HALIFAX

HALIFAX REGIONAL MUNICIPALITY

LUCASVILLE GREENWAY

FUNCTIONAL PLAN

FINAL REPORT – REVISION 1

LUCASVILLE GREENWAY SOCIETY

WSP

Project No. 181-11813
April 2021

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1 INTRODUCTION

1.1 LUCASVILLE GREENWAY

Halifax Regional Municipality (HRM) and Regional Council have been given direction to implement the Integrated Mobility Plan (IMP) "All Ages and Abilities Bicycle Network" within the Regional Centre. In June 2017, Council approved that Lucasville Road be included in HRM's Active Transportation 2014-19 Priorities Plan. In October 2017, Halifax Water initiated Phase 1 of the new watermain that extends from Bryanston Road to Pockwock Service Road.

WSP was retained by HRM to complete the detailed design for Halifax Water's Phase 1 of the watermain on Lucasville Road.

1.1.1 LUCASVILLE GREENWAY SOCIETY VISION

The local community group, Lucasville Greenway Society (LGS), has identified the need for active transportation facilities to provide connection and access to other communities, assets within the community and destinations on Sackville Road and Hammonds Plains Road. LGS produced the "Lucasville Greenway Vision" report and have hosted/conducted several community consultation sessions that supported the envisioned off-road, multi-use pathway along Lucasville Road. There is a strong desire to have affordable transportation such as bus service, accessibility, walking/cycling infrastructure that is important to the community.

1.2 STUDY AREA

The Study Area for this project is shown in Figure 1-1 and extends from Old Sackville Road to Hammonds Plains Road along Lucasville Road.

1.3 PROJECT OBJECTIVES

The primary goal of this project is to provide functional planning, integration analysis and cost estimates for active transportation infrastructure opportunities along Lucasville Road within the perimeter of the new watermain proposed by Halifax Water and to integrate with HRM's paving projects.

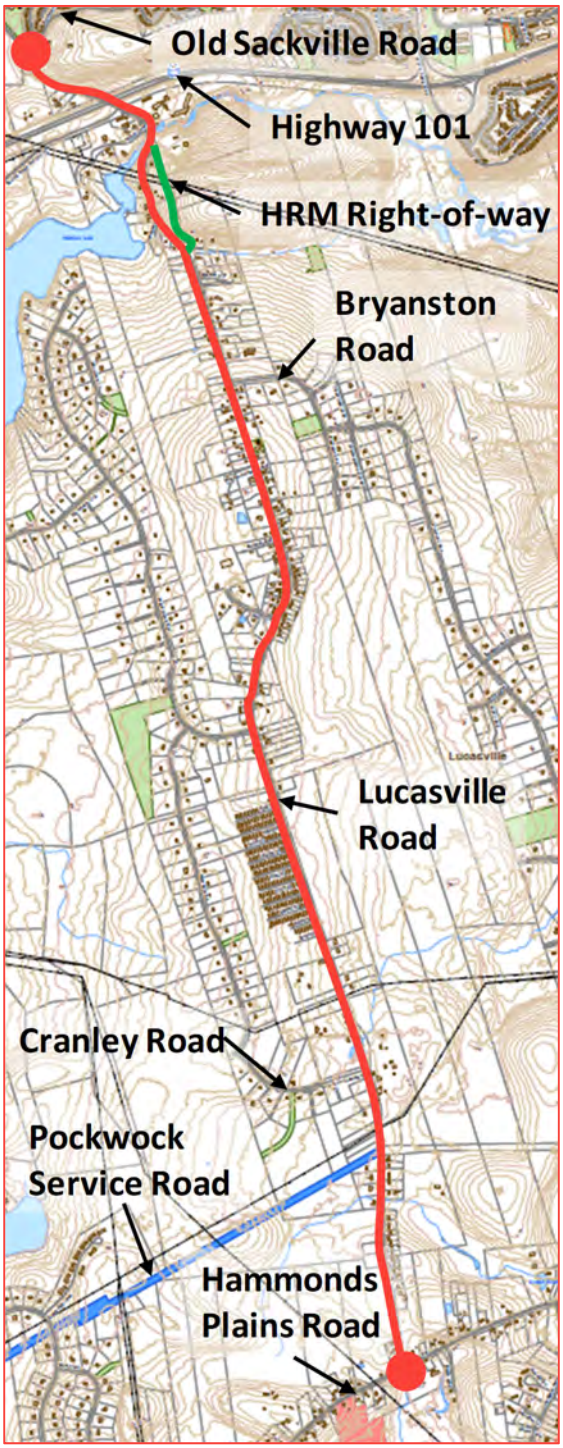


Figure 1-1: Study Area

2 EXISTING OPERATIONS & NEW WATERMAIN

2.1 EXISTING CONDITIONS

Lucasville Road is a 2-lane major collector roadway with gravel shoulders and open ditching on both sides. The posted speed limit ranges from 50 to 70 km/h, from Sackville Road to Hammonds Plains Road with approximately 7,900 vehicles per day. There are no transit services in the area. Lucasville Road is an important north-south connection from Sackville Drive to Hammonds Plains Road that provides access to other communities and community destinations.

Along Lucasville Road there is an existing watermain that travels on the east side from Pockwock Service Road to Hammonds Plains Road. At Pockwock Service Road, the watermain crosses to the west side and then returns to the east side between Cranley Road and Tenth Street, as shown in Figure 2-1.

2.2 HALIFAX WATER – NEW WATERMAIN

In October 2017, Halifax Water initiated the planning of Stage 1 of a new watermain on Lucasville Road, in the vicinity of the Wallace Lucas Community Centre to the Pockwock Service Road. Halifax Water is proposing to place the new watermain on the opposite side of the existing watermain within the right-of way of Lucasville Road, see Figure 2-1. The new watermain shown in red, will be placed within the shoulder of the roadway as shown in the cross section in Figure 2-2. The new watermain is on the west side of Lucasville Road with a small portion being on the east side near Pockwock Service Road.

Figure 2-1: Existing & Proposed Watermain

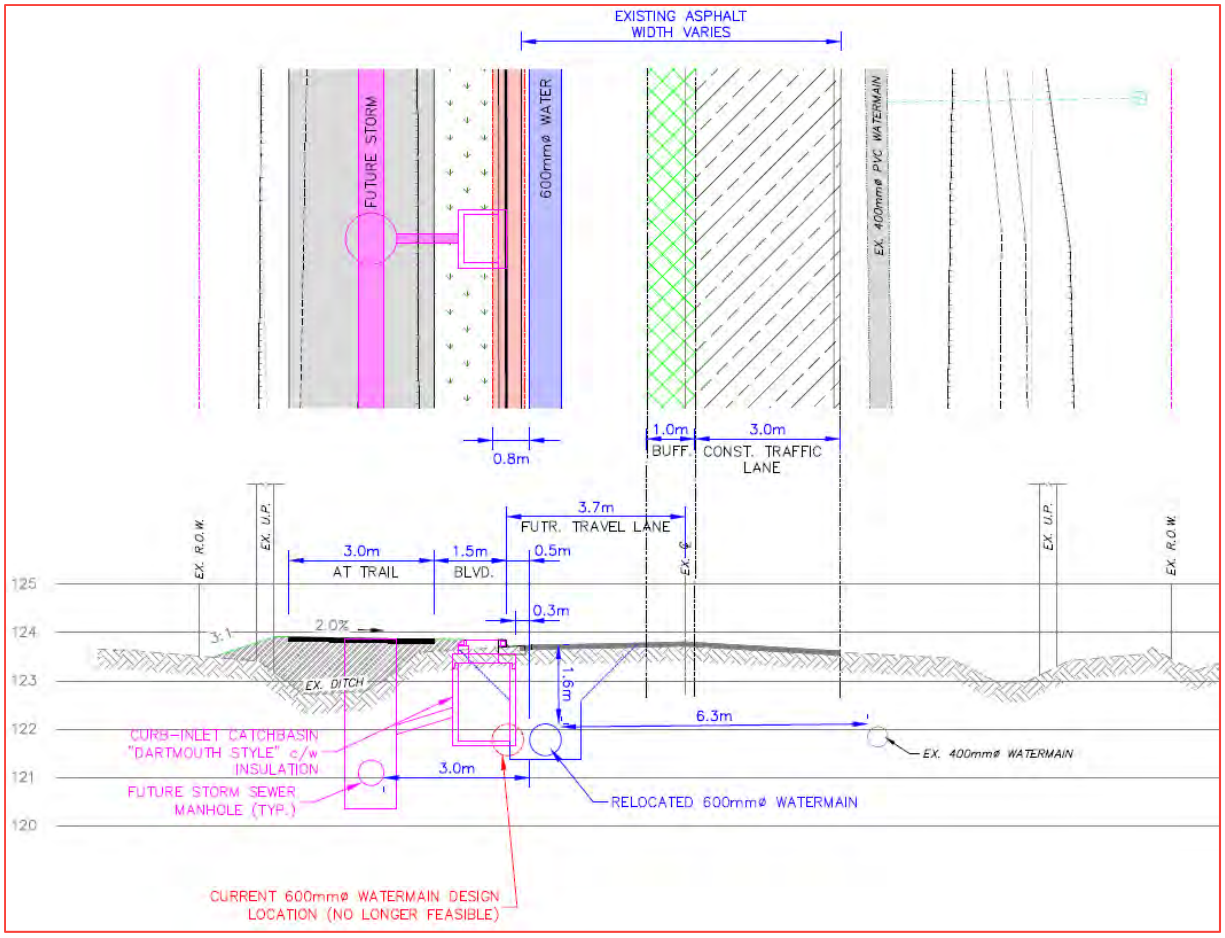


Figure 2-2: Proposed Cross Section for Proposed Watermain

3 STAKEHOLDER ENGAGEMENT

Separate meetings were held with HRM staff, stakeholder groups (Halifax Water) and the LGS. The following sections are summaries of what we heard from each of the following groups.

3.1.1 KICK-OFF & LUCASVILLE GREENWAY SOCIETY MEETINGS

A kick-off meeting was held with HRM staff and committee members from LGS on Thursday, August 30th, 2018, who provided insight on various areas of expertise related to the LGS vision. The following is a summary of what we heard from the meeting:

- Minimize the need for pedestrians and cyclists to cross the road as much as possible.
- Requested to have the distance between each segment shown in detail with associated cost estimates.
- It was noted that there is pyritic slate in the area beginning near the surface and extending approximately 100 feet deep.
- Suggestion to present final option to community for feedback.
- Requested to include the timelines of the Halifax Water project and the Active Transportation (AT) Trail project.
- Provide a phasing plan to identify priorities.
- Identified three key stakeholders: Atlantic Playland, Hefler Lumber Mill and Timber Trails Trailer Park.
- Opportunity to incorporate future transit into the design.

On Friday, November 9th, 2018, HRM and WSP met with committee members from Lucasville Greenway Society and Councillor Lisa Blackburn to review the proposed alignment of the greenway. WSP presented the preferred alignment option which highlighted the proposed trail crossing and the different type of active transportation facilities along Lucasville Road. It was noted that pedestrian crossings would be required for Wallace Lucas Community Centre and at intersections to allow access to the greenway.

3.1.2 HALIFAX WATER MEETINGS

A separate meeting was held with Halifax Water and HRM to discuss the integration of the two projects on Monday November 5th, 2018. Project information was provided which included updates on project status and the proposed schedule for construction of the new watermain. It was noted by Halifax Water that the project design timeline for the proposed watermain was scheduled for tender in early December 2018 and that the proposed greenway and type of facility would need to be determined as soon as possible.

On Friday, December 7th, 2018, Halifax Water, HRM and WSP met to discuss the preferred design option of the proposed trail and the potential impacts to the proposed watermain. HRM stated that an active transportation corridor is envisioned along Lucasville Road and that the proposed infrastructure of Halifax Water be designed accordingly. Therefore, there will need to be a slight shift of the greenway and of the Halifax Water project to allow both projects to work within the same footprint.

4 PROJECT OBJECTIVES

4.1 PROJECT PURPOSE

The primary design purpose is to develop a facility that is attractive to as wide of a group of potential users as possible and is safe and convenient for walking, bicycling and other modes of active transportation. Ideally, this would include accommodation of all ages and abilities – commonly referred to as an 'AAA' AT facility. An 'AAA' active transportation network is a continuous and connected street infrastructure, including physically separated bike lanes as well as shared roadways and multi-use trails, that supports "All Ages and Abilities" in walking and cycling to common everyday destinations. This includes the accommodation of the visually impaired and is a fully accessible facility for everyone's use.

A key aspect of the design philosophy is that the facility aims to accommodate not only current users, but also potential users who are currently uncomfortable traveling by active modes in the Lucasville area. The considerations are summarized in Table 4-1.

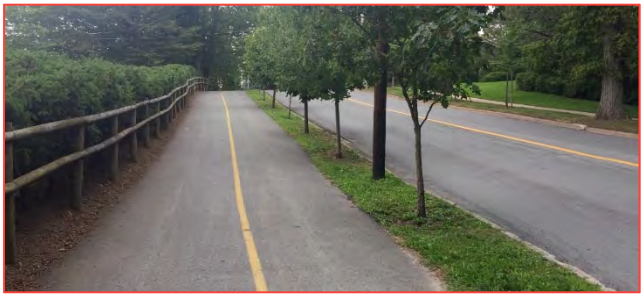
Table 4-1: Project Considerations

Factor	Evaluation Considerations
Active Transportation (Pedestrians/Cyclists)	Accommodation of active transportation is very important to HRM and to the Lucasville Greenway Society. Evaluation of the active transportation facility design will focus on the extent to which key inputs such as pedestrian/cyclist exposure to vehicular traffic (i.e. separation and crossing distances) are expected to change with implementation of each design option.
Vehicular Traffic	Lucasville Road is classified as a major collector and ideally, vehicular capacity should remain consistent with existing conditions.
Transit	There is currently no Transit service provided on Lucasville Road.
HRM Right-of-Way	There is approximately a 20-meter right-of-way (ROW) which varies along Lucasville Road. Designing within the ROW will reduce the need to acquire property.
Halifax Watermain (Existing and Proposed)	There is an existing watermain located on the east side of Lucasville, with a small portion located on the west side, in the shoulder of the roadway. The existing watermain requires that a 5-foot cover be maintained while the watermain is in commission. The proposed watermain will be placed on the opposite side of the existing watermain on Lucasville Road. There are environmental requirements when installing a watermain near storm systems, which have been considered accordingly.
Future Residential Development	There is potential for development of future sub-divisions in the Lucasville area. A multi-use pathway provides an attractive active transportation option for future property owners and their families.

4.2 AT FACILITY TYPE FOR LUCASVILLE ROAD

4.2.1 ACTIVE TRANSPORTATION (AT) GREENWAY

AT greenways, also commonly referred to as multi-use trails, are dedicated facilities that permit 2-way travel for non-motorized AT uses. AT greenways are typically 3.0 to 4.0m wide and include a crusher dust or asphalt pavement surface.



AT greenways are present in a wide variety of applications, from rural recreational trails to urban AT corridors. When used in the vicinity of a roadway, separation between a greenway and the adjacent roadway is an important consideration. Provision of a buffer area, often in the form of a grassed boulevard with vegetation such as trees, increases the level of comfort for users, and is particularly important in locations where traffic volumes and speeds are high. In locations where there is minimal available space or curvature in the roadway, it can be beneficial to include vertical separation elements such as physical barriers (i.e. guide rail, jersey barrier, etc.) although this adds complexity to snow clearing and other maintenance activities.

Where space is available, the facility will ideally be separated from the roadway to increase user safety and comfort. This type of facility is included in HRM's *Municipal Design Guidelines* (2013) as an "Active Transportation Off Road Trail". The preferred minimum cross section width is 4.0m, with a 0.5m shoulders on either side, 2:1 side slopes that blend with the existing grade and ditching as required.

4.3 DESIGN CONSIDERATIONS

The AT facility design review was completed by comparing the design benefits and challenges to determine which side of Lucasville Road is more suited to accommodate an active transportation facility. Further description of the benefits and challenges are noted below.

4.3.1 DESIGN INTEGRATION OPPORTUNITIES ALONG LUCASVILLE ROAD

HALIFAX WATER PLANNED TRANSMISSION LINE

Halifax Water is planning to construct a water transmission line from Pockwock Service Road to connect to Sackville Drive. The project will be completed in multiple phases, with Phase 1 being constructed in the 2019 construction season from Byranston Road to Pockwock Service Road (shown in Figure 4-1). The transmission line is proposed on the west side of Lucasville Road with a small portion on the east side between Tenth Street and Cranley Road. This provides an opportunity to integrate the transmission line and/or design to accommodate the future active transportation.

EXISTING AT INFRASTRUCTURE

Along the frontage of Timber Trails, located on the west side of Lucasville, there is an existing crusher dust pathway on private property that is used by both the public and the Timber Trails community. The pathway runs parallel to Lucasville Road and extends from First Street to Tenth Street, see Figure 4-1. If the existing pathway were to be included within the active transportation corridor, HRM would require an easement or purchase private property to upgrade and maintain the multi-use pathway.

CONNECTIONS TO DESTINATIONS

Throughout the community of Lucasville there are multiple benefits of providing connections to destinations along Lucasville Road. There are two established subdivisions with opportunity for growth, there is a community centre and a church that provide activities and services, there is a new dog park and there is the Atlantic Splash Adventure waterpark open during the summer months, see Figure 4-1 for approximate locations identified by stars.

4.3.2 DESIGN CHALLENGES ALONG LUCASVILLE ROAD

Within any typical right-of-way there is infrastructure, utilities, retaining walls, encroachments of personal property and trees/shrubs.

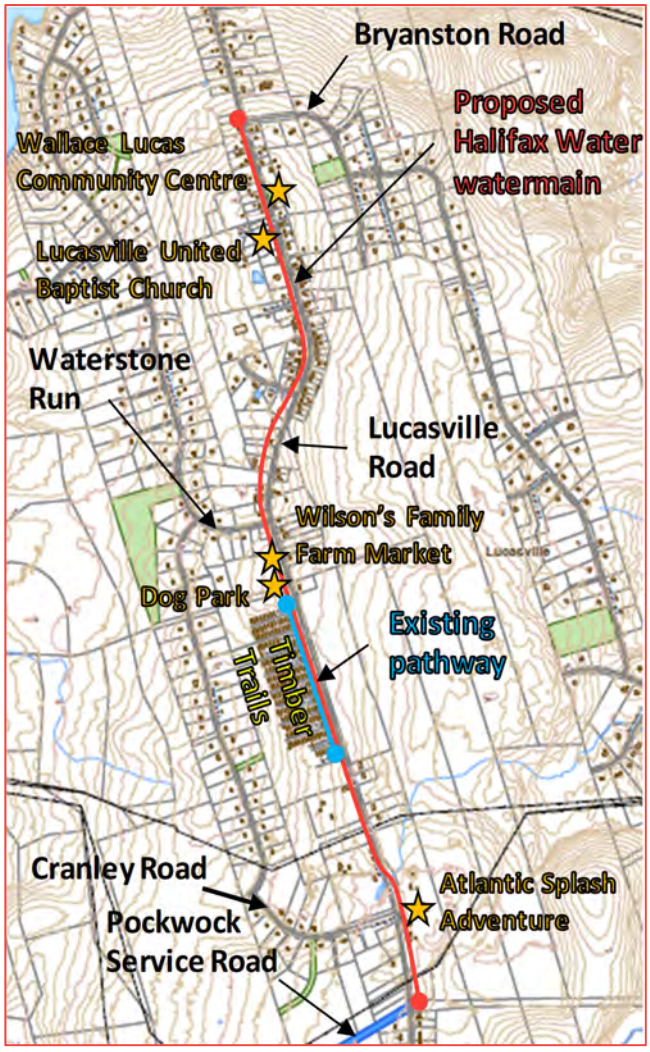


Figure 4-1: Destinations along Lucasville Road

HALIFAX WATER EXISTING WATERMAIN

Along Lucasville Road there is existing Halifax Water infrastructure within the ROW, with the majority being on the east side. The Halifax Water watermain provides service to the residents in Lucasville and is located within the shoulder of the roadway. Since the watermain material is PVC, it is not recommended that the pipe be exposed to elements and requires 5 feet of cover. This watermain crosses Lucasville Road from the east to the west side between Tenth Street and Cranley Road and then back to the east side at Pockwock Service Road continuing to Hammonds Plains Road.

UTILITIES

Within the right-of-way of Lucasville Road are the Nova Scotia Power utility poles and HRM fire hydrants. Both the utility poles and fire hydrants are located on the edge of the ROW and shift from the east and west side of the roadway.

DRIVEWAYS & GRADING

There are multiple driveways along Lucasville Road with some properties having two or more. When upgrading a roadway to include services or active transportation facilities, the driveways along the corridor typically need to be adjusted. Some driveways along Lucasville Road slope away from the roadway and may require a retaining wall for support or may become steeper due to the driveway being shorter.

RETAINING WALLS, PROPERTY ENCROACHMENTS

Resident owned retaining walls and driveway/yard decorations sometime encroach into the road right-of-way. The retaining walls can be expensive to remove and replace within the private property, similar to permanent driveway decorations, such as pillars or lighting features near the edge of the roadway. Yard decorations such as lawn ornaments or benches can easily be moved onto the private property.

TREES AND SHRUBS

There are existing trees, shrubs and vegetation along the ditching on both sides of Lucasville Road. Depending on the alignment of the active transportation facility and available space, the trees/shrubs may need to be cleared to accommodate the AT facility. If there is sufficient space for plantings within the median buffer without impacting sight distance, this would be the ideal opportunity to plant new trees or shrubs.

4.4 AT CONCEPTUAL DESIGN OPTIONS

An AT Greenway along the side of Lucasville Road is an option that would concentrate all AT users on one side of the road and provide physical separation from vehicular traffic. Consideration has been given to the potential to locate a greenway on the east side, west side, or a combination of both. There are a variety of constraints that influence the suitability of each side, including available space, conflicts with existing infrastructure, and accessibility to destinations. The AT greenway would be 3.0m wide and separated from traffic by horizontal space.

WEST SIDE:

- ✓ The majority of destinations in the area are located on the west side of Lucasville Road, which would reduce the number of crossings required.
- ✓ Integration with Halifax Water transmission line project.
- ✓ Connection into the existing AT infrastructure along the frontage of Timber Trails.
- ✓ Connection to Cranley Road and Bryanston Road to create a loop.
- ✓ Opportunity to go behind the existing ditch from Waterstone Run to Cranley Road to allow for a separated AT facility.
- × Width of gravel shoulder varies considerably. Narrow in many places with minimal space to adjacent treed areas.
- × Located on the inside of the horizontal curve and adjacent to dense trees, reducing sightlines and exposure to sunlight.
- × Requires marked crosswalk to access Wallace Lucas Community Centre & Atlantic Playground.
- × Power poles on the west side of Lucasville Road from Waterstone Run to Bryanston Road.

EAST SIDE:

- ✓ The wide gravel shoulder with the existing watermain underground on the east side of the road provides space to build the greenway.
- ✓ Located on the outside of the horizontal curve for much of its length, providing improved visibility. Also, minimal vegetation increases exposure to light.
- × There are numerous power poles running along the east side of Lucasville Road from Pockwock Service Road to Bryanston Road.
- × Few destinations along the west side with the exception of the Wallace Lucas Community Centre & Atlantic Playground.
- × Existing watermain in the shoulder of the road which requires exposure coverage.
- × Steep grades towards homes from roadway.
- × Requires multiple marked crosswalks to access destinations on west side of Lucasville Road.

5 OPTIONS EVALUATION

5.1 EVALUATION CRITERIA

A framework of evaluation criteria was developed to provide a high level comparative analysis of AT facility options. These criteria are described below, are listed in no particular order, and have not been assigned relative weighting. They are intended only to identify strengths and weaknesses of the option being evaluated.

Table 5-1: Evaluation Considerations

Criteria	Description
Convenience/ Connectivity	The degree to which the option is convenient to a wide variety of users. Influenced primarily by factors including directness and connectivity to key locations along the corridor.
User Comfort/ Safety	The overall level of comfort and safety for users. Influenced primarily by factors including separation from vehicular traffic and management of conflicts at driveways.
Impact to Infrastructure	Impacts to existing utility pole and traffic signal pole locations, storm and sanitary water infrastructure, gas lines, etc.
Impact to Traffic	Impacts to vehicular traffic operation including reduced street / intersection capacity.
Impact to Property Owners	Impact on properties such things as retaining walls, access to homes/land or the local neighbourhood.
Construction Cost	Magnitude of construction cost implications. Consideration for retaining walls, bridge structures, roadway adjustments and/or property acquisition.
Maintenance	Additional level of effort required for ongoing maintenance activities (i.e. snow clearing).

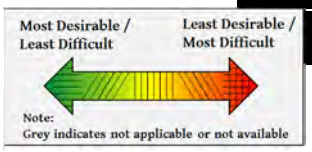
5.2 EVALUATION OF OPTIONS

A multi-criteria analysis was used to evaluate the two AT facility options under consideration. Each option was given equal weight and evaluated based on the identified study evaluation criteria in order to assess its ability to meet defined project objectives while considering its feasibility and accommodation to users' needs. A matrix, presented in Table 5-2, was created to enable the comparison between options based on study evaluation criteria.

The evaluation found that the west side AT greenway is the best option for meeting project objectives and the needs of users. This option provides excellent connectivity to local destinations and other AT facilities and provides a high level of safety and comfort for users. Downsides to this option are higher numbers of driveways and conflicts with existing and new infrastructure, but many issues can be mitigated through design. The west side AT greenway option has been pursued for further review, discussed in Section 6.

Table 5-2: Evaluation Matrix

Evaluation Criteria		Greenway Options	
		1. AT Greenway - West Side	2. AT Greenway - East Side
User Convenience	Connections to broader AT network		
	Connections to key destinations		
User Safety / Comfort	Separation from vehicular traffic		
	Conflicts with Traffic (e.g. intersections)		
Impacts	Infrastructure (utility poles, traffic signal poles, and water infrastructure)		
	Traffic Impacts (e.g. reduced capacity)		
	Property Impacts (e.g. acquisition)		
Construction Costs			
Maintenance			



6 PREFERRED DESIGN PLAN

6.1 DESIGN STANDARD

The proposed AT Greenway will have two different cross sections along the corridor and will have a 3m wide asphalt surface with either a curb and grass buffer or the existing ditch separating it from the travel lanes along its length. A minimum of 4.5m separation from the edge of the travel lane will accommodate a 3m Greenway and 1.5m grass buffer. In accordance with AT guidelines, grades should be as flat as possible, with maximum slopes in the 5-8% range. The proposed cross sections are depicted in Figure 6-1 and Figure 6-2.

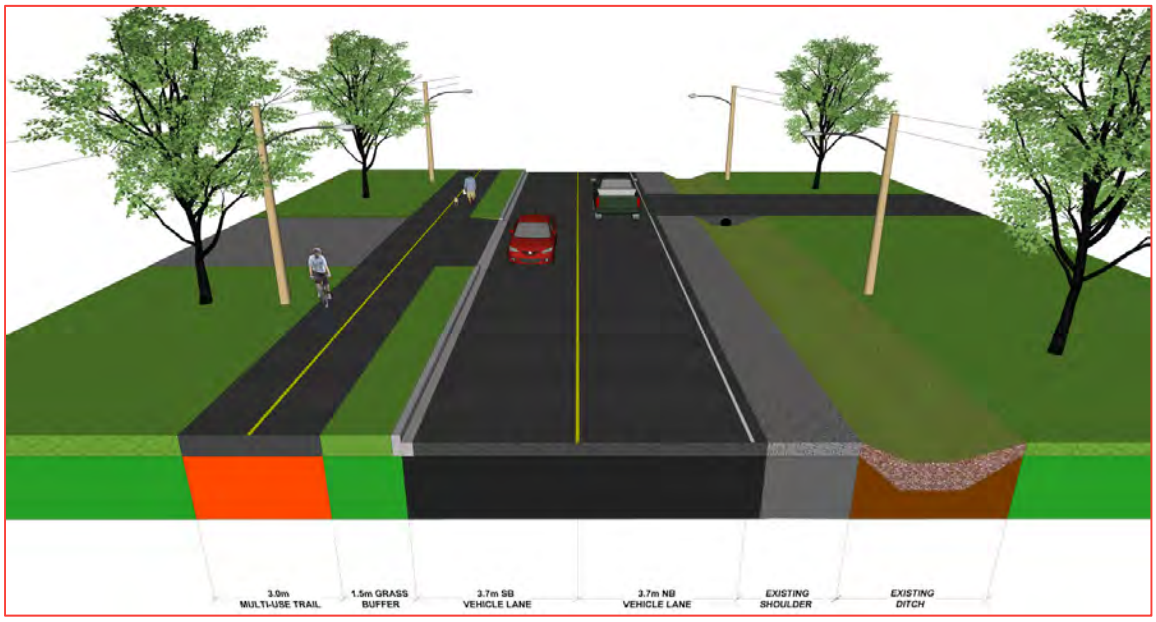


Figure 6-1: Proposed Lucasville Road Cross Section with curb looking north

Figure 6-2: Proposed Lucasville Road Cross Section with existing ditch looking north

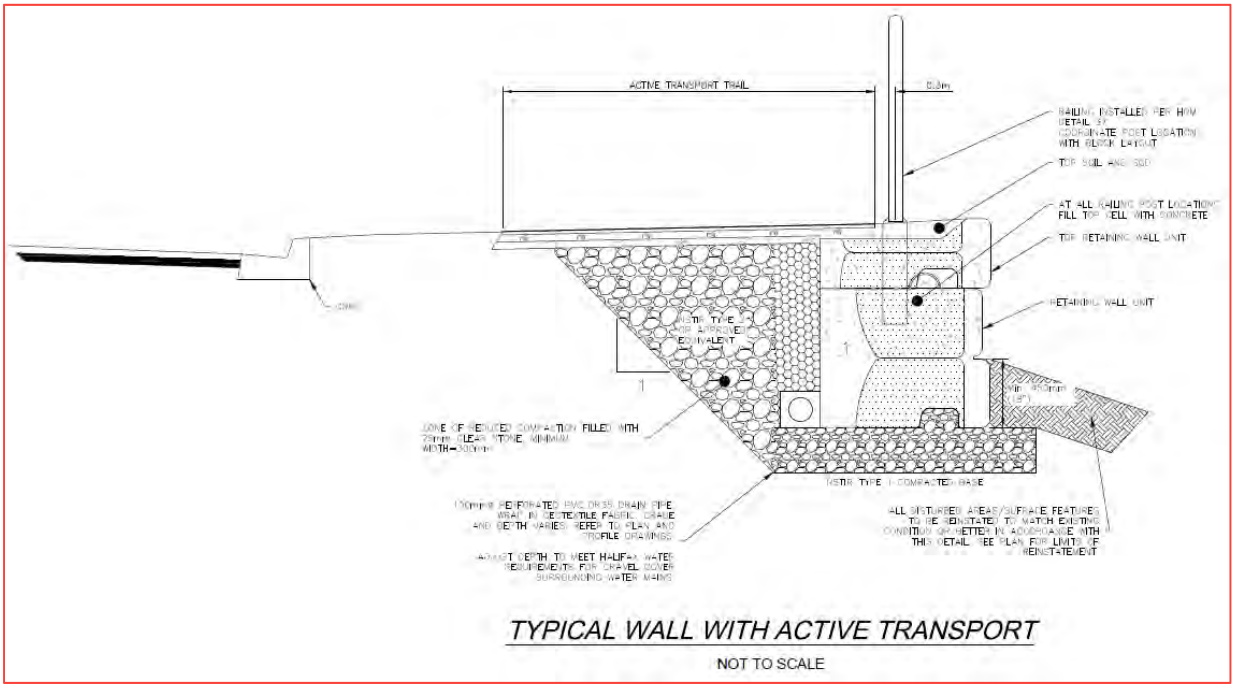
6.1.1 DETAILED DESIGN PHASE

During the detailed design phase (not included in this scope of work), several considerations should be addressed. The proposed design includes a cross section along Lucasville Road with an existing ditch (looking north) that has the potential for run off water, therefore, the cross drains will be designed to slope away from property owners to prevent water drainage from encroaching on their properties. In addition, the AT facility will be designed to include a 1.5-meter wide buffer for snow clearing reserves and existing infrastructure such as utility poles, fire hydrants and trees, which will allow for necessary maintenance along the corridor.

Another approach for the design of the AT facility along Segment 3 is to re-design portions of the section of roadway from Wallace Lucas Community Centre (WLCC) to Old Sackville Road. This re-design may include curb and gutter on both sides of the road and an alignment shift away from the steep cliff. This would reduce or eliminate the need for a retaining wall along the west side of Lucasville Road. A typical retaining wall cross section is shown in Figure 6-3.

Along the sections where there is curb and gutter, there is required to be a storm sewer system to catch and disperse the surface water. The proposed infrastructure selected for this project includes manholes, catchbasins, storm sewer piping and outlet areas. For the sections noted within the project study area, there is approximately 1.7km of AT facility that requires a storm sewer system. The typical maximum length for manholes/catchbasins is 120m and this depends on grading and the curvature of the system. Keeping this in mind, there will be approximately 15 manholes/catchbasins required along the AT facility. The manhole is suggested to be surrounded by asphalt and flush with the asphalt surface so there isn't a depression at every manhole cover.

Concern has been expressed involving the transformation of Lucasville Road from a rural road to partially an urban connector and an urban arterial. The concern is that this transformation will create inconsistencies along the roadway, however, the development of purposed multi-use path will provide an opportunity to establish consistencies and correct existing inconsistencies. During the detailed design process, geotechnical investigation should be completed as this area is known for acidic slate.



TYPICAL WALL WITH ACTIVE TRANSPORT

NOT TO SCALE

Figure 6-3: Typical Retaining Wall Cross Section

6.2 PHASING & ALIGNMENT

Lucasville Road was separated into four segments to illustrate the proposed AT Greenway conceptual design plans. The four segments along Lucasville Road, from Old Sackville Road to Hammonds Plains Road, are illustrated in Figure 6-4 and described below:

- Segment 1 – Old Sackville Road to Bryanston Road
- Segment 2 – Bryanston Road to Waterstone Run
- Segment 3 – Waterstone Run to Cranley Road
- Segment 4 – Cranley Road to Hammonds Plains Road

After the evaluation comparing the west and east side greenway options was complete, the selected option is the Greenway being placed on the **west side** (see Table 5-2**)**. The summaries for Segments 1, 2 and 3 are provided in Table 6-1.

Table 6-1: Summary of Segments 1, 2 & 3

	Lucasville Road		
	Segment 1 (Old Sackville Rd to Bryanston Rd)	**Segment 2** (Bryanston Rd to Waterstone Run)	**Segment 3** (Waterstone Run to Cranley Rd)
Infrastructure	Install AT Greenway and concrete curb and gutter on the west side of Lucasville Road. A pedestrian bridge is required across the Sackville River. (Potential opportunity to coordinate with Halifax Water with Phase 2 of their transmission line project.) A retaining wall may be required along Segment 3.	Install AT Greenway and concrete curb and gutter on the west side of Lucasville Road.	Install AT Greenway behind the existing ditch on the west side of Lucasville Road.
Segment Length	2.0 km	1.7 km	1.7 km
Cross Section	3m asphalt trail on the west side, 1.5m (min) buffer with curb and gutter (See Figure 6-1).	3m asphalt trail on the west side, 1.5m (min) buffer with curb and gutter (See Figure 6-1).	3m asphalt trail on the west side behind the existing ditch (See Figure 6-2).
Halifax Water	Halifax Water plans to extend the transmission line on the west side of Lucasville to Sackville Drive in the next few years.	The new Halifax Water transmission line will be located on the west side of Lucasville Road. The transmission line includes the required underground storm sewer.	With the implementation of the AT facility behind the existing ditch, there will be little to no impact to the proposed Halifax Water transmission line.
Pedestrian Crossings	RRFB crosswalk proposed at Old Sackville Road with curb extensions, if space is available.	RRFB crosswalks proposed for connections to Bryanston Road and Wallace Lucas Community Centre.	RRFB crosswalk proposed at Cranley Road for connections Atlantic Playground.
West Side Utility Poles	Need to relocate 22 of 34 utility poles to behind the greenway.	Need to relocate 15 of 40 utility poles to behind the greenway.	Need to relocate 3 of 6 utility poles to between the road and greenway.
Property Acquisition	Pinch point at Civic #330, may require property acquisition.	None anticipated.	An easement or property is required from Timber Trails (between First and Tenth Street) to incorporate the existing crusher dust path (and upgrade to 3 metre asphalt greenway).

6.2.1 *SEGMENT 4: CRANLEY ROAD TO HAMMONDS PLAINS ROAD*

Topographic survey data were not available for Lucasville Road from Pockwock Service Road to Hammonds Plains Road and this section, was reviewed using aerial images and notes/information gathered during the site drive along Lucasville Road.

To continue consistency and complete the AT Facility connection to Hammonds Plains Road, the extension of the AT Greenway from Cranley Road (Segment 2) will continue along the east side of Lucasville Road. The AT Facility will be similar to the cross section shown in Figure 6-2. The existing watermain is on the east side of Lucasville Road and this may require for the facility to be behind the ditch, closer to the properties.

Further investigation will be required for Segment 4 to determine the location of the existing watermain, property boundaries, utilities and the road right-of way.

6.2.2 *ADDITIONAL IMPROVEMENTS*

SPEED REDUCTION

Other design elements can be considered to reduce speed along a section of roadway. Commonly used are the speed reduction signs, also known as Feedback Signs, which shows the approximate speed of the approaching vehicle. This measure can be helpful in reducing speed.

Another measure that may be included to reduce speed along Lucasville Road, is to have a consistent posted speed limit. There are three different posted speed limits along Lucasville Road ranging from 50-70 km/h. With a consistent speed limit and police enforcement, the speed may reduce.

LANDSCAPE OPTIONS

To improve the aesthetics and assist with beautifying the community, trees, plants and shrubs can be planted within the grass buffer area between the proposed multi-use greenway. When designing the locations for the landscape elements the visibility between vehicles and the multi-use greenway users must remain clear at driveway locations and on the approach to side streets.

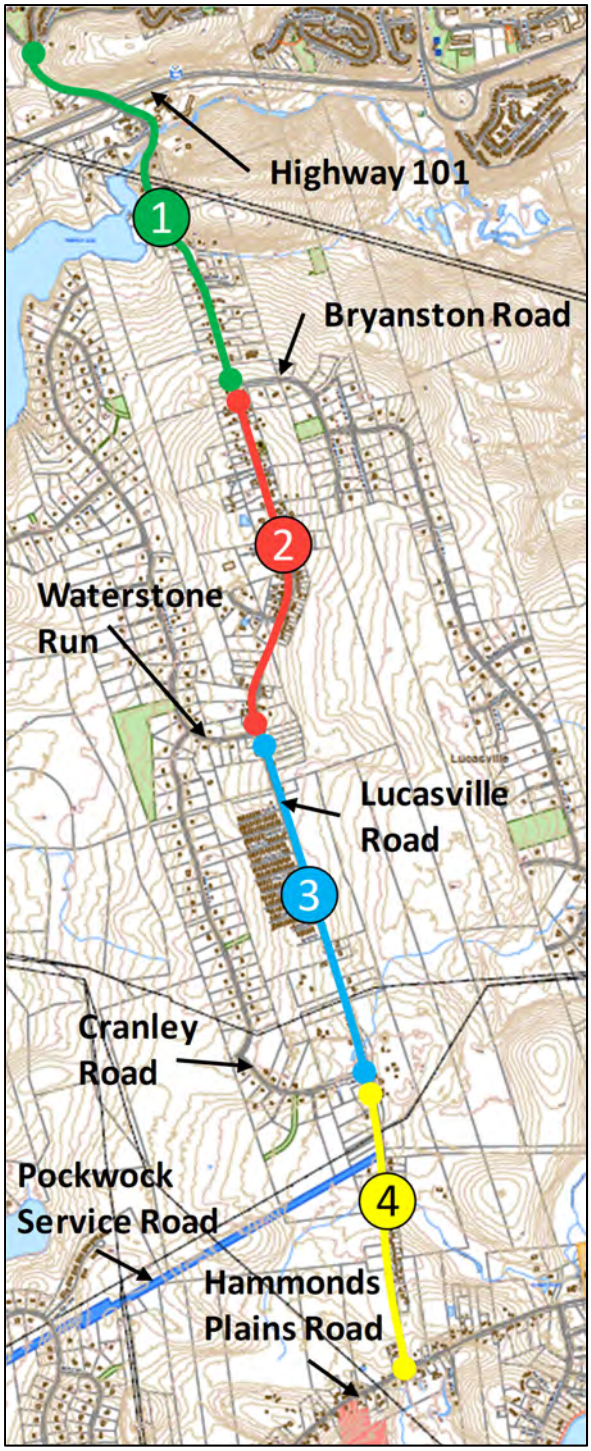


Figure 6-4: Proposed Segments for Greenway

6.2.3 COST ESTIMATES FOR GREENWAY

Class 'C' cost estimates have been prepared for the preferred design options provided in Appendix A. The cost estimates do not include possible property acquisition, relocation of utility poles and services or underground infrastructure relocation. It is estimated that these measures can be implemented for a budget of $7,670,000 plus HST. The breakdown per segment is as follows and the cost breakdown is further detailed in Appendix B.

- Segment 1 – Old Sackville Road to Bryanston Road $ 4,230,000
- Segment 2 – Bryanston Road to Waterstone Run $ 2,620,000
- Segment 3 – Waterstone Run to Cranley Road $ 820,000

Total **$ 7,670,000**

** Note: Segment 4 was reviewed at a high level and did not include a conceptual design or cost estimate.

7 SUMMARY & RECOMMENDATIONS

7.1 SUMMARY

HRM is continuing to improve on the existing active transportation (AT) infrastructure and create new opportunities to provide a safer, more comfortable place to walk and cycle in the municipality that will help people choose active travel to get from origin to destination. In June 2017, Council approved the addition of Lucasville Road in HRM's Active Transportation 2014-19 Priorities Plan.

The local community group, LGS, has identified the need for active transportation facilities to provide connection and access to other communities, community assets and destinations on Sackville Drive and Hammonds Plains Road. There is a strong desire to have affordable transportation such as bus service, accessibility, walking/cycling infrastructure that is important to the community.

The primary goal of this project is to provide functional planning, integration analysis and cost estimates for active transportation infrastructure opportunities along Lucasville Road within the perimeter of the new watermain proposed by Halifax Water. The Study Area for this project extends from Old Sackville Road to Hammonds Plains Road along Lucasville Road.

Conceptual Design Options were prepared and presented to the Lucasville Greenway Society to receive comments and concerns on the proposed active transportation facilities. Feedback was provided on the routing and the design options to assist with identifying the preferences of the proposed AT facility.

The preferred option for each segment was identified through discussion with HRM staff as well application of the evaluation criteria developed for this assessment. Conceptual design plans (30%) for Segments 1, 2 & 3 (Old Sackville Road to Cranley Road) were prepared for the AT facilities on Lucasville Road.

7.2 IMPLEMENTATION PLAN AND RECOMMENDATIONS

This document outlines a conceptual plan for an active transportation corridor along Lucasville Road. A proposed implementation plan has been identified below to demonstrate the necessary proceeding actions.

FINALIZE FEASIBILITY

- HRM to finalize decision regarding the feasibility of this project.

DETAILED PLANNING

- Proceed with the detailed planning while prioritizing the next Halifax Water watermain section.

DESIGN PLANNING

- Proceed with the design planning to recapitalize the roadway.

FUNCTIONAL PLANNING

- Proceed with the functional planning for the remainder of the projects vision.

Based on the background review, Lucasville Greenway Society engagement, as well as conceptual design, the following recommendations have been developed for consideration by HRM. Recommendations are presented as Priority A & B where items in Priority 'A' should generally be considered during the earlier months of the Action Plan, with those in Priority 'B' considered in the later months.

PRIORITY 'A'

- Collect legal survey and additional topographical survey (behind ROW) for Segment 3 (Waterstone Run to Cranley Road).
- Complete the detailed design for Segment 2 & 3 and tender the work for construction.
- Gain an easement/acquire property from Timber Trails of the existing gravel pathway for Segment 3.
- HRM should acquire property, as needed, along Segment 3 on the west side of Lucasville Road.

PRIORITY 'B'

- Complete the detailed design of Segment 1 and tender the work for construction.
- Complete survey and detailed design of Segment 4 and tender the work for construction.

7.3 NEXT STEPS

WSP was hired in July 2019 to complete a feasibility study to further review Segment 1 (Old Sackville Road to Wallace Lucas Community Centre). The feasibility study was intended to provide further assessment and routing options for this Segment to determine options to combine the future phase of Halifax's Water watermain, road recapitalization and a multi-use pathway (MUP) on Lucasville Road and is attached in Appendix C.

The feasibility study determined the following:

- WSP developed five (5) potential route options (Options 1, 1A, 2, 2A and 2B) along Segment 1. During the internal review process, it was determined that Option 1 and Option 2 were significantly more feasible than the remaining possibilities. Cross sections were prepared for consideration for Option 1 and Option 2 that included existing utilities. Due to the impracticality of the additional possibilities (Options 1A, 2A and 2B), they were not further investigated. The opportunities and obstacles associated with all of the potential options are summarized in the Cross Section Memo in Appendix C (Memo Appendix A).
- Option 1 and Option 2 were evaluated in order to assess the ability to meet defined project objectives while considering its practicality and accommodation to users' needs. WSP prepared evaluation criteria to complete a high-level comparative analysis of Option 1 and 2. Some of the criteria included, convenience/connectivity, user comfort/safety, impacts to infrastructure and construction cost. The evaluation matrix indicated that Option 2 consists of more beneficial attributes than Option 1. Establishing a multi-use pathway on the east side of Lucasville Road offers the following key attributes:
    - Horizontal displacement and some vertical displacement from vehicular traffic.
    - Ties into the existing sidewalk on Old Sackville Road, therefore, cyclists would not be required to dismount until this intersection.
    - Future option to continue the MUP to Sackville Drive on the east side of Lucasville Road.
    - Alignment falls within the recommended slope range for AT user comfort.
    - Requires minimal fill to meet grading requirements.
    - Expected to have maintain space for snow storage by the existing ditch remaining on the east side of Lucasville Road.
- WSP completed the 30% detailed design package which included the drawings and the construction cost estimate for the multi-use pathway on Lucasville Road from Old Sackville Road to Wallace Lucas Community Centre and can be found in Appendix C (Memo Appendix B & C).

Appendix A

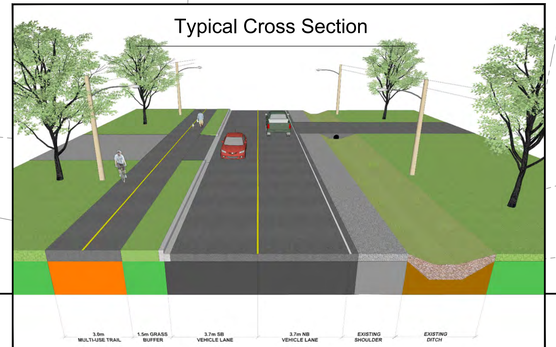
CONCEPT DESIGN PLANS

Segment 1
Segment 2

RELOCATE U.P.
RELOCATE U.P.
TIE INTO EXISTING DRIVEWAYS (TYP.)
RELOCATE U.P.
NEW CURB
EXISITNG UTILITY POLE WITH GUY WIRE
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
RELOCATE U.P.
MATCHLINE 1A
TO BRYANSTON ROAD
EXISITNG TREE
EXISTING 400mmØ WATERMAIN
FUTURE LOCATION OF WATER TRANSMISSION MAIN
EXISITNG EDGE OF ASPHALT
RELOCATE U.P.
LUCASVILLE ROAD
WADEE CT
D T Storage
3+500
3+600
3+700
3+800
3+900
4+000
515
510
483
467
463
449
425
421
407
395
488
488
478
474
460
452
438
434
406
386

WEBBER DRIVE
RETAINING WALL REQUIRED
TIE INTO EXISTING DRIVEWAYS (TYP.)
LUCASVILLE ROAD
RETAINING WALL REQUIRED
RELOCATE U.P.
RELOCATE U.P.
EXISTING 400mmØ WATERMAIN
EXISITNG EDGE OF ASPHALT
RELOCATE U.P.
FUTURE LOCATION OF WATER TRANSMISSION MAIN
RELOCATE U.P.
RETAINING WALL REQUIRED
EXISITNG FIRE HYDRANT
EXISITNG UTILITY POLE WITH GUY WIRE
MATCHLINE 1A
4+100
4+200
4+300
4+400
4+500
4+600
4+700
355
371
370
306
276
262
231
225
Stockville River
EXISITNG STONE WALL TO BE RELOCATED
NEW AT BRIDGE (APPROX. 30m LONG)
EX. BRIDGE
MATCHLINE 1B

Legend
- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPERTY ENCROACHMENT
- EXISTING UTILITY POLES
- EXISTING TREES
- EXISTING BUILDING
- PROPOSED AT TRAIL
- DRIVEWAY REINSTATEMENT
- NEW CURB
- FUTURE LOCATION OF WATER TRANSMISSION MAIN
- EXISTING 400mmØ WATERMAIN
- EXISTING FIRE HYDRANT
- EXISTING DITCH
- EXISTING CULVERT

Typical Cross Section


CONCEPTUAL

EXISITNG UTILITY POLE
EXISITNG FENCE (APPROX.)
White Water Marine Ltd.
HWY. 101 OVERPASS
CONSIDER PLACING TRAIL BEHIND OVERPASS COLUMNS WITH RETAINING WALL
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
SERVICE ROAD
HIGHWAY 101
TIE INTO EXISTING DRIVEWAYS (TYP.)
EXISITNG FIRE HYDRANT
NEW CURB
EXISITNG EDGE OF ASPHALT
EXISTING 400mmØ WATERMAIN
EXISITNG FIRE HYDRANT
EXISTING STONE WALLS TO BE RELOCATED
LUCASVILLE ROAD
MATCHLINE 1B
Hefler Forest Products
RELOCATE GUIDERAIL
EXISTING EDGE OF ASPHALT
EXISTING CURB
EXISTING EDGE OF SIDEWALK
UPGRADE EXISTING SIDEWALK TO MULTI-USE TRAIL
ADD TACTILE INDICATOR
EXISTING CROSSWALK LOCATION, UPGRADE TO SHARED CROSSING LOCATION
EXISTING SIDEWALK
OLD SACKVILLE ROAD
4+800
4+900
5+000
5+100
5+200
5+300
5+400
5+500
211
225
93
89
85

SEGMENT 1 - CONCEPT PLAN
Lucasville Road AT Connector
Lucasville, Nova Scotia

HALIFAX

MARCH 31, 2021

181-11813

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Sheet Segment 1 +24x36

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LUCASVILLE ROAD

WATERSTONE RUN

PROPOSED CROSSWALK

Segment 2
Segment 3

NEW CURB

EXISITNG UTILITY POLE WITH GUY WIRE

TIE INTO EXISTING DRIVEWAYS (TYP.)

RELOCATE U.P.

EXISTING 400mmØ WATERMAIN

NEW 600mmØ WATER TRANSMISSION MAIN

EXISITNG EDGE OF ASPHALT

EXISITNG UTILITY POLE (U.P.)

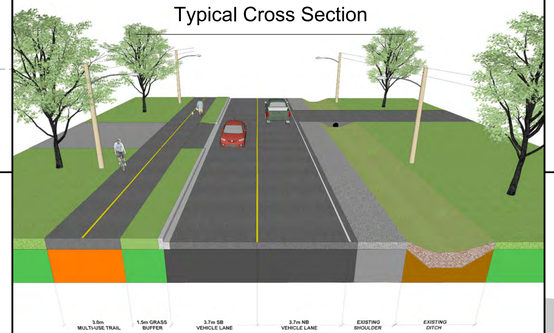
SALTO DRIVE

MATCHLINE 2A

Legend

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPERTY ENCROACHMENT
- EXISTING UTILITY POLES
- EXISTING TREES
- EXISTING BUILDING
- PROPOSED AT TRAIL
- DRIVEWAY REINSTATEMENT
- NEW CURB
- FUTURE LOCATION OF WATER TRANSMISSION MAIN
- EXISTING 400mmØ WATERMAIN
- EXISTING FIRE HYDRANT
- EXISTING DITCH
- EXISTING CULVERT

Typical Cross Section



CONCEPTUAL

EXISITNG DRIVEWAY POSTS

EXISTING FIRE HYDRANT

EXISTING TREE

RELOCATE U.P.

BYRONS LANE

RELOCATE GUY WIRE

EXISTING UTILITY POLE

EXISTING FIRE HYDRANT

EXISTING EDGE OF ASPHALT

MATCHLINE 2B

Lucasville United Baptist Church

WILLIAM PARSONS LANE

RELOCATE U.P.'s

EXISITNG STONE POSTS AND WALL

EXISITNG UTILITY POLE WITH GUY WIRE

ADD TACTILE INDICATOR

PROPOSED SHARED CROSSING LOCATION

Wallace Lucas Community Centre

BRYANSTON ROAD

Segment 1
Segment 2

SEGMENT 2 - CONCEPT PLAN
Lucasville Road AT Connector

Lucasville, Nova Scotia

HALIFAX

MARCH 31, 2021

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Sheet Segment 2-24x36

SEGMENT 3
SEGMENT 4
CRANLEY ROAD
ADD TACTILE INDICATOR
NEW CULVERT
PROPOSED CROSSWALK
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
EXTEND CULVERTS
EXISTING FIRE HYDRANT
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
EXISTING FENCE
EXISTING FIRE HYDRANT
EXISITNG UTILITY POLE
LUCASVILLE ROAD
Atlantic Splash Adventure
PROPOSED SHARED CROSSING LOCATION
EXISTING WATERCOURSE
EXISITNG UTILITY POLE WITH GUY WIRE
EXISTING EDGE OF ASHALT
EXISTING 400mmØ WATERMAIN
NEW 600mmØ WATER TRANSMISSION MAIN
MATCHLINE 3A
MATCHLINE 3A
TENTH STREET
NINTH STREET
EIGHTH STREET
SEVENTH STREET
SIXTH STREET
FIFTH STREET
FOURTH STREET
THIRD STREET
RELOCATE EXISITNG UTILITY POLE WITH GUY WIRE
EXISTING STORM LATERAL
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
EXISTING TREE
EXISTING EDGE OF ASHALT
EXISTING 400mmØ WATERMAIN
NEW 600mmØ WATER TRANSMISSION MAIN
EXISITNG SANITARY FORCEMAIN
LUCASVILLE ROAD
MATCHLINE 3A
MATCHLINE 3B
MATCHLINE 3B

NOTE:
PROPOSED A.T. TRAIL TO MATCH ALIGNMENT OF EXISTING TIMBER TRAILS GRAVEL PATHWAY BETWEEN FIRST STREET AND TENTH STREET

Legend

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPERTY ENCROACHMENT
- EXISTING UTILITY POLES
- EXISTING TREES
- EXISTING BUILDING
- PROPOSED AT TRAIL
- DRIVEWAY REINSTATEMENT
- NEW CURB
- FUTURE LOCATION OF WATER TRANSMISSION MAIN
- EXISTING 400mmØ WATERMAIN
- EXISTING FIRE HYDRANT
- EXISTING DITCH
- EXISTING CULVERT

Typical Cross Section

CONCEPTUAL

THIRD STREET
SECOND STREET
FIRST STREET
RELOCATE GUY WIRE
REINSTATE ASPHALT DRIVEWAY
LIMIT OF EXISTING GRAVEL PATH
RELOCATE EXISTNG MAILBOXES
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
EXISITNG UTILITY POLE
NEW 600mmØ WATER TRANSMISSION MAIN
1.0m GRAVEL BUFFER
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
Dog Park
Wilson's Family Farm Market
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
EXTEND CULVERT
Segment 2
Segment 3
WATERSTONE RUN
LUCASVILLE ROAD
EXISTING FIRE HYDRANT
EXISTING SIGN POST
EXISTING EDGE OF ASHALT
EXISTING 400mmØ WATERMAIN

SEGMENT 3 - CONCEPT PLAN
Lucasville Road AT Connector

Lucasville, Nova Scotia

HALIFAX

MARCH 31, 2021 181-11813

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Sheet Segment 3-24x36

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Appendix B

COST ESTIMATES

LUCASVILLE ROAD AT CONNECTOR
CLASS 'C' ESTIMATE OF PROBABLE COSTS

PROJECT NO.	181-11813
DATE:	March 31, 2021
CLIENT:	HRM
CONSULTANT:	WSP
UNIT PRICE SOURCE:	WSP

NOTES:

1. ALL PRICES SHOWN ARE IN 2019 CANADIAN DOLLARS AND EXCLUDE HST.
2. QUANTITIES BASED ON WSP SEGMENT 1, 2 AND 3 CONCEPT DRAWINGS, DATED MARCH 31, 2021.
3. ESTIMATE DOES NOT INCLUDE COST ALLOWANCES FOR PROPERTY ACQUISITION, UTILITY POLE RELOCATION, ENGINEERING, ADMINISTRATION OR
4. CONSTRUCTION COSTS DO NOT INCLUDE FEES FOR RE-DESIGN OR INSTALLATION OF PROPOSED WATERMAIN.
5. TRAIL UNIT PRICES ARE BASED ON STANDARD HRM GRAVEL AND ASPHALT THICKNESSES (250mm TYPE 2 GRAVEL, 150mm TYPE 1 GRAVEL, 75mm
6. STREET LANDSCAPING ELEMENTS HAVE BEEN EXCLUDED EXCEPT FOR TOPSOIL & SOD REINSTATEMENT.
7. QUANTITIES AND UNIT PRICES ARE BASED ON A STAND ALONE PROJECT. THERE MAY BE SAVINGS IN SEGMENT 1 IF THIS PROJECT IS COMPLETED IN CONJUNCTION WITH THE WATERMAIN INSTALLATION WORK.
8. COSTS SHOWN FOR TRAIL INSTALLATION AT THE SEGMENT 3 OVERPASS IS A GENERAL ALLOWANCE ONLY. FURTHER INVESTIGATION AND DETAILED DESIGN IS REQUIRED TO DETERMINE THE APPROPRIATE TRAIL TREATMENT AND ASSOCIATED COSTS AT THE HIGHWAY CROSSING.

				SEGMENT 2		SEGMENT 3		SEGMENT 1	
ITEM	DESCRIPTION	UNITS	UNIT PRICE	QNTY.	COST	QNTY.	COST	QNTY.	COST
EARTHWORK									
1	Clearing	ha	$15,000	0.2	$3,000	0.2	$3,000	0.3	$4,500
2	Grubbing	ha	$35,000	0.2	$7,000	0.2	$7,000	0.3	$10,500
7	Borrow	m3	$25	4,300	$107,500	900	$22,500	5,000	$125,000
WATER SYSTEM									
11	Fire Hydrant								
11.2	Relocation of Fire Hydrant	each	$7,500	0	$0	2	$15,000	0	$0
STORM SEWER									
30	Storm Pipe	m	$500	1720	$860,000	0	$0	1,890	$945,000
31	Storm Manholes	each	$4,500	22	$99,000	0	$0	24	$108,000
32	Catchbasins	each	$3,000	22	$66,000	0	$0	24	$72,000
33	Catchbasin Leads	m	$450	66	$29,700	0	$0	72	$32,400
36	Culverts								
36.4	750mm Dia. Concrete, 65D	m	$650	0	$0	11	$7,150	0	$0
36.34	Extend 2x900mm Culverts with Headwalls at Watercourse Crossing	m	$2,500	0	$0	9	$22,500	0	$0
38	Remove Existing Structures								
38.3	Remove Culverts	each	$900	47	$42,300	0	$0	25	$22,500
39.1	Culvert Headwalls								
39.1.1.3	Concrete Headwall (750mm Dia.)	each	$800	0	$0	1	$800	0	$0
39.1.2	Gabion Headwall	m3	$700	0	$0	23	$16,100	0	$0
STREET WORKS									
40	Gravels								
40.3	Type 1 - 150mm Thick	m2	$15	6,200	$93,000	5,980	$89,700	7,200	$108,000
40.7	Type 2 - 250mm Thick	m2	$25	7,570	$189,250	7,310	$182,750	8,800	$220,000
40.17	Type 1S - 75mm Thick	m2	$8	0	$0	1,660	$13,280	0	$0
42	Asphalt Concrete								
42.1.2	Type C-HF - 50mm Thick	m2	$17	520	$8,840	0	$0	600	$10,200
42.1.8	Type B-HF - 75mm Thick	m2	$25	520	$13,000	0	$0	600	$15,000
42.1.13	Type D-HF - 75mm Thick	m2	$30	5,160	$154,800	4,980	$149,400	6,000	$180,000
42.3.13	Full Depth Asphalt Removal	m2	$5	390	$1,950	460	$2,300	280	$1,400
43	Curb								
43.1	Concrete Curb and Gutter	m	$120	1720	$206,400	0	$0	1,890	$226,800
44	Sidewalk								
44.12	Sidewalk Removal	m2	$30	0	$0	0	$0	170	$5,100
45	Retaining Wall	m2	$750	0	$0	0	$0	640	$480,000
49	Driveway Reinstatement								
49.1	Driveway Reinstatement, Gravel - 150mm	t	$45	290	$13,050	70	$3,150	160	$7,200
49.2	Driveway Reinstatement, Asphalt - 65mm	m2	$55	390	$21,450	460	$25,300	280	$15,400
LANDSCAPING									
50.1	Topsoil & Sod - 150mm Thick	m2	$15	5,200	$78,000	2,500	$37,500	6,000	$90,000
57	Handrails and Fences	m	$250	0	$0	0	$0	320	$80,000
ADDITIONAL ITEMS									
65	Pavement Markings	LS	Varies	1	$4,000	1	$3,500	1	$4,000
69.1	30m AT Bridge	LS	$400,000	0	$0	0	$0	1	$400,000
69.2	Trail Overpass Installation	LS	$100,000	0	$0	0	$0	1	$100,000
EROSION AND SEDIMENT CONTROL									
74	Environmental Controls	LS	Varies	1	$5,000	1	$10,000	1	$20,000

ITEM	DESCRIPTION	UNITS	UNIT PRICE	SEGMENT 2 QNTY.	SEGMENT 2 COST	SEGMENT 3 QNTY.	SEGMENT 3 COST	SEGMENT 1 QNTY.	SEGMENT 1 COST
MISCELLANEOUS									
92	Guiderails								
92.7	Remove and Reinstall Guiderail	m	$100	0	$0	0	$0	20	$2,000
94	Tactile Warning Surface Indicator	each	$300	1	$300	1	$300	1	$300
99.1	Traffic Control	LS	Varies	1	$60,000	1	$20,000	1	$80,000
99.2	Relocation / Reinstatement of Miscellaneous Private Property Items (pillars, walls, signs, landscaping, etc.)	LS	Varies	1	$35,000	1	$25,000	1	$20,000

Segment 2 = Install 3.0m paved trail c/w Storm Sewer System behind new curb on west side of Lucasville Road between Bryanston Road and Waterstone Run.

Segment 3 = Install 3.0m paved trail behind ditch on west side of Lucasville Road between Waterstone Run and Cranley Road.

Segment 1 = Install 3.0m paved trail c/w Storm Sewer System behind new curb on west side of Lucasville Road between Bryanston Road and Old Sackville Road.

	Segment 2	Segment 3	Segment 1
Sub-Total	**$2,098,540**	**$656,230**	**$3,385,300**
Contingency (25%)	**$524,640**	**$164,060**	**$846,330**
TOTAL COST (excl. HST)	**$2,620,000**	**$820,000**	**$4,230,000**

Disclaimer: This estimate of probable construction cost is approximate only. Actual cost may vary significantly from this estimate due to market conditions such as material and labour costs, time of year, industry workload, competition, etc. This estimate has been prepared based on our experience with similar projects. This estimate has not been prepared by obtaining any estimates or quotes from contractors. Due to the uncertainties of what contractors bid, WSP cannot make any assurances that this estimate will be within a reasonable range of the tendered low bid. When assessing this project for business feasibility purposes this estimate should not be relied upon without considering these factors.

Appendix C

LUCASVILLE AT CORRIDOR: OLD SACKVILLE ROAD TO WALLACE LUCAS COMMUNITY CENTRE – CROSS SECTION CONCEPT MEMO

MEMO

TO: Dawn Neil, Active Transportation Planner, Halifax Regional Municipality

FROM: Courtney McCarthy, P.Eng. - Transportation Engineer, WSP Canada Inc.

SUBJECT: **Lucasville Active Transportation Corridor: Old Sackville Road to Wallace Lucas Community Centre – Cross Section Concept Memo**

DATE: **April 30, 2021**

BACKGROUND INFORMATION

The Halifax Regional Municipality (HRM) is continuing to improve on the existing active transportation (AT) infrastructure and create new opportunities to provide a safer and more comfortable place to walk and cycle in the municipality. In June 2017, Council approved the addition of Lucasville Road in HRM's Active Transportation 2014-19 Priorities Plan.

The local community group, Lucasville Greenway Society (LGS), has identified the need for active transportation facilities to provide connection and access to other communities, community assets and destinations on Sackville Drive and Hammonds Plains Road. There is a strong desire to have affordable transportation such as bus service, accessibility and walking/cycling infrastructure.

In 2018, WSP Canada Inc. (WSP) was retained to complete functional planning, integration analysis and cost estimates from active transportation opportunities along Lucasville Road within the perimeter of the new Halifax Water watermain. The study area extended from Old Sackville Road to Cranley Road and was divided into three (3) segments. Preferred design options for each segment were identified by applying evaluation criteria that was developed for the assessment and deliberation with HRM staff and the LGS. Conceptual design plans (30%) for the AT facilities for Segments 1, 2 and 3 were completed in June 2019 and revised in April 2021.

In July 2019, WSP was retained to complete a feasibility study for the section of Lucasville Road from Old Sackville Road to Wallace Lucas Community Centre, Segment 1 (See Figure 1). The feasibility study is intended to provide further assessment and routing options for this Segment to determine options to combine Phase 2 of the watermain, road recapitalization and a multi-use pathway (MUP) on Lucasville Road. This memo outlines the cross-section options developed for this segment of Lucasville Road.

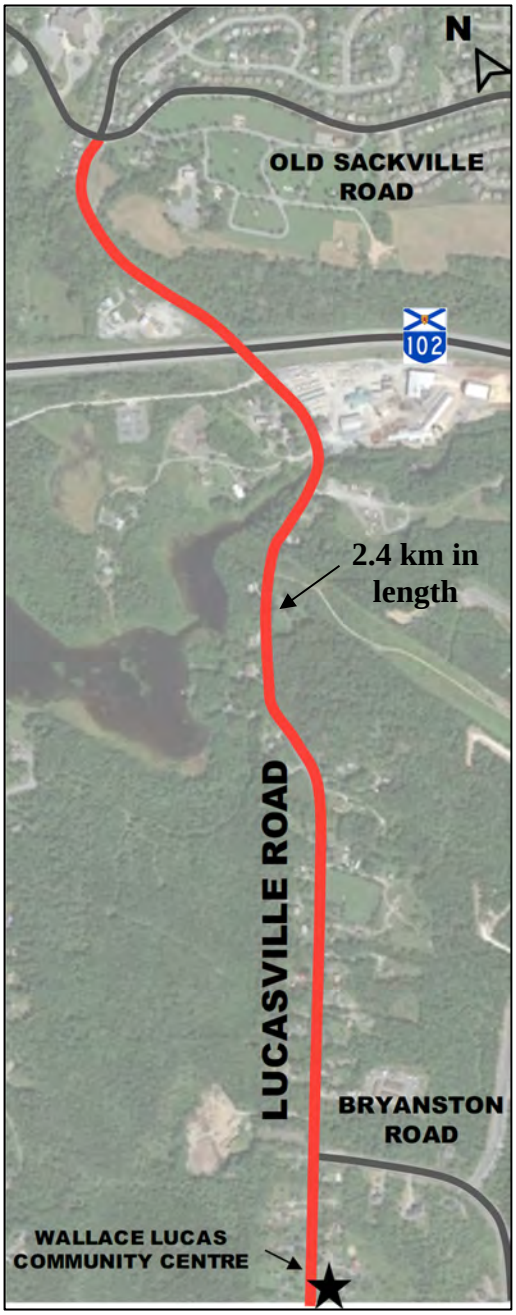


Figure 1 – Lucasville Rd – Old Sackville Rd to WLCC

1 Spectacle Lake Drive
Dartmouth, NS, Canada B3B 1X7
Tel.: +1 902-835-9955
Fax: +1 902-835-1645
www.wsp.com

EXISTING CONDITIONS

Lucasville Road is a two-way collector that runs north-south between Sackville Drive and Hammonds Plains Road (approximately 7.2 kms). In the Segment 1 study area, Lucasville Road observes approximately 8,000 two-way vehicles per day. Two (2) locations within the Segment 1 study area have been chosen to represent the existing conditions along Lucasville Road and to display future possible options that include a multi-use pathway. Location A and Location B are located approximately 330 m and 960 m north of Bryanston Road, respectively (see Figure 2). The posted speed limit is 50 km/h north of Location B and 60 km/h south of Location B.

Currently at Location A, there are two lanes for vehicular traffic and relatively narrow gravel shoulders and ditches on both sides of Lucasville Road (see Figure 3). Location A is located on a negative grade in the northbound direction.

Currently at Location B, there are two lanes for vehicular traffic and relatively narrow gravel shoulders with a ditch on the right side of the roadway and a steep slope on the left side (see Figure 4). Location B is located between two (2) horizontal curves and there is a negative grade present in the northbound direction.

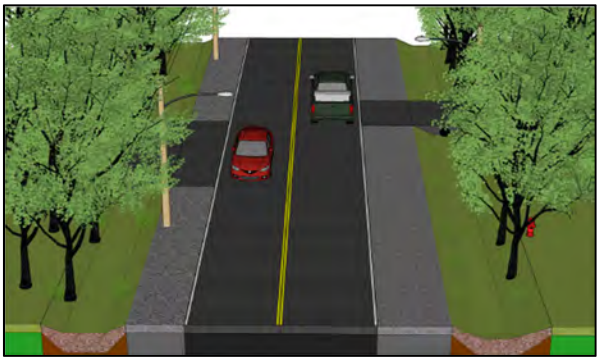


Figure 3 – Lucasville Road Existing Conditions: Location A (Looking North)

Figure 4 – Lucasville Road Existing Conditions: Location B (Looking North)

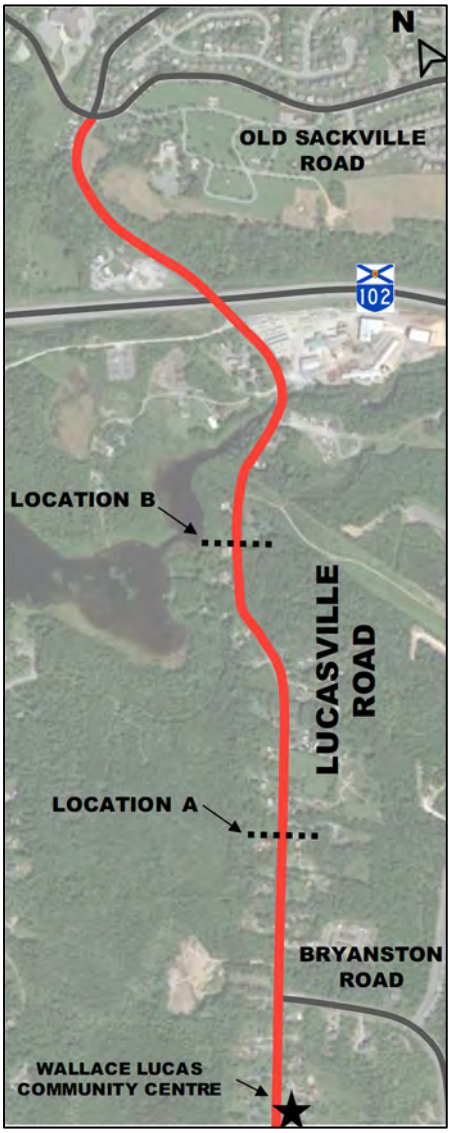


Figure 2 – Location A and B Along Lucasville Road

CONSTRAINTS ALONG THE CORRIDOR

Two constraints identified along the corridor are the Sackville River Bridge Crossing (see Figure 5) and the Highway 101 overpass (see Figure 6).

The Sackville River Bridge Crossing accommodates two lanes of traffic with a sidewalk on the east side. The existing watermain runs parallel to the bridge crossing on the east side of the bridge. This bridge may be up for re-surfacing in the next couple of years, however replacing the structure is a longer timeframe. Therefore, the active transportation facility, whether on the west or east side of the Bridge, will require its own structure.

To provide a connection from the Lucasville community to Sackville, the active transportation facility needs to go under the Highway 101 overpass. The Highway 101 overpass currently allows two lanes of traffic between the two abutments of the bridge. The AT facility may be able to go behind the abutments of the bridge on the west or east side of Lucasville Road. Placing railing where there is a slope can hinder the flow of the multi-use pathway and difficult to install and maintain. Further investigation and detailed design will be required.

Figure 5 – Sackville River Bridge Crossing

Figure 6 – Highway 101 overpass

MULTI-USE PATHWAY OPTIONS

MULTI-USE PATHWAY OPTIONS ON WEST SIDE

Option 1 (West Side MUP) consists of constructing a multi-use pathway along the west side of Lucasville Road for the entire length of Segment 1 (approximately 2.4 kms) and includes a 3m wide asphalt trail with a 1.5m buffer and curb and gutter, see Appendix A. This option was considered in order to integrate construction with the Halifax Water transmission line project.

Option 1A (West Side MUP Road Realignment) includes a 3m wide asphalt multi-use pathway with a 1.5m buffer and curb and gutter on the west side of Lucasville Road. Option 1A involves realigning Lucasville Road between Civic 386 and Sackville River bridge crossing to the east (approximately 550 m) shown in Figure 7 by the yellow dashed line. This option was considered to reduce the length of retaining walls required along the steep slope section of Lucasville Road.

MULTI-USE PATHWAY OPTIONS ON EAST SIDE

Option 2 (East Side MUP) involves constructing a multi-use pathway along the east side of Lucasville Road for the entire length of Segment 1 (approximately 2.4 kms). Option 2 includes a 3m wide asphalt multi-use pathway with two different ditch options, one with curb and gutter and a 1.5m buffer and one with a ditch (buffer), see Appendix A.

Option 2A (East Side MUP Road Realignment) includes the same multi-use pathway as Option 2 and involves realigning Lucasville Road to the west between Civic 386 and Sackville River bridge crossing, shown in Figure 7 by the yellow dashed line.

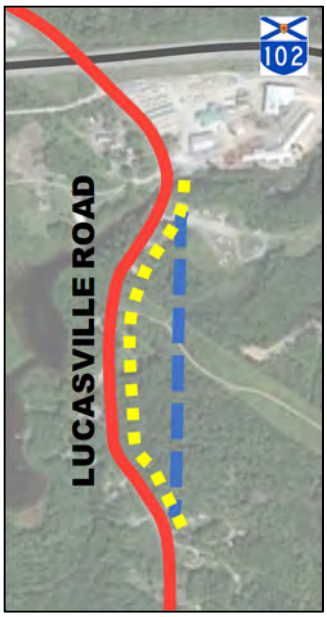


Figure 7 – Realignment & Greenway Options

Option 2B (Greenway MUP Option) includes a 3m wide paved multi-use pathway with gravel shoulders within the HRM easement that parallels Lucasville Road, shown in Figure 7 by the blue dashed line. The HRM easement extends from Civic 386 to the Sackville River bridge crossing.

CROSS SECTION OPTIONS

WSP developed five (5) potential route options (Options 1, 1A, 2, 2A and 2B). During the internal review process, it was determined that Option 1 and Option 2 were significantly more feasible than the remaining possibilities.

Cross sections have been prepared for consideration for Option 1 and Option 2 that include existing utilities and the proposed MUP at Location A and Location B. The detailed drawings for the multi-use pathway described in Option 1 and Option 2 are located in Appendix A. Due to the impracticality of the additional possibilities (Options 1A, 2A and 2B), they were not further investigated and, therefore, no cross sections or detailed drawings were prepared. The opportunities and obstacles associated with all of the potential options are summarized in tables below.

Table 1 – Option 1 Cross Section Opportunities and Obstacles Summary

Option 1 – West Side MUP	✓ AT users are physically separated from vehicular traffic	× New curb required along the entire length of the MUP
	✓ Access to residential properties	× Multiple driveway and intersection crossings
	✓ Minimal property encroachment	× Multiple driveways to be reinstated
	✓ Minimal relocation of existing utility poles	× Retaining wall required for the steep slope
	✓ Potential integration with the Halifax Water transmission line project	× Significant amount of fill required to build up the steep slope area near Location B
	✓ No cut area (excavation) required	× Significant amount of trail fencing is required due to the presence of steep slopes
	✓ Minimal, if any, tree removal required	× Requires new AT structure to cross the Sackville River

Figure 8 – Option 1: Location A

Figure 9 – Option 1: Location B

Table 2 – Option 1A Cross Section Opportunities and Obstacles Summary

Option 1A – West Side MUP Road Realignment	✓ AT users physically separated from vehicular traffic	× Requires realigning Lucasville Road to the east for approximately 550m
	✓ Significantly reduces amount of fill required	× Realignment will require significant amount of rock cutting/excavation
	✓ Improved road structure for Lucasville Road and opportunity to integrate the multi-use pathway with the road reconstruction	× Retaining walls may still be required
		× Significant amount of construction required
		× Additional construction time to rebuild roadway
		× Substantial amount of property acquisition required

*Option 1A was not further investigated, more detail in Option Evaluation section

Table 3 – Option 2 Cross Section Opportunities and Obstacles Summary

Option 2 – East Side MUP	✓ AT users physically separated from vehicular traffic	×	Requires a number of existing utility poles and guy wires to be relocated
	✓ Access to key destinations	×	Driveways impacted with reinstatement
	✓ Minimal amount of fill required	×	Some tree removal is required
	✓ Retaining wall is not required	×	Some cut area (excavation) is required
	✓ New curb required along 550m of Lucasville Road	×	Encroaches private property at multiple locations
	✓ Cyclists are not required to dismount until they reach Old Sackville Road	×	Risk of encroaching on cover required for the existing watermain (PVC pipe)
	✓ Future connection to Sackville Drive from Old Sackville Road, to continue the MUP	×	Requires new AT structure to cross the Sackville River

Figure 10 – Option 2: Location A

Figure 11 – Option 2: Location B

Table 4 – Option 2A Cross Section Opportunities and Obstacles Summary

Option 2A – East Side MUP Road Realignment	✓ AT users physically separated from vehicular traffic	×	Requires realigning Lucasville Road to the west for approximately 550m
	✓ Significantly reduces amount of excavation required	×	Realignment will require significant amount of fill
	✓ Improved road structure for Lucasville Road and opportunity to integrate the multi-use pathway with the road reconstruction	×	A large retaining wall would be required
		×	Significant amount of construction required
		×	Additional construction time to rebuild roadway
		×	Large impact to private properties

*Option 2A was not further investigated, more detail in Option Evaluation section

Table 5 – Option 2B Cross Section Opportunities and Obstacles Summary

Option 2B – Greenway Option	✓ Reduced exposure to vehicular traffic	×	Easement required for connection
	✓ Minimal impact to privately own property	×	Requires a large amount of tree clearing on the east side of Lucasville Road
	✓ Opportunity to provide diversion from a busy street and provide a higher quality experience for users within nature. Possible options for interpretive heritage opportunities and amenities (benches)	×	Multi-use trail would consist of a significant slope not suitable for all ages and abilities
		×	Accessible grades cannot be met by integrating switchbacks

*Option 2B was not further investigated, more detail in Option Evaluation section

OPTION EVALUATION

This section of the report defines the evaluation criteria used to compare the MUP options, reviews the MUP options developed and assesses the MUP options based on the evaluation criteria.

EVALUATION CRITERIA

A framework of evaluation criteria was developed to provide a high level comparative analysis of the MUP route options under consideration. The criteria used to evaluate the options are described below, are listed in no particular order, and have not been assigned relative weighting. They are intended only to identify strengths and weaknesses of the option being evaluated.

Convenience/Connectivity

- The degree to which the option is convenient to a wide variety of users.
- Influenced primarily by factors including directness and connectivity to key locations along the corridor.
- Key destinations may include access to private properties/driveways and commercial properties.
- Connectivity is influenced by connections to existing AT facilities.

User Comfort/Safety

- The overall level of comfort and safety for users.
- Influenced primarily by level of separation/exposure to motor vehicle traffic and management of conflicts at driveways and intersections.
- A preferred user experience captures the elements of an All Ages and Abilities facility, which includes ease of comprehension on where to be and how to proceed as well as a perception of safety.

Impact to Infrastructure

- Impacts to existing municipal infrastructure.
- Influenced by the necessity to relocate existing utility poles and guy wires.
- Consideration given to the location of the existing and future Halifax Water transmission lines.

Impact to Traffic

- The degree to which operations of vehicular traffic are affected.
- Influenced by conflicts at residential and commercial driveways.
- Reductions in roadway/intersection capacity significantly impacts vehicular operations.
- Safe and functional flow of vehicle traffic needs to be maintained.

Impact to Private Properties

- Impacts to privately owned infrastructure and property.
- Acquisition of additional property outside of the street right-of-way should be minimized, particularly where it would be costly or where it would greatly impact the existing land owner.
- Impact on properties such things as retaining walls, access to homes/land or the local neighbourhood.

Construction Cost

- Significantly influenced by the magnitude of construction cost implications.
- A general sense of the relative cost of each option is developed and evaluated, without going into detailed measurements and calculations.
- Options that preserve existing infrastructure score better than options that require new infrastructure to be constructed.

Maintenance

- Influenced by the level of effort required for ongoing maintenance of the facility.
- The key elements to determining operating cost are maintenance and snow/ice removal.
- Railings are difficult to install and require maintenance.

EVALUATION OF OPTIONS

Based on a review of the MUP route options under consideration and the evaluation criteria, it was determined that Option 1A, Option 2A and Option 2B are less practical alternatives than Option 1 and Option 2. The impracticality of Options 1A, 2A and 2B are discussed in some detail and Options 1 and 2 were examined with respect to the evaluation criteria.

OPTIONS 1A, 2A & 2B

Realigning Lucasville Road between Civic 386 and Sackville River (Option 1A and Option 2A) would result in significant construction costs and substantial impacts to vehicular traffic and private properties. Option 1A requires realigning Lucasville Road to the east between Civic 386 and the Sackville River bridge crossing. Shifting this portion of Lucasville Road to the east would require a substantial amount of cutting and excavation to meet grading requirements. Option 2A requires realigning Lucasville Road to the west between Civic 386 and the Sackville River bridge crossing. Shifting this portion of Lucasville Road to the west would require a substantial amount of fill to meet grading requirements, along with an extensive retaining wall. In addition, both Option 1A and 2A require a relatively significant amount of property acquisition.

The Greenway MUP (Option 2B) was eliminated as a feasible route possibility, despite the horizontal and vertical displacement from vehicles and reduced conflict points. It was determined that accessible slopes cannot be met even with the integration of switchbacks due to the existing terrain between Lucasville Road and the Sackville River. This would result a steep, uncomfortable trail that would be inaccessible for AT users.

OPTIONS 1 & 2

Option 1 and Option 2 were evaluated based on the evaluation criteria in order to assess the ability to meet defined project objectives while considering its practicality and accommodation to users' needs. A matrix was created to enable the comparison between Option 1 and Option 2 (see Table 6) and highlights unique opportunities and constraints associated with Option 1 and Option 2.

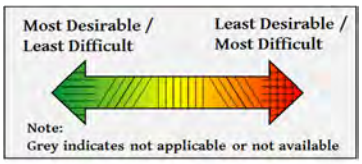


Table 6 – Evaluation Matrix (Option 1 and Option 2)

Criteria		Option 1 - West Side MUP	Option 2 - East Side MUP	Description
Convenience/ Connectivity	Access to private properties/driveways			Option 1 and Option 2 conflict with the approximate same number of private driveways and will provide the same level of direct access private properties.
	Access to Commercial Properties and Side Streets			Option 1 crosses more intersections/service roads and a commercial driveway (White Water Marine). Option 2 crosses more commercial driveways (DT Storage, the Cookie Lady and Hefler Forest Products).
	Connections to Existing AT Facilities			Option 1 could connect to the existing sidewalk near Old Sackville Road, which is recommended to be replaced with a 2.5m AT trail as cyclists are required to dismount at the existing sidewalk. Option 2 connects to the existing sidewalk near Old Sackville Road, where cyclists would transition to the roadway.
User Comfort/Safety	Separation from Vehicular Traffic			Option 1 and Option 2 both offer separation between AT users and vehicles with Option 2 having some sections of trail raised above the roadway for additional separation.
	Conflicts			Option 1 and Option 2 conflict with the approximate same number of driveways/intersections/service roads.
	Accessibility			Option 1 and Option 2 both fall within the recommended grades/slopes for all users.

Criteria		Option 1 - West Side MUP	Option 2 - East Side MUP	Description
Impact to Right-of-Way Infrastructure	Utility Poles and Guy Wires			Option 1 requires that 5 utility poles be relocated. Option 2 requires that 10 utility poles and 3 guy wires be relocated.
	Guiderail			Option 1 requires some guiderail to be relocated. Option 2 does not require any guiderail to be relocated.
	Existing Halifax Water Transmission Line			Option 1 has interaction with the existing watermain near the marine yard. Option 2 trail alignment may include restrictions near the existing watermain and may be challenging to maintain cover on the PVC pipe.
Impact to Traffic	Conflicts			Option 1 requires more locations where vehicles are required to yield to AT users (approaching from side streets and service roads). Option 1 and Option 2 may have conflicts with vehicles at driveways.
	Construction			Option 1 involves more retaining wall construction and work along the shoulder of the roadway. Option 2 involves more cutting/clearing, however, work is further from the shoulder of the roadway.
	Delay After Implementation			Option 1 and Option 2 will be very similar in operations of Lucasville Road.
Impact to Private Properties	Property Acquisition/Easement			Option encroaches on one property owner. Option 2 encroaches on private property at multiple locations.
	Driveway Reinstatement			Option 1 requires 25 driveways to be reinstated with either storm system or new culverts. Option 2 requires 24 driveways to be reinstated with either storm system or new culverts.
	Retaining Wall			Option 1 requires a retaining wall near Location B, which fronts 3 properties. Option 2 does not require a retaining wall.
Construction Costs	Fill Required			Option 1 requires a substantial amount of fill due to the presence of the steep slopes. Option 2 requires minimal fill.
	Retaining Wall			Option 1 requires a retaining wall near Location B and at the Sackville River crossing. Option 2 does not require a retaining wall.
	Cut/Excavation Required			Option 1 requires minimal cutting. Option 2 requires a significant amount of cutting/excavation due to the terrain present on the east side of Lucasville Road.
	Trail Construction			Option 1 requires a storm system with the new curb along the entire multi-use pathway. Option 2 requires new storm system and curb for approximately half of the segment and the other half incudes ditching.
	Property Acquisition/Easement			Option 1 encroaches minimally on private property. Option 2 requires multiple property easements or acquisitions.
	New Curb			Option 1 requires new curb along most of the MUP. Option 2 requires some new curb (approx. 550m).
	Fencing			Option 1 requires fencing due to the presence of the steep slope. Option 2 requires fencing along the portion of the MUP that is raised (vertically displaced) from Lucasville Road.
Other Considerations	Snow/Ice Removal			Option 1 is closer to the roadway, therefore, there will be minimal space for snow storage. Option 2 has more space for snow storage due to the presence of the existing ditch.

SUMMARY

WSP initially developed five (5) route options (Options 1, 1A, 2, 2A and 2B) for a multi-use pathway along Segment 1 of Lucasville Road (Old Sackville Road to Wallace Lucas Community Centre). During the preliminary internal review process, it was determined that Option 1 and Option 2 were more feasible than the remaining possibilities (Options 1A, 2A & 2B).

Realigning Lucasville Road between Civic 386 and Sackville River bridge crossing (Option 1A and Option 2A) would result in significant construction costs and substantial impacts to vehicular traffic and private properties. Shifting this section of Lucasville Road to the east would require a substantial amount of cutting and excavation to meet grading requirements, whereas shifting the same roadway section to the west would require a substantial amount of fill and an extensive retaining wall. In addition, both Option 1A and 2A require a relatively significant amount of property acquisition. The Greenway MUP (Option 2B) was eliminated as a feasible route possibility because it was determined that accessible slopes can not be met even with the integration of switchbacks. In addition, this alternative route would require a formal easement agreement in order to construct the MUP in the undeveloped land to the east of Lucasville Road.

Option 1 and Option 2 were evaluated based on the evaluation criteria in order to assess the ability to meet defined project objectives while considering its practicality and accommodation to users' needs. The evaluation matrix indicated that Option 2 consists of more beneficial attributes than Option 1. Establishing a multi-use pathway on the east side of Lucasville Road offers the following key attributes:

- Horizontal displacement and some vertical displacement from vehicular traffic.
- The alignment of the MUP can be designed so that there is minimal interaction with the existing watermain.
- Ties into the existing sidewalk on Old Sackville Road, therefore, cyclists would not be required to dismount until this intersection.
- Future option to continue the MUP to Sackville Drive on the east side of Lucasville Road after another phase.
- Alignment falls within the recommended slope range for AT user comfort.
- Requires minimal fill to meet grading requirements.
- Does not require the construction of retaining walls.
- Minimal impact on vehicular traffic during construction or post-implementation.
- Expected to have maintain space for snow storage by the existing ditch remaining on the east side of Lucasville Road.
- Provides more access to commercial destinations along Lucasville Road.

RECOMMENDATION & 30% DETAILED DESIGN

WSP recommended conducting further investigation into Option 2. WSP met with HRM and the Lucasville Greenway Society to review this memo and it was decided that Option 2 would proceed to 30% detailed design.

WSP completed the 30% detailed design of the multi-use pathway along Lucasville Road from Old Sackville Road to Wallace Lucas Community Centre and can be found in Appendix B. The associated construction cost estimate can be found Appendix C.

APPENDIX A
CONCEPT OPTIONS 1 & 2

SEGMENT 1 - CONCEPT PLAN
Lucasville Road AT Connector
Option 1- West Side Trail
Lucasville, Nova Scotia
HALIFAX
March 31, 2021
181-11813-01
wsp
Segment 2
Segment 1
1.5m BUFFER
3.0m AT TRAIL
0.5m BUFFER
EXISTING RIGHT OF WAY
TIE INTO EXISTING DRIVEWAYS (TYP.)
FUTURE LOCATION OF WATER TRANSMISSION MAIN
RELOCATE U.P.
NEW TOP OF SLOPE (TYP.)
EXISITNG UTILITY POLE WITH GUY WIRE
DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT
MATCHLINE 1A
TO BRYANSTON ROAD
LUCASVILLE ROAD
AREA WHERE CUT IS REQUIRED
D T Storage
FENCE REQUIRED
NEW CURB (TYP.)
WADE CT.
WEBBER DRIVE
RETAINING WALL REQUIRED
AREA WHERE FILL IS REQUIRED
EXISTING RIGHT OF WAY
FENCE REQUIRED
RELOCATE U.P.
NEW CURB (TYP.)
NEW TOP OF SLOPE (TYP.)
RELOCATE EXISTING GUIDERAIL
SACKVILLE RIVER
NEW AT STRUCTURE TO CROSS SACKVILLE RIVER
EXISTING STONE WALL TO BE RELOCATED BEHIND NEW AT TRAIL
SACKVILLE RIVER BRIDGE
MATCHLINE 1B
CONCEPTUAL
Legend
EXISTING ROW
EXISTING PROPERTY BOUNDARY
PROPERTY ENCROACHMENT
EXISTING UTILITY POLES
EXISTING TREES
EXISTING BUILDING
PROPOSED AT TRAIL
DRIVEWAY REINSTATEMENT
NEW CURB
RETAINING WALL
FENCE
EXISTING 400mmØ WATERMAIN
EXISTING FIRE HYDRANT
EXISTING WATER VALVE
EXISTING DITCH
EXISTING CULVERT
LUCASVILLE ROAD - OPTION 1: LOCATION A
LUCASVILLE ROAD - OPTION 1: LOCATION B
White Water Marine Ltd.
EXISITNG FENCE (APPROX.)
EXISTING UTILITY POLE
AREA WHERE FILL IS REQUIRED
EXISITNG FIRE HYDRANT
RELOCATE EXISTING GUIDERAIL
HWY. 101 OVERPASS
CONSIDER PLACING TRAIL BEHIND OVERPASS COLUMNS WITH RETAINING WALL
HIGHWAY 101
SERVICE ROAD
FENCE REQUIRED
TIE INTO EXISTING DRIVEWAYS (TYP.)
NEW CURB (TYP.)
EXISTING EDGE OF ASPHALT
EXISTING STONE WALLS TO BE RELOCATED BEHIND TRAIL
NEW TOP OF SLOPE (TYP.)
Hefler Forest Products
EXAMPLE OF AT TRAIL UNDER AN OVERPASS (MIC MAC BOULEVARD)
EXTEND AT TRAIL TO OLD SACKVILLE ROAD. REPLACE WITH 2.5m ASPHALT TRAIL.
EXISTING CURB
EXISTING EDGE OF SIDEWALK
ADD TACTILE INDICATORS AT PEDESTRIAN RAMPS
EXISTING CROSSWALK LOCATION, UPGRADE TO SHARED CROSSING LOCATION
EXISTING SIDEWALK
OLD SACKVILLE ROAD

SEGMENT 1 - CONCEPT PLAN

Lucasville Road AT Connector

Option 2- East Side Trail

Lucasville, Nova Scotia

HALIFAX

March 31, 2021

181-11813-01

SCALE: 1:750 METRIC

8 4 0 10 20 30 40 50

10 6 2

wsp

Segment 2

Segment 1

EXISTING 400mmØ WATERMAIN

NEW CURB (TYP.)

EXISITNG EDGE OF ASPHALT

RELOCATE U.P.

TIE INTO EXISTING DRIVEWAYS (TYP.)

1.5m BUFFER
3.0m AT TRAIL
0.5m BUFFER

AREA WHERE FILL IS REQUIRED

DISCUSSION WITH LANDOWNERS ARE REQUIRED ABOUT PROPERTY EASEMENT

LUCASVILLE ROAD

LUCASVILLE ROAD – OPTION 2: LOCATION A

EXISTING GRADE

EXISTING ROADWAY

NEW CURB

ASPHALT TRAIL

OFFSET FROM CL (m)

LOCATION A

MATCHLINE 1A

EXISTING RIGHT OF WAY

REMOVE TREES

RELOCATE FIRE HYDRANT

D T Storage

NEW TOP OF SLOPE (TYP.)

WADES CT.
RELOCATE EXISTING STONE WALL BEHIND AT TRAIL

RELOCATE GUY WIRE

WEBBER DRIVE

AREA WHERE CUT IS REQUIRED

SACKVILLE RIVER

EXISITNG FIRE HYDRANT

LOCATION B

LUCASVILLE ROAD – OPTION 2: LOCATION B

MATCHLINE 1B

SACKVILLE RIVER BRIDGE

EXISTING GUIDERAIL

NEW AT STRUCTURE TO BE BUILT WITH EXISTING WATERMAIN CROSSING

CONCEPTUAL

Legend

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPERTY ENCROACHMENT
- EXISTING UTILITY POLES
- EXISTING TREES
- EXISTING BUILDING
- PROPOSED AT TRAIL
- DRIVEWAY REINSTATEMENT
- NEW CURB
- RW RETAINING WALL
- FENCE
- EXISTING 400mmØ WATERMAIN
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING DITCH
- EXISTING CULVERT

White Water Marine Ltd.

HIGHWAY 101

SERVICE ROAD

CONSIDER PLACING TRAIL BEHIND OVERPASS COLUMNS WITH RETAINING WALL

EXISITING FIRE HYDRANT

FENCE REQUIRED

EXAMPLE OF AT TRAIL UNDER AN OVERPASS (MIC MAC BOULEVARD)

Hefler Forest Products

TIE INTO EXISTING DRIVEWAYS (TYP.)

EXISTING CROSSWALK LOCATION, UPGRADE TO SHARED CROSSING LOCATION

EXISTING SIDEWALK

OLD SACKVILLE ROAD

MATCHLINE 1A

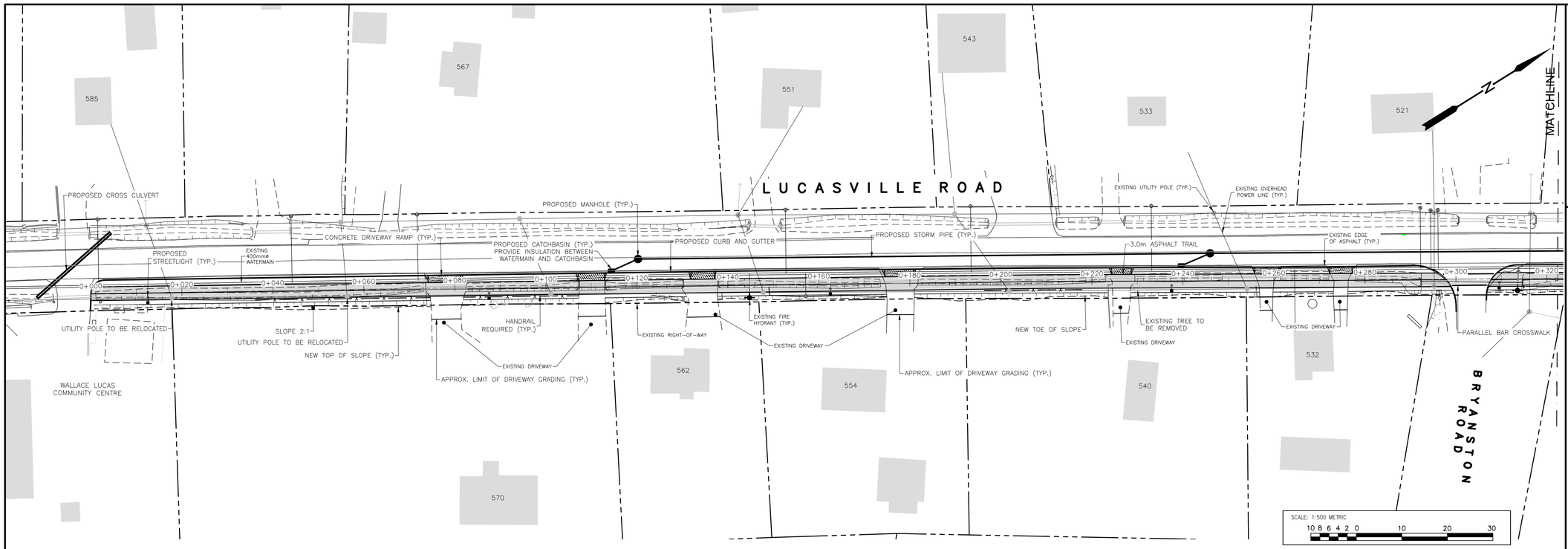
MATCHLINE 1B

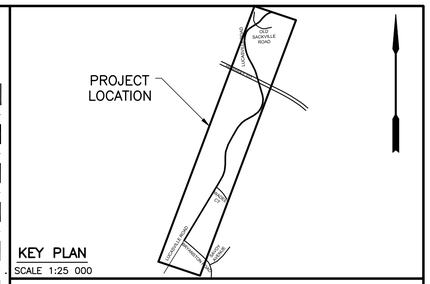
MATCHLINE 1C

FILE: K:\DATA\TMO\PROJECTS\181813\01_WIP\LUCASVILLE_RD_A1_SEGMENT_2\15-DWG\SLS-4-CIVIL\SLS-4-PRODUCTION_DWG\181813-15103 - SEGMENT 2 TRAIL OPTIONS.DWG

Sheet Option2 - 24x36

APPENDIX B
30% DETAILED DESIGN



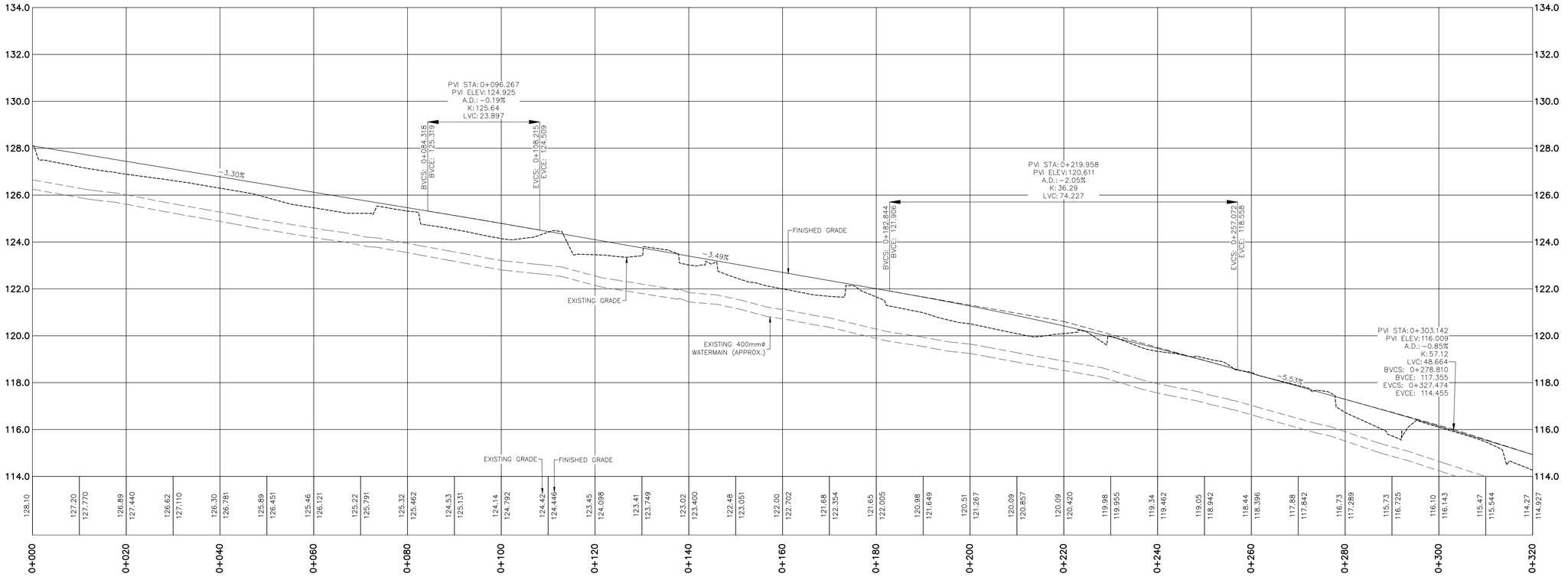


PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X — X	FENCE / HANDRAIL	x — x
GR — GR	GUIDERAIL	
RW — RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G — G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

NOTES

1. PLAN VALUES ARE BASED ON THE NOVA SCOTIA COORDINATE REFERENCING SYSTEM.
2. ALL WORK IS TO BE DONE IN ACCORDANCE WITH HRM CONTRACT DOCUMENTS.
3. GRADES SHOWN ARE APPROXIMATE. FINISHED GRADE IS TO BE APPROVED IN THE FIELD BY THE ENGINEER.
4. UTILITY INFORMATION IS APPROXIMATE ONLY. CONTRACTOR IS RESPONSIBLE TO ARRANGE FOR ON SITE LOCATES WITH ALL UTILITIES PRIOR TO START OF WORK. CONTACT www.info-ex.com AND OTHERS AS REQUIRED.
5. CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS REQUIRED TO PERFORM WORK AND TO COMPLY WITH ALL APPLICABLE ENVIRONMENTAL REGULATIONS.
6. WHERE EXISTING CONDITIONS ARE SHOWN THEY ARE NOT NECESSARILY ACCURATE OR COMPLETE. THE CONTRACTOR SHALL CONFIRM ALL EXISTING DIMENSIONS AND LOCATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
7. THE CONTRACTOR SHALL CHECK AND VERIFY ALL PROPOSED DIMENSIONS BEFORE PROCEEDING WITH CONSTRUCTION. ANY ADJUSTMENTS WILL BE MADE BY THE ENGINEER AS NECESSARY.
8. CONTRACTOR IS RESPONSIBLE FOR SETTING GRADES AND LAYOUT CONTROL.
9. TRAFFIC SIGNS ARE NOT TO BE REMOVED OR REPLACED WITHOUT AUTHORIZATION FROM THE TRAFFIC AUTHORITY AND THE ENGINEER.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF TREES. TREES ARE NOT TO BE REMOVED WITHOUT PERMISSION FROM THE ENGINEER.
11. WORK IN THE IMMEDIATE AREA OF A NOVA SCOTIA COORDINATE MONUMENT MUST BE CARRIED OUT BY HAND. THE CONTRACTOR IS RESPONSIBLE FOR ANY COSTS IF MONUMENTS ARE DISTURBED.
12. AT COMPLETION OF WORK REINSTATE ALL DISTURBED SURFACES TO THE SATISFACTION OF THE ENGINEER.
13. WATER VALVE BOX EXTENSIONS – THE MINIMUM INSIDE DIAMETER OF A VALVE BOX EXTENSION SHALL BE 125 mm AND THE MINIMUM LENGTH OF A VALVE BOX EXTENSION SHALL BE 300 mm. CONTRACTOR TO CONFIRM APPROPRIATE PRODUCT TO BE USED WITH HALIFAX WATER OPERATIONS DEPARTMENT STAFF.
14. ALL NEW PEDESTRIAN RAMPS TO INCLUDE TACTILE WALKING SURFACE INDICATOR PLATES AS PER HRM DETAIL 131 UNLESS OTHERWISE NOTED.



PRELIMINARY

No.	Date	Revision Description	Appr'd
2	APR 30/21	RE-ISSUED FOR 30% DESIGN	
1	MAR 31/21	ISSUED FOR 30% DESIGN	

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, Canada B3B 1X7
T 902-835-9955 F 902-835-1645 www.wsp.com

HALIFAX

LUCASVILLE ROAD AT CONNECTOR

SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 0+000 TO 0+320

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	Sheet 1 OF 8
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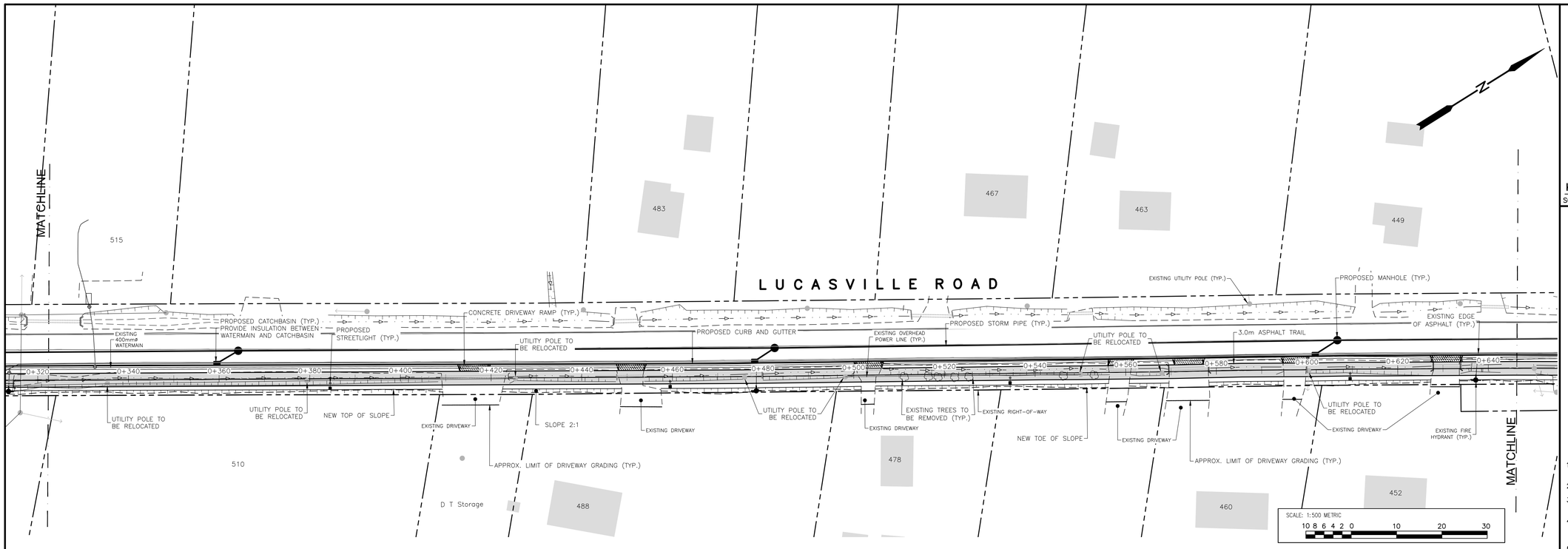
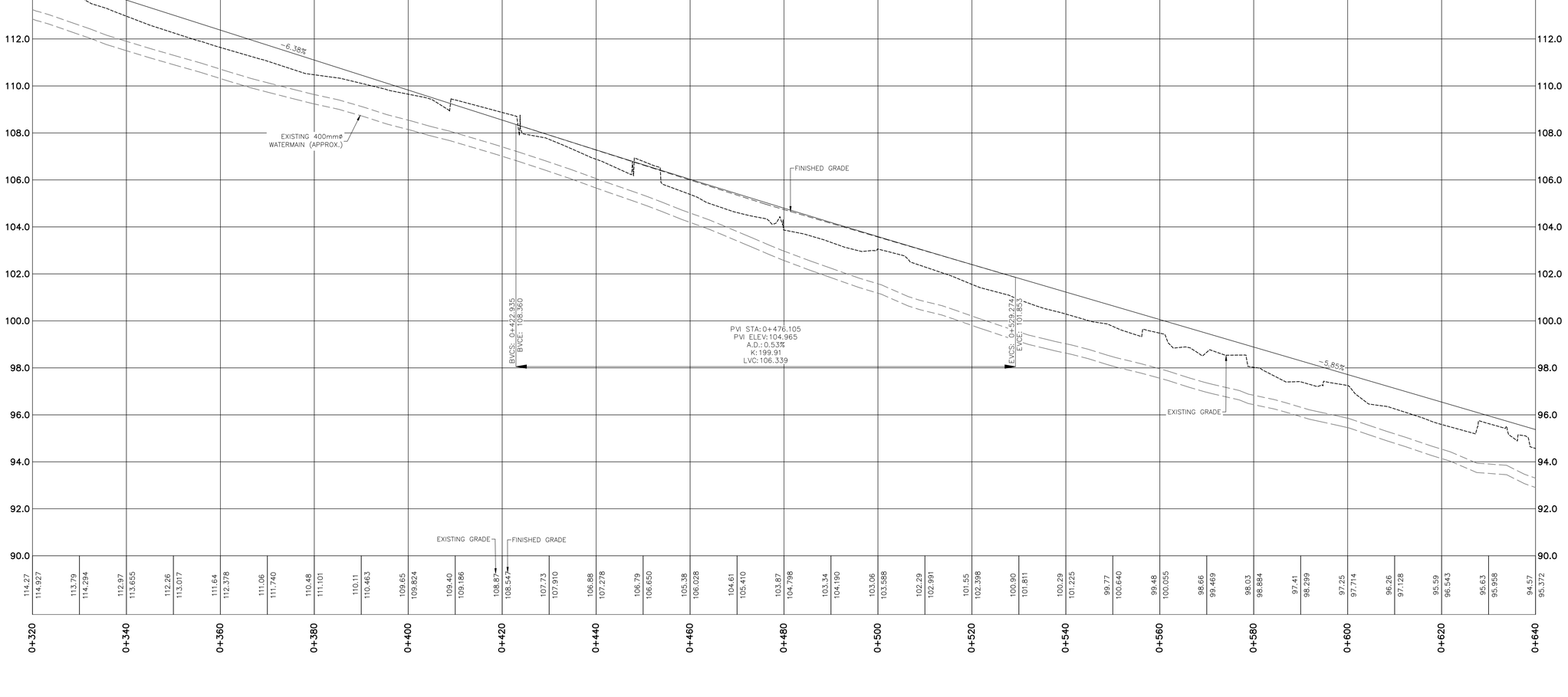
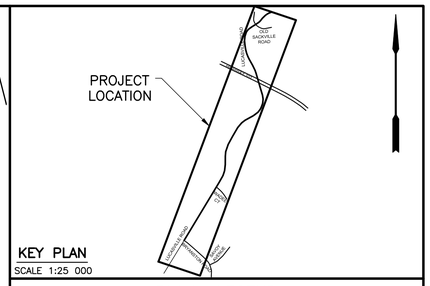
Checked		







PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X X	FENCE / HANDRAIL	X X
GR GR	GUIDERAIL	
RW RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

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PRELIMINARY

No.	Date	Revision Description	Appr'd
2	APR 30/21	RE-ISSUED FOR 30% DESIGN	
1	MAR 31/21	ISSUED FOR 30% DESIGN	

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, Canada B3B 1X7
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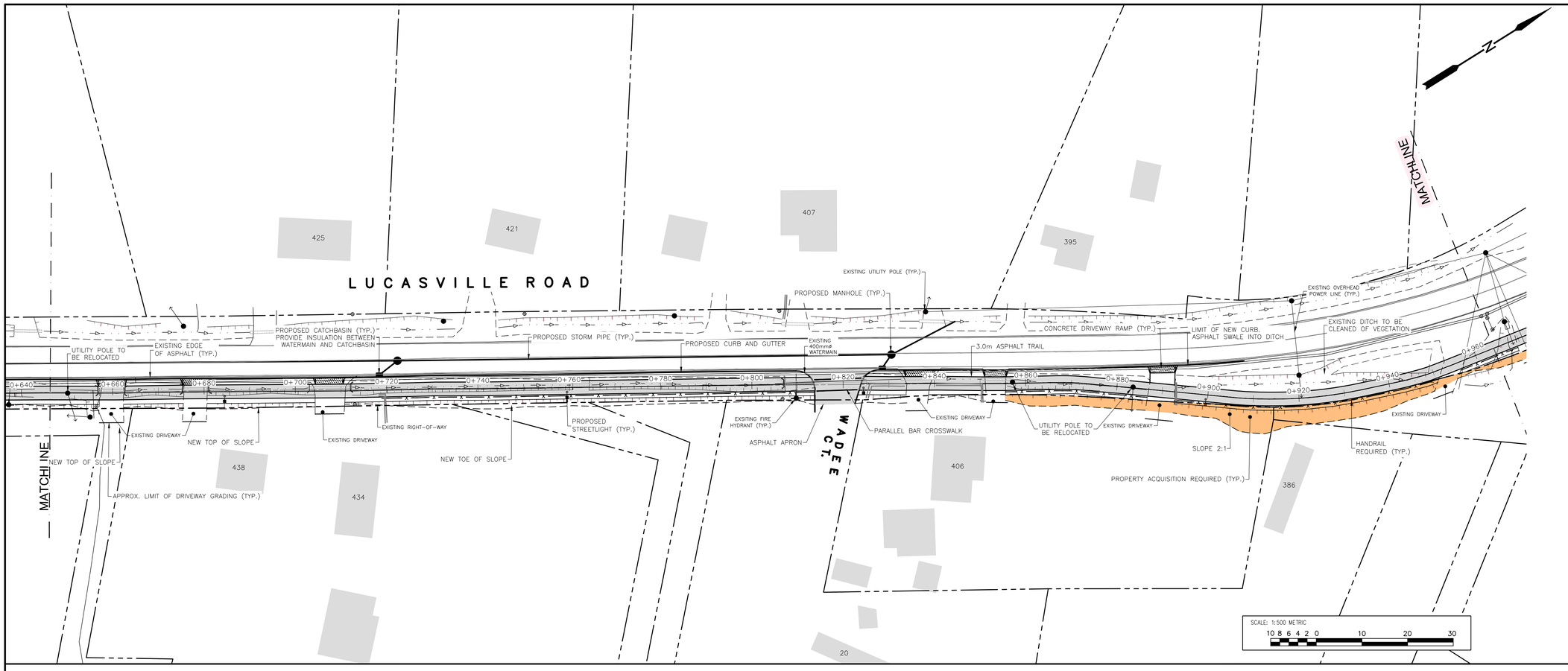
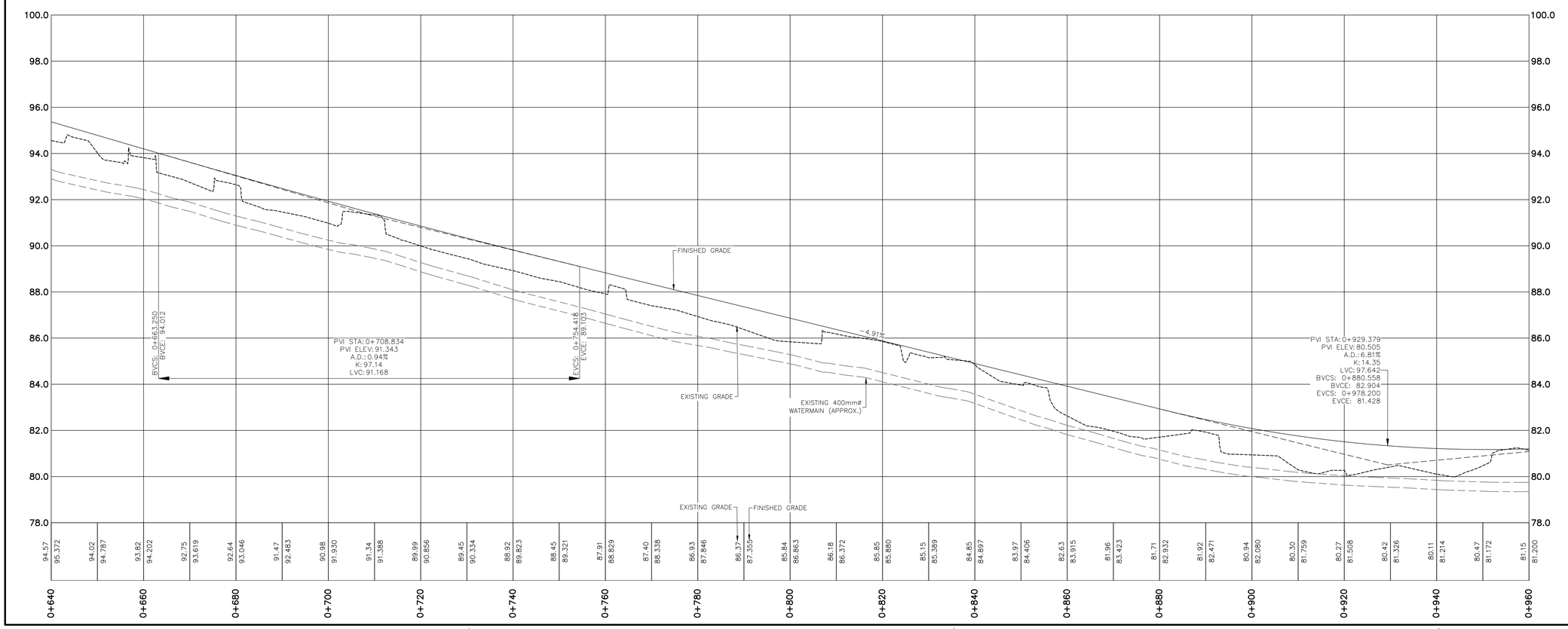
HALIFAX

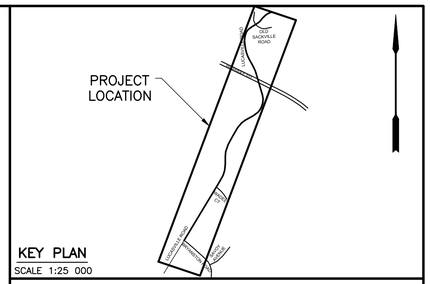
LUCASVILLE ROAD AT CONNECTOR
SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 0+320 TO 0+640

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	Sheet 2 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013	Drawing No. – – –
Checked		







KEY PLAN
SCALE 1:25 000

PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X X	FENCE / HANDRAIL	x x
GR GR	GUIDERAIL	
RW RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

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PRELIMINARY

No.	Date	Revision Description	Appr'd
2	APR 30/21	RE-ISSUED FOR 30% DESIGN	
1	MAR 31/21	ISSUED FOR 30% DESIGN	

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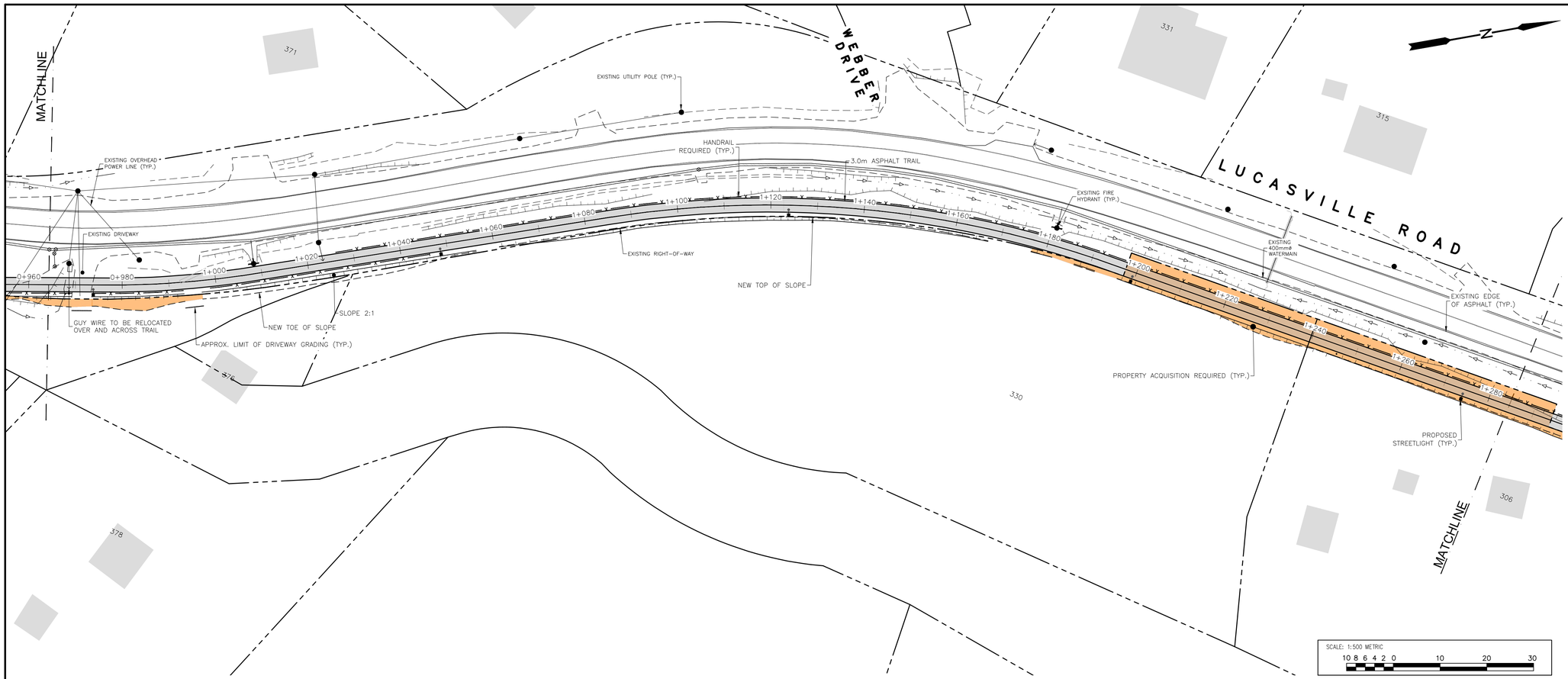
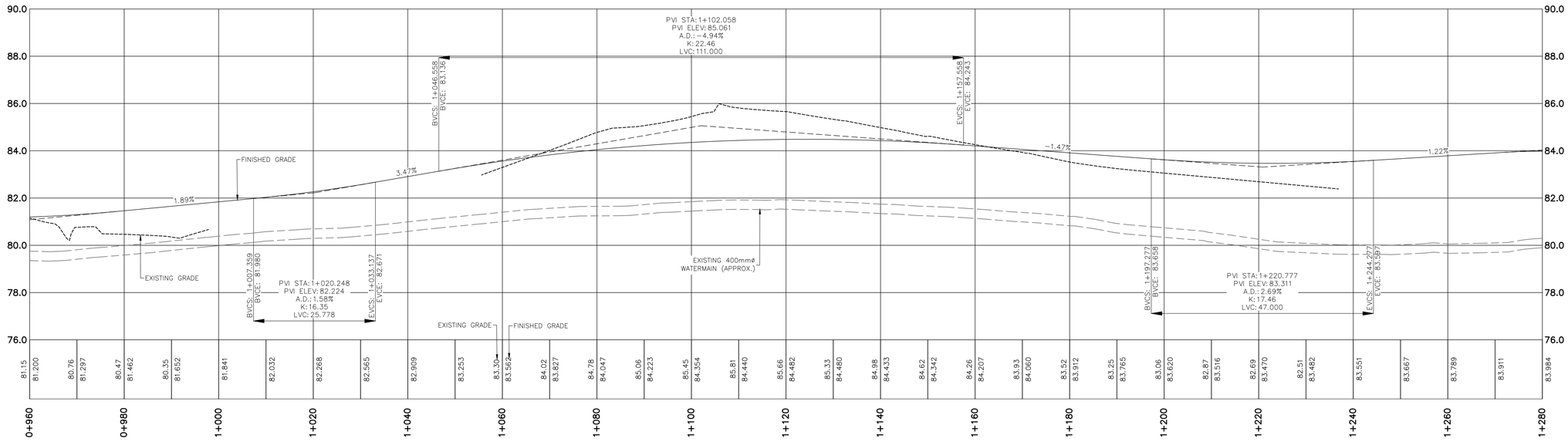
HALIFAX

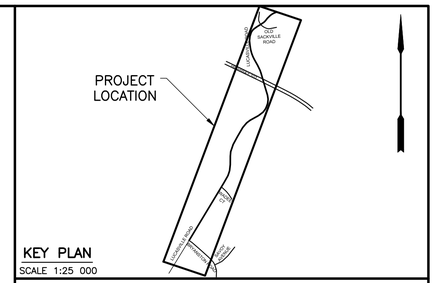
LUCASVILLE ROAD AT CONNECTOR
SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 0+640 TO 0+960

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	Sheet 3 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013	Drawing No. – – –
Checked		







KEY PLAN
SCALE 1:25 000

PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X X	FENCE / HANDRAIL	x x
GR GR	GUIDERAIL	
RW RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

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PRELIMINARY

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2	APR 30/21	RE-ISSUED FOR 30% DESIGN	
1	MAR 31/21	ISSUED FOR 30% DESIGN	

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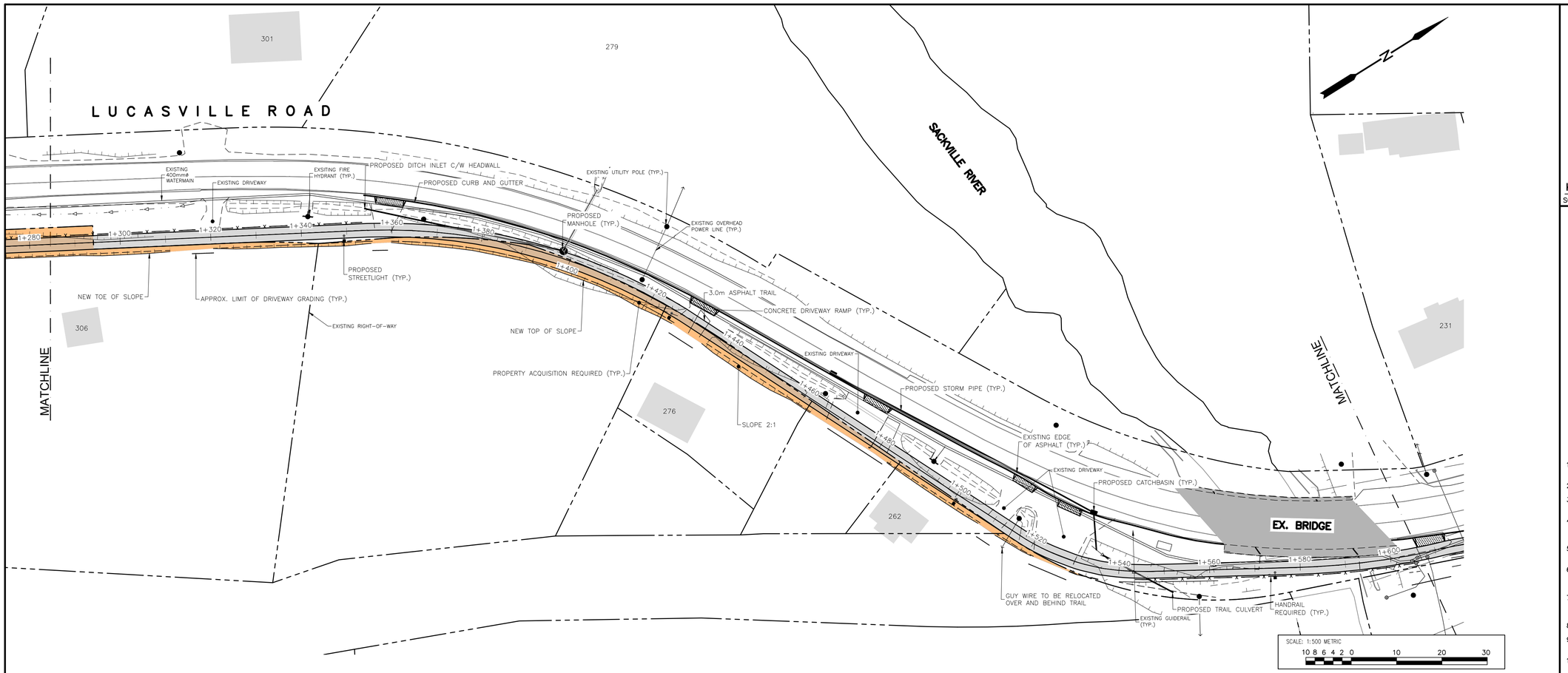
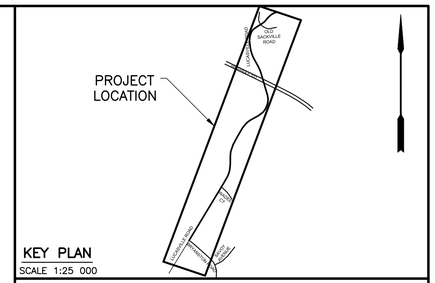
HALIFAX

LUCASVILLE ROAD AT CONNECTOR
SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 0+960 TO 1+280

Date MAR 31, 2021	Drawn S.HAY/J.GRAY		Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx		Sheet 4 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013		Drawing No. – – –
Checked			





PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X — X	FENCE / HANDRAIL	x — x
GR — GR	GUIDERAIL	
RW — RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G — G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

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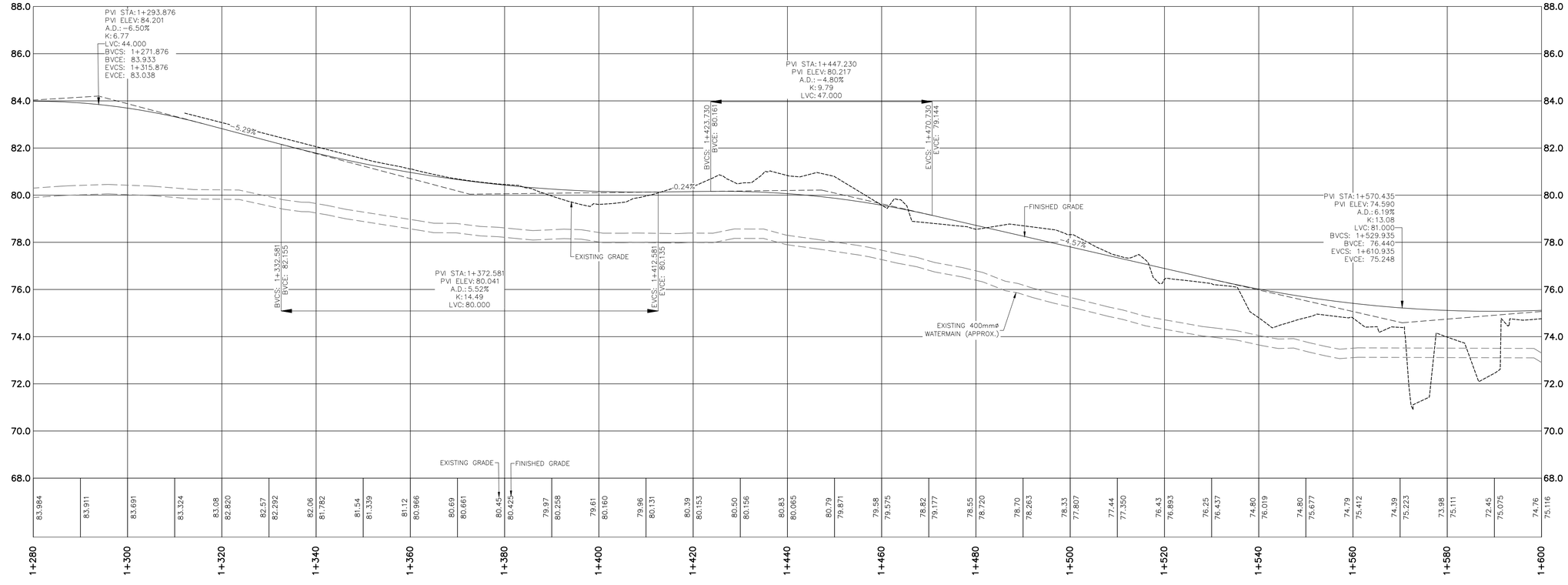

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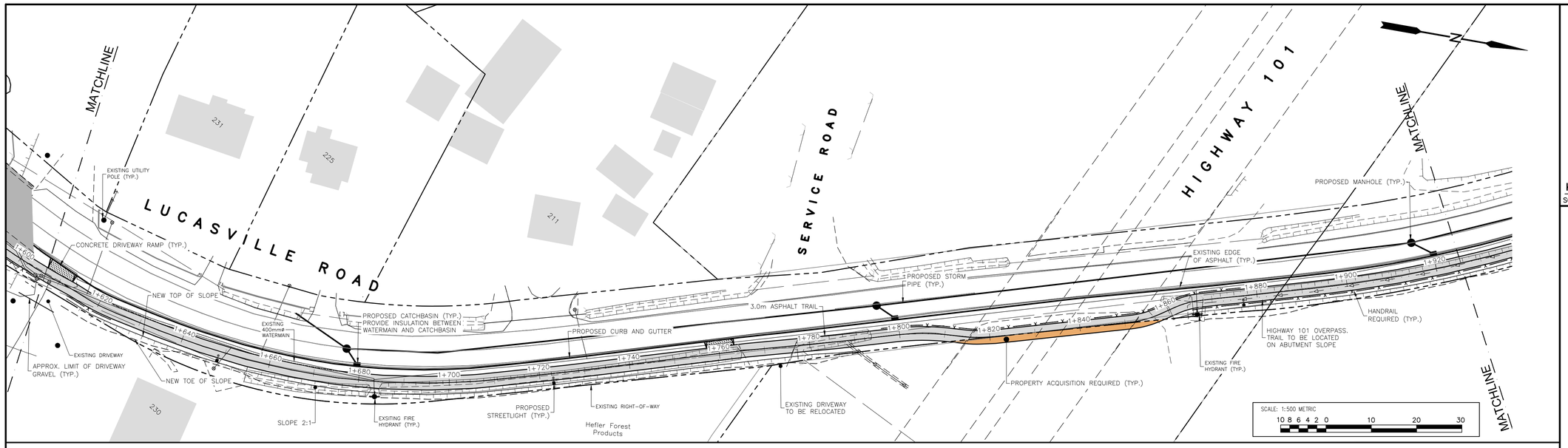
HALIFAX

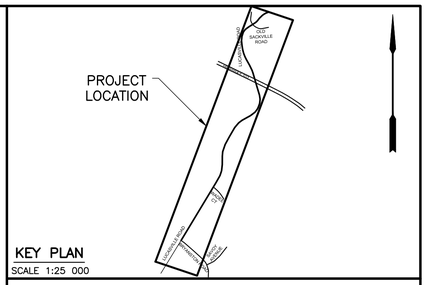
LUCASVILLE ROAD AT CONNECTOR

SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD PLAN AND PROFILE STA. 1+280 TO 1+600

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	Sheet 5 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013	Drawing No. – – –
Checked		





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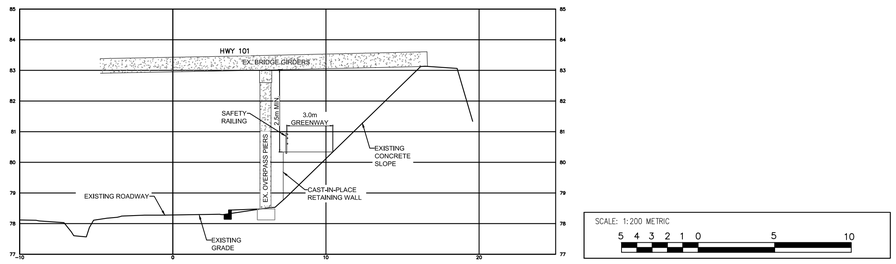

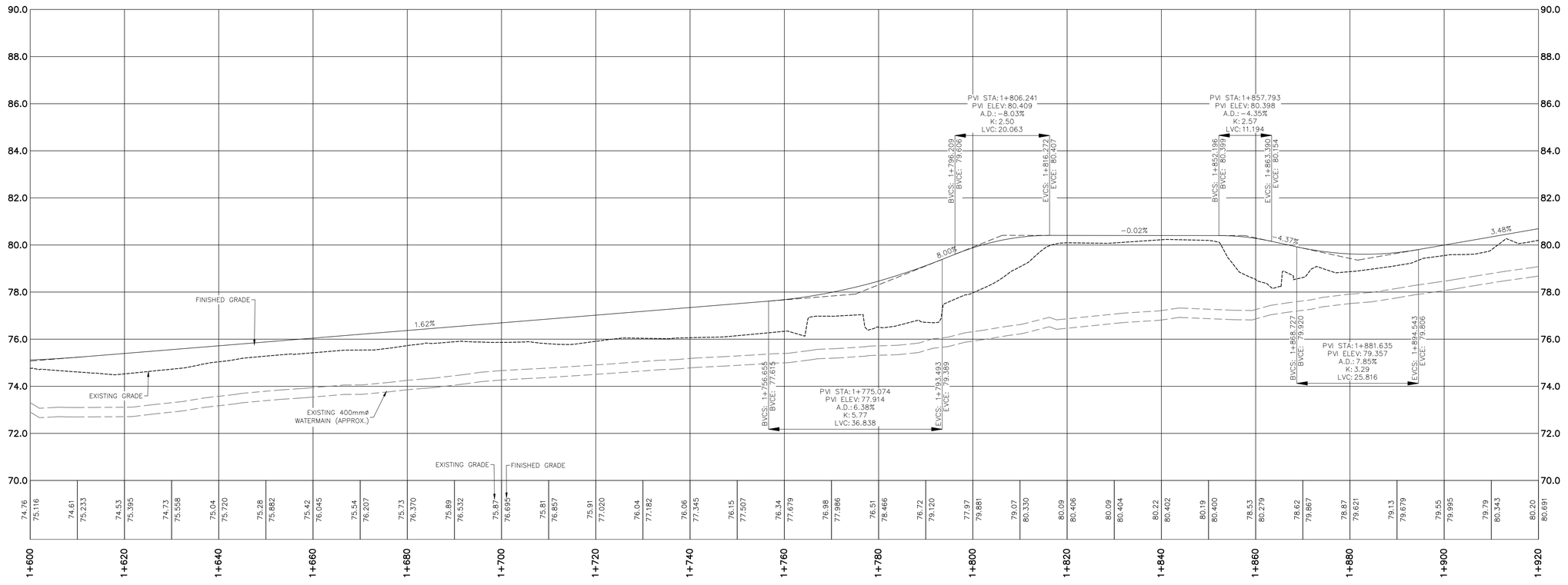

PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X X	FENCE / HANDRAIL	x x
GR GR	GUIDERAIL	
RW RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
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	SEWER MANHOLES	
	CATCHBASIN	
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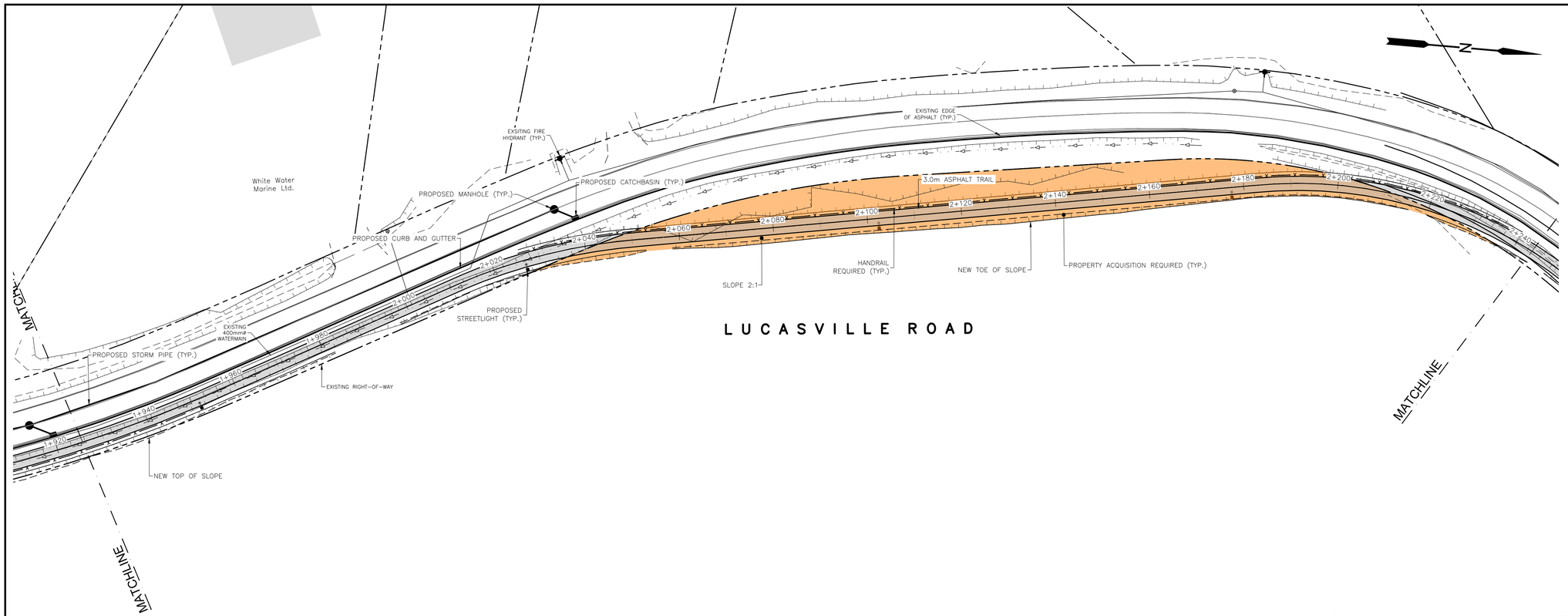
HALIFAX

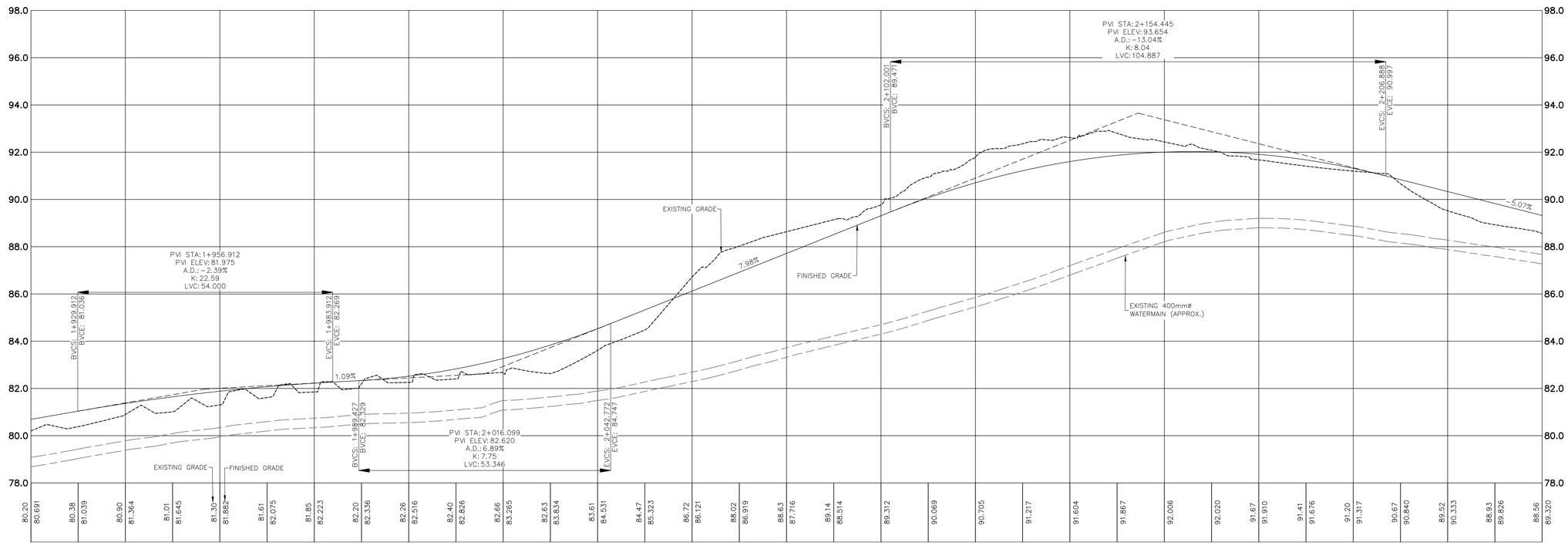
LUCASVILLE ROAD AT CONNECTOR

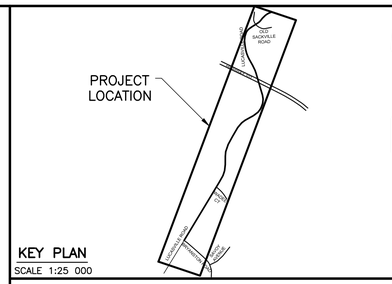
SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 1+600 TO 1+920

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No.	
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	XX-XXX	
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013	Sheet 6 OF 8	
Checked		Drawing No. — — —	







PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X — X	FENCE / HANDRAIL	X — X
GR — GR	GUIDERAIL	
RW — RW	RETAINING WALL	
	CONCRETE CURB	
	PROPERTY LINE	
	TOP OF SLOPE	
	BOTTOM OF SLOPE	
	SEWER MANHOLES	
	CATCHBASIN	
G — G	GAS MAIN	
	CONCRETE SIDEWALK	
	ASPHALT SURFACE	
	EDGE OF GRAVEL SURFACE	
	DITCH	
	WATERMAIN	
	TREE	

NOTES

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14. ALL NEW PEDESTRIAN RAMPS TO INCLUDE TACTILE WALKING SURFACE INDICATOR PLATES AS PER HRM DETAIL 131 UNLESS OTHERWISE NOTED.

PRELIMINARY

No.	Date	Revision Description	Appr'd
2	APR 30/21	RE-ISSUED FOR 30% DESIGN	
1	MAR 31/21	ISSUED FOR 30% DESIGN	

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, Canada B3B 1X7
T 902-835-9955 F 902-835-1645 www.wsp.com

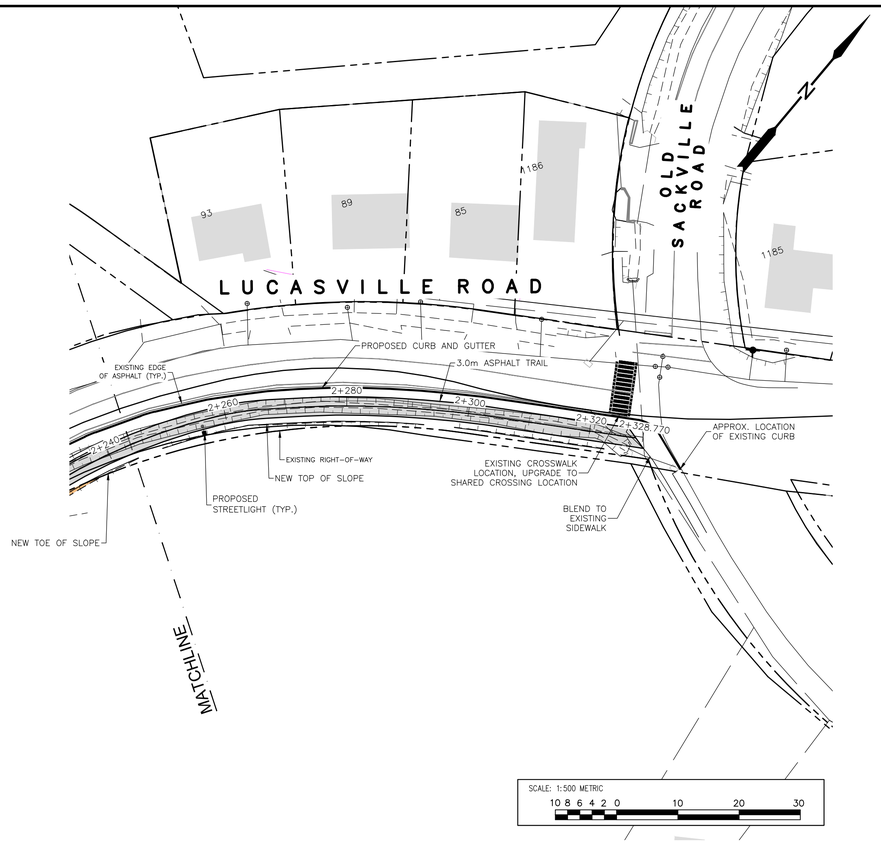
HALIFAX

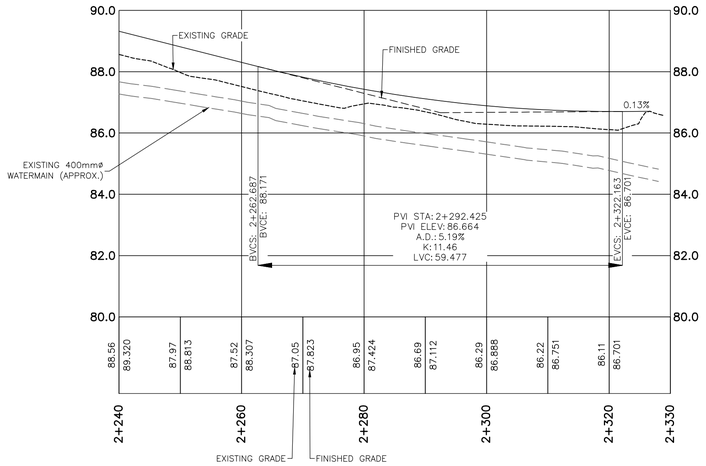
LUCASVILLE ROAD AT CONNECTOR

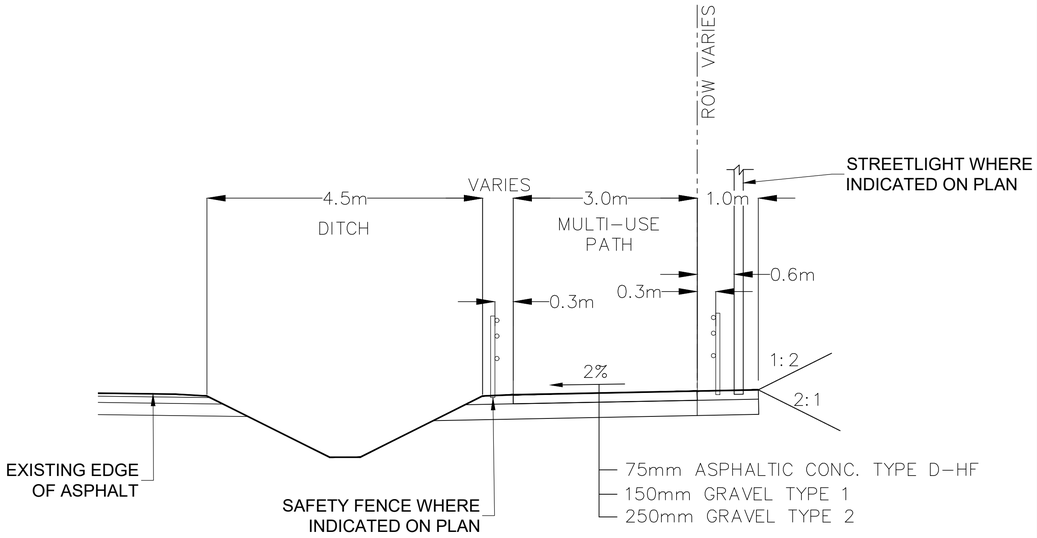
SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 1+920 TO 2+240

Date MAR 31, 2021	Drawn S.HAY/J.GRAY		Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx		Sheet 7 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013		Drawing No. — — —
Checked			

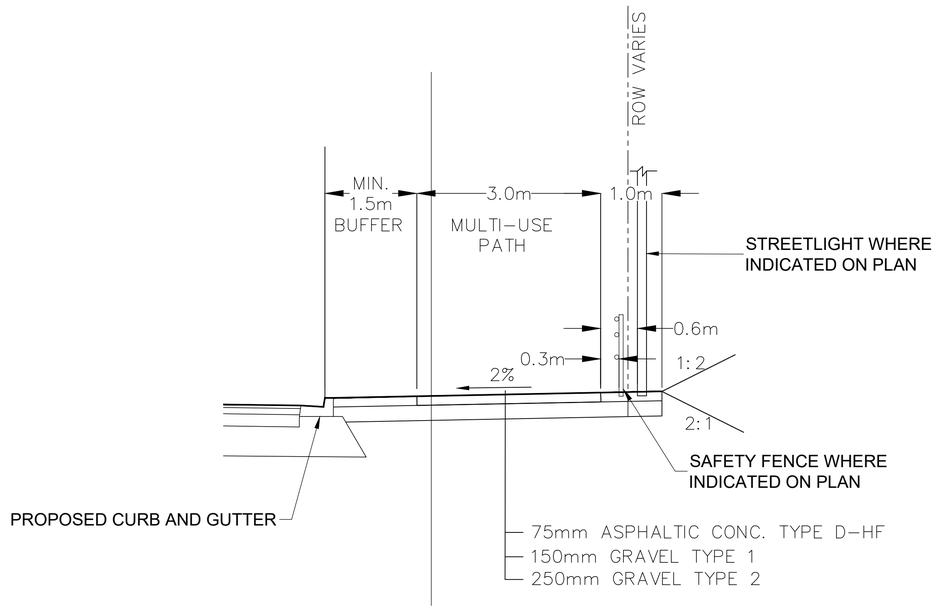






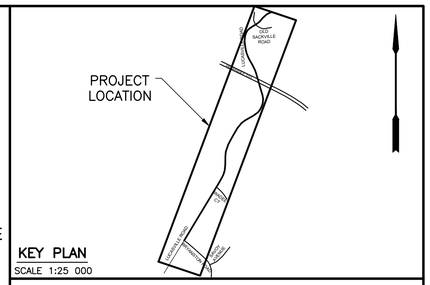
TRAIL WITH DITCH

NOT TO SCALE



TRAIL WITH CURB AND GUTTER

NOT TO SCALE



PLAN LEGEND

EXISTING		PROPOSED
	WATERVALVE	
	FIRE HYDRANT	
	UTILITY POLE AND GUY WIRE	
	STREET LIGHT	
	SIGN POST/BASE	
X — X	FENCE / HANDRAIL	x — x
GR — GR	GUIDERAIL	
RW — RW	RETAINING WALL	
	CONCRETE CURB	
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	TOP OF SLOPE	
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HALIFAX

LUCASVILLE ROAD AT CONNECTOR

SEGMENT 1
LUCASVILLE, NS

LUCASVILLE ROAD
PLAN AND PROFILE
STA. 2+240 TO 2+330

Date MAR 31, 2021	Drawn S.HAY/J.GRAY	Tender No. XX-XXX
Scale Horz. 1:500 Vert. 1:100	Survey No. SU18xxxx	Sheet 8 OF 8
Reference	DATUM HORZ: NAD83(CSRS) EPOCH 2010.0 3° MTM PROJECTION ZONE 5 VERT: CGVD2013	Drawing No. — — —
Checked		

APPENDIX C
CONSTRUCTION COST ESTIMATE

HRM - Lucasville Road AT Connector - 2.3kms
Wallace Lucas Community Center to Old Sackville Road
CLASS D ESTIMATE OF PROBABLE COSTS

PROJECT NO.	181-11813
DATE:	April 30, 2021
CLIENT:	HRM
CONSULTANT:	WSP
UNIT PRICE SOURCE:	WSP

NOTE: HST NOT INCLUDED IN INDICATED UNIT PRICES AND TOTALS.
ESTIMATE BASED ON 30% DESIGN SUBMISSION DATED APRIL 30, 2021
EXCLUDES LAND ACQUISITION, ENGINEERING, CONSTRCUTION ADMIN./INSPECTION

Lucasville Rd., Lucasville, Nova Scotia

This estimate of probable construction cost is approximate only. Actual cost may vary significantly from this estimate due to market conditions such as material and labour costs, time of year, industry workload, competition, etc. This estimate has been prepared based on our experience with similar projects. This estimate has not been prepared by obtaining any estimates or quotes from contractors. Due to the uncertainties of what contractors bid, WSP cannot make any assurances that this estimate will be within a reasonable range of the tendered low bid. When assessing this project for business feasibility purposes this estimate should not be relied upon without considering these factors.

ITEM NO.	DESCRIPTION	UNIT	QTY	PRICE	TOTAL PRICE
	EARTHWORKS				
1	**Clearing**	ha	0.3	$ 5,000.00	$ 1,620.00
2	**Grubbing**	ha	0.3	$ 15,000.00	$ 4,860.00
4	**Mass Excavation and Embankment - Rock**	m^3	3650	$ 250.00	$ 912,500.00
5	**Borrow Material and Embankment**	m^3	5265	$ 40.00	$ 210,600.00
				Sub Total	**$ 1,129,580.00**
	STORM SEWER				
30	**Pipe**				
.1	**Pipe (Including Reinstatement)**				
.9	600 mm dia. Concrete, 65D storm pipe	m	1235	$ 800.00	$ 988,000.00
31	**Manholes**				
.3	1500 mm dia. Precast Concrete c/w adjustable MH frame and R10 cover with HRWC logo	ea.	12	$ 9,000.00	$ 108,000.00
32	**Installation of New Catchbasins**				
.1	1050 mm dia. Precast Concrete c/w S361 frame and grate - storm	ea.	13	$ 6,000.00	$ 78,000.00
33	**Catchbasin Leads**				
.1	**Catchbasin Leads Including Reinstatement**				
.4	300 mm dia. PVC DR35 - CB lead including reinstatement	m	60	$ 600.00	$ 36,000.00
36	**Culverts**				
.2	600mm dia. Concrete, 65D - Culvert	m	21	$ 800.00	$ 16,800.00
38	**Remove Existing Structures**				
.3	Remove Pipe - including reinstatement	m	360	$ 125.00	$ 45,000.00
40	**Ditch Cleaning**	m	460	$ 20.00	$ 9,200.00
				Sub Total	**$ 1,281,000.00**
	STREET CONSTRUCTION				
40	**Gravels**				
.3	Type 1 (150mm)	m^2	7270	$ 15.00	$ 109,050.00
.4	Type 1 (200mm) - Curb Reinstatement	m^2	1125	$ 21.00	$ 23,630.00
.16	Type 2 (250mm)	m^2	7850	$ 25.00	$ 196,250.00
42	**Asphaltic Concrete**				
.1	Asphaltic Concrete				
.2	Type C-HF (50mm) - Curb Reinstatement and Apron	m^2	1200	$ 22.00	$ 26,400.00
.9	Type B-HF (50mm) - Curb Reinstatement and Apron	m^2	1200	$ 22.00	$ 26,400.00
13	Type D-HF (75mm)	m^2	6930	$ 45.00	$ 311,850.00
43	**Curb**				
.1	Concrete Curb and Gutter	m	1871	$ 150.00	$ 280,650.00
46	**Traffic Sign Base**				
.1	Urban Traffic Sign Post	each	10	$ 600.00	$ 6,000.00
47 .1	**Adjust Existing Structures to Grade**				
.5	Type 1 Water Valves	ea.	12	$ 300.00	$ 3,600.00
49	**Driveway Reinstatement**				
.1	Driveway Reinstatement, Gravel -150mm	ea.	30	$ 750.00	$ 22,500.00
.3	Driveway Curb Cut	m^2	230	$ 135.00	$ 31,050.00
				Sub Total	**$ 1,037,380.00**
	LANDSCAPING				
50	**Topsoil and Sod**				
.1	Topsoil and Sod - 150mm	m^2	4600	$ 20.00	$ 92,000.00
52	**Trees, Shrubs, Groundcover**				
.1	Trees	l.s.	1	$ 25,000.00	$ 25,000.00
53	**Hydroseed**	m^2	4150	$ 1.00	$ 4,150.00
54	**Tree Removal**				
.1	0 mm - 200 mm tree removal	ea.	7	$ 350.00	$ 2,450.00
.3	400 mm - 500 mm tree removal	ea.	1	$ 1,000.00	$ 1,000.00
57	**Handrail and Fences**				
.4	Handrail	m	1128	$ 450.00	$ 507,600.00
				Sub Total	**$ 632,200.00**

ITEM NO.	DESCRIPTION	UNIT	QTY	PRICE	TOTAL PRICE
	ADDITIONAL ITEMS (TRAFFIC)				
60	**Trench Excavation Off-Site Removals**				
.1	Rock	m^3	3900	$ 250.00	$ 975,000.00
.2	Pyritic Slate Off-Site Disposal	m^3	7550	$ 185.00	$ 1,396,750.00
62	Replacement of Unsuitable Material with Type 2 Gravel or Surge Rock	m^3	365	$ 70.00	$ 25,550.00
65	**Pavement Markings**				
.1	Lines				
.1	White Solid Single Line	m	1850	$ 2.00	$ 3,700.00
.3	Yellow Solid Single Line	m	2310	$ 3.00	$ 6,930.00
.4	Crosswalks	m	16	$ 15.00	$ 240.00
				Sub Total	**$ 2,408,170.00**
	EROSION AND SEDIMENT CONTROL				
70	**Erosion and Sediment Control Plan**	l.s.	1	$ 10,000.00	$ 10,000.00
				Sub Total	**$ 10,000.00**
	ELECTRICAL				
81	**Traffic Concrete Base**				
.17	Utility Pole Removal/Relocation	ea.	14	$ 500.00	$ 7,000.00
87	**Area Lighting**				
.1	Single Arm Pole c/w Luminare	ea.	30	$ 8,000.00	$ 240,000.00
.3	2-50mm PVC Conduit	m	1900	$ 150.00	$ 285,000.00
				Sub Total	**$ 532,000.00**
	MISCELLANEOUS				
90	**Project Information Sign**	ea.	2	$ 500.00	$ 1,000.00
99	**Traffic Control**	l.s.	1	$ 250,000.00	$ 250,000.00
				Sub Total	**$ 251,000.00**
				TOTAL	**$ 7,281,330.00**
				50% CONTINGENCY	**$ 3,640,665.00**
				TOTAL	**$ 10,921,995.00**