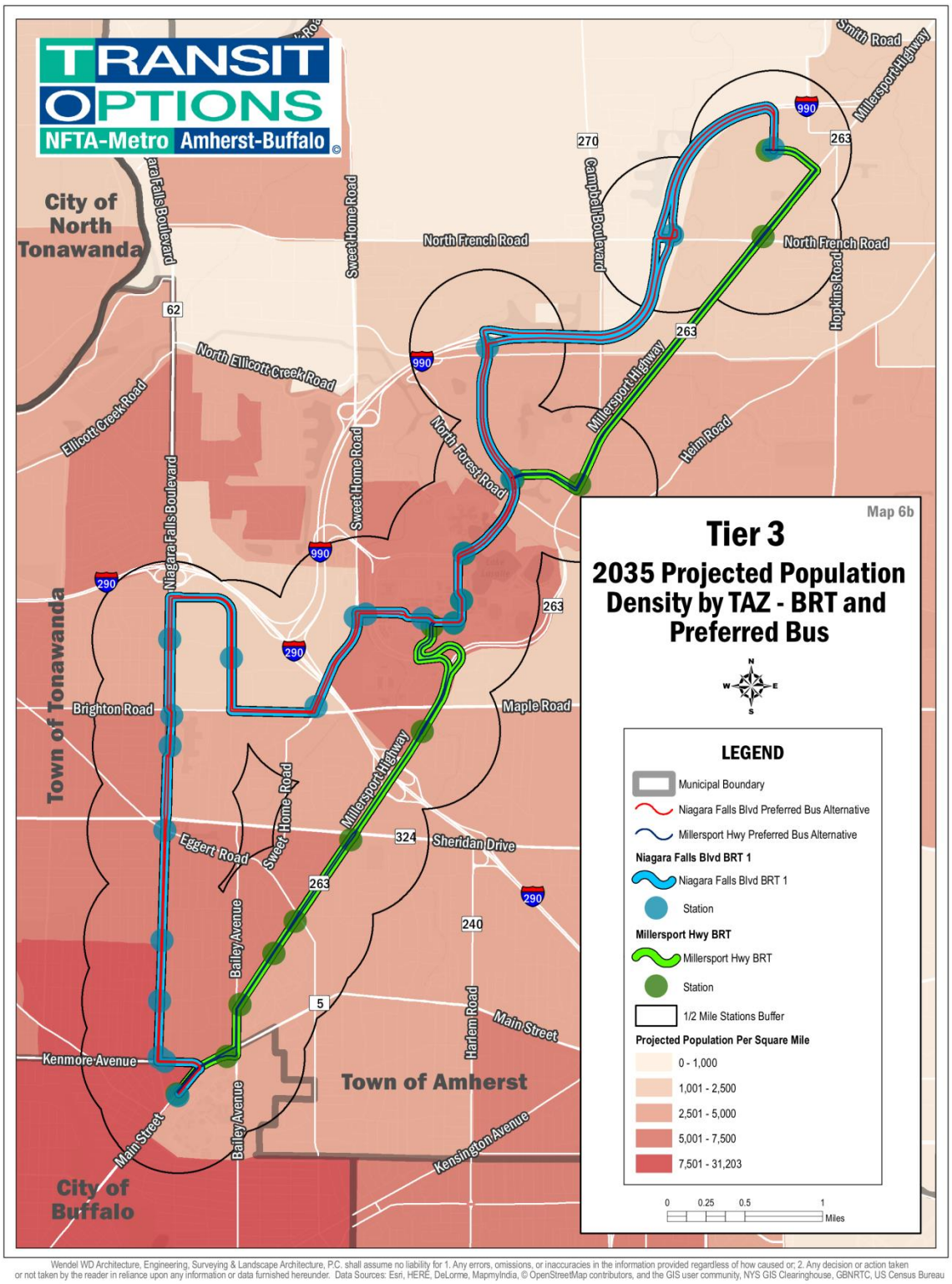


Figure 13 2035 Employment Density – LRT Alternatives

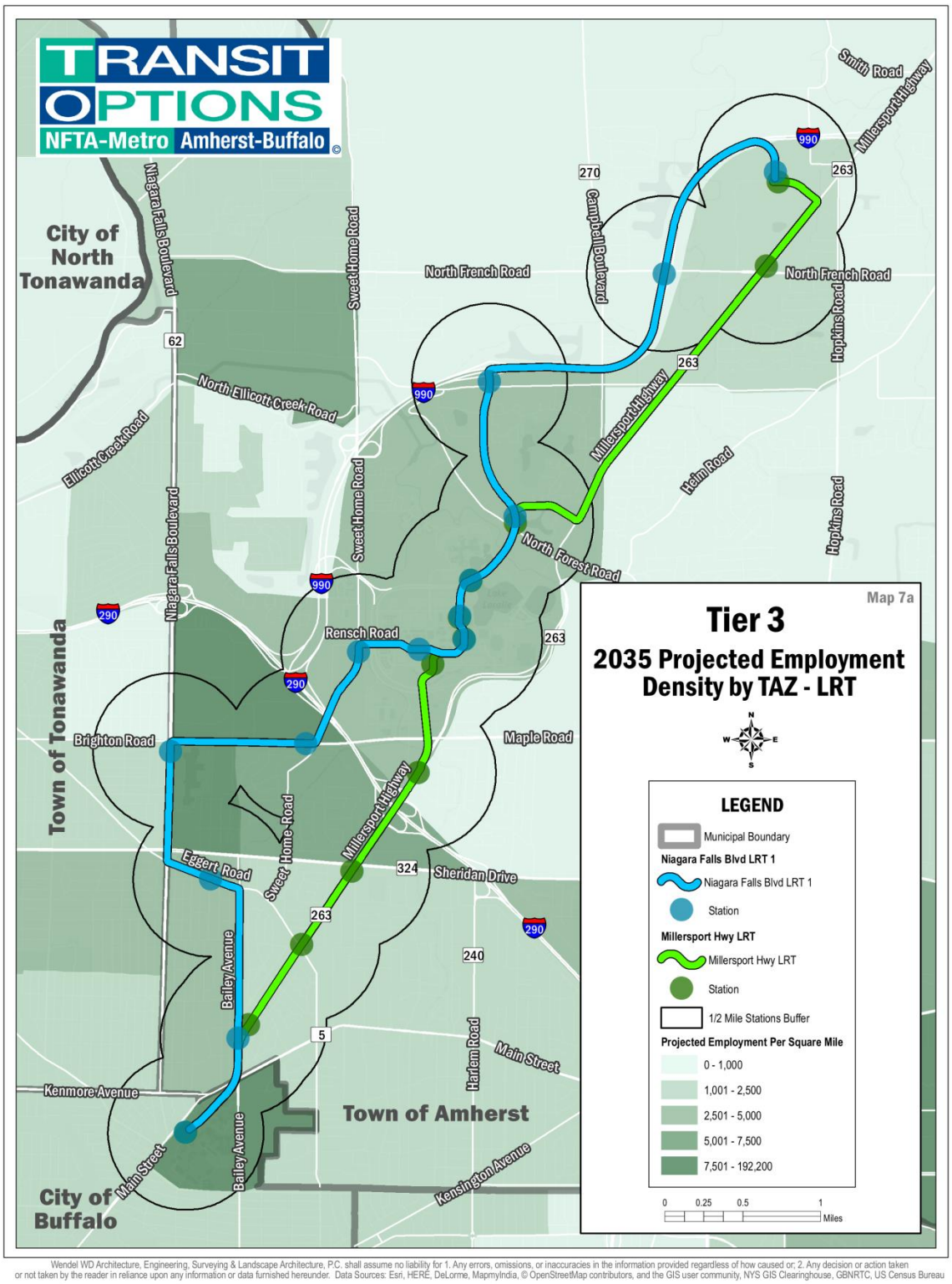
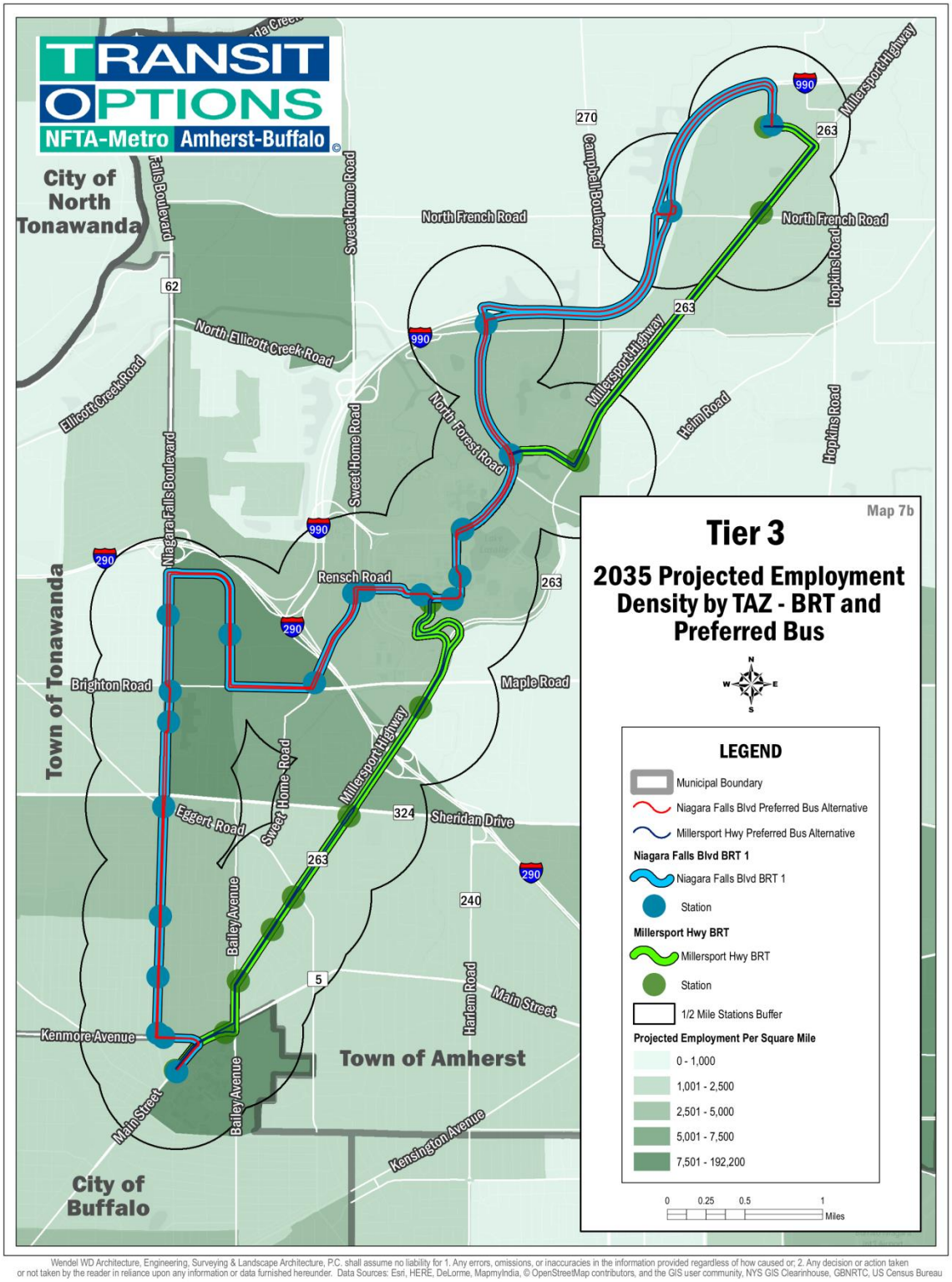


Figure 14 2035 Employment Density – BRT/Preferred Bus Alternatives



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

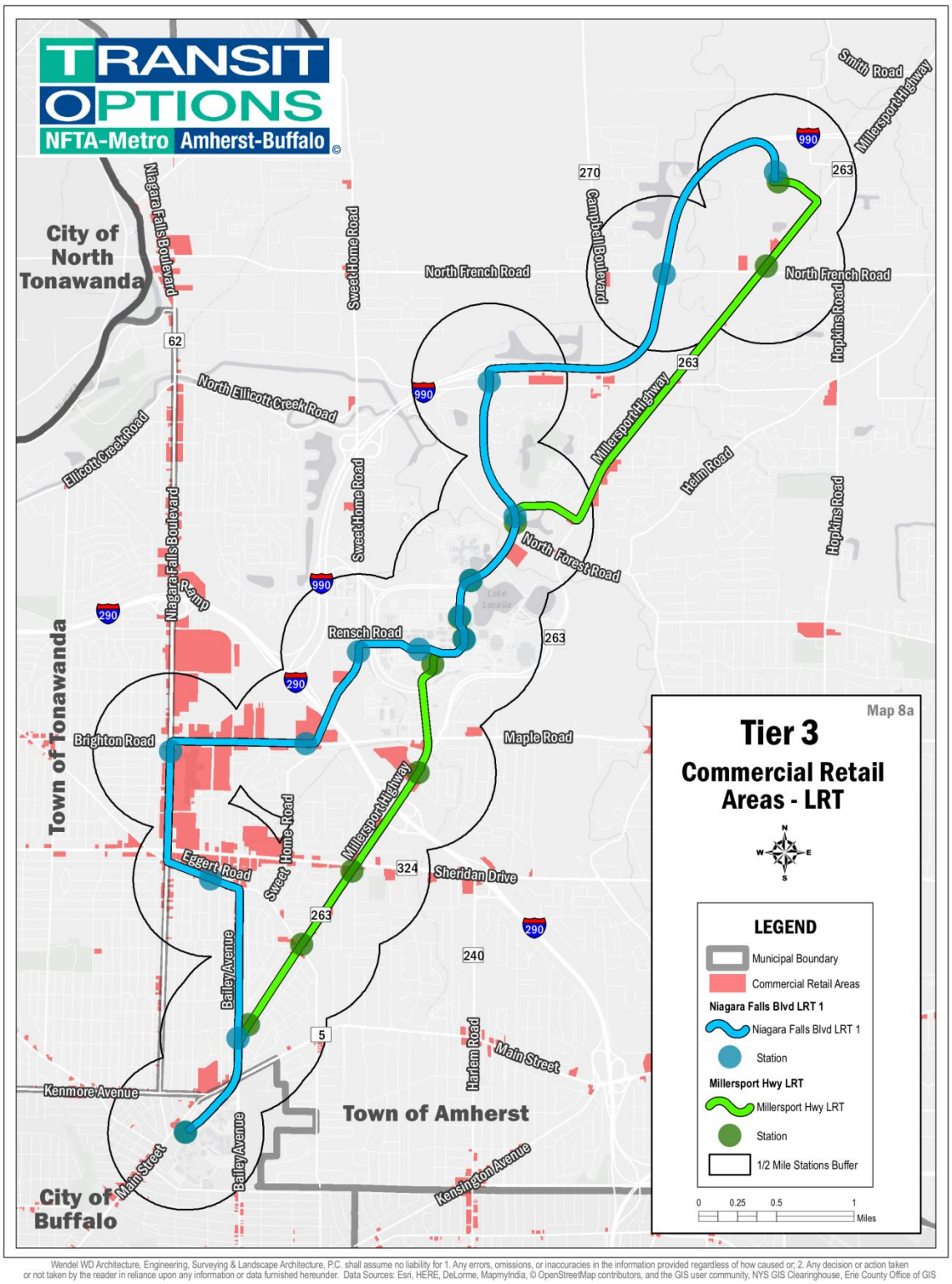
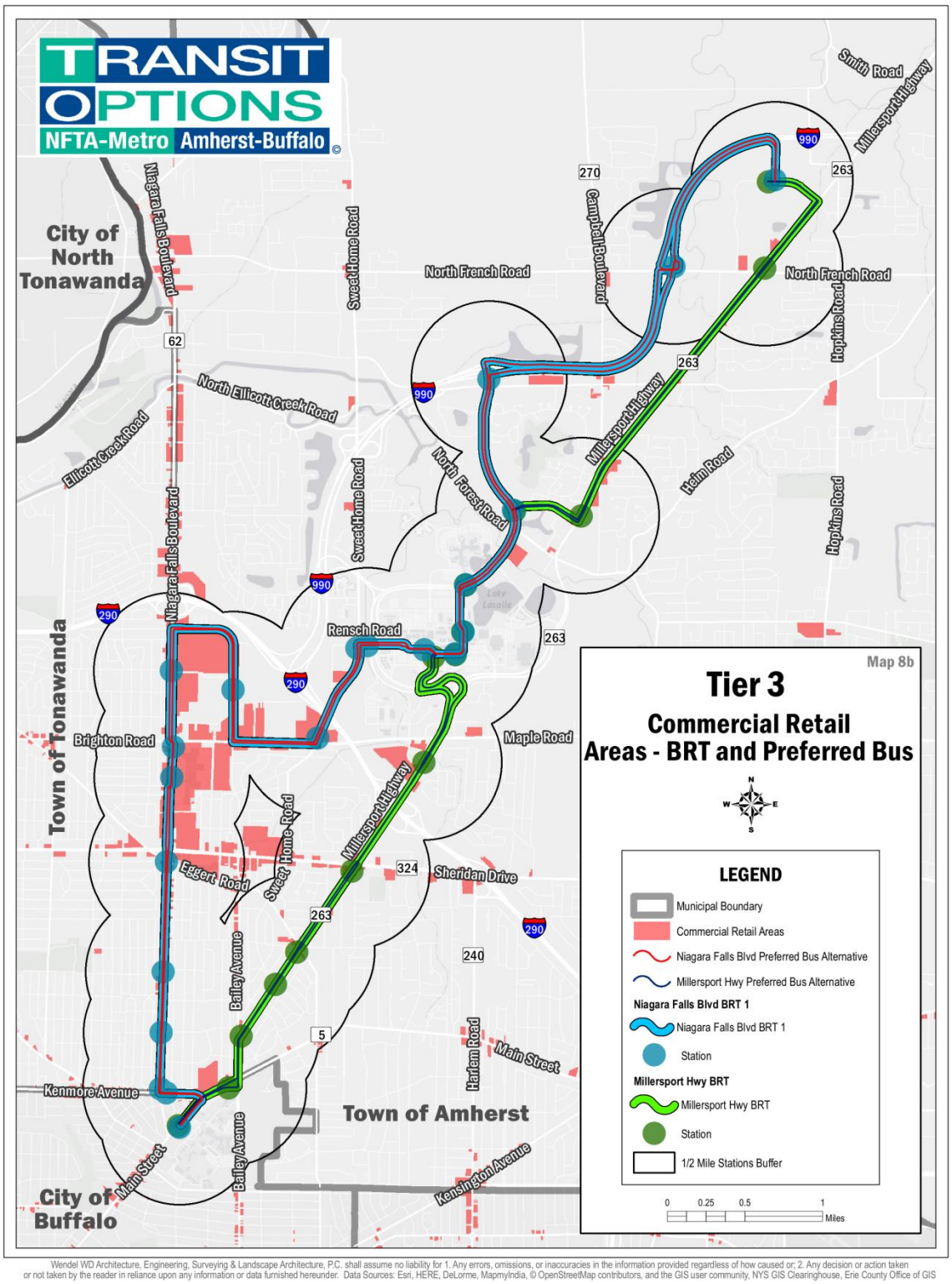


Figure 16 Commercial Area – BRT/Preferred Bus Alternatives



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:

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.