APPENDIX A

Frequently Asked Questions

Fenelon Falls Second Crossing Environmental Assessment

On May 29, 2021, the City of Kawartha Lakes (City) and Dillon Consulting (Dillon) presented an update to the public on the progress of the Fenelon Falls Second Crossing Environmental Assessment (EA) and Traffic Study work. The virtual meeting was recorded and can be watched by visiting this link: https://jumpinkawarthalakes.ca/ffsecondcrossing/widgets/70720/videos/7354

Leading up to the May 29th meeting, and for the weeks following the meeting, the City and Dillon team received multiple questions and comments from the public regarding the project. This document summarizes the questions received and provides responses. Although worded differently, many questions were received that raise the same issues. As such, this document summarizes and combines questions that address the same issues.

Based on the input received from the community, the technical team from Dillon is preparing an Interim Environmental Study Report for the City that will include information on the study findings, summary of input received and recommendations for next steps. The report will be submitted to the City in late summer/early fall 2021. The report will be made public and shared on the City's website.

Key Themes of Questions and Comments Received

The questions and comments received from the public and stakeholders varied by issue. The key themes of the questions and comments received include:

- Concerns with the impacts that a new bypass or a second in town bridge would have on people, property, environment, wildlife, recreation, quality of life, traffic operations/local road connections, road safety, boating and flooding.
- Concerns with the effectiveness of a new bypass to address traffic in Fenelon Falls.
- Concerns that a new bypass would be a truck haul route with truck traffic that would to residents along the bypass route.
- Concerns with the cost of a new bypass over the Burnt River.
- Questions regarding better use of existing bypass routes available in the surrounding area.
- Questions regarding the potential economic impacts that a bypass could have on in-town businesses.
- Questions regarding completion of an economic impacts and benefits study looking at a bypass and a second in-town bridge.
- Concerns with the effectiveness of in-town intersection improvements at Helen and Lindsay Street to address traffic in Fenelon Falls.
- Concerns with the impacts to businesses that could result from changes to the Helen Street and Lindsay Street intersection.
- Concerns with the impacts to residents on Elliot Street that would occur with the in-town traffic improvements that would increase the use of Elliot Street.
- Questions regarding the traffic study completed and the origin and destination of vehicles.
- Concerns with the condition of the existing in-town bridge and pedestrian connections in-town.
- Concerns with the property and traffic impacts that a second in-town bridge would have.
- Concerns with the location of a second in-town bridge in relation to schools and residences.
- Questions regarding the potential for a second in-town bridge in the future.
- Concerns regarding the design of the Tim Hortons drive-through and traffic queueing.

- Concerns regarding land use planning near the existing bridge in-town.
- Questions regarding next steps in the study process and when recommendations will be made.
- Concerns with lack of action and continued traffic congestion that will get worse.

The remainder of this document summarizes the questions received and provides responses. In addition to the questions posed in this document, there were many comments received from community members. There was an overall recognition in the comments of the traffic concerns in town and a desire to see lower impact solutions implemented in town first before other major new infrastructure is progressed that would displace and impact people. There were also comments in support of improving active transportation systems to support safe and attractive cycling and walking options, including across the existing bridge in town.

Frequently Asked Questions

Questions Related to Bypass Options

1. **It sounds like you are saying the new bypass should be built. Why are you proposing a new bypass connection along 3rd Concession over the Burnt River?**

A new bypass is not being proposed for implementation at this time. The new bypass is only one option that is being examined. The study is not complete and as such the bypass option is still being reviewed. There are no final recommendations going forward to Council at this time that confirm a new bypass to be constructed. The bypass option at 3rd Concession is being recommended for further study as there are complex issues that need further examination before a recommendation to proceed could be made. Current work is conceptual and high level. There is more work to do to understand the design requirements needed for a bridge in this area given the existing flood plain and topography. Additional work would also identify the range of impacts that a new bypass at 3rd Concession over the Burnt River would have before it could be recommended.

Important to note is that the Municipal Class EA process was recently updated by the Province which requires more detailed study for bridges over waterbodies that needs to be done for this bypass. These changes came into effect after the project began in 2019 but are now required. In order for a new bypass over the Burnt River to be recommended, a Schedule C EA study needs to be completed which involves more detailed review of concepts, designs, impacts and recommendations. The work that has been done to date provides the understanding of additional work needed to complete a full Schedule C EA for a new Burnt River bypass.

2. **Why are you considering a new bypass connection with another bridge over the Burnt River when there are two existing connections that could be used instead? There is Mitchells Bridge on Northline Road and a bridge on Burnt River Road at Concession Road 6, can you use one of those as a bypass route instead of building new?**

One key function of a bypass would be to redirect truck traffic. The bypass would act as the primary haul route to reduce truck traffic traveling through downtown Fenelon Falls. In 2006 a study of haul route options was completed that identified 3rd Concession with a new bridge over the Burnt River as the preferred route. The previous study recommended that an environmental assessment (EA) be completed for the identified route. This is now the EA that follows up on that recommendation. The

previous study did look at the existing routes options and did not recommend they be carried forward as haul routes that would be effective to better manage truck traffic through the region.

Subsequent to the 2006 study, Mitchells Bridge was upgraded. The current road connections to Mitchells bridge are not sufficient to handle truck traffic at this time. Load requirements of the bridge would need to be assessed to determine capacity if this were to become a more significant bypass. Given the turning requirements of trucks, all of the intersections along the Northline/Mitchells bridge route (along Northline and Poulson) would need to be redesigned. The turning requirements would limit truck use as long haul trucks are less likely to take routes with multiple turns that require slow lead in. Truck travel delays result in economic impacts to drivers. However, based on feedback received, there is the potential to review existing route signage for the Mitchells Bridge and Northline Road bypass around town that currently exists. The City is going to look into this. This can be done in the near future for general traffic during peak periods. This may result in improvements to in-town traffic congestion which can be reviewed and factored into the additional study required.

The other existing bridge connection further north over the Burnt River at Burnt River Road and Concession 6 was not identified as an appropriate haul route when the detailed haul route study was completed in 2006 as it is further from the connecting east-west routes.

3. **Starting at 3rd Concession and Northline Road, what would be the travel time difference between taking the new bypass route straight across Concession 3rd, versus taking the existing route down Northline over Mitchells bridge, across Poulson and then up to 121 and 3rd Concession? Is it more than 10 minutes?**

Mapping indicates that a regular vehicle can complete the existing route along Northline using Mitchells Bridge currently in approximately 9-10 minutes (heavy vehicles would operate at slower speeds and would increase that time to more than 10 minutes. We do not have detailed numbers on this).

With a new 3rd Concession Burnt River bypass, the 3.3 km connection would take less than 3 minutes in clear travel conditions.

4. **What property impacts will the new bypass have (including the new Burnt River bridge and 3rd Concession upgrades)? Will you be expropriating?**

The specific property impacts of a new bypass need to be confirmed through additional study. Given that a new bypass would include a new bridge over the Burnt River and the need to upgrade 3rd Concession, it is anticipated that if this option is recommended, there will be impacts to properties. These impacts may include full property acquisition for the footprint of the new bridge as well as potential easements along 3rd Concession. However, the extents of these property impacts are not yet known. Current drawings showing where the bridge would be located are for conceptual demonstration only and do not indicate any specifics about property impacts or the dimensions of the bridge or road upgrades. In addition, connecting the existing local roads that run north-south along Burnt River would need to be reviewed in order to determine safe connections at 3rd Concession. Changes to the existing road connections could also have property impacts. Further study is required to understand the limits of any potential property impacts. No decisions have been made about any expropriation or easements.

5. **Will you be compensating people for impacting property values for those properties near the new bypass that are not expropriated?**

It is too early in the work to identify specifics related to property impacts, impacts to property values or compensation approaches related to these issues. If the bypass option is progressed any further, additional studies will need to be completed that consider the full range of impacts of various bridge and road designs in order to understand what compensation may be appropriate and how the impacts could be mitigated.

6. **What will the noise, air quality, water quality and natural environment impacts be of the new Burnt River bridge and required upgrades of 3rd Concession? Are you aware of the natural habitats, species, wildlife, woodlots and water in the area that would be impacted?**

If the bypass option is progressed any further, additional studies will need to be completed related to air quality, noise, soils, water quality and quantity, wildlife, aquatic and terrestrial habitat and environmentally significant wetlands and woodlands. Baseline studies have been completed at a high level that identify general environmental conditions in the study area but this work will need to be supplemented with more detailed study to determine the potential impacts and mitigation that would be required if a new bypass is progressed further.

These additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution. Specific environmental surveys would be needed once the footprint of a bridge and road improvements was identified.

7. **Will the proposed bypass comply with existing planning and environmental policy?**

The design of a bypass would have to consider the applicable policies and regulations as per the Municipal Class Environmental Assessment process, including applicable municipal, provincial and federal regulations. Municipal infrastructure is permitted in the study area. If there are environmental impacts, they may require compensation and restoration. This would be determined through future study if the bypass solution is progressed further.

8. **What impacts will the bypass have on existing recreation activities including boating, the boat launch, connections to the Victoria Rail Trail, walkers, runners and on ATVing and Snowmobiling?**

If the bypass option is progressed further, additional studies will need to be completed related to specific impacts to existing recreation activities. Baseline studies have been completed at a high level that identify recreational assets and activities in the study area that may be affected but this work will need to be supplemented with more detailed study to determine the potential impacts and mitigation that would be required. This could include improving recreational amenities such as the boat launch, ATV routes and connections to and from the Victoria Rail Trail. This may also include improving pedestrian and multi-use trail connections along 3rd Concession as well.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

9. **Have the consultants considered the slopes and geometry of 3rd Concession in designing the bypass and bridge over Burnt River? This includes consideration of sightlines, speeds, requirements for trucks to use loud engine-breaks and how to provide safe connections to the local roads servicing the properties along Burnt River?**

The challenging slopes and flood plain in the study area are key reasons why further study is required before a new bypass on 3rd Concession over the Burnt River would be recommended. These issues require consideration of bridge and road design options that have not been done for the solutions level assessment so far. If the bypass option is progressed any further, additional studies will need to be completed related to the geometry of 3rd Concession and the design of a new bridge crossing. There are road and bridge design standards that must be met. These include standards related to safety, sightlines, design speeds and intersections/local road connections. Access to the local roads would need to be maintained. More detailed study to determine the design requirements and design options to implement a bypass and achieve safe connections would be required.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

10. **Will access to the 4 roads accessing the 3rd Concession near the river remain as they are (River, Brook, Cedarplank and River Bank roads) or would they have to be moved?**

Connections to the existing roads would need to be provided if a new bypass were built. If the bypass option is progressed any further, additional studies will need to be completed to determine how and where specifically to connect the four roads accessing properties along the Burnt River on either side of 3rd Concession. The team is aware of the connections required. Sightlines and safety would be key considerations for these connections.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

11. **Have the consultants considered the flood plain and flooding issues around the Burnt River?**

The study team is aware of the flood plain and the design requirements that would have to be met if a bypass was progressed further. If the bypass option is progressed further, additional studies will need to be completed related to the design of a new bridge crossing and impacts to the flood plain. There are road and bridge design standards that must be met in relation to the flood plain.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

12. **Have the consultants considered spring (flooding) and winter (freezing) conditions for the road design in order to address safe road conditions in all seasons for all vehicle types?**

Yes the consultants need to consider all seasons and conditions in the design of a roadway or bridge. If the bypass option is progressed any further, additional studies will need to be completed that consider all seasonal conditions for the design of a new bridge crossing and road upgrades. There are road and bridge design standards that must be met in this regard for all vehicle types.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

13. Will you be repaving/upgrading all of 3rd Concession for the bypass? Will you add a shoulder? Will you be adding signalized intersection lights at key intersections?

The specific upgrades required along the full length of 3rd Concession have not yet been determined. If the bypass option is progressed further, additional studies will need to be completed related to the requirements to repave or upgrade 3rd Concession. This will include review of intersections and shoulders that may be needed and will need to meet road design standards.

Additional studies would be completed as per the Schedule C Municipal Class Environmental Assessment Process that would be required for a bypass solution or a new in-town bridge solution.

14. Why are you proposing a bypass that is so far from the traffic issues that exist in the town of Fenelon Falls? Shouldn't the solutions be focused on managing the issues in town, especially since there are major commercial and retail destinations in town that a bypass won't serve?

There are multiple potential solutions being explored through the environmental assessment process. Some of the solutions are located in town. A bypass is one solution being explored. All of the other solutions being considered are located in town. The bypass would relieve some of the traffic congestion issues and provide a haul route for trucks to reduce truck traffic travelling through downtown Fenelon Falls. It is recognized that the bypass would not serve all travellers who are destined for town in order to access the retail, commercial or recreational amenities in town. Through this project, initial traffic improvements at the Helen Street and Lindsay Street intersection and at the Elliot Street and Lindsay Street intersection are being recommended. This will address some of the traffic flow issues in town.

15. How and when was the volume of traffic using the bypass determined? Where are these vehicles going?

The volume of traffic that would use the new bypass was determined based on current Streetlight data that demonstrates the existing volume of vehicles traveling through the region as well as local and regional origin and destination patterns. This data is then analyzed to determine an approximate percentage of vehicles that would use the bypass as a similar or better route given the origin and destination patterns that are observed in the data. Based on this analysis, approximately 20% of the vehicles going through town would likely use the bypass. The data analysis is approximate at the level of study done. If the bypass is progressed for further study, more information on traffic patterns and volumes that would use the bypass would need to be completed. The Interim Study Report that will go to Council in the Fall of 2021 will include the background traffic study completed with more detailed information on this analysis.

16. What impact will the bypass have on businesses in town that will no longer get the traffic? Have you consulted with businesses in town? Have you done a study of economic impacts and benefits to look at how a bypass may negatively or positively impact businesses?

Through the consultation process, the business community in town has been consulted. The concerns from businesses relate more to the impact that congestion has on attracting patrons who don't want to deal with traffic and parking. There have been fewer concerns from the business community in town that a bypass would take traffic away. Current conditions are seen to be negatively impacting businesses as traffic congestion limits driver interest to stop in town. Redirecting some of the traffic, including truck traffic, is seen as a positive by business owners/operators. There is also interest from the business community for a second in-town crossing to support economic growth in town.

There has not been a detailed study of potential economic impacts and benefits of a bypass or a second in town bridge. Completion of such a study may be recommended for next steps. There are many factors that contribute to business prosperity in small towns that would have to be considered, such as population demographics, population growth, work force, regional anchors, parking, business clusters, etc.

17. **What is the traffic volume planned for intersection of Hwy 35 and 3rd Concession? Will intersection need to be modified? Any safety concerns?**

The traffic volumes at this intersection have not been studied in detail. If the bypass is progressed for further study, traffic volumes and intersection safety at intersections along 3rd Concession would need to be reviewed. Recommendations for improvements along 3rd Concession and at intersections would need to be identified in the next steps.

18. **If the bypass if built will there be truck restrictions through town to ensure that trucks take the bypass?**

The City would look at implementing a designated haul route and restricting trucks of a certain size from using the bridge in town.

Questions Related to Second In-Town Bridge Options?

19. **A second in town bridge would have just as many or more impacts to people, property, environment, water quality and quality of life as a new bypass. Have you looked in detail at all of the impacts that new in town bridge would have and talked to Parks Canada about this given that the Trent Severn is a Federally protected National Heritage site?**

The study has considered the impacts that a second in town bridge would have on the existing community and environment. Similar to the bypass solution, more study would be needed to understand the specific impacts, design options and mitigation requirements if a second in town bridge was progressed further. The project team has been in contact with Parks Canada and would have to continue to work with Parks Canada if a second bridge crossing in town was progressed for further consideration.

20. **Can the City protect for a future second bridge crossing now so that as growth comes online in the area the City is able to proceed with designing and implementing a second in town bridge?**

The City would have to consider the value of protecting land now and reserving the space for a future right-of-way. Such an approach has the potential to sterilize the surrounding properties and would have to be examined more closely.

21. **Why is a second in-town bridge crossing not being proposed at Clifton Street?**

A Clifton Street connection was examined in the early stages of work. A new bridge connection at Clifton would require easements and property taking from all of the residential properties along Clifton Street given the current right-of-way extents. The current uses along Clifton Street are all residential uses. It is not recommended that a road that is residential for the complete length of the road be used for a bridge connection. There are other options that have been examined that provide a more reasonable alternative route than Clifton Street. The other routes being explored do not include solely residential uses. In addition, the proximity of Clifton to Colbourne Street is not preferred as it runs parallel to the

existing traffic route on Colborne Street and could result in a relocation of traffic issues around the same few blocks of downtown.

22. Why are you considering a second crossing route in town on Wychwood that would go right by a school and a long term care home?

There are multiple factors that are considered when looking at options for a second bridge connection. Wychwood does have a school and long term care home but provides the best route option to connect the shorter distances over the Trent-Severn Waterway while having fewer residential properties along the majority of the route. Wychwood has fewer residential uses compared to other road connection options. The potential impacts to the school and long term care home would have to be examined in more detail if the second in town bridge crossing was progressed further. It is recognized that impacts to schools and the safety of children crossing roads is of paramount interest and would need specific attention in future study if progressed.

23. Are you aware of the historical cemetery that's located between Francis Street and Sturgeon Point Road? Would the new road connections needed to connect a second in town bridge impact this?

We are aware of the presence of a cemetery. Initial cultural heritage and archaeological studies have identified this. Future road connections would have to take the cemetery into account. Further study would be needed to confirm the exact extents and significance of the cemetery and then road designs would have to identify options to avoid impacts if a second in town bridge option was progressed.

24. Can an active transportation link/bridge be built at either the Victoria Rail Trail or to connect Clifton Street and the back of the Sobeys? This could be a pedestrian, cycling, ATV bridge only. Would this improve traffic flow on existing bridge? Could this provide space needed on the existing bridge to expand that for automobiles?

This is outside the scope of the study as we are not looking at bridge options that would be exclusively active transportation or pedestrian bridges. There is the potential that a new active transportation connection could be added in town. The work being done for this study would not preclude a new active transportation/pedestrian link. The added link may provide some improvement to traffic operations at the Helen and Lindsay Street intersection by reducing pedestrian crossings at the intersection but an active transportation connection in and of itself is unlikely to make a significant change to existing auto traffic issues.

25. Is the City concerned that if there is an emergency on the existing bridge, there is no way to get through town if the bridge is closed or cannot be used?

The City is aware of this concern raise by residents and has consulted with Fire and Emergency Services on this issue. Fire and EMS have not said this would be a major concern as there are other routes around if necessary that Fire and EMS are aware of and would use. Having a second bridge is an advantage related to emergency response but it has not been identified as a requirement.

26. Does the City have a long term vision for Fenelon Falls that considers how the town will develop over time, including supporting the downtown character, increased tourism and economic growth, improving pedestrian and cycling connections, improving the overall transportation network and protecting and enhancing the green space?

The City has an Official Plan, Growth Management Plan, Transportation Master Plan and Servicing Mast Plan that cover the whole City of Kawartha Lakes including Fenelon Falls. These plans include consideration of growth, transportation, environment, economy, etc. The City is starting a review of these in 2021/2022 that will look to establish a medium and long term vision out to 2051. There is also a Fenelon Falls Downtown Revitalization Plan that the City recently developed with local residents and businesses that has led to recent improvements.

Questions Related to In-Town Traffic Operations Improvements

27. Can you adjust the signal timing at the intersection of Helen and Lindsay Streets to improve traffic flow? This includes adding/increasing advanced left turns from Lindsay Street into Sobeys and onto Helen Street?

The City and Dillon have looked extensively at this. The City has tried multiple signal timing arrangements over the years and the current arrangement provides the best operation possible given the competing movements. Dillon also examined this at the beginning of the study in 2019 and confirmed that there are limited additional signal timing changes that could be made to significantly improve intersection operations. Unfortunately, each modification to the signal phases has a knock on impact to another movement that just modifies the traffic delays but does little to reduce them.

28. Is the City of Kawartha Lakes working with Sobeys and Tim Hortons to address their traffic issues to find better solutions? In particular, the drive-thru at the Tim Hortons is not big enough and results in long queues that back up along Elliot and at peak times down Lindsay Street. Can the Tim Horton's access on Elliot be shifted further east on Elliot to accommodate longer queue lanes both on-site and along Elliot itself or can the Tim Hortons be moved further south on Lindsay to a larger lot?

The project team has corresponded with Tim Hortons and Sobeys and will continue to consult with them on issues related to traffic operations. Through this study the City is only able to provide solutions that relate to the design and operations of public rights-of-way. The City recognizes that there are concerns regarding on-site traffic operations and traffic queuing on Elliot Street related to the Tim Hortons drive-thru. The City will continue to consult with property owners to improve traffic conditions where possible.

29. Why was the gas station on the corner of Helen Street and Lindsay Street approved for increases recently given all of the known traffic issues?

The gas station is an existing use and the approval was a renovation. The City cannot prevent a property owner from completing a renovation when the use is not changing.

30. Will the entrance to The Locker also be closed/adjusted given that it also has traffic during peak times?

This will be looked at during the next steps of design work required for the in town intersection modifications if supported for implementation. The Locker is not the primary source causing traffic queuing and should be looked after other improvements are made.

31. Are you closing or moving the Helen and Lindsay Street intersection entirely? What is happening at that intersection and will there still be lights at the intersection of Helen and Lindsay Street?

The Helen and Lindsay Street intersection will remain in place as a signalized intersection. Based on the traffic study recommendations, the movements that would no longer be permitted at the Helen and Lindsay Street intersection would include:

- No southbound left turn from the bridge into the Sobeys/Tim Hortons/RWH access driveway
- No driving straight through the intersection from Helen Street into the Sobeys/Tim Hortons/RWH access driveway
- No left turns onto southbound Lindsay Street to exit the Sobeys/Tim Hortons/RWH site
- No driving straight through onto Helen Street to exit the Sobeys/Tim Hortons/RWH site

The movements that would continue to be permitted at the Helen and Lindsay Street intersection, that would continue to be signalized, would include:

- Right turn into the Sobeys/Tim Hortons/RWH access driveway from northbound Lindsay Street
- Right turn out of the Sobeys/Tim Hortons/RWH access driveway onto the bridge northbound
- Through traffic heading north and south on Lindsay Street and on the bridge
- Right turns from Helen Street onto Lindsay Street southbound
- Left turns from Helen Street onto the bridge northbound
- Right turns from the southbound bridge onto Helen Street

The proposed intersection modifications would require signal coordination of the existing signalized intersection at Helen and Lindsay Street with the new signalized intersection proposed at Elliot and Lindsay Street.

32. Do you have data on how much traffic is caused by Sobeys and Tim Hortons specifically? Will you get this data before a final decision is made?

Through the traffic study work, the number of vehicles that enter and exit the parking lot via the Helen and Lindsay Street intersection have been obtained. The number is a total number and does not differentiate between Sobeys versus Tim Hortons users. Though the traffic study it was observed that approximately 300 vehicles enter/exit the Lindsay Street access per hour on a peak Saturday midday. Vehicle volumes for the separate Tim Hortons entrance on Elliot Street were not obtained. Additional traffic data can be obtained in advance of intersection design, and through discussions with project stakeholders.

33. More development is being proposed in Fenelon that would affect Elliot Street traffic. Have you accounted for this growth? Particularly for the projects that would be on Juniper Street? What do your "2031 capacity" traffic numbers include for considering growth in Fenelon Falls? Are we at capacity with existing population by 2031 or does that include growth?

The 2031 volumes were obtained from the City's Corridor Study which includes background traffic growth representing growth in population and employment in and around Fenelon Falls as well as approved developments. Based on the study, 1.15% growth was assumed. The capacity numbers include these growth considerations. The study does not include traffic volumes that could result from new developments that are conceptual and not approved.

34. Will you be updating local roads in town, including Elliot Street, to handle the extra traffic that the in town intersection changes at the Helen and Lindsay Street intersection will create?

Yes, local roads will be improved. There are planned improvements to Elliot Street that have been on the City books prior to this study. The improvements include repaving, adding a turning lane for queuing into the Tim Hortons and adding sidewalk connections. The Elliot Street improvements are planned regardless of the outcome of this study as they are needed to improve Elliot beyond the current condition.

35. Will your work consider the changing traffic patterns as a result of COVID and post-pandemic life as more people permanently or partially work from home or work flexible hours or move permanently from urban city residences to seasonal cottage residences?

COVID-19 has affected travel patterns but we do not yet know what the permanent changes may be. Every 5 years the City does a roads review for updating the 5 year plan and the next one will commence in 2022. For this the City will look at current traffic patterns. For the 2022 study, that will include the traffic patterns that have resulted from the pandemic. In addition, the City just initiated the planning work required for updating the Growth Management Plan, Master Servicing Plan and Master Transportation Plan. These plans will look at recent growth and travel patterns as well as future projections. These studies are all going to commence within approximately one year and as such can include consideration of pandemic effects.

36. Currently, how many days of the year are there traffic delays at the Helen and Lindsay Street intersection and how long are the delays?

Vehicle data was not obtained at the intersection for every day of the year. However the following information can be provided regarding general travel patterns using the Fenelon Falls bridge that contribute to traffic delays at the Helen and Lindsay Street intersection.

- Summer volumes can be up to 30% higher than winter volumes at the intersection
- Summer Fridays and weekends can be up to 40% and 30% higher than Summer weekdays, respectively
- The traffic delays are primarily caused by vehicles trying to enter and exit the Sobeys/Tim Hortons/RWH access driveway on Lindsay Street. The biggest issue is related to the southbound left turn vehicles queuing on the bridge to enter the Sobeys/Tim Hortons/RWH access entrance. The queues back up and block the through vehicles which cannot get to the intersection. This is compounded by vehicles from Helen Street and from northbound Lindsay Street that are also trying move through the intersection to access the Sobeys/Tim Hortons/RWH driveway as well as head northbound on the bridge.
- Based on the data collected and information from the previous traffic study, it is estimated that vehicles would be delayed an average of 2 traffic signal cycles during the peak seasonal periods between May and September. This will continue to deteriorate. We have heard from community members who have experienced delays of 3 or more traffic signal rounds to get through the intersection.

37. What will be the result of the proposed traffic operation changes? Will most of the congestion be eliminated?

It is anticipated that the proposed changes would have an immediate improvement on traffic flow in town. The modifications would reduce vehicle congestion by more effectively managing the southbound left turn queue and reducing the traffic delays. With the implementation of the recommended improvements it is anticipated that the intersection would be able to operate under capacity to 2031.

38. **Can the intersection modifications be implemented on a seasonal basis? So that they are in place during summer peaks but not for the remainder of the year? This would allow permanent residents to continue using the existing connections that we are used to outside of the seasonal busy periods.**

This is something that the City can look at in next steps of detailed design for the intersection modifications if the modifications are supported and carried forward to next steps.

39. **Will the new Elliot and Lindsay Street intersection also have long queues of traffic trying to access the Tim Hortons and Sobeys? Given how close the intersections will be, will the left turn queuing from Lindsay Street to Elliot Street back up and spill into the Helen and Lindsay Street intersection and block that as well?**

Based on the Synchro traffic modelling done, the amount of queuing storage space that would be available with the implementation of the Elliot Street intersection would be enough to handle the volume of vehicles modelled. There may be circumstances that would cause back-ups on occasion but that would relate more to illegal traffic moves than to the proximity of the two signalized intersections. With the proposed arrangement of intersections and with coordinated traffic signals, the traffic should be able to clear through the lights and no longer cause back-ups that extend through downtown.

40. **The signals at Colbourne and Francis Street are also an issue, how is the study considering this intersection?**

Beyond this study the City is also making improvements to Colbourne and Francis Street. These improvements were planned ahead of this study and are being implemented. The plans for Colbourne and Francis Street were considered in the study.

Questions Related to the Existing Bridge

41. **Can you expand the existing bridge in town to accommodate more traffic? Including removing/relocating the pedestrian sidewalk to use that space for more auto traffic?**

A significant expansion of the existing bridge to accommodate more lanes for through traffic and/or left turn queuing is not recommended. Slight expansion of the southbound left turn queueing lane may be possible to provide some space for a few more southbound left turn queueing vehicles but this would not address the majority of the traffic issues as the number of vehicles in the southbound left turn queue continues to grow beyond the queue capacity that would be available even if more space was added. Furthermore, the complications of expanding the existing bridge include issues related to road geometry, the existing power station, the falls and the lock system. Given that Colbourne Street remains a two lane road (single lane in each direction), the technical issues related to expanding the existing bridge would only be met with more traffic issues that would bottleneck at Colbourne and Water Street. The traffic problems would then just be relocated to a different intersection in downtown.

42. Will the existing bridge be refurbished including the pedestrian connections to allow more space for pedestrians and mobility devices to pass? There are concerns about the existing condition of the bridge and the safety and comfort of the sidewalks and cycling options.

Yes. Refurbishment has been approved and initial emergency repairs were done in January and February 2021. The City is currently evaluating options for the asset for other improvements needed. This includes improving the pedestrian connections and providing pedestrian connections on both sides of the bridge.

43. Did Dillon Consulting review the report provided by Ainsley to the City of Kawartha Lakes in 2016 entitled ENG-2016-019 FENELON FALLS CORRIDOR ENVIRONMENTAL ASSESSMENT? There were some recommendations for pedestrian improvements that have not been implemented. Why not?

Yes Dillon has reviewed the Ainsley report. The City is currently working on pedestrian improvements that have been considered in this study, including a new lookout on the existing bridge and a new mid-block pedestrian crossings on Lindsay at the Secondary School between Green Street and Elliot Street. The pedestrian improvements need to be coordinated with the bridge rehabilitation and will improvements to Elliot Street.

Questions Related to Consultation Process

44. We did not know about previous meetings and are concerned about how notifications have been provided. How did you notify people?

The City provided notices through multiple means including newspaper notifications, hand delivered notices to residences along Burnt River in the area of the bypass, Admail notices using Canada Postal services to postal codes in the potential areas of impact in town, letters to agencies and stakeholders, advertisement on the electronic road sign in Fenelon Falls, and through email outreach to community stakeholder groups and local businesses in Fenelon Falls.

45. Did you notify all potentially impacted property owners of the project and the consultation opportunities?

Yes. We understand that previous notices may have been missed which is why an additional public meeting was held on May 29, 2021. That meeting was held to make sure that potentially impacted property owners were aware of the project and have the opportunity to provide input and feedback to the project team and the City. The City welcomes people to continue to provide feedback and input on the project and to ask questions of the project team. Decisions have not been made on recommendations and next steps and as such the City encourages people to reach out to the project team with questions or comments.

46. Are you aware that many rural residents don't have the bandwidth to attend Zoom meetings?

Yes. Unfortunately with the COVID-19 pandemic, we must follow the direction of public health and limit in-person consultation. Recognizing the access issues that virtual meetings pose, the May 29th meeting was recorded and can be watched at any time by following this link: https://jumpinkawarthalakes.ca/ffsecondcrossing/widgets/70720/videos/7354

Questions Related to Next Steps

47. How is the City going to pay for the project? Out of what budget?

Depending on the option that is progressed, the next steps of study would include identification of budget and include information on which capital budget would be required to cover the cost of implementation.

48. When will we get more information on the recommendations and when will construction begin?

Dillon Consulting is preparing an Interim Study Report with recommendations to go to the City in late Summer/early Fall 2021. At that time there will be a presentation either to Committee of the Whole or to City Council. Recommendations will proceed depending on direction from Council. This direction is anticipated in Fall 2021. Following this, depending on the recommendations that are progressed, more design work needs to be completed before any construction can begin. Depending on the recommended solution(s), this can take anywhere from 1-3 years to confirm designs with implementation occurring after that time depending on budget approval and the permitting process.

49. Will there be more consultation and how will the directly affected property owners be notified?

Consultation will depend on recommendations and direction from Council related to the options for consideration. If the City is directed to complete further study of a new bypass or of a second in town bridge crossing, there will be more consultation in accordance with the Schedule C Class Environmental Assessment Process. This includes direct consultation with impacted property owners. Notification will include door to door mail to affected properties as well we notices sent via email to the full list of project contacts that have expressed interest or sent in comments to the project team. In addition, road signs, newspaper ads and social media posts by the City may also be used to notify the public of meetings. If the City is directed to pursue next steps for the in town traffic modifications, there will be consultation with specific property owners and information on the detailed designs for the intersection improvements will be shared.

50. Will input from the community be reflected in recommendations?

Yes. Recommendations will be framed in context with the community input received. It is important to note that all of the options have received mixed input ranging from supportive to against. There is no option where all input received has been supportive and there is no option where all input received has been against the option. However, public input received has made clear that a new Burnt River bypass and a new second bridge crossing in town would have the greatest impacts to residents and the environment and have received extensive criticism.

APPENDIX B

Natural Environment Baseline Study, Part A: Desktop Study and Part B: Field Investigations

MEMO

DATE: July 26, 2019

SUBJECT: Fenelon Falls Second Crossing Study PART A – Desktop Research Memo (Environmental and Biological Surveys)

OUR FILE: 19-9411

Introduction

The Transportation Master Plan and the Fenelon Falls Corridor Study identified the need for additional roadway capacity across the Trent-Severn Waterway within the 2031 planning horizon to reduce vehicle delays in this area during peak times. The City of Kawartha Lakes retained Dillon Consulting Limited (Dillon) to complete a Desktop Research Memo (Environmental and Biological Surveys) for the Fenelon Falls Second Crossing Environmental Assessment (EA), in support of developing baseline conditions to be able to complete a high level evaluation of the alternative solutions for the current traffic issues related to the existing bridge crossing of the Trent-Severn Waterway in downtown Fenelon Falls, Ontario. There are two proposed Study Areas: By-Pass (Study Area A) and In Town (Study Area B) (**Attachment A;** Figure 1A and Figure 1B).

For the By-Pass Study Area A, one solution is proposed that includes:

1. A By-Pass: a new route to be connected around the town so that those travelling to areas beyond the town can go around (trucks and cottagers mainly). This route would likely follow 3rd Concession crossing the Burnt River.

For the In Town Study Area B, three solutions are proposed that include the following:

1. A new second crossing in town: there are four options for this second crossing, one at Clifton Street and three at Wychwood Crescent;
2. Upgrading/widening the exiting bridge: this would also require modifying the main streets of Lindsay and Colborne that tie into the bridge on either side in order to accommodate more traffic (no widening would be needed but the right-of-way (ROW) would require redistribution of lanes and sidewalks); and
3. In Town traffic operations improvements: these would be schedule A+ and B improvements related to intersection design and changing of driveways onto the main street as well as reconfiguration of the Lindsay and Helen intersection.

In support of the desktop research, Dillon completed biological background reviews and desktop assessments within the two Study Areas. The background review included the following sources:

- Land Information Ontario (LIO) (MNRF, 2019);
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019);
- City of Kawartha Lakes Official Plan (City of Kawartha Lakes, 2006);
- Fenelon Falls Official Plan (Village of Fenelon Falls, 2012);
- Kawartha Region Conservation Authority (KRCA) Regulated Areas (KRCA, 2019);

- Ontario Breeding Bird Atlas (Cadman et al., 2007);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2018);
- Fisheries and Oceans Canada (DFO) Aquatic species at risk map (2019);
- Land Information Ontario GIS Data, Aquatic Resource Area Point, Line and Polygon Segment Database (2018).
- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre's (NHIC) database for Species at Risk (SAR) and Species of Conservation Concern (SCC) occurrences (MNRF, 2019);
- Digital Distribution Maps of the Mammals of the Western Hemisphere (NatureServe, 2007);
- Ontario Butterfly Atlas (Toronto Entomologists Association, 2018);
- Natural Heritage Reference Manual (MNRF, 2010);
- Significant Wildlife Habitat Technical Guide (MNRF, 2000); and
- Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015).

The purpose of this memo is to summarize the findings from the desktop research completed for the Study Areas. A separate memo will be produced with the findings of field surveys.

Description of the Natural Environment

Natural Heritage Features

Study Area A

Natural features that occur within the Study Area include Wooded Areas, Provincially Significant Wetlands (PSW) (Balsam Lake 15 and Ellery Bay), Unevaluated Wetlands, Locally Significant Wetlands (Sturgeon Lake No. 14), Watercourses, Waterbodies and one Area of Natural and Scientific Interest (ANSI) – Life Science (Burnt River Mouth Wetlands) (**Attachment A;** Figure 2A). The Study Area does not overlap with KRCA Regulated Areas (KRCA, 2019).

The Study Area is located within the Natural Heritage System of A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019).

Study Area B

Natural features that occur within the Study Area include Wooded Areas, one Unevaluated Wetland, Watercourses and one Waterbody (Fenelon River) (**Attachment A;** Figure 2B). Along the east and west sides of the Fenelon River from approximately between Colborne Street to the north and Janlisda Drive to the south, there is an Environmental Constraint Area identified (Schedule A; Village of Fenelon Falls, 2012). A portion of Fenelon River is identified as an Environmentally Sensitive Area from approximately Colborne Street to the north and the fork in the river to the south (Schedule C; Village of Fenelon Falls, 2012). The Study Area does not overlap with KRCA Regulated Areas (KRCA, 2019).

The Study Area is partially located within the Natural Heritage System of A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019).

Preliminary Desktop Ecological Land Classification

A desktop assessment was conducted for the Study Areas to determine high level vegetation communities characterized by using the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al., 1998), based on second approximation classifications. Preliminary desktop ELC results for the Study Areas are described below.

Study Area A

The Study Area is mostly composed of agriculture (OAG), low density residential (CVR_1) and single family residential (CVR_3). There are also commercial and institutional lands in the Study Area. In addition, there are natural areas of swamp, marsh, forest, thicket, meadow and open water throughout the Study Area. Refer to **Attachment A;** Figure 3A for the preliminary desktop ELC results.

Study Area B

The Study Area is mostly composed of low density residential (CVR_1). The Fenelon River runs through the central portion of the Study Area. There are also areas of greenlands (CGL), commercial and institutional (CVC), hedgerows (TAGM5) and agriculture (OAG). There are a few areas of deciduous forest/swamp within the Study Area. Refer to **Attachment A**; Figure 3B for the preliminary desktop ELC results.

Fish and Fish Habitat

Study Area A

The following watercourses and waterbodies are located within Study Area A:

- Cameron Lake;
- Sturgeon Lake;
- Martin Creek;
- Rosedale River;
- Balsam Lake;
- Goose Lake;
- Burnt River; and
- Several unnamed watercourses.

Based on the presence of the aforementioned watercourses and waterbodies, there is fish habitat present within the Study Area. A review of Ontario Aquatic Resources Area (ARA) point, line and polygon segments database within the Study Area identified fish communities consisting primarily of spring and fall spawning minnows and baitfish, coarse fish, and sport fish species, including top predators (Muskellunge (*Esox masquinongy*), Northern Pike (*Esox lucius*) and Largemouth Bass (*Micropterus salmoides*). None of the fish species identified are SCC (S1-S3 ranked and Special Concern species). Review of DFO aquatic species at risk mapping (August 2019) did not identify any aquatic SAR within the

Study Area. Lake Sturgeon (*Aciper fulvescens*), listed as provincially Endangered (Great Lakes – Upper St. Lawrence populations), was identified in Sturgeon Lake within the Study Area, however, Lake Sturgeon was not identified on the DFO aquatic SAR map (August 2019).

Study Area B

The following watercourses are located within Study Area B:

- Fenelon River; and
- One unnamed watercourse.

Based on the presence of the aforementioned watercourses, there is fish habitat present within the Study Area. A review of Ontario ARA polygon segment database for Sturgeon Lake immediately downstream of the Study Area identified a fish community consisting primarily of spring and fall spawning minnows and baitfish, coarse fish, and sport fish species, including top predators (Muskellunge, Northern Pike, Largemouth Bass, and Smallmouth Bass *(Micropterus dolomieu*). None of the fish species identified are SCC. Review of DFO aquatic species at risk mapping (August 2019) did not identify any aquatic SAR within the Study Area. Lake Sturgeon was identified in Sturgeon Lake which is directly connected to the Fenelon River immediately downstream of the Study Area, however, Lake Sturgeon was not identified on the DFO aquatic SAR map (August 2019).

Wildlife and Wildlife Habitat

Criteria for identifying significant wildlife habitat (SWH) within the Study Areas follows the guidelines outlined in the Natural Heritage Reference Manual (MNRF, 2010), the Significant Wildlife Habitat Technical Guide (MNRF, 2000) and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015).

There are four categories of SWH identified. Using the background review and preliminary desktop ELC classifications against the criteria for identifying SWH, the candidate SWHs identified within the Study Areas is outlined below.

Study Area A

The following candidate SWHs have been identified for Study Area A:

1. **Seasonal Concentrations Areas**
    - Bat Maternity Colonies. This candidate SWH is identified in the deciduous and mixed forests (FOD/FOM) and swamps (SWD/SWM) within the Study Area.
    - Turtle Wintering Areas. This candidate SWH is identified in the open water (OA) in the Study Area.
    - Deer Wintering Areas (Stratum 2). This confirmed SWH is identified by the MNRF in a portion in the northeast of the Study Area (**Attachment A;** Figure 2A).

2. **Rare Vegetation Communities or Specialized Habitat for Wildlife**
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat. This candidate SWH is identified in the forests and swamps adjacent to the rivers and lakes in the Study Area.

- Woodland Raptor Nesting Habitat. This candidate SWH is identified in the forests and swamps that extend outside of the Study Area and are large (>30 ha) in size with interior habitat.
- Turtle Nesting Areas. This candidate SWH is identified in and adjacent to the marshes along roadway edges that may provide suitable gravel areas for turtle nesting in the Study Area.
- Amphibian Breeding Habitat (Woodland). This candidate SWH is identified in the forests and swamps with open water or potential for vernal pools within the Study Area.

3. **Habitats for Species of Conservation Concern**
   - Special Concern and Rare Wildlife Species (Evening Grosbeak, Eastern Wood-Pewee, Bald Eagle, Snapping Turtle, Northern Map Turtle and Eastern Musk Turtle). This candidate SWH is identified in the forests or open water areas in the Study Area.

4. **Animal Movement Corridors**
   - None.

Study Area B

The following candidate SWHs have been identified for Study Area B:

5. **Seasonal Concentrations Areas**
   - Bat Maternity Colonies. This candidate SWH is identified in the deciduous forests (FOD) and swamps (SWD) within the Study Area.
   - Turtle Wintering Areas. This candidate SWH is identified in the open water (OA) Fenelon River in the Study Area.
   - Deer Wintering Areas (Stratum 2). This confirmed SWH is identified by the MNRF in the east of the Study Area (**Attachment A;** Figure 2B).

6. **Rare Vegetation Communities or Specialized Habitat for Wildlife**
   - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat. This candidate SWH is identified in the forest adjacent to Fenelon River in the Study Area.
   - Amphibian Breeding Habitat (Woodland). This candidate SWH is identified in the forests and swamps within the Study Area.

7. **Habitats for Species of Conservation Concern**
   - Special Concern and Rare Wildlife Species (Evening Grosbeak, Eastern Wood-Pewee, Bald Eagle, Snapping Turtle, Northern Map Turtle and Eastern Musk Turtle). This candidate SWH is identified in the forests or Fenelon River in the Study Area.

8. **Animal Movement Corridors**
   - None.

Species at Risk and Species of Conservation Concern

Study Area A

A total of 11 SAR and 12 SCC were identified as potentially occurring within the vicinity of the Study Area based on secondary source information (**Attachment B: Table 1**). Of these species, the following have been identified as having potential habitat within the Study Area based on background reviews and preliminary desktop ELC, with associated provincial statuses:

- Chimney Swift (*Chaetura pelagica*; THR);
- Evening Grosbeak (*Coccothraustes vespertinus*; SC);
- Eastern Wood-Pewee (*Contopus virens*; SC);
- Bald Eagle (*Haliaeetus leucocephalus*; SC);
- Barn Swallow (*Hirundo rustica*; THR);
- Snapping Turtle (*Chelydra serpentine*; SC);
- Blanding's Turtle (*Emydoidea blandingii*; THR);
- Northern Map Turtle (*Graptemys geographica*; SC);
- Eastern Musk Turtle (*Sternotherus odoratus*; SC);
- Eastern Small-footed Myotis (*Myotis leibii*; END);
- Little Brown Myotis (*Myotis lucifugus*; END);
- Northern Myotis (*Myotis septentrionalis*; END); and
- Tri-colored Bat (*Pipistrellus subflavus*; END).

Species at Risk

Chimney Swift and Barn Swallow may nest in the structures (i.e. chimneys, culverts, etc.) within the Study Area. If these structures are to be impacted by the work, targeted surveys for these species should be completed.

Blanding's Turtle may inhabit rivers and lakes in the Study Area, they may also nest adjacent to marshes along gravel roadway edges. If work is proposed in and around the open water or marsh areas, targeted Blanding's Turtle surveys are recommended.

The deciduous and mixed forests and swamps may provide roosting habitat for SAR bats. If work is proposed within these potential habitats for SAR bats, snag/cavity tree surveys should be conducted to determine presence/absence of potential suitable bat habitats.

Species of Conservation Concern

Evening Grosbeak, Eastern Wood-Pewee and Bald Eagle typically nests in open deciduous forests. If these forests are to be impacted by the project, breeding bird surveys are recommended to determine presence/absence of these species.

Snapping Turtle, Northern Map Turtle and Eastern Musk Turtle may inhabit rivers and lakes in the Study Area. If these open water areas are to be impacted by the project, these areas should be surveyed for turtles.

Study Area B

A total of 11 SAR and 13 SCC were identified as potentially occurring within the vicinity of the Study Area based on secondary source information (**Attachment B: Table 2**). Of these species, the following have been identified as having potential habitat within the Study Area based on background reviews and preliminary desktop ELC, with associated provincial statuses:

- Chimney Swift (THR);
- Evening Grosbeak (SC);
- Eastern Wood-Pewee (SC);
- Bald Eagle (SC);
- Barn Swallow (THR);
- Snapping Turtle (SC);
- Blanding's Turtle (THR);
- Northern Map Turtle (SC);
- Eastern Musk Turtle (SC);
- Eastern Small-footed Myotis (END);
- Little Brown Myotis (END);
- Northern Myotis (END); and
- Tri-colored Bat (END).

Species at Risk

Chimney Swift and Barn Swallow may nest in the structures (i.e. chimneys, culverts, etc.) within the Study Area. If these structures are to be impacted by the work, targeted surveys for these species should be completed.

Blanding's Turtle may inhabit Fenelon River in the Study Area. If work is proposed in and around the river, targeted Blanding's Turtle surveys are recommended.

The deciduous forests and swamps may provide roosting habitat for SAR bats. If work is proposed within these potential habitats for SAR bats, snag/cavity tree surveys should be conducted to determine presence/absence of potential suitable bat habitats.

Species of Conservation Concern

Evening Grosbeak, Eastern Wood-Pewee and Bald Eagle typically nests in open deciduous forests. If these forests are to be impacted by the project, breeding bird surveys are recommended to determine presence/absence of these species.

Snapping Turtle, Northern Map Turtle and Eastern Musk Turtle may inhabit Fenelon River in the Study Area. If the river is to be impacted by the project, the river should be surveyed for turtles.

Summary and Recommendations

There are two proposed Study Areas: By-Pass (Study Area A) and In Town (Study Area B) for the Fenelon Falls Second Crossing EA project. Desktop research was completed as a biological background review and desktop assessments for the Study Areas.

Natural features in the Study Areas indicate that Study Area A has large waterbodies surrounded by wetlands including PSWs. There is also an ANSI – Life Science (Burnt River Mouth Wetlands). Study Area B has one waterbody Fenelon River running through the central portion of the Study Area, as well as one Unevaluated Wetland and woodlands.

The preliminary desktop ELC assessments were completed for the Study Areas. The Study Area A consists primarily of agriculture and residential lands, with open water rivers and lakes surrounded by swamps and marshes. There are also commercial lands, forest, thicket and meadow. The Study Area B consists primarily of residential lands with Fenelon River running through centrally. There are also areas of agriculture, forest, swamp, greenlands and hedgerow.

Based on the presence of the watercourses and/or waterbodies in both Study Areas, there is fish habitat present. The fish communities consist primarily of spring and fall spawning minnows and baitfish, coarse fish, and sport fish species, including top predators. None of the fish species identified are SCC, however, Lake Sturgeon was identified in Sturgeon Lake within both Study Areas.

Both Study Area A and B have candidate SWH in the forests and swamps as Bat Maternity Colonies, Bald Eagle and Osprey Nesting, Foraging and Perching Habitat and Amphibian Breeding Habitat (Woodland). Both Study Areas have candidate Turtle Wintering Areas in open water areas. Both Study Areas have portions of confirmed Deer Wintering Areas. Both Study Areas have candidate Special Concern and Rare Wildlife Species (Evening Grosbeak, Eastern Wood-Pewee, Bald Eagle, Snapping Turtle, Northern Map Turtle and Eastern Musk Turtle). In addition, Study Area A has candidate Turtle Nesting Areas adjacent to mashes along gravel roadway edges and Woodland Raptor Nesting Habitat in large forests and swamps.

Potential habitat for the following SAR and SCC exists in both Study Areas:

- Chimney Swift (THR);
- Evening Grosbeak (SC);
- Eastern Wood-Pewee (SC);
- Bald Eagle (SC);
- Barn Swallow (THR);
- Snapping Turtle (SC);
- Blanding's Turtle (THR);
- Northern Map Turtle (SC);
- Eastern Musk Turtle (SC);
- Eastern Small-footed Myotis (END);
- Little Brown Myotis (END);
- Northern Myotis (END); and
- Tri-colored Bat (END).

Overall, based on our background review and desktop assessment results, the Study Area B (In Town) has fewer natural features and candidate SWHs. Both Study Areas have similar SAR and SCC to consider within habitats. Either Study Area option would require further studies including (but not limited to) the following:

- Confirmatory ELC;
- Botanical surveys;
- Breeding bird surveys;
- Amphibian surveys;
- Turtle surveys;
- Deer survey; and
- Snag/cavity tree assessments.

If habitats for wildlife are confirmed significant, standard mitigation measures (e.g. timing windows, wildlife sweeps, etc.) to minimize potential adverse effects on wildlife may be required for proposed works in the habitats. Targeted SAR surveys may also be required depending on the extents of the proposed works and will be confirmed through discussions with the Ministry of Environment, Conservation and Parks (MECP). If SAR is confirmed in the Study Areas, registration and/or permitting under the *Endangered Species Act, 2007* may also be required and will be confirmed through discussions with the MECP.

Results of field studies are provided in a separate memo.

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Attachments

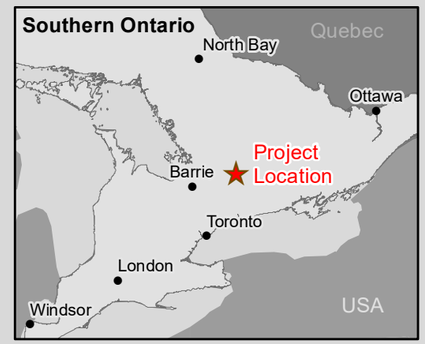
Attachment A: Figures
Attachment B: Tables

FENLON FALLS SECOND CROSSING STUDY

PROJECT LOCATION

FIGURE 1A

- Potential New Crossing
- Potential Road Widening and Upgrade
- Potential Traffic Route
- Potential Area of Interest
- Study Area
- Expressway / Highway
- Major Road
- Minor Road



SCALE 1:65,000

0 0.5 1 2 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, FENELON FALLS

MAP CREATED BY: LK
MAP CHECKED BY: GM
MAP PROJECTION: NAD 1983 UTM Zone 17N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DILLON CONSULTING

PROJECT: 19-9411
STATUS: DRAFT
DATE: 2019-07-17

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FENELON FALLS SECOND CROSSING STUDY

PROJECT LOCATION

FIGURE 1B

Major Road

Minor Road

SCALE 1:7,216

0 50 100 200 m

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, FENELON FALLS

MAP CREATED BY: GM
MAP CHECKED BY: MW
MAP PROJECTION: NAD 1983 UTM Zone 17N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DILLON CONSULTING

PROJECT: 19-9411
STATUS: DRAFT
DATE: 2019-07-17

FENLON FALLS SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

DESIGNATED NATURAL FEATURES
FIGURE 2A

- Potential New Crossing
- Potential Road Widening and Upgrade
- Potential Traffic Route
- Potential Area of Interest
- Study Area
- Expressway / Highway
- Major Road
- Minor Road
- Watercourse
- Waterbody
- Provincially Significant Wetland
- Locally Significant Wetland
- Unevaluated Wetland
- ANSI, Earth Science
- ANSI, Life Science
- Provincial Park
- Wooded Area

Wintering Area (Sub Type)

- Deer Wintering Area (Stratum 2)
- Deer Yard (Stratum 1)

SCALE 1:66,750

0 0.5 1 2 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, FENELON FALLS

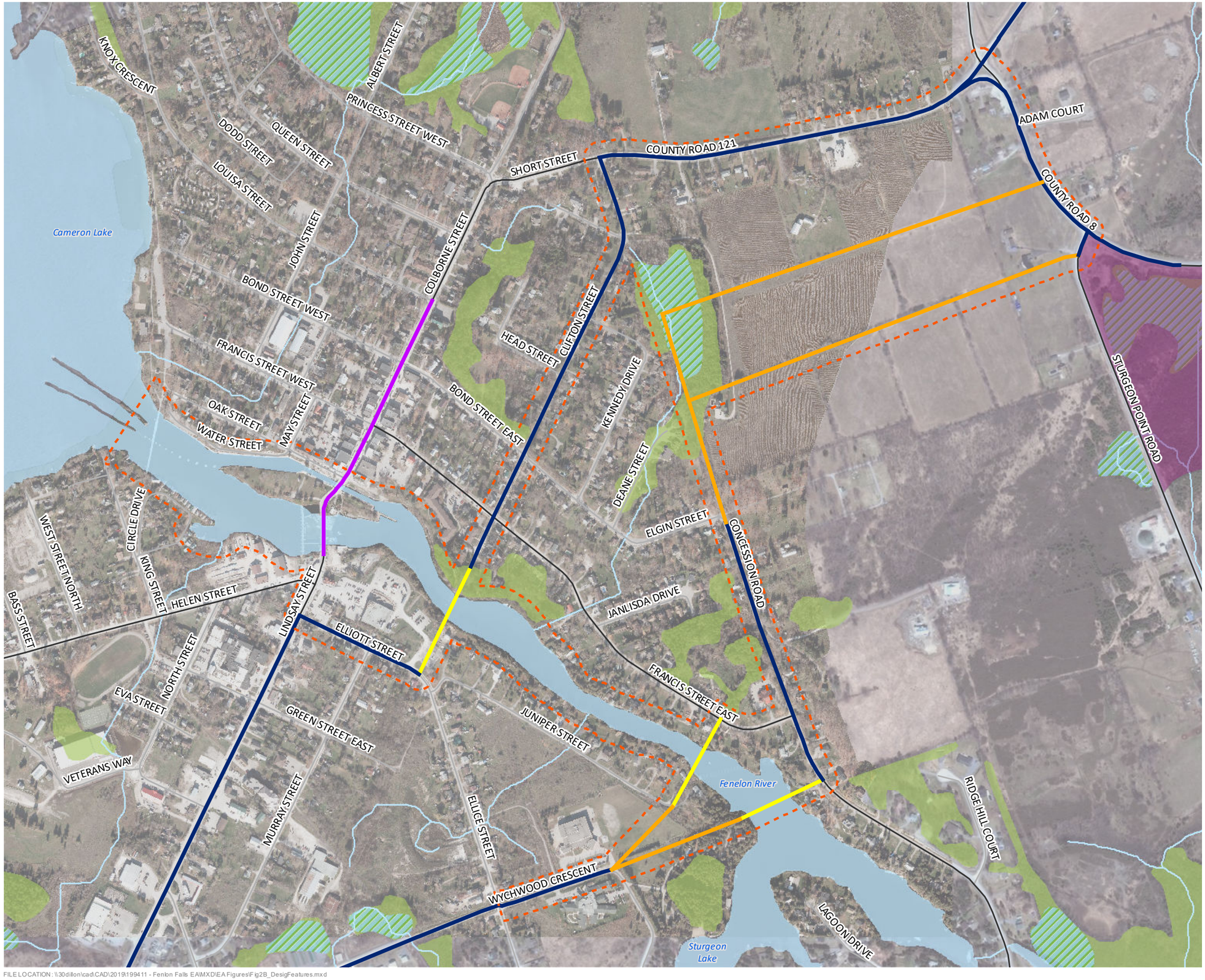
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MAP CHECKED BY: GM
MAP PROJECTION: NAD 1983 UTM Zone 17N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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FENLON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

DESIGNATED NATURAL FEATURES

FIGURE 2B

- Potential New Crossing
- Potential New Road
- Potential Traffic Improvement
- Potential Traffic Route
- Study Area
- Major Road
- Minor Road
- Watercourse
- Waterbody
- Unevaluated Wetland
- Wooded Area

Wintering Area (Sub Type)

- Deer Wintering Area (Stratum 2)

SCALE 1:7,250

0 75 150 300 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, FENELON FALLS

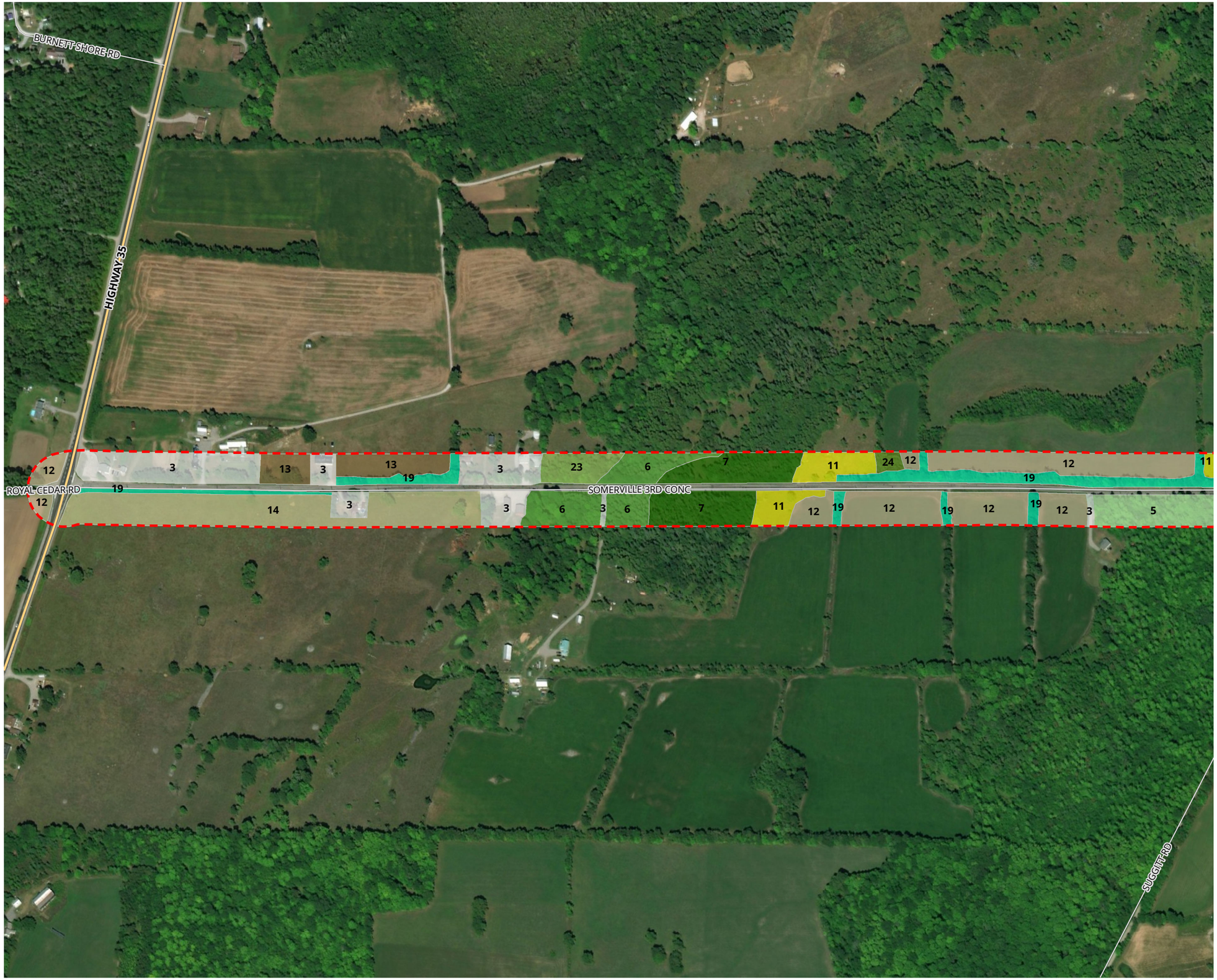
MAP CREATED BY: LK
MAP CHECKED BY: GM
MAP PROJECTION: NAD 1983 UTM Zone 17N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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DATE: 2019-07-17

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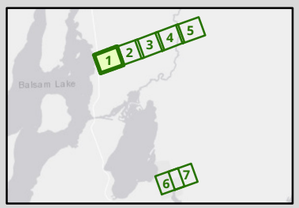
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 1 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 5. FOD: Deciduous Forest
- 6. FOM: Mixed Forest
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 19. TAGM5: Fencerow
- 23. WOD: Deciduous Woodland
- 24. WOM: Mixed Woodland



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N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 2019-12-04

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FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

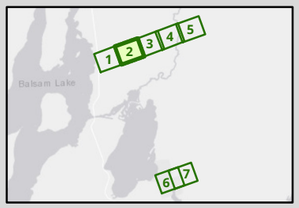
ECOLOGICAL LAND CLASSIFICATION
MAP 2 (NORTHERN SITE)



Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 5. FOD: Deciduous Forest
- 8. IAG: Agricultural Buildings
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 19. TAGM5: Fencerow



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
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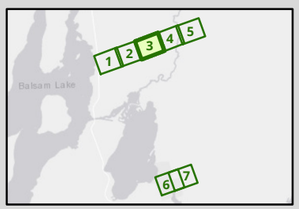
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 3 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 9. MAM: Meadow Marsh
- 10. MEG: Graminoid Meadow
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 15. SWC: Coniferous Swamp
- 19. TAGM5: Fencerow
- 22. WOC: Coniferous Woodland



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411

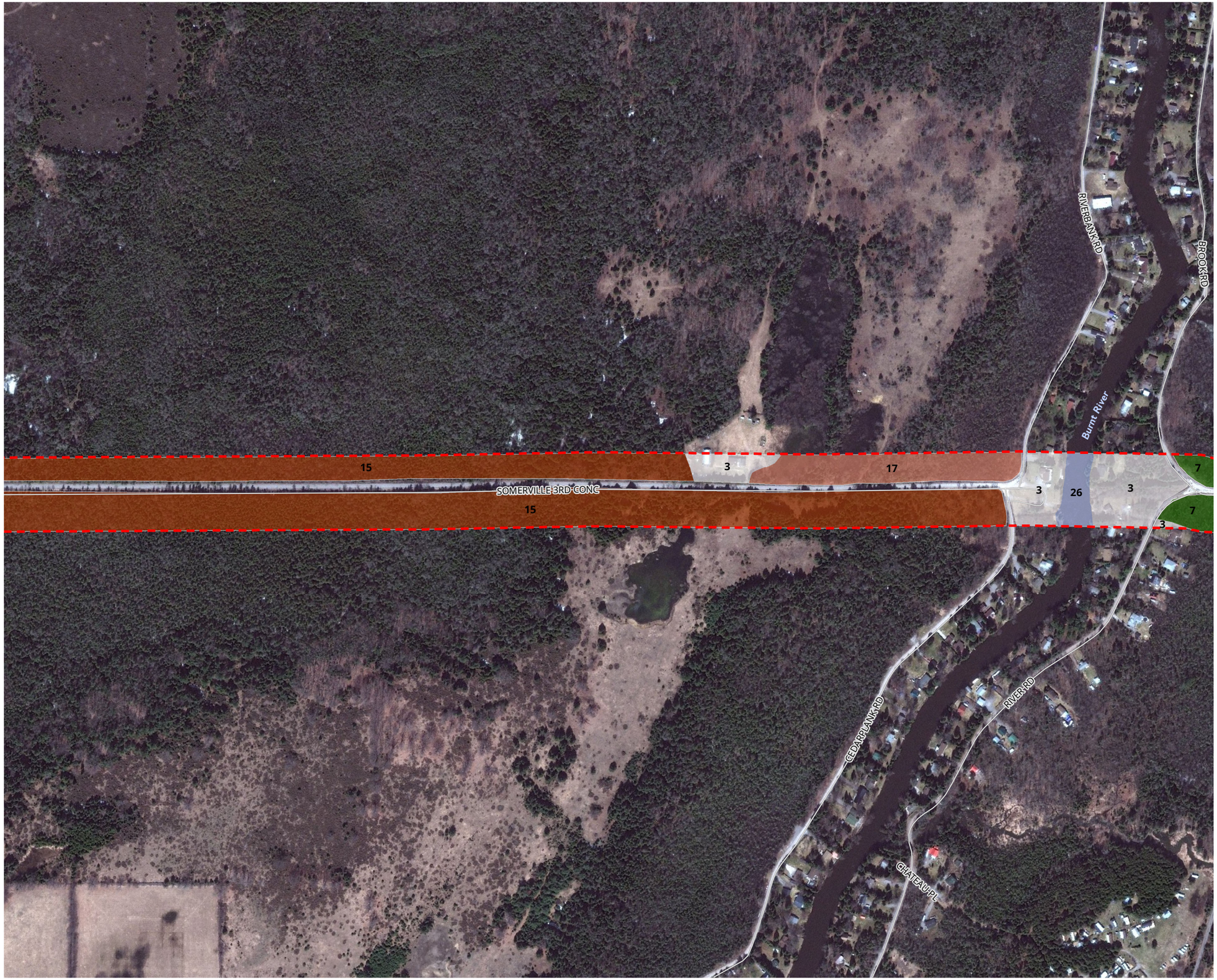
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DATE: 2019-12-04

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FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

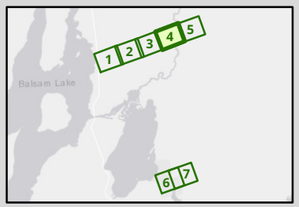
ECOLOGICAL LAND CLASSIFICATION
MAP 4 (NORTHERN SITE)



Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 15. SWC: Coniferous Swamp
- 17. SWM: Mixed Swamp
- 26. OAO: Open Aquatic



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N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411

STATUS: DRAFT

DATE: 2019-12-04

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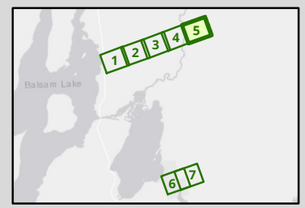
FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION
MAP 5 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 6. FOM: Mixed Forest
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 11. MEM: Mixed Meadow
- 22. WOC: Coniferous Woodland
- 26. OAO: Open Aquatic



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 2019-12-04

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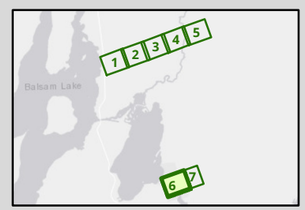
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 6 (SOUTHERN SITE)

Study Area

Ecological Land Classification

- 1. CGL: Greenlands
- 2. CVC: Commercial and Industrial
- 3. CVR_1: Low Density Residential
- 4. CVS_1: Education
- 6. FOM: Mixed Forest
- 10. MEG: Graminoid Meadow
- 11. MEM: Mixed Meadow
- 12. OAGM1:Annual Row Crop
- 16. SWD: Deciduous Swamp
- 19. TAGM5: Fencerow
- 21. THM: Mixed Thicket*
- 23. WOD: Deciduous Woodland
- 24. WOM: Mixed Woodland
- 25. WOM: Mixed Woodland/SWD: Deciduous Swamp
- 26. OAO: Open Aquatic



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

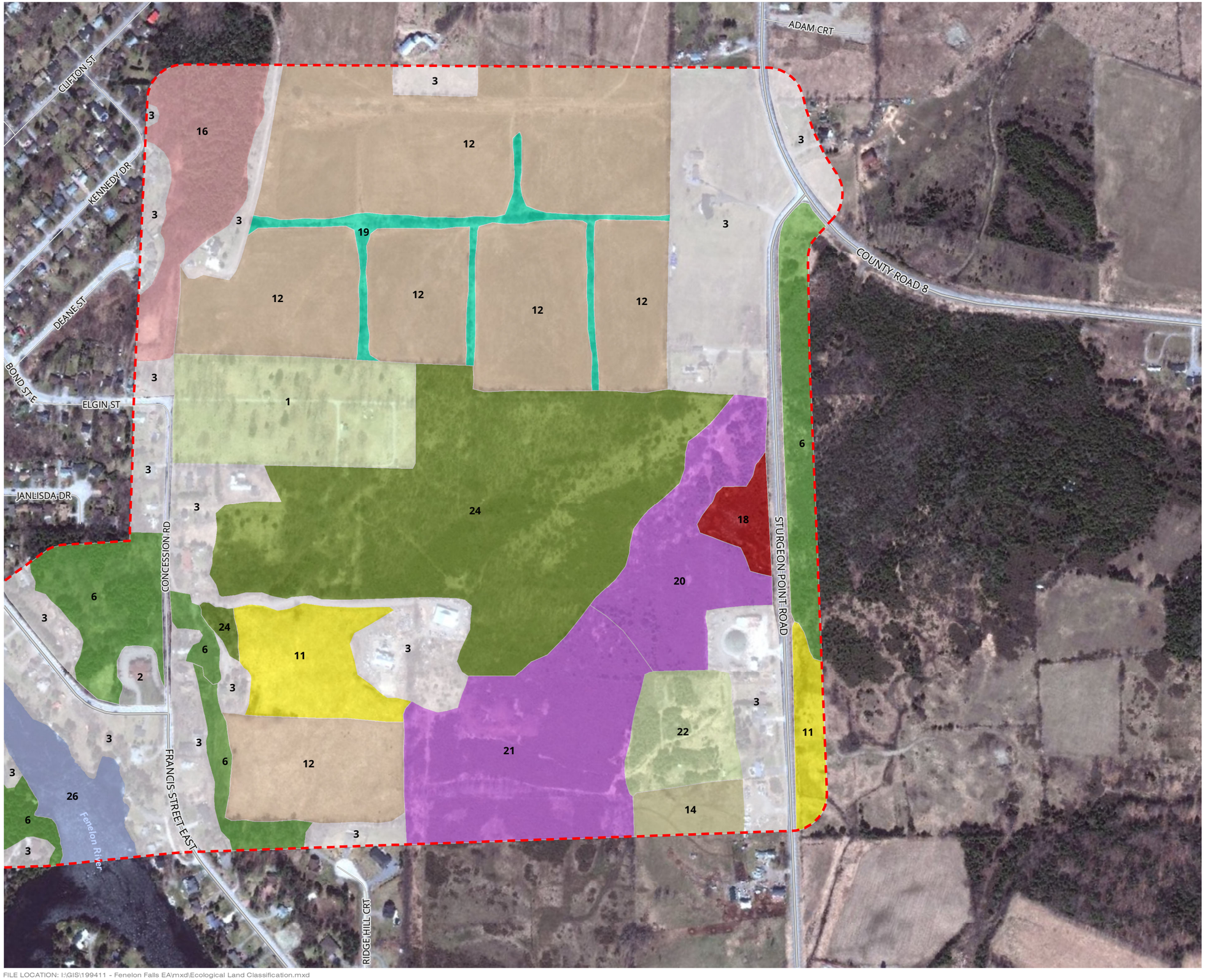
DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 2019-12-04

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Ecological Land Classification.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 7 (SOUTHERN SITE)



Study Area

Ecological Land Classification

- 1. CGL: Greenlands
- 2. CVC: Commercial and Industrial
- 3. CVR_1: Low Density Residential
- 6. FOM: Mixed Forest
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 14. OAGM4: Open Pasture
- 16. SWD: Deciduous Swamp
- 18. SWT: Swamp Thicket
- 19. TAGM5: Fencerow
- 20. THM: Mixed Thicket
- 21. THM: Mixed Thicket*
- 22. WOC: Coniferous Woodland
- 24. WOM: Mixed Woodland
- 26. OAO: Open Aquatic

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



1:5,000

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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 2019-12-04

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Ecological Land Classification.mxd

Table 1: Species at Risk and Species of Conservation Concern with the Potential to Occur within Study Area A (By-Pass)

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
BIRDS										
Cardellina canadensis	Canada Warbler	THR	SC	S4B	OBBA	N/A	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat usually requires at least 30 ha.	NO	N/A	N/A
Chaetura pelagica	Chimney Swift	THR	THR	S4B,S4N	OBBA	N/A	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; fees over open water.	YES	Chimneys in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting, if impacts proposed to these areas. If Chimney Swift nests are identified, registration under the *ESA 2007* may be required.
Chordeiles minor	Common Nighthawk	THR	SC	S4B	OBBA	N/A	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	NO	N/A	N/A
Coccothraustes vespertinus	Evening Grosbeak	---	SC	S4B	CBC	N/A	Coniferous or mixed forests; deciduous tree stands; parks, orchards.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Contopus virens	Eastern Wood-Pewee	SC	SC	S4B	OBBA	N/A	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearing, edges; farm woodlots, parks.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Dolichonyx oryzivorus	Bobolink	THR	THR	S4B	OBBA	N/A	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	NO	N/A	N/A
Euphagus carolinus	Rusty Blackbird	SC	SC	S4B	CBC	N/A	Openings in coniferous woodlands bordering bodies of water; tree-bordered marshes, beaver ponds, muskegs, bogs, fends or wooded swamps; stream borders with alder, willow; wooded island on lakes.	NO	N/A	N/A
Haliaeetus leucocephalus	Bald Eagle	---	SC	S2N,S4B	CBC	N/A	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 km from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals.	YES	Wooded areas around rivers and lakes in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Hirundo rustica	Barn Swallow	THR	THR	S4B	OBBA	N/A	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	YES	Structures (barns, culverts) in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional. If Barn Swallow nests are identified, registration under the *ESA 2007* may be required.
Riparia riparia	Bank Swallow	THR	THR	S4B	OBBA	N/A	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	NO	N/A	N/A
Sturnella magna	Eastern Meadowlark	THR	THR	S4B	OBBA	N/A	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	NO	N/A	N/A
Vermivora chrysoptera	Golden-winged Warbler	THR	SC	S4B	OBBA	N/A	Early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubbery clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat.	NO	N/A	N/A
HERPTILES										

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Chelydra serpentina	Snapping Turtle	SC	SC	S3	OHA	N/A	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species. In addition, gravel roadway edges adjacent to marshes may provide nesting habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Emydoidea blandingii	Blanding's Turtle	THR	THR	S3	OHA	N/A	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Graptemys geographica	Northern Map Turtle	SC	SC	S3	OHA	N/A	Large rivers and lakes with slow-moving water and a soft bottom. High-quality water that supports mollusc prey.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Heterodon platirhinos	Eastern Hog-nosed Snake	THR	THR	S3	OHA	N/A	Sandy upland fields, pastures, savannahs, sandy beaches; dry open oak-pine-maple forest with sandy soils; prefer forest areas > 5ha.	NO	N/A	N/A
Sternotherus odoratus	Eastern Musk Turtle	SC	SC	S3	OHA	N/A	Aquatic, except when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Thamnophis sauritus	Eastern Ribbonsnake (Great Lakes population)	SC	SC	S3	OHA	N/A	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	NO	N/A	N/A
MAMMALS										
Myotis leibii	Eastern Small-footed Myotis	---	END	S2S3	MWH	N/A	Roosts in caves, mine shafts, hollow trees or buildings that are in or near woodland; hibernates in cold dry caves or mines; maternity colonies in caves or buildings; hunts in forests.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
Myotis lucifugus	Little Brown Myotis	END	END	S4	MWH	N/A	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
Myotis septentrionalis	Northern Myotis	END	END	S3	MWH	N/A	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
Pipistrellus subflavus	Tri-colored Bat	END	END	S3?	MWH	N/A	Can be found in a variety of forested habitats. They form day roosts and maternity colonies in older forest and occasionally in barns or other structures, and overwinter in caves. They forage over water and along streams in the forest.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
INSECTS										

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Danaus plexippus	Monarch	SC	SC	S2N,S4B	OBA	N/A	Meadows and open areas where milkweed grows.	NO	N/A	N/A

1 – Status identified by the Committee on the Status of Endangered Wildlife in Canada under the federal SARA, 2002; 2 – SAR in Ontario List under the provincial ESA, 2007; 3 – Ontario S-Rank; S5 = secure; S4= apparently secure; S3 = vulnerable; S2 = imperilled; SX = Extirpated; SH = Possibly Extirpated; SNA = non-native or exotic species to Ontario; 4 –MNRF SAR in Area = MNRF Species at Risk in Ontario List by area of the province, MNRF Reg. Habitat = MNRF Regulated Habitat (O. Reg. 242/08), OBBA = Ontario Breeding Bird Atlas, CBC = Christmas Bird Count, OHA = Ontario Amphibian and Reptile Atlas, MWH = Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, OBA = Ontario Butterfly Atlas; 5 – MNRF Significant Wildlife Technical Guide - Appendix G (2000).

Table 2: Species at Risk and Species of Conservation Concern with the Potential to Occur within Study Area B (In Town)

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
BIRDS										
Ammodramus savannarum	Grasshopper Sparrow	SC	SC	S4B	OBBA	N/A	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha.	NO	N/A	N/A
Cardellina canadensis	Canada Warbler	THR	SC	S4B	OBBA	N/A	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat usually requires at least 30 ha.	NO	N/A	N/A
Chaetura pelagica	Chimney Swift	THR	THR	S4B,S4N	OBBA	N/A	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; fees over open water.	YES	Chimneys in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting, if impacts proposed to these areas. If Chimney Swift nests are identified, registration under the *ESA 2007* may be required.
Chlidonias niger	Black Tern	---	SC	S3B	OBBA		Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs.	NO	N/A	N/A

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Coccothraustes vespertinus	Evening Grosbeak	---	SC	S4B	CBC	N/A	Coniferous or mixed forests; deciduous tree stands; parks, orchards.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Contopus virens	Eastern Wood-Pewee	SC	SC	S4B	OBBA	N/A	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearing, edges; farm woodlots, parks.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Dolichonyx oryzivorus	Bobolink	THR	THR	S4B	OBBA	N/A	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	NO	N/A	N/A
Euphagus carolinus	Rusty Blackbird	SC	SC	S4B	CBC	N/A	Openings in coniferous woodlands bordering bodies of water; tree-bordered marshes, beaver ponds, muskegs, bogs, fends or wooded swamps; stream borders with alder, willow; wooded island on lakes.	NO	N/A	N/A

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Haliaeetus leucocephalus	Bald Eagle	---	SC	S2N,S4B	CBC	N/A	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 km from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals.	YES	Wooded areas around Fenelon River in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Hirundo rustica	Barn Swallow	THR	THR	S4B	OBBA	N/A	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	YES	Structures (barns, culverts) in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional. If Barn Swallow nests are identified, registration under the *ESA 2007* may be required.
Melanerpes erythrocephalus	Red-headed Woodpecker	THR	SC	S4B	CBC, OBBA	N/A	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40cm dbh; require about 4 ha for a territory.	NO	N/A	N/A

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Riparia riparia	Bank Swallow	THR	THR	S4B	OBBA	N/A	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	NO	N/A	N/A
Sturnella magna	Eastern Meadowlark	THR	THR	S4B	OBBA	N/A	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	NO	N/A	N/A
HERPTILES										
Chelydra serpentina	Snapping Turtle	SC	SC	S3	OHA	N/A	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Emydoidea blandingii	Blanding's Turtle	THR	THR	S3	OHA	N/A	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Graptemys geographica	Northern Map Turtle	SC	SC	S3	OHA	N/A	Large rivers and lakes with slow-moving water and a soft bottom. High-quality water that supports mollusc prey.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Heterodon platirhinos	Eastern Hog-nosed Snake	THR	THR	S3	OHA	N/A	Sandy upland fields, pastures, savannahs, sandy beaches; dry open oak-pine-maple forest with sandy soils; prefer forest areas > 5ha.	NO	N/A	N/A
Sternotherus odoratus	Eastern Musk Turtle	SC	SC	S3	OHA	N/A	Aquatic, except when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Thamnophis sauritus	Eastern Ribbonsnake (Great Lakes population)	SC	SC	S3	OHA	N/A	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	NO	N/A	N/A
MAMMALS										
Myotis leibii	Eastern Small-footed Myotis	---	END	S2S3	MWH	NO	Roosts in caves, mine shafts, hollow trees or buildings that are in or near woodland; hibernates in cold dry caves or mines; maternity colonies in caves or buildings; hunts in forests.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
Myotis lucifugus	Little Brown Myotis	END	END	S4	MWH	NO	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Myotis septentrionalis	Northern Myotis	END	END	S3	MWH	NO	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
Pipistrellus subflavus	Tri-colored Bat	END	END	S3?	MWH	NO	Can be found in a variety of forested habitats. They form day roosts and maternity colonies in older forest and occasionally in barns or other structures, and overwinter in caves. They forage over water and along streams in the forest.	YES	Forests and swamps in the Study Area may provide habitat for this species.	Snag/cavity tree assessments should be conducted to confirm suitable habitat.
INSECTS										
Danaus plexippus	Monarch	SC	SC	S2N,S4B	OBA	N/A	Meadows and open areas where milkweed grows.	NO	N/A	N/A

1 – Status identified by the Committee on the Status of Endangered Wildlife in Canada under the federal SARA, 2002; 2 – SAR in Ontario List under the provincial ESA, 2007; 3 – Ontario S-Rank; S5 = secure; S4= apparently secure; S3 = vulnerable; S2 = imperilled; SX = Extirpated; SH = Possibly Extirpated; SNA = non-native or exotic species to Ontario; 4 –MNRF SAR in Area = MNRF Species at Risk in Ontario List by area of the province, MNRF Reg. Habitat = MNRF Regulated Habitat (O. Reg. 242/08), OBBA = Ontario Breeding Bird Atlas, CBC = Christmas Bird Count, OHA = Ontario Amphibian and Reptile Atlas, MWH = Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, OBA = Ontario Butterfly Atlas; 5 – MNRF Significant Wildlife Technical Guide - Appendix G (2000).

Memo

Date: January 28, 2020

Subject: Natural Environment Existing Conditions PART B – 2019 Field Investigations Memo for the Fenelon Falls Second Crossing Study

Our File: 19-9411

Introduction

The City of Kawartha Lakes has retained Dillon Consulting Limited (Dillon) to carry out a Municipal Class Environmental Assessment (EA) for the addition of a second bridge crossing in the town of Fenelon Falls, Ontario. This project is based on the results of the Transportation Master Plan and the Fenelon Falls Corridor Study which both identified the need for additional roadway capacity across the Trent-Severn Waterway within a 2031 planning horizon. This was proposed as a way to address summer traffic concerns in Fenelon Falls.

The first phase of this project is to determine the most suitable location for an additional crossing. Two separate locations are being considered (i.e. Northern Site and Southern Site). The Northern Site is located to the north of Fenelon Falls, extending east to west along Concession Road 3 between Highway 35 and Highway 121, and crosses the Burnt River (**Attachment A**, Figure 1). This site is characterized by agricultural lands to the west, and forested lands including wetlands to the east. The Southern Site is located on the east site of Fenelon Falls, and is bounded on the east by Sturgeon Point Road, on the south by Wychwood Crescent, and by West Street on the west (**Attachment A**, Figure 2). These lands are characterized largely by open agricultural fields, interspersed with natural features such as mixed meadows, deciduous and coniferous forests, a small amount of wetland, as well as many residential properties and a small amount of commercial property.

In support of the Municipal Class EA, a natural environment baseline conditions memo was prepared (under separate cover) based on background and secondary source information reviewed. The information collected as part of the background review was used to help inform the scoping of the 2019 field program. The intent of the field program was to ground truth the results of background review in support of preliminary and detail design for the project. The purpose of this memo is to document and summarize the existing natural environment conditions identified as a result of 2019 field investigations, as well as provide a preliminary impact assessment for the project.

Methodology

In order to document the existing natural environment conditions, the following field investigations were completed:

- Aquatic stream assessment;
- Ecological Land Classification (ELC) of vegetation communities;
- Botanical Assessment; and
- Incidental wildlife observations.

Detailed methods for each survey are summarized below.

Aquatic Stream Assessment

The Burnt River is located within the Northern Site and Fenelon River is located within the Southern Site.

Due to private residential and commercial properties (with no access) and steep cliff faces along Fenelon River within the Study Area, an aquatic assessment was not completed. Representative photos of Fenelon River were taken upstream of the Study Area from available vantage points which are discussed further below.

Due to safety concerns with wading in the Burnt River, an aquatic assessment was completed from the shoreline for the reach within the Study Area (**Figure 1, Attachment A**). As a result, the channel dimensions (e.g., width and depth) provided herein are approximations. The assessment was completed from the public boat launch at the dead end of 3rd Concession Road, on the west side of the Burnt River. Information collected during the assessment included (where applicable): channel form, characterization of flow, substrate type, channel dimensions and riparian vegetation. This data was used in combination with a background review memo completed by Dillon (Fenelon Falls Second Crossing Environmental Assessment – Desktop Research Memo, July 2019), to determine general fish habitat conditions.

Ecological Land Classification & Botanical Assessment

Vegetation communities were assessed using ELC to identify and assess potential natural heritage features within the Study Areas. High-level ELC reconnaissance was completed in general accordance with the ELC System for Southern Ontario, second approximation (Lee et al., 1998; Lee, 2008) in order to classify and map ecological communities to the vegetation level. The ecological community boundaries were determined through the review of aerial photography, background mapping and then further refined through on site vegetation. As the majority of the Study Areas consisted of private property, ELC and botanical assessments in the field were carried out through roadside vehicle “windshield” surveys. The botanical assessment was completed concurrent with high-level ELC “windshield” surveys. Botanical species nomenclature included herein is based on the species lists for Ontario maintained by the NHIC which uses international standards for taxonomy and nomenclature.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 ha in size before it is defined. Based on the composition of vegetation communities within the Study Area, patches of vegetation less than 0.5 ha or disturbed/planted vegetation were described, provided they clearly fit within an ELC vegetation type.

Incidental Wildlife

A general wildlife assessment was completed within each Study Area based on incidental wildlife observations. Incidental observations of wildlife were noted, and generally include evidence of dens, tracks, and scat. These observations help to determine potential ecological functions or linkages within the Study Areas.

Results

Refer to **Table 1** for the field investigation survey date as well as a summary of weather conditions, followed by a summary of the 2019 field investigation results.

Table 1: Date and Weather Conditions

Date	Weather Conditions[1]	Air Temp (°C)	Surveys Completed
October 23, 2019	50% cloud cover, wind level 1, no precipitation.	6	ELC, Botanical Assessment, and Aquatic Stream Assessment

[1]Beaufort Scale, wind level 1 = light air (1-3 mph).

Aquatic Stream Assessment

Although an aquatic assessment was not completed for Fenelon River, representative photos were taken upstream of the Study Area from available vantage points to document general aquatic conditions (**Attachment B**, Photos 1 – 4).

The Burnt River is a permanent watercourse that flows through the Study Area in a southerly direction, outletting into Cameron Lake approximately 9km downstream of the Study Area. During field investigations, the mean wetted width was observed to be approximately 37 m, while the mean bankfull width was approximately 40 m and the depth greater than 2 m. The watercourse consisted of flat morphology in the vicinity of the Study Area. Dominant substrate along the west bank consists of sand with minor amounts of gravel and detritus. In-stream cover observed consisted of vascular macrophytes, woody debris (in-stream and overhanging) and organic debris. Portions of the banks where residential properties are maintained to the River's edge have been hardened by concrete, steel sheet piling and railroad ties. In locations where the banks are not hardened, the riparian area is vegetated with mixed coniferous and deciduous trees and shrubs, and as such, both banks are considered to be stable. Within

the Study Area, approximately 5% of the River was shaded by the aforementioned riparian vegetation. Land use surrounding the River within the Study Area consists of a public boat launch, residential properties, and woodland and wetland communities.

Reference photos from the aquatic assessment can be found in **Attachment B** (Photos 5-8).

Ecological Land Classification

Each of the ELC communities documented within the Study Areas are considered common in Ontario. **Table 2** outlines the communities documented during ELC surveys and summarizes the dominant vegetation cover per community.

Northern Site: A total of 17 separate communities, 11 of which are considered natural and 6 of which are considered cultural were documented. The location, type, and boundaries of these communities are delineated in Figure 2A (**Attachment A**). The natural communities within the Study Area are generally bisected by Sommerville 3rd Concession and adjacent to existing anthropogenic uses (i.e., roads, active agriculture lands, residential development, etc.). The western half of the Study Area is dominated by agricultural lands and residential properties, while the eastern portion of the Study Area is largely dominated by natural features. A wetland system consisting largely of a coniferous swamp extends from Northline Road, east to the Burnt River, and represents the largest contiguous natural feature within the Study Area. Refer to **Table 2A** for a description of the ELC communities documented within the Study Area.

Southern Site: A total of 17 separate communities were documented; 10 of which are considered natural and 7 of which are considered cultural. The location, type, and boundaries of these communities are delineated in Figure 2B (**Attachment A**). The natural communities within the Study Area have been disturbed due to adjacent anthropogenic uses (i.e., roads, parks, active agricultural lands, recreational activities, residential development, etc.) and contain invasive species such as Common Dandelion (*Taraxacum officinale*), Reed Canary Grass (*Phalaris arundinacea)*, Common Buckthorn (*Rhamnus Cathartica)*, and White Sweet-clover (*Melilotus albus*). Much of the lands within the Study Area are influenced by anthropogenic activities and consist of urban residential and active agricultural lands. Natural communities also found in the area included woodlands, thicket, swamp, and meadows. It should be noted that a portion of the Study Area along the southern boundary was not visible during the "windshield" survey. As a result, ELC in these areas was determined based on aerial imagery interpretation only. Refer to Table 2B for a description of the ELC communities documented within the Study Area.

Table 2a: Ecological Land Classification– Northern Site

ELC Code	Classification	Total within Study Area (ha)	Description	Comments	Photo Attachment B
MEM	Mixed Meadow	6.63	This open community contained rare occurrences of Balsam Poplar, Ground Juniper, and Eastern White Cedar. The ground layer species included abundant Canada Goldenrod, as well as occasional occurrences of species such as White Sweet-clover, New England Aster (*Symphyotrichum novae-angliae*), and grass species as Smooth Brome.	This community is located throughout the western portion of the Study Area amongst the agricultural fields.	25
MEG	Graminoid Meadow	1.59	Similar to the mixed meadow communities found in the Study Area this meadow community is dominated largely by gramminoid species such as Smooth Brome and Reed Canary Grass. Other species present included Canada Goldenrod and New England Aster.	This community is located in the central portion of the Study Area west of Northline Road.	26
MAM	Meadow Marsh	0.82	This community is relatively open with little or no canopy. Rare occurrences of Tamarack (*Larix laricina*) are present and occasional understory shrubs, such as Bebb's Willow, occur. Ground layer vegetation is dominated by abundant Reed Canary Grass and Broad-leaved Cattail with occasional occurrences of Canada Goldenrod.	This community is located in the eastern end of the Study Area adjacent to the larger coniferous swamp.	27
SWC	Coniferous Swamp	13.46	This wetland area is the largest community found within the Study Area. Coniferous tree species comprise greater than 75% of the canopy cover and included species such as White Pine, Eastern White Cedar, White Spruce, Tamarack, Black Spruce (*Picea mariana*) and Eastern Hemlock (*Tsuga Canadensis*). Ground layer species observed included Fern species, Broad-leaved Cattail, Reed Canary Grass, and Aster species.	This community dominates the Study Area between Northline Road to the west and the Burnt River to the east.	28

ELC Code	Classification	Total within Study Area (ha)	Description	Comments	Photo Attachment B
FOM/SWM	Mixed Forest/Mixed Swamp	3.35	This forest community contained a mix of both deciduous species such as Sugar Maple, Red Oak, Balsam Poplar and Green Ash (*Fraxinus pennsylvanica*), and coniferous species such as White Spruce, and Eastern White Cedar. Ground layer species observed include Red-osier Dogwood (*Cornus sericea ssp sericea*), Reed Canary Grass and Broad-leaved Cattail.	Several communities located within the Study Area to the east of the Burnt River, as well as a single community at the west end of the Study Area east of highway 35.	29
WOC	Coniferous Woodland	2.52	This relatively open community has less than 60% tree canopy consisting of primarily coniferous species such as Eastern White Cedar, White Pine (*Pinus strobus*) and White Spruce. Ground cover consisted of abundant grass species such as Smooth Brome with occasional occurrences of Canada Goldenrod and New England Aster.	Two small communities were observed within the Study Area; one at the eastern end adjacent to Hwy 121, and the second east of Northline Rd within the Coniferous Swamp.	30
WOM	Mixed Woodland	0.10	This small open woodland community contained a mix of both deciduous species such as Sugar Maple, American Elm, White Birch (*Betula papyrifera*), and coniferous species such as, and Eastern White Cedar. Understory appeared dominated by Common Buckthorn. Ground layer species noted were Riverbank Grape (*Vitis riparia*), Canada Goldenrod, and Wild Carrot.	This community is located in the western half of the Study Area west of Potter's Road.	31
WOD	Deciduous Woodland	0.39	This woodland community contained a mix of predominately deciduous species such as American Elm, Red Oak, and White Ash. Ground layer species noted were Canada Goldenrod, Smooth Brome, and Aster species.	This community located at the western end of the Study Area east of Highway 35.	32
FOD	Deciduous Forest	1.35	This forest community contains primarily deciduous tree species such as Sugar Maple, Red Oak, Trembling Aspen,	This communities is located in the western	33

ELC Code	Classification	Total within Study Area (ha)	Description	Comments	Photo Attachment B
			and White Birch. The understory contained shrub species such as Canadian Yew (*Taxus Canadensis*) while the ground layer included species such as Canada Goldenrod.	end of the Study Area west of Potter's Road.	
FOM	Mixed Forest	4.09	With a canopy containing greater than 60% tree cover this community contained a mix of both deciduous species such as Manitoba Maple, American Elm, Red Oak, and Sugar Maple, and coniferous species such as White Spruce, and Eastern White Cedar. Understory appeared dominated by Common Buckthorn. Ground layer species observed include Canada Goldenrod and Wild Carrot.	This community is located throughout the Study Area with the highest concentration found at the eastern perimeter of the Study Area west of Hwy 121.	34
OAO	Open Aquatic	0.40	Burnt River	--	5 - 8
TAGM5	Fencerow	2.04	This community consists of planted fencerows of various different tree and shrub species such as Sugar Maple, Staghorn Sumac, White Ash, and Common Lilac.	This community was a common occurrence between agricultural fields throughout the Study Area.	35
IAG	Agricultural Infrastructure	0.43	Agricultural buildings.	---	--
CVR	Residential	9.15	Private residential housing.	Common throughout the Study Area.	36
OAGM1	Annual Row Crops	4.91	Annual row crops such as corn, soybeans and wheat.	The most common community found throughout the Study Area.	37
OAGM2	Perennial Cover Crops	3.22	Perennial cover crops such as grasses and fescue.	Found in several locations throughout the Study Area.	38

ELC Code	Classification	Total within Study Area (ha)	Description	Comments	Photo Attachment B
OAGM4	Open Pasture	3.94	This community was an open grassy pasture for cattle grazing.	This community is located within the western half of the Study Area.	39

Table 2b: Ecological Land Classification– Southern Site

ELC Code	Classification	Area within Study Area (ha)	Description	Comments	Photo Attachment B
MEM	Mixed Meadow	6.18	This open community contained rare occurrences of Balsam Poplar (*Populus balsamifera*), Trembling Aspen (*Populus tremuloides*), Black Locust (*Robinia pseudoacacia*), Eastern Red Cedar *(Juniperus virginiana),* and Staghorn Sumac (*Rhus typhina*). The ground layer species included abundant Canada Goldenrod (*Solidago Canadensis*), as well as occasional occurrences of species such as Wild Carrot (*Daucus carota*), Common Milkweed (*Asclepias syriaca*), White Sweet-clover (*Melilotus albus*), Red Clover (*Trifolium pratense*), Curly Dock (*Rumex crispus*) and grass species Orchard Grass (*Dactylis glomerata*).	This community occurred twice within the Study Area, next to the school on Wychwood Crescent, as well as east of Concession Road.	9
MEG	Gramminoid Meadow	0.42	Similar to the nearby Mixed Meadow the vegetation in this community is dominated largely by gramminoid species Reed Canary Grass (*Phalaris arundinacea*), with occasional occurences or Orchard grass, Canada Goldenrod and Wild Carrot.	This community occurred only once within the Study Area on the corner of Ellice Street and Wychwood Crescent, and is likely a continuation of the above MEM after it crosses Wychwood Crescent.	10
SWT	Swamp Thicket	0.87	This wetland community occurs at the low lying area of a larger mixed thicket community. Tree/shrub species include Bebb's Willow (*Salix bebbiana)*, Common Juniper (*Juniper communis*), and Eastern White Cedar (*Thuja occidentalis).* Open wet areas are dominated by Broad-leaved Cattail (*Typha lattifolia*).	A single small community can be found at the eastern border of the Study Area along Sturgeon Point Road.	11

ELC Code	Classification	Area within Study Area (ha)	Description	Comments	Photo Attachment B
THM	Mixed Thicket	11.96	This community was dominated by shrub species, Bebb's Willow, Common Juniper and Eastern White Cedar with occasional occurrences of invasive Common Buckthorn (*Rhamnus cathartica*).	This community is located along the eastern border of the Study Area off Sturgeon Point Road.	12
WOM/SWD	Mixed Woodland/Deciduous Swamp	1.13	This community is a complex of open woodland and deciduous swamp. Canopy species include abundant Silver Maple (*Acer sacharinum*) along with occasional occurrences of Manitoba Maple (*Acer negundo*), Eastern White Cedar, White Ash (*Fraxinus americana*), and American Elm (*Ulmus Americana*). The ground layer consists of abundant Reed Canary Grass along with occasional occurrences of Common Reed (*Phragmites australis*), Broad-leaf Cattail, and Canada Goldenrod.	This community borders the north and south sides of Wychwood Crescent in the south western portion of the Study Area.	13
SWD	Deciduous Swamp	3.72	This community contains primarily deciduous tree species such as Sugar Maple, Red Oak (*Quercus rubra*), Trembling Aspen, and Basswood (*Tilia americana*). Invasive Common Buckthorn was common in the understory, and the ground layer contained species such as Canada Goldenrod.	This community is located in the north west corner of the Study Area.	14
WOM	Mixed Woodland	16.17	With less than 60% tree canopy this woodland community contained a mix of both deciduous species such as Manitoba Maple, American Elm, Red Oak, and White Ash, and coniferous species such as White Spruce (*Picea alba*), and Eastern White Cedar. Understory appeared dominated by Common Buckthorn. Ground layer species observed included Common Burdock (*Arctium minus*), Garlic Mustard (*Alliaria petiolate*), and Red Clover.	This large woodland community is located in the east-central portion of the Study Area.	15

ELC Code	Classification	Area within Study Area (ha)	Description	Comments	Photo Attachment B
FOM	Mixed Forest	7.33	This community contained a mix of both deciduous species such as Manitoba Maple, American Elm, Red Oak, and White Ash, and coniferous species such as White Spruce, and Eastern White Cedar. Understory appeared dominated by Common Buckthorn. Ground layer species observed included Common Burdock (*Arctium minus*), Garlic Mustard (*Alliaria petiolate*), and Red Clover.	This community is located along the Fenelon River as well as west of Concession Road.	16
WOD	Deciduous Woodland	1.76	With less than 60% tree canopy this woodland community contained a mix of predominately deciduous species such as Manitoba Maple, American Elm, Red Oak, and White Ash. Understory appeared dominated by Common Buckthorn. Ground layer species observed included Canada Goldenrod, Smooth Brome (*Bromus inermis*), and Aster species (*Aster spp*.).	This community is located in the western part of the Study Area adjacent to Ellice Street and Wychwood Crescent.	17
TAGM5	Fencerow	1.55	This community consists of planted fencerows of various different tree and shrub species such as Sugar Maple, Staghorn Sumac, White Ash, and Common Lilac (*Syringa vulgaris*).	Commonly observed adjacent to the agricultural fields in the eastern half of the Study Area	18
OAO	Open Aquatic	2.59	Fenelon River.	--	1 - 4
CVS_1	Educational	3.24	Langton Public School.	Located off Wychwood Crescent.	19
CGL	Greenlands	4.89	Fenelon Falls Cemetery.	Centrally located east of Concession Road.	20

ELC Code	Classification	Area within Study Area (ha)	Description	Comments	Photo Attachment B
CVC	Commercial and Institutional	2.52	Light commercial industry.	Several communities along Wychwood Crescent.	21
CVR	Residential	27.68	Private residential housing.	Common throughout the Study Area.	22
OAGM1	Annual Row Crops	26.01	Annual row crops such as corn, soybean or wheat.	Common in the eastern portion of the Study Area outside of the city.	23
OAGM4	Open Pasture	1.02	This community was an open grassy pasture for cattle grazing.	One community located in the southeast corner of the study area off of Sturgeon Road 25.	24

Botanical Assessment

During 2019 field studies a total of 34 plant species were documented at the northern site, and a total of 44 species were documented at the southern site. A combined total of 55 species were documented. Of the 55 species, 64% are listed as native species and are considered to be common (SRank of S4) to very common (SRank of S5) in the province of Ontario. Conversely, 36% of the species observed are listed as introduced species; therefore, a status ranking is not applicable as the species is not a suitable target for conservation activities (SRank of SE or SNA). No SAR species were identified during vegetation survey.

The Co-efficient of Conservatism (CC) provides additional information on the nature of the vegetation communities within the Study Areas. The CC values range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a landscape that is relatively unaltered or is in a pre-settlement condition. For example, a CC of 0 is given to plants such as Manitoba Maple (*Acer negundo*) that demonstrate little fidelity to any remnant natural community (i.e. may be found almost anywhere). Similarly, a CC of 10 is applied to plants like Shrubby Cinquefoil (*Potentilla fructicosa*) that are almost always restricted to a pre-settlement remnant (i.e. a high quality natural area). Introduced plants were not part of the pre-settlement flora, so no CC values have been applied to these species.

Of the 54 species identified within the Study Area, three have a CC value of 7 or greater; American Larch (*Larix laricina*), Eastern Hemlock (*Tsuga canadensis*), and Black Spruce (*Picea mariana*). The mean CC value for the site was 2.22 out of a possible 10, indicating a disturbed landscape.

Refer to **Attachment C** for the list of the vegetation species observed within the Study Area.

Species at Risk

The following SAR were identified as having potential habitat within both Study Areas based on the result of background reviews and the field investigations. The species provincial status under the *Endangered Species Act, 2007* (ESA) follows the scientific name (i.e. THR= threatened and END= endangered):

- Chimney Swift (*Chaetura pelagica*; THR);
- Barn Swallow (*Hirundo rustica*; THR);
- Bobolink (Dolichonyx oryzivorous; THR);
- Eastern Meadowlark (*Sturnella magna*; THR);
- Blanding's Turtle (*Emydoidea blandingii*; THR);
- Eastern Small-footed Myotis (*Myotis leibii*; END);
- Little Brown Myotis (*Myotis lucifugus*; END);
- Northern Myotis (*Myotis septentrionalis*; END); and
- Tri-colored Bat (*Pipistrellus subflavus*; END)

No SAR were observed within the Study Areas during field investigations; however, targeted species-surveys were not included as part of the field investigation scope. The following summarizes the potential for the Study Areas to support the aforementioned SAR.

Chimney Swift and Barn Swallow may nest in association with anthropogenic structures (i.e. chimneys, culverts, etc.) within the Study Areas.

Bobolink and Eastern Meadowlark habitat includes meadows, fallow fields, pastures and perennial cover crops, each of which are located within the Study Areas.

The Burnt and Fenelon Rivers have the potential to provide Blanding's Turtle foraging and overwintering habitat, while the woodland/wetland communities have the potential to provide transitional habitat to and from local nesting habitats. The species may also nest adjacent/along gravel roadways, particularly those adjacent to wetland communities as well as the Burnt and Fenelon Rivers.

The deciduous, coniferous and mixed forests, woodlands and wetland communities within the Study Areas each have the potential to provide roosting and foraging habitat for SAR bats.

In the event the project works (i.e. new roads/crossings) are proposed within and/or adjacent to potential SAR habitat, it is recommended that species-specific surveys be completed in advance/during detail design in support of potential permitting and/or approvals under the ESA.

Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (MNRF 2000) defines Species of Conservation Concern (SCC) as globally, nationally, provincially, regionally, or locally rare (SRank of S1 to S3) and federally Endangered, Threatened and Special Concern species; but do not include SAR (listed as Endangered or Threatened under the ESA).

A total of 16 SCC were identified as potentially occurring within the vicinity of the Northern Study Area based on secondary source information (**Attachment D**, Table 1). Of the 16 species identified, 13 have been identified as having potential habitat within the Northern Study Area based on field investigation results; ESA and S-rank designations follow the species scientific names (i.e. SC = Special Concern; S1B = Breeding population is critically imperiled; S3 = Vulnerable; S4N = Non-breeding population is apparently secure):

- Canada Warbler (*Cardellina Canadensis;* SC*);*
- Common Nighthawk (*Chordeiles minor;* SC);
- Rough-legged Hawk (*Buteo lagopus*; S1B, S4N)
- Western Chorus Frog (*Pseudacris triseriata*; S3)
- Snapping Turtle (*Chelydra serpentine*; SC);
- Northern Map Turtle (*Graptemys geographica*; SC);
- Eastern Musk Turtle (*Sternotherus odoratus*; SC);
- Monarch (*Danaus plexippus;* SC)

A total of 16 SCC were identified as potentially occurring within the vicinity of the Southern Study Area based on secondary source information (**Attachment B**, Table 2). Of the 16 species identified, 11have been identified as having potential habitat within the Southern Study Area based on field investigation results; ESA designations follow the species scientific names (i.e. SC = Special Concern; S1B = Breeding population is critically imperiled; S3 = Vulnerable; S4N = Non-breeding population is apparently secure):

- Canada Warbler (*Cardellina Canadensis;* SC*)*
- Rough-legged Hawk (*Buteo lagopus*; S1B, S4N)
- Evening Grosbeak (*Coccothraustes vespertinus*; SC);
- Eastern Wood-Pewee (*Contopus virens*; SC);
- Bald Eagle (*Haliaeetus leucocephalus*; SC);
- Red-headed Woodpecker (*Melanerpes erythrocephalus;* SC);
- Western Chorus Frog (*Pseudacris triseriata*; S3)
- Snapping Turtle (*Chelydra serpentine*; SC);
- Northern Map Turtle (*Graptemys geographica*; SC);
- Eastern Musk Turtle (*Sternotherus odoratus*; SC);
- Monarch (*Danaus plexippus;* SC)

Criteria for identifying SWH within the Study Areas follows the guidelines outlined in the Natural Heritage Reference Manual (MNRF, 2010), the Significant Wildlife Habitat Technical Guide (MNRF, 2000) and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015).

There are four categories of SWH included in the Criteria Schedules for Ecoregion 6E. Based on the results of the background review as well as the 2019 field investigations, the Study Areas were assessed as having the potential to provide SWH.

The following candidate SWH were assessed as present within the Northern Site.

1. **Seasonal Concentrations Areas of Animals**
    - Bat Maternity Colonies: Deciduous and mixed forests (FOD/FOM), deciduous, coniferous and mixed woodlands (WOD/WOC/WOM) as well as coniferous and mixed swamps (SWC/SWM) within the Study Area have the potential to support this habitat type.
    - Turtle Wintering Areas: Burnt River (OAO) within the Study Area has the potential to support this habitat type.
    - Reptile Hibernaculum: Deciduous and mixed forests (FOD/FOM), meadows (ME), woodlands (WOD) and coniferous and mixed swamps (SWC/SWM) within the Study Area have the potential to provide features that go below the frost line (e.g. rock piles, slopes, etc.) .
    - Deer Wintering Areas: Confirmed habitat identified by the Ministry of Natural Resources and Forestry (MNRF) along Concession 3 Road.

2. **Rare Vegetation Communities or Specialized Habitat for Wildlife**

- Old Growth Forest: Deciduous and mixed forests (FOD/FOM) as well as coniferous and mixed swamps (SWC/SWM) ≥30 ha or with at least 10 ha of interior habitat (assuming 100 m buffer at edge of forest) within the Study Area have the potential to support this habitat.
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat: Deciduous and mixed forests (FOD/FOM) as well as coniferous and mixed swamps (SWC/SWM) adjacent to Burnt River within the Study Area have the potential to support this habitat.
- Woodland Raptor Nesting Habitat: Deciduous and mixed forests (FOD/FOM), woodlands (WOD/WOM) and coniferous and mixed swamps (SWC/SWM)>30 ha with >10 ha of interior habitat (assuming a 200 m buffer from the edge) within the Study Area have the potential to support this habitat.
- Turtle Nesting Areas: Suitable gravel areas adjacent to the meadow marsh (MAM) within the Study Area has the potential to support this habitat.
- Amphibian Breeding Habitat (Woodland): Deciduous and mixed forests (FOD/FOM) as well as coniferous and mixed swamps (SWC/SWM) within the Study Area have the potential to support this habitat.
- Woodland Area-Sensitive Bird Breeding Habitat: Mature (>60 years old) deciduous and mixed forests (FOD/FOM) and coniferous and mixed swamps (SWC/SWM) >30 ha >30 ha with interior habitat (assuming 200 m from edge) have the potential to support this habitat.

3. **Habitats for Species of Conservation Concern**
    - Marsh Breeding Bird Habitat: Meadow Marsh (MAM) within the Study Area has the potential to support this habitat.
    - Terrestrial Crayfish: Meadow marsh (MAM) as well as mixed swamp (SWM) within the Study Area have the potential to support this habitat. .
    - Special Concern and Rare Wildlife Species Deciduous and mixed forests (FOD/FOM), meadows (ME) and/or open water areas (OAO) within the Study Area have the potential to support this habitat.

4. **Animal Movement Corridors**
    - None.

The following candidate SWH were assessed as present within the Southern Site.

1. **Seasonal Concentrations Areas**
    - Bat Maternity Colonies: Mixed forests (FOM) deciduous, coniferous and mixed woodlands (WOD/WOC/WOM) and deciduous swamp (SWD) within the Study Area have the potential to support this habitat.

- Turtle Wintering Areas: Fenelon River (OAO) within the Study Area has the potential to support this habitat.
- Reptile Hibernaculum: Mixed forests (FOM), meadows (ME) and coniferous, deciduous and mixed woodlands (WOC/WOD/WOM) within the Study Area have the potential to support this habitat.
  Colonially – Nesting Bird Breeding Habitat (Tree/Shrubs): Deciduous swamp (SWD) within the Study Area has the potential to support this habitat.
- Deer Wintering Areas: Confirmed habitat identified by the MNRF along the east side of Sturgeon Point Road.

2. **Rare Vegetation Communities or Specialized Habitat for Wildlife**
   - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat: Mixed forests (FOM) adjacent to Fenelon River within the Study Area have the potential to support this habitat.
   - Woodland Raptor Nesting Habitat: Mixed forests (FOM) and deciduous swamp (SWD) ≥30 ha with ≥10 ha of interior habitat (assuming a 200 m buffer from the edge) within the Study Area have the potential to support this habitat.
   - Amphibian Breeding Habitat (Woodland): Mixed forests (FOM) and deciduous swamp (SWD) within the Study Area have the potential to support this habitat.

3. **Habitats for Species of Conservation Concern**
   - Marsh Breeding Bird Habitat: Deciduous swamp (SWD) within the Study Area has the potential to support this habitat.
   - Terrestrial Crayfish: Deciduous swamp (SWD) within the Study Area has the potential to support this habitat.
   - Special Concern and Rare Wildlife Species: Mixed forests (FOM), meadows (ME) and/or open water area (OAO - Fenelon River) within the Study Area have the potential to support this habitat.

4. **Animal Movement Corridors**
   - None.

Incidental Wildlife

Incidental wildlife species observed within the Study Areas are listed below in **Table 3.** Each of the species incidentally observed are considered common and secure in Ontario (i.e. SRank S4 or S5).

Table 3: Incidental Wildlife Observations

Scientific Name	Common Name	SARA[1]	ESA[2]	Srank[3]
Birds				
Branta canadensis	Canada Goose	---	---	S5
Colaptes auratus	Northern Flicker	---	---	S4B
Corvus brachyrhynchos	American Crow	---	---	S5B
Corvus corax	Common Raven	---	---	S5
Cyanocitta cristata	Blue Jay	---	---	S5
Poecile atricapillus	Black-capped Chickadee	---	---	S5
Turdus migratorius	American Robin	---	---	S5B
Zenaida macroura	Mourning Dove	---	---	S5
Zonotrichia albicollis	White-throated Sparrow	---	---	S5B
Mammals				
Sciurus carolinensis	Eastern Gray Squirrel	---	---	S5

Notes: 1: Federal Species at Risk Act (SARA) Registry Status; END Endangered; THR Threatened. 2. Ontario Endangered Species Act (ESA) Species at Risk in Ontario List Status (Ontario Regulation 230/08, as of the date of this memo); END Endangered. THR Threatened. 3. Provincial Conservation Ranking (SRank); S1 - Extremely rare in Ontario; S2 - Very rare in Ontario; S3 - Rare to uncommon in Ontario; S4 - Considered to be common in Ontario. 4. NHIC = MNRF Natural Heritage Information Centre, MNRF Reg. Habitat = MNRF Regulated Habitat (O. Reg. 242/08); OBBA = Ontario Breeding Bird Atlas, MWH = Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, OHA = Ontario Herpetofaunal Atlas.

Preliminary Impact Assessment

A preliminary impact assessment was conducted for the additional bridge crossing for this project on the natural features within the Study Areas (i.e. Northern Site and Southern Site). If a new bridge crossing was to be located within Burnt River (Northern Site) or Fenelon River (Southern Site), the following are potential impacts to the natural features within the Study Areas:

- Changes to surface water and/or groundwater flows;
- Impacts to the water quality and fish habitat in the rivers through sedimentation and/or contamination;
- Impacts to soils through erosion and/or contamination;
- Removal of riparian vegetation;
- Removal of aquatic vegetation;
- Death of fish individuals;
- Harmful Alteration, Disruption or Destruction of Fish Habitat (HADD);
- Erosion to the banks along the rivers;

- Entry of deleterious substances into the River from machinery (i.e. fluid leaks, refueling operations, spills);
- Change in local river hydraulics due to potential new in-water features (i.e. bridge piers, abutments), erosion protection (i.e. riprap rock placement around piers, footings and/or abutments);
- Impacts within the floodplain areas, where necessary permitting will be required;
- In the event the project works are proposed within and/or adjacent to potential SAR habitat, it is recommended that species-specific surveys be completed in advance/during detail design in support of potential permitting and/or approvals under the ESA;
- In the event the project works are proposed within and/or adjacent to candidate SWH, it is recommended that these candidate SWH be evaluate for significance through appropriate studies and/or assumed significant, with mitigation measures applied as required; and
  If work is proposed to occur in proximity to wetland areas, there is potential for impacts to the wetlands as accidental vegetation damage, changes to water quality or quantity, erosion and sedimentation.

Summary

Natural features within the Northern Site include Burnt River with adjacent coniferous and mixed swamps (SWC/SWM), deciduous and mixed forests (FOD/FOM), deciduous and mixed woodlands (WOD/WOM), meadows (ME), and meadow marsh (MAM). Remaining lands within the Northern Site consist primarily of residential, and agricultural lands. Natural features within the Southern Site include Fenelon River (OAO), as well as deciduous and mixed forests (FOD/FOM), deciduous and mixed woodlands (WOD/WOM), deciduous swamp (SWD), mixed and swamp thickets (THM/SWT) and meadows (ME). Remaining lands within the Southern Site consist of residential, agricultural, commercial and greenlands.

Overall, based on our background review and field investigation results, the Southern Study Area has fewer natural features and candidate SWHs. Both Study Areas have similar SAR and SCC habitat potential. Once the preferred crossing is confirmed, the following surveys are recommended in order to determine appropriate mitigation measures and development setbacks in support of detail design for the project:

- Confirmatory ELC;
- Botanical surveys (spring and summer);
- Breeding bird surveys;
- Amphibian surveys;
- Turtle surveys; and
- Snag/cavity tree assessments.

At a minimum, standard mitigation measures (e.g. timing windows, wildlife sweeps, etc.) will be required to minimize and/or avoid potential adverse effects on wildlife and wildlife habitats. Once the preferred crossing is confirmed, it is recommended that consultation with the Ministry of the Environment, Conservation and Parks (MECP) take place to confirm whether SAR surveys are required. In the event SAR surveys are required, and SAR habitat is confirmed within the preferred crossing alignment, the project

may be eligible for registration under *Ontario Regulation (O. Reg.) 242/08*. In the event it is determined that the project is eligible for registration, the project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA so long as the conditions in the Regulation are followed. It should be noted that project registration is a Proponent driven process (i.e. the Proponent is required to make the determination of whether the project is eligible). In the event it is determined that the project is not eligible for registration, permitting and/or approvals under the ESA may be required. It should be noted that permitting under the ESA can take upwards of 18 months

REFERENCES

Lee, H. T., Bakowsky, W. D., Riley, J., Bowles, J., Puddister, M., Uhlig, P., & McMurray, S. 1998. *Ecological land classification for southern Ontario: First approximation and its application.* Ontario Ministry of Natural Resources, South Central Region, Science Development and Transfer Branch.

Lee, H. 2008. *Draft ecological land classification for Southern Ontario*. London, Ontario: Ontario Ministry of Natural Resources.

Newmaster, S.G., A. Lehela, Peter W. C. Uhlig, Sean McMurray and Michael J. Oldham. 1998 Ontario Plant List. Forest Research Information Paper No. 123, Ontario Forest Research Institute. Ontario Ministry of Natural Resources. Sault Ste. Marie, Ontario.

ATTACHMENTS

A – Figures

B – Site Photographs

C – Botanical Species List

D – SAR and SCC Tables

Attachment A

Figures

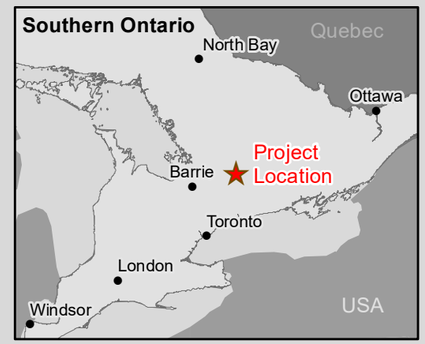
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FENLON FALLS SECOND CROSSING STUDY

PROJECT LOCATION

FIGURE 1A

- Potential New Crossing
- Potential Road Widening and Upgrade
- Potential Traffic Route
- Potential Area of Interest
- Study Area
- Expressway / Highway
- Major Road
- Minor Road



SCALE 1:65,000

0 0.5 1 2 km

N W E S

MAP DRAWING INFORMATION:
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MAP CREATED BY: LK
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MAP PROJECTION: NAD 1983 UTM Zone 17N

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FENELON FALLS SECOND CROSSING STUDY

PROJECT LOCATION

FIGURE 1B

Major Road

Minor Road

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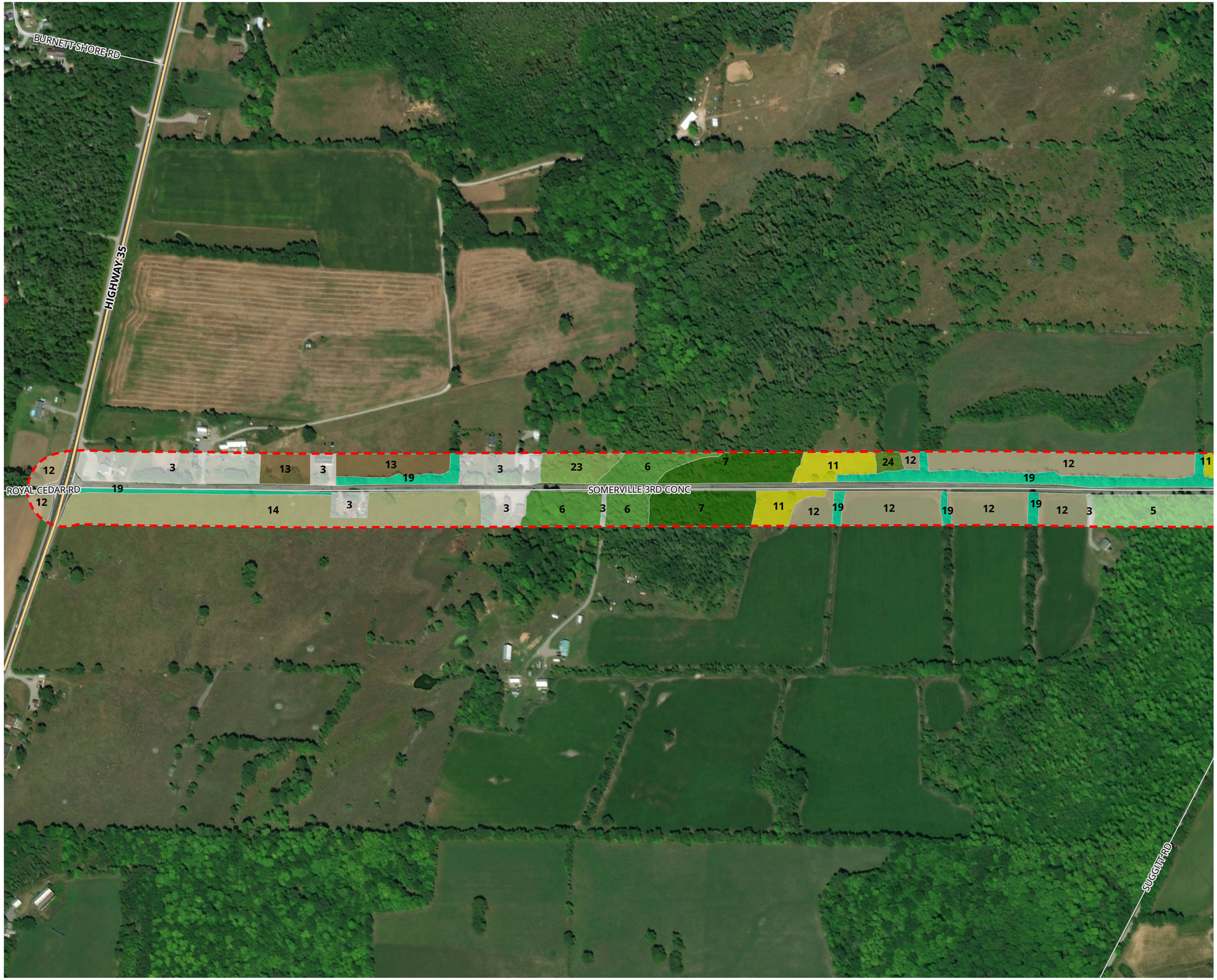
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MAP CREATED BY: GM
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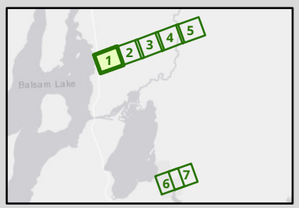
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 1 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 5. FOD: Deciduous Forest
- 6. FOM: Mixed Forest
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 19. TAGM5: Fencerow
- 23. WOD: Deciduous Woodland
- 24. WOM: Mixed Woodland



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N W E S

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DATA PROVIDED BY MNRF

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MAP PROJECTION: NAD 1983 UTM Zone 17N

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FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

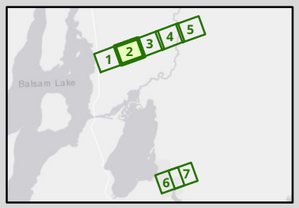
ECOLOGICAL LAND CLASSIFICATION
MAP 2 (NORTHERN SITE)



Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 5. FOD: Deciduous Forest
- 8. IAG: Agricultural Buildings
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 19. TAGM5: Fencerow



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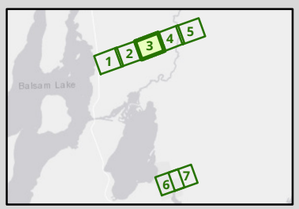
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 3 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 9. MAM: Meadow Marsh
- 10. MEG: Graminoid Meadow
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 13. OAGM2: Perennial Cover Crop
- 14. OAGM4: Open Pasture
- 15. SWC: Coniferous Swamp
- 19. TAGM5: Fencerow
- 22. WOC: Coniferous Woodland



1:5,000

0 50 100 200 m

N W E S

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MAP CREATED BY: GM
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MAP PROJECTION: NAD 1983 UTM Zone 17N

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PROJECT: 199411

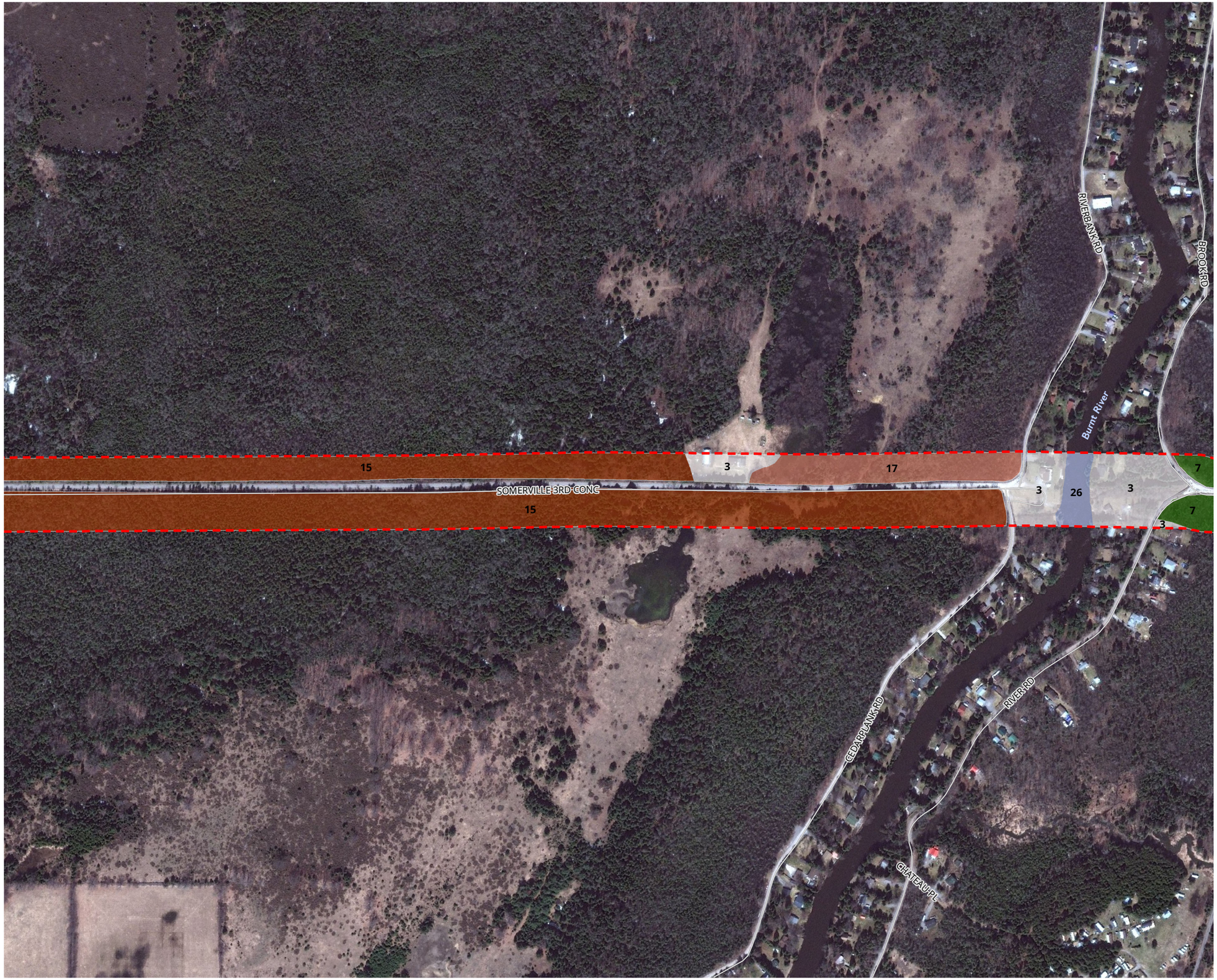
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FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

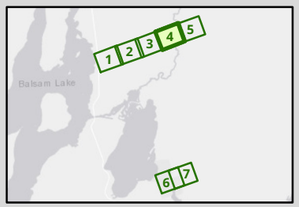
ECOLOGICAL LAND CLASSIFICATION
MAP 4 (NORTHERN SITE)



Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 15. SWC: Coniferous Swamp
- 17. SWM: Mixed Swamp
- 26. OAO: Open Aquatic



1:5,000

0 50 100 200 m

N W E S

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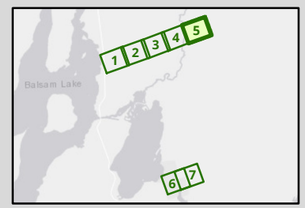
FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION
MAP 5 (NORTHERN SITE)

Study Area

Ecological Land Classification

- 3. CVR_1: Low Density Residential
- 6. FOM: Mixed Forest
- 7. FOM: Mixed Forest/SWM: Mixed Swamp
- 11. MEM: Mixed Meadow
- 22. WOC: Coniferous Woodland
- 26. OAO: Open Aquatic



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0 50 100 200 m

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

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MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

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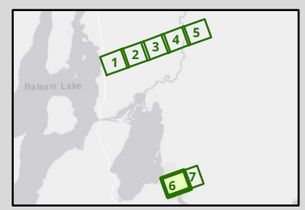
FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 6 (SOUTHERN SITE)

Study Area

Ecological Land Classification

- 1. CGL: Greenlands
- 2. CVC: Commercial and Industrial
- 3. CVR_1: Low Density Residential
- 4. CVS_1: Education
- 6. FOM: Mixed Forest
- 10. MEG: Graminoid Meadow
- 11. MEM: Mixed Meadow
- 12. OAGM1:Annual Row Crop
- 16. SWD: Deciduous Swamp
- 19. TAGM5: Fencerow
- 21. THM: Mixed Thicket*
- 23. WOD: Deciduous Woodland
- 24. WOM: Mixed Woodland
- 25. WOM: Mixed Woodland/SWD: Deciduous Swamp
- 26. OAO: Open Aquatic



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MAP DRAWING INFORMATION:
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MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

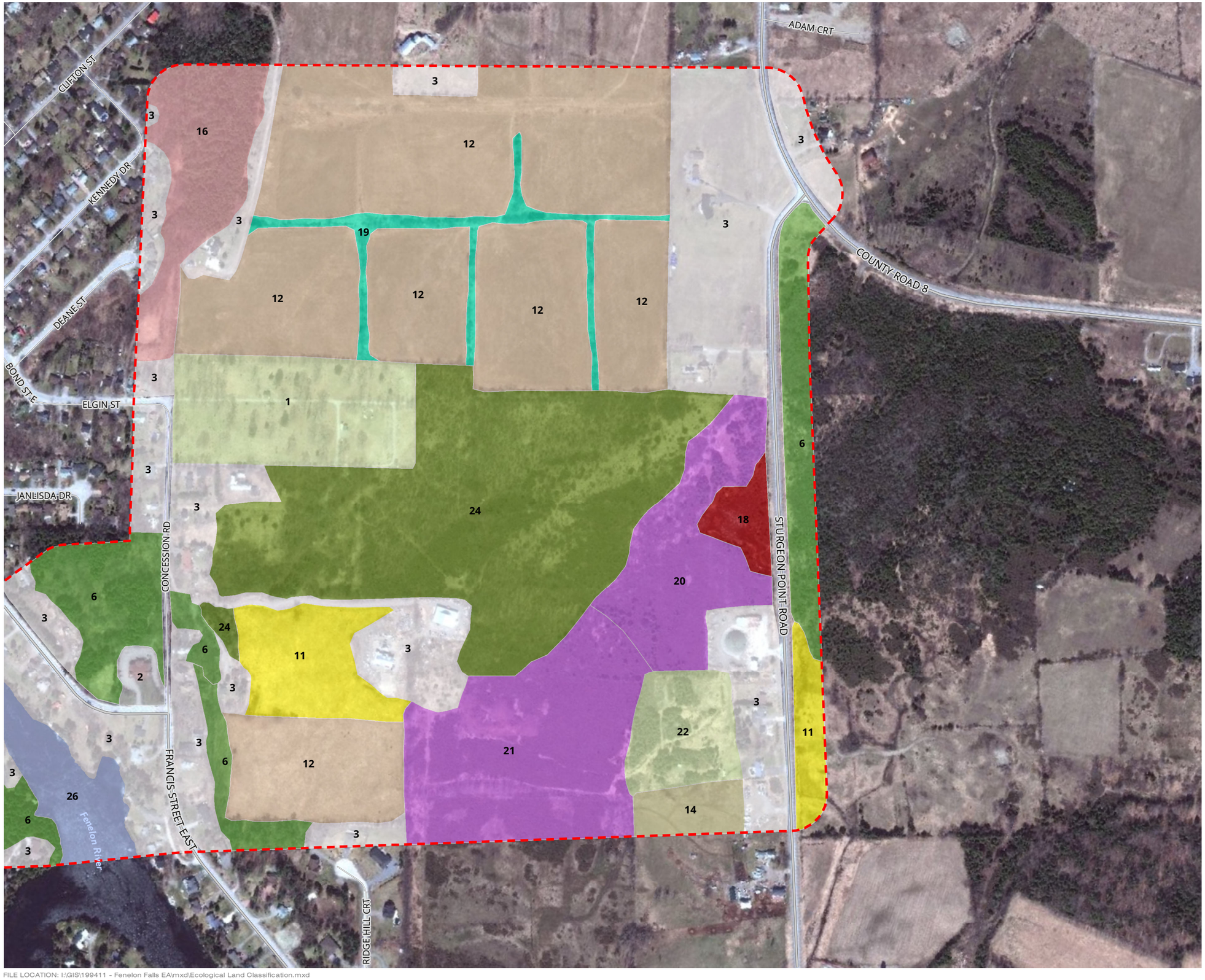
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DATE: 2019-12-04

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Ecological Land Classification.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

ECOLOGICAL LAND CLASSIFICATION MAP 7 (SOUTHERN SITE)



Study Area

Ecological Land Classification

- 1. CGL: Greenlands
- 2. CVC: Commercial and Industrial
- 3. CVR_1: Low Density Residential
- 6. FOM: Mixed Forest
- 11. MEM: Mixed Meadow
- 12. OAGM1: Annual Row Crop
- 14. OAGM4: Open Pasture
- 16. SWD: Deciduous Swamp
- 18. SWT: Swamp Thicket
- 19. TAGM5: Fencerow
- 20. THM: Mixed Thicket
- 21. THM: Mixed Thicket*
- 22. WOC: Coniferous Woodland
- 24. WOM: Mixed Woodland
- 26. OAO: Open Aquatic

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



1:5,000

0 50 100 200 m

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 2019-12-04

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FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

CANDIDATE SIGNIFICANT WILDLIFE HABITAT - NORTH MAP 1

BURNETT SHORE RD
HIGHWAY 35
ROYAL CEDAR RD
SOMERVILLE 3RD CONC
SUGGITT RD

Bat Maternity Colonies
Woodland Area-sensitive Bird Breeding Habitat
Old Growth Forest
Amphibian Breeding Habitat (Woodland)
Reptile Hibernaculum
Woodland Raptor Nesting Habitat
Woodland Raptor Nesting Habitat
Reptile Hibernaculum
Bat Maternity Colonies
Bat Maternity Colonies
Bat Maternity Colonies
Old Growth Forest
Bat Maternity Colonies
Reptile Hibernaculum
Amphibian Breeding Habitat (Woodland)
Amphibian Breeding Habitat (Woodland)
Bat Maternity Colonies
Reptile Hibernaculum
Woodland Area-sensitive Bird Breeding Habitat
Reptile Hibernaculum
Amphibian Breeding Habitat (Woodland)

Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bat Maternity Colonies
- Old Growth Forest
- Reptile Hibernaculum
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

CANDIDATE SIGNIFICANT WILDLIFE HABITAT - NORTH MAP 2

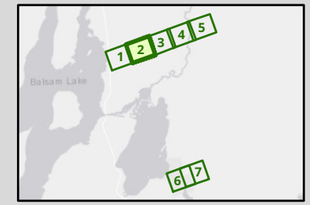
Woodland Raptor Nesting Habitat
Reptile Hibernaculum
Reptile Hibernaculum
Bat Maternity Colonies
Reptile Hibernaculum
Reptile Hibernaculum
Old Growth Forest
SOMERVILLE 3RD CONC
AUTO LANE
Amphibian Breeding Habitat (Woodland)
Reptile Hibernaculum
Reptile Hibernaculum
Reptile Hibernaculum
Woodland Area-sensitive Bird Breeding Habitat
Woodland Raptor Nesting Habitat
Reptile Hibernaculum
Reptile Hibernaculum
Amphibian Breeding Habitat (Woodland)
Old Growth Forest
Bat Maternity Colonies
SUGGITT RD
Woodland Area-sensitive Bird Breeding Habitat
POTTERS RD

Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bat Maternity Colonies
- Old Growth Forest
- Reptile Hibernaculum
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

CANDIDATE SIGNIFICANT WILDLIFE HABITAT - NORTH MAP 3



Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Bat Maternity Colonies
- Marsh Breeding Bird Habitat
- Old Growth Forest
- Reptile Hibernaculum
- Terrestrial Crayfish
- Turtle Nesting Areas
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411

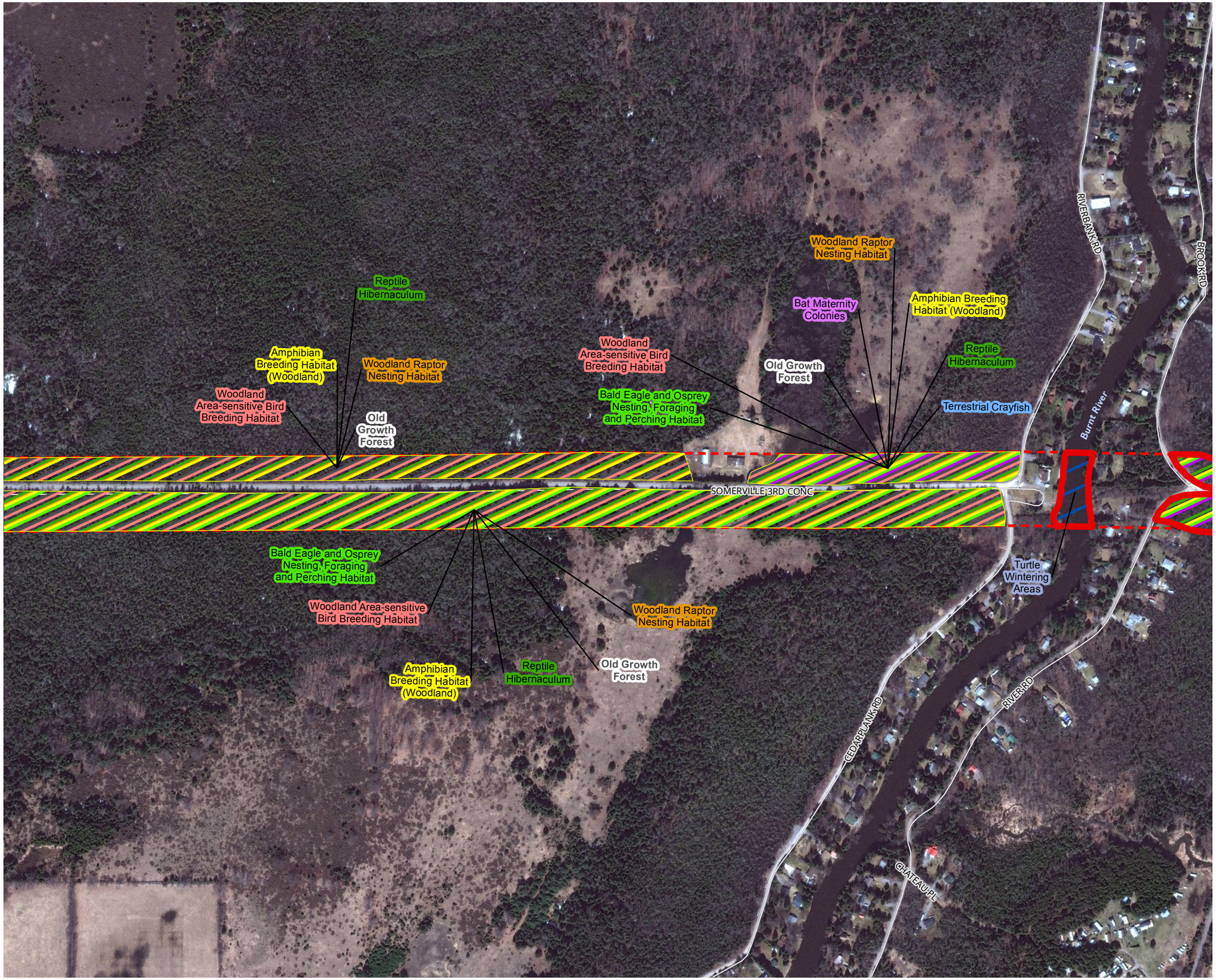
STATUS: DRAFT

DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

CANDIDATE SIGNIFICANT WILDLIFE HABITAT - NORTH MAP 4

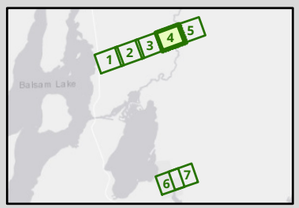


Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Bat Maternity Colonies
- Old Growth Forest
- Reptile Hibernaculum
- Terrestrial Crayfish
- Turtle Wintering Areas
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411

STATUS: DRAFT

DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS
SECOND CROSSING
ENVIRONMENTAL ASSESSMENT

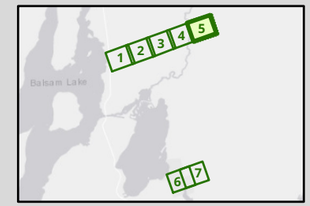
CANDIDATE SIGNIFICANT WILDLIFE HABITAT - NORTH
MAP 5

Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Bat Maternity Colonies
- Old Growth Forest
- Reptile Hibernaculum
- Turtle Wintering Areas
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

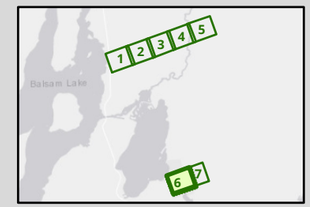
CANDIDATE SIGNIFICANT WILDLIFE HABITAT - SOUTH MAP 6

Study Area

CandidateSWH

- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Bat Maternity Colonies
- Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)
- Marsh Breeding Bird Habitat
- Reptile Hibernaculum
- Terrestrial Crayfish
- Turtle Wintering Areas

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

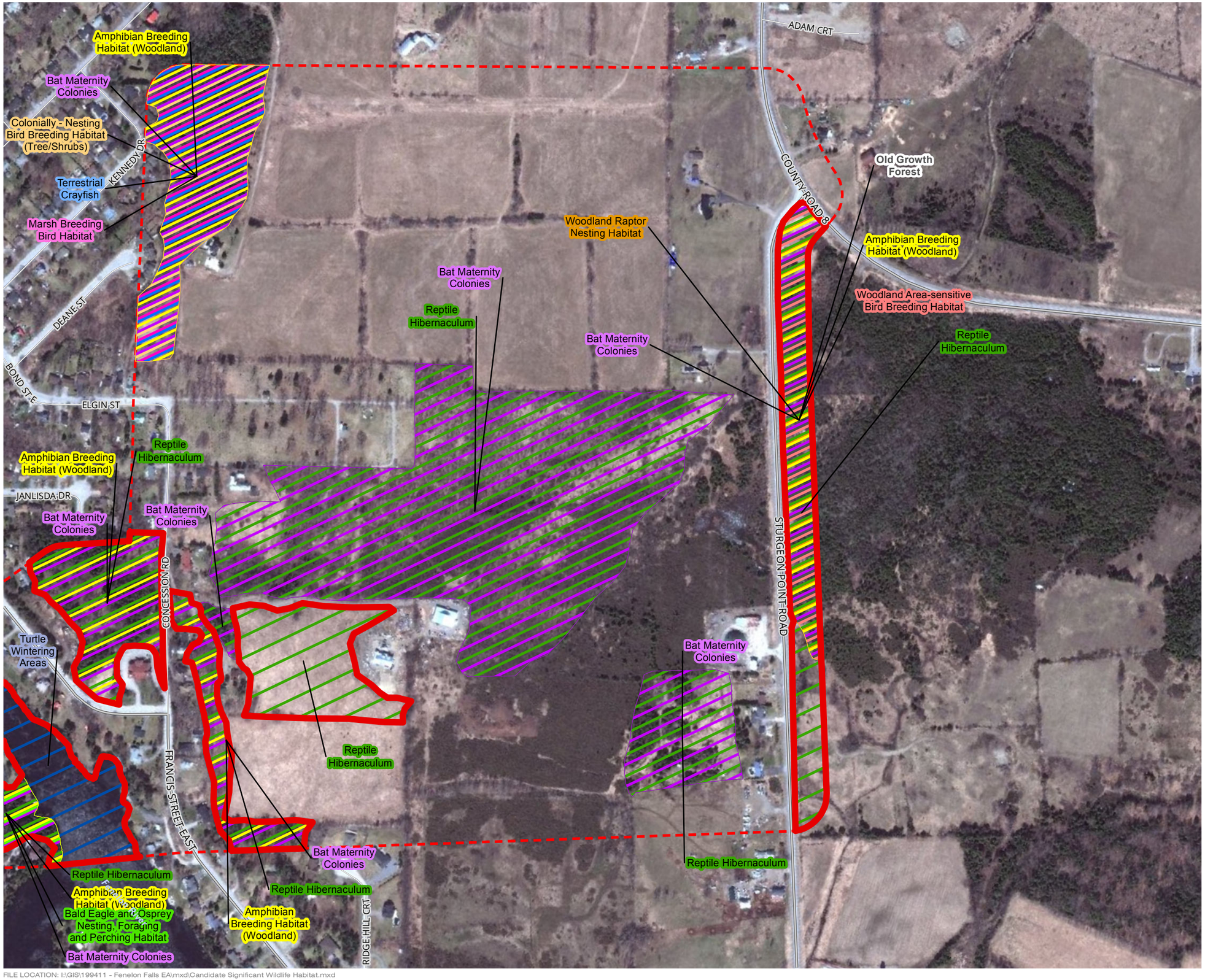
DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

FENELON FALLS SECOND CROSSING ENVIRONMENTAL ASSESSMENT

CANDIDATE SIGNIFICANT WILDLIFE HABITAT - SOUTH MAP 7



CandidateSWH

- Study Area
- Special Concern and Rare Wildlife Species
- Amphibian Breeding Habitat (Woodland)
- Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Bat Maternity Colonies
- Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)
- Marsh Breeding Bird Habitat
- Old Growth Forest
- Reptile Hibernaculum
- Terrestrial Crayfish
- Turtle Wintering Areas
- Woodland Area-sensitive Bird Breeding Habitat
- Woodland Raptor Nesting Habitat

* Classified based on aerial imagery interpretation. Access was not available at time of survey.



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MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: GM/LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 199411
STATUS: DRAFT
DATE: 12/4/2019

FILE LOCATION: I:\GIS\199411 - Fenelon Falls EA\mxd\Candidate Significant Wildlife Habitat.mxd

Attachment B

Site Photographs

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Attachment B: Site Photos (October 23rd, 2019)

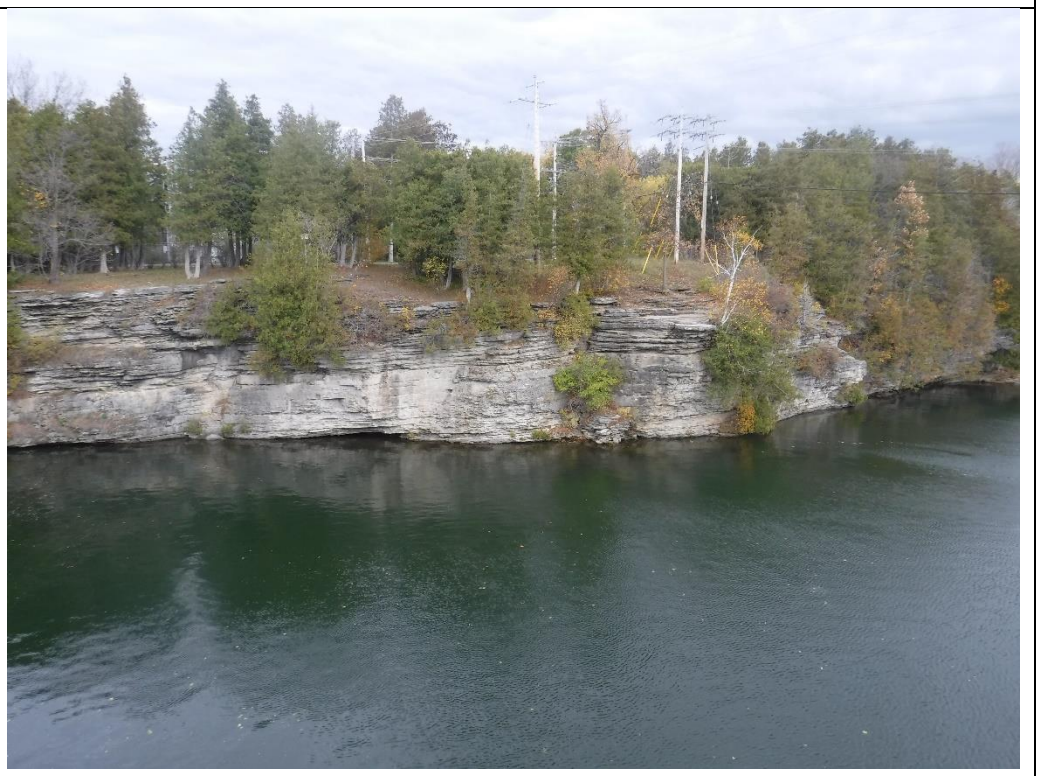
Photo 1 Fenelon River - general conditions upstream of the Study Area, facing downstream (southeast) approximately 300 m downstream of the Fenelon Falls.	
Photo 2 Fenelon River – steep rock face upstream of the Study Area, facing northeast approximately 300 m downstream of the Fenelon Falls.	

Photo 3 Fenelon River – general conditions upstream of the Study Area, facing southeast approximately 300 m downstream of the Fenelon Falls.	
Photo 4 Fenelon River – steep rock face upstream of the Study Area, facing west, approximately 300 m downstream of the Fenelon Falls.	

Photo 5 Burnt River - general conditions within the Study Area, facing upstream (north) from the public boat launch (west bank). Steel sheet piling and concrete hardening along both banks.	
Photo 6 Burnt River - general conditions within the Study Area, facing downstream (south) from the public boat launch (west bank). Residential properties and bank hardening along the east bank. Mixed coniferous and deciduous riparian vegetation along both banks.	

Photo 7 Burnt River – residential property and bank hardening along the east bank. Facing directly across the River (east) from the public boat launch.	
Photo 8 Burnt River - emergent aquatic vegetation, in-stream and overhanging woody debris along the west bank, facing downstream (south).	

Photo 9 **Southern Site** MEM: Mixed Meadow	
Photo 10 **Southern Site** MEG: Mixed Meadow	

Photo 11 **Southern Site** SWT: Swamp Thicket	
Photo 12 **Southern Site** THM: Mixed Thicket	

Photo 13: **Southern Site** WOM/SWD: Mixed Woodland/ Deciduous Swamp	
Photo 14 **Southern Site** SWD: Deciduous Swamp	

Photo 15 **Southern Site** WOM: Mixed Woodland	
Photo 16 **Southern Site** FOM: Mixed Forest	

Photo 17 **Southern Site** WOD: Deciduous Woodland	
Photo 18 **Southern Site** TAGM5: Fencerow	

Photo 19 **Southern Site** CVS-1: Educational	
Photo 20 **Southern Site** CGL: Greenlands (Cemetery)	

Photo 21 **Southern Site** CVC: Commercial and Institutional	
Photo 22 **Southern Site** CVR: Residential	

Photo 23 **Southern Site** OAGM1: Annual row crops	
Photo 24 **Southern Site** OAGM4: Open Pasture	

Photo 25: **Northern Site** MEM: Mixed Meadow	
Photo 26 **Northern Site** MEG: Graminoid Meadow	

Photo 27 **Northern Site** MAM: Meadow Marsh	
Photo 28 **Northern Site** SWC: Coniferous Swamp	

Photo 29 **Northern Site** FOM/SWM Mixed Forest/Mixed Swamp	
Photo 30 **Northern Site** WOC: Coniferous Woodland TAGM5: Fencerow; in foreground	

Photo 31 **Northern Site** WOM; Mixed Woodland	
Photo 32 **Northern Site** WOD; Deciduous Woodland	

Photo 33 **Northern Site** FOD; Deciduous Forest	
Photo 34 **Northern Site** FOM: Mixed Forest	

Photo 35 **Northern Site** TAGM5: Fencerow	
Photo 36 **Northern Site** CVR: Residential	

Photo 37 **Northern Site** OAGM1: Annual Row Crops	
Photo 38 **Northern Site** OAGM2: Perennial Cover Crops	

Photo 39 **Northern Site** OAGM4: Open Pasture	

Attachment C

Botanical Species List

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Table C-1: Plant List – Fenelon Falls (Northern Site)

Scientific Name	Common Name	SARA[1]	ESA[2]	SRank[3]	CC[4]
Acer saccharum	Sugar Maple	---	---	S5	4
Betula papyrifera	Paper Birch	---	---	S5	2
Bromus inermis	Awnless Brome	---	---	SNA	---
Cornus sericea ssp sericea	Red-osier Dogwood	---	---	S5	2
Dactylis glomerata	Orchard Grass	---	---	SNA	---
Daucus carota	Wild Carrot	---	---	SNA	---
Fagus grandifolia	American Beech	---	---	S4	6
Fraxinus americana	White Ash	---	---	S4	4
Fraxinus pennsylvanica	Green Ash	---	---	S4	3
Juniperus communis	Ground Juniper	---	---	S5	4
Larix laricina	American Larch	---	---	S5	7
Lonicera tatarica	Tartarian Honeysuckle	---	---	SNA	---
Melilotus albus	White Sweet-clover	---	---	SNA	---
Phalaris arundinacea	Reed Canary Grass	---	---	S5	0
Picea glauca	White Spruce	---	---	S5	6
Picea mariana	Black Spruce	---	---	S5	8
Pinus strobus	Eastern White Pine	---	---	S5	4
Pinus sylvestris	Scotch Pine	---	---	SNA	---
Populus balsamifera	Balsam Poplar	---	---	S5	4
Populus tremuloides	Trembling Aspen	---	---	S5	2
Potentilla recta	Sulphur Cinquefoil	---	---	SNA	---
Quercus rubra	Northern Red Oak	---	---	S5	6
Rhus hirta	Staghorn Sumac	---	---	S5	1
Salix bebbiana	Bebb's Willow	---	---	S5	4
Solidago canadensis var. canadensis	Canada Goldenrod	---	---	S5	1

Scientific Name	Common Name	SARA[1]	ESA[2]	SRank[3]	CC[4]
Symphyotrichum novae-angliae	New England Aster	---	---	S5	2
Taxus canadensis	Canadian Yew	---	---	S4	7
Thuja occidentalis	Eastern White Cedar	---	---	S5	4
Tilia americana	American Basswood	---	---	S5	4
Tsuga canadensis	Eastern Hemlock	---	---	S5	7
Typha latifolia	Broad-leaved Cattail	---	---	S5	3
Ulmus americana	American Elm	---	---	S5	3
Vicia cracca	Tufted Vetch	---	---	SNA	---
Vitis riparia	Riverbank Grape	---	---	S5	0

[1]Federal Species at Risk Act, [2]Provincial Endangered Species Act, [3]Provincial Conservation ranking where SNA= Not Applicable, SE= Non-Native species, S1= Extremely Rare, S2= Very Rare, S3= Rare, S4= Apparently Secure and S5= Secure, [4]=Coefficient of Conservatism

Table C-2: Plant List – Fenelon Falls (Southern Site)

Scientific Name	Common Name	SARA[1]	ESA[2]	SRank[3]	CC[4]
Acer negundo	Manitoba Maple	---	---	S5	0
Acer saccharinum	Silver Maple	---	---	S5	5
Acer saccharum	Sugar Maple	---	---	S5	4
Alliaria petiolata	Garlic Mustard	---	---	SNA	---
Arctium minus	Common Burdock	---	---	SNA	---
Asclepias syriaca	Common Milkweed	---	---	S5	0
Bromus inermis	Awnless Brome	---	---	SNA	---
Convallaria majalis	European Lily-of-the-valley	---	---	SNA	---
Cornus alternifolia	Alternate-leaved Dogwood	---	---	S5	6
Cornus sericea ssp sericea	Red-osier Dogwood	---	---	S5	2
Dactylis glomerata	Orchard Grass	---	---	SNA	---
Daucus carota	Wild Carrot	---	---	SNA	---
Equisetum arvense	Field Horsetail	---	---	S5	0
Fraxinus americana	White Ash	---	---	S4	4
Hesperis matronalis	Dame's Rocket	---	---	SNA	---
Juglans nigra	Black Walnut	---	---	S4	5
Juniperus communis	Ground Juniper	---	---	S5	4
Juniperus virginiana	Eastern Red Cedar	---	---	S5	4
Melilotus albus	White Sweet-clover	---	---	SNA	---
Phalaris arundinacea	Reed Canary Grass	---	---	S5	0
Phragmites australis ssp. americanus	Common Reed	---	---	S4?	---
Picea glauca	White Spruce	---	---	S5	6
Pinus strobus	Eastern White Pine	---	---	S5	4

Scientific Name	Common Name	SARA[1]	ESA[2]	SRank[3]	CC[4]
Pinus sylvestris	Scotch Pine	---	---	SNA	---
Populus balsamifera	Balsam Poplar	---	---	S5	4
Populus tremuloides	Trembling Aspen	---	---	S5	2
Prunus virginiana	Choke Cherry	---	---	S5	2
Quercus rubra	Northern Red Oak	---	---	S5	6
Rhamnus cathartica	Common Buckthorn	---	---	SNA	---
Rhus hirta	Staghorn Sumac	---	---	S5	1
Robinia pseudoacacia	Black Locust	---	---	SNA	---
Rumex crispus	Curly Dock	---	---	SNA	---
Salix alba	White Willow	---	---	SNA	---
Salix bebbiana	Bebb's Willow	---	---	S5	4
Solidago canadensis var. canadensis	Canada Goldenrod	---	---	S5	1
Syringa vulgaris	Common Lilac	---	---	SNA	---
Taraxacum officinale	Common Dandelion	---	---	SNA	---
Thuja occidentalis	Eastern White Cedar	---	---	S5	4
Tilia americana	American Basswood	---	---	S5	4
Trifolium pratense	Red Clover	---	---	SNA	---
Typha latifolia	Broad-leaved Cattail	---	---	S5	3
Ulmus americana	American Elm	---	---	S5	3
Verbascum thapsus	Common Mullein	---	---	SNA	---
Vitis riparia	Riverbank Grape	---	---	S5	0

[1]Federal Species at Risk Act, [2]Provincial Endangered Species Act, [3]Provincial Conservation ranking where SNA= Not Applicable, SE= Non-Native species, S1= Extremely Rare, S2= Very Rare, S3= Rare, S4= Apparently Secure and S5= Secure, [4]=Coefficient of Conservatism

Attachment D

*S*AR *an*d *S*CC T*ab*l*es*

DILLON
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Table 1: Species of Conservation Concern with the Potential to Occur within Northern Study Area

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
BIRDS										
Cardellina canadensis	Canada Warbler	THR	SC	S4B	OBBA	N/A	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat usually requires at least 30 ha.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting, if impacts proposed to these areas. If Canada Warbler nests are identified, registration under the *ESA 2007* may be required.
Buteo lagopus	Rough-legged Hawk	---	---	S1B,S4N	CBC	N/A	Winter across southern Canada in open country, including prairies, shrubsteppes, semideserts, fields, marshes, bogs and dunes.	YES	Meadows, marsh and fields in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm presence/absence. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Chordeiles minor	Common Nighthawk	THR	SC	S4B	OBBA	N/A	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	YES	Fields and woodlands in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Coccothraustes vespertinus	Evening Grosbeak	---	SC	S4B	CBC	N/A	Coniferous or mixed forests; deciduous tree stands; parks, orchards.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Contopus virens	Eastern Wood-Pewee	SC	SC	S4B	OBBA	N/A	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearing, edges; farm woodlots, parks.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Hydroprogne caspia	Caspian Tern	---	---	S3B	OBBA		Breeds in a variety of habitats along water, such as salt marshes, barrier islands, dredge soil islands, freshwater lake islands, and river islands. During migration and winter found along coastlines, large rivers and lakes. Roosts on islands and isolated spits.	NO	N/A	N/A

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Euphagus carolinus	Rusty Blackbird	SC	SC	S4B	CBC	N/A	Openings in coniferous woodlands bordering bodies of water; tree-bordered marshes, beaver ponds, muskegs, bogs, fends or wooded swamps; stream borders with alder, willow; wooded island on lakes.	YES	Woodlands and wooded swamps in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Haliaeetus leucocephalus	Bald Eagle	---	SC	S2N,S4B	CBC	N/A	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 km from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals.	YES	Wooded areas around rivers and lakes in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Podiceps grisegena	Red-necked Grebe	---	---	S3B,S4N	CBC	N/A	Permanent freshwater lakes with a fringe of aquatic emergent vegetation; marshes, impoundments or sewage lagoons with > 4 ha of open water; protected marshy areas or bays in larger lakes; nest greatly affected by wave action of boats and other human disturbances.	NO	N/A	N/A

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Vermivora chrysoptera	Golden-winged Warbler	THR	SC	S4B	OBBA	N/A	Early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubbery clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat.	YES	Meadows, abandoned fields and woodlands in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional. If Golden-winged Warbler nests are identified, registration under the *ESA 2007* may be required.
HERPTILES										
Chelydra serpentina	Snapping Turtle	SC	SC	S3	OHA	N/A	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species. In addition, gravel roadway edges adjacent to marshes may provide nesting habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Pseudacris triseriata pop. 1	Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield Population)	THR	---	S3	OHA	N/A	Forest openings around woodland ponds, damp meadows, marshes, bottom land swamps and temporary ponds, or even urban areas.	YES	Open water (Burnt River), wetland, forest and woodland communities within the Study Area may provide habitat for this species.	Amphibian surveys should be conducted in these areas to confirm use.
Graptemys geographica	Northern Map Turtle	SC	SC	S3	OHA	N/A	Large rivers and lakes with slow-moving water and a soft bottom. High-quality water that supports mollusc prey.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Sternotherus odoratus	Eastern Musk Turtle	SC	SC	S3	OHA	N/A	Aquatic, except when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	YES	Open water (rivers, lakes) in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Thamnophis sauritus	Eastern Ribbonsnake (Great Lakes population)	SC	SC	S3	OHA	N/A	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	NO	N/A	N/A
INSECTS										
Danaus plexippus	Monarch	SC	SC	S2N,S4B	OBA	N/A	Meadows and open areas where milkweed grows.	YES	Meadows in the Study Area may provide habitat for this species.	Botanical surveys should be completed to determine if Milkweed is present and being used by Monarch within suitable habitat.

1 – Status identified by the Committee on the Status of Endangered Wildlife in Canada under the federal SARA, 2002; 2 – SAR in Ontario List under the provincial ESA, 2007; 3 – Ontario S-Rank; S5 = secure; S4= apparently secure; S3 = vulnerable; S2 = imperilled; SX = Extirpated; SH = Possibly Extirpated; SNA = non-native or exotic species to Ontario; 4 –MNRF SAR in Area = MNRF Species at Risk in Ontario List by area of the province, MNRF Reg. Habitat = MNRF Regulated Habitat (O. Reg. 242/08), OBBA = Ontario Breeding Bird Atlas, CBC = Christmas Bird Count, OHA = Ontario Amphibian and Reptile Atlas, MWH = Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, OBA = Ontario Butterfly Atlas; 5 – MNRF Significant Wildlife Technical Guide - Appendix G (2000).

Table 2: Species of Conservation Concern with the Potential to Occur within the Southern Study Area (In Town)

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
BIRDS										
Ammodramus savannarum	Grasshopper Sparrow	SC	SC	S4B	OBBA	N/A	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha.	NO	N/A	N/A
Cardellina canadensis	Canada Warbler	THR	SC	S4B	OBBA	N/A	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat usually requires at least 30 ha.	YES	Mixed forests and woodlands in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Buteo lagopus	Rough-legged Hawk	---	---	S1B,S4N	CBC	N/A	Winter across southern Canada in open country, including prairies, shrubsteppes, semideserts, fields, marshes, bogs and dunes.	YES	Meadows and fields in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm presence/absence. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Chlidonias niger	Black Tern	---	SC	S3B	OBBA		Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs.	NO	N/A	N/A
Coccothraustes vespertinus	Evening Grosbeak	---	SC	S4B	CBC	N/A	Coniferous or mixed forests; deciduous tree stands; parks, orchards.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
Contopus virens	Eastern Wood-Pewee	SC	SC	S4B	OBBA	N/A	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearing, edges; farm woodlots, parks.	YES	Forests in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Podiceps grisegena	Red-necked Grebe	---	---	S3B,S4N	CBC	N/A	Permanent freshwater lakes with a fringe of aquatic emergent vegetation; marshes, impoundments or sewage lagoons with > 4 ha of open water; protected marshy areas or bays in larger lakes; nest greatly affected by wave action of boats and other human disturbances.	NO	N/A	N/A
Euphagus carolinus	Rusty Blackbird	SC	SC	S4B	CBC	N/A	Openings in coniferous woodlands bordering bodies of water; tree-bordered marshes, beaver ponds, muskegs, bogs, fends or wooded swamps; stream borders with alder, willow; wooded island on lakes.	NO	N/A	N/A
Haliaeetus leucocephalus	Bald Eagle	---	SC	S2N,S4B	CBC	N/A	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 km from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals.	YES	Wooded areas around Fenelon River in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Melanerpes erythrocephalus	Red-headed Woodpecker	THR	SC	S4B	CBC, OBBA	N/A	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40cm dbh; require about 4 ha for a territory.	YES	Mixed forests and deciduous woodlands in the Study Area may provide habitat for this species.	Breeding bird surveys should be conducted in these areas to confirm nesting. Vegetation removals should be completed outside the breeding bird period (April 1 to August 31). If vegetation removals are required during this period, a nest survey should be completed by a qualified environmental professional.
HERPTILES										
Chelydra serpentina	Snapping Turtle	SC	SC	S3	OHA	N/A	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Pseudacris triseriata pop. 1	Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield Population)	THR	---	S3	OHA	N/A	Forest openings around woodland ponds, damp meadows, marshes, bottom land swamps and temporary ponds, or even urban areas.	YES	Wetland, forest and woodland communities within the Study Area may provide habitat for this species.	Amphibian surveys should be conducted in these areas to confirm use.
Graptemys geographica	Northern Map Turtle	SC	SC	S3	OHA	N/A	Large rivers and lakes with slow-moving water and a soft bottom. High-quality water that supports mollusc prey.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.

Scientific Name	Common Name	SARA Status[1]	ESA Status[2]	S-Rank[3]	Information Source[4]	Observed in the Field	Habitat Requirements[2,5]	Potential Habitat in the Study Area	Rationale for Potential to Occur	Recommendations
Sternotherus odoratus	Eastern Musk Turtle	SC	SC	S3	OHA	N/A	Aquatic, except when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	YES	Fenelon River in the Study Area may provide habitat for this species.	Turtle surveys should be conducted in these areas to confirm use.
Thamnophis sauritus	Eastern Ribbonsnake (Great Lakes population)	SC	SC	S3	OHA	N/A	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	NO	N/A	N/A
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Danaus plexippus	Monarch	SC	SC	S2N,S4B	OBA	N/A	Meadows and open areas where milkweed grows.	YES	Meadows in the Study Area may provide habitat for this species.	Botanical surveys should be completed to determine if Milkweed is present and being used by Monarch within suitable habitat.

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APPENDIX C

Stage 1 Archaeological Assessment Draft

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
SECOND FENELON FALLS AREA CROSSING
PART OF LOT 22, 23, CONCESSION 1, FORMER TOWNSHIP OF VERULAM; LOTS 21-23, CONCESSIONS 10-11, FORMER TOWNSHIP OF FENELON; AND LOTS 12-13, BROKEN FRONT CONCESSION AND LOTS 16-25, CONCESSIONS 2-3, FORMER TOWNSHIP OF SOMERVILLE
VICTORIA COUNTY
CITY OF KAWARTHA LAKES, ONTARIO

ORIGINAL REPORT

Prepared for:

Dillon Consulting Ltd.
235 Yorkland Boulevard, Suite 800
Toronto, ON M2J 4Y8

Archaeological Licence #P383 (Williams)
Ministry of Tourism, Culture and Sport PIF# P383-0151-2019
ASI File: 18EA-188

20 December 2019

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Stage 1 Archaeological Assessment
Second Fenelon Falls Area Crossing
Part of Lot 22, 23, Concession 1, Former Township of Verulam;
Lots 21-23, Concessions 10-11, Former Township of Fenelon; and
Lots 12-13, Broken Front Concession and Lots 16-25, Concessions 2-3, Former Township of Somerville
Victoria County
City of Kawartha Lakes, Ontario

EXECUTIVE SUMMARY

ASI was contracted to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Second Fenelon Falls Area Crossing Municipal Class Environmental Assessment. The project is located in the City of Kawartha Lakes and involves determining the preferred solution for a second Fenelon Falls area crossing/bridge. The Stage 1 Study Area includes the In Town option, between approximately Sturgeon Lake Road, County Road 121, and West Street South; and the Bypass option along Concession Road 3 from Highway 35 across the Burnt River to County Road 121.

The Stage 1 background study determined that six previously registered archaeological sites are located within one kilometre of the Study Area. The property inspection determined that parts of the Study Area exhibits archaeological potential and will require Stage 2 assessment.

In light of these results, the following recommendations are made:

1. The Study Area exhibits archaeological potential. These lands require Stage 2 archaeological assessment by test pit/pedestrian survey at five metre intervals, where appropriate, prior to any proposed impacts to the property;

1. BdGq-19 is within the Study Area and is considered to exhibit further cultural heritage value or interest. A Stage 3 Archaeological Assessment is recommended in accordance with the S & G in order to clarify the nature and extent of the cultural deposits, and to aid in the determine of a Stage 4 mitigation strategy, if one is required.

2. The Fenelon Falls Cemetery is within the Study Area and should be avoided by project designs. Any proposed impacts within 10 m of the cemetery property should be subject to Stage 3 Cemetery Investigation.

    - A Stage 3 cemetery investigation entails the mechanical removal of topsoil around the cemetery, under the supervision of a licensed archaeologist. The exposed subsoil will then be shovel-shined and thoroughly examined for the presence of burial shafts;

- Prior to conducting any Stage 3 investigations in the vicinity of the cemetery, Stage 2 survey should be conducted within the areas of archaeological potential to locate any near-surface finds.

3. The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, slopes in excess of 20 degrees, or having been previously assessed. These lands do not require further archaeological assessment; and,

4. Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

PROJECT PERSONNEL

Senior Project Manager:	Lisa Merritt, MSc. (P094) *Partner / Director* *Environmental Assessment Division*
Project Coordinator:	Katrina Thach, Hon. BA (R1225) *Archaeologist / Project Coordinator* *Environmental Assessment Division*
Project Director (Licensee):	Blake Williams, MLit (P383) *Associate Archaeologist / Technical Writer* *Mitigation Division*
Project Manager:	Eliza Brandy, MA (R1109) *Associate Archaeologist / Project Manager* *Environmental Assessment Division*
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1.0 PROJECT CONTEXT

Archaeological Services Inc. (ASI) was contracted by Dillon to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Second Fenelon Falls Area Crossing Municipal Class Environmental Assessment (Class EA). The project is located in the City of Kawartha Lakes and involves determining the preferred solution for a second Fenelon Falls area crossing/bridge (Figure 1). The Stage 1 Study Area includes the In Town option, between approximately Sturgeon Lake Road, County Road 121, and West Street South; and the Bypass option along Concession Road 3 from Highway 35 across the Burnt River to County Road 121.

All activities carried out during this assessment were completed in accordance with the *Ontario Heritage Act* (2017, as amended in 2018) and the 2011 *Standards and Guidelines for Consultant Archaeologists* (S & G), administered by the Ministry of Tourism, Culture and Sport (MTCS 2011).

1.1 Development Context

The Study Area is located on the Treaty 20 within the traditional territory and Treaty Territories of the Williams Treaties First Nations. These Nations include: Hiawatha First Nation, Curve Lake First Nation, Scugog Island First Nation, Alderville First Nation (Mississauga) and Rama First Nation, Georgina Island First Nation, and Beausoleil First Nation (Chippewa). The Haudenosaunee and Huron-Wendat First Nations also consider this area part of their traditional territory.

All work has been undertaken as required by the *Environmental Assessment Act*, RSO (Ministry of the Environment 1990 as amended 2010) and regulations made under the Act, and are therefore subject to all associated legislation. This project is being conducted in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (2000 as amended in 2007, 2011 and 2015).

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment was granted by Dillon on July 9, 2019.

1.2 Historical Context

The purpose of this section, according to the S & G, Section 7.5.7, Standard 1, is to describe the past and present land use and the settlement history and any other relevant historical information pertaining to the Study Area. A summary is first presented of the current understanding of the Indigenous land use of the Study Area. This is then followed by a review of the historical Euro-Canadian settlement history.

1.2.1 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (BP) (Ferris 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards and Fritz 1988) and populations now occupied less extensive territories (Ellis and Deller 1990).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 BP; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 BP and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Ellis et al. 1990; Ellis et al. 2009; Brown 1995:13).

Between 3,000-2,500 BP, populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 BP and exchange and interaction networks broaden at this time (Spence et al. 1990:136, 138) and by approximately 2,000 BP, evidence exists for macro-band camps, focusing on the seasonal harvesting of resources (Spence et al. 1990:155, 164). By 1,500 BP there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 BP - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch and Williamson 2013:13–15). Bands likely retreated to interior camps during the winter. It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 BP, lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (CE), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson 1990:317). By 1300-1450 CE, this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al. 1990:343). From 1450-1649 CE this process continued with the coalescence of these small villages into larger communities (Birch and Williamson 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed.

By the early sixteenth century, there was an ancestral Huron-Wendat presence in the upper Trent valley, widely thought to be formed through in-situ cultural development and immigration focussed in the vicinity of Balsam Lake in the upper Trent valley (Gates St.Pierre 2015; Ramsden 2016; Warrick and Lesage 2016; Williamson 2016). Villages were present around Cameron and Sturgeon Lakes in the sixteenth century (Walker 2012:34). This territory was abandoned towards the end of the sixteenth century as the populations moved to the Penetanguishene Peninsula in Simcoe County to join with other ancestral Huon-Wendat communities.

By 1600 CE, the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s, the traditional enmity

between the Haudenosaunee[1] and the Huron-Wendat (and their Algonquian allies such as the Nippissing and Odawa) led to the dispersal of the Huron-Wendat.

Shortly after dispersal of the Wendat, Ojibwa began to expand into southern Ontario and Michigan from along the east shore of Georgian Bay, west along the north shore of Lake Huron, and along the northeast shore of Lake Superior and onto the Upper Peninsula of Michigan (Rogers 1978:760–762). This history of their homeland and population movement, published in 1978 in the *Smithsonian Handbook of Northamerican Indians, Northeast Volume*, was constructed by Rogers using both Anishinaabeg oral tradition and the European documentary record. Rogers notes that this migration included those populations that were later known as the Chippewa, Ojibwa, Mississauga, and Saulteaux or "Southeastern Ojibwa" groups. He also noted linguistic differences between those groups split between Central Ojibwa-Odawa, spoken primarily by the Odawas of Manitoulin Island and Michigan and some Ojibwas (or Chippewas) of the Lower Peninsula of Michigan and that part of southwestern Ontario lying west of a north-south line drawn through the base of the Bruce peninsula east of which is spoken the second major dialect, spoken by Ojibwa (or Chippewa) and Mississauga. There is also sub-dialectical variation within each major dialect, and some groups and individuals whose speech is fundamentally of one type use certain forms characteristic of the other.

Ojibwa were first encountered by Samuel de Champlain in 1615 along the eastern shores of Georgian Bay. While he probably met Odawa, Etienne Brule later encountered other groups and by 1641, Jesuits had journeyed to Sault Sainte Marie (Thwaites 1896:11:279) and opened the Mission of Saint Peter in 1648 for the occupants of Manitoulin Island and the northeast shore of Lake Huron. The Jesuits reported that these Algonquian peoples lived "solely by hunting and fishing and roam as far as the "Northern sea" to trade for " Furs and Beavers, which are found there in abundance" (Thwaites 1901, 33:67), and "all of these Tribes are nomads, and have no fixed residence, except at certain seasons of the year, when fish are plentiful, and this compels them to remain on the spot" (Thwaites 1896-1901: 33:153). The locations of both Iroquoian and Algonquian groups at the time of first contact are well-documented. The Nipissing lived near Lake Nipissing, which was on the historic route between Quebec and the Wendat country; some wintered with the Wendat (Thwaites 1896-1901: 14:7; 18: 229; 21:239; 23:227; 33:153). Other Algonquian-speaking groups who wintered with the Wendat included the Algonquin led by Captain Yroquet in 1615-16 (Biggar 1971:3:94); the Tontthrataronons (an Algonquin tribe), about fifteen cabins of which were wintering near the mission of Saint Jean Baptiste to the Arendaehronons in the Relation of 1640-41 (Thwaites 1896-1901: 21: 247); some Island Algonquins noted in the Relation of 1643-44 (Thwaites 1896-1901: 26:301); and a village of the Atontrataronnon Algonquins, who abandoned their country on the shores of the St. Lawrence because of attacks from the Haudenosaunee to live in safety near the village of Saint Jean Baptiste as noted in the Relation of 1643-44 (Thwaites 1896-1901: 27:37).

Other Algonquian groups were recorded along the northern and eastern shores and islands of Lake Huron and Georgian Bay - the "Ouasouarini" [Chippewa], the "Outchougai" [Outchougai], the "Atchiligouan" [Achiligouan] near the mouth of the French River and north of Manitoulin Island the "Amikouai, or the nation of the Beaver" [Amikwa; Algonquian] and the "Oumisagai" [Mississauga; Chippewa] (Thwaites 1896-1901: 18:229, 231). Father Louys André was put in charge of the Mission of Saint Simon on the Lake of the Hurons (Thwaites 1896-1901: 55:133-155). At the end of the summer 1670, he began his mission work among the Mississagué, who were located on the banks of a river that empties into Lake Huron approximately 30 leagues from the Sault. These observations were further supported by the maps

[1] The Haudenosaunee are also known as the New York Iroquois or Five Nations Iroquois and after 1722 Six Nations Iroquois. They were a confederation of five distinct but related Iroquoian–speaking groups – the Seneca, Onondaga, Cayuga, Oneida, and Mohawk. Each lived in individual territories in what is now known as the Finger Lakes district of Upper New York. In 1722 the Tuscarora joined the confederacy.

attributed to Brébeuf (1631/1651) and Bressani (1657). Bréhant de Galinée also created a map of his 1669-70 travels, which provides the location of populations, individual villages, missions and forts, and interesting landscape features and marks the location of the Mississagué and the Amikwa on the north shore of Lake Huron, "the Saulteaux, or in Algonkin Waoüitiköungka Entaöuakk or Ojibways" at Sault Ste Marie (Coyne 1903:73).

After the Huron had been dispersed, the Haudenosaunee began to exert pressure on Ojibwa within their homeland to the north. While their numbers had been reduced through warfare, starvation, and European diseases, the coalescence of various Anishinaabeg groups led to enhanced social and political strength (Thwaites 1896-1901: 52:133) and Sault Sainte Marie was a focal point for people who inhabited adjacent areas both to the east and to the northwest as well as for the Saulteaux, who considered it their home (Thwaites 1896-1901: 54:129-131).

During the 1690s, some Ojibwe began moving south into extreme southern Ontario and soon replaced, it appears by force, the Haudenosaunee who had settled after 1650 along the north shores of Lakes Erie and Ontario. By the first decade of the eighteenth century, the Michi Saagiig Anishinaabeg (Mississauga Anishinaabeg) had settled at the mouth of the Humber, near Fort Frontenac at the east end of Lake Ontario and the Niagara region and within decades were well established to the south of their former homeland. In 1736, the French estimated there were 60 men at Lake Saint Clair and 150 among small settlements at Quinte, the head of Lake Ontario, the Humber River, and Matchedash (Rogers 1978:761). The history of Anishinaabeg movement from along the north shore of Lake Huron and their military actions against the Haudenosaunee is based almost entirely on Anishinaabeg oral tradition provided by elders such as George Copway, or Kahgegagahbowh or Robert Paudash. George Copway was born among the Mississauga in 1818 and followed a traditional lifestyle until his family converted to Christianity. He became a Methodist missionary in Canada and the US, including to the Saugeen Mission for a period, and later a popular author and lecturer (MacLeod 1992:197; Smith 2000).

According to Copway, the objectives of campaigns against the Haudenosaunee were to create a safe trade route between the French and the Ojibway, to regain the land abandoned by the Wendat and "drive the Iroquois wholly from the peninsula." Copway describes more than 700 canoes meeting near Sault Ste Marie and splitting into three parties for a three-pronged attack via the Ottawa River, Lake Simcoe and along the Trent River, and the St. Clair River, and all of which had fierce engagements with the Haudenosaunee. While various editions of Copway's book have these battles occurring in the mid-seventeenth century, common to all is a statement that the battles occurred around 40 years after the dispersal of the Huron (Copway 1850:88; Copway 1851:91; Copway 1858:91). Various scholars agree with this timeline ranging from 1687, in conjunction with Denonville's attack on Seneca villages (Johnson 1986:48; Schmalz 1991:21–22) to around the mid- to late-1690s leading up to the Great Peace of 1701 (Schmalz 1977:7; Bowman 1975:20; Smith 1975:215; Tanner 1987:33; Von Gernet 2002:7–8).

Robert Paudash's 1904 account of Mississauga origins is like that of Copway's and relies on oral history. It came from Paudash's father, who died at the age of 75 in 1893 and was the last hereditary chief of the Mississauga at Rice Lake. His account in turn came from his father Cheneebeesh, who died in 1869 at the age of 104 and was the last sachem or Head Chief of all the Mississaugas. He also relates a story of origin on the north shore of Lake Huron near the river that gave them their name having been founded by a party of Shawnee (Paudash 1905:7–8) and later, after the dispersal of the Wendat, carrying out coordinated attacks against the Haudenosaunee.

Francis Assikinack (1858:308–309) provides similar details on battles with the Haudenosaunee. Francis Assikinack (b. 1824) was an Ojibwa of Manitoulin Island. He enrolled at Upper Canada College when he was 16 and after graduation, worked for the Indian Department as an interpreter, clerk, and teacher.

Doug Williams (Gidigaa Migizi) is a former chief of the Curve Lake First Nation and is a Pipe Carrier, Sweat Lodge Keeper and Associate Professor/Director of Studies for the Ph.D. Program of the Chanie Wenjack School of Indigenous Studies at Trent University. His oral histories were related to him by his grandparents, great uncle and their contemporaries and he relates that the Mississauga pushed the Haudenosaunee out of southern Ontario (Migizi 2018:42-44). A detailed history of the Michi Saagiig prepared by Gitiga Migizi was provided to ASI by Dr. Julie Kapyrka of Curve Lake First Nation (Migizi and Kapyrka 2015) for inclusion in reports within their traditional territory included in Appendix A.

Peace was achieved between the Haudenosaunee and the Anishinaabek Nations in August of 1701 when representatives of more than twenty Anishinaabek Nations assembled in Montreal to participate in peace negotiations (Johnston 2004:10). During these negotiations, captives were exchanged and the Iroquois and Anishinaabek agreed to live together in peace. Peace between these nations was confirmed again at council held at Lake Superior when the Iroquois delivered a wampum belt to the Anishinaabek Nations.

From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there is no interruption to Anishinaabeg control and use of southern Ontario. While hunting in the territory was shared, and subject to the permission of the various nations for access to their lands, its occupation was by Anishinaabeg until the assertion of British sovereignty, the British thereafter negotiating treaties with them. Eventually, with British sovereignty, tribal designations changed (Smith 1975:221–222; Surtees 1985:20–21). The word "Saulteux," for example, was gradually substituted by "Chippewa" while the north shore of Lake Ontario groups became known as "Mississauga," although some observers, like John Graves Simcoe, described them as a branch of the "Chippewa" and the two terms were often used as synonyms. The nineteenth-century Mississauga also called themselves "Ojibwa," especially when addressing an English-speaking audience (Jones 1861:31).

According to Rogers (1978), by the twentieth century, the Department of Indian Affairs had divided the "Anishinaubag" into three different tribes, despite the fact that by the early eighteenth century, this large Algonquian-speaking group, who shared the same cultural background, "stretched over a thousand miles from the St. Lawrence River to the Lake of the Woods." With British land purchases and treaties, the bands at Beausoleil Island, Cape Croker, Christian Island, Georgina and Snake Islands, Rama, Sarnia, Saugeen, the Thames, and Walpole, became known as "Chippewa" while the bands at Alderville, New Credit, Mud Lake, Rice Lake, and Scugog, became known as "Mississauga." The northern groups on Lakes Huron and Superior, who signed the Robinson Treaty in 1850, appeared and remained as "Ojibbewas" in historical documents.

In 1763, following the fall of Quebec, New France was transferred to British control at the Treaty of Paris. The British government began to pursue major land purchases to the north of Lake Ontario in the early nineteenth century, the Crown acknowledged the Mississaugas as the owners of the lands between Georgian Bay and Lake Simcoe and entered into negotiations for additional tracts of land as the need arose to facilitate European settlement.

The eighteenth century saw the ethnogenesis in Ontario of the Métis, when Métis people began to identify as a separate group, rather than as extensions of their typically maternal First Nations and paternal European ancestry (Métis National Council n.d.). Métis populations were predominantly located north and west of Lake Superior, however, communities were located throughout Ontario (MNC n.d.; Stone and

Chaput 1978:607,608). During the early nineteenth century, many Métis families moved towards locales around southern Lake Huron and Georgian Bay, including Kincardine, Owen Sound, Penetanguishene, and Parry Sound (MNC n.d.). Recent decisions by the Supreme Court of Canada (Supreme Court of Canada 2003; Supreme Court of Canada 2016) have reaffirmed that Métis people have full rights as one of the Indigenous people of Canada under subsection 91(24) of the Constitution Act, 1867.

The Study Area is within Treaty 20 the Rice Lake Purchase of 1818, and the Williams Treaties of 1923, on the traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, including the Mississaugas of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and the Chippewas of Beausoleil First Nation, Georgina Island First Nation and the Rama First Nation (Williams Treaties First Nations 2017). In October and November of 1923, the governments of Canada and Ontario, chaired by A.S. Williams, signed treaties with the Chippewa and Mississauga for three large tracts of land in central Ontario and the northern shore of Lake Ontario which had never been included in previous treaties (Department of Indigenous and Northern Affairs 2013). Part of the Williams Treaties area includes lands originally negotiated under the Rice Lake Treaty, Treaty No. 20, signed on November 5, 1818 between the Mississaugas in the Rice Lake area and the Crown, which opened up colonization for settlers (Department of Indigenous and Northern Affairs 2016).

1.2.2 Euro-Canadian Land Use: Township Survey and Settlement

Historically, the Study Area is located in the Victoria County, part of Lot 22, 23, Concession 1, Former Township of Verulam; Lots 21-23, Concessions 10-11, Former Township of Fenelon; and Lots 12-13, Broken Front Concession and Lots 16-25, Concessions 2-3, Former Township of Somerville.

The S & G stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches, and early cemeteries are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the *Ontario Heritage Act* or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those that are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 m of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into the hinterlands. Early transportation routes followed existing Indigenous trails, both along the lakeshore and adjacent to various creeks and rivers (ASI 2006).

Fenelon Township

Fenelon Township was named after Father Fenelon, a Sulpician missionary and explorer, who in 1668 founded a mission on the Bay of Quinte. Originally surveyed in 1822, settlement and immigration to the area was minimal until the 1830's. An early settler to the township was Angus McLaren, who inhabited land at what became known as McLaren's Creek. Following McLaren were the Edwards, Waldons, and Tompkins, who made their homes in the southern part of the township. Many Irish Protestants came to settle the area around Sturgeon Lake while the centre of the township by Scottish Presbyterians. Some early inhabitants around Cameron Lake were John Bellsford, Hamilton and Samuel Boyce, and Robert Dennistoun. There are only two incorporated villages in the township, Fenelon Falls and Sturgeon Point. The police village of Cambray became part of the township in 1975. Other small villages within the township are Pleasant Point, Glenarm, Islay, and Rosedale (Mika and Mika 1981).

In about 1833, John Langton emigrated from England and settled on the north eastern shore of Sturgeon Lake. In 1837, his sister Anne Langton joined him at what became known as Blythe farmstead. Anne became a highly accomplished visual artist, sketching her surroundings and was influential to her community, building the first school and library in the area and doing charitable work. She died in 1896 in Toronto and her journal *A Gentlewoman in Upper Canada* was posthumously published in 1950 which details the portrait of life at that time in the Fenelon Falls area (Archives of Ontario 2015; Williams 1990).

Fenelon Falls

The site chosen for the settlement which would become Fenelon Falls was a natural and strategic choice. Located along a narrow river connecting Lakes Cameron and Sturgeon, both shallow lakes, at the point of a waterfall provided the village site with two major advantages for any pioneer village; water-power and water transportation (Allen et al. 2001). The village lot was surveyed on Lot 23 of Concession X and was patented to the Honourable Duncan Cameron, a Toronto banker and Provincial Secretary of Upper Canada. Surrounding lands were granted to the Earl of Mountcashel. Cameron sold Lot 23 to Robert Jameson, of the famous Irish Whisky distilling family, in 1833 (OAA 1985; Maryboro Lodge 2015; Kirkconnell 1967). In 1834 James Wallis, the founder of Fenelon Falls, partnered with Jameson to erect a mill at the waterfall at the southeast end of Cameron Lake. The mill harnessed the power of the waterfall which cascaded down a 23 foot cliff into a rocky gorge that flowed from Cameron Lake to Sturgeon Lake. This became the nucleus of a settlement, first known as Cameron Falls after Duncan Cameron. The name changed to Fenelon Falls in 1838 (Mika and Mika 1981; Rayburn 1997).

The lands used for the first church were donated by Wallis in 1835, who also conducted the services until the first Anglican clergyman arrived in the settlement in 1838 (Mika and Mika 1981). In 1837, Wallis built a house for his family near the mill, at 50 Oak Street, and called it Maryboro. By 1838 Wallis had opened a post office as well as a grist mill. The main industry of the settlement was lumber and at one point three large sawmills operated in the village (Mika and Mika 1981).

During the 1870s the railway came to the village which helped to stimulate the local economy. The Fenelon Falls Gazette was launched by Mr. E.D. Hand in 1872 (Kirkconnell 1967). Fenelon Falls was incorporated as a village in 1875. The first Reeve was J.D. Smith; Councillors: J.W. Fitzgerald; Joseph McArthur, William Jordan and Richard Jackson (Mika and Mika 1981; Kirkconnell 1967). By the 1880s the village had several stores operating, as well as a bank, library, and hotel. Work began on a local section of the Trent Canal in 1882 and following that four years later the Fenelon Falls locks opened (Mika and Mika 1981). The population rose and fell over the years, from 1,312 people in 1886 it fell to

837 in 1920, only to rise again to 1,359 in 1967. This is likely due to the decline of the lumber industry and the rise of tourism in the twentieth century (Kirkconnell 1967).

The Fenelon Falls Cemetery has burials that to date around 1898. The property is illustrated as being owned by John D. Naylor on 1877 historical mapping. Naylor died in 1904 and is buried in the cemetery with his wife Rachel who died in 1910. The cemetery presently features rows of graves, vegetation, maintenance buildings, and circulation routes connecting to the east side of Concession Road, at the intersection of Elgin Street.

Somerville Township

The township was originally surveyed in the early 1830's and was named after Julia Somerville, the wife of Sir Francis Bond Head. The soil conditions within the township were unsuited for agriculture which delayed settlement until the 1860's. It was then that that Bobcaygeon colonization road was constructed along the eastern boundary of the township and lumbermen came into the heavily forested region (Mika and Mika 1983). Early settlers to the township include the families of Badgerow, Cookman, Ead, Mason, Powers Taggart, and Watson. Within the township, Kinmount, a police village, began to take shape in 1861 when John Hunter built a mill on the river. Bringing further growth to the hamlet was the Victoria Railway in 1876. The community experienced a setback when in 1890 a fire started that destroyed many of the village businesses. During the 1920's, a survey of the township discovered that the once heavily forested land had been burnt over to nearly 62 percent. The township's forests has been greatly depleted during the height of lumbering operations from the 1850's to the 1880's. Reforestation efforts began in the later twentieth century (Mika and Mika 1983).

Baddow

The community of Baddow was originally named Ead's Settlement after its pioneer Joseph Ead. Other early settlers included William Cookman, William Mason, and Isaac Watson. In 1865, a Baptist church was established in Baddow and a post office followed in 1876 (Mika and Mika 1977).

Verulam Township

The township was named after James Walter Grimson, the Earl of Verulam. The township was surveyed in 1831 by John Houston and opened to settlers the following year. Speculators seized the land which delayed serious settlement. The first inhabitant was a trader named Billy McDeough. He arrived in the township before the land was surveyed. McDeough arrived to trade with the Mississaugas at the site of present-day Bobcaygeon The first permanent settlers of the township were John Hunter and William Bell, both arriving in 1832. Hunter settled in the southeast of the township and Bell north of Bobcaygeon. Later that year, John McFeeter arrived along with the Fraser and McAndrew families. Settlement tended to focus around the lakes within the township first Bobcaygeon, a mill centre was founded in 1832 by Thomas Need. The community began to develop after the construction of a canal and lock in 1833 that connected Pigeon and Sturgeon Lakes. It remained a part of the township until 1877 when it was incorporated as its own independent municipality Within the township the former post village of Fairburn was named after Charles W. Fairburn. Another was Red Rock, which was named from the red granite found to the west of the community. In addition, there was also the post village of Sandy Point (Mika and Mika 1983).

Trent-Severn Waterway

Planning of the Trent-Severn Waterway began as early as 1785, initially as a means of transporting commercial and military goods between Lake Ontario into the Upper Great Lakes while avoiding the border with the United States as a safeguard during periods of hostility. Construction began with a lock at Bobcaygeon in 1833. Construction continued intermittently depending on the federal governments in power, and as popular support and funding allowed. The entire 387 km route between the outlet of the Trent River in Trenton on Lake Ontario, and Port Severn in Georgian Bay (Lake Huron) was completed in 1920 (Legget 2015; Libraries and Archives Canada 2005; Parks Canada 2017).

The waterway predominantly follows a series of natural lakes and rivers, supplemented by artificial canals, passing generally northwest from Lake Ontario through the Trent River, Rice Lake, Otonabee River, the Kawartha Lakes, Lake Simcoe, Lake Couchiching, Severn River, and into Georgian Bay. The waterway is accessed by a total of 44 locks, 75 control dams, 15 swing bridges, and two marine railways at Big Chute. While originally conceived as a commercial and military transportation route, the waterway primarily serves recreational boaters (Libraries and Archives Canada 2005; Legget 2015; Parks Canada 2017)

Construction of the Trent-Severn Waterway had a devastating effect on Indigenous people living in the area by flooding their traditional territory, including the destruction of wild rice beds, burials, and traditional use areas. It is estimate that 12,000 hectares of island reserve lands were lost due to flooding in 1837, 1856, and 1880 – in 2012 the Canadian government approved a $71 million settlement with Curve Lake, Hiawatha and Mississaugas of Scugog Island First Nations as part of the Islands in the Trent System Claim for compensation of this loss (Peterborough This Week 2012).

The section of the Waterway from Young's Point to Rosedale was the most extensively developed for transportation in the nineteenth century. The first lock in this section was finished at Bobcaygeon in 1835. The Fenelon Falls Lock No.34 was built as a “double lock in flight” in the 1880s. The Fenelon Lock was one of the first applications of dynamite to build the canal, but a fixed rail bridge impeded navigation, because the Crown and Grand Trunk Railway couldn’t agree on who should pay to repair it. The railway bridge at Fenelon Falls is the earliest example of a plate girder construction on the waterway. When building a new lock in 1963, in order to retain some of the first lock's heritage character, the original natural limestone face of the lower entrance walls was reused into the lower lock entrance walls (Beahen 1978:10–15).

In 1868 the Ontario Department of Public Works proposed construction of locks at Rosedale, in response to pressure from the Toronto and Nipissing Railway and at Fenelon Falls, to open a route connected the sawmill operators with the railway. It included the construction of a dam halfway between Balsam and Cameron Lakes which resulted in flooding of the Balsam River and the lock. The Rosedale Lock No. 35 was completed in 1873 and was a wooden 100 feet long and 30 feet wide lock, modelled on one at Lindsay. The dam also had a small timber slide. (Wilson 2017:19–20) This was abandoned in 1910.

At Fenelon Falls near the west end of the canal cut is Maryboro Lodge, now the Fenelon Museum, which was built in the 1830s by James Wallis (Beahen 1978:10–15).

1.2.3 Historical Map Review

The 1877 Map of the County of Victoria and the 1881 Victoria Supplement in Illustrated Atlas of the Dominion of Canada (Patterson 1877; Belden 1881) were examined to determine the presence of historic features within the Study Area during the nineteenth century (Figures 2-3).

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases.

In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historic mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

The 1877 map depicts the In Town option as within the developed area of the historic Village of Fenelon Falls. A cemetery is shown within the In Town option, as well as farmsteads surrounding the village. The Bypass option is shown between what is now Highway 35 and County Road 121 across the railway and Burnt River and through Baddow. The 1881 map illustrates two churches and a school house along Concession Road 3. In Fenelon Falls, the Naylor farmstead is shown along County Road 121.

1.2.4 Twentieth-Century Mapping Review

The National Topographic System (NTS) 1916 Kirkfield Sheet (Department of Mines 1916), 1940 Lake Simcoe Sheet (Department of National Defence 1940), and 1994/1999 Fenelon Falls/Lindsay Sheets (Department of Energy, Mines and Resources 1994; Natural Resources Canada 1999), as well as the 1954 aerial photography of the area (University of Toronto 1954), were examined to determine the extent and nature of development and land uses within the Study Area (Figures 4-7).

The twentieth-century mapping and photography reveals that the Study Area retained a rural agricultural character throughout the twentieth century. The 1916 map illustrates that a number of houses were present along the road which his now Highway 35, with a cluster of settlement in Rosedale and Baddow. The map illustrates the Trent Severn Waterway from Balsam Lake to Cameron Lake with associated structures along either side of the canal. Early twentieth century mapping was not available for the eastern part of the Study Area.

The later topographic maps demonstrate that minimal development occurred in the Study Area into the mid-twentieth century. The historically surveyed roads are depicted as following their present alignments. The Victoria Railway became the Canadian National Railway. The 1954 aerial photograph depicts the Study Area in the same context as earlier mapping. The majority of the Study Area remained agricultural in nature. The 1990s topographic maps illustrate that the Study Area remained in a rural agricultural

context into the late twentieth century. The In Town option is shown to have dense residential develop along the river and Ellice Street. Along the Bypass area there has been some development with additional houses and commercial business illustrated along Concession Road 3, as well as development along Burnt River.

1.3 Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Study Area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the MTCS through "Ontario's Past Portal"; published and unpublished documentary sources; and the files of ASI.

1.3.1 Current Land Use and Field Conditions

A review of available Google satellite imagery shows that the Study Area has remained relatively unchanged since 2007.

A Stage 1 property inspection was conducted on October 22 and 23, 2019 that noted the Bypass option extends along Concession Road 3 between Highway 35 and County Road 121. Concession Road 3 carries one lane of vehicular traffic in an east-west direction with narrow gravel shoulders on either side. The lands between Highway 35 and Northline Road primarily consists of active agricultural lands and associated residences. The historical community of Baddow is located at the junction of Concession Road 3 with Suggitt Road and Potters Road. This intersection consists of historical agricultural lands to the north and late twentieth century residences to the south. To the east of Northline Road, the lands within the study area consist primarily of forested land. Burnt River intersects with the study area between Riverbank and Cedarplank Roads on the west bank and Brook and River Roads on the east bank. Residences line both banks of the river and a boat launch is located at the terminal end of Concession Road 3 on the west bank of the Burnt River. The Victoria Rail Trail intersects Concession Road 3 between the Burnt River and County Road 121.

The In Town option extends across the Fenelon River. The portion of the Study Area on the east side of the Fenelon River is primarily agricultural land, with residential properties lining the east bank of the river. The land within the Study Area to the west of Sturgeon Point Road consists almost exclusively of forested land and active agricultural properties and their associated residences. Temporally mixed residential properties line the east bank of the Fenelon River along Francis Street East, Concession Road, and Elgin Street. The Fenelon Falls Cemetery is located at the intersection of Elgin Street and Concession Road and a health centre is located on Francis Street at Concession Road. Francis Street East carries one lane of vehicular traffic in either direction. The right-of-way contains gravel shoulders to the south of Concession Road and paved pedestrian sidewalks to the west of Concession Road. Concession Road carries one lane of vehicular traffic in either direction with gravel shoulders.

1.3.2 Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful indicator of archaeological potential. Accordingly, a description of the physiography and soils are briefly discussed for the Study Area.

The S & G stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP (Karrow and Warner 1990:Figure 2.16), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include: elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including; food or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S & G, Section 1.3.1).

The Study Area is within drumlinized till plains, limestone plains, and spillways of the Peterborough Drumlin Field, the Carden Plain, and the Drummer Moraines (Figure 8). The In Town option contains three drumlins.

The Peterborough Drumlin Field extends from Simcoe County east to Hastings County and is generally characterized by rolling till plains overlying limestone bedrock. The region is approximately 4,532 km^2 and contains over 3000 drumlins in addition to many other drumlinoid hills and surface flutings (Chapman and Putnam 1984:169). The drumlins are composed of highly calcareous till but there are local differences in composition. The till plains of the regions were formed during the retreat of the Lake Ontario ice lobe of the Laurentide glacier and they indicate directionality of glacial advance and retreat. Till is produced from the advance of continental glacial ice. Soil and rock is carried forward by the ice, mixed and milled, producing a heterogeneous soil which is characteristic of glaciations (Chapman and Putnam 1984:10, 16). The Carden Plain is an area of 583 km^2 of limestone plain with little overburden, that spans between the Kawartha Lakes and Lake Couchiching. The Area was under Lake Algonquin, and some beaches and offshore sand deposits are found (Chapman and Putnam 1984). The Drummer Moraines is an area of 1554 km^2 consisting of rough stony and bordering the Canadian Shield from the Kawartha Lakes eastward. The underlying bedrock is sedimentary limestones, forming a plain which declines gently southward from an elevation of 244 to 183 metres at surface level. The limestone terminates in an escarpment 8 to 23 metres in height on the north, with smaller north-facing escarpments

in some places while in others the rock face is hidden beneath a morainic mantle. The southern boundary is irregular between the moraines and the drumlinized till plain (Chapman and Putnam 1984).
Figure 9 depicts surficial geology for the Study Area (Ontario Geological Survey 2010). The surficial geology mapping demonstrates that the Study Area is underlain by deposits of:

- Paleozoic bedrock; Bedrock-drift complex in Paleozoic terrain;
- Till - sandy silt to silty sand-textured till on Paleozoic terrain;
- Ice-contact stratified deposits - sand and gravel, minor silt, clay and till;
- Coarse-textured glaciolacustrine deposits -sand, gravel, minor silt and clay,
- Modern Alluvial deposits - clay, silt, sand, gravel, may contain organic remains; and
- Organic deposits - peat, muck, marl

Soils in the Study Area (Figure 10) consist of:

- Otonabee loam - good to excessive drainage;
- Otonabee sandy loam - good to excessive drainage;
- Dummer shallow phase loam - good to excessive drainage;
- Dummer loam - good to excessive drainage;
- Wendigo sand - good to excessive drainage
- Bottom Land - variable drainage;

The Study Area is within the Cameron Lake, Balsam Lake and Sturgeon Lake subwatersheds of the Kawartha watershed. Balsam Lake is the highest point along the Trent-Severn Waterway from which water flows westward into the Severn system and eastward into Cameron Lake, where it exits over the falls at Fenelon Falls and into Sturgeon Lake. The Scugog River also drains into Sturgeon Lake from the south. Water flows northeast to the outlet at Bobcaygeon into Pigeon Lake (Kawartha Conservation 2019a; 2019b; 2019c).

1.3.3 Previous Archaeological Research

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MTCS. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and approximately 18.5 km north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Study Area under review is located in Borden block *BdGq*.

According to the OASD, six previously registered archaeological sites are located within one kilometre of the Study Area, one of which is within the Study Area (Ministry of Tourism, Culture and Sport 2018). A summary of the sites is provided below.

Table 1: List of previously registered sites within one kilometre of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type	Researcher
BdGq-19	**Fenelon Trails**	**Euro-Canadian**	**midden**	**NEAA 2009**
BdGq-10	n/a	Pre-Contact Indigenous	Camp	Swayze 2006
BdGq-11	n/a	Pre-Contact Indigenous	Camp	Swayze 2006
BdGq-13	n/a	Early Archaic	Camp	Swayze 2006
BdGq-14	n/a	Early Archaic	Camp	Swayze 2006
BdGq-15	n/a	Early Archaic	Camp	Swayze 2006

NEAA - Northeastern Archaeological Associates Ltd.
Site in **bold** is within the Study Area

According to the background research, two previous reports detail fieldwork within 50 m of the Study Area.

Northeastern Archaeological Associates Ltd (2010) conducted a Stage 1-2 archaeological assessment of approximately 290 ha east of Fenelon Falls, including part of the current Study Area south of County Road 121 and west of Sturgeon Point Road. Large portions of the property were identified as not being impacted by the proposed work therefore NEAA did not survey two cultivated fields and one forested area that were to be tested at a later date. A gravel pit and rock ridge were also not subject to test pit survey within the development area. ASI could not locate any follow up survey of these properties. NEAA's survey identified BdGq-19 within the current Study area, which consisted of a scatter of 31 artifacts dating to the mid- to late-nineteenth-century Euro-Canadian artifacts within 11 positive test pits. As such this site has further cultural heritage value or interest and requires Stage 3 archaeological assessment.

Northeastern Archaeological Associates Ltd (2013) conducted a Stage 1-2 archaeological assessment of approximately 31.5 ha in part of Lot 23, Concession 11, Fenelon Township, including part of the current Study Area south of County Road 121 and west of Sturgeon Point Road. The Stage 2 survey in 2011 consisted of test pit and pedestrian survey at five metre intervals and did not result in the recovery of any archaeological material. The area was considered clear of further archaeological concern.

2.0 FIELD METHODS: PROPERTY INSPECTION

A Stage 1 property inspection must adhere to the S & G, Section 1.2, Standards 1-6, which are discussed below. The entire property and its periphery must be inspected. The inspection may be either systematic or random. Coverage must be sufficient to identify the presence or absence of any features of archaeological potential. The inspection must be conducted when weather conditions permit good visibility of land features. Natural landforms and watercourses are to be confirmed if previously identified. Additional features such as elevated topography, relic water channels, glacial shorelines, well-drained soils within heavy soils and slightly elevated areas within low and wet areas should be identified and documented, if present. Features affecting assessment strategies should be identified and documented such as woodlots, bogs or other permanently wet areas, areas of steeper grade than indicated on topographic mapping, areas of overgrown vegetation, areas of heavy soil, and recent land disturbance such as grading, fill deposits and vegetation clearing. The inspection should also identify and document

structures and built features that will affect assessment strategies, such as heritage structures or landscapes, cairns, monuments or plaques, and cemeteries.

The Stage 1 archaeological assessment property inspection was conducted under the field direction of Johanna Kelly (P1017) of ASI, on October 22 and 23, 2019, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Study Area. It was a visual inspection only and did not include excavation or collection of archaeological resources. Fieldwork was only conducted when weather conditions were deemed suitable and seasonally appropriate, per S & G Section 1.2., Standard 2. Previously identified features of archaeological potential were examined; additional features of archaeological potential not visible on mapping were identified and documented as well as any features that will affect assessment strategies. Field observations are compiled onto the existing conditions of the Study Area in Section 7.0 (Figures 11-17) and associated photographic plates are presented in Section 8.0 (Plates 1-42).

3.0 ANALYSIS AND CONCLUSIONS

The historical and archaeological contexts have been analyzed to help determine the archaeological potential of the Study Area. These data are presented below in Section 3.1. Results of the analysis of the Study Area property inspection are presented in Section 3.2.

3.1 Analysis of Archaeological Potential

The S & G, Section 1.3.1, lists criteria that are indicative of archaeological potential. The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (see Table 2);
- Water sources: primary, secondary, or past water source (Cameron Lake, Balsam Lake, Sturgeon Lake, Fenelon River, Burnt River);
- Early historic transportation routes (Concession Rd 3);
- Proximity to early settlements (Baddow, Fenelon Falls); and
- Well-drained soils (Otonabee loam/sandy loam; Dummer loam/shallow phase; Wendigo sand)

According to the S & G, Section 1.4 Standard 1e, no areas within a property containing locations listed or designated by a municipality can be recommended for exemption from further assessment unless the area can be documented as disturbed. The Municipal Heritage Register was consulted and no properties within the Study Area are Listed or Designated under the Ontario Heritage Act. The Trent-Severn Waterway is considered a National Historic Site. Fenelon Falls Lock 34 is located at Colborne/Lindsay Street, in the heart of Fenelon Falls, outside of the current Study Area, and the waterway downstream passes through the Study Area.

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance.

3.2 Analysis of Property Inspection Results

The property inspection determined that the Study Area exhibits archaeological potential. These areas will require Stage 2 archaeological assessment prior to any development. According to the S & G Section 2.1.2, test pit survey is required on terrain where ploughing is not viable, such as wooded areas, properties where existing landscaping or infrastructure would be damaged, overgrown farmland with heavy brush or rocky pasture, and narrow linear corridors up to 10 metres wide (Plates 1-13, 15-18, 21-22, 25, 27-29, 33, 36, 37, 39, 41; Figures 12-17: areas highlighted in green).

Parts of the Study Area were previously assessed and do not require further work (Figures 15-17: areas highlighted in light red). One location previous assessed by NEAA 2010 has an outstanding requirement for Stage 3 assessment of the historical site BdGq-19, prior to any proposed impacts (Figures 15-16: areas outlined in orange, Supplementary Documentation Figures 1-2). According to S & G: Section 2.2, Standard 1 (c), archaeological sites with more than 20 artifacts that pre-date 1900 are culturally significant and as such must be subject to a Stage 3 Site-Specific assessment. It is our preliminary determination with the current information that BdGq-19, does not show a sufficient amount of cultural heritage value or interest to require Stage 4 mitigation of development impacts.

The Fenelon Falls Cemetery is within the Study Area and should be avoided by project designs (Figure 15-17: areas outlined in purple). A Stage 3 Cemetery Investigation will be required on any lands impacted by the project designs within 10 metres of the cemetery property to confirm the presence or absence of unmarked graves (Figures 15-17: areas hatched in teal). A Stage 3 cemetery investigation entails the mechanical removal of topsoil around the cemetery, under the supervision of a licensed archaeologist. The exposed subsoil will then be shovel-shined and thoroughly examined for the presence of burial shafts. Prior to conducting any Stage 3 investigations in the vicinity of the cemetery, Stage 2 survey should be conducted within the areas of archaeological potential to locate any near-surface finds.

The property inspection and contour data determined that some of lands within the Study Area are sloped in excess of 20 degrees, and according to the S & G Section 2.1 do not retain potential (Plates 19, 23-25, 38; Figures 15-17: areas highlighted in pink). A part of the Study Area is located in low and wet conditions, and according to the S & G Section 2.1 does not retain potential (Plate 14; Figures 13-17: areas highlighted in blue). The remainder of the Study Area has been subjected to deep soil disturbance events and according to the S & G Section 1.3.2 do not retain archaeological potential (Plates 1-13, 15-21, 23-38, 40-42; Figures 12-17: areas highlighted in yellow). These areas do not require further survey.

3.3 Conclusions

The Stage 1 background study determined that six previously registered archaeological sites are located within one kilometre of the Study Area, one of which is a Euro-Canadian mid 19th century historical site (BdGq-19) that is located within the Study Area and requires a Stage 3 archaeological assessment. The property inspection determined that the Study Area exhibits archaeological potential.

4.0 RECOMMENDATIONS

In light of these results, the following recommendations are made:

1. The Study Area exhibits archaeological potential. These lands require Stage 2 archaeological assessment by test pit/pedestrian survey at five metre intervals, where appropriate, prior to any proposed impacts to the property;

2. BdGq-19 is within the Study Area and is considered to exhibit further cultural heritage value or interest. A Stage 3 Archaeological Assessment is recommended in accordance with the S & G in order to clarify the nature and extent of the cultural deposits, and to aid in the determine of a Stage 4 mitigation strategy, if one is required.

    - The Stage 3 Site Specific Assessment should commence with the creation of a recording grid on a fixed datum, the position of which has been recorded using GPS. Then, a controlled surface collection must be conducted to precisely define the nature and extent of the site. To meet surface visibility requirements, the site area must be re-ploughed and allowed to weather for a least one substantial rainfall prior to commencing this work. The location of each artifact should be mapped with the aid of a tape measure and transit, and a surface map produced for the site.

    - The site must then be excavated by hand, placing 1 m square units in a 5 m grid across the site with additional units amounting to 20% of the grid total. These will be placed in areas of interest around units of high artifact counts or other significant areas of the site. The test units should be excavated five cm into the sterile subsoil and soil fills screening through 6 mm wire mesh to facilitate artifact recovery. The sterile subsoil should be troweled, and all soil profiles examined for undisturbed cultural deposits.

3. The Fenelon Falls Cemetery is within the Study Area and should be avoided by project designs. Any proposed impacts within 10 m of the cemetery property should be subject to Stage 3 Cemetery Investigation.

    - A Stage 3 cemetery investigation entails the mechanical removal of topsoil around the cemetery, under the supervision of a licensed archaeologist. The exposed subsoil will then be shovel-shined and thoroughly examined for the presence of burial shafts;

    - Prior to conducting any Stage 3 investigations in the vicinity of the cemetery, Stage 2 survey should be conducted within the areas of archaeological potential to locate any near-surface finds.

4. The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, slopes in excess of 20 degrees, or having been previously assessed. These lands do not require further archaeological assessment; and,

5. Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

NOTWITHSTANDING the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MTCS should be immediately notified.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

ASI also advises compliance with the following legislation:

- This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, RSO 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological field work on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act.*

- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.

- The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

- Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the Ontario Heritage Act and may not be altered, nor may artifacts be removed from them, except by a person holding an archaeological license.

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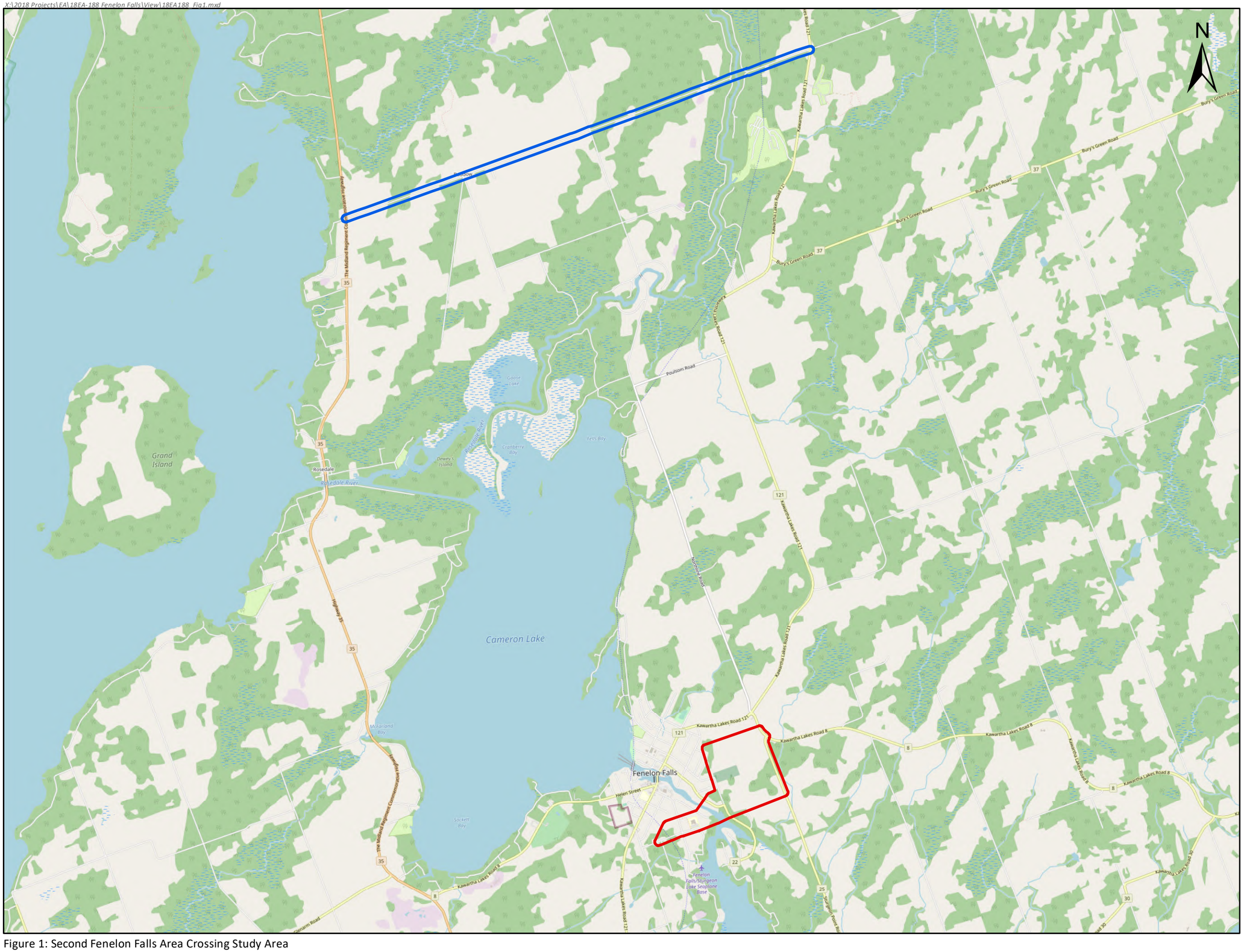
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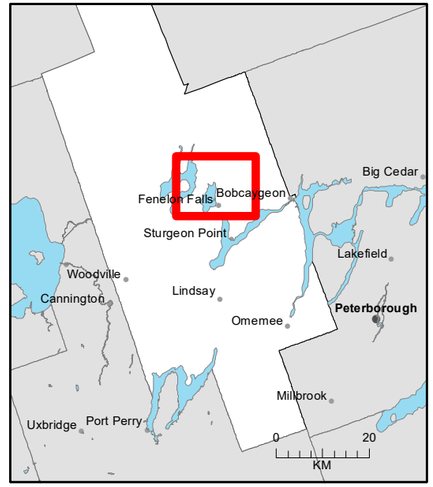
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7.0 MAPS

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STUDY AREA (BYPASS)

STUDY AREA (IN TOWN)

Sources:
Ortho: ESRI

Projection: NAD 1983 UTM Zone 17N

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Page Size: 11 x 17

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Kilometres

ASI PROJECT NO.: 18EA-188
DATE: 2019-11-11

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FILE: 18EA188_Fig1

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Figure 1: Second Fenelon Falls Area Crossing Study Area

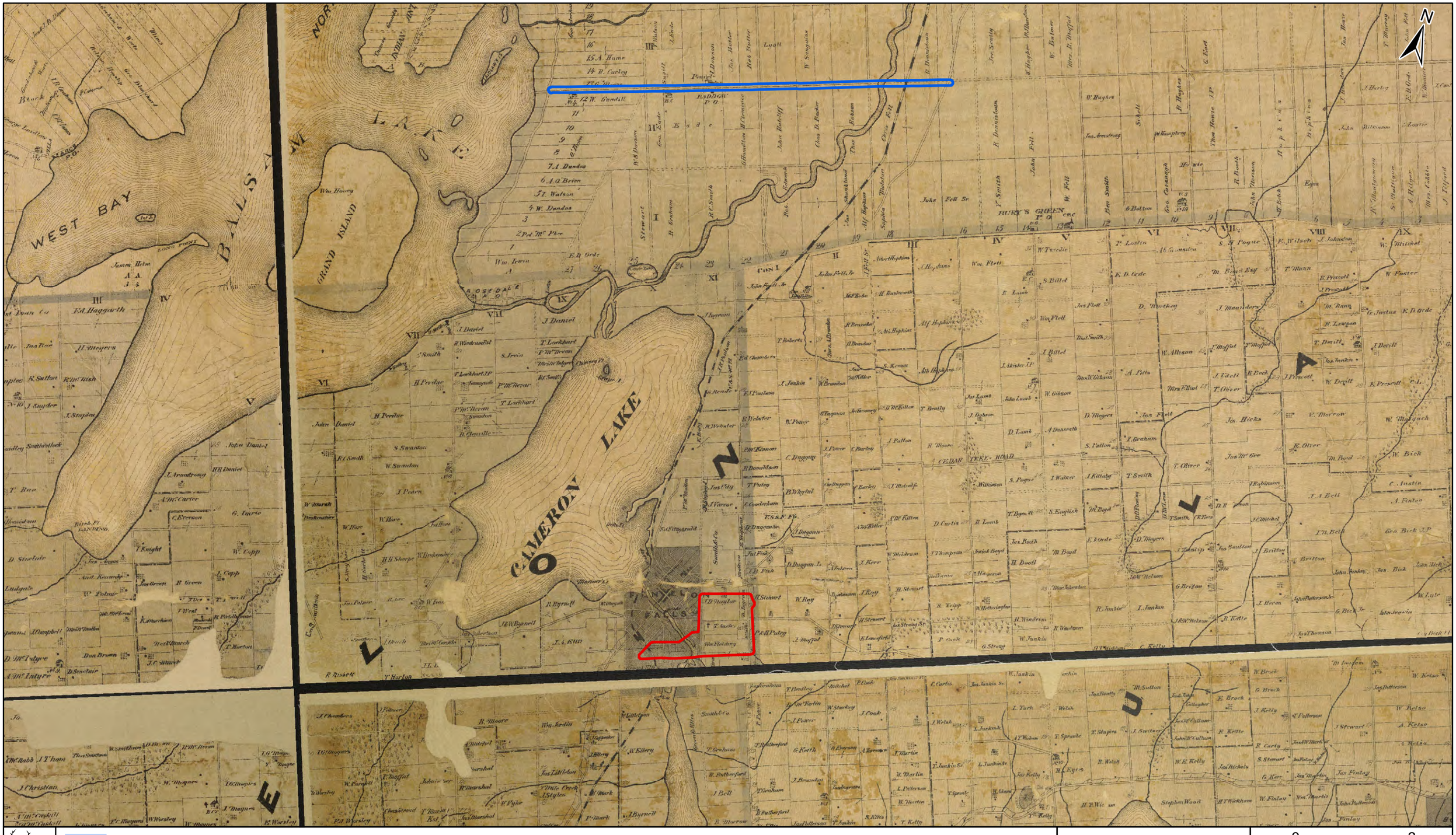
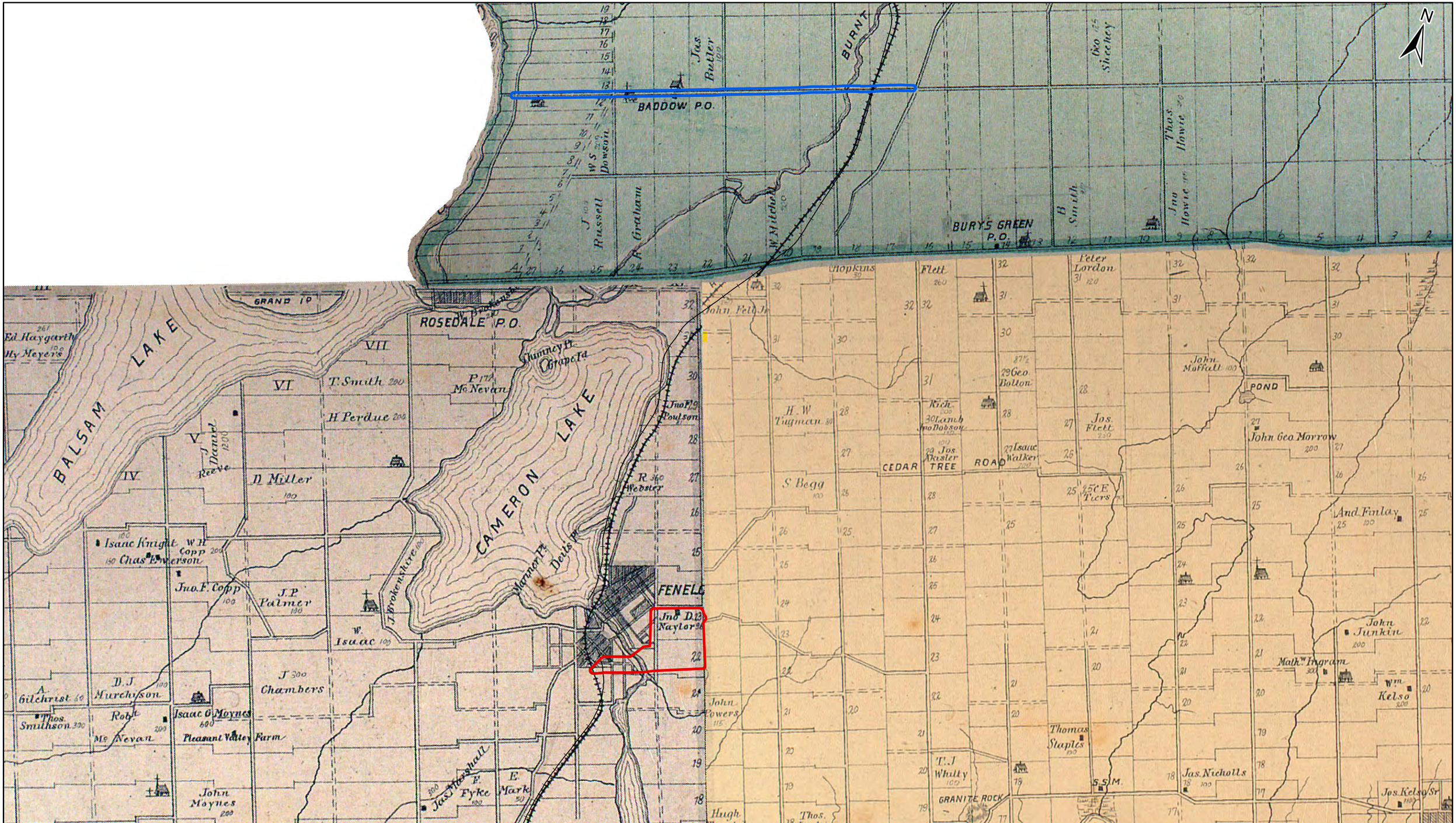


Figure 2: Study Area (Approximate Location) Overlaid on the 1877 Map of Victoria County



STUDY AREA (BYPASS)

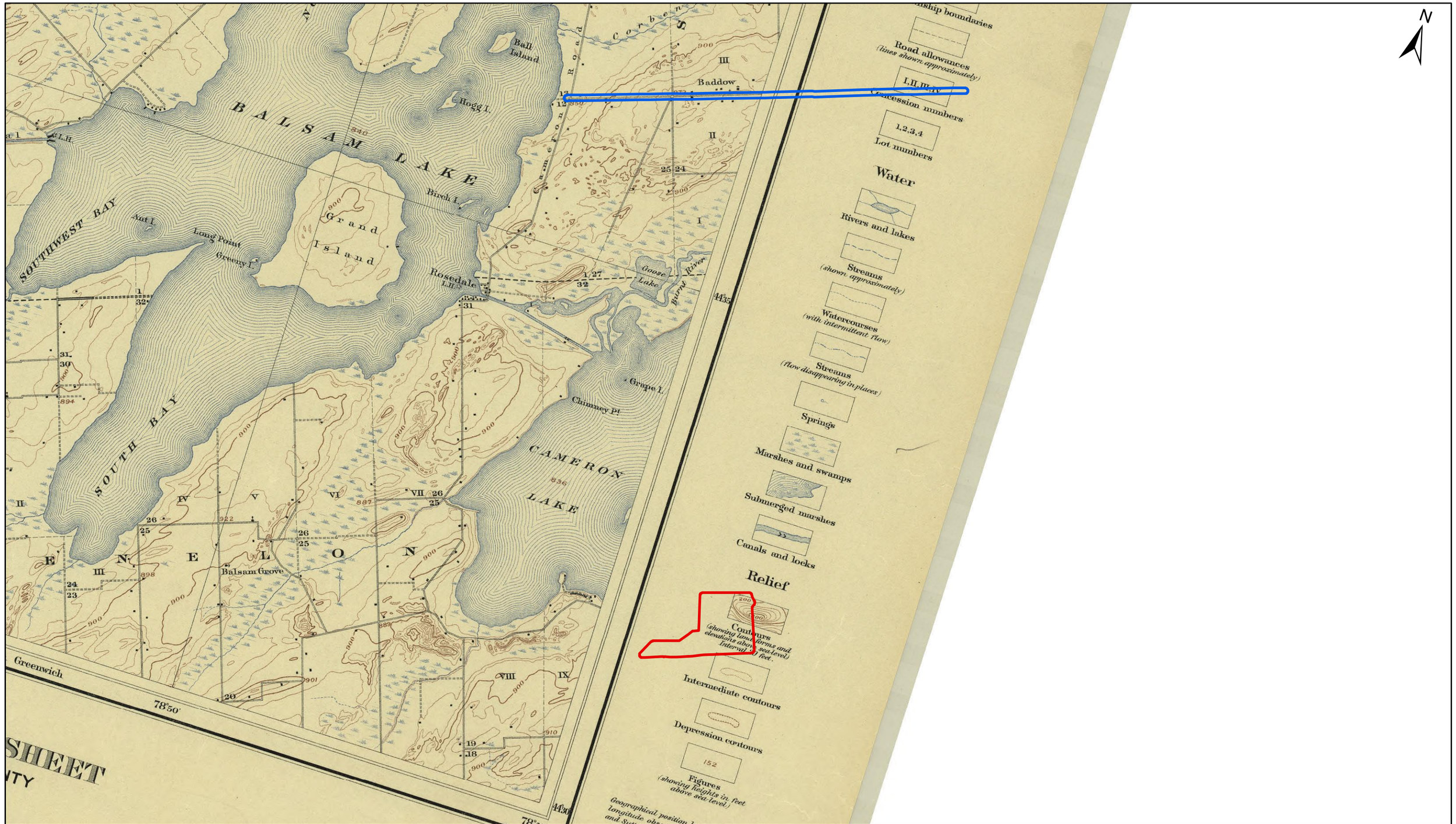
STUDY AREA (IN TOWN)

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DATE: 2019-11-21 FILE: 18EA188_HistMaps

Figure 3: Study Area (Approximate Location) Overlaid on the 1881 Map of Fenelon, Verulam & SomervilleTownship



STUDY AREA (BYPASS)

STUDY AREA (IN TOWN)

Projection: NAD 1983 UTM Zone 17N
Scale: 1:60,000
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Kilometres

ASI PROJECT NO.: 18EA188 DRAWN BY: BW/AB
DATE: 2019-11-11 FILE: 18EA188_HistMaps

Figure 4: Study Area (Approximate Location) Overlaid on the 1916 NTS Kirkfield Sheet



STUDY AREA (BYPASS)

STUDY AREA (IN TOWN)

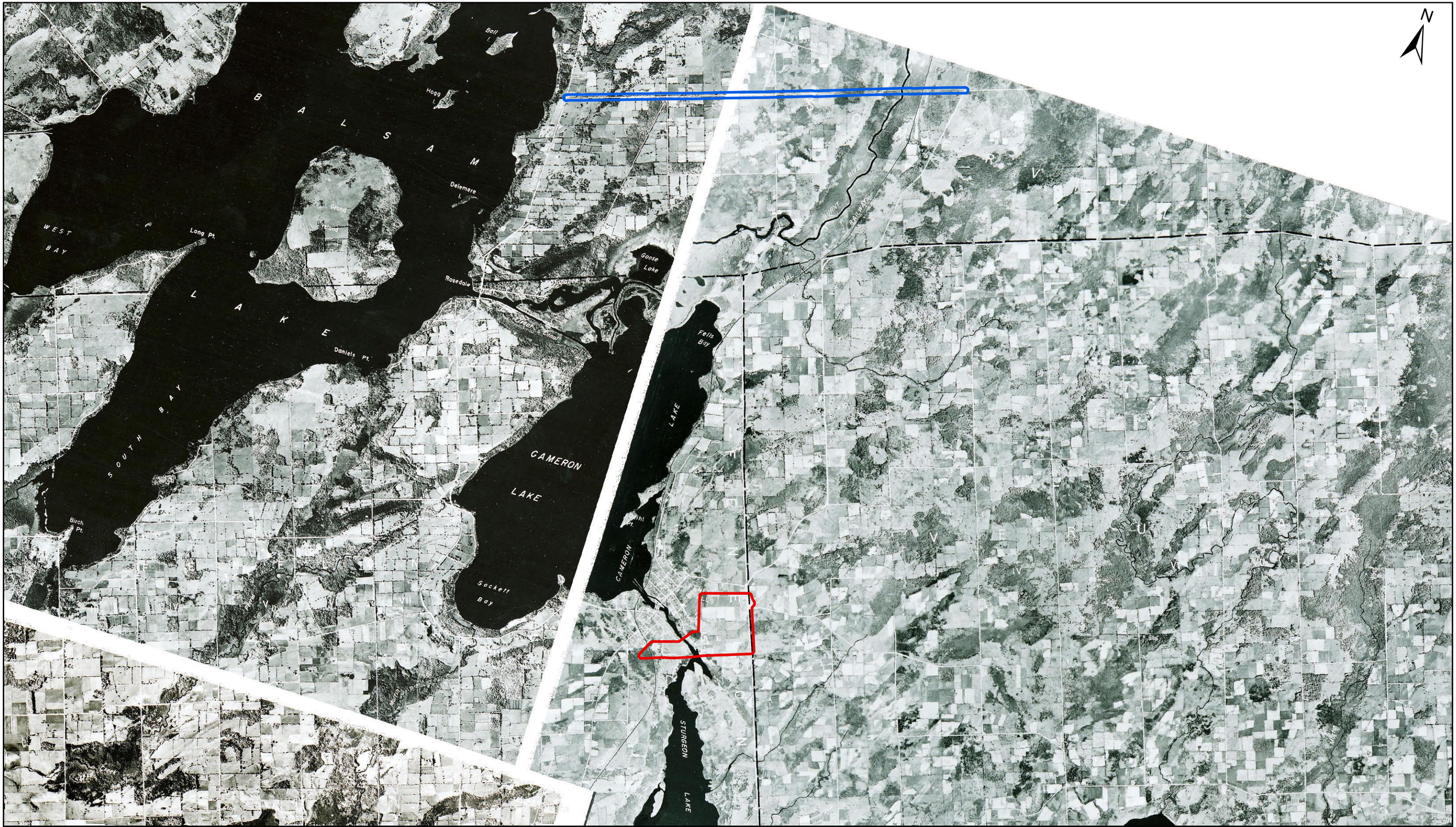
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Projection: NAD 1983 UTM Zone 17N
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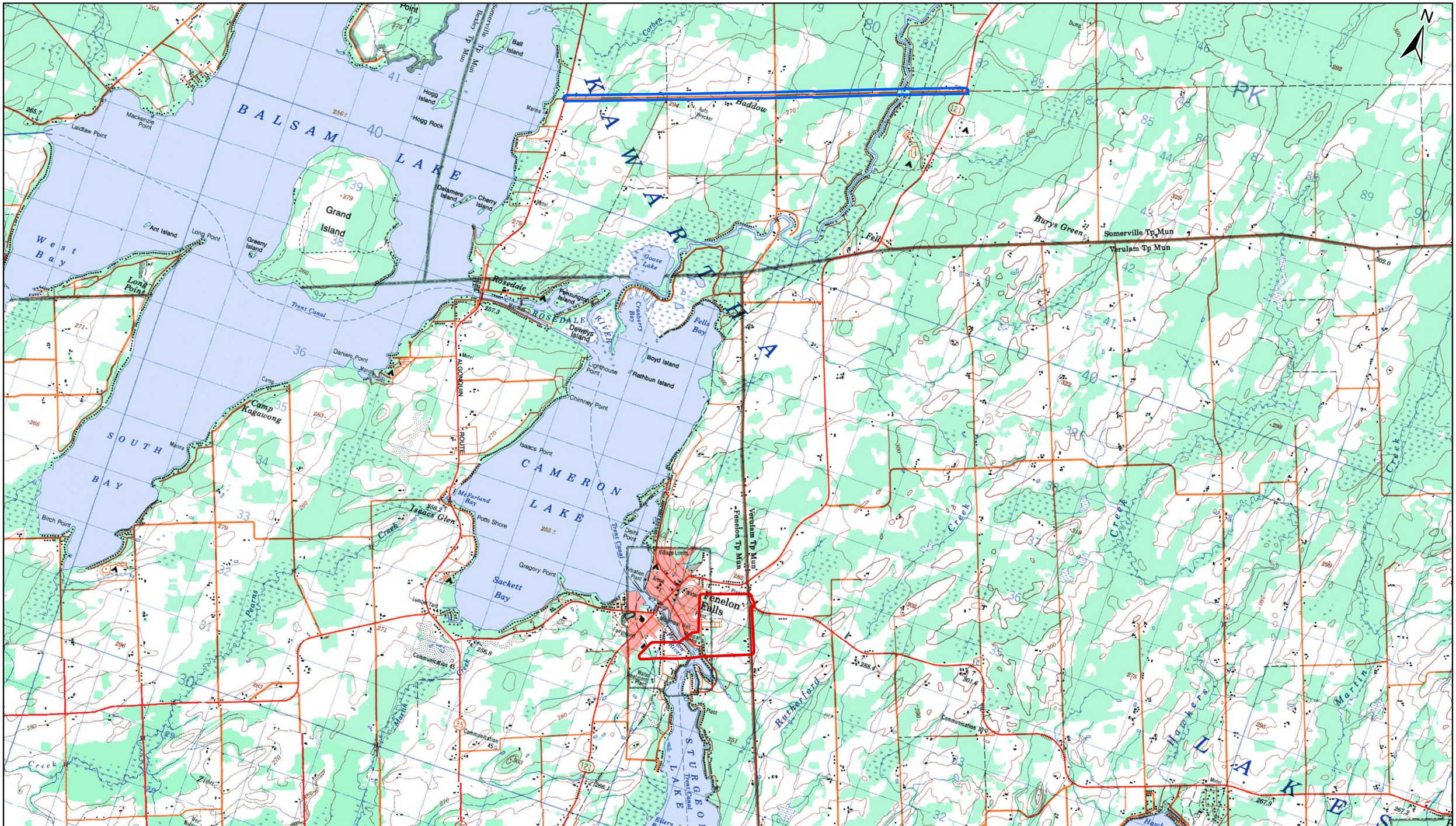
Figure 5: Study Area (Approximate Location) Overlaid on the 1940 NTS Lake Simcoe Sheet



Projection: NAD 1983 UTM Zone 17N
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Page Size: 11 x 17

ASI PROJECT NO.: 18EA188 DRAWN BY: BW/AB
DATE: 2019-11-11 FILE: 18EA188_HistMaps

Figure 6: Study Area (Approximate Location) Overlaid on the 1954 Aerial Photography



STUDY AREA (BYPASS)

STUDY AREA (IN TOWN)

ASI

Projection: NAD 1983 UTM Zone 17N
Scale: 1:60,000
Page Size: 11 x 17

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Kilometres

ASI PROJECT NO.: 18EA188 DRAWN BY: BW/AB
DATE: 2019-11-11 FILE: 18EA188_HistMaps

Figure 7: Study Area (Approximate Location) Overlaid on the 1994/1999 NTS Fenelon Falls and Lindsay Sheets

N

STUDY AREA (BYPASS)
STUDY AREA (IN TOWN)
PEAT AND MUCK
ESKERS
LIMESTONE PLAINS
DRUMLINS
TILL PLAINS (DRUMLINIZED)
SPILLWAYS
TILL MORAINES
RAILROAD
ROAD

ASI

Projection: NAD 1983 UTM Zone 17N
Scale: 1:60,000
Page Size: 11 x 17

0 2
Kilometres

ASI PROJECT NO.: 18EA188 DRAWN BY: BW/AB
DATE: 2019-11-11 FILE: 18EA188_Geo

Figure 8: Study Area - Physiographic Landforms

N

STUDY AREA (BYPASS)
STUDY AREA (IN TOWN)
PALEOZOIC BEDROCK
PRECAMBRIAN BEDROCK
DIAMICTON
FILL
GRAVEL
ORGANIC DEPOSITS
SAND
SILT
ROAD
RAILROAD

Projection: NAD 1983 UTM Zone 17N
Scale: 1:60,000
Page Size: 11 x 17

0 2
Kilometres

ASI PROJECT NO.: 18EA188 DRAWN BY: BW/AB
DATE: 2019-11-11 FILE: 18EA188_Geo

Figure 9 : Study Area - Surficial Geology

N

STUDY AREA (BYPASS)
STUDY AREA (IN TOWN)
WATERBODY / NO DATA
RAPIDLY DRAINED
WELL DRAINED
IMPERFECTLY DRAINED
POORLY DRAINED
VERY POORLY DRAINED
ROAD
RAILROAD

Projection: NAD 1983 UTM Zone 17N
Scale: 1:60,000
Page Size: 11 x 17

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Kilometres

ASI PROJECT NO.: 18EA188
DATE: 2019-11-11
DRAWN BY: BW/AB
FILE: 18EA188_Geo

Figure 10: Study Area - Soil Drainage

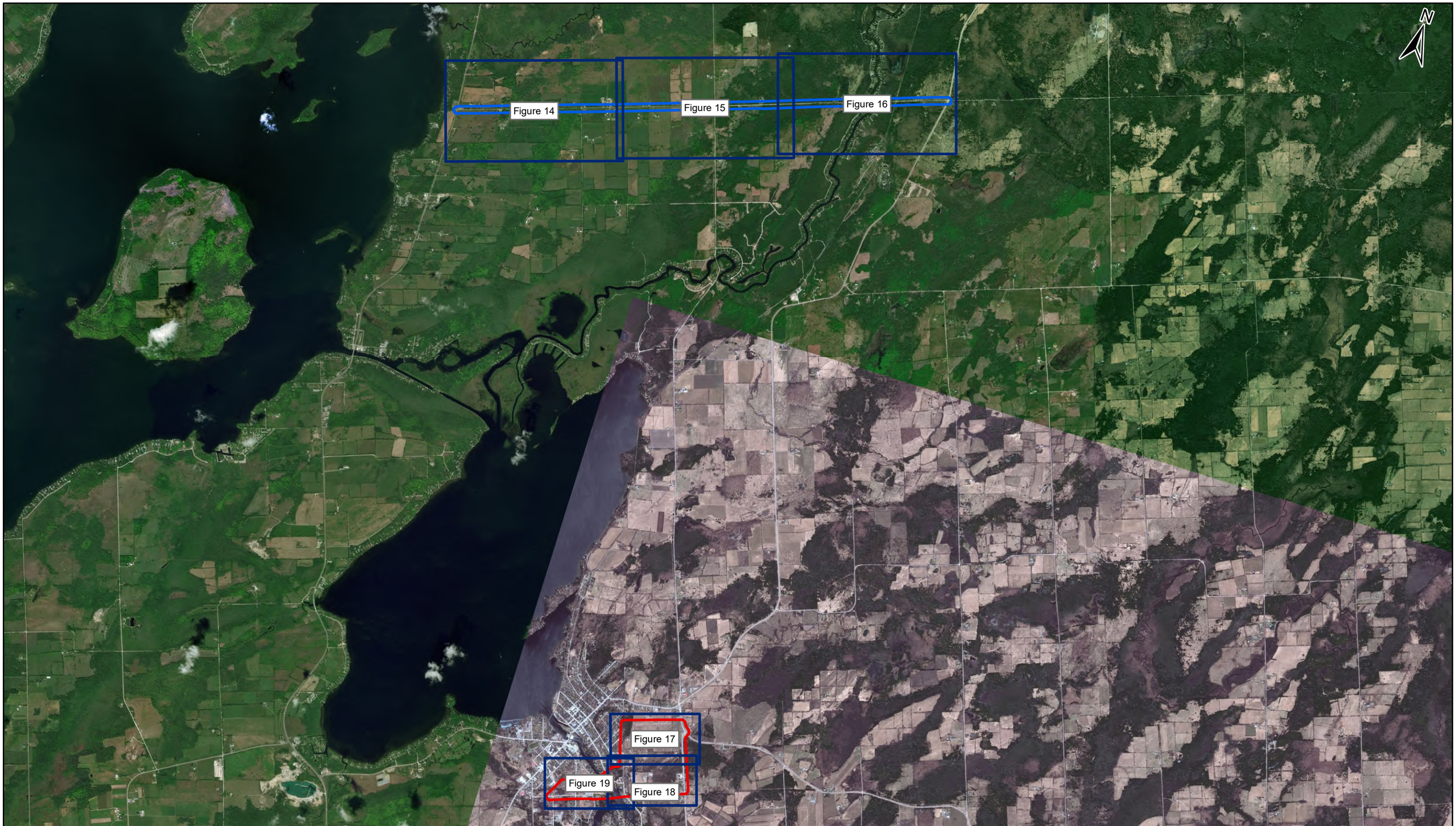


Figure 11: Study Area - Results of the Property Inspection (Key Map)

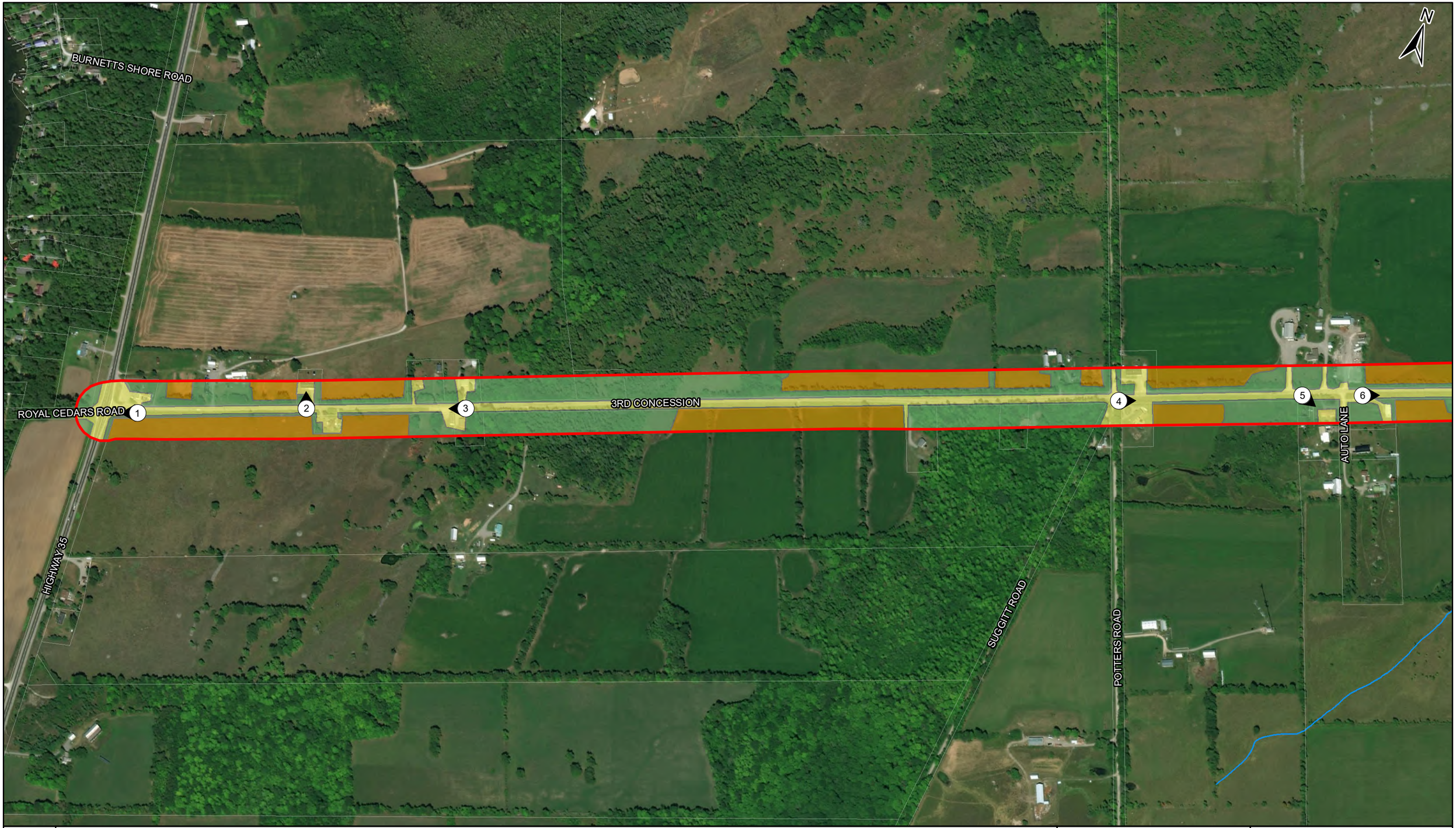


Figure 12: Bypass Option - Results of the Property Inspection

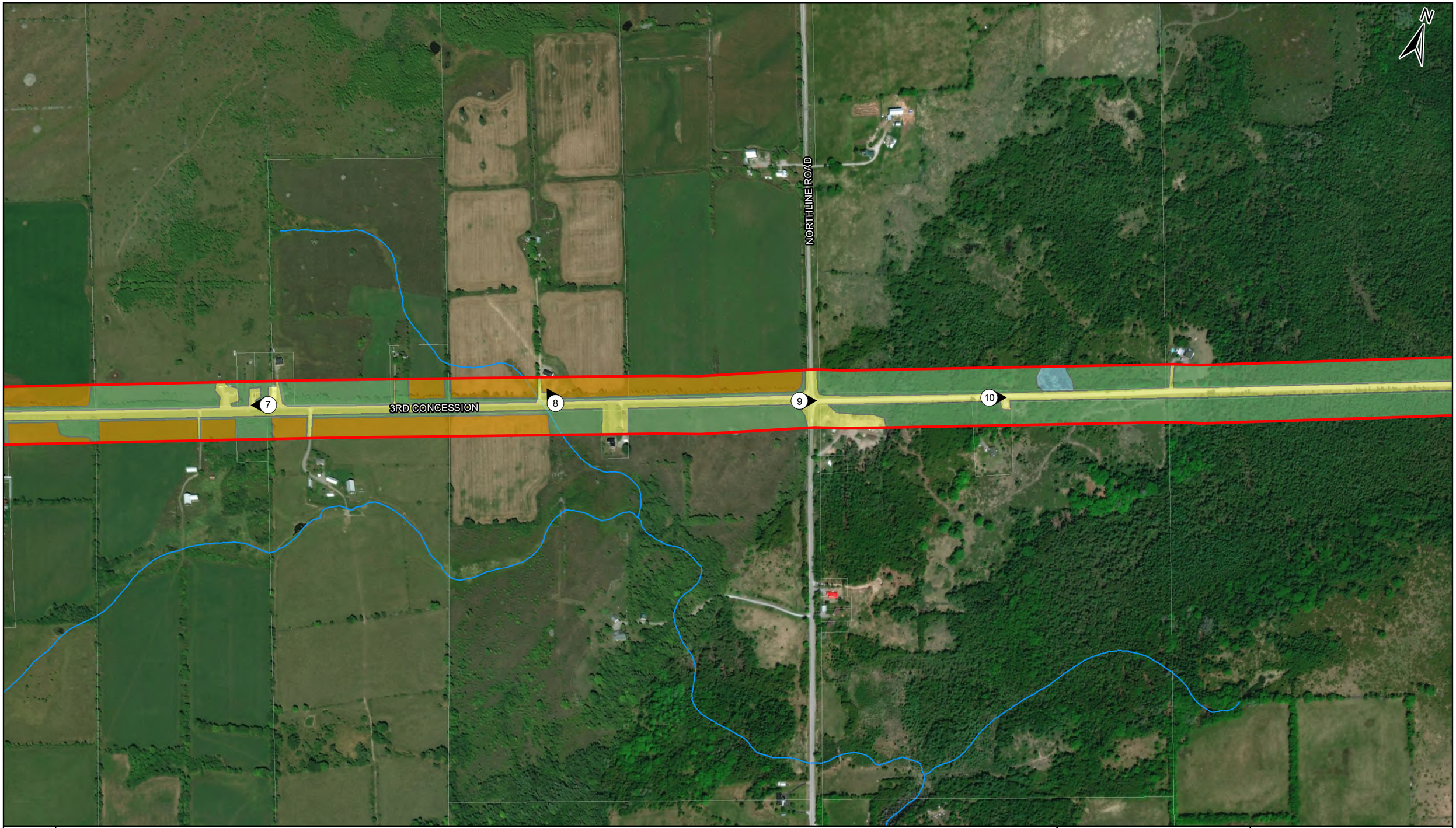
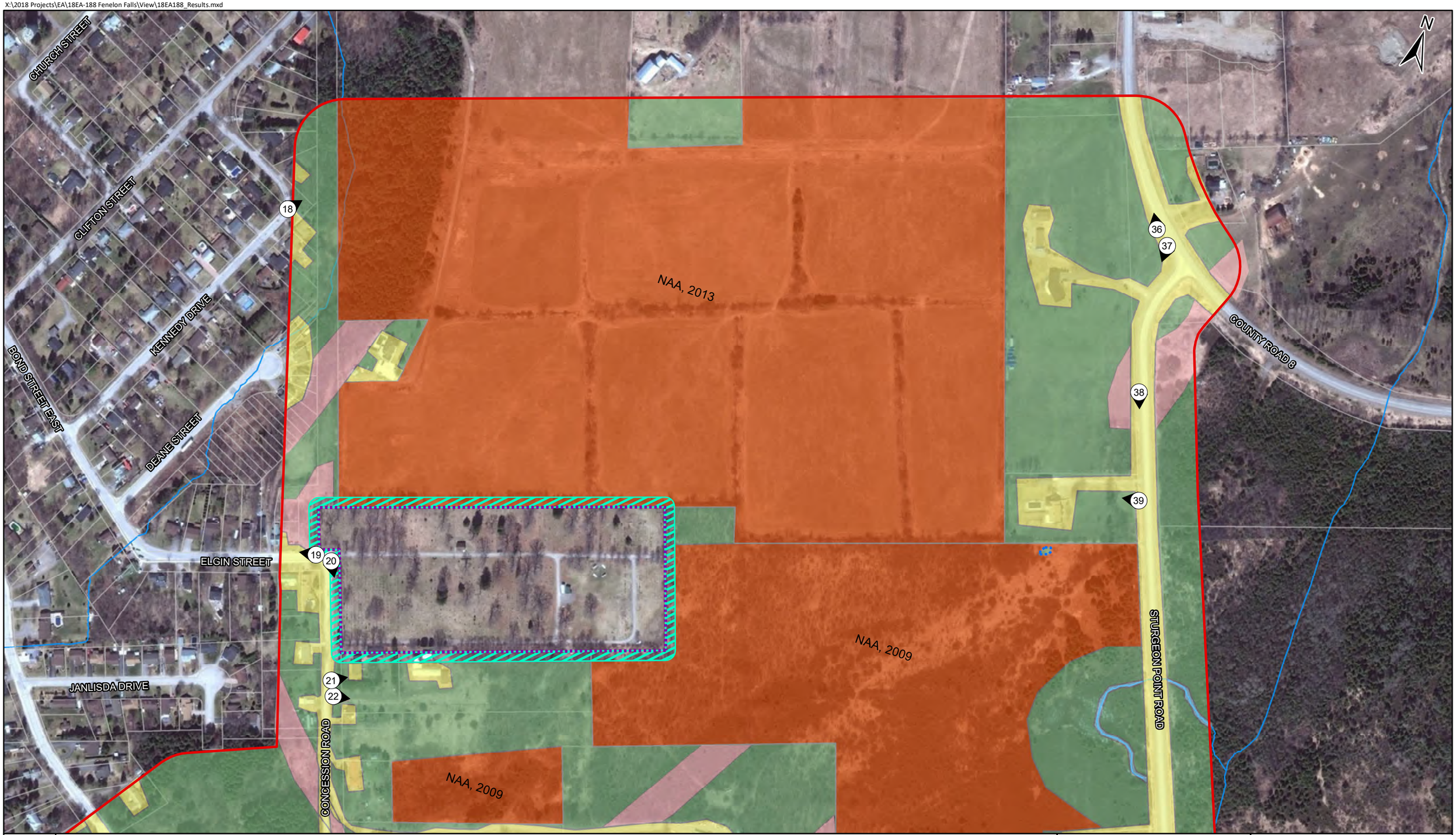


Figure 13: Bypass Option - Results of the Property Inspection



Figure 14: Bypass Option - Results of the Property Inspection

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STUDY AREA (IN TOWN)
DISTURBED - NO POTENTIAL
PREVIOUSLY ASSESSED - NO FURTHER WORK
SLOPE - NO POTENTIAL
TEST PIT SURVEY REQUIRED
LOW/WET - NO POTENTIAL
CEMETERY
REQUIRES STAGE 3 CEMETERY INVESTIGATION
REQUIRES FURTHER ASSESSMENT
PHOTO LOCATIONS AND DIRECTION

Basemap: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

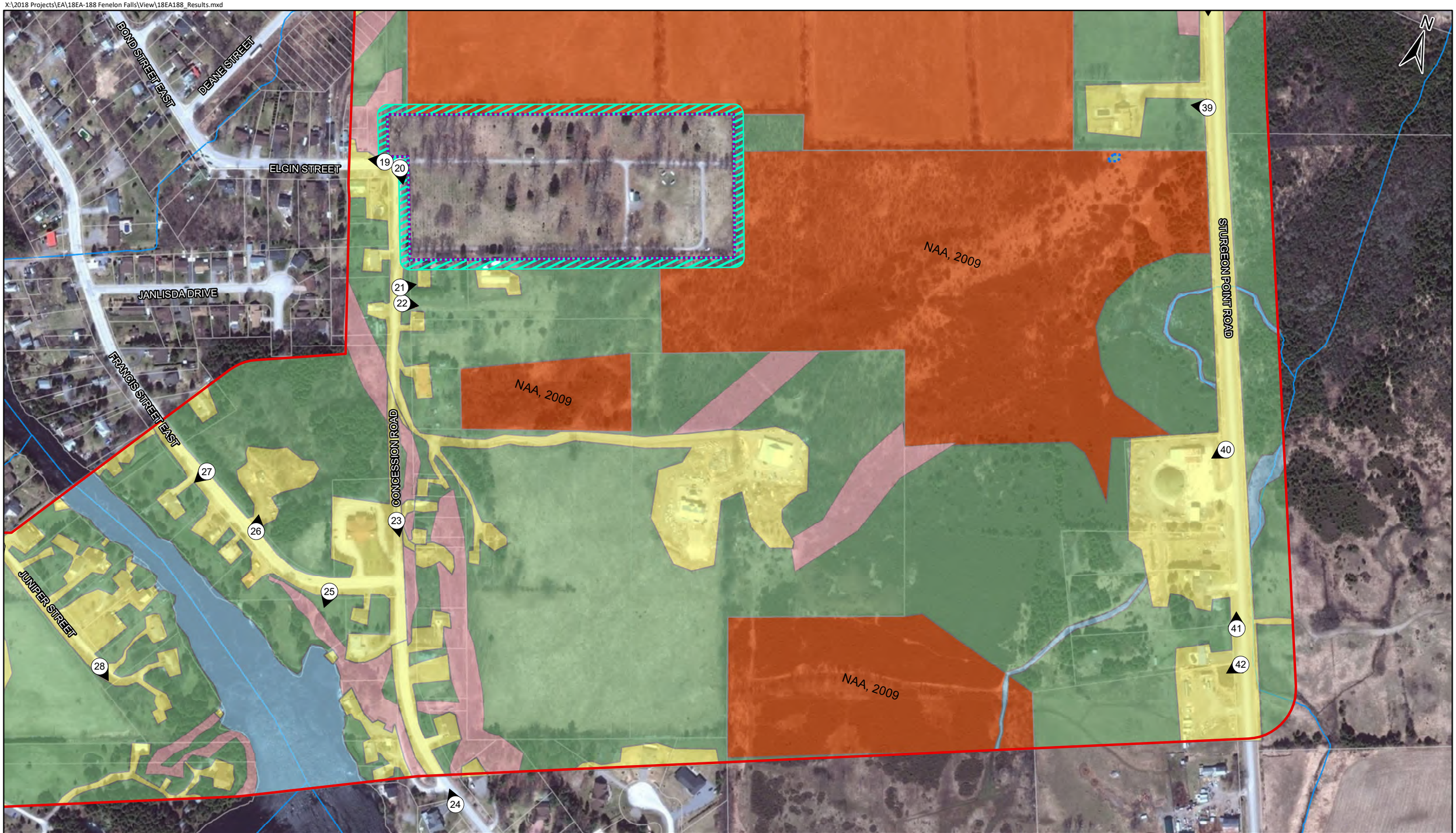
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FILE: 18EA188_Results

Figure 15: In Town Option - Results of the Property Inspection

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STUDY AREA (IN TOWN)
DISTURBED - NO POTENTIAL
PREVIOUSLY ASSESSED - NO FURTHER WORK
SLOPE - NO POTENTIAL
TEST PIT SURVEY REQUIRED
LOW/WET - NO POTENTIAL
CEMETERY
REQUIRES STAGE 3 CEMETERY INVESTIGATION
REQUIRES FURTHER ASSESSMENT
PHOTO LOCATIONS AND DIRECTION

Basemap: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD 1983 UTM Zone 17N
Scale: 1:3,500
Page Size: 11 x 17

0 100
Metres

ASI PROJECT NO.: 18EA188
DATE: 2019-12-20
DRAWN BY: AB/ESB
FILE: 18EA188_Results

Figure 16: In Town Option - Results of the Property Inspection

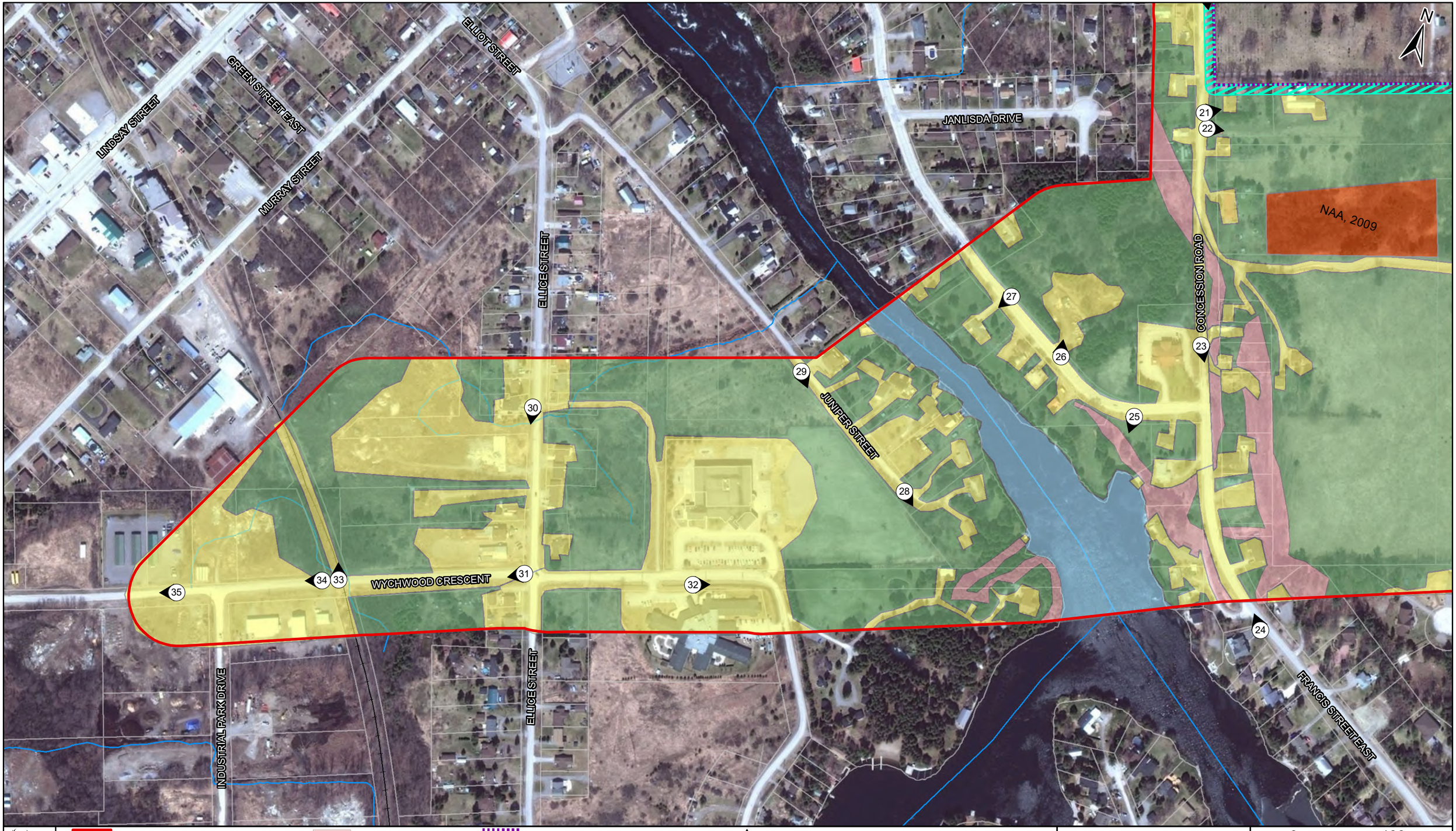


Figure 17: In Town Option - Results of the Property Inspection

8.0 IMAGES



Plate 1: [W] Concession Road 3; Area beyond disturbed ROW requires Stage 2



Plate 2: [N] Concession Road 3; Area beyond disturbed ROW requires Stage 2



Plate 3: [W] Concession Road 3; Area is disturbed, no potential



Plate 4: [E] Concession Road 3; Area is disturbed, no potential



Plate 5: [SE] Concession Road 3; Area requires Stage 2



Plate 6: [E] Concession Road 3; Areas beyond disturbed ROW requires Stage 2



Plate 7: [W] Concession Road 3; Area beyond disturbed ROW requires Stage 2



Plate 8: [NW] Concession Road 3; Area requires Stage 2



Plate 9: [E] Concession Road 3; Area is disturbed, no potential



Plate 10: [E] Concession Road 3; Area beyond disturbed ROW requires Stage 2



Plate 11: [NW] Concession Road 3; Area is disturbed, no potential



Plate 12: [SE] Concession Road 3; Area is disturbed, no potential



Plate 13: [SE] Burnt River; Area is disturbed and low and wet



Plate 14: [SE] Burnt River; Area is low and wet



Plate 15: [W] Concession Road 3; Area is disturbed, no potential



Plate 16: [NW] Victoria Rail Trail; Area is disturbed, no potential



Plate 17: [E] Concession Road 3; Area beyond disturbed ROW requires Stage 2



Plate 18: [NW] Kennedy Drive; Area requires Stage 2



Plate 19: [W] Elgin Street; Area is disturbed, no potential



Plate 20: [S] Concession Road; Area requires Stage 3 Cemetery Investigation



Plate 21: [E] Concession Road; Area requires Stage 2



Plate 22: [E] Concession Road; Area requires Stage 2



Plate 23: [SE] Concession Road; Area is disturbed and sloped, no potential



Plate 24: [NW] Francis Street East; Area requires Stage 2


Plate 25: [SW] Francis Street E; Area beyond disturbed ROW requires Stage 2


Plate 26: [N] Francis Street E; Area is disturbed, no potential


Plate 27: [SW] Francis Street E; Area requires Stage 2


Plate 28: [SE] Juniper Street; Area requires Stage 2


Plate 29: [SE] Juniper Street; Area requires Stage 2


Plate 30: [S] Ellice Street; Area is disturbed, no potential



Plate 31: [W] Wychwood Crescent; Area is disturbed, no potential



Plate 32: [E] Wychwood Crescent; Area is disturbed, no potential



Plate 33: [N] Victoria Rail Trail; Area beyond disturbed trail requires Stage 2



Plate 34: [W] Wychwood Crescent; Area is disturbed, no potential



Plate 35: [W] Wychwood Crescent; Area is disturbed, no potential



Plate 36: [N] County Road 8; Area beyond disturbed ROW requires Stage 2


Plate 37: [SW] Sturgeon Point Road; Area requires Stage 2


Plate 38: [S] Sturgeon Point Road; Area is sloped and disturbed, no potential


Plate 39: [W] Sturgeon Point Road; Area requires Stage 2


Plate 40: [SW] Sturgeon Point Road; Area is disturbed, no potential


Plate 41: [N] Sturgeon Point Road; Area beyond ROW requires Stage 2


Plate 42: [W] Sturgeon Point Road; Area is disturbed, no potential

APPENDIX A: MICHI SAAGIIG HISTORY

The traditional homelands of the Michi Saagiig (Mississauga Anishinaabeg) encompass a vast area of what is now known as southern Ontario. The Michi Saagiig are known as "the people of the big river mouths" and were also known as the "Salmon People" who occupied and fished the north shore of Lake Ontario where the various tributaries emptied into the lake. Their territories extended north into and beyond the Kawarthas as winter hunting grounds on which they would break off into smaller social groups for the season, hunting and trapping on these lands, then returning to the lakeshore in spring for the summer months.

The Michi Saagiig were a highly mobile people, travelling vast distances to procure subsistence for their people. They were also known as the "Peacekeepers" among Indigenous nations. The Michi Saagiig homelands were located directly between two very powerful Confederacies: The Three Fires Confederacy to the north and the Haudenosaunee Confederacy to the south. The Michi Saagiig were the negotiators, the messengers, the diplomats, and they successfully mediated peace throughout this area of Ontario for countless generations.

Michi Saagiig oral histories speak to their people being in this area of Ontario for thousands of years. These stories recount the "Old Ones" who spoke an ancient Algonquian dialect. The histories explain that the current Ojibwa phonology is the 5th transformation of this language, demonstrating a linguistic connection that spans back into deep time. The Michi Saagiig of today are the descendants of the ancient peoples who lived in Ontario during the Archaic and Paleo-Indian periods. They are the original inhabitants of southern Ontario, and they are still here today.

The traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands. This also includes all the tributaries that flow from the height of land north of Toronto like the Oak Ridges Moraine, and all of the rivers that flow into Lake Ontario (the Rideau, the Salmon, the Ganaraska, the Moira, the Trent, the Don, the Rouge, the Etobicoke, the Humber, and the Credit, as well as Wilmot and 16 Mile Creeks) through Burlington Bay and the Niagara region including the Welland and Niagara Rivers, and beyond. The western side of the Michi Saagiig Nation was located around the Grand River which was used as a portage route as the Niagara portage was too dangerous. The Michi Saagiig would portage from present-day Burlington to the Grand River and travel south to the open water on Lake Erie.

Michi Saagiig oral histories also speak to the occurrence of people coming into their territories sometime between 500-1000 A.D. seeking to establish villages and a corn growing economy – these newcomers included peoples that would later be known as the Huron-Wendat, Neutral, Petun/Tobacco Nations. The Michi Saagiig made Treaties with these newcomers and granted them permission to stay with the understanding that they were visitors in these lands. Wampum was made to record these contracts, ceremonies would have bound each nation to their respective responsibilities within the political relationship, and these contracts would have been renewed annually (see Gitiga Migizi and Kapyrka 2015). These visitors were extremely successful as their corn economy grew as well as their populations. However, it was understood by all nations involved that this area of Ontario were the homeland territories of the Michi Saagiig.

The Odawa Nation worked with the Michi Saagiig to meet with the Huron-Wendat, the Petun, and Neutral Nations to continue the amicable political and economic relationship that existed – a symbiotic relationship that was mainly policed and enforced by the Odawa people.

Problems arose for the Michi Saagiig in the 1600s when the European way of life was introduced into southern Ontario. Also, around the same time, the Haudenosaunee were given firearms by the colonial governments in New York and Albany which ultimately made an expansion possible for them into Michi Saagiig territories. There began skirmishes with the various nations living in Ontario at the time. The Haudenosaunee engaged in fighting with the Huron-Wendat and between that and the onslaught of European diseases, the Iroquoian speaking peoples in Ontario were decimated.

The onset of colonial settlement and missionary involvement severely disrupted the original relationships between these Indigenous nations. Disease and warfare had a devastating impact upon the Indigenous peoples of Ontario, especially the large sedentary villages, which mostly included Iroquoian speaking peoples. The Michi Saagiig were largely able to avoid the devastation caused by these processes by retreating to their wintering grounds to the north, essentially waiting for the smoke to clear.

Michi Saagiig Elder Gitiga Migizi (2017) recounts:

> "We weren't affected as much as the larger villages because we learned to paddle away for several years until everything settled down. And we came back and tried to bury the bones of the Huron, but it was overwhelming, it was all over, there were bones all over – that is our story.
>
> There is a misnomer here, that this area of Ontario is not our traditional territory and that we came in here after the Huron-Wendat left or were defeated, but that is not true. That is a big misconception of our history that needs to be corrected. We are the traditional people, we are the ones that signed treaties with the Crown. We are recognized as the ones who signed these treaties and we are the ones to be dealt with officially in any matters concerning territory in southern Ontario.
>
> We had peacemakers go to the Haudenosaunee and live amongst them in order to change their ways. We had also diplomatically dealt with some of the strong chiefs to the north and tried to make peace as much as possible. So, we are very important in terms of keeping the balance of relationships in harmony.
>
> Some of the old leaders recognized that it became increasingly difficult to keep the peace after the Europeans introduced guns. But we still continued to meet, and we still continued to have some wampum, which doesn't mean we negated our territory or gave up our territory – we did not do that. We still consider ourselves a sovereign nation despite legal challenges against that. We still view ourselves as a nation and the government must negotiate from that basis."

Often times, southern Ontario is described as being "vacant" after the dispersal of the Huron-Wendat peoples in 1649 (who fled east to Quebec and south to the United States). This is misleading as these territories remained the homelands of the Michi Saagiig Nation.

The Michi Saagiig participated in eighteen treaties from 1781 to 1923 to allow the growing number of European settlers to establish in Ontario. Pressures from increased settlement forced the Michi Saagiig to slowly move into small family groups around the present-day communities: Curve Lake First Nation, Hiawatha First Nation, Alderville First Nation, Scugog Island First Nation, New Credit First Nation, and Mississauga First Nation.

APPENDIX D

Preliminary Cultural Heritage Resource Assessment

CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS REPORT

SECOND FENELON FALLS AREA CROSSING
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

CITY OF KAWARTHA LAKES, ONTARIO

DRAFT REPORT

Prepared for:

Dillon Consulting Limited
235 Yorkland Boulevard, Suite 800
Toronto, ON M2J 4Y8

ASI File: 18CH-169

August 2019 (revised December 2019)

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PRELIMINARY CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS REPORT

SECOND FENELON FALLS AREA CROSSING
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

CITY OF KAWARTHA LAKES, ONTARIO

EXECUTIVE SUMMARY

ASI was contracted by Dillon Consulting Limited to conduct a Preliminary Cultural Heritage Resource Assessment for the Second Fenelon Falls Area Crossing Municipal Class Environmental Assessment (Class EA). The study area is located in the City of Kawartha Lakes and involves carrying out a Schedule C Class EA to determine the preferred solution for a second Fenelon Falls area crossing/bridge. The study area is generally located in the village of Fenelon Falls and the surrounding rural agricultural area.

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a mixed land use history of the main settlement area and agricultural use dating back to the early nineteenth century. The study area was narrowed from the original scope to a smaller Bypass study area and an In Town study area but detailed designs have not been finalized.

A review of federal registers and municipal and provincial inventories revealed that there is one previously identified feature of cultural heritage value within the updated Second Fenelon Falls Area Crossing study area. An additional 16 resources were identified during the field review.

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. Once detailed designs of the proposed In Town and Bypass work are available, this report will be updated with a confirmation of impacts of the undertaking on the cultural heritage resources identified within and/or adjacent to the study area and will recommend appropriate mitigation measures. Mitigation measures may include, but are not limited to, completing a property-specific heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.



PROJECT PERSONNEL

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Graphics Preparation:	Robin Latour, MPhil, PDip *Associate Archaeologist | Geomatics Specialist* *Operations Division*
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Plate 12: In Town study area, looking southeast towards the terminal end of Juniper Street. 23

1.0 INTRODUCTION

ASI was contracted by Dillon Consulting Limited to conduct a Preliminary Cultural Heritage Resource Assessment for the Second Fenelon Falls Area Crossing Municipal Class Environmental Assessment (Class EA). The study area is located in the City of Kawartha Lakes and involves carrying out a Schedule C Class EA to determine the preferred solution for a second Fenelon Falls area crossing/bridge. The study area is generally located in the village of Fenelon Falls and the surrounding rural agricultural area (Figure 1).

Initially, four high level potential alternative solutions for this project were identified. The solutions include:

1. A new second crossing in-town: there are two options for this second crossing, one at Clifton Street and one at Wychwood Crescent;
2. Upgrading/widening the existing bridge: this would also require modifying Lindsay Street and Colborne Street that tie into the bridge on either side in order to accommodate more traffic (no widening would be needed but the ROW would require redistribution of lanes and sidewalks);
3. A bypass: a new route to be connected around the town so that those travelling to areas beyond the town can go around (trucks and cottagers mainly). This route would likely follow 3rd Concession crossing the Burnt River; and
4. In-town traffic operations improvements: these would be schedule A+ and B improvements related to intersection design and changing of driveways onto the main street as well as reconfiguration of the Lindsay Street and Helen Street intersection.

In October 2019 the potential alternative solutions were narrowed to two options, the Bypass and In Town options.

The purpose of this report is to describe the existing conditions of the study area, present a built heritage and cultural landscape inventory of cultural heritage resources. Once detailed designs of the proposed In Town and Bypass work are available, this report will be updated to include proposed appropriate mitigation measures and recommendations for minimizing and avoiding negative impacts on identified cultural heritage resources. This research was conducted by Kirstyn Allam, Cultural Heritage Assistant, and Johanna Kelly, Cultural Heritage Associate, under the senior project management of Lindsay Graves, all of ASI.

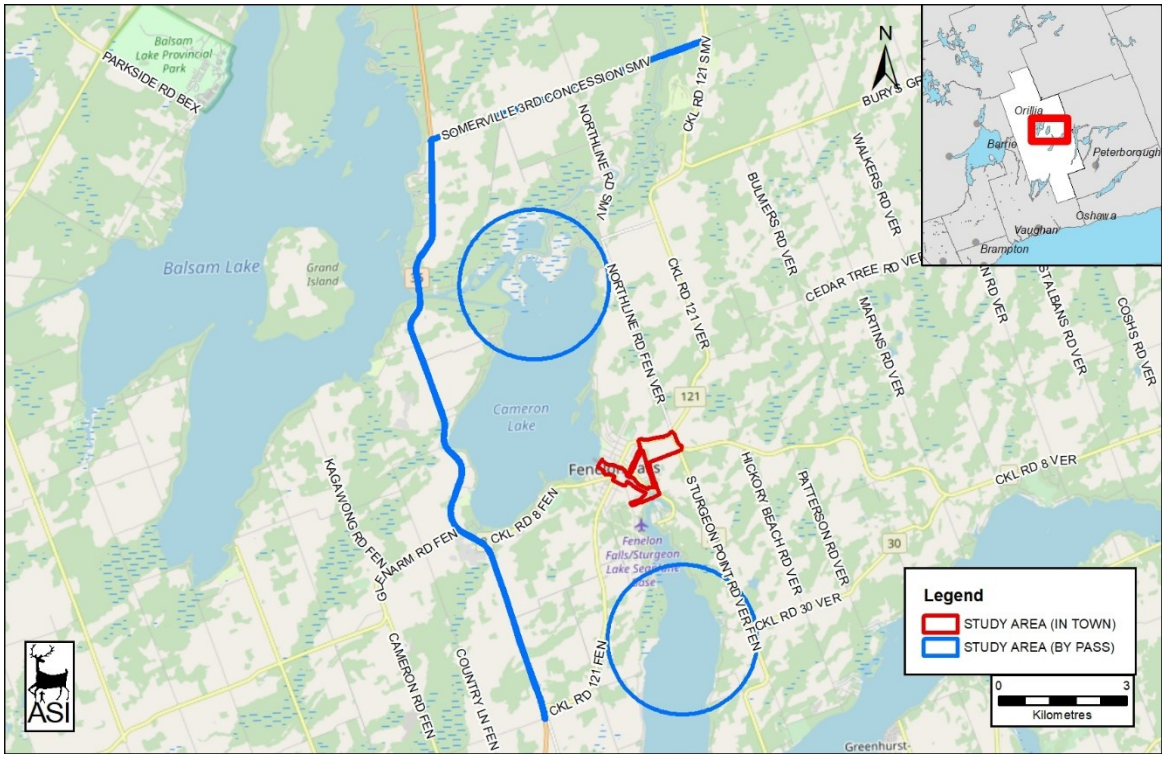


Figure 1: Location of the study area
Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT

2.1 Legislation and Policy Context

This cultural heritage assessment considers cultural heritage resources in the context of improvements to specified areas, pursuant to the *Environmental Assessment Act*. This assessment addresses above ground cultural heritage resources over 40 years old. Use of a 40-year-old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Heritage, Sport, Tourism and Culture Industries 2016). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

For the purposes of this assessment, the term cultural heritage resources is used to describe both cultural heritage landscapes and built heritage resources. A cultural landscape is perceived as a collection of individual built heritage resources and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage resources are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

The analysis throughout the study process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines. Under the *Environmental Assessment Act* (1990) environment is defined in Subsection 1(c) to include:

- cultural conditions that influence the life of man or a community, and;
- any building, structure, machine, or other device or thing made by man.

The Ministry of Heritage, Sport, Tourism and Culture Industries is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario and has published two guidelines to assist in assessing cultural heritage resources as part of an environmental assessment: *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992), and *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1980). Accordingly, both guidelines have been utilized in this assessment process.

The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (Section 1.0) states the following:

> When speaking of man-made heritage we are concerned with the works of man and the effects of his activities in the environment rather than with movable human artifacts or those environments that are natural and completely undisturbed by man.

In addition, environment may be interpreted to include the combination and interrelationships of human artifacts with all other aspects of the physical environment, as well as with the social, economic and cultural conditions that influence the life of the people and communities in Ontario. The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* distinguish between two basic ways of visually experiencing this heritage in the environment, namely as cultural heritage landscapes and as cultural features.

Within this document, cultural heritage landscapes are defined as the following (Section 1.0):

> The use and physical appearance of the land as we see it now is a result of man's activities over time in modifying pristine landscapes for his own purposes. A cultural landscape is perceived as a collection of individual man-made features into a whole. Urban cultural landscapes are sometimes given special names such as townscapes or streetscapes that describe various scales of perception from the general scene to the particular view. Cultural landscapes in the countryside are viewed in or adjacent to natural undisturbed landscapes, or waterscapes, and include such land uses as agriculture, mining, forestry, recreation, and transportation. Like urban cultural landscapes, they too may be perceived at various scales: as a large area of homogeneous character; or as an intermediate sized area of homogeneous character or a collection of settings such as a group of farms; or as a discrete example of specific landscape character such as a single farm, or an individual village or hamlet.

A cultural feature is defined as the following (Section 1.0):

> …an individual part of a cultural landscape that may be focused upon as part of a broader scene, or viewed independently. The term refers to any man-made or modified object in or on the land or underwater, such as buildings of various types, street furniture, engineering works, plantings and landscaping, archaeological sites, or a collection of such objects seen as a group because of close physical or social relationships.

The Ministry of Heritage, Sport, Tourism and Culture Industries has also published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (Ministry of Tourism, Culture and Sport 2014, now administered by the Ministry of Heritage, Sport, Tourism and Culture Industries; Standards and Guidelines hereafter). These *Standards and Guidelines* apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest. They are mandatory for Ministries and prescribed public bodies and have the authority of a Management Board or Cabinet directive. Prescribed public bodies include:

- Agricultural Research Institute of Ontario
- Hydro One Inc.
- Liquor Control Board of Ontario
- McMichael Canadian Art Collection
- Metrolinx
- The Niagara Parks Commission
- Ontario Heritage Trust
- Ontario Infrastructure and Lands Corporation
- Ontario Lottery and Gaming Corporation
- Ontario Power Generation Inc.
- Royal Botanical Gardens
- Toronto Area Transit Operating Authority
- St. Lawrence Parks Commission

The *Standards and Guidelines* provide a series of definitions considered during the course of the assessment:

A provincial heritage property is defined as the following:

> Provincial heritage property means real property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.

A provincial heritage property of provincial significance is defined as the following:

> Provincial heritage property that has been evaluated using the criteria found in *Ontario Heritage Act* O. Reg. 10/06 and has been found to have cultural heritage value or interest of provincial significance.

A built heritage resource is defined as the following:

> …one or more significant buildings (including fixtures or equipment located in or forming part of a building), structures, earthworks, monuments, installations, or remains associated with architectural, cultural, social, political, economic, or military history and identified as being important to a community. For the purposes of these Standards and Guidelines, "structures" does not include roadways in the provincial highway network and in-use electrical or telecommunications transmission towers.

A cultural heritage landscape is defined as the following:

> …a defined geographical area that human activity has modified and that has cultural heritage value. Such an area involves one or more groupings of individual heritage features, such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form distinct from that of its constituent elements or parts. Heritage conservation districts designated under the *Ontario Heritage Act*, villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trails, and industrial complexes of cultural heritage value are some examples.

Additionally, the *Planning Act* (1990) and related *Provincial Policy Statement* (*PPS*), which was updated in 2014, make several provisions relating to heritage conservation. One of the general purposes of the *Planning Act* is to integrate matters of provincial interest in provincial and municipal planning decisions. To inform all those involved in *Planning Act*ivities of the scope of these matters of provincial interest, Section 2 of the *Planning Act* provides an extensive listing. These matters of provincial interest shall be regarded when certain authorities, including the council of a municipality, carry out their responsibilities under the *Act*. One of these provincial interests is directly concerned with:

> 2.(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest

Part 4.7 of the *PPS* states that:

> The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.
>
> Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.
>
> Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.

> In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.

Those policies of relevance for the conservation of heritage features are contained in Section 2- Wise Use and Management of Resources, wherein Subsection 2.6 - Cultural Heritage and Archaeological Resources, makes the following provisions:

> 2.6.1 Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

Several definitions that have specific meanings for use in a policy context accompany the policy statement. These definitions include built heritage resources and cultural heritage landscapes.

A *built heritage resource* is defined as: "a building, structure, monument, installation or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Aboriginal community" (Ministry of Municipal Affairs and Housing 2014).

A *cultural heritage landscape* is defined as "a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association" (Ministry of Municipal Affairs and Housing 2014). Examples may include, but are not limited to farmscapes, historical settlements, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.

In addition, significance is also more generally defined. It is assigned a specific meaning according to the subject matter or policy context, such as wetlands or ecologically important areas. With regard to cultural heritage and archaeology resources, resources of significance are those that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people (Ministry of Municipal Affairs and Housing 2014).

Criteria for determining significance for the resources are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation (Ministry of Municipal Affairs and Housing 2014).

Accordingly, the foregoing guidelines and relevant policy statement were used to guide the scope and methodology of the cultural heritage assessment.

2.2 City of Kawartha Lakes Cultural Heritage Policies

Section 10 of the *City of Kawartha Lakes Official Plan* (2012) sets out a number of policies with regard to cultural heritage resources. The Official Plan is currently under appeal. Policies that are relevant to this study include:

10. Culture and heritage

10.5 Heritage:

a) The City shall encourage the conservation and preservation of its significant built heritage resources, significant cultural heritage landscapes and significant archaeological resources.

c) Development in areas considered to be of architectural or heritage value shall have regard for the conservation and preservation of architecture or historic buildings, features or sites therein.

d) The City recognizes that the City's heritage resources include individual buildings, group of buildings, streetscapes, neighbourhoods, landscaping and landmarks. For the purpose of this section, the term "building" is considered to include both buildings and structures and the term "conserve" is generally considered to mean retention of the existing form, material and integrity of site.

f) The City shall require development proponents to conserve such resources through preservation in-situ, documentation, avoidance and/or removal.

g) The City shall ensure land development adjacent to protected heritage properties are not adversely impacting identified heritage attributes of these properties.

i) The City shall encourage comprehensive cultural heritage resource mapping, archaeological resource mapping, heritage master planning and other heritage site inventories for the City;

j) The City shall seek the advice of the Province regarding cultural heritage conservation matters when appropriate.

30. Definitions

Adjacent lands:

means those lands, contiguous to a specific Natural Heritage Feature or Area, where it is likely that development or site alteration would have a negative impact on the Feature or Area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches, which achieve the same objectives.

2.3 Data Collection and Methodology

During the cultural heritage assessment, all potentially affected cultural heritage resources are subject to inventory. Short form names are usually applied to each resource type, (e.g. barn, residence).

Generally, when conducting a preliminary identification of cultural heritage resources, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of cultural heritage resources in a geographic area.

Background historical research, which includes consultation of primary and secondary source research and historical mapping, is undertaken to identify early settlement patterns and broad agents or themes of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as retaining cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified cultural heritage resources. The field review is also used to identify cultural heritage resources that have not been previously identified on federal, provincial, or municipal databases.

Several investigative criteria are utilised during the field review to appropriately identify new cultural heritage resources. These investigative criteria are derived from provincial guidelines, definitions, and experience. During the environmental assessment, a built structure or landscape is identified as a cultural heritage resource if it is considered to be 40 years or older, and if the resource satisfies at least one of the following criteria:

Design/Physical Value:

- It is a rare, unique, representative or early example of a style, type, expression, material or construction method.
- It displays a high degree of craftsmanship or artistic merit.
- It demonstrates a high degree of technical or scientific achievement.
- The site and/or structure retains original stylistic features and has not been irreversibly altered so as to destroy its integrity.
- It demonstrates a high degree of excellence or creative, technical or scientific achievement at a provincial level in each period.

Historical/Associative Value:

- It has a direct association with a theme, event, belief, person, activity, organization, or institution that is significant to: the City of Kawartha Lakes; the Province of Ontario; or Canada.
- It yields, or has the potential to yield, information that contributes to an understanding of the history of: the City of Kawartha Lakes; the Province of Ontario; or Canada.
- It demonstrates or reflects the work or ideas of an architect, artist builder, designer, or theorist who is significant to: the City of Kawartha Lakes; the Province of Ontario; or Canada.
- It represents or demonstrates a theme or pattern in Ontario's history.
- It demonstrates an uncommon, rare or unique aspect of Ontario's cultural heritage.

- It has a strong or special association with the entire province or with a community that is found in more than one part of the province. The association exists for historical, social, or cultural reasons or because of traditional use.
- It has a strong or special association with the life or work of a person, group or organization of importance to the province or with an event of importance to the province.

Contextual Value:

- It is important in defining, maintaining, or supporting the character of an area.
- It is physically, functionally, visually, or historically linked to its surroundings.
- It is a landmark.
- It illustrates a significant phase in the development of the community or a major change or turning point in the community's history.
- The landscape contains a structure other than a building (fencing, culvert, public art, statue, etc.) that is associated with the history or daily life of that area or region.
- There is evidence of previous historical and/or existing agricultural practices (e.g. terracing, deforestation, complex water canalization, apple orchards, vineyards, etc.)
- It is of aesthetic, visual or contextual important to the province.

If a resource meets one of these criteria it will be identified as a cultural heritage resource and is subject to further research where appropriate and when feasible. Typically, detailed archival research, permission to enter lands containing heritage resources, and consultation is required to determine the specific heritage significance of the identified cultural heritage resource.

When identifying cultural heritage landscapes, the following categories are typically utilized for the purposes of the classification during the field review:

Farm complexes:	comprise two or more buildings, one of which must be a farmhouse or barn, and may include a tree-lined drive, tree windbreaks, fences, domestic gardens and small orchards.
Roadscapes:	generally two-lanes in width with absence of shoulders or narrow shoulders only, ditches, tree lines, bridges, culverts and other associated features.
Waterscapes:	waterway features that contribute to the overall character of the cultural heritage landscape, usually in relation to their influence on historical development and settlement patterns.
Railscapes:	active or inactive railway lines or railway rights of way and associated features.
Historical settlements:	groupings of two or more structures with a commonly applied name.

Streetscapes:	generally consists of a paved road found in a more urban setting, and may include a series of houses that would have been built in the same time period.
Historical agricultural landscapes:	generally comprises a historically rooted settlement and farming pattern that reflects a recognizable arrangement of fields within a lot and may have associated agricultural outbuildings, structures, and vegetative elements such as tree rows.
Cemeteries:	land used for the burial of human remains.

Results of the desktop data collection and field review are contained in Section 3.0, while Section 4.0 contain conclusions and recommendations with respect to potential impacts of the undertaking on identified cultural heritage resources. Cultural heritage resource location mapping is provided in Section 6.0.

3.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT

This section provides a brief summary of historical research and a description of identified above ground cultural heritage resources that may be affected by the proposed undertaking.

3.1 Background Historical Summary

A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including Indigenous and Euro-Canadian land use and settlement.

3.1.1 Indigenous Land Use and Settlement

Southern Ontario has a cultural history that begins approximately 11,000 years ago. The land now encompassed by the former Township of Vaughan has a cultural history which begins approximately 10,000 years ago and continues to the present. Table 1 provides a general summary of the history of Indigenous land use and settlement of the area.[1]

Table 1: Outline of Southern Ontario Prehistory

Period	Archaeological/ Material Culture	Date Range	Lifeways/ Attributes
PALEO-INDIAN PERIOD			

[1] While many types of information can inform the precontact settlement of the City of Kawartha Lakes, this summary table provides information drawn from archaeological research conducted in southern Ontario over the last century. As such, the terminology used in this review related to standard archaeological terminology for the province rather than relating to specific historical events within the region. The chronological ordering of this summary is made with respect to two temporal referents: BCE – before Common Era and CE – Common Era.

Period	Archaeological/ Material Culture	Date Range	Lifeways/ Attributes
Early	Gainey, Barnes, Crowfield	9000-8500 BCE	Big game hunters
Late	Holcombe, Hi-Lo, lanceolate	8500-7500 BCE	Small nomadic groups
ARCHAIC			
Early	Nettling, Bifurcate-base	7800-6000 BCE	Nomadic hunters and gatherers
Middle	Kirk, Stanley, Brewerton, Laurentian	6000-2000 BCE	Transition to territorial settlements
Late	Lamoka, Genesee, Crawford Knoll, Innes	2500-500 BCE	Polished/ground stone tools (small stemmed)
WOODLAND PERIOD			
Early	Meadowood	800-400 BCE	Introduction of pottery
Middle	Point Peninsula, Saugeen	400 BCE-CE 800	Incipient horticulture
Late	Algonkian, Iroquoian	CE 800-1300	Transition to village life and agriculture
	Algonkian, Iroquoian	CE 1300-1400	Establishment of large palisaded villages
	Algonkian, Iroquoian	CE 1400-1600	Tribal differentiation and warfare
POST-CONTACT PERIOD			
Early	Huron, Neutral, Petun, Odawa, Ojibwa	CE 1600-1650	Tribal displacements
Late	Six Nations Iroquois, Ojibwa	CE 1650-1800's	
	Euro-Canadian	CE 1800-present	European settlement

The study area is within Treaty 20 and the Williams Treaties of 1923, on the traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, including the Mississaugas of Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Scugog Island First Nation and the Chippewas of Beausoleil First Nation, Georgina Island First Nation and the Rama First Nation (Williams Treaties First Nations 2017). In October and November of 1923, the governments of Canada and Ontario, chaired by A.S. Williams, signed treaties with the Chippewa and Mississauga for three large tracts of land in central Ontario and the northern shore of Lake Ontario which had never been included in previous treaties (Department of Indigenous and Northern Affairs 2013). Part of the Williams Treaties area includes lands originally negotiated under the Rice Lake Treaty, Treaty No. 20, signed on November 5, 1818 between the Mississaugas in the Rice Lake area and the Crown, which opened up colonization for settlers (Department of Indigenous and Northern Affairs 2016).

3.1.2 Historical Euro-Canadian Land Use: Township Survey and Settlement

Historically, the study area is located in the former Fenelon Township, former Somerville Township, and former Verulam Township, Victoria County.

Fenelon Township

Fenelon Township was named after Father Fenelon, a Sulpician missionary and explorer, who in 1668 founded a mission on the Bay of Quinte (Mika and Mika 1981).

Originally surveyed in 1822, settlement and immigration to the area was minimal until the 1830s. An early settler to the township was Angus McLaren, who inhabited land at what became known as McLaren's Creek. Following McLaren were the Edwards, Waldons, and Tompkins, who made their homes in the southern part of the township (Mika and Mika 1981).

Many Irish Protestants came to settle the area around Sturgeon Lake while the centre of the township was settled by Scottish Presbyterians. Some early inhabitants around Cameron Lake were John Bellsford, Hamilton and Samuel Boyce, and Robert Dennistoun (Mika and Mika 1981).

There are only two incorporated villages in the township: Fenelon Falls and Sturgeon Point. The police village of Cambray became part of the township in 1975. Other small villages within the township are Pleasant Point, Glenarm, Islay, and Rosedale (Mika and Mika 1981).

Fenelon Falls

The site chosen for the settlement which would become Fenelon Falls was a natural and strategic choice. Located along a narrow river connecting the shallow Cameron Lake and Sturgeon Lake at the point of a waterfall provided the village site with two major advantages for any pioneer village: water-power and water transportation (Allen et al. 2001). The village lot was surveyed on Lot 23 of Concession X and was patented to the Honourable Duncan Cameron, a Toronto banker and Provincial Secretary of Upper Canada. Surrounding lands were granted to the Earl of Mountcashel. Cameron sold Lot 23 to Robert Jameson, of the famous Irish Whisky distilling family, in 1833 (OAA 1985; Maryboro Lodge 2015; Kirkconnell 1967). In 1834 James Wallis, the founder of Fenelon Falls, partnered with Jameson to erect a mill at the waterfall at the southeast end of Cameron Lake. They harnessed the power of the waterfall which cascaded down a 23-foot cliff into a rocky gorge that flowed from Cameron Lake to Sturgeon Lake. This became the nucleus of a settlement, first known as Cameron Falls after Duncan Cameron. The name changed to Fenelon Falls in 1838 (Mika and Mika 1981; Rayburn 1997).

The lands used for the first church were donated by Wallis in 1835, who also conducted the services until the first Anglican clergyman arrived in the settlement in 1838 (Mika and Mika 1981). In 1837, Wallis built a house for his family near the mill, at 50 Oak Street, and called it Maryboro. By 1838 Wallis had opened a post office as well as a grist mill. The main industry of the settlement was lumber and at one point three large sawmills operated in the village (Mika and Mika 1981).

During the 1870s the railway came to the village which helped to stimulate the local economy. The Fenelon Falls Gazette was launched by Mr. E.D. Hand in 1872 (Kirkconnell 1967). Fenelon Falls was incorporated as a village in 1875. The first Reeve was JD Smith; Councillors: JW Fitzgerald; Joseph McArthur, Wm Jordan and Richard Jackson (Mika and Mika 1981; Kirkconnell 1967). By the 1880s the village had several stores operating, as well as a bank, library, and hotel. Work began on a local section of the Trent Canal in 1882 and four years later the Fenelon Falls locks opened (Mika and Mika 1981). The population rose and fell over the years, from 1,312 people in 1886 to 837 in 1920, to 1,359 in 1967. This is likely due to the decline of the lumber industry and the rise of tourism in the twentieth century (Kirkconnell 1967).

Cameron

The community of Cameron was named after Duncan Cameron, who was a Toronto banker. He had been granted land in the Rosedale District, west of Cameron Lake in the early days of the Euro-Canadian settlement. In 1860, a post office opened in Cameron (Mika and Mika 1977).

Rosedale

The town of Rosedale was named in honour of John D. Cameron's wife, Rosa (Richard Fortin Associates 2012). In the summertime, Rosedale turned into a busy summer resort community (Mika and Mika 1983).

Somerville Township

The township was originally surveyed in the early 1830s and was named after Julia Somerville, the wife of Sir Francis Bond Head. The soil conditions within the township were unsuited for agriculture which delayed settlement until the 1860s. It was then that that Bobcaygeon colonization road was constructed along the eastern boundary of the township and lumberjacks came into the heavily forested region (Mika and Mika 1983).

Early settlers to the township include the Badgerow, Cookman, Ead, Mason, Powers Taggart, and Watson families.

Within the township, Kinmount, a police village, began to take shape in 1861 when John Hunter built a mill on the river. Bringing further growth to the hamlet was the Victoria Railway in 1876. The community experienced a setback when in 1890 a fire destroyed many of the village businesses.

During the 1920s, a survey of the township discovered that the once heavily forested land had been burnt over to nearly 62 percent. The township's forests had been greatly depleted during the height of lumbering operations from the 1850s to the 1880s. Reforestation efforts began in the later twentieth century (Mika and Mika 1983).

Baddow

The community of Baddow was originally named Ead's Settlement after its pioneer Joseph Ead. Other early settlers included William Cookman, William Mason, and Isaac Watson. In 1865, a Baptist church was established in Baddow and a post office followed in 1876 (Mika and Mika 1977).

Trent-Severn Waterway

Planning of the Trent-Severn Waterway began as early as 1785, initially as a means of transporting commercial and military goods between Lake Ontario into the Upper Great Lakes while avoiding the

border with the United States as a safeguard during periods of hostility. Construction began with a lock at Bobcaygeon in 1833. Construction continued intermittently depending on the federal governments in power, and as popular support and funding allowed. The entire 387 km route between the outlet of the Trent River in Trenton on Lake Ontario, and Port Severn in Georgian Bay (Lake Huron) was completed in 1920 (Legget 2015; Libraries and Archives Canada 2005; Parks Canada 2017a).

The waterway predominantly follows a series of natural lakes and rivers, supplemented by artificial canals, passing generally northwest from Lake Ontario through the Trent River, Rice Lake, Otonabee River, the Kawartha Lakes, Lake Simcoe, Lake Couchiching, Severn River, and into Georgian Bay. The waterway is accessed by a total of 44 locks, 75 control dams, 15 swing bridges, and two marine railways at Big Chute. While originally conceived as a commercial and military transportation route, the waterway primarily serves recreational boaters (Libraries and Archives Canada 2005; Legget 2015; Parks Canada 2017a)

Construction of the Trent-Severn Waterway had a devastating effect on Indigenous people living in the area by flooding their traditional territory, including the destruction of wild rice beds, burials, and traditional use areas. It is estimate that 12,000 hectares of island reserve lands were lost due to flooding in 1837, 1856, and 1880. In 2012 the Canadian government approved a $71 million settlement with Curve Lake, Hiawatha and Mississaugas of Scugog Island First Nations as part of the Islands in the Trent System Claim for compensation of this loss (Peterborough This Week 2012).

The section of the Waterway from Young's Point to Rosedale was the most extensively developed for transportation in the nineteenth century. The first lock in this section was finished at Bobcaygeon in 1835. The Fenelon Falls Lock No.34 was built as a “double lock in flight” in the 1880s. The Fenelon Lock was one of the first applications of dynamite to build the canal, but a fixed rail bridge impeded navigation, because the Crown and Grand Trunk Railway couldn’t agree on who should pay to repair it. The railway bridge at Fenelon Falls is the earliest example of a plate girder construction on the waterway. In the process of building a new lock in 1963, the original face of the lower entrance walls is of natural limestone was rebuilt into the lower entrance walls to retain some of the first lock's heritage character (Beahen 1978:10–15).

In 1868 the Ontario Department of Public Works proposed construction of locks at Rosedale, in response to pressure from the Toronto and Nipissing Railway and at Fenelon Falls, to open a route connected the sawmill operators with the railway. It included the construction of a dam halfway between Balsam and Cameron Lakes which resulted in flooding of the Balsam River and the lock. The Rosedale Lock No. 35 was completed in 1873 and was a wooden 100 feet long by 30 feet wide lock, modelled on one at Lindsay. The dam also had a small timber slide (Wilson 2017:19–20). This was abandoned in 1910. At Fenelon Falls near the west end of the canal cut is Maryboro Lodge, built in the 1830s by James Wallis but now home to the Fenelon Museum (Beahen 1978:10–15).

3.1.3 Review of Historical Mapping

The 1877 *Map of the County of Victoria* was reviewed to determine the potential for the presence of cultural heritage resources within the study area from the nineteenth century (Figure 2).

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference about the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historical mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

The 1877 *Map of the County of Victoria* (Figure 2) depicts the in-town study area as within the developed area of the historic Village of Fenelon Falls. Within the in-town study area a wharf and locks are depicted. The in-town study area follows the Fenelon River as it passes through Fenelon Falls. The bypass study area is depicted as following historically surveyed roads through Fenelon Township and Somerville Township. These roads are Highway 35, Concession Road 3, Kawartha Lakes County Road 121, Northline Road, Suggitt Road, Fells Bay Road, Blythe Shore Road, Sturgeon Point Road (Kawartha Lakes County Road 25), West Street South, Gillis Street, Wagar Road, Hickory Beach Road, Clifton Street, Gold Street, and Potters Road; as well as passing through the historic Village of Rosedale. Also, a telegraph line is illustrated as following some of the historic roads. The bypass areas of interest are both depicted in a rural agricultural context. The southern area of interest has the Victoria Railway transecting its northwestern portion. The bypass study area transects the Rosedale River, Martin Creek (labelled on the map as Two Mile Creek), Rutherford Creek, Burnt River, and Goose Lake. There are several residences and orchards illustrated along the bypass study area and the bypass areas of interest. A graveyard, churches, and schools are also depicted along and within the study area.

In addition to nineteenth-century mapping, historical topographic mapping and aerial photographs from the twentieth century were examined. This report presents maps and aerial photographs from 1940, 1954, and 1994. These do not represent the full range of maps consulted for the purpose of this study but were judged to cover the full range of land uses that occurred in the area during this period.

The twentieth-century mapping and photography reveals that the study area retained a rural agricultural character throughout the twentieth century. The 1940 topographic map (Figure 3) demonstrates that minimal development occurred in the Villages of Fenelon Falls and Rosedale. Three lighthouses are depicted within the study areas. The historically surveyed roads are depicted as following their present alignments. The Victoria Railway is now labelled as the Canadian National Railway. A canal is labelled on the map connecting Balsam Lake to Cameron Lake. The settlement of Powles Corners is now depicted on the map. Perrin Creek is illustrated on the map. The 1954 aerial photograph (Figure 4) depicts the study area in the same context as earlier mapping. Most of the study area remains agricultural in nature. The 1994 topographic map (Figure 5) illustrates that the study areas remained in a rural agricultural context into the late twentieth century. The in-town study area had some further development with a municipal hall, medical centre, and filtration plant depicted with the

study area. Along the bypass study area and within the areas of interest, there has been some development with additional houses illustrated and the community of Isaacs Glen labelled on the map.

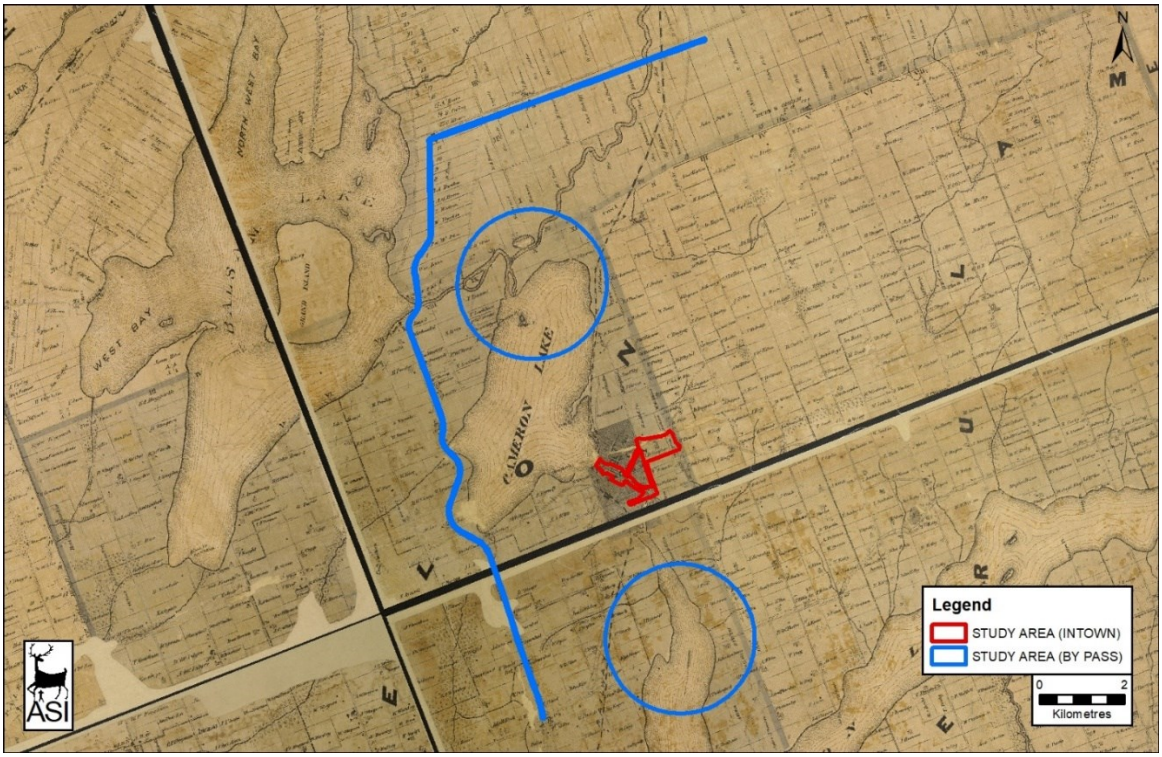


Figure 2: The study area overlaid on the 1877 *Map of the County of Victoria*.

Base Map: Patterson 1877

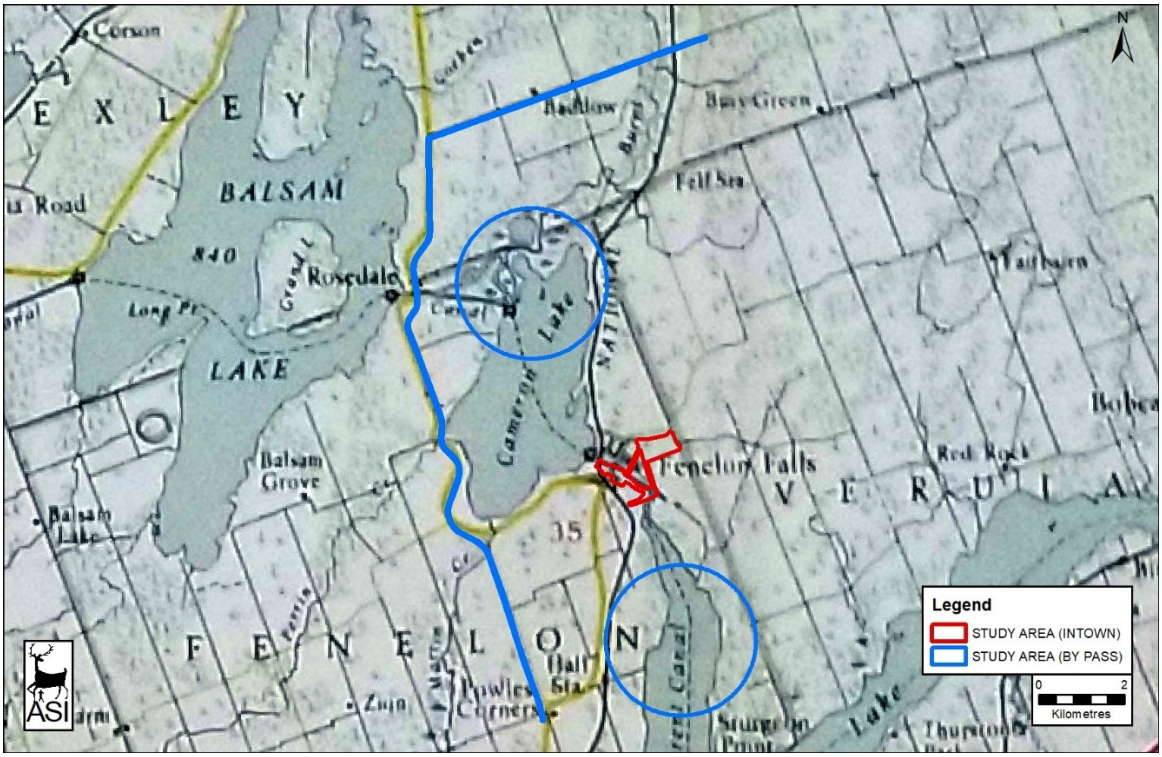


Figure 3: The study area overlaid on the 1940 Lake Simcoe NTS map.
Base Map: NTS Sheet No. 31/D (Department of National Defence 1940)

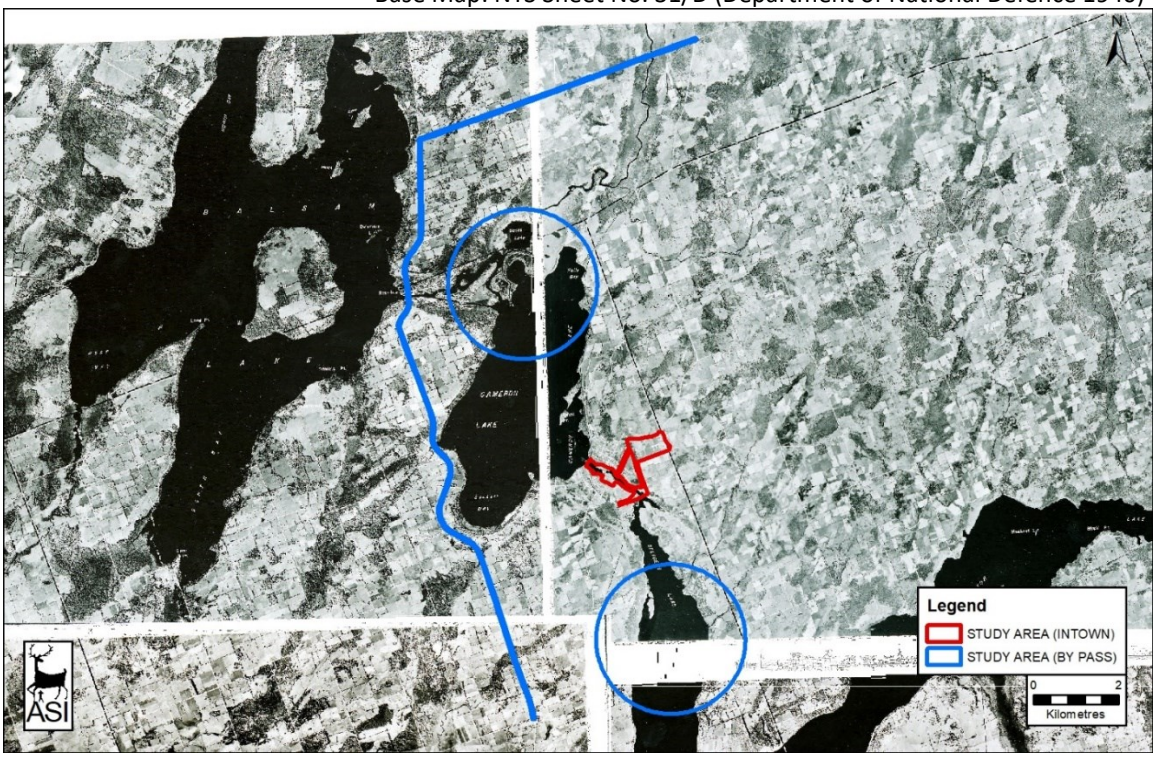


Figure 4: The study area overlaid on the 1954 aerial photograph.
Reference: Plates: 444.783, 444.784, 445.783, and 445.784 (Hunting Survey Corporation 1954a, b, c, d)

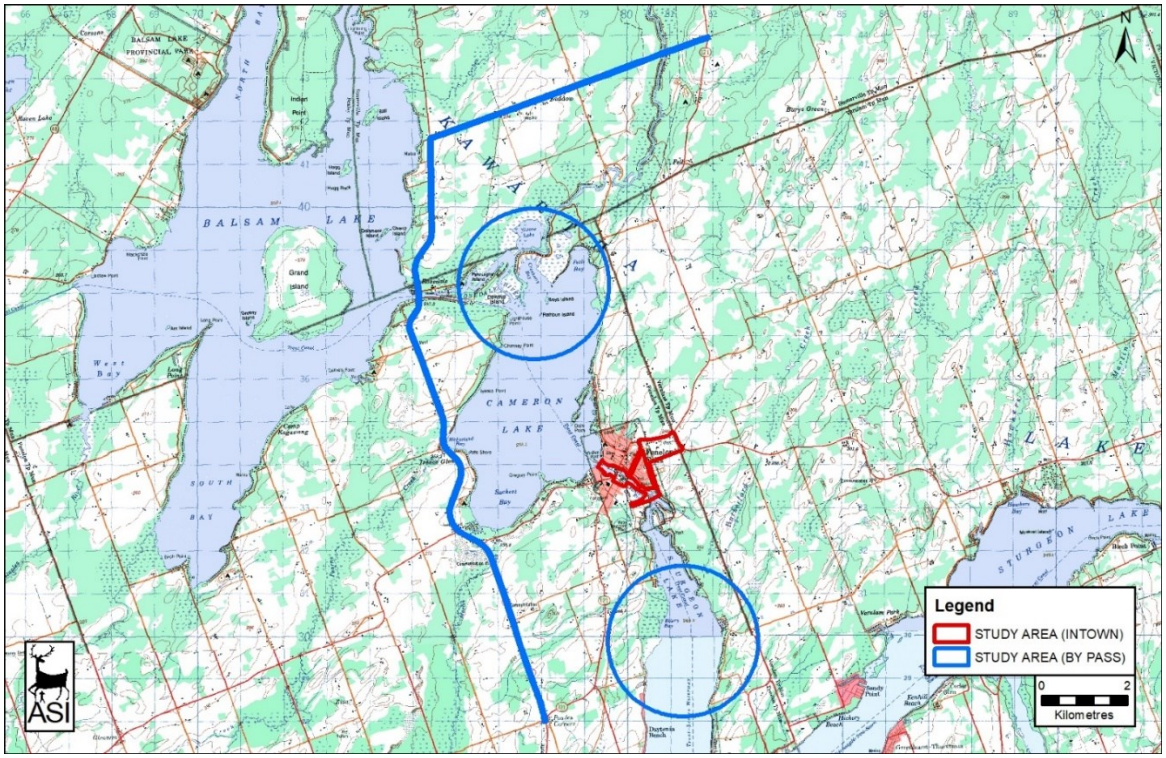


Figure 5: The study area overlaid on the 1994 Fenelon Falls NTS map.
Base Map: NTS Sheet No. 31/D-10 (Department of Energy, Mines and Resources 1994)

3.2 Existing Conditions

3.2.1 Review of Existing Heritage Inventories

The preliminary identification of existing cultural heritage resources within the study area was undertaken by consulting the following resources:

- The Kawartha Lakes Heritage Property Register provides a list of cultural heritage resources that are listed as properties of potential cultural heritage value, and properties that are designated under Part IV and Part V of the *Ontario Heritage Act*[2];
- The inventory of Ontario Heritage Trust easements[3];
- The Ontario Heritage Trust's *Ontario Heritage Plaque Guide*, an online, searchable database of Ontario Heritage Plaques[4];
- *Ontario's Historical Plaques* website[5];

[2] Reviewed 12 July 2019 (https://www.kawarthalakes.ca/en/business-growth/heritage-designated-buildings-register.aspx)
[3] Reviewed 12 July 2019 (https://www.heritagetrust.on.ca/en/property-types/easement-properties)
[4] Reviewed 12 July 2019 (https://www.heritagetrust.on.ca/en/index.php/online-plaque-guide)
[5] Reviewed 12 July 2019 (http://www.ontarioplaques.com/)

- Inventory of known cemeteries/burial sites in the Ontario Genealogical Society's online databases[6];
- Parks Canada's *Canada's Historic Places* website: available online, the searchable register provides information on historic places recognized for their heritage value at the local, provincial, territorial, and national levels[7];
- Parks Canada's *Directory of Federal Heritage Designations*, a searchable online database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses[8];
- Canadian Heritage River System. The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage[9]; and,
- United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites[10].

In addition, the following stakeholders were contacted to gather information on potential cultural heritage resources, active and inactive cemeteries, and areas of identified Indigenous interest within and/or adjacent to the study area:

- The Economic Development Officer – Arts, Culture and Heritage, City of Kawartha Lakes, was contacted to gather information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email communication 12 July 2019 through website, Debra Soule from the City of Kawartha Lakes responded via email communication 24 July 2019)[11]. A response confirmed the locations of previously identified cultural heritage resources.

- Karla Barboza; Team Lead, Heritage, Ministry of Heritage, Sport, Tourism and Culture Industries, was also contacted to gather information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email communication 12 July 2019 and 16 July 2019)[12]. A response confirmed that there are no properties designated by the Ministry and no provincial heritage properties within the study area.

- The Ontario Heritage Trust was also contacted to gather information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email communication 12 July 2019, Kevin DeMille responded via email 19 July 2019). A response confirmed that the Ontario Heritage Trust does not have any conservation easements or Trust-owned properties in the study area.

[6] Reviewed 12 July 2019 (http://vitacollections.ca/ogscollections/2818487/data?grd=3186)
[7] Reviewed 12 July 2019 (https://www.historicplaces.ca/en/pages/about-apropos.aspx)
[8] Reviewed 12 July 2019 (https://www.pc.gc.ca/apps/dfhd/search-recherche_eng.aspx)
[9] Reviewed 12 July 2019 (http://chrs.ca/the-rivers/)
[10] Reviewed 12 July 2019 (http://whc.unesco.org/en/list/?search=&order=country)
[11] Contacted 12 July 2019 (https://www.kawarthalakes.ca/en/business-growth/heritage-designated-buildings-register.aspx
[12] Contacted 12 July 2019 at registrar@ontario.ca.

The study area was narrowed and this report has been updated to describe the existing conditions of the two focused study areas; the Bypass study area and the In Town study area (see Figure 6 to Figure 8).

A review of federal registers and municipal and provincial inventories revealed that there is one previously identified resource, The Trent-Severn Waterway of cultural heritage value within the updated study area. The Trent-Severn Waterway has been identified as a National Historic Site.

3.2.2 Field Review

Following the narrowing of the study area, a field review of the Bypass and the In Town study areas were undertaken by Johanna Kelly, Cultural Heritage Associate, ASI, on October 22 and 23, 2019 to document the existing conditions. The field review was preceded by a review of available, current and historical, aerial photographs and maps (including online sources such as Google maps). These large-scale maps were reviewed for any potential cultural heritage resources which may be extant in the study area. The existing conditions of the study area are described below. Identified cultural heritage resources are discussed in Section 3.2.3 and in detail in Section 6.0, and they are mapped in Section 7.0.

The updated Bypass study area extends along Concession Road 3 between Highway 35 and County Road 121. Concession Road 3 carries one lane of vehicular traffic in an east-west direction with narrow gravel shoulders on either side (Plate 1). The lands between Highway 35 and Northline Road primarily consists of active agricultural lands and associated residences. The historical community of Baddow is located at the junction of Concession Road 3 with Suggitt Road and Potters Road (Plate 2). This intersection consists of historical agricultural lands to the north and late twentieth century residences to the south. To the east of Northline Road, the lands within the study area consist primarily of forested land (Plate 3 and Plate 4). Burnt River intersects with the study area between Riverbank and Cedarplank Roads on the west bank and Brook and River Roads on the east bank (Plate 5 and Plate 6). Residences line both banks of the river and a boat launch is located at the terminal end of Concession Road 3 on the west bank of the Burnt River. The Victoria Rail Trail intersects Concession Road 3 between the Burnt River and County Road 121.





Plate 1: Bypass study area, looking east along Concession Road 3, agricultural fields are visible on either side of the road.



Plate 2: Bypass study area, historical community of Baddow, looking south from Concession Road 3 along Suggit and Potters Roads.



Plate 3: Bypass study area, looking east along Concession Road 3, wooded land visible on either side of the road.



Plate 4: Bypass study area, looking west along Concession Road 3.



Plate 5: Bypass study area, looking east from the terminal end of Concession Road 3 towards the boat launch and Burnt River.

Plate 6: Bypass study area, looking west along the terminal end of Concession Road 3 towards the Burnt River and Brook and River Roads.

The updated In Town study area is irregularly shaped and extends across the Trent River. The portion of the study area on the east side of the Trent River is primarily agricultural land, with residential properties lining the east bank of the river. The land within the study area to the west of Sturgeon Point Road consists almost exclusively of forested land and active agricultural properties and their associated residences (Plate 7). Temporally mixed residential properties line the east bank of the Trent River along Francis Street East, Concession Road, and Elgin Street (Plate 8 and Plate 9). The Fenelon Falls Cemetery is located at the intersection of Elgin Street and Concession Road and a health centre is located on Francis Street at Concession Road. Francis Street East carries one lane of vehicular traffic in either direction. The right-of-way contains gravel shoulders to the south of Concession Road and paved pedestrian sidewalks to the west of Concession Road. Concession Road carries one lane of vehicular traffic in either direction with gravel shoulders.

The portion of the In Town study area on the west side of the Trent River is comprised primarily of residential and industrial properties. This portion of the study area contains short term seasonal rental properties as well as residential properties along the west bank of the Trent River. A school, long term care facility, and marine salvage and recycling facility are located on Wychwood Crescent. Wychwood Crescent, Ellice Street, and Juniper Street all carry a single lane of vehicular traffic in either direction with gravel shoulders (Plate 10 to Plate 12). The Victoria Rail Trail intersects with Wychwood Crescent between Ellice Street and West Street South.



Plate 7: In Town study area, looking south along Sturgeon Point Road



Plate 8: In Town study area, looking west along Frances Street East.



Plate 9: In Town study area, looking south along Concession Road. The Fenelon Falls Cemetery is on the left.



Plate 10: In Town study area, looking south along Ellice Street.



Plate 11: In Town study area, looking east along Wychwood Crescent.



Plate 12: In Town study area, looking southeast towards the terminal end of Juniper Street.

3.2.3 Identified Cultural Heritage Resources

Based on the results of the background research and field review, 17 potential cultural heritage resources (CHR) were identified within and/or adjacent to the Bypass and the In Town study areas (see Figure 6 to Figure 8). The cultural heritage resources include eight built heritage resources (BHR) and nine cultural heritage landscapes (CHLs) (Table 2). A detailed inventory of these cultural heritage resources within the study area is presented in Section 7.0 and mapping of the features is provided in Section 8.0 of this report.

Table 2: Identified cultural heritage resources within and/or adjacent to the study area

Feature ID	Location	Resource Type	Heritage Recognition	Description/Comments
CHL 1	19 Somerville 3rd Concession	Farmstead	Identified during field review	Nineteenth century farmstead
CHL 2	Trent-Severn Waterway	Waterway and Locks	National Historic Site	Trent-Severn Waterway National Historic Site; Fenelon Falls Lock 34.
CHL 3	165 Somerville 3rd Concession	Farmstead	Identified during field review	Nineteenth or early-twentieth century farmstead
CHL 4	211 Somerville 3rd Concession	Farmstead	Identified during field review	Nineteenth or early-twentieth century farmstead
CHL 5	903 Northline Road	Farmstead	Identified during field review	Nineteenth century farmstead
CHL 6	902 Northline Road	Farmstead	Identified during field review	Nineteenth century farmstead
CHL 7	Victoria Rail Trail	Former Rail Corridor	Identified during field review	Currently in use as a recreational trail, the alignment follows the path of the historical Victoria Railway
CHL 8	589 and 595 County Road 8	Farmstead	Identified during field review	Nineteenth or early-twentieth century farmstead
CHL 9	84 Concession Road	Cemetery	Identified during field review	Fenelon Falls Cemetery

Table 2: Identified cultural heritage resources within and/or adjacent to the study area

Feature ID	Location	Resource Type	Heritage Recognition	Description/Comments
BHR 1	72 Somerville 3rd Concession	School	Identified during field review	Former schoolhouse, currently used as a community centre
BHR 2	208 Somerville 3rd Concession	Church	Identified during field review	Baddow Baptist Church
BHR 3	269 Somerville 3rd Concession	Church	Identified during field review	Nineteenth-century church
BHR 4	94 Sturgeon Point Road	Farmstead residence	Identified during field review	Nineteenth-century farmstead
BHR 5	29 Elgin Street	Residential	Identified during field review	Vernacular residence
BHR 6	69 Concession Road	Residential	Identified during field review	Vernacular residence
BHR 7	34 Concession Road	Residential	Identified during field review	Vernacular residence
BHR 8	207 Francis Street East	Residential	Identified during field review	Vernacular residence

3.2.4 Screening for Potential Impacts

To assess the potential impacts of the undertaking, identified cultural heritage resources are considered against a range of possible impacts, based on the *Ontario Heritage Tool Kit InfoSheet #5: Heritage Impact Assessments and Conservation Plans* (Ministry of Heritage, Sport, Tourism and Culture Industries 2006) which include:

- Destruction of any, or part of any, significant heritage attributes or features;
- Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance;
- Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden;
- Isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
- Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces;
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.

Several additional factors are also considered when evaluating potential impacts on identified cultural heritage resources. These are outlined in a document set out by the Ministry of Culture and Communications (now Ministry of Heritage, Sport, Tourism and Culture Industries) and the Ministry of the Environment entitled *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992) and include:

- Magnitude: the amount of physical alteration or destruction which can be expected;
- Severity: the irreversibility or reversibility of an impact;
- Duration: the length of time an adverse impact persists;
- Frequency: the number of times an impact can be expected;
- Range: the spatial distribution, widespread or site specific, of an adverse impact; and
- Diversity: the number of different kinds of activities to affect a heritage resource.

For the purposes of evaluating potential impacts of development and site alteration, MHSTCI (2010) defines "adjacent" as: "contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan."

Once a technically preferred detailed design for the Fenelon Falls Area Crossing Municipal Class EA study area has been identified, the cultural heritage resources identified within and adjacent to the study area will be evaluated against the above criteria and a summary of impact screening results will be provided. Various works associated with infrastructure improvements have the potential to affect cultural heritage resources in a variety of ways, and as such, appropriate mitigation measures for the undertaking need to be considered.

Where any above-ground cultural heritage resources are identified, which may be affected by direct or indirect impacts, appropriate mitigation measures should be developed. This may include completing a heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

4.0 CONCLUSIONS

The results of background historic research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use and residential development history dating back to the early nineteenth century. A review of federal registers and municipal and provincial inventories revealed that there is one previously identified feature of cultural heritage value within the Fenelon Falls Area Crossing study area. An additional 16 features were identified during the fieldwork.

Key Findings

- A total of 17 cultural heritage resources were identified within and/or adjacent to the study area.

- Eight built heritage resources (BHRs) and nine cultural heritage landscapes (CHLs) were identified within and/or adjacent to the study area. One CHL is identified as a National Historic Site and eight CHLs and eight BHRs were identified during the field review.

- Identified cultural heritage resources are historically, architecturally, and contextually associated with land use patterns in the City of Kawartha Lakes and more specifically representative of the early settlement of the communities of Baddow and Fenelon Falls.

5.0 RECOMMENDATIONS

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. Once detailed designs of the proposed In Town and Bypass work are available, this report will be updated with a confirmation of impacts of the undertaking on the cultural heritage resources identified within and/or adjacent to the study area and will recommend appropriate mitigation measures. Mitigation measures may include, but are not limited to, completing a property-specific heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

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7.0 Cultural Heritage Resource Inventory

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
CHL 1	19 Somerville 3rd Concession	Farmstead	Identified during field review	Historical: -Structure present in same location on 1945 mapping. Physical/Design: -One-and-a-half storey nineteenth-century Ontario farmhouse with centre gable, large front porch, clad in horizontal white coloured siding. -A large rectangular wooden barn with a gable roof is visible from the road and features a small addition on the west elevation with a gambrel roof, horizontal log construction, and parged stone foundations in addition to other additions visible on aerial photography. -aerial photography shows circulation routes as well as several more outbuildings and agricultural fields. Context: -Located on the north side of 3rd Concession. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking north towards the house and barn at 19 Somerville 3rd Concession (ASI 2019).
CHL 2	Trent-Severn Waterway	River	National Historic Site	Historical: -The waterway has been used by Indigenous Peoples and European settlers for as long as people have lived in the area. -During the nineteenth-century locks and dams were constructed as many mill towns grew up along the waterway. Physical/Design: -Approximately 50 km of man made canals, 45 locks, 60 bridges, and 150 dams create a fully-navigable system (Parks Canada 2017b). -The waterway extends from Port Severn, on Georgian Bay, to Trenton, on the Bay of Quinte. -Fenelon Falls Lock 34 is on an island and features falls on the lower side of the lock station. Context: -Fenelon Falls Lock 34 is located at Colborne/Lindsay Street, in the heart of Fenelon Falls. -The waterway passes through the City of Kawartha Lakes in a northwest to southeast orientation.	 Aerial view of Lock 34 and the Trent-Severn Waterway (Google Earth 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
CHL 3	165 Somerville 3rd Concession	Farmstead	Identified during field review	Historical: -Structure present in same location on 1945 mapping. Physical/Design: -The Georgian style cottage features a portico, centered door with symmetrical fenestrations, gable roof and rear additions. -Three rectangular wooden barns with gable roofs are visible from the road, at least one features parged stone foundations. -aerial photography shows circulation routes, tree lines or windbreaks, and agricultural fields. Context: -Located on the north side of 3rd Concession. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking north towards the house and barn at 165 Someville 3rd Concession (ASI 2019).
CHL 4	211 Somerville 3rd Concession	Farmstead	Identified during field review	Historical: -Structure present in same location on 1945 mapping. Physical/Design: -The rectangular wooden barn features a metal sheet gable roof and stone foundation. -Any earlier structure has been demolished and replaced with a modern residence. -aerial photography shows circulation routes, tree lines or windbreaks, and agricultural fields. Context: -Located on the north side of 3rd Concession. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking north towards the barn and circulation routes at 211 Somerville 3rd Concession (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
CHL 5	903 Northline Road	Farmstead	Identified during field review	Historical: -Property owner is listed as Jason Butler on 1877 mapping. -Structure present in same location on 1945 mapping. Physical/Design: -One-and-a-half- storey nineteenth-century Ontario farmhouse features a centre gable with arched window located within, and a large rear addition, clad in horizontal white coloured siding. -aerial photography shows circulation routes as well as several outbuildings, tree lines or windbreaks, and agricultural fields. Context: -Located on the west side of Northline Road. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking west towards the residence at 903 Northline Road (ASI 2019).
CHL 6	902 Northline Road	Farmstead	Identified during field review	Historical: -Structure present in same location on 1945 mapping. Physical/Design: -The buff brick residence features an L-shaped floor plan with a cross gable roof, external chimney, and segmental brick headed windows and doors. -aerial photography shows circulation routes as well as several outbuildings, tree lines or windbreaks, and agricultural fields. Context: -Located on the east side of Northline Road. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking southeast towards 902 Northline Road (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
CHL 7	Victoria Rail Trail	Former Rail Corridor	Identified during field review	Historical: -Construction on the Victoria Railway began in 1874 between Victoria County and Haliburton. The railway officially opened in 1878. -Victoria Railway is illustrated on 1877 mapping. -The line became part of the Midland Railway of Canada and then the Canadian national Railway. It was abandoned by the early 1990s. Physical/Design: -the Victoria Rail Trail, together with the Haliburton Rail Trail, follows the path of the original extent of the historical Victoria Railway. Context: -The Victoria Rail Trail extends from Bethany to Kinmount and crosses the study areas at Somerville 3rd Concession and Wychwood Crescent. -Contributes to the historical agricultural character of rural Kawartha Lakes and has connections to early transportation routes.	 Looking north from Someville 3rd Concession along the Victoria Rail Trail (ASI 2019)  Looking north from Wychwood Crescent along the Victoria Rail Trail (ASI 2019)

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
CHL 8	589 and 595 County Road 8	Farmstead	Identified during field review	Historical: -One structure is present in same location on 1945 mapping. Physical/Design: -Ontario farmhouse features a cross gable roof with multiple centre gables and a covered porch with sloped roof and is clad in horizontal white coloured siding. -A large wooden barn with a gambrel roof and stone foundations is visible from the public right-of-way. -The house has been severed from the original property and is within a separate parcel currently. -Aerial photography shows circulation routes as well as several outbuildings, tree lines or windbreaks, and agricultural fields. Context: -Located on the west side of County Road 8. -Contributes to the historical agricultural character of rural Kawartha Lakes.	 Looking northeast towards the residence and barn at 589 and 595 County Road 8 (ASI 2019).
CHL 9	84 Concession Road	Cemetery	Identified during field review	Historical: -The cemetery is illustrated in same location on 1945 mapping. -Earliest burials appear to date to c.1898 -property is illustrated as being owned by John D. Naylor on 1877 mapping. Physical/Design: -Fenelon Falls Cemetery features rows of graves, vegetation, maintenance buildings, and circulation routes. Context: -Located on the east side of Concession Road, at the intersection of Elgin Street. -Contributes to the historical character of the early community of Fenelon Falls.	 Looking west from Concession Road across the Fenelon Falls Cemetery (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
BHR 1	72 Somerville 3rd Concession	School	Identified during field review	Historical: -Mapping from 1881 and 1945 illustrate a school in the same location. Physical/Design: -One storey former school building with a rectangular shaped footprint, field stone foundation, gable roof, enclosed entrance with gable roof, and smaller rear tail or addition. The building is clad in horizontal vinyl siding. -Currently being used as a community centre. Context: -Located on the east side of Northline Road. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking southeast towards the structure at 72 Somerville 3rd Concession (ASI 2019).
BHR 2	208 Somerville 3rd Concession	Church	Identified during field review	Historical: -Mapping from 1881 and 1945 illustrate a church in the same location. Physical/Design: -One storey church with a rectangular shaped footprint, field stone foundation, gable roof, and enclosed entrance with gable roof. The east and west elevations each feature three arched windows with three distinct panes of stained glass. Sign over the entrance reads “1874 Baddow Baptist Church” -A row of mature deciduous trees line the front of the lot. Context: -Located on the south side of Somerville 3rd Concession. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking south towards 208 Somerville 3rd Concession (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
BHR 3	269 Somerville 3rd Concession	Church	Identified during field review	Historical: -Mapping from 1881 and 1945 illustrate a church in the same location. Physical/Design: -One storey church with a rectangular shaped footprint with a one storey addition or tail at the rear, field stone foundation, gable roof, and enclosed entrance with gable roof that has metal siding. A brick chimney is visible at the rear. The east and west elevations each feature three arched windows that have been boarded up. The building is clad with red shingles. -A two-and-a-half storey house is located set further back from the church, likely dates to the late twentieth century. Context: -Located on the north side of Somerville 3rd Concession. -Contributes to the historic agricultural character of rural Kawartha Lakes and the historical community of Baddow.	 Looking south towards 208 Somerville 3rd Concession (ASI 2019).
BHR 4	94 Sturgeon Point Road	Farmstead residence	Identified during field review	Historical: -One structure is present in same location on 1945 mapping. Physical/Design: -Gothic Revival style farmhouse has a rectangular footprint with a cross gable roof that features decorative bargeboard and is clad in horizontal light blue coloured siding. -A large wooden barn with a metal gambrel roof and stone foundations is visible from the public right-of-way. -The property on which the house and barn sit has likely been severed from the agricultural fields it was originally associated with. -Aerial photography shows circulation routes as well as several outbuildings on the property. Context: -Located on the west side of Sturgeon Point Road. -Contributes to the historical agricultural character of rural Kawartha Lakes and the historical community of Fenelon Falls.	 Looking northwest towards the residence at 94 Sturgeon Point Road (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
BHR 5	29 Elgin Street	Residential	Identified during field review	Historical: -Structure is present in same location on 1945 mapping. Physical/Design: -The vernacular residence features a rectangular footprint with an enclosed addition on the front elevation and is clad in white vinyl siding. -the property features rolling topography and curated vegetation. Context: -Located on the north side of Elgin Street. -Contributes to the historical character of the community of Fenelon Falls.	 Looking northwest towards the residence at 94 Sturgeon Point Road (ASI 2019).
BHR 6	69 Concession Road	Residential	Identified during field review	Historical: -Structure is present in same location on 1945 mapping. Physical/Design: -The residence features a square footprint a hipped roof with a central dormer and is clad in white vinyl siding. Context: -Located on the west side of Concession Road. -Contributes to the historical character of the community of Fenelon Falls.	 Looking west towards the residence at 69 Concession Road (ASI 2019).

Feature ID	Location	Resource Type	Heritage Recognition	Description	Photos
BHR 7	34 Concession Road	Residential	Identified during field review	Historical: -Structure is present in same location on 1945 mapping. Physical/Design: -The residence is mostly obscured from publicly accessible right-of-way. -The property features a stone retaining wall and has likely been partially regraded. Context: -Located on the west side of Concession Road.	 Looking east towards the residence at 34 Concession Road (Google Street view 2019).
BHR 8	207 Francis Street East	Residential	Identified during field review	Historical: -Structure is present in same location on 1945 mapping. Physical/Design: -The residence features a rectangular shaped footprint with a rear tail, a hipped roof that extends to cover an upper floor balcony and features decorative bargeboard, and is clad in blue vinyl siding. Context: -Located on the west side of Francis Street East. -Contributes to the historical character of the community of Fenelon Falls.	 Looking east towards the residence at 207 Francis Street East (Google Streetview 2019).

8.0 CULTURAL HERITAGE RESOURCE MAPPING

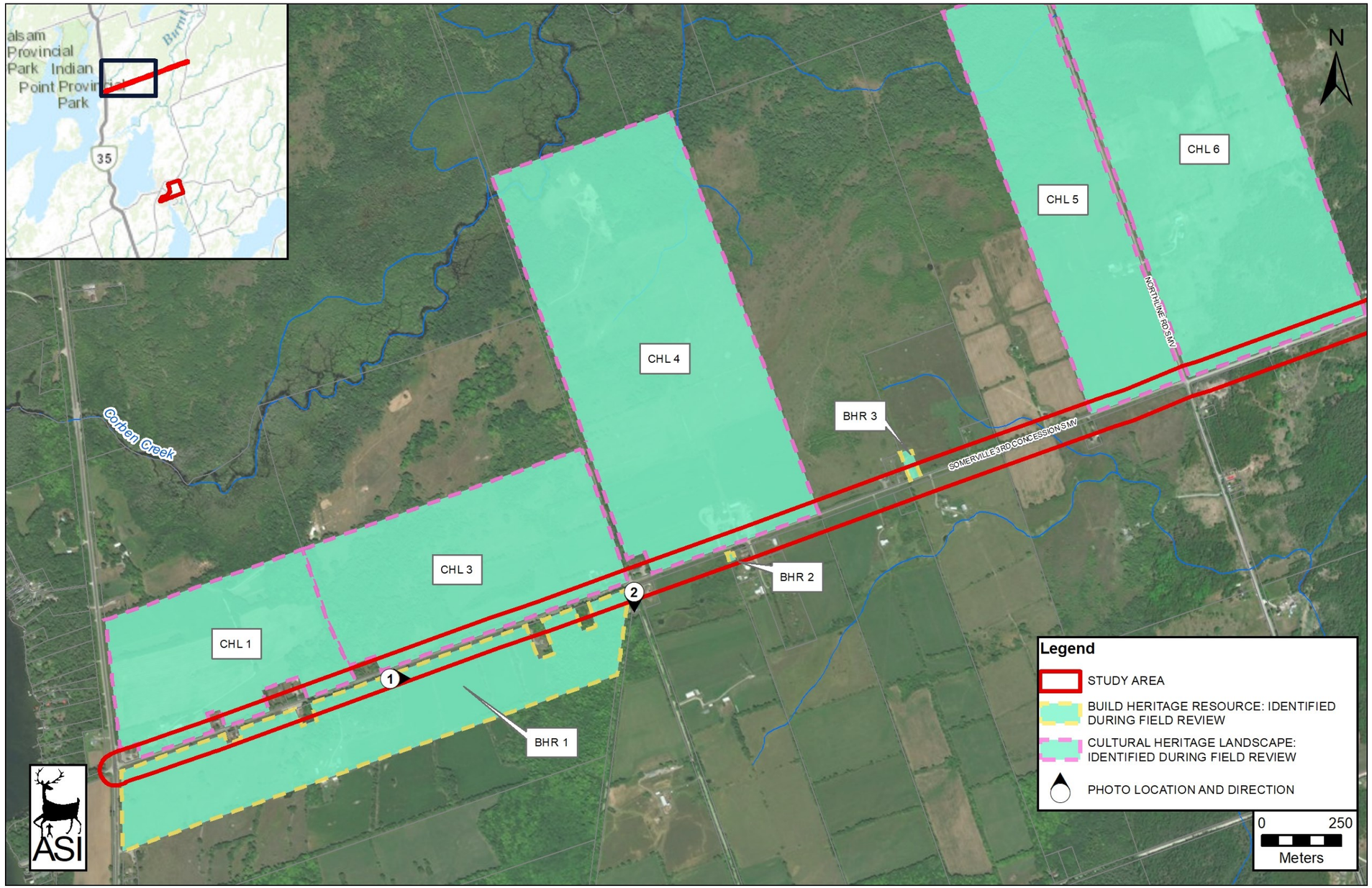


Figure 6: Location of Built Heritage Resources and Cultural Heritage Landscapes in the Bypass study area

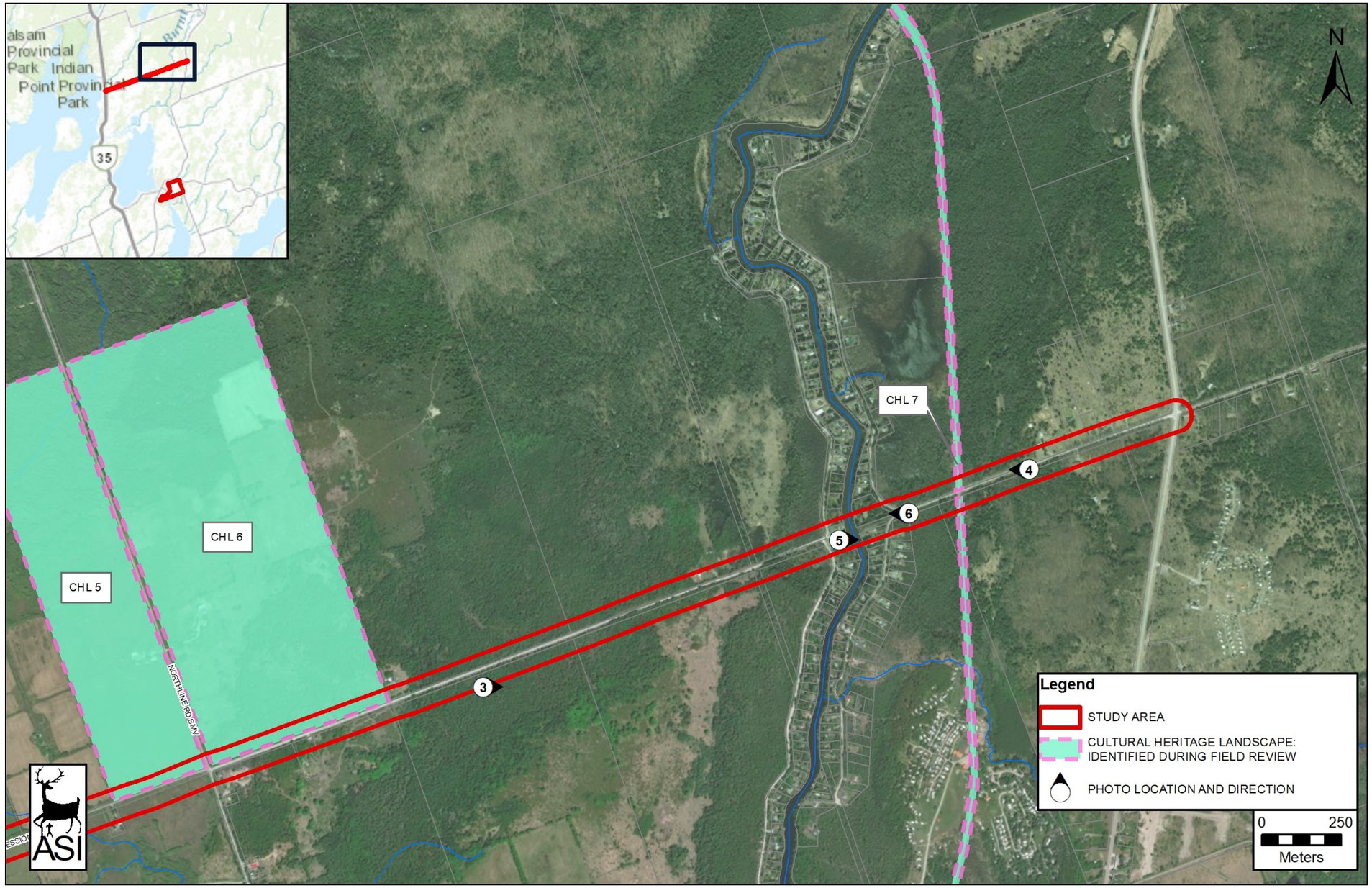


Figure 7: Location of Built Heritage Resources and Cultural Heritage Landscapes in the Bypass study area

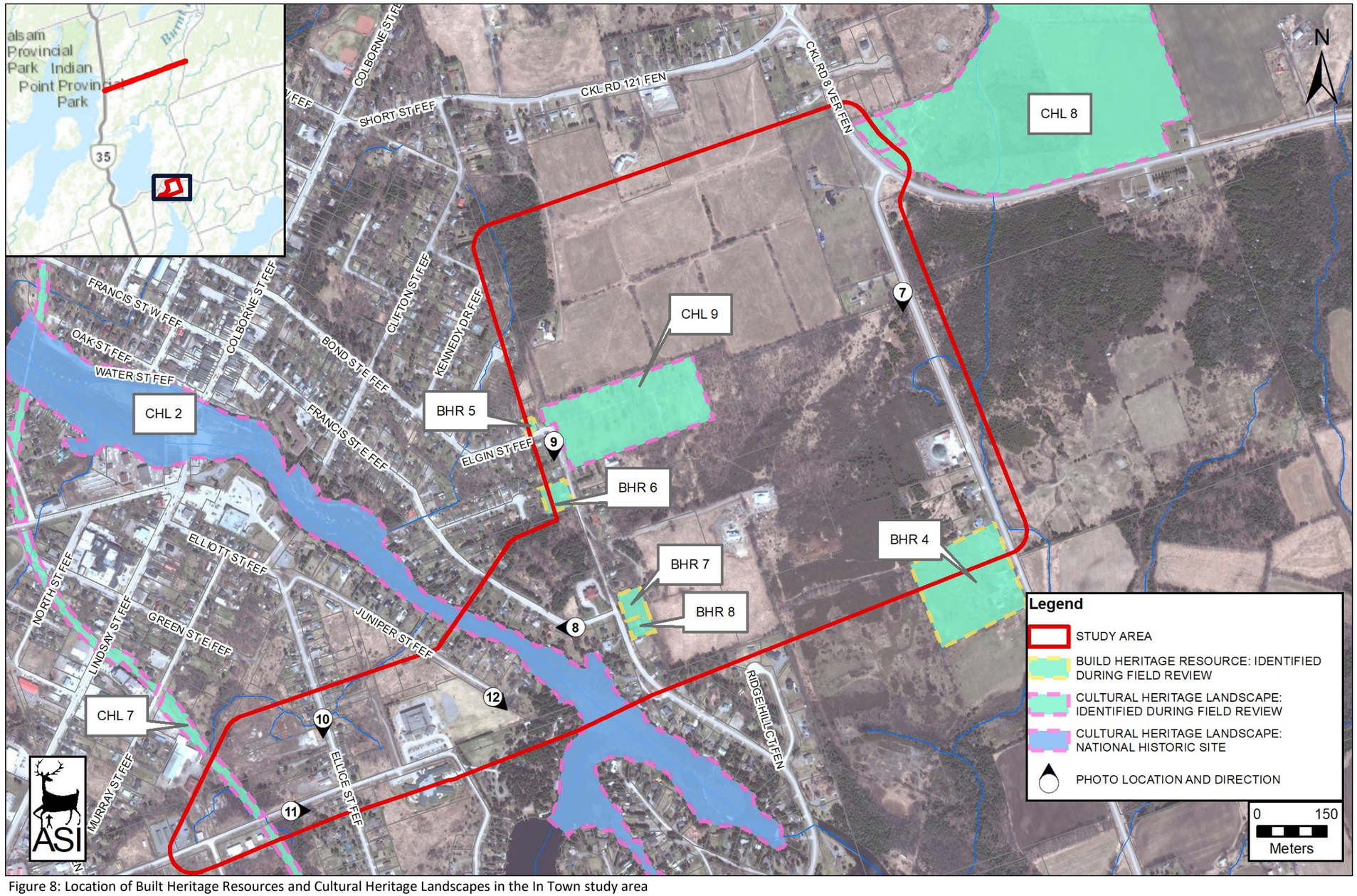


Figure 8: Location of Built Heritage Resources and Cultural Heritage Landscapes in the In Town study area

APPENDIX E

Traffic Improvements Analysis

DILLON CONSULTING

CITY OF KAWARTHA LAKES

Traffic Improvements Analysis

Fenelon Falls Second Crossing EA Study

October 2020 - 19-9411

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Appendices

A Detailed Lane Arrangement Drawings

B Detailed Implementation Drawings

1.0 Introduction

Fenelon Falls is a village in the City of Kawartha Lakes located in Ontario. The village is centred on the Parks-Canada protected Trent-Severn Waterway, and with limited crossings of the Waterway, trips are required to cross through town to access opposite sides. The variability and seasonality of the traffic volumes due to summer cottagers can result in vehicle delays and congestion through the existing crossing. A corridor study of the downtown area was undertaken in 2016 which suggested that by 2031, additional capacity will be required to accommodate peak spring weekend and summer weekday/weekend vehicle volumes. The intersection south of the existing crossing of the Trent-Severn Waterway in Fenelon Falls will be near/at capacity. The analysis indicated that the southbound left-turns at the intersection of Helen Street and Lindsay Street would be over capacity with vehicles queuing back into the southbound through lane and over the single lane structure. The need for additional vehicle capacity has led to the Fenelon Falls Second Crossing EA. The Second Crossing EA is exploring potential long range solutions to address high levels of congestion such as building a new bridge structure or constructing a bypass to alleviate the congestion in Town.

However, it is understood that the implementation of a new crossing is many years away due to the need for further design, approvals and construction, and is conditional on funding. Near term traffic improvements are therefore being considered to improve traffic flow through town. The downtown revitalization plan has addressed numerous other recommendations that were identified in the corridor study to improve traffic flow north of the bridge. Further improvements to improve vehicle circulation south of the bridge are explored herein particularly at the intersection of Helen Street and Lindsay Street. Four local operational improvements are being explored:

- Traffic Light Signal Changes (**Section 3.1**),
- Access Control (**Section 3.2**),
- Additional Capacity (**Section 3.3**); and,
- Network Reconfiguration (**Section 3.4**).

For each of the above operational improvements, a series of variations were also assessed. Additional analysis was undertaken considering the applicability of roundabouts in the corridor as well as school bus operations.

The following traffic analysis presents the comprehensive analysis of all options and sub-options to provide a better understanding of potential near term solutions to manage vehicle circulation in advance of, and in combination with, a longer term second bridge or bypass solution.

2.0 Baseline 2031 Conditions

Traffic volumes were obtained from the corridor study that was previously complete by Ainley Consulting Engineers, Planners (Ainley) in 2015. Dillon Consulting Limited (Dillon) also collected weekend traffic data at Lindsay Street and Helen Street from May 24, 2019 to May 28, 2019 to confirm the future 2031 volume from the corridor study. The scope of the study included analysis of the 2031 PM peak and 2031 Saturday peak periods. The 2031 Saturday peak hour volumes were used for the primary analysis as they had the largest volume at the intersection of Lindsay Street and Helen Street.

Traffic data at the intersection of Lindsay Street at Elliot Street was unavailable for the weekend periods, therefore it was assumed that the PM weekday volumes would be the most representative of the Saturday peak. At the intersections of Lindsay Street at Elliot Street and Lindsay Street at Green Street the PM peak hour volumes were balanced to align with the Saturday peak hour at Lindsay Street and Helen Street. **Figure 1** shows the 2031 PM and Saturday peak hour traffic volumes. Note that all analyses were performed using 2031 volumes, with no reduction for a potential bypass route.

Figure 2 illustrates the existing lane traffic control and intersection lane arrangements, assumed to be present in 2031.

Figure 1: 2031 Traffic Volumes

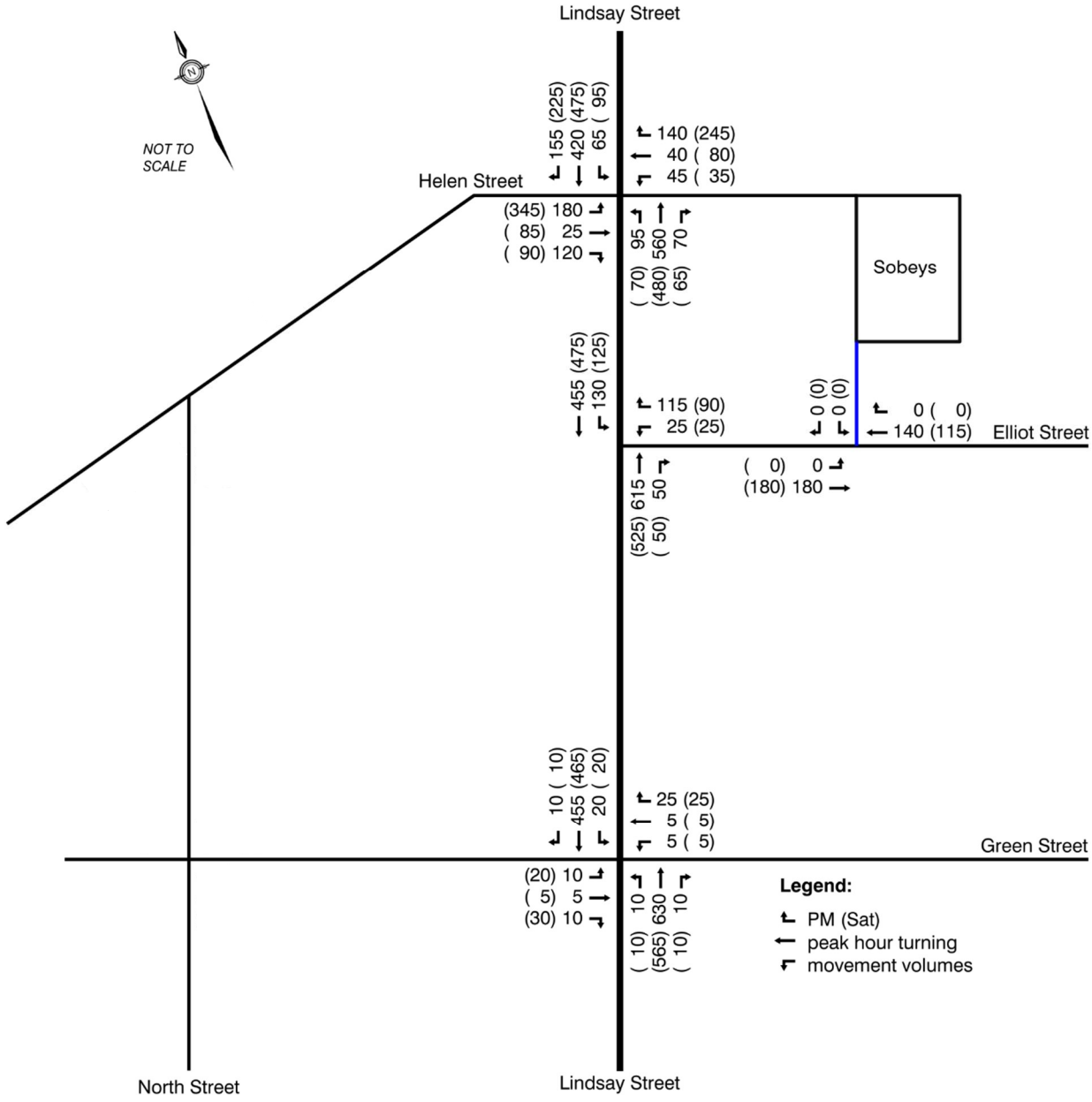
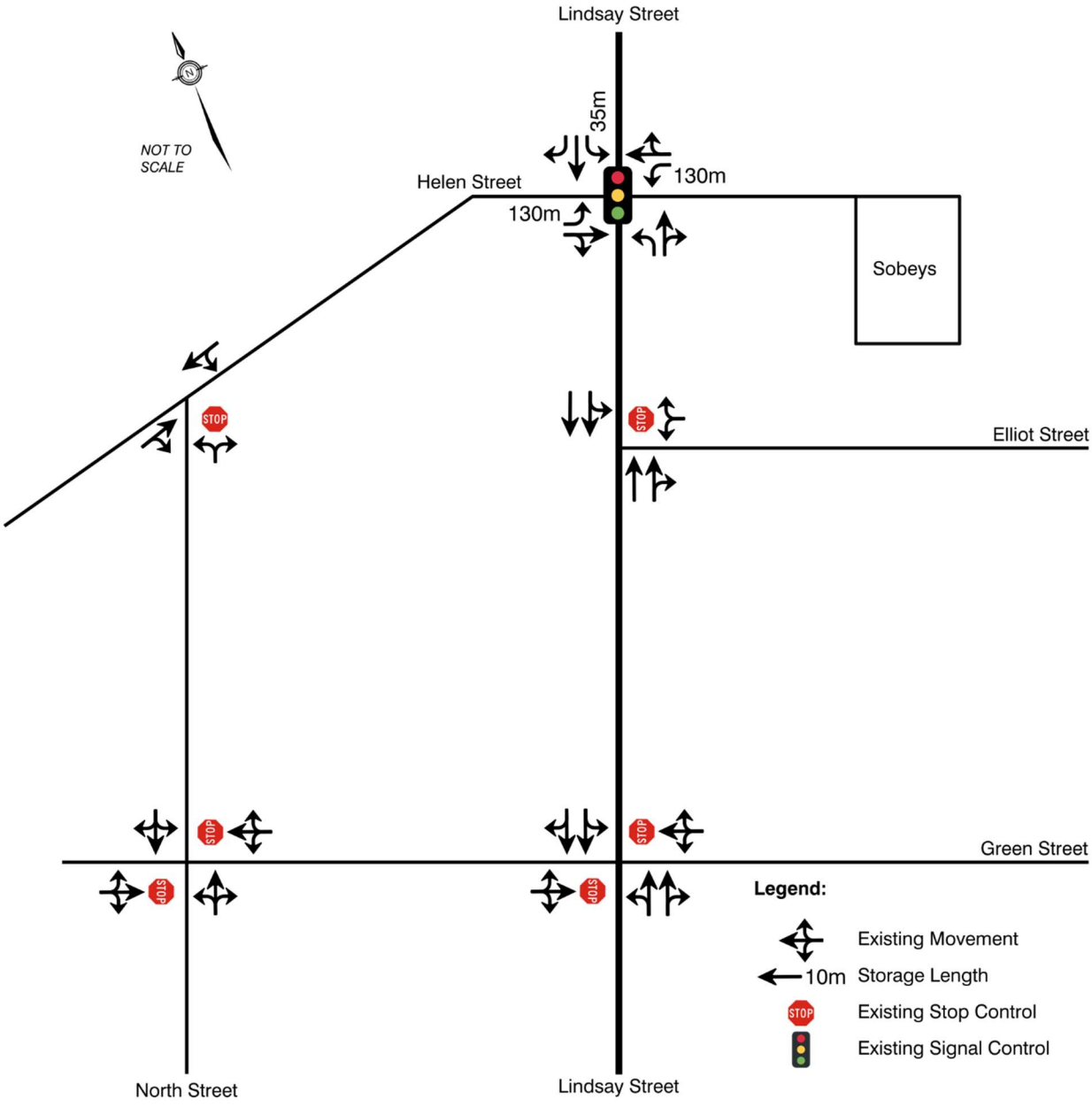


Figure 2: Existing Traffic Control and Lane Arrangements



2.1 Analysis Parameters

The 2015 Corridor Study output level of service (LOS) based on Highway Capacity Manual (HCM) 2010 methodology. An update was made available since the publication of the previous report therefore updated analysis are based on synchro methodology for signalized intersections and HCM 6th methodology for two-way stop control (TWSC) intersections.

For the Traffic Improvement Analysis, the LOS is being reported based on average vehicle delay (shown in **Table 1**) as well as the Volume to Capacity ratio (V/C) for representing the theoretical intersection capacity and percentage that is used to serve the anticipated demand. For two way stop control (TWSC) intersections (unsignalized intersections) the 95th percentile queue length is based on a vehicle length of 7.0 m.

Table 1: Intersection Level of Service

Level of Service	Signalized Intersection Delay	Un-Signalized Intersection Delay
A	0 – 10 seconds	0 – 10 seconds
B	10 – 20 seconds	10 – 15 seconds
C	20 – 35 seconds	15 – 25 seconds
D	35 – 55 seconds	25 – 35 seconds
E	55 – 80 seconds	35 – 50 seconds
F	+ 80 seconds	+ 50 seconds

For the analysis of intersection operations:

- Intersection operations with LOS D are considered acceptable, and LOS E can be appropriate in constrained conditions. Improving vehicle LOS can sometimes be at the detriment to other road users including pedestrians and cyclists, therefore mitigation measures must consider impacts and benefits to all modes.
- While LOS is often reported as a measure of delay, intersection V/C is also used with the target V/C of intersection approaches being at 85% or better.
- A third measure that is reviewed is vehicles queueing to ensure that queues can be stored in the provided space and cleared each signal cycle.

2.2 Traffic Operations

Using the same assumptions as for the Corridor Study, **Table 2** indicates at first glance that the intersection of Lindsay Street and Helen Street will operate at an acceptable level of service (LOS) in 2031. However, the traffic operations noted in the table can be worse than indicated since the southbound left-turn movement is anticipated to queue past the existing storage length resulting in queues backing up and blocking the through movement**.** As a result, Lindsay Street at Helen Street is not

anticipated to operate at an acceptable LOS with the existing signal timing and lane geometry. As well, the eastbound left-turn movement is anticipated to have a volume to capacity (v/c) ratio of 0.86. The other intersections within the study area are anticipated to operate acceptably.

The analysis illustrates critical movements that do not achieve desired intersection operations in **RED.**

Table 2: 2031 Corridor Study Level of Service

Int.	Mvmt	Saturday Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	**0.86**	35.8	D	**#76.6**
	EBTR	0.24	7.2	A	18.1
	WBL	0.15	24	C	11.2
	WBTR	0.78	27.7	C	52.8
	NBL	0.33	21.2	C	19.7
	NBTR	0.76	26.8	C	**#132.3**
	SBL	0.61	38.1	D	**#36.9**
	SBT	0.66	23.1	C	99.4
	SBR	0.34	9.3	A	28
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-
	NBR	-	-	-	-
	WBLR	0.31	17.9	C	9.1
	SBL	0.14	9.3	A	3.5
	SBT	-	0.6	A	-
Lindsay St. & Green St. (TWSC)	NBL	0.01	8.4	A	0
	NBT	-	0.1	A	-
	NBR	-	-	-	-
	EBLTR	0.17	17.7	C	4.2
	WBLTR	0.10	15.2	C	2.1
	SBL	0.02	8.8	A	0.7
	SBT	-	0.1	A	-
	SBR	-	-	-	-

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

3.0 Transportation Improvement Options

The following section presents the options and results of the traffic analysis undertaken for various alternative intersection and network configurations developed to mitigate vehicle congestion through town for the 2031 planning horizon. Figures illustrating lane configurations for each option can be found in **Appendix A**. Each figure corresponds to its respective sections in this report.

3.1 Traffic Light Signal Changes

Traffic signals can be adjusted to ensure that southbound left turning vehicles at the intersection of Helen Street and Lindsay Street get enough green-time so that they do not spill into and block the southbound through movement. The existing left-turn storage lane was estimated at approximately 20 metres in length. The following options consider the provision of additional signal phases including protected left-turn signals to improve operations.

- Optimizing Signals to manage southbound queue spill back;
- Adding protected signal phase for left-turn movements (NB, SB and EB)
- Adding protected signal phase for left-turn movements (SB and EB)

These options do not require changes in roadway geometry or significant construction.

3.1.1 Optimizing Signals

Signal changes included adjusting green-time, adjusting the cycle length, and an examination of signal sequence. The allotted green-time can be adjusted between competing approaches in order to maximize the intersection flow and facilitate the greatest vehicle movement. There is also the ability to adjust signal timings to favour one movement over another in order to manage queues and minimize delay to critical movements at the intersection. Optimizing signals can also adjust the sequence of signals in order to accommodate split phasing to clear specific queuing movements.

Table 3 illustrates the signal optimization results with three distinct cycle lengths on the Saturday peak period. The addiotnal green-time required to serve the southbound left-turn demand would result in the eastbound and westbound intersection approaches being significantly over capacity. All cycle lengths were deemed not feasible based on the Saturday peak hour analysis.

Table 3: 2031 Intersection Operations - Signal Optimization (Saturday Peak Hour)

Int.	Cycle length	100s				110s				120s			
	Mvmt	V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Sat)	EBL	**1.90**	446.9	**F**	**#165.4**	**1.79**	401.9	**F**	**#161.5**	**1.70**	358.7	**F**	**#172.6**
	EBTR	0.36	21.3	C	37.6	0.36	24.6	C	42.6	0.36	27.9	C	47.1
	WBL	0.17	34.7	C	14.8	0.17	39.6	D	16.2	0.18	44.7	D	18
	WBTR	**0.88**	46	D	**#84.0**	**0.92**	58.5	**E**	**#101.5**	**0.97**	74.4	**E**	**#118.8**
	NBL	0.17	10.6	B	13.6	0.17	10.7	B	13.9	0.17	10.7	B	14.4
	NBTR	0.52	13.5	B	92.1	0.52	13.9	B	95.2	0.51	14.2	B	98.4
	SBL	0.27	12.2	B	19.2	0.26	12.3	B	19.7	0.26	12.4	B	20.1
	SBT	0.45	12.7	B	77.4	0.45	13.1	B	80	0.44	13.4	B	82.7
	SBR	0.25	4.5	A	18.2	0.25	4.8	A	19.3	0.25	4.9	A	20.6

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

3.1.2 Northbound, Southbound and Eastbound Left-Turn Protected Phases

The impact of introducing northbound and southbound left-turn signal phases at the intersection was examined; there is currently an eastbound left-turn phase within the signal cycle. The existing westbound left-turn lane is assumed to be maintained and would operate as a permissive movement with the westbound through vehicles.

Table 4 illustrates the synchro results for the three most optimal cycle lengths examined for the Saturday peak period. Each alternative cycle length presents a cleared southbound approach; however, eastbound and westbound and northbound movements incur long delays, queues, and excessive v/c ratios.

With a cycle length of 90 seconds the eastbound right-turn movement approaches capacity with a v/c of 0.95. The eastbound left-turn and northbound through movement have queue lengths that are expected to continue to grow past two cycle lengths.

With a cycle length of 100 seconds the westbound through-right-turn movements exceeds the critical v/c ratio at 0.87. The eastbound left-turn, westbound through-right-turn and northbound through movements have queue lengths that are expected to continue to grow past two cycle lengths.

With a cycle length of 110 seconds the eastbound right-turn and westbound through-right-turn movements approach capacity with a v/c of 0.97 and 0.91, respectively. The eastbound left-turn and westbound through-right-turn movements have queue lengths that are expected to continue to grow past two cycle.

Table 4: Northbound, Southbound and Eastbound Left-Turn Protected Phase Analysis

Int.	Cycle length	90s				100s				110s			
	Mvmt	V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Sat)	EBL	**0.95**	56.1	**E**	**#97.8**	0.85	42.1	D	**#99.8**	**0.97**	68.5	**E**	**#120.5**
	EBTR	0.26	11.4	B	25.5	0.25	12.5	B	28.4	0.27	16.5	B	34.4
	WBL	0.16	29.9	C	13.2	0.17	34.6	C	14.8	0.17	39.1	D	16.1
	WBTR	0.81	33.2	C	61.3	**0.87**	45.1	D	**#84.0**	**0.91**	57	**E**	**#100.1**
	NBL	0.25	14.4	B	14.2	0.26	16.3	B	15.4	0.22	14.7	B	15.1
	NBTR	0.80	34	C	**#152.1**	0.79	35.6	D	**#160.0**	0.73	32.3	C	146.8
	SBL	0.43	18.1	B	18.2	0.45	20.8	C	19.8	0.38	17.5	B	19.5
	SBT	0.70	29.2	C	115	0.69	31	C	123.1	0.61	27.9	C	122.5
	SBR	0.37	12.4	B	34.1	0.37	14.2	B	38.1	0.33	13.7	B	38.7

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

3.1.3 Eastbound and Southbound Left-Turn Protected Phases

By eliminating the northbound left-turn phase more time is able to be allotted to the other movements. The impact of introducing southbound left-turn phase at the intersection was examined and exhibited in **Table 5**.

Many cycle lengths were utilized in order to test optimal scenarios; however, only the best option has been reported on for the proceedings of this report.

Table 5: Eastbound and Southbound Left-Turn Protected Phase Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	**0.92**	50.3	D	**#94.1**	0.70	37.6	D	**#43.8**
	EBTR	0.26	10.8	B	24.8	0.29	8.1	A	16.2
	WBL	0.16	29.9	C	13.2	0.29	35.5	D	16.5
	WBTR	0.82	34.1	C	61.3	0.57	16.3	B	23.9
	NBL	0.26	23.5	C	20.8	0.21	13.5	B	19.4
	NBTR	0.80	35.2	D	**#156.6**	0.72	21.4	C	130.4
	SBL	0.44	18.8	B	18.6	0.22	7.8	A	9.2
	SBT	0.58	20.7	C	98.3	0.41	10.1	B	57.4
	SBR	0.31	8.7	A	27.6	0.17	3.4	A	11.5

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

The intersection performs reasonably well with all movements operating at LOS 'D' or better. However, during the Saturday peak period the eastbound left-turn v/c ratio is 0.92 and both the eastbound left-turn and northbound through-right-turn movements are anticipated to have queue lengths that will continue to grow preceding two cycle lengths.

3.1.4 Summary of Traffic Signal Modifications

Future 2031 traffic volumes cannot be accommodated with signal changes alone based on the analysis presented in Sections 3.1.1, 3.1.2, and 3.1.3.

The southbound approach can be improved by adding green-time to the signal, but this would reduce the available green-time on competing northbound and eastbound approaches. Vehicle queueing on the southbound approach across the bridge can be mitigated, but would result in queues developing on the northbound and eastbound approaches with vehicles waiting multiple signal cycles to proceed through the intersection.

3.2 Access Control

To improve vehicle circulation at the intersection of Lindsay Street and Helen Street, options that restrict select movement in/out of properties at the intersection were considered. This section reviews the impact of modifying access to the existing Sobeys /Tim Hortons including the impact of the resulting vehicle diversions.

The following options were considered to improve intersection and road network operations.

- Modifying the East Leg at Helen Street / Lindsay Street to be Exit only from Sobeys / Tim Hortons (with either two or three WB approach lanes).
- Restricting all access to and from Sobeys / Tim Hortons via East Leg at Helen Street / Lindsay Street
- Modifying the East Leg at Helen Street / Lindsay Street to be northbound Right-in Right-out
- Improving Sobeys / Tim Hortons on-site vehicle circulation
- Restrict northbound left-turn into Gas station from Lindsay Street on northwest corner (uncontrolled access north of signal).

Diverted inbound and/or outbound vehicles will make use of Elliot Street for access to/from the adjacent properties. Two alternative intersection configurations were evaluated for the Lindsay Street at Elliot Street intersection as follows:

- Two way stop controlled intersection (existing)
- Signalized intersection (single westbound lane on Elliot Street approaching Lindsay Street)

The sections below present the results for each of the scenarios combining alternative intersection modifications on Lindsay Street at both Helen Street and Elliot Street.

3.2.1 East Leg of Helen St. and Lindsay St. - Exit Only; Elliot St. Stop Control

Transforming the East leg at the Lindsay Street at Helen Street intersection to exit only would require that all inbound vehicle use Elliot Street to access the Sobeys / Tim Hortons.

This option maintains the existing lane configuration for the westbound approach at Helen Street and Lindsay Street. Additional southbound through capacity is provided by designating the existing southbound left-turn lane for southbound through vehicles since there are two receiving lanes available. The inside lane would be used for vehicles destined to Elliot Street, and vehicles destined south on Lindsay Street can use the curb lane to bypass potentially queued vehicles at Elliot Street. This provides additional storage for southbound left turning vehicles (between Elliot Street and the Bridge) compared to existing conditions. Providing two southbound through lanes approaching Helen Street also reduces the potential that a heavy vehicle undertaking a southbound left-turn chokes off southbound through vehicles due to its large turning radius and off-tracking into the adjacent lanes.

It is noted that this alternative maintains the existing side street stop control at Elliot Street. Southbound left turning vehicles are not provided with a traffic signal to turn onto Elliot Street, and must wait for a gap in northbound vehicle traffic on Lindsay Street to undertake the turn.

The assumptions for the diverted traffic are provided below:

- 100% of southbound vehicles entering via the existing Lindsay Street access will be diverted to Elliot Street.
- 100% of eastbound through vehicles at the intersection of Helen Street and Lindsay Street will turn right onto southbound Lindsay Street to use the Elliot Street access;
- 25% of westbound right-turn vehicles at Lindsay Street and Helen Street will be diverted to Elliot Street;
- 50% of westbound left-turn vehicles at Lindsay Street and Helen Street will be diverted to Elliot Street.

Figure 3 shows the Saturday peak and PM peak hour volumes and **Figure 4** provides a schematic of the lane geometry and traffic control. The analysis examined Lindsay Street at Helen Street, Lindsay Street at Elliot Street, Lindsay Street at Green Street is provided in **Table 6**.

By eliminating access to Sobeys and Tim Hortons from Lindsay Street directly the intersection of Lindsay Street and Helen Street operates acceptably. As a result of diverted vehicles on Elliot Street, the westbound movement at intersection of Lindsay Street and Elliot Street nears the capacity of a single lane stop controlled intersection with a v/c of 0.94, a LOS F, a total delay 91.9 seconds, and a queue

length of 56 metres. The queue on Elliot Street is expected to exceed the existing Tim Hortons' entrance. Lindsay Street at Green Street and Elliot Street at the New Access are expected to operate acceptably.

Figure 3: East Leg Exit Only; Elliot St. Stop Control Traffic Volumes

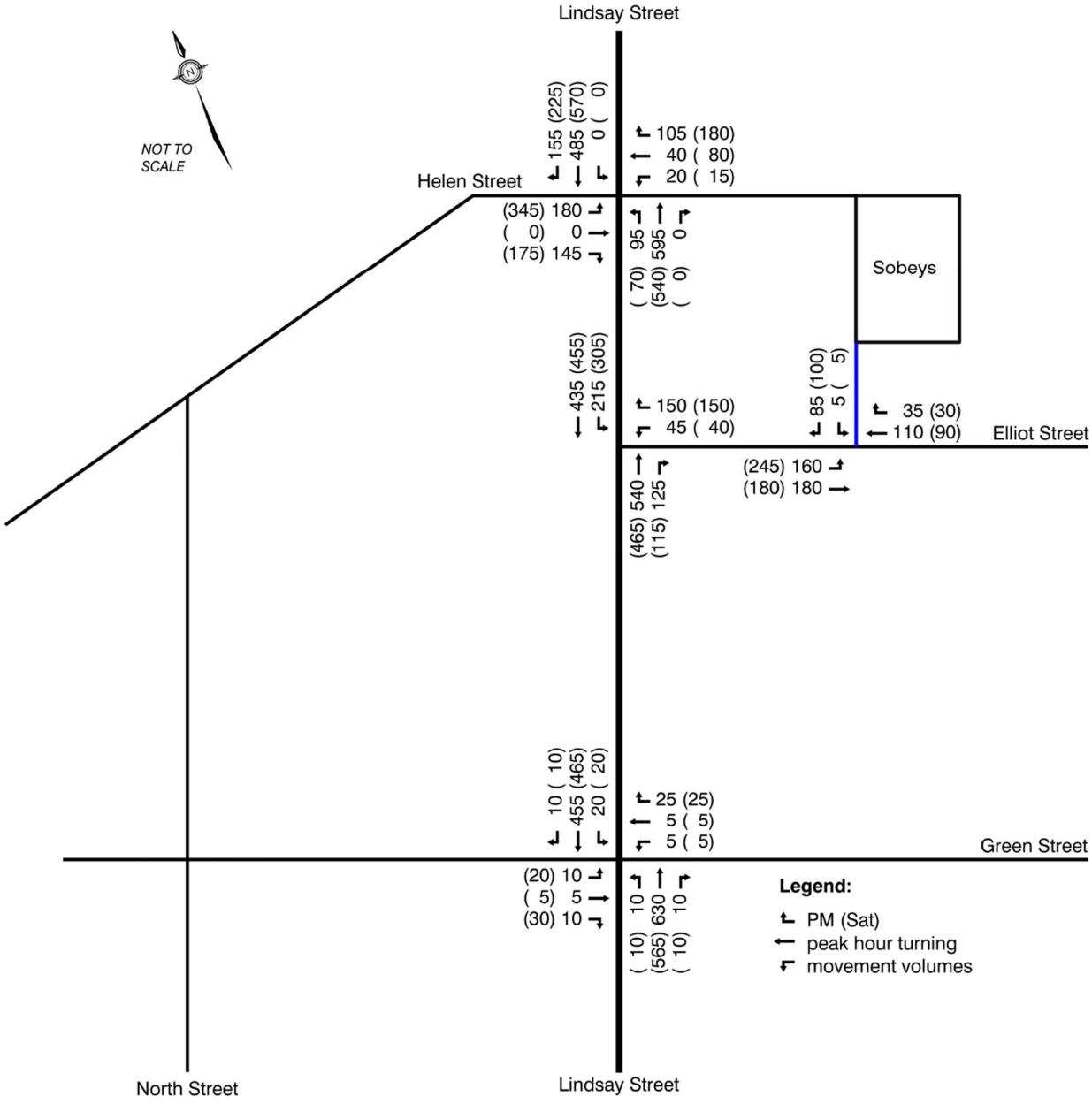


Figure 4: East Leg Exit Only; Elliot St. Stop Control Configuration

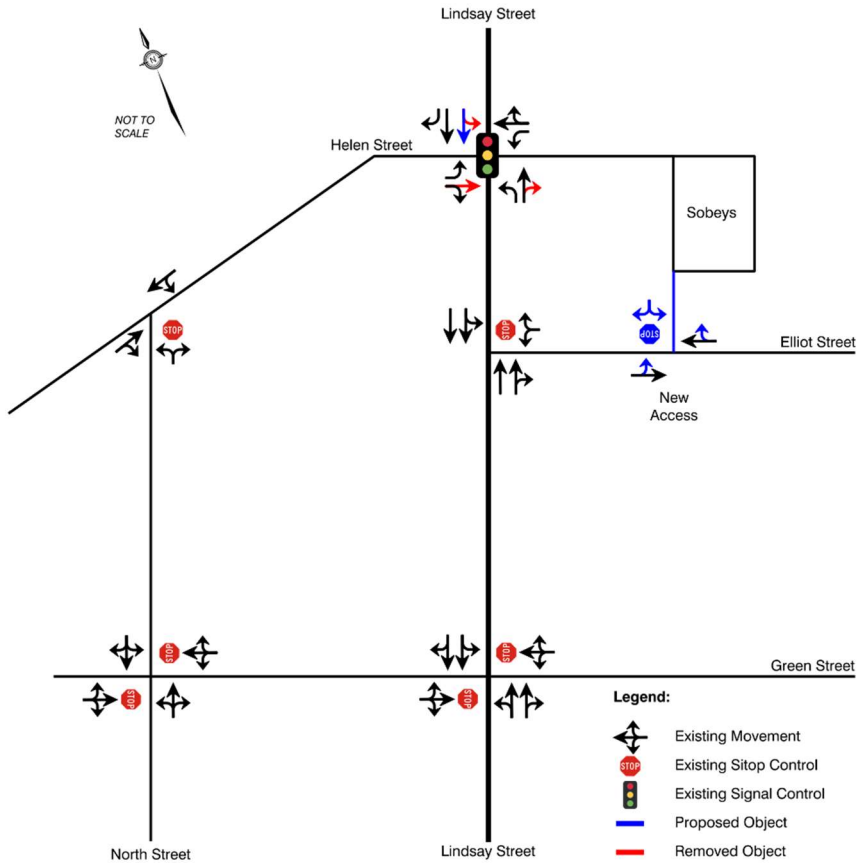


Table 6: East Leg Exit Only; Elliot St. Stop Control Analysis

Int.	Approach	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	0.64	19	B	69.4	0.42	17	B	33.8
	EBR	0.23	6.5	A	19.7	0.24	4.6	A	11.3
	WBL	0.05	29.9	C	7.9	0.06	22.8	C	8
	WBTR	0.71	31.1	C	59.8	0.38	12.2	B	19.7
	NBL	0.32	22.6	C	20.2	0.27	11.7	B	15.1
	NBT	**0.84**	34.3	C	129.3	0.76	19.4	B	89.2
	SBT	0.48	20	B	55.9	0.33	10.4	B	27.2
	SBR	0.37	7.6	A	22.9	0.22	2.5	A	7.6
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBTR	-	-	-	-	-	-	-	-
	WBLR	**0.94**	91.9	**F**	56	0.79	55	**F**	42.7
	SBTL	0.35	10.8	B	11.2	0.26	10.5	B	7.7
	SBT	-	-	-	-	-	-	-	-

3.2.2 East Leg of Helen St. and Lindsay St. - Exit Only. Three Westbound Lanes; Elliot St. Stop Control

Traffic volumes and assumptions used for this analysis are consistent with section **3.2.1.**

As the existing access is exit only, the lane for inbound vehicles is no longer required. This option reviews having three westbound lanes: a westbound left-turn, westbound though, and westbound right-turn lane. **Figure 5** shows the lane configuration for this option and **Table 7** provides the detailed results of the traffic operations analysis.

By providing an additional westbound lane the intersection of Lindsay Street and Helen Street is further improved. The maximum v/c, delay and 95th percentile queue length decreased from 0.84 to 0.81, from 31.1 seconds to 29.5 seconds, and from 129.3m to 98.8m, respectively. However, the additional lane did not impact Lindsay Street and Elliot Street which continues to operate at a failing LOS. It is noted that this option includes some outbound vehicles being diverted to Elliot Street, which may not be necessary with the added westbound lane exiting directly onto Lindsay Street. A sensitivity analysis was undertaken that confirmed some vehicles would need to divert in order to maintain acceptable operations at Helen Street / Lindsay Street.

Figure 5: East Leg Exit Only with Three Westbound Lanes; Elliot St. Stop Control Configuration

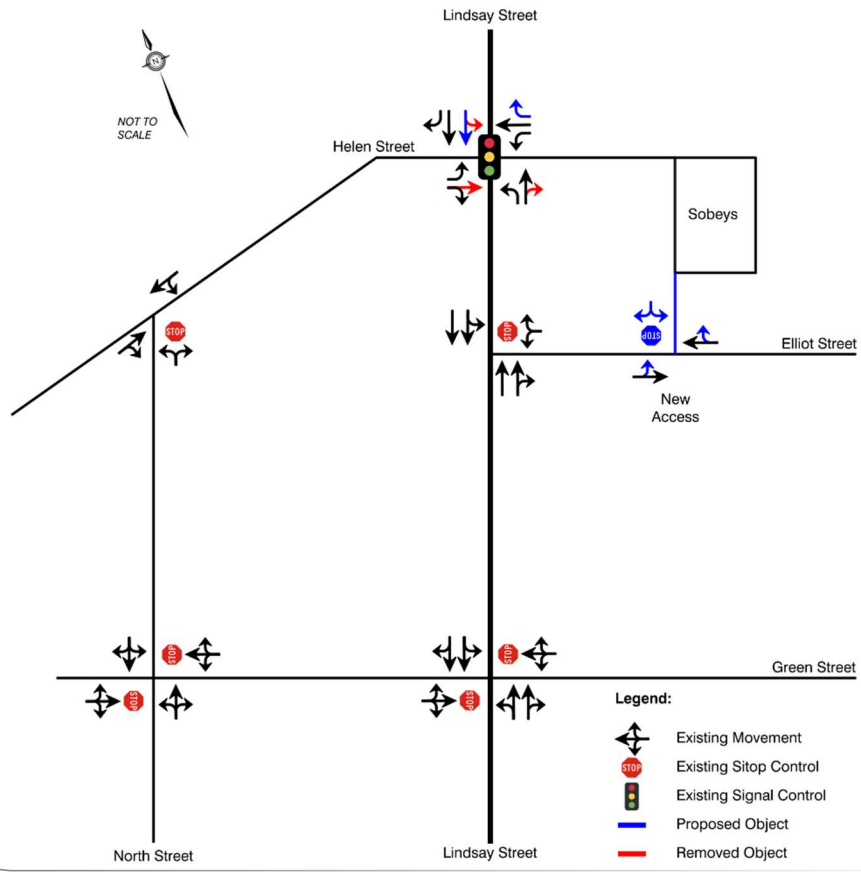


Table 7: East Leg Exit Only with Three Westbound Lanes; Elliot St. Stop Control Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	0.57	16.8	B	63.6	0.37	15.7	B	33.5
	EBR	0.24	6.1	A	17.7	0.21	4.2	A	11.2
	WBL	0.05	27.4	C	7.2	0.05	24.5	C	8.3
	WBT	0.28	29.5	C	24.3	0.09	24.6	C	13.2
	WBR*	0.49	10.2	B	17.8	0.26	8.1	A	12.5
	NBL	0.30	17.1	B	15.4	0.21	11.7	B	15.3
	NBT*	**0.81**	27.7	C	98.8	0.61	15.8	B	90.8
	SBT	0.46	16	B	42.1	0.26	10.2	B	27.7
	SBR	0.35	5.2	A	16	0.18	2.4	A	7.7
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBTR	-	-	-	-	-	-	-	-
	WBLR*	**0.94**	91.9	**F**	56	0.79	55	**F**	42.7
	SBTL	0.35	10.8	B	11.2	0.26	10.5	B	7.7
	SBT	-	-	-	-	-	-	-	-

Note: * 25% of the westbound right-turn vehicles at Lindsay Street and Helen Street were assumed to be diverted to Elliot Street. It is noted that a reduction in congestion due to the three westbound lanes may reduce the diversion of vehicles. The westbound left-right-turn movements at Lindsay Street and Elliot Street and the northbound through movement at Lindsay Street and Helen Street would see an improved LOS and the westbound right-turn at Lindsay Street and Helen Street may see a decrease in LOS.

3.2.3 East Leg of Helen St. and Lindsay St. - Exit only, Three Westbound Lanes; Elliot St. Signal Control

This option includes three westbound lanes at the Sobeys / Tim Hortons **Exit-only onto Lindsay Street**, **as well as the implementation of a signalized intersection control at the intersection of Lindsay Street and Elliot Street**. The intersections on Lindsay Street are analyzed as actuated-coordinated intersections meaning that they would have vehicle detectors to dynamically adjust signal timings (signal would not be activated on Helen Street, or Elliot Street if there are no vehicles or pedestrians waiting) and the signals at Helen Street and Elliot Street would be coordinated to minimize vehicles being trapped between intersections. Traffic volumes and assumptions used for this analysis are consistent with section **3.2.1.** **Figure 6** shows the lane configuration for this option and **Table 7** provides the results of the traffic operations analysis. **Appendix B** provides a conceptual figure of this alternative.

The intersection of Lindsay Street and Helen Street has slightly worsened as a result of the coordination with Elliot Street (synchronization limits the ability to dynamically adjust signals with vehicle detectors), however all movements at each intersection are performing acceptably during both weekday PM peak and Saturday peak with a LOS 'D' or better.

The 95th percentile queue length for the northbound through movement on Lindsay Street at Helen Street is expected to exceed the distance to the upstream Elliot Street intersection and can result in

queues spilling over and potentially blocking the Elliot Street intersection. The queues however are cleared each cycle with coordinated signals. Mitigation measures to prevent blockage at the Elliot Street intersection can include installation of "do not block intersection" signage, and painted cross hatching through the intersection where vehicles should not stop. The 95th percentile queue length on Elliot Street is not expected to extend beyond the existing Tim Hortons' entrance.

Figure 6: East Leg Exit Only with Three Westbound Lanes; Elliot St. Signal Control Configuration

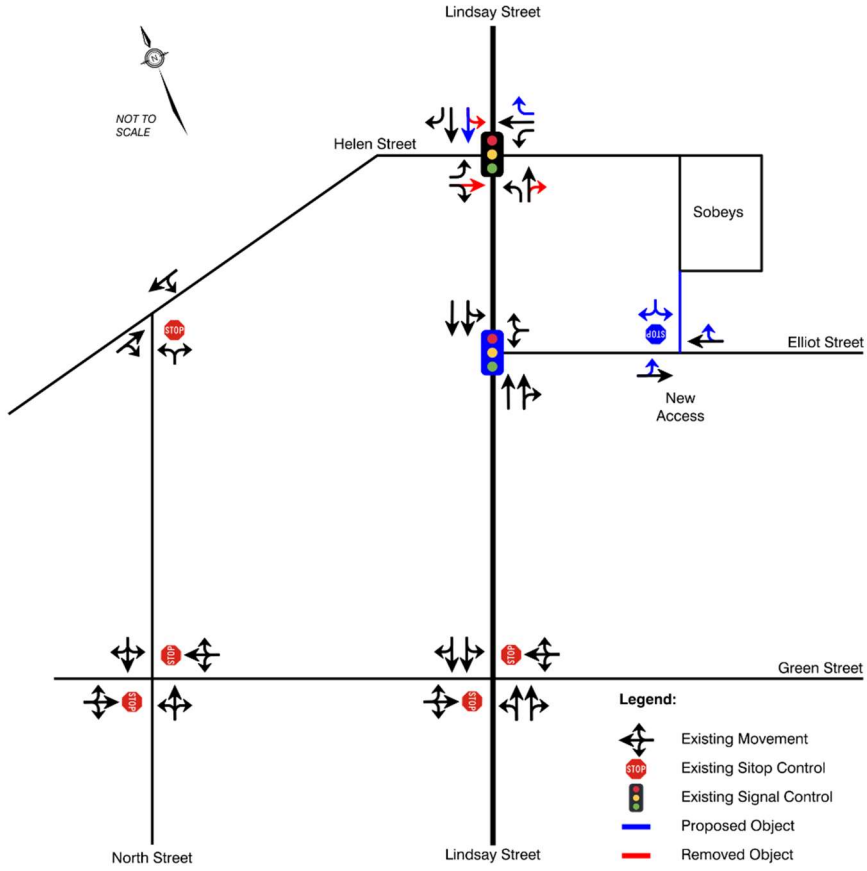


Table 8: East Leg Exit Only with Three Westbound Lanes; Elliot St. Signal Control Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	**0.73**	35.2	D	82.2	0.54	35.2	D	43.5
	EBR	0.31	10.8	B	23.9	0.33	6.4	A	13.2
	WBL	0.08	40.1	D	8.7	0.11	37	D	10.2
	WBT	0.41	47.3	D	29.8	0.20	38.5	D	16.3
	WBR*	0.58	13.5	B	19.3	0.42	12.7	B	14.6
	NBL	0.19	12	B	12.7	0.18	7.2	A	12.9

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
	NBT*	0.55	18.3	B	116.2	0.52	10.2	B	107.3
	SBT	0.31	13	B	46.4	0.22	7.2	A	30
	SBR	0.27	4.5	A	18.2	0.16	1.7	A	7.6
Lindsay St. & Elliot St. (Signalized)	WBLR*	0.68	23.9	C	28.1	0.67	21.7	C	27
	NBTR	0.22	2.2	A	18.3	0.26	2.6	A	21.8
	SBTL	0.46	3.5	A	22	0.41	2.5	A	11.3

Note: * 25% of the westbound right-turn vehicles at Lindsay Street and Helen Street were assumed to be diverted to Elliot Street. It is noted that a reduction in congestion due to the three westbound lanes may reduce the diversion of vehicles. The westbound left-right-turn movements at Lindsay Street and Elliot Street and the northbound through movement at Lindsay Street and Helen Street would see an improved LOS and the westbound right-turn at Lindsay Street and Helen Street may see a decrease in LOS.

3.2.4 East Leg of Helen St. and Lindsay St. – Closed; Elliot St. Stop Control

This option includes the complete closure of the Sobeys / Tim Hortons access on Lindsay Street. All inbound and outbound vehicles to Sobeys Tim Hortons would be diverted to Elliot Street. The intersection of Helen Street and Lindsay Street will be maintained as a signalized intersection to enable eastbound right-turn and left-turn movements. As with the options that restricted inbound access to Sobeys / Tim Hortons at this intersection, the existing southbound left-turn would be designated as a through lane.

It is noted that this alternative maintains the existing side street stop control at Elliot Street. Southbound left turning vehicles are not provided with a traffic signal to turn onto Elliot Street, and must wait for a gap in northbound vehicle traffic on Lindsay Street to undertake the turn.

The assumptions for the diverted traffic are provided below:

- 100% of vehicles that would enter the existing access will be diverted via Elliot Street.
- 100% of vehicles that would exit at Lindsay Street and Helen Street will be diverted via Elliot Street.

Figure 7 shows the Saturday peak and PM peak hour volumes, and **Figure 8** provides a schematic of the lane geometry and traffic control. **Table 9** presents the traffic operations analysis for this option.

By eliminating access to and from Sobeys and Tim Hortons from Lindsay Street directly the intersection of Lindsay Street and Helen Street operates acceptably as more green-time is allocated to other movements. However, as a result of diverted vehicles on Elliot Street, the westbound movement at intersection of Lindsay Street and Elliot Street exceeds the capacity of a single lane stop controlled intersection. Adding an additional westbound lane on Elliot Street approaching Lindsay Street was examined but the intersection still operated with a failing LOS. Signalization of this intersection was considered and is presented as an alternative in the section below.

Figure 7: East Leg Closed; Elliot St. Stop Control Traffic Volumes

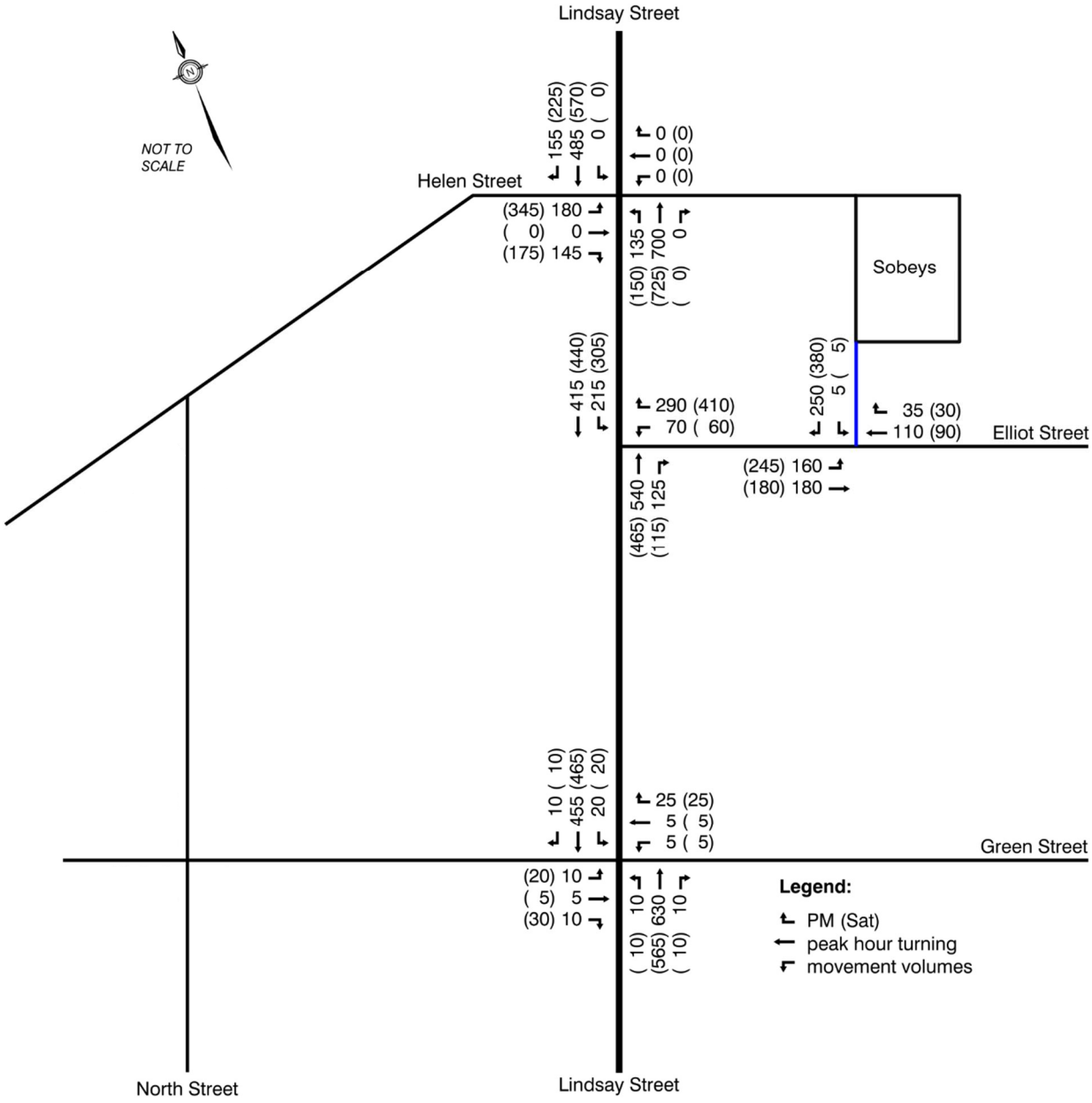


Figure 8: East Leg Closed; Elliot St. Stop Control Configuration

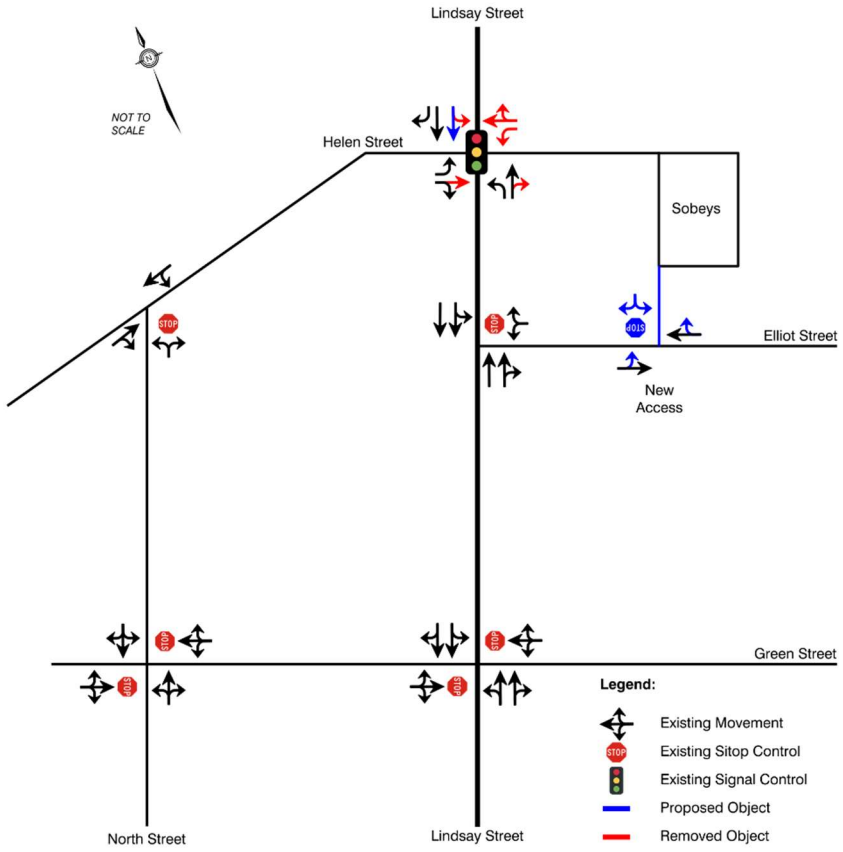


Table 9: East Leg Closed; Elliot St. Stop Control Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	0.72	28.9	C	78.8	0.49	23.5	C	41.3
	EBR	0.33	9.7	A	21.8	0.31	6.5	A	13.3
	NBL	0.41	13.4	B	26.5	0.32	8.5	A	17.6
	NBT	**0.81**	19.9	B	126.7	0.74	13.9	B	95.1
	SBT	0.34	9.3	A	34.1	0.27	6.4	A	22.4
	SBR	0.27	2.2	A	8.9	0.19	1.7	A	6.1
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-
	WBL	1.04	233.4	F	135.8	0.82	129	F	30.8
	WBR	0.65	19.4	C	33.6	0.49	15.9	C	18.9
	SBL	0.35	10.8	B	11.2	0.26	10.5	B	7.7
	SBT	-	1.1	A	-	-	0.9	A	-

3.2.5 East Leg of Helen St. and Lindsay St. – Closed; Elliot St. Signal Control

This option reviews the implementation of a signalized intersection control at Lindsay Street and Elliot Street to improve the intersection operations. The intersections on Lindsay Street are analyzed as actuated-coordinated intersections and optimized for best coordination. Traffic volumes and assumptions used for this analysis are consistent with section **3.2.4. Figure 9** shows the lane configuration for this option and **Table 10** provides the traffic operations.

The intersection of Lindsay Street and Helen Street will operate at an acceptable LOS with signals coordinated along Lindsay Street.

By introducing additional vehicles heading northbound the 95th percentile queue length for the northbound through movement is expected to increase, in comparison to the "Exit Only" option, and will queue past Lindsay Street and Elliot Street. The additional vehicles on Elliot Street (due to closing the East leg at Helen Street and Lindsay Street) result in a v/c of 0.85 for the westbound shared left-right-turn lane.

Although not shown in **Table 10**, the addition of a westbound lane on Elliot Street approaching Lindsay Street would improve the westbound Saturday Peak hour v/c from 0.85 to 0.81. This would also reduce average delay to 28.4 seconds, and the 95th percentile queues to 37.2m. While the westbound queues are expected to surpass the Tim Hortons' entrance, all movements at each intersection are performing acceptably during both weekday PM peak and Saturday peak, with a LOS 'D' or better.

Closing the Sobeys / Tim Hortons access via Lindsay Street is not recommended as it would result in diverting vehicles to Elliot Street where operations will become constrained.

Figure 9: East Leg Closed; Elliot St. Signal Control Configuration

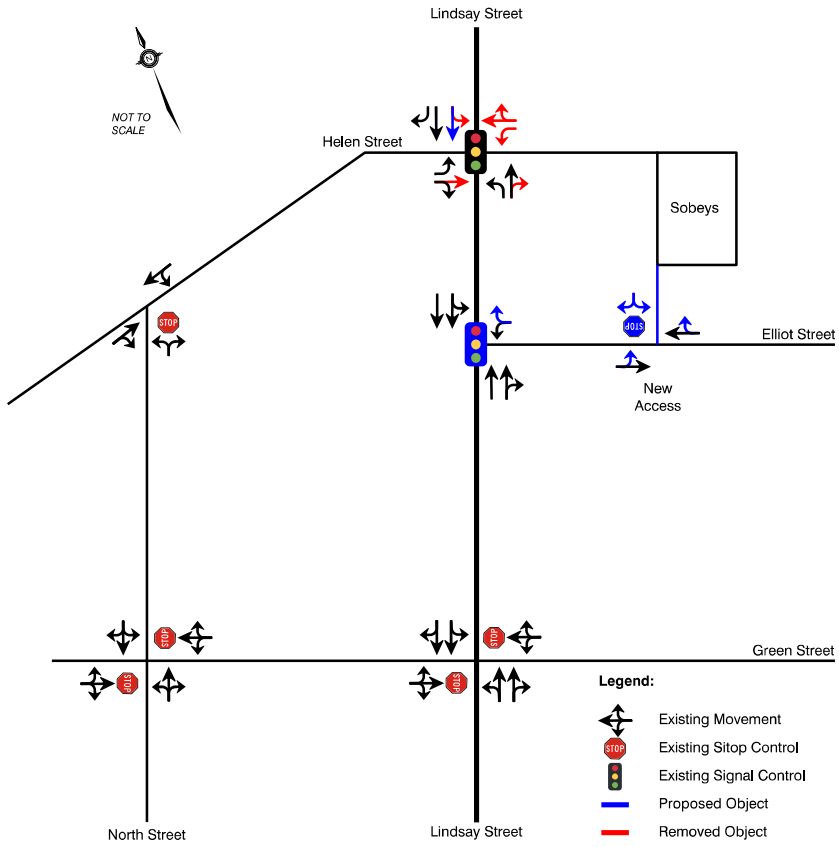


Table 10: East Leg Closed; Elliot St. Signal Control Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	**0.81**	41.4	D	78.8	0.65	40.2	D	44.7
	EBR	0.37	10.7	B	21.8	0.38	7.4	A	13.5
	NBL	0.35	11.1	B	m19.5	0.24	5.8	A	14.3
	NBT	0.68	16.1	B	142.8	0.58	8.3	A	116.1
	SBT	0.29	8.7	A	34.1	0.21	5.1	A	22.8
	SBR	0.24	1.9	A	8.9	0.15	1.3	A	6
Lindsay St. & Elliot St. (Signalized)	WBLR	**0.85**	25.7	C	51.3	0.79	21.9	C	40
	NBTR	0.25	5.4	A	30.8	0.28	4.4	A	30.9
	SBTL	0.54	6.3	A	67.6	0.43	4	A	45.3

Note: m represents that the 95th percentile queue is metred by an upstream signal (queues would be limited due to signal coordination)

3.2.6 Right-in Right-out Access Only (East Leg)

This option includes providing partial access to the Sobeys / Tim Hortons via Lindsay Street with a northbound right-in right-out movement only. The intersection would still be signalized to enable eastbound left-turn and right-turn movements.

Additional southbound through capacity is provided by designating the existing southbound left-turn lane for southbound through vehicles since there are two receiving lanes available. The inside lane would be used for vehicles destined to Elliot Street, and vehicles destined south on Lindsay Street can use the curb lane to bypass potentially queued vehicles at Elliot Street. This provides additional storage for southbound left turning vehicles (between Elliot Street and the Bridge) compared to existing conditions. Providing two southbound through lanes approaching Helen Street also reduces the potential that a heavy vehicle undertaking a southbound left-turn chokes off southbound through vehicles due to its large turning radius and off-tracking into the adjacent lanes.

This option analyses Lindsay Street and Elliot Street as a signalized intersection as it failed as a stop control shown in previous sections.

The assumptions for the diverted traffic are provided below:

- 100% of vehicles that would enter the existing access from the North or West leg will be diverted to Elliot Street.
- 100% of eastbound through vehicles will turn right at the intersection of Helen Street and Lindsay Street, to enter using Elliot Street.
- 100% of westbound through and left-turn vehicles that would exit at Lindsay Street and Helen Street will be diverted to Elliot Street; they will then proceed to Lindsay Street and Elliot Street and continue to their destination.

Figure 10 shows the Saturday peak and PM peak hour volumes and **Figure 11** provides a schematic of the lane geometry and traffic control. **Table 11** provides the traffic operations for this configuration.

Overall, all intersection operations operate acceptably with the worst LOS being a 'C' and the highest v/c being 0.69. Due to the close proximity of the intersections, northbound vehicles at the intersection of Lindsay Street and Helen Street are still expected to queue through Lindsay Street and Elliot Street, potentially blocking the intersection. The queues however are cleared each cycle with coordinated signals. Mitigation measures to prevent blockage at the Elliot Street intersection can include installation of "do not block intersection" signage, and painted cross hatching through the intersection where vehicles should not stop. The 95th percentile queue length on Elliot Street is not expected to extend beyond the existing Tim Hortons' entrance.

Appendix B provides a detailed figure illustrating how this alternative would be implemented.

Figure 10: Right-In Right-Out Access Only Traffic Volumes

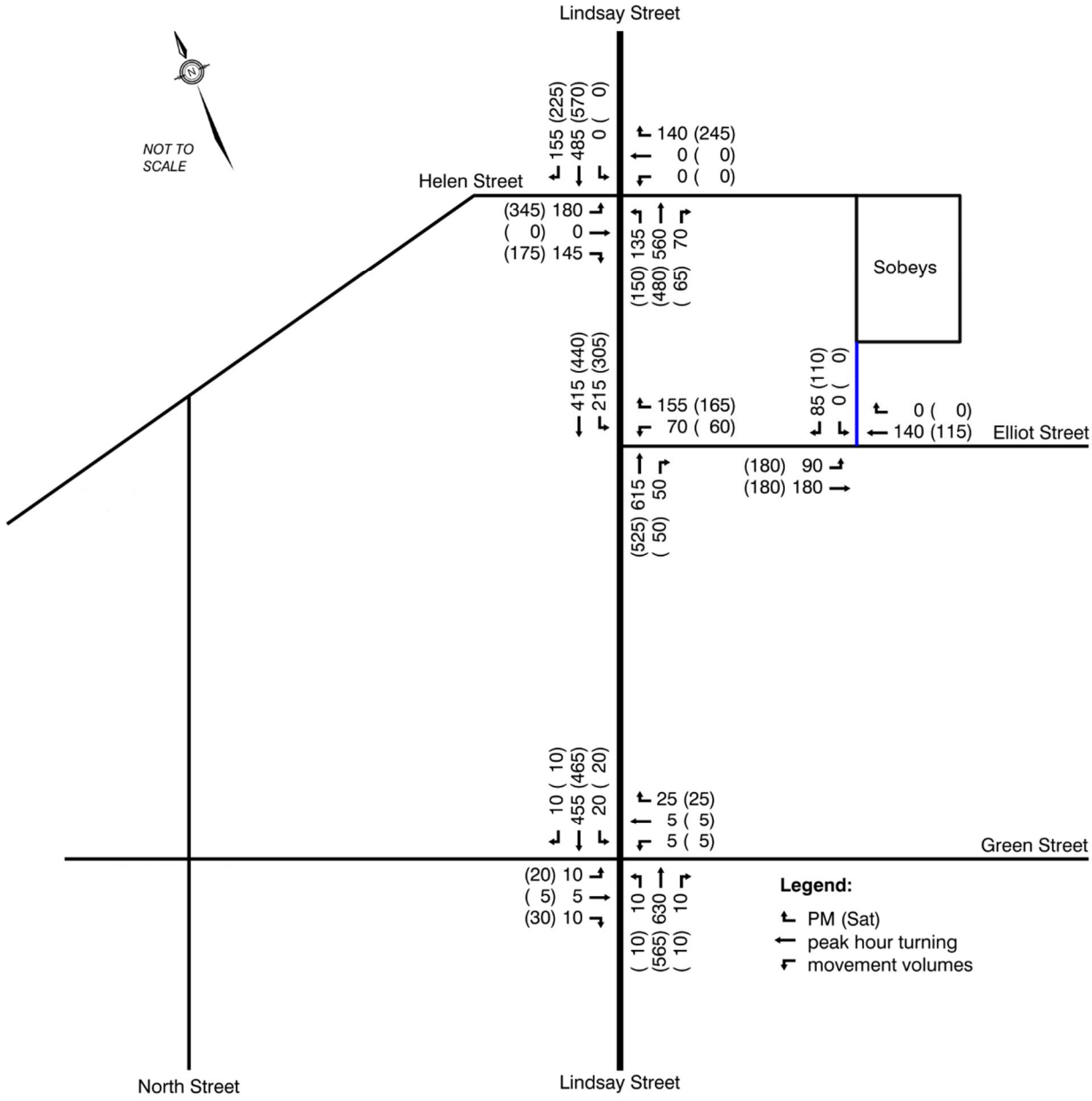


Figure 11: Right-In Right-Out Access Only Configuration

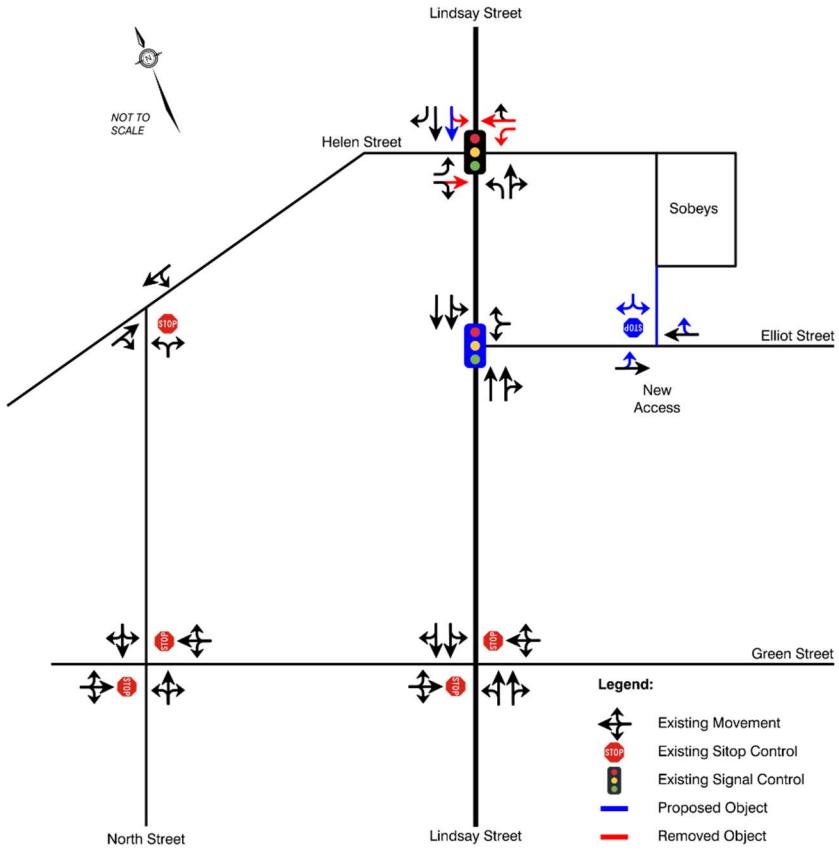


Table 11: Right-In Right-Out Access Only Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	**0.68**	30.6	C	70.4	0.44	28.1	C	42.8
	EBR	0.34	8.6	A	18.4	0.31	6.4	A	13.6
	WBR	0.63	13.2	B	22.4	0.38	3.4	A	2.5
	NBL	0.38	11.6	B	19.5	0.27	6.8	A	11.4
	NBTR	0.55	12.2	B	97.8	0.59	10	B	97.3
	SBT	0.30	9.6	A	37.4	0.24	6.9	A	23.3
	SBR	0.25	2.5	A	11.6	0.16	1.5	A	6.1
Lindsay St. & Elliot St. (Signalized)	WBLR	0.68	21.9	C	30.1	0.69	24.8	C	34.2
	NBTR	0.23	3.3	A	21.4	0.27	3.8	A	27.3
	SBTL	0.49	3.8	A	54.9	0.42	3.1	A	10.7

3.2.7 Prohibited Left-Turn from Northbound Lindsay St. to Gas Station

It has been observed that some vehicles heading northbound over the bridge attempt to make a left-turn into the gas station and are forced to stop in the through lane, waiting for a gap in opposing traffic. This results in vehicles queueing behind the turning vehicle, preventing other vehicles from proceeding through and over the bridge, ultimately blocking the intersection.

Future intersection design should consider installing a median between northbound and southbound directions on the North leg of the intersection. Northbound vehicles requiring access to the gas station should be undertaking a left-turn at Helen Street. Southbound vehicles on Lindsay Street would not be impacted with this modification. It was noted that fuel vehicles serve the gas station via the southbound approach and exit westbound onto Helen Street and would not be impacted.

No synchro analysis was performed as there is insufficient traffic data at the gas station access on Lindsay Street.

3.2.8 Summary of Access Control Measures

The analysis that was undertaken related to modification to site access adjacent to the intersection of Lindsay Street at Helen Street resulted in alternatives that can accommodate forecast 2031 vehicle demands.

- The existing Sobeys Tim Hortons access via Lindsay Street can be modified to operate as outbound only (V/C of 0.73), or as a right-in right-out for northbound vehicles (V/C of 0.68) to improve vehicle circulation and manage vehicle queues.
- Signalization is required at the intersection of Lindsay Street at Elliot Street to accommodate diverted vehicles. Both signalized intersection would be coordinated.

3.3 Additional Capacity

Additional capacity can be gained through roadway widening and/or extending storage lanes at the intersection where queues cannot be contained (vehicles spilling over and impacting adjacent lanes). It has been noted that congestion and vehicles are observed southbound over the bridge approaching the Helen Street intersection. While there are three lanes approaching the intersection, the storage lanes for southbound right-turn and southbound left-turns are short and queues spill over into the southbound through lane choking off all southbound movement. The southbound storage lane can only be extended by widening the bridge. The analysis undertaken presents operations at the intersection if the bridge were to be widened to for one southbound through lane and one southbound left-turn lane. Due to the limited width of the existing bridge structure, the additional southbound vehicle lane will require the elimination of or relocation of the existing pedestrian facility.

There are already two northbound lanes south of the bridge, with a single lane continuing over the bridge. North of the bridge the road includes a four-lane cross section (two lanes per direction) however

the road also includes on-street parking resulting in only one travel lane per direction. Widening the bridge for two northbound lanes is not recommended as it would not provide additional corridor capacity since only one downstream travel lane is provided; a widened bridge would create a northbound bottleneck where the two lanes converge into the single travel lane. Northbound improvements can be potentially achieved by better coordinating the traffic signals on Lindsay Street at Helen Street and Francis Street.

Additional capacity for the eastbound approach can be provided by extending the existing left-turn lane, and providing separate eastbound through and eastbound right-turn lanes. The little volume of eastbound through vehicles would suggest that a separate lane would not be justified. Dual eastbound turn lanes were not considered since there is limited space to provide two northbound receiving lanes without widening the bridge, and as discussed previously, would create a northbound bottleneck. The analysis includes provision of an extended eastbound left-turn lane.

The traffic operations with extended southbound left-turn storage onto the bridge and eastbound left-turn storage is shown in **Table 12**; the signal timing has been optimized to minimize delays for all approaches and to ensure southbound vehicles are not continuously growing.

The overall intersection is still not expected to operate well; the westbound through-right-turn movements results in a v/c of 0.86 which is over the desired target. Both the eastbound left-turn and the westbound through-right-turn movements have queues that cannot being processed each signal cycle. Even though the turn lane has been extended, vehicle queues growing each signal cycle ultimately spills over into the through / right-turn lane. Extending the southbound right-turn lane was also examined however it did not improve traffic operations and thus was not included.

Widening the bridge is not recommended as it would not solve the queueing issue at the intersection.

Table 12: Extend Southbound Left-Turn and Eastbound Left-Turn Storage Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	95% Queue Length (m)	V/C	Delay (s)	LOS	95% Queue Length (m)
Lindsay St. & Helen St. (Signalized)	EBL	0.81	35.5	D	**#89.8**	0.59	31.1	C	42.8
	EBTR	0.24	10.7	B	25.6	0.27	7.8	A	16.6
	WBL	0.17	33.5	C	14.5	0.31	41.4	D	18.1
	WBTR	**0.86**	42.6	D	**#78.9**	0.59	18.6	B	26.4
	NBL	0.29	22.5	C	21.3	0.22	10.9	B	18.1
	NBTR	0.70	27	C	134.4	0.63	15.8	B	118.5
	SBL	0.51	31.9	C	33.7	0.23	12.3	B	14.6
	SBT	0.61	24.6	C	112.1	0.42	12.1	B	67.7
	SBR	0.33	11.4	B	33.9	0.18	4.6	A	14.5

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

3.4 Network Reconfiguration

To improve vehicle circulation at the intersection of Lindsay Street and Helen Street, options that restrict select movement at the intersection were considered. These restrictions would require existing road users to be diverted through the area road network to complete their trip.

The following options were considered to improve intersection and road network operations.

- Remove the eastbound left-turn movement at Helen Street / Lindsay Street
- Remove the eastbound left-turn and the eastbound through movement Helen Street / Lindsay Street
- Remove all left turns, and eastbound and westbound through movements at Helen Street / Lindsay Street (right-in right-out)
- Remove the eastbound left-turn, and southbound left-turn movements (access)
- Realign Helen Street / Elliot Street extension

Diverted vehicles will make use of Elliot Street as well as North Street and Green Street to complete their trip. The analysis include impacts to intersections along the diversion and considers the need for signalization at Lindsay Street and Green Street, and at Lindsay Street at Elliot Street.

3.4.1 Remove Eastbound Left-Turn Movement at Helen St. and Lindsay St. (signal phases maintained)

An analysis of removing the eastbound left-turn movement at Lindsay Street and Helen Street has been performed. **Figure 12** shows the Saturday peak and PM peak hour volumes assuming 100% of eastbound left-turn vehicles would be diverted to North Street, onto Green Street, where they would then proceed to Lindsay Street and continue to their destination heading northbound through at Lindsay Street and Helen Street.

Table 13 provides the traffic operations for this option. The intersection signal timings have been optimized to ensure southbound queues are contained within the available storage and do not continue to grow each signal cycle. By removing the eastbound left-turn movement at the intersection of Lindsay Street and Helen Street, the eastbound left-turn phase is able to be removed, allowing more time to be allocated to all other movements. This option still results in the westbound through/right-turn movement nearing capacity with a v/c of 0.91, a LOS of 'E' and a queue length that continues to grow each signal cycle in the Saturday peak period. **Removing the eastbound left-turn movement alone would not result in the intersection operating with acceptable LOS.**

The introduction of additional vehicles to the intersection Green Street and Lindsay Street is also expected to cause the intersection to fail during both the Saturday and PM peak hours if it remains a two-way-stop controlled. A signal control would be required at Lindsay Street and Green Street to

operate with an acceptable LOS as shown in **Table 14**. **Figure 13** provides a schematic of the lane geometry and traffic control.

Table 13: Remove Eastbound Left-Turn Movement Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (Signalized)	EBT	0.27	40	D	31.3	0.11	35.7	D	11.5
	EBR	0.27	9.6	A	13.5	0.42	11.1	B	14.8
	WBL	0.16	38.7	D	16	0.28	39.9	D	17.9
	WBTR	**0.91**	57	**E**	**#100.1**	0.60	18.7	B	26.3
	NBL	0.13	5.9	A	9.6	0.15	3.9	A	9.9
	NBTR	0.71	13	B	157.4	0.62	7.7	A	104.1
	SBL	0.40	12.1	B	19.9	0.19	4.9	A	8.4
	SBT	0.38	7.3	A	56.5	0.32	4.5	A	38.2
	SBR	0.21	1.9	A	10.2	0.14	1.1	A	5.6
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-
	WBLR	0.51	34.5	D	18.9	0.51	28.6	D	18.9
	SBL	0.19	11.4	B	4.9	0.19	10.9	B	4.9
	SBT	-	1	A	-		0.9	A	-
Lindsay St. & Green St. (TWSC)	NBL	0.01	8.4	A	0	0.01	8.7	A	0
	NBT	-	0.1	A	-	-	0.1	A	-
	NBR	-	-	-	-	-	-	-	-
	EBLTR	**1.88**	**448.40**	**F**	215.6	**1.06**	125.6	**F**	69.3
	WBLTR	0.10	15.2	C	2.1	0.11	16.1	C	2.1
	SBL	0.02	8.8	A	0.7	0.02	9.1	A	0.7
	SBT	-	0.1	A	-	-	0.1	A	-
	SBR	-	-	-	-		-	-	-

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

Table 14: Remove Eastbound Left-Turn Movement Analysis (Signalized Lindsay St. at Green St.)

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Green St. (Signalized)	EBLTR	0.80	39	D	95	0.75	50.2	D	58.3
	WBLTR	0.05	7.3	A	6	0.09	13.4	B	8.3
	NBLTR	0.36	18.1	B	67.9	0.30	7.4	A	44.3
	SBLTR	0.32	17.6	B	57.2	0.24	7	A	32.4

Figure 12: Remove Eastbound Left-Turn Movement Traffic Volumes

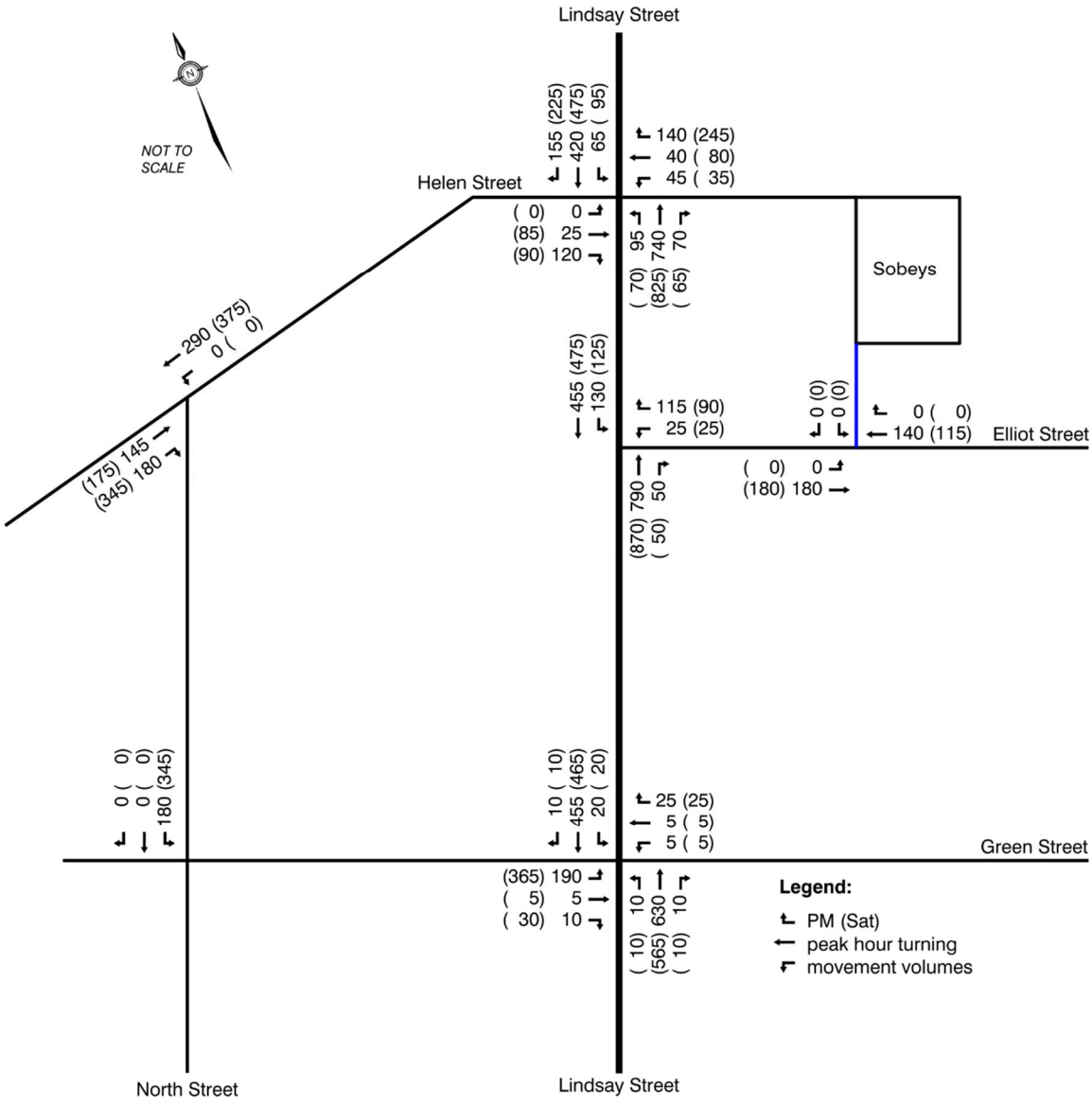
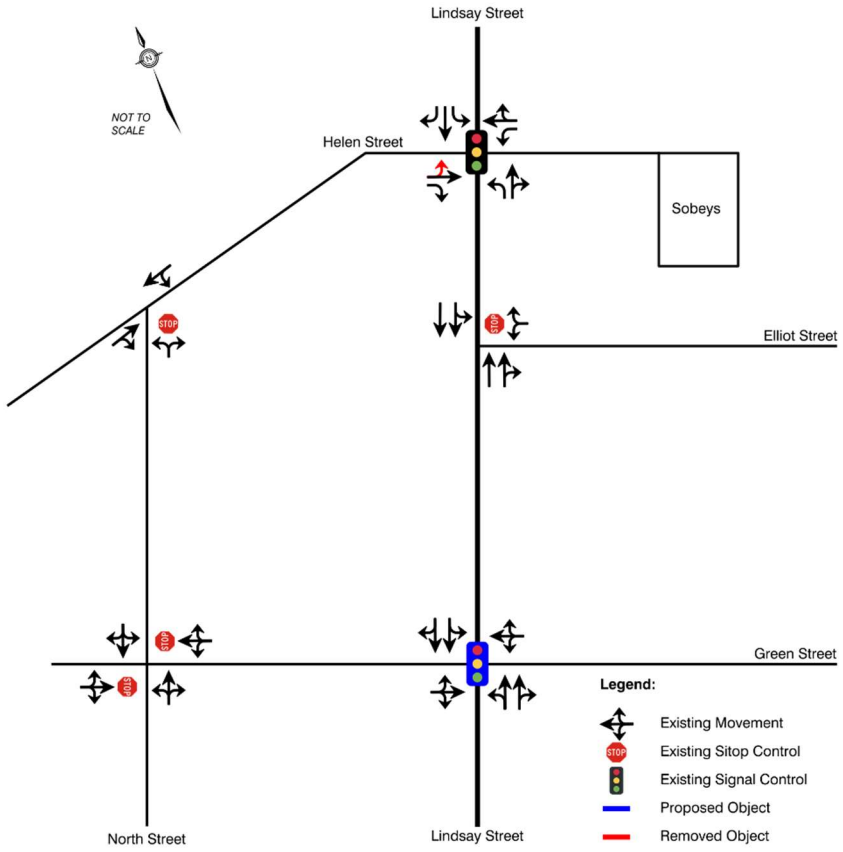


Figure 13: Remove Eastbound Left-Turn Movement Configuration



3.4.2 Remove Eastbound Left-Turn Movement at Helen St. and Lindsay St. (add southbound left-turn phase)

Traffic volumes and lane configurations used for this analysis are the same as those used in **Figure 12** and **Figure 13**. For this option, a southbound left-turn phase has been introduced to the intersection of Lindsay Street and Helen Street. This options allows for a shorter cycle length then the previous section as less green-time is required for the southbound left-turn movement to prevent queues from exceeding existing storage length. As shown in Section 3.4.1. a traffic signal is required at the intersection of Lindsay Street and Green Street to accommodate diverted vehicles. The analysis below includes signalization at the intersection. **Table 15** shows the expected traffic operations for this option.

Adding a southbound left-turn phase allows the southbound, eastbound, and westbound movement to operate acceptably; no excessive queuing is expected on the bridge in either the Saturday or PM peak hours. The addition of a southbound left-turn signal phase takes green-time away from the northbound through phase. This and the additional northbound through volumes results in the northbound though-right-turn movement nearing capacity with a v/c of 0.91 and queue lengths that will exceed 235 metres and continues to grow. **It is therefore determined that this option does not adequately accommodate forecast vehicle volumes for 2031.**

Table 15: Remove Eastbound Left-Turn Movement, Add Southbound Left-Turn Phase Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (Signalized)	EBT	0.23	29.8	C	25.2	0.08	30.1	C	11.5
	EBR	0.24	8	A	11.6	0.33	9.5	A	14.8
	WBL	0.14	28.8	C	13.1	0.20	31.8	C	17.9
	WBTR	0.77	29.5	C	60.9	0.49	14.6	B	26.4
	NBL	0.15	10.7	B	13.4	0.20	8.6	A	14.1
	NBTR	**0.91**	31.5	C	**#235.6**	**0.86**	22.6	C	149.8
	SBL	0.46	13.2	B	14.1	0.25	5.2	A	5.9
	SBT	0.43	8.3	A	58.8	0.38	5.8	A	38.2
	SBR	0.23	2.3	A	11	0.16	1.3	A	5.6
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-
	WBLR	0.51	34.5	D	18.9	0.51	28.6	D	18.9
	SBL	0.19	11.4	B	4.9	0.19	10.9	B	4.9
	SBT	-	1	A	-	-	0.9	A	-
Lindsay St. & Green St. (Signalized)	EBLTR	0.80	39	D	95	0.75	50.2	D	58.3
	WBLTR	0.05	7.3	A	6	0.09	13.4	B	8.3
	NBLTR	0.36	18.1	B	67.9	0.30	7.4	A	44.3
	SBLTR	0.32	17.6	B	57.2	0.24	7	A	32.4

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles.

3.4.3 Remove Eastbound Left-Turn and Through Movement at Helen St. and Lindsay St. (signal phases maintained)

A review of converting the eastbound movement to right-out only at Lindsay Street and Helen Street has been performed.

For this option the eastbound left-turn and through movements at Lindsay Street at Helen Street have been redirected. This analysis assumes that 100% of eastbound left-turn and through vehicles would be diverted to North Street, onto Green Street, where they would then proceed to Lindsay Street and continue their trip at Lindsay Street and Helen Street. Due to the increase in volume at Lindsay Street and Green Street a signal has been installed to improve traffic operations. The signal at Lindsay Street and Green Street has been coordinated with Lindsay Street and Helen Street. The intersections were optimized to minimize delays for all directions, **Table 16** shows the traffic operations at the intersections. **Figure 14** shows the Saturday peak and PM peak hour volumes and **Figure 15** provides a schematic of the lane geometry and traffic control.

The result show that all the intersection of Lindsay Street and Helen Street will operate with all movements forecasted to perform at LOS 'D' or better and a maximum v/c of 0.89. Vehicle queuing to exit the Sobeys/Tim Hortons cannot be fully accommodated ach signal cycle. More green-time has been allocated to the northbound movements for the intersection to operate without failing. As a result, the southbound left-turn movement's 95th percentile queue is expected to be 33.5 metres and will extend past the existing storage, causing spillage into southbound the through lane in the Saturday peak hour. This will block southbound vehicles from entering the intersection, leading to excessive queues on the bridge and is anticipated to yield larger queues than reported in the table. **It is therefore determined that this option does not adequately accommodate forecast vehicle volumes for 2031.**

The additional vehicles traveling northbound through the intersection at Lindsay Street and Elliot Street are expected to cause issues for westbound vehicles during the Saturday peak hour. The westbound vehicles are expected to operate at a LOS of E with average delays of 43.8 seconds per vehicle, however the 95th percentile queue length is expected to be 23.1m and is not anticipated to cause impacts to the Tim Hortons access.

By signalizing Lindsay Street and Green Street the intersection is expected to operate acceptably.

Figure 14: Eastbound Right-Turn Only Traffic Volumes

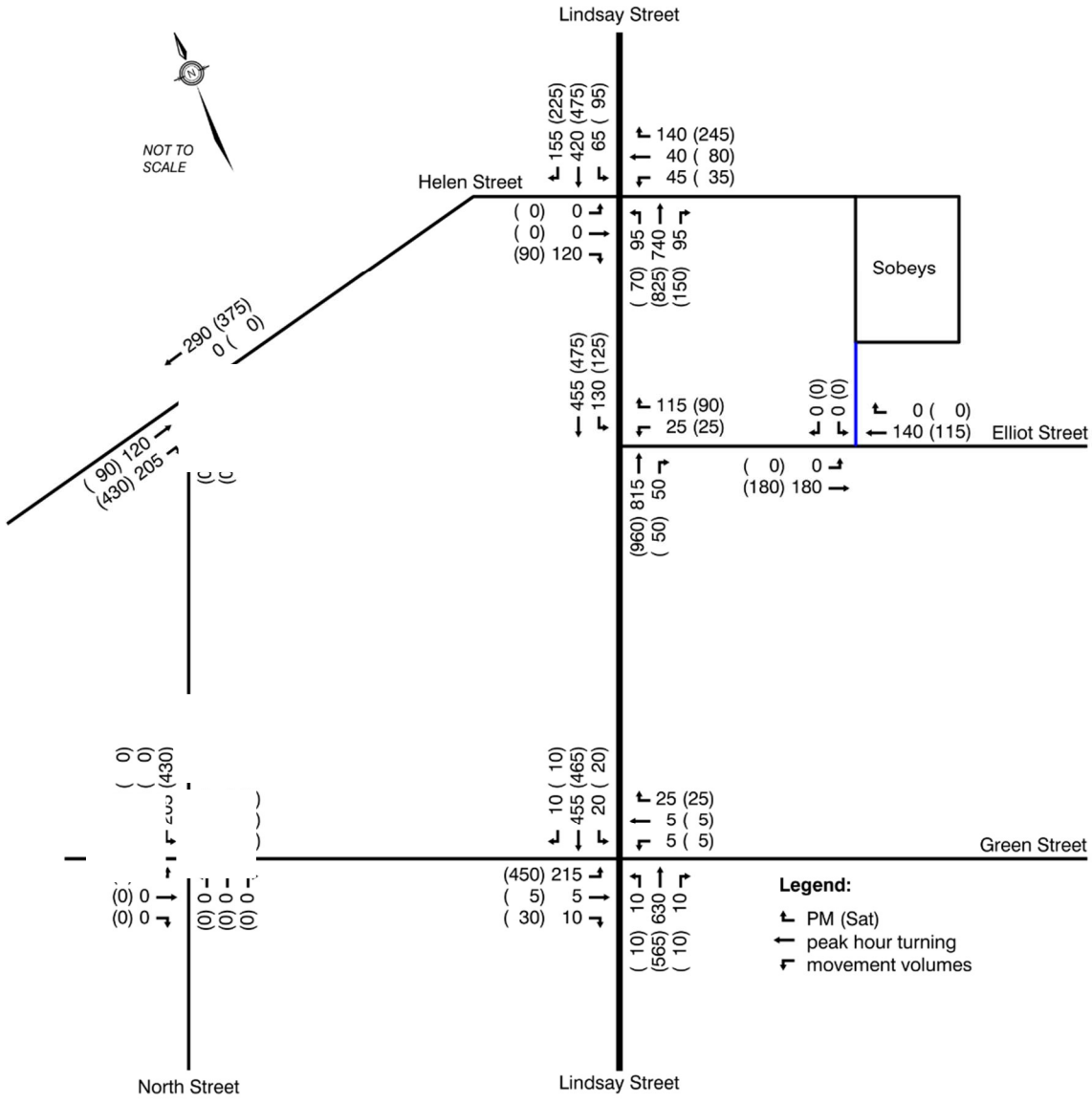


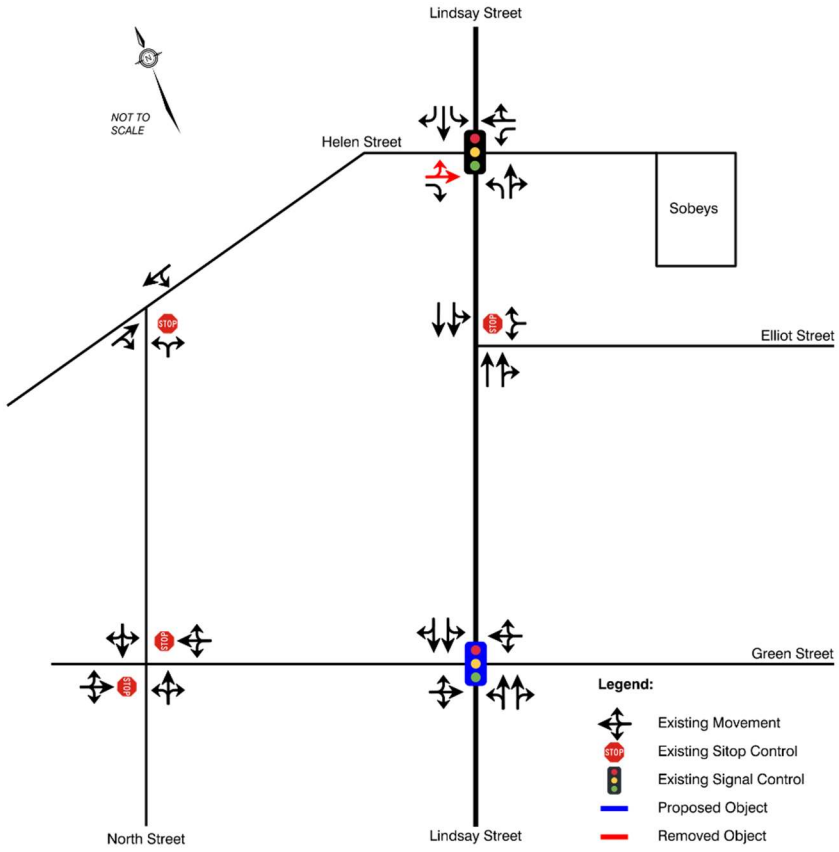
Table 16: Eastbound Right-Turn Only Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (Signalized)	EBR	0.16	0.6	A	0	0.23	0.9	A	0
	WBL	0.11	36	D	15.3	0.25	47	D	20.2
	WBTR	**0.89**	52	D	**#91.9**	0.65	24.8	C	31.2
	NBL	0.13	5.2	A	m6.4	0.14	2.7	A	7.5
	NBTR	0.80	18.4	B	184.7	0.62	6.3	A	62.8
	SBL	0.54	22	C	33.5	0.18	4.4	A	8.6
	SBT	0.38	7.8	A	61.7	0.31	4	A	40.3
	SBR	0.22	2.3	A	12.1	0.14	1.1	A	6

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-
	WBLR	0.59	43.8	E	23.1	0.53	30.3	D	19.6
	SBL	0.21	12.1	B	5.6	0.19	11.1	B	4.9
	SBT	-	1.2	A	-	-	0.9	A	-
Lindsay St. & Green St. (Signalized)	EBLTR	0.80	32.5	C	105.1	0.77	53.4	D	69.1
	WBLTR	0.05	5.1	A	4.9	0.09	13.5	B	8.6
	NBLTR	0.42	24.7	C	77.7	0.31	8.6	A	50.7
	SBLTR	0.38	20.3	C	66.8	0.24	7.1	A	40

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. Queue shown is only maximum after two cycles. Note: m represents that the 95th percentile queue is metred by an upstream signal

Figure 15: Eastbound Right-Turn Only Configuration



3.4.4 Remove Eastbound Left-Turn and Through Movement at Helen St. and Lindsay St. (add southbound left-turn phase)

This option includes the addition of a protected signal phase to accommodate southbound left turning vehicles. The results of this option is presented in in **Table 17.** Traffic volumes, intersection control, lane geometry and assumptions used for this analysis are consistent with **Section 3.4.3**.

By adding a southbound left-turn phase at the Lindsay Street at Helen Street intersection, the southbound left-turn queue length is able to be reduced from 33.5 metres to 15.4 metres in the Saturday peak hour. However it is anticipated that as a result of the additional northbound through and right-turn vehicles the northbound through-right-turn lane will not be able to accommodate vehicle demand. It is forecasted to be at capacity with a volume to capacity of 1.00, a delay of 47.3 seconds per vehicle, and will have a queue length that continues to grow past 255 metres after two cycle lengths. **It is therefore determined that this option does not adequately accommodate forecast vehicle volumes for 2031.**

Lindsay Street at Elliot Street is expected to operate the same as the previous section with the worst movement operating at a LOS equal 'E' during the Saturday peak hour with a two-way stop control. Signalization of the Elliot Street intersection could be included to manage westbound delays and queues. Lindsay Street at Green Street is expected to operate acceptably during both Saturday and weekday PM peak hours with the identified signal control.

Table 17: Eastbound Right-Turn Only, Add Southbound Left-Turn Phase Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (Signalized)	EBR	0.17	0.7	A	0	0.23	1	A	0
	WBL	0.11	25.5	C	11.2	0.22	37.1	D	17.1
	WBTR	0.78	26.5	C	48.4	0.59	18.2	B	25.4
	NBL	0.15	10.3	B	m10.6	0.15	3	A	6.1
	NBTR	**1.00**	47.3	D	**#255.5**	0.65	7.5	A	64.8
	SBL	0.43	12.9	B	15.4	0.20	5.2	A	8.7
	SBT	0.41	7.8	A	59.8	0.32	4.5	A	38.4
	SBR	0.22	2.3	A	11.4	0.14	1.1	A	5.7
Lindsay St. & Elliot St. (TWSC)	NBT	-	-	-	-	-	-	-	-
	NBR	-	-	-	-	-	-	-	-
	WBLR	0.59	43.8	**E**	23.1	0.53	30.3	D	19.6
	SBL	0.21	12.1	B	5.6	0.19	11.1	B	4.9
	SBT	-	1.2	A	-	-	0.9	A	-
Lindsay St. & Green St. (Signalized)	EBLTR	0.82	28.2	C	86.3	0.75	43.8	D	57.2
	WBLTR	0.05	4.3	A	4.2	0.09	11.1	B	7.3
	NBLTR	0.44	19.6	B	58.1	0.32	8.3	A	45.3
	SBLTR	0.39	15.7	B	29.1	0.25	6.7	A	24

Note: # represents that the 95th percentile volume exceeds capacity, queue may be longer. m indicates that the queue is metered by an upstream signal

3.4.5 East and West Legs Right-in Right-out at Helen St. and Lindsay St.

While **Section 3.2.6** presents the analysis of a northbound right-in right-out access for the east leg at the intersection of Lindsay Street and Helen Street, and **Section 3.4.3** addresses a right-out for the west leg of the intersection, an additional analysis that includes both northbound and southbound right-in right-out configurations at this intersection was reviewed.

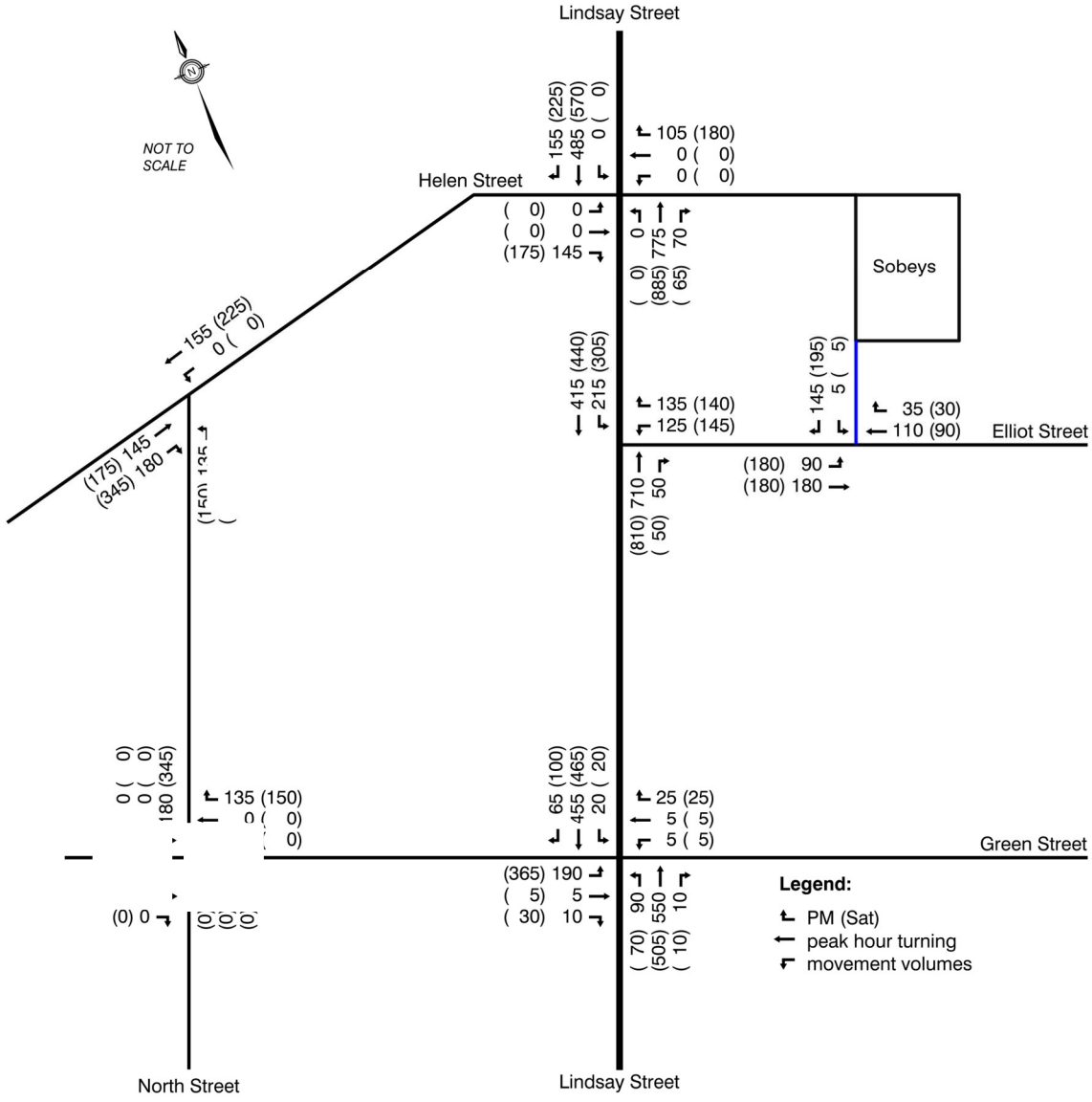
This alternative would result in the removal of the signalization at the intersection which would impact pedestrian crossings as there are no other controlled pedestrian crossings on Lindsay Street south of the bridge. A median could be provided to restrict left turns as well as eastbound and westbound through movements.

The assumptions for the diverted traffic are as follows:

- 100% of vehicles entering the existing access at Lindsay Street and Helen Street from southbound left-turn or eastbound through movements will be diverted to the new access via Lindsay Street and Elliot Street.
- 100% of westbound through and left-turn vehicles that would exit at Lindsay Street and Helen Street will be diverted to Elliot Street.
- 100% of eastbound left-turn vehicles at Lindsay Street and Helen Street would be diverted to North Street, onto Green Street, for access to northbound Lindsay Street.
- 100 % of the northbound left-turn vehicles at Lindsay Street and Helen Street would be diverted to Green Street, onto North Street, and would then continue their trip onto Helen Street.
- Of the vehicles that would make a northbound left-turn movement at Lindsay Street and Helen Street:
    - The vehicles that came from Elliot Street would make a westbound left-turn at Lindsay Street and Elliot Street and would be diverted to Green Street, onto North Street and would then continue their trip onto Helen Street.
    - The vehicles that came from Lindsay Street would make a northbound left-turn on Green Street, onto North Street, and would then continue their trip onto Helen Street.
- 25% of westbound right-turn vehicles at Lindsay Street and Helen Street would be diverted to Elliot Street. The removal of the signal at the existing access can result in vehicles being delayed to undertake the westbound right-turn and would use Elliot Street where the signal can facilitate egress.

Figure 16 shows the Saturday peak and PM peak hour volumes.

Figure 16: East and West Legs Right-in Right-out Traffic Volumes



By restricting southbound and eastbound left-turn movements at Lindsay Street and Helen Street, intersections at Lindsay Street at Elliot Street and at Green Street will both require signalization to accommodate diverted vehicle volumes, as shown in **Section 3.2 and Section 3.4.1** respectively**. Table 18** provides the analysis of traffic operations at the intersections. The removal of the pedestrian crossing at Helen Street can be mitigated by including a controlled pedestrian crossing at the new signalized intersection at Elliot Street. **Figure 17** provides a schematic of the lane geometry and traffic control. **Appendix B** provides a detailed figure illustrating how this alternative could be implemented.

The intersection of Lindsay Street and Helen Street is expected to operate with increased delays for the westbound right-turn movement due to the removal of the signal control and increase in approaching northbound vehicles during the Saturday peak hour. It is expected that the signalized intersection at Lindsay Street and Elliot Street will provide gaps in traffic (during yellow and all-red clearance phases) to allow vehicles to make the westbound right-turn movement.

Providing a signalized intersection on Lindsay Street at Elliot Street with a protected and permitted southbound signal phase enables the intersection to operate near capacity with a maximum v/c of 0.93 corresponding to the southbound through-left-turn movements during the Saturday peak hour. While the intersection in near its theoretical capacity, queues can be managed in all directions such that vehicles can clear each signal cycle. Providing a separate westbound left-turn and westbound right-turn lane on Elliot Street would improve the intersection operations with a reported southbound through-left-turn movement v/c of 0.57 which is within the acceptable LOS targets.

Lindsay Street at Green Street operates with adequate capacity as a signalized intersection.

Figure 17: East and West Legs Right-in Right-out Configuration

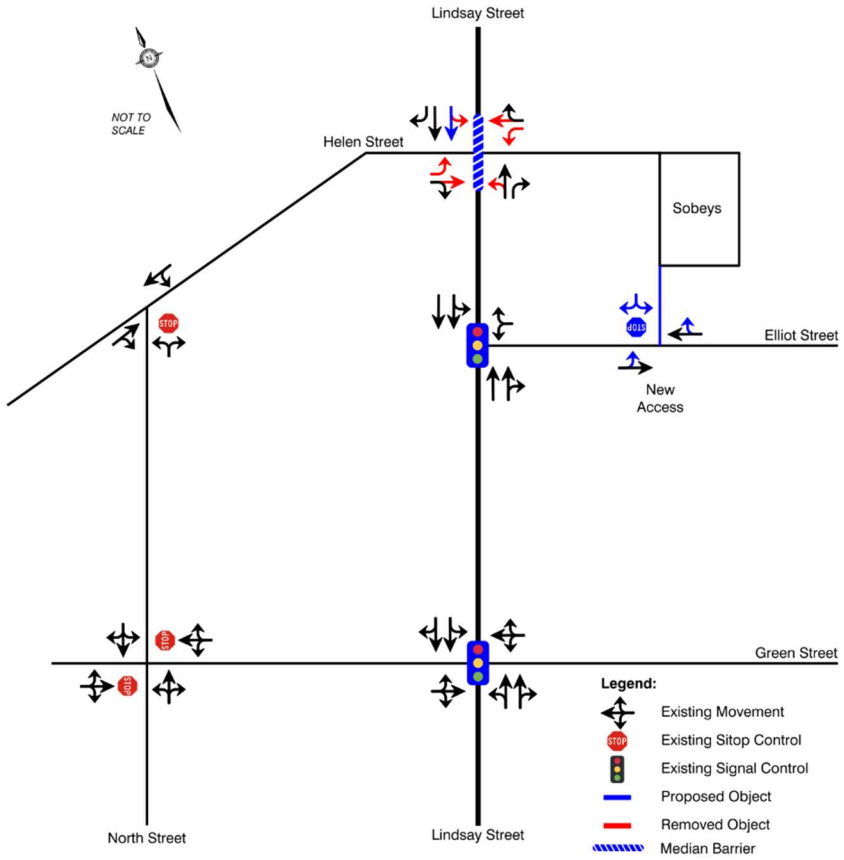


Table 18: East and West Legs Right-in Right-out Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (TWSC)	NBTR	-	-	-	-	-	-	-	-
	EBR	0.29	12.7	B	8.4	0.22	11.5	B	5.6
	WBR	0.69	42	E	32.9	0.34	21.4	C	10.5
	SBTR	-	-	-	-	-	-	-	-
Lindsay St. & Elliot St. (Signalized)	WBLR	0.76	35.8	D	57.9	0.72	32.8	C	49.9
	NBTR	0.38	6.1	A	32.5	0.34	4	A	22.9
	SBTL	0.93	10.6	B	58.4	0.48	7.8	A	42.5
Lindsay St. & Elliot St. (Signalized) +WBL lane	WBL	0.57	39	D	37.9	0.53	38.8	D	34
	WBR	0.40	8.5	A	13.9	0.41	9.2	A	14
	NBTR	0.35	4.1	A	20.1	0.31	3.2	A	17.7
	SBTL	0.57	7.3	A	46.2	0.44	5.3	A	31.2
Lindsay St. & Green St. (Signalized)	EBLTR	0.81	32.5	C	74.7	0.71	39.8	D	47.2
	WBLTR	0.06	5.9	A	5	0.09	10.8	B	7.1
	NBLTR	0.44	15.9	B	55.1	0.38	7.9	A	42.5
	SBLTR	0.39	10.9	B	30	0.28	4.9	A	15.4

3.4.6 Remove Eastbound Left-Turn and Southbound Left-Turn Movements at Helen St. and Lindsay St.

The two most critical movements at the intersection of Lindsay Street at Helen Street are the southbound left-turn and the eastbound left-turn, both with queues that are expected to overflow into adjacent lanes blocking all traffic movement. A review of removing the eastbound and southbound left-turn movement was undertaken to understand how the intersection would operate without these two critical movements. The analysis in the previous sections demonstrate that signalization on Lindsay Street at Elliot Street and at Green Street would be required to accommodate diverted vehicles.

Figure 18 shows the Saturday peak and PM peak hour volumes and **Figure 19** provides a schematic of the lane geometry and traffic control. **Appendix B** provides a detailed figure illustrating how this alternative would be implemented. The assumptions for the diverted traffic are:

- 100% of vehicles the southbound left-turn vehicles from Lindsay Street accessing the Sobeys/Tim Hortons at Helen Street would be diverted downstream to Elliot Street.
- 100% of eastbound left-turn vehicles at Lindsay Street and Helen Street would be diverted along North Street, to Green Street for access to northbound /southbound Lindsay Street

Table 19 provides the traffic operations at the intersections.

By removing the eastbound left-turn phase at Lindsay Street at Helen Street more time is able to be allocated to other movements. This change allows the intersection to operate acceptably, with a maximum v/c of 0.83, average delays of 35.5 seconds per vehicle (LOS of D), for the westbound through-right-turn movement.

The removal of the southbound movement allows the intersection to have two southbound through lanes, resulting in queueing that will not extend onto the bridge. The 95th percentile queue length for the northbound through movement at Lindsay Street and Helen Street is expected to exceed the distance between the two intersections and will result in queuing spilling over and potentially blocking the intersection if Lindsay Street and Elliot Street; this is due to the diverted northbound vehicles, and can be mitigated with signage and line painting.

Overall, all intersection movements will operate acceptably.

Figure 18: Remove Eastbound and Southbound Left-Turn Movements Traffic Volumes

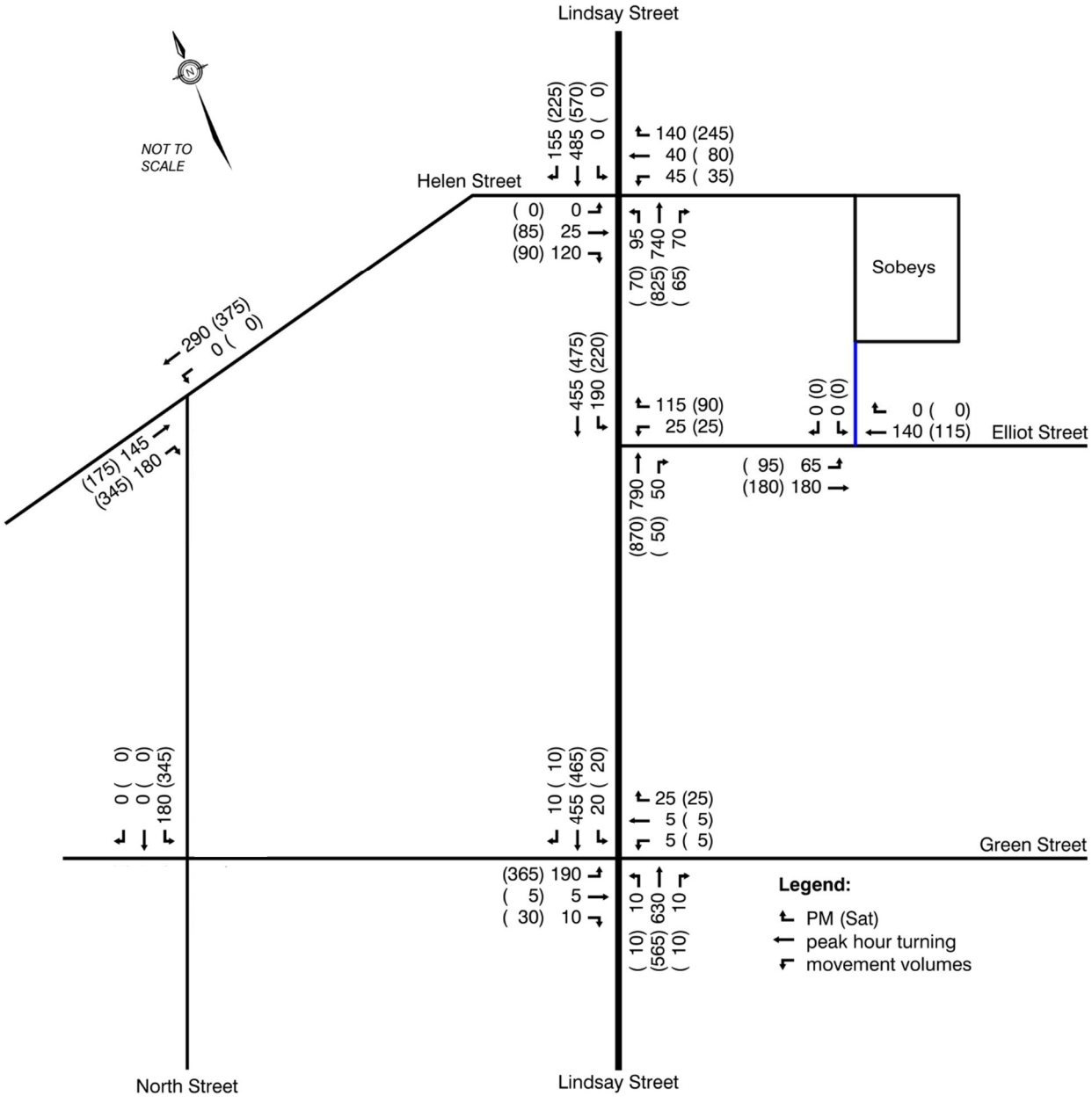


Figure 19: Remove Eastbound and Southbound Left-Turn Movements Configuration

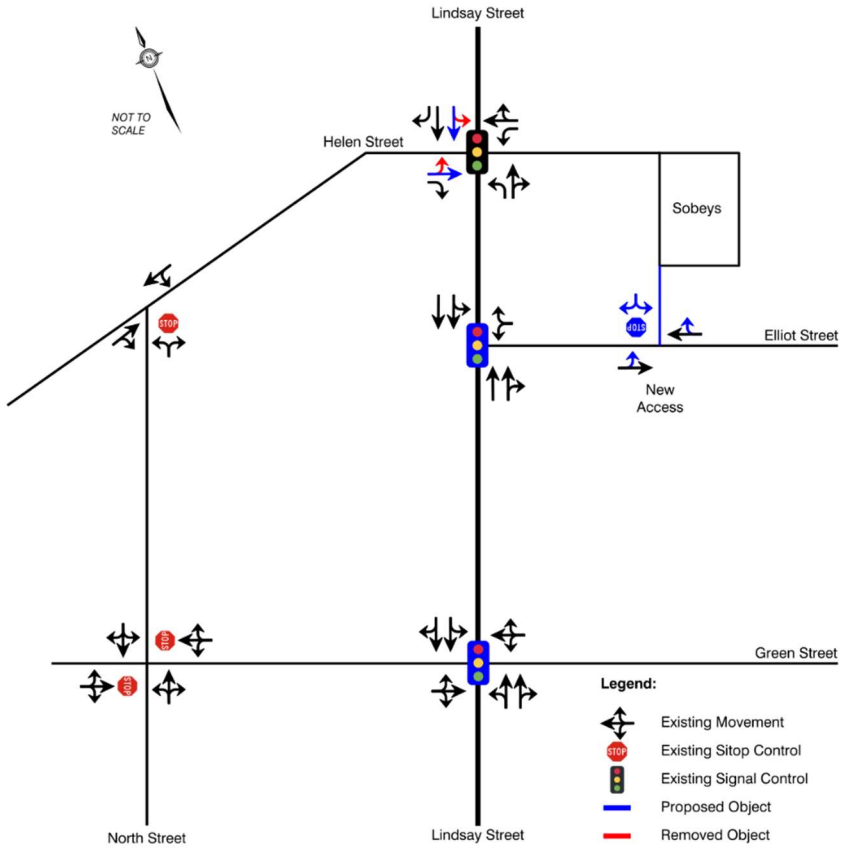


Table 19: Remove Eastbound and Southbound Left-Turn Movements Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Helen St. (Signalized)	EBT	0.26	31.2	C	24.7	0.10	30.4	C	10
	EBR	0.26	7.9	A	11.4	0.39	9.7	A	13.4
	WBL	0.15	29.5	C	12.8	0.25	33.8	C	15.5
	WBTR	0.83	35.5	D	60.6	0.56	15.9	B	23.1
	NBL	0.14	4	A	5.4	0.16	2.4	A	4.5
	NBTR	0.74	11.1	B	116.4	0.65	6.4	A	73.4
	SBT	0.25	6.2	A	31	0.20	3.9	A	18.7
	SBR	0.22	1.4	A	7.7	0.14	1	A	4.9
Lindsay St. & Elliot St. (Signalized)	WBLR	0.53	21.1	C	19.5	0.55	17.4	B	19
	NBTR	0.34	2.8	A	24.6	0.32	1.9	A	14.3
	SBTL	0.47	2.9	A	17.6	0.43	3.5	A	17.5
Lindsay St. & Green St. (Signalized)	EBLTR	0.79	32.9	C	78.3	0.71	39.2	D	46.8
	WBLTR	0.05	6.1	A	5.1	0.09	10.7	B	7
	NBLTR	0.37	16.4	B	59.1	0.32	7.4	A	39.9
	SBLTR	0.33	12.9	B	30.8	0.25	4.6	A	13

3.4.7 Helen St. Realignment

An alternative that had been considered in the "1985 cause report" which includes the realignment of Helen Street to intersect Lindsay Street at the Elliot Street intersection with a new traffic signal. It is noted that the new intersection at Elliot Street would be designed as a more significant intersection to accommodate heavy-vehicle turning movements, and with multiple approach lanes to increase vehicle capacity. The roadway would require property and is not considered a near term solution. This alternative does not impact operations at Green Street.

The analysis presented below includes the conversion of the Sobeys/Tim Horton access to a northbound right-in right-out due to the close proximity of the existing access to Elliot Street and the potential impact of southbound queues. This would represent a worst case scenario with all southbound vehicles being diverted to the new intersection at Elliot Street. **Figure 20** shows the Saturday peak and PM peak hour volumes and **Figure 21** provides a schematic of the lane geometry and traffic control.

Table 20 provides the traffic operations at the intersections.

Operating the intersection of Lindsay Street at Elliot Street / Helen Street with eastbound left-turn and westbound left-turn signals and northbound left-turn and southbound left-turn permissive movements, the intersection is able to maintain an acceptable level of service and v/c of 0.73. Due to the high eastbound left-turn volumes, a double left-turn lane is required to manage queue lengths and allow for appropriate distribution of green-time to each approach.

Figure 20: Helen St. Realignment Volumes

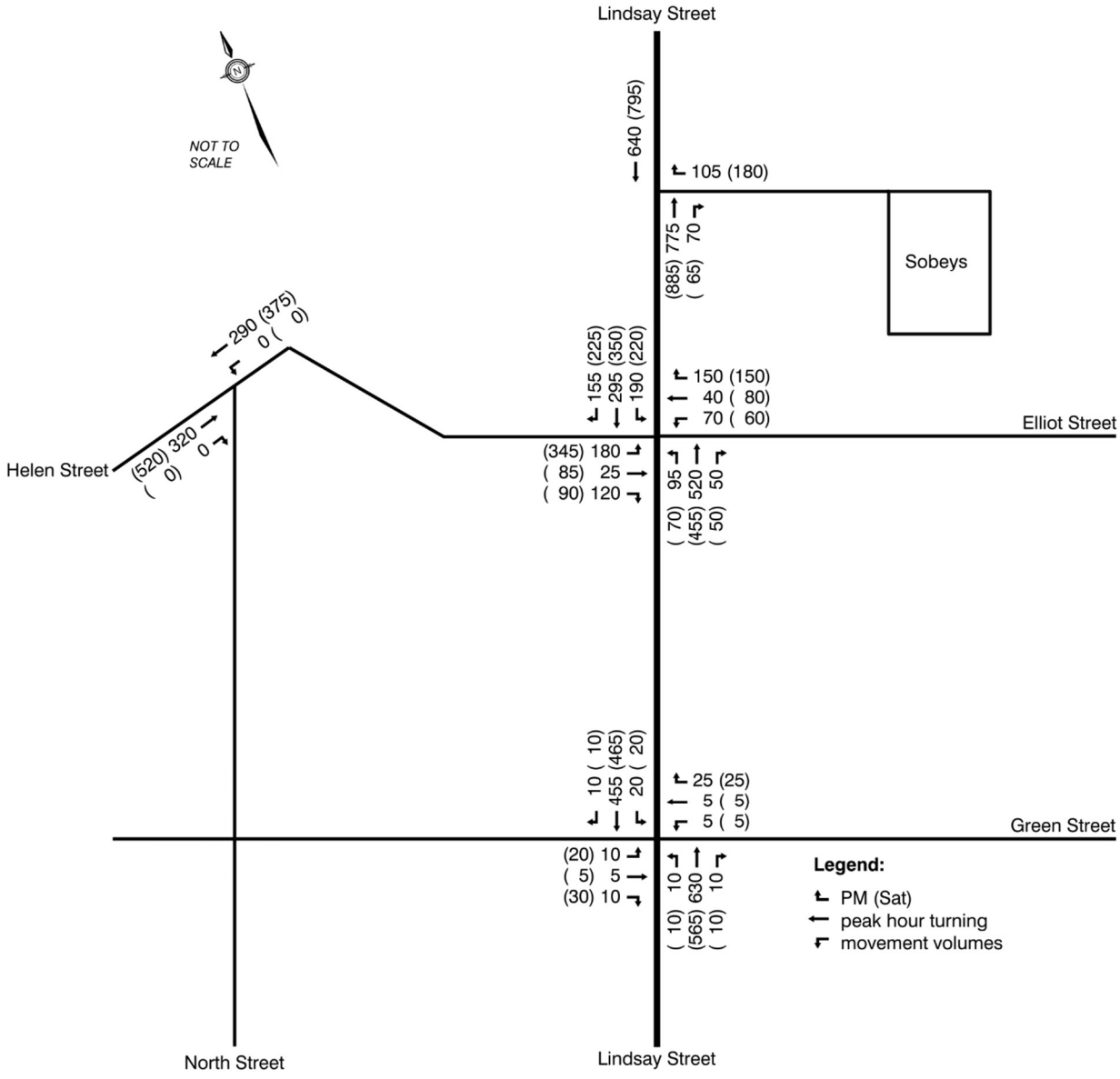


Figure 21: Helen St. Realignment Configuration

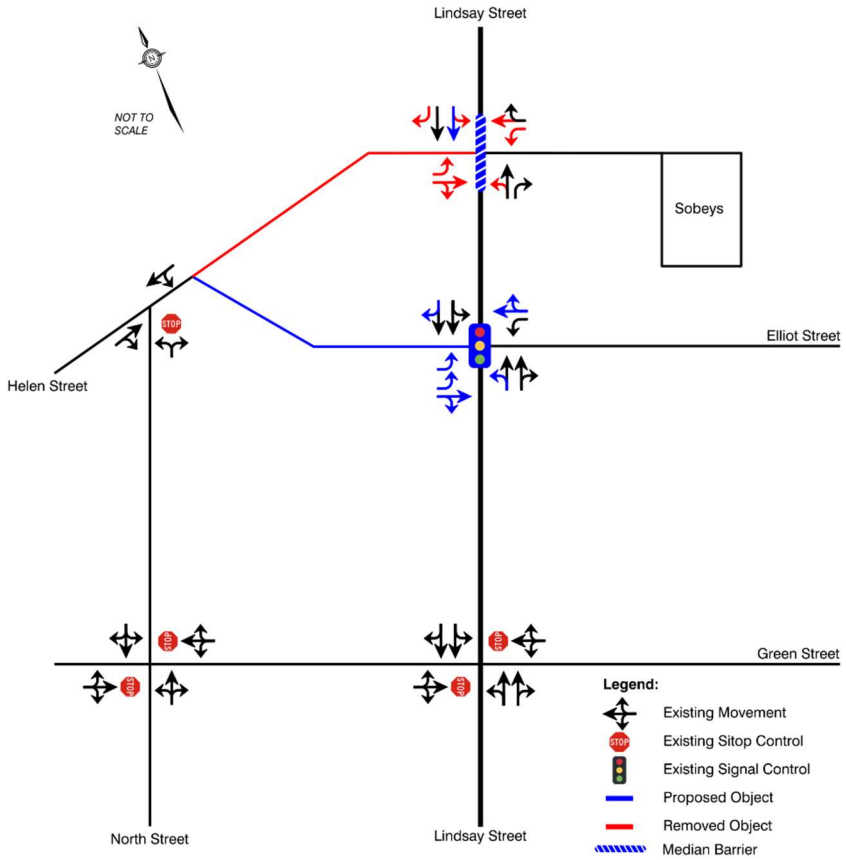


Table 20: Helen St. Realignment Analysis

Int.	Mvmt	Saturday Peak				Weekday PM Peak			
		V/C	Delay (s)	LOS	Q95% (m)	V/C	Delay (s)	LOS	Q95% (m)
Lindsay St. & Existing Helen St. (TWSC)	NBTR	-	-	-	-	-	-	-	-
	WBR	0.69	42	E	32.9	0.34	21.4	C	10.5
	SBT	-	-	-	-	-	-	-	-
Lindsay St. & Elliot St. / Helen St. (Signalized)	EBL	0.73	47.8	D	51.4	0.50	41.3	D	27.3
	EBTR	0.42	25.2	C	40.5	0.41	13.2	B	20.6
	WBL	0.42	50.3	D	25.3	0.42	44.7	D	26
	WBTR	0.72	36.6	D	53.3	0.58	17.2	B	26.4
	NBLTR	0.45	15.4	B	55.1	0.47	11.8	B	52.6
	SBLTR	0.72	20.3	C	90.3	0.56	12.6	B	53.5

3.4.8 Summary of Network Reconfiguration

By restricting movements at Lindsay Street and Helen Street and diverting existing road users throughout the network, forecasted 2031 vehicle demand can be accommodated. The following presents a summary of the results of the network reconfiguration alternatives.

- **Removing the eastbound left-turn movement and/or eastbound through movement** from the intersection of Lindsay Street at Elliot Street does not sufficiently improve vehicle operations. (V/C of 0.89 to 1.0)
- **Limiting the east and west legs of Lindsay Street at Helen Street to right-in right-out** suggests that the intersection can be converted to a two-way stop controlled intersection. Signalization is required at the intersections of Lindsay Street at Elliot Street and Lindsay Street at Green Street to accommodate diverted vehicles and provide a controlled pedestrian crossing of Lindsay Street. Both signalized intersection would be coordinated but the southbound movement at Elliot Street operates close to capacity to accommodate the southbound left-turn. (V/C of 0.93)
- **Restricting the eastbound and southbound left-turn movements at Lindsay Street and Helen Street** can improve vehicle circulation. Signalization would be required at the intersections of Lindsay Street at Elliot Street and Lindsay Street at Green Street in addition to the Helen Street intersection to accommodate diverted vehicles. The northbound through movement at Lindsay Street and Helen Street is expected to queue past the Lindsay Street at Elliot Street intersection, potentially blocking the intersection. All three signalized intersection would be coordinated to ensure vehicles flow through the corridor. (V/C of 0.83)
- **Removing the existing west leg of Lindsay Street and Helen Street and realigning the Helen Street to intersect with Elliot Street** is expected to improve vehicle circulation and manage vehicle queues. Signalization is required at the intersection of Lindsay Street at Elliot Street to accommodate the new alignment and diverted vehicles. This options would not be implemented in the short / medium term due to the property and roadway realignment that is required. Provision of other solutions does not preclude this option in the future. (V/C of 0.73)

4.0 Other Considerations

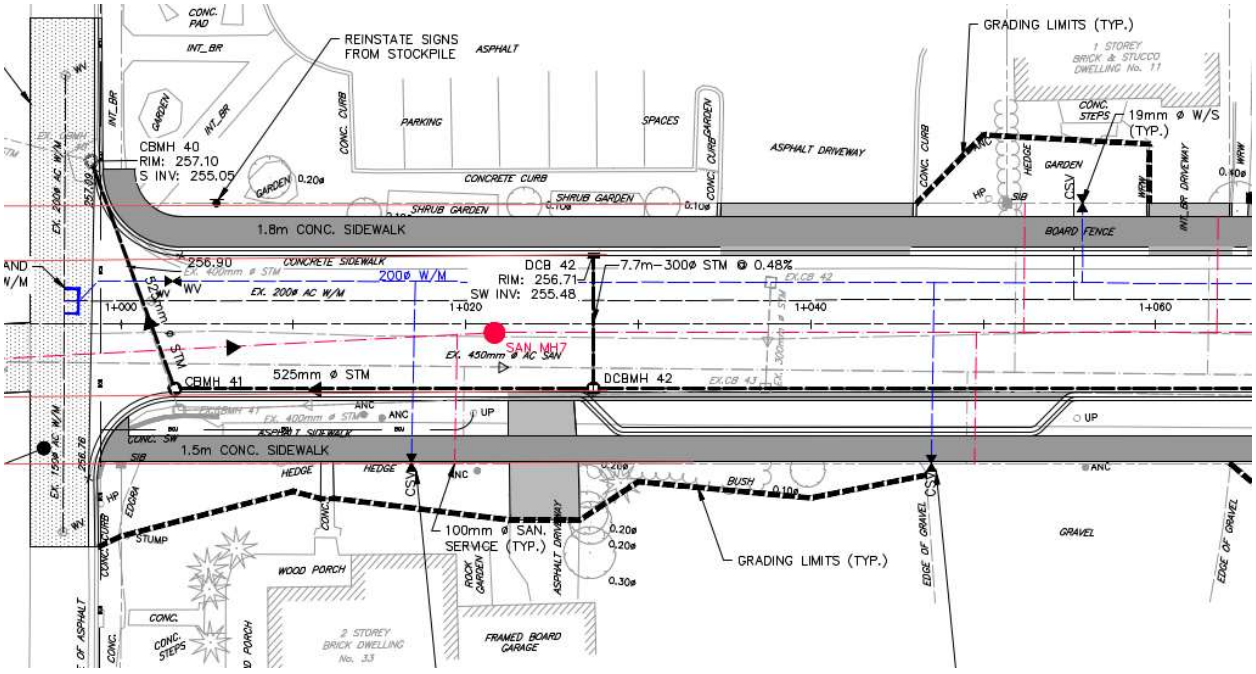
4.1 On Site Circulation between Tim Hortons and Sobeys

A qualitative analysis has been examined for installing a median between the Sobeys parking lot and the Tim Hortons parking lot. This could be beneficial in the event of restricted access to the East leg of the intersection of Helen Street and Lindsay Street and could prevent possible queueing of vehicles onto Elliot Street should vehicles attempt to enter the Sobeys parking lot by use of the Tim Hortons access on Elliot Street. It was noted during field visits that there were instances when vehicle were queued for westbound egress from Tim Hortons to Lindsay Street such that they were blocking inbound vehicles, resulting in intersection grid-lock.

A synchro analysis was not performed as there is insufficient traffic data for the Tim Hortons access on Elliot Street, and on site circulation between Sobeys and Tim Hortons**. It is suggested that property managers undertake a comprehensive on-site circulation traffic study to identify potential measures that improve the overall environment for all users and patrons.**

It is noted that a roadway redesign for Elliot Street has been prepared which includes mitigation measures to enable eastbound vehicles to "slip-by" a potentially queued vehicle on Elliot Street waiting to undertake a left-turn for Tim Hortons access **(Figure 22).** There may be further opportunity to lengthen the slip by lane, or increase the roadway to a full three lane cross section between Lindsay Street and the Tim Hortons access.

Figure 22: Planned Elliot Street Redesign at Lindsay Street



While two eastbound lanes can be provided in order to maximize storage for queued vehicles waiting for access to Tim Hortons, several of the Traffic Improvement Options require the signalization of Elliot Street. While the analysis fcuses on an intersection with a single westbound approach lane, there may be opportunity to provide a short left turn storage pocket that would be aligned back-to-back with an eastbound left-turn lane for Tim Hortons access as shown in **Figure 23.**

Figure 23: Elliot St. Conceptual Lane Arrangement (3 lane cross section)



4.2 Roundabout at Helen St. and Lindsay St.

The feasibility of implementing a roundabout at the intersection of Helen Street and Lindsay Street was evaluated using SIDRA INTERSECTION 7.0 (and HCM outputs). To accommodate the forecast 2031 vehicle demands, a two-lane roundabout would be required which would have significant property impacts. The East and North legs of the intersection are constrained to one lane only due to space considerations with limited ability for road widening for a two lane roundabout approach.

Figure 24 illustrates the roundabout geometry with a two lane northbound and eastbound approach. **The roundabout configuration would not provide adequate capacity to accommodate the forecast demand** with reported V/C of 0.86 and 0.91 for the south and north legs respectively, as shown in **Table 21.**

Figure 24: SIDRA Roundabout Analysis

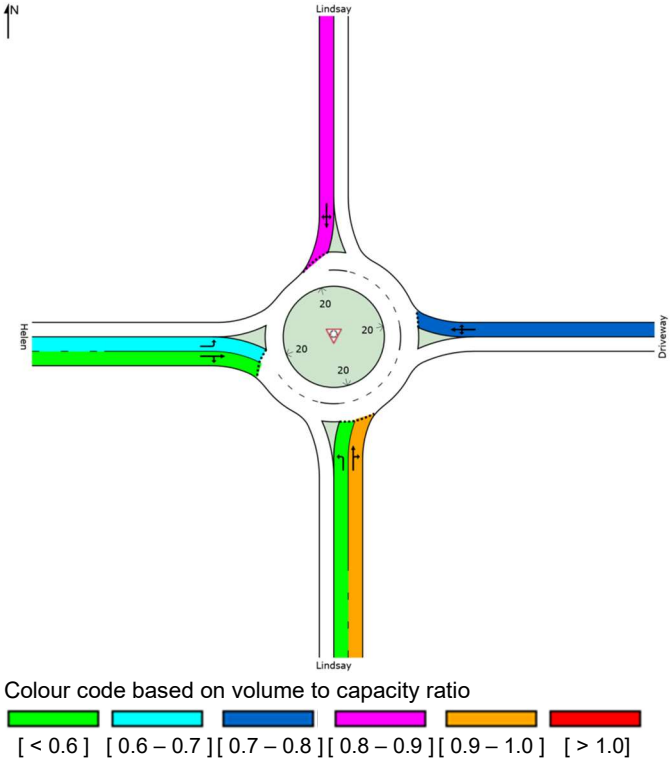


Table 21: SIDRA Roundabout Analysis Results

	South Leg	East Leg	North Leg	West Leg	Intersection
V/C Ratio	**0.91**	0.70	**0.86**	0.62	**0.91**

4.3 School Buses and Delivery Trucks

Access control changes leading to a detour along North Street and Green Street could impact Fenelon Falls Secondary School (FFSS), and Langton Public School (LPS), specifically leading to increased school bus congestion during peak times. Inbound and outbound school buses currently utilize Green Street, North Street, and Helen Street and Lindsay Street as shown in **Figure 25** and **Figure 26**. There are 10 school routes that serve LPS, and 23 school routes that serve FFSS. School buses that serve FFSS in the AM drop off students on Lindsay Street which occupies one of the two available southbound lanes vehicle lanes.

It is noted that weekday AM vehicle volumes are not as significant as the PM peak and the weekend volumes. In the PM peak there is less impact due to school buses since they are not serving the schools directly on Lindsay Street. The movements that could be impacted by network reconfiguration include:

- Outbound buses from LPS: northbound left-turn from Lindsay Street onto Helen Street (3 buses)
- Outbound buses from FFSS: eastbound left-turn from Helen Street onto Lindsay Street (9 buses).

It is recommend that a signalized pedestrian crossing be provided in the corridor if signalization of Green Street or Elliot Street is not implemented.

Figure 25: Inbound School Bus Routes

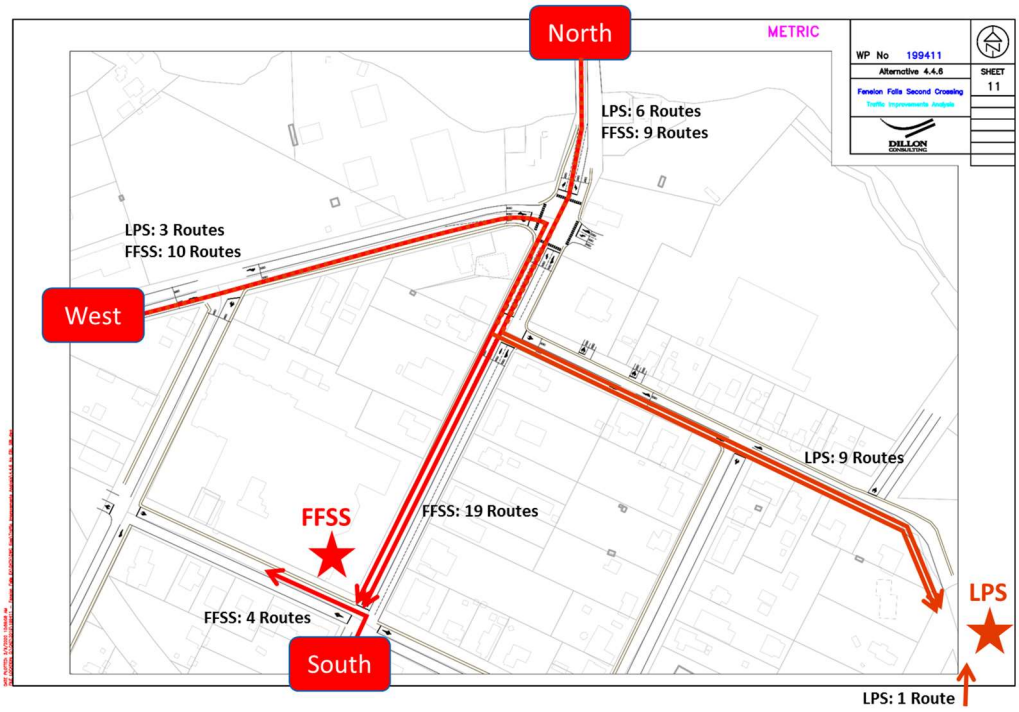
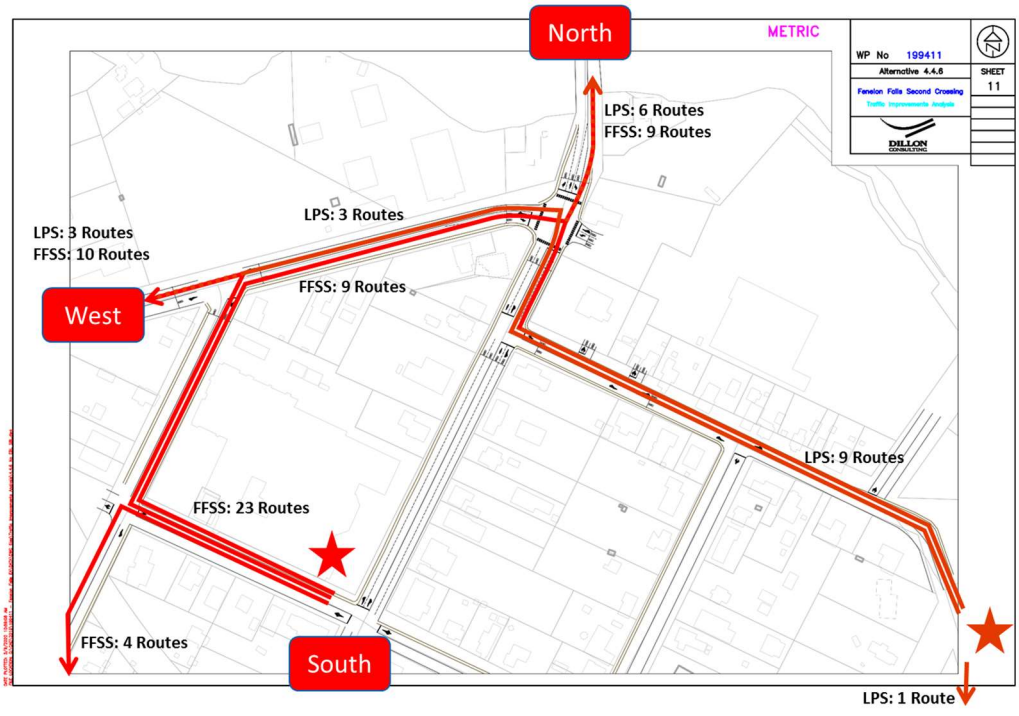


Figure 26: Outbound School Bus Routes



As well, delivery trucks operating along Lindsay Street and Elliot Street create additional heavy vehicle volumes in the form of delivery trucks. Traffic data obtained for the intersection include breakdown of vehicle type to estimate percentage of vehicles that are heavy for inclusion in the analysis.

Sobeys Delivery Trucks follow the schedule shown below between the hours of 7:00 AM and 10:00 PM, with minor seasonal variations. Most deliveries are expected to occur between 7:00 AM and 2:00 PM.

- Monday: 10 Trucks
- Tuesday: 11 Trucks
- Wednesday: 8 Trucks
- Thursday: 11-12 Trucks
- Friday: 15 Trucks
- Saturday: 5 Trucks
- Sunday: 3 Trucks

The traffic analysis that was undertaken included the two-way stop controlled intersection on Elliot Street at the Sobeys rear access where commercial vehicles access the site. This intersection would also accommodate the diverted inbound/outbound vehicles due to the access control and network reconfiguration alternatives being considered. The analysis confirms that the two-way stop control would adequately accommodate vehicle volumes and further intersection widening or control is not required.

5.0 Evaluation of Alternatives

It was determined that modifications to traffic signals alone would not be able to improve the intersection operations for the 2031 planning horizon and that other measures would be required to achieve acceptable LOS. Several options were developed and assessed in the previous sections. Reasonable solutions were evaluated further to better understand their advantages and disadvantages.

The four distinct alternatives that were evaluated as potential near term traffic solutions include:

1. Access Control: east leg at Lindsay Street at Helen Street - Egress only (Section 4.2.3)
2. Access Control: east leg at Lindsay Street at Helen Street - Right-in Right-out (Section 4.2.6)
3. Network Modification: Lindsay Street at Helen Street – northbound and southbound Right-in Right-out (Section 4.4.5)
4. Network Modification: Lindsay Street at Helen Street – remove eastbound left-turn and southbound left-turn movements (Section 4.4.6)

These options are presented and compared in **Table 22**. All analyses were performed with 2031 volumes, with no reduction for a potential bypass route. It is anticipated that with approximately 20% volume reduction from a future bypass, the intersection and bridge will be better able to handle the forecast traffic demands beyond 2031.

Table 22: Comparison of Alternatives

Intersection	Advantages	Disadvantages
Section 4.2.3 : Access Control: east leg at Lindsay Street at Helen Street - Egress only		
Lindsay St. and Helen St.	• SB movement not expected to have excessive queue • Minor construction required	• EBL, WBL, WBT have delays greater than 35 seconds per vehicle and operate at a LOS of D. • NBT movement will extend to South intersection. • Worst V/C = 0.73 and corresponds to EBL, with a queue of 82.2 metres • Signage required to ensure northbound vehicles use Elliot Street as there is no site access downstream.
Lindsay St. and Elliot St.	• Overall operates acceptably • Movements operate at a LOS of C or better	• Signals required to accommodate diverted vehicles • Worst v/c corresponds to WBLR at 0.68 with a delay of 23.9 seconds per vehicle • NB movement will be impacted by intersection at Helen Street
Section 4.2.6 : Access Control: east leg at Lindsay Street at Helen Street - Right-in Right-out		
Lindsay St. and Helen St.	• SB movement not expected to have excessive queue • Movements operate at a LOS of C or better • Minor construction required	• NBT movement will extend to South intersection • Worst V/C = 0.68 and corresponds to EBL, with a queue of 70.4 metres

Intersection	Advantages	Disadvantages
Lindsay St. and Elliot St.	• Overall operates acceptably • Movements operate at a LOS of C or better	• Signals required to accommodate diverted vehicles • Worst v/c corresponds to WBLR at 0.69 and a delay of 24.8 • NB movement will be impacted by intersection at Helen Street
Section 4.4.5: Network Modification: Lindsay Street at Helen Street – northbound and southbound Right-in Right-out		
Lindsay St. and Helen St.	• SB and NB operate as free flow • EB will not have excessive queues	• Elimination of signal impacts pedestrian crossing. Pedestrians to use signal at Elliot Street which may not be convenient for people on the bridge. • WBR operates at a LOS of E with a delay of 42 seconds / vehicle.
Lindsay St. and Elliot St.	• New signals provides controlled pedestrian crossing	• Signals required to accommodate diverted vehicles • southbound left-turn lane is expected to near capacity of a single left-turn with a v/c of 0.93 (can be improved with a widened westbound approach) • WBLR is expected to operate at a LOS of D with a delay of 35.8 seconds per vehicle.
Lindsay St. at Green St.	• Overall operates acceptably • Movements operate at a LOS of C or better	• Signals required to accommodate diverted vehicles • Worst V/C = 0.81 and corresponds to EBLTR, with a queue of 74.7 metres
Section 4.4.6 : Network Modification: Lindsay Street at Helen Street – remove eastbound left-turn and southbound left-turn movements		
Lindsay St. and Helen St.	• SB movement not expected to have excessive queue • Minor construction required	• NBT movement will extend to South intersection • Worst V/C = 0.83 and corresponds to WBTR, with a queue of 60.6 metres • WBTR has operates at a LOS of D with a Delay of 35.5 seconds per vehicle
Lindsay St. and Elliot St.	• Overall operates acceptably • Movements operate at a LOS of C or better	• Signals required to accommodate diverted vehicles • Worst v/c corresponds to WBLR at 0.53 and a delay of 21.1 • NB movement will be impacted by intersection at Helen Street
Lindsay St. at Green St.	• Overall operates acceptably • Movements operate at a LOS of C or better	• Signals required to accommodate diverted vehicles • Worst V/C = 0.79 and corresponds to EBLTR, with a queue of 8.3 metres

Each of these four alternatives are technically feasible and have a minimal impact on delivery vehicles as well as the school buses. The network Modification alternatives are do not operate as well as the Access Control alternatives, and result in fewer vehicle diversions. Providing a northbound right-in right-out maintains good site visibility for northbound and southbound vehicle on Lindsay Street and is the recommended solution.

6.0 Conclusions

A detailed traffic study was undertaken to evaluate opportunities to improve vehicle flow through Fenelon Falls since construction of a new bridge, bridge widening or providing a bypass route will not be implemented in the near term.

Traffic analysis of the existing congestion on Lindsay Street has identified that the intersection of Lindsay Street at Helen Street is a major bottleneck for the corridor, resulting in southbound vehicle queues that extend over the bridge and through town. The traffic analysis for the 2031 planning horizon suggests that vehicle queues will not be accommodated with vehicles being added to the back of the queue each signal over the peak period eventually "choking-off" the adjacent through lane impacting intersection capacity. Signal changes alone would not be able to solve the queueing issue. Widening the bridge for an additional southbound left-turn lane to store the queues may reduce the occurrence of queue spill back, however the analysis suggests that there is not enough available green-time to accommodate the long vehicle queues with more vehicles arriving each signal cycle than can be processed through the intersection.

A roundabout was reviewed but the size and scale of the roundabout would have large property impacts and would likely not be a near-term solution. The roundabout with a single southbound approach lane and dual northbound and eastbound approach lanes was not able to adequately accommodate vehicle volumes.

Potential solutions that could improve vehicle circulation include changes to the adjacent Sobeys/Tim Hortons access, and/or turn restrictions for other roadway users. **The analysis demonstrates that with the implementation of a right-in right-out configuration for the access to/from Lindsay Street, a maximum v/c ratio of 0.68 can be achieved for the worst movement in the roadway network.**

Signalization of Elliot Street is required to accommodate diverted inbound and outbound site vehicles. The intersection can be provided with a single westbound approach lane for both left and right turning vehicles. Westbound vehicle queues that are less than 30 – 35m 95% of the time are anticipated which would not significantly impact the Tim Hortons access on Elliot Street. It is noted that an eastbound slip-by lane is currently included in the design for Elliot Street to mitigate potential impacts due to an inbound vehicle trying to access the Tim Hortons and blocking eastbound vehicles. Consideration for lengthening the slip-by lane, and/or providing a full 3 lane cross section between Lindsay Street and the access can be explored in the future if queueing on Elliot Street continues to be an issue.

Appendix A

Detailed Lane Arrangement Drawings

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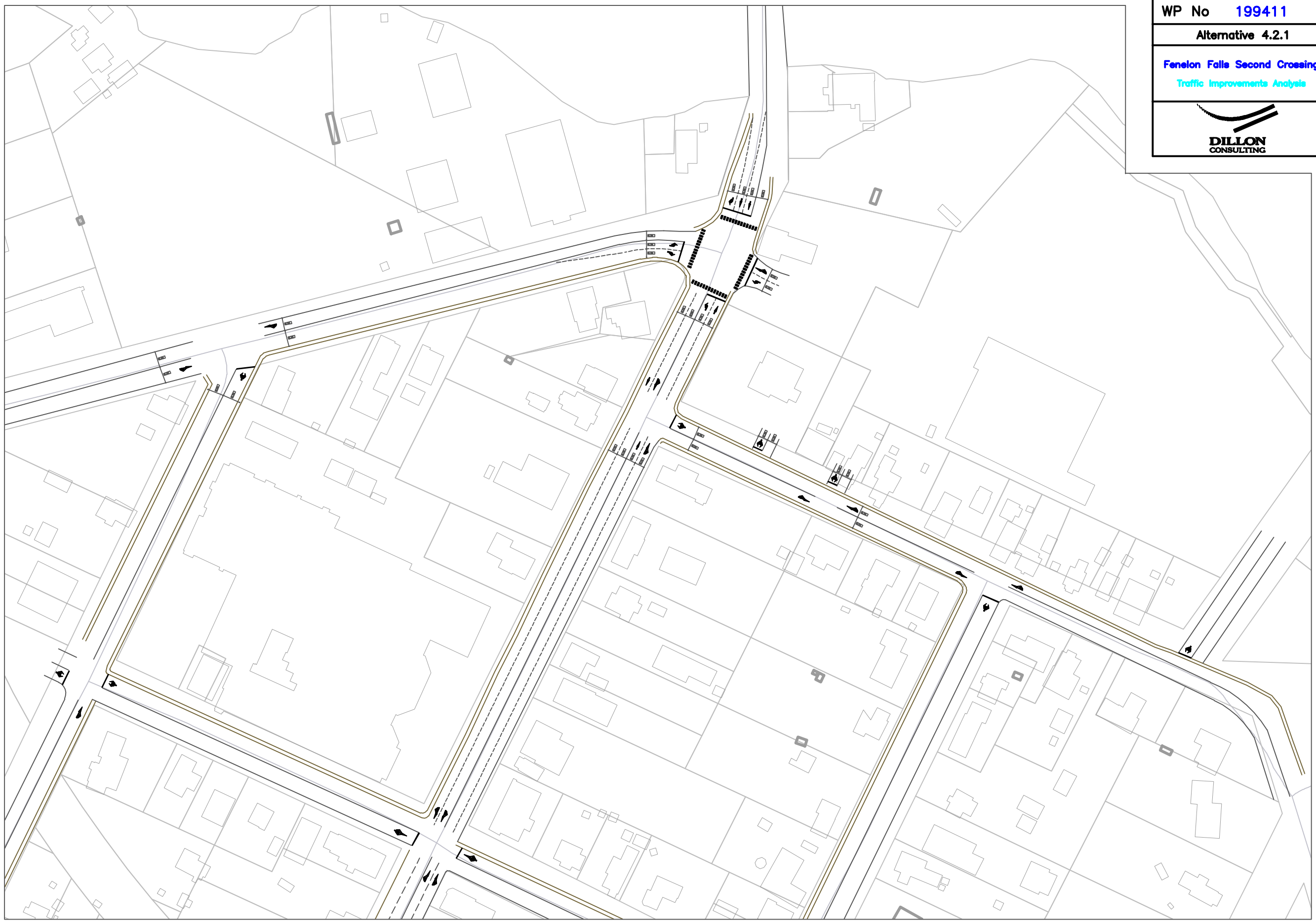
Alternative 4.2.1

SHEET 1

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



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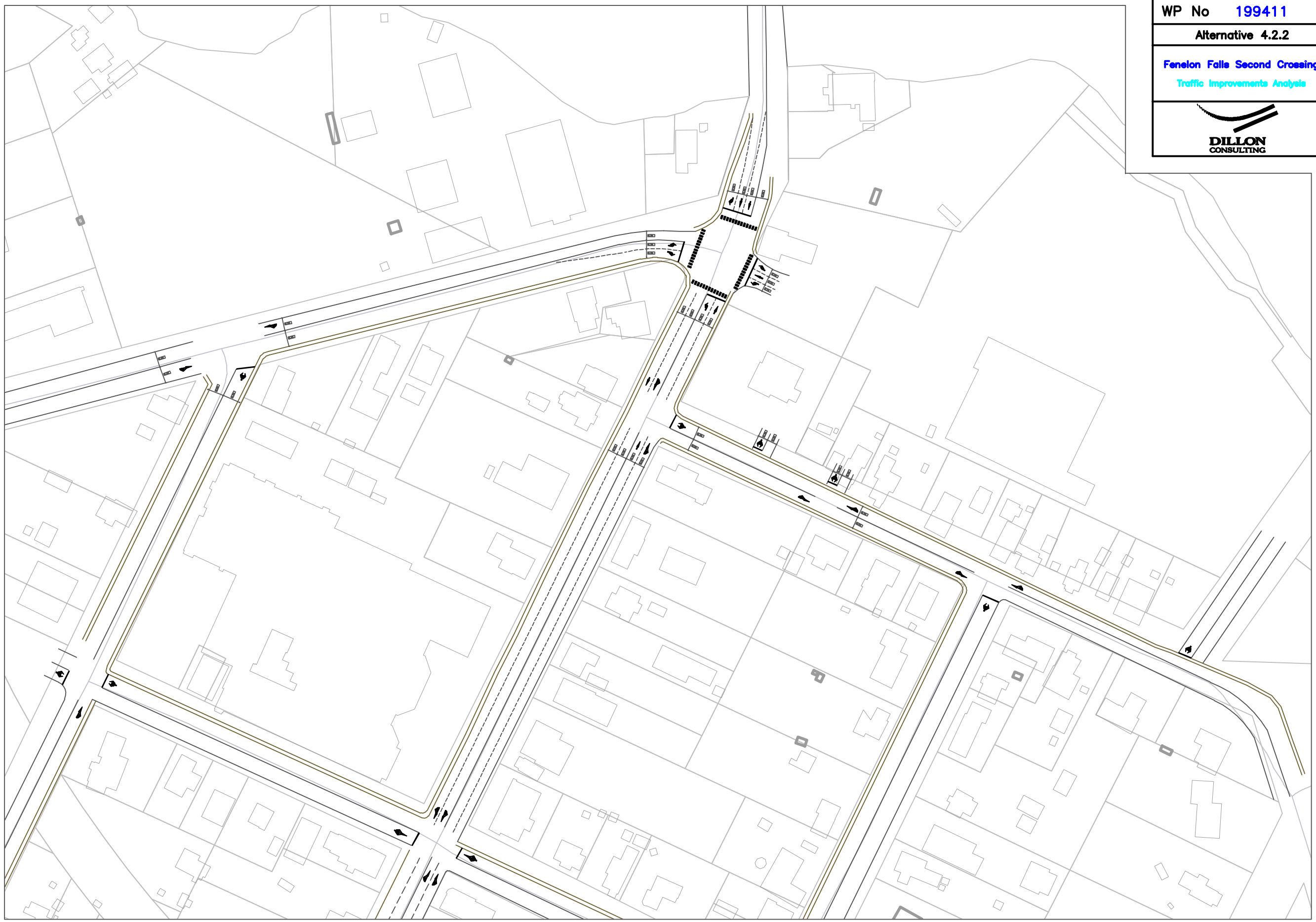
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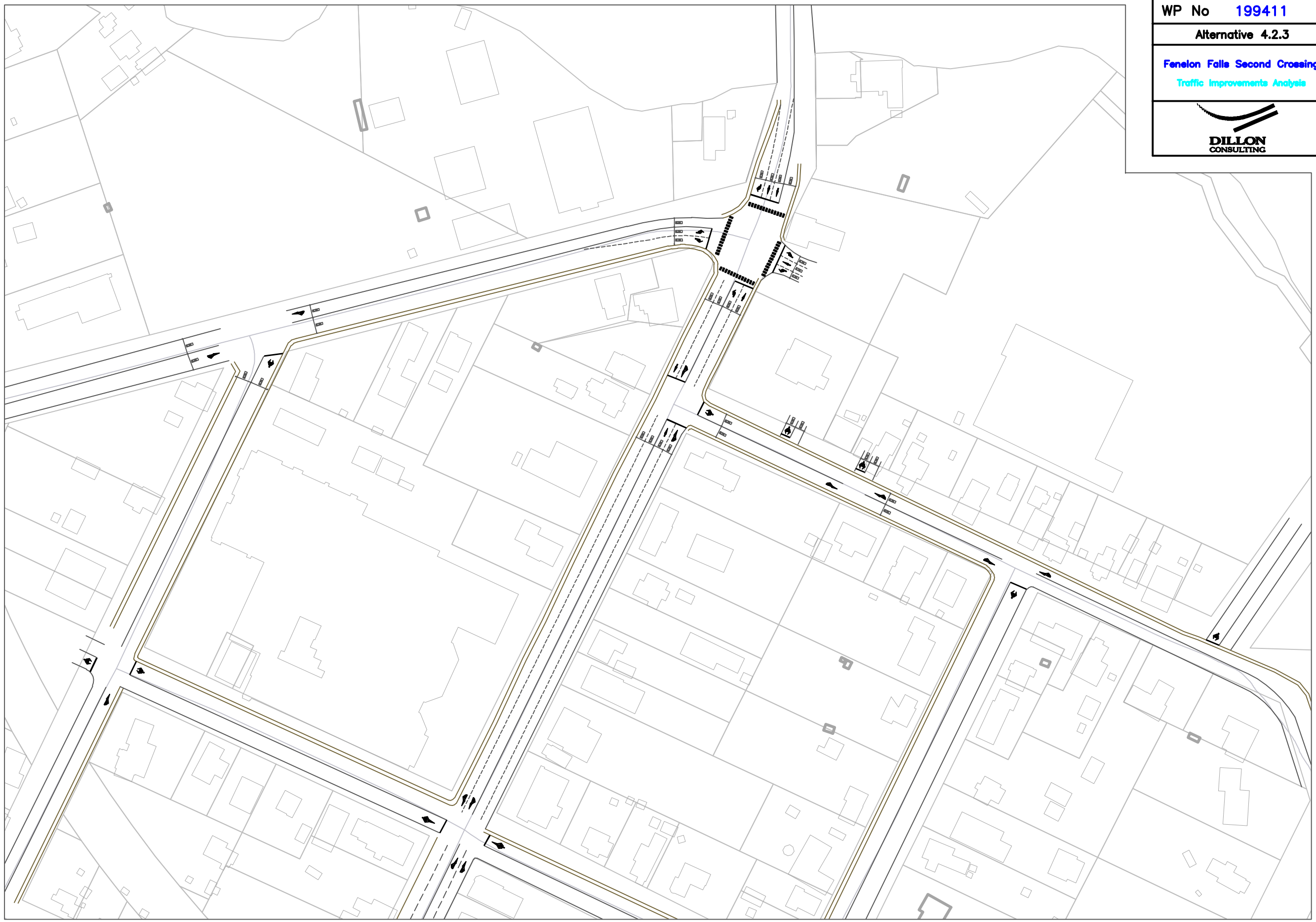
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SHEET 3



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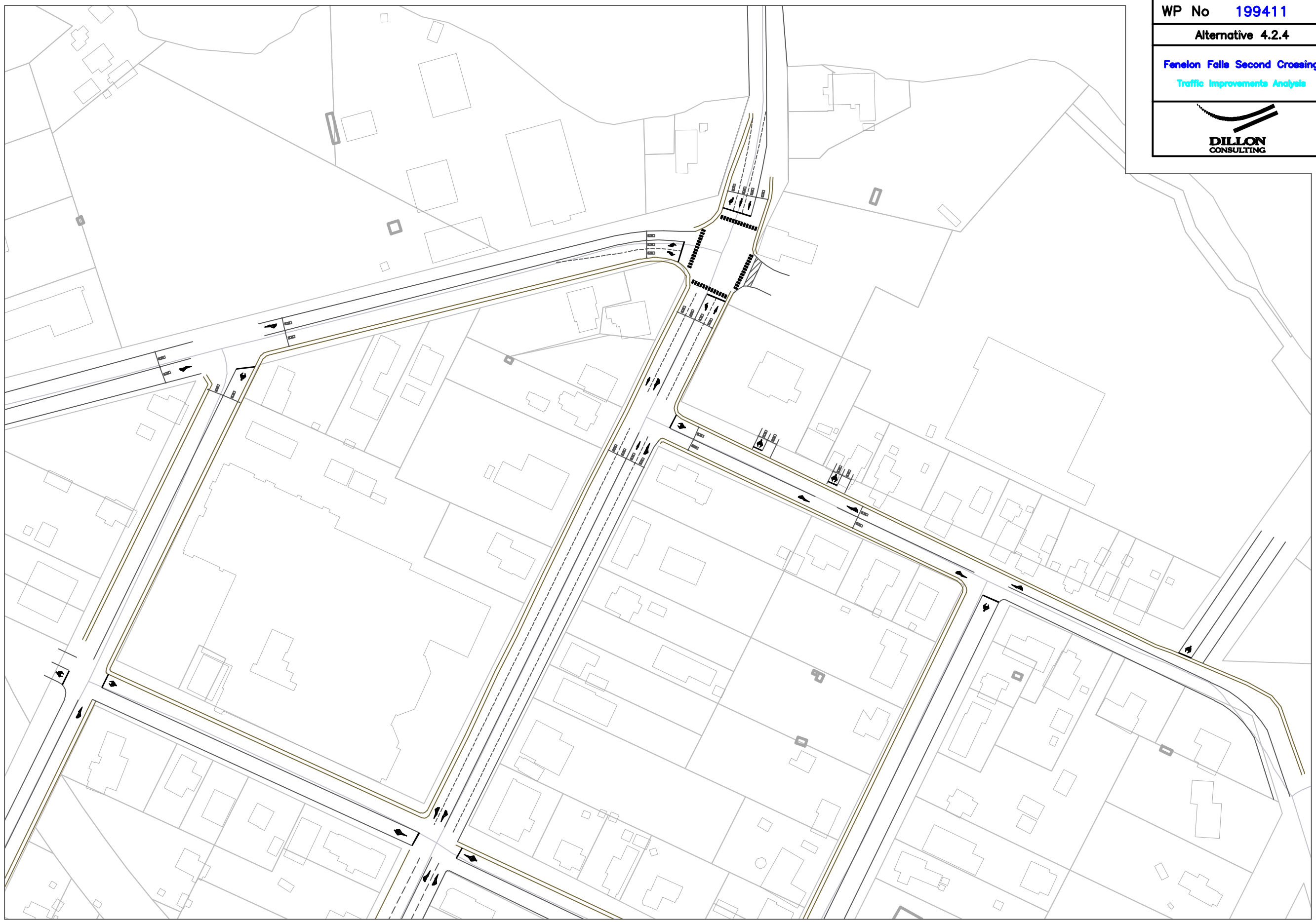
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Fenelon Falls Second Crossing

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SHEET 4



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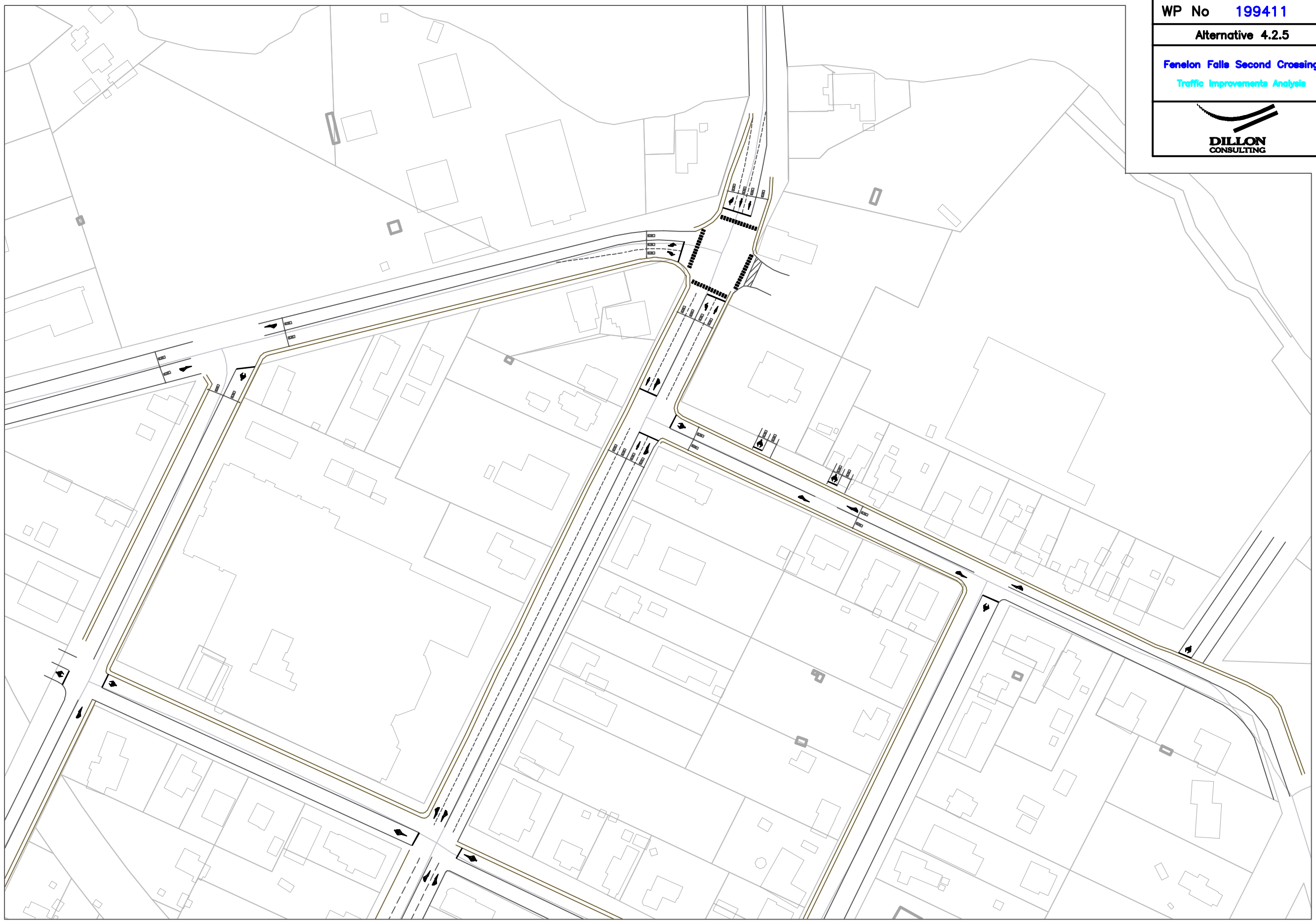
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Fenelon Falls Second Crossing

Traffic Improvements Analysis

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SHEET 5



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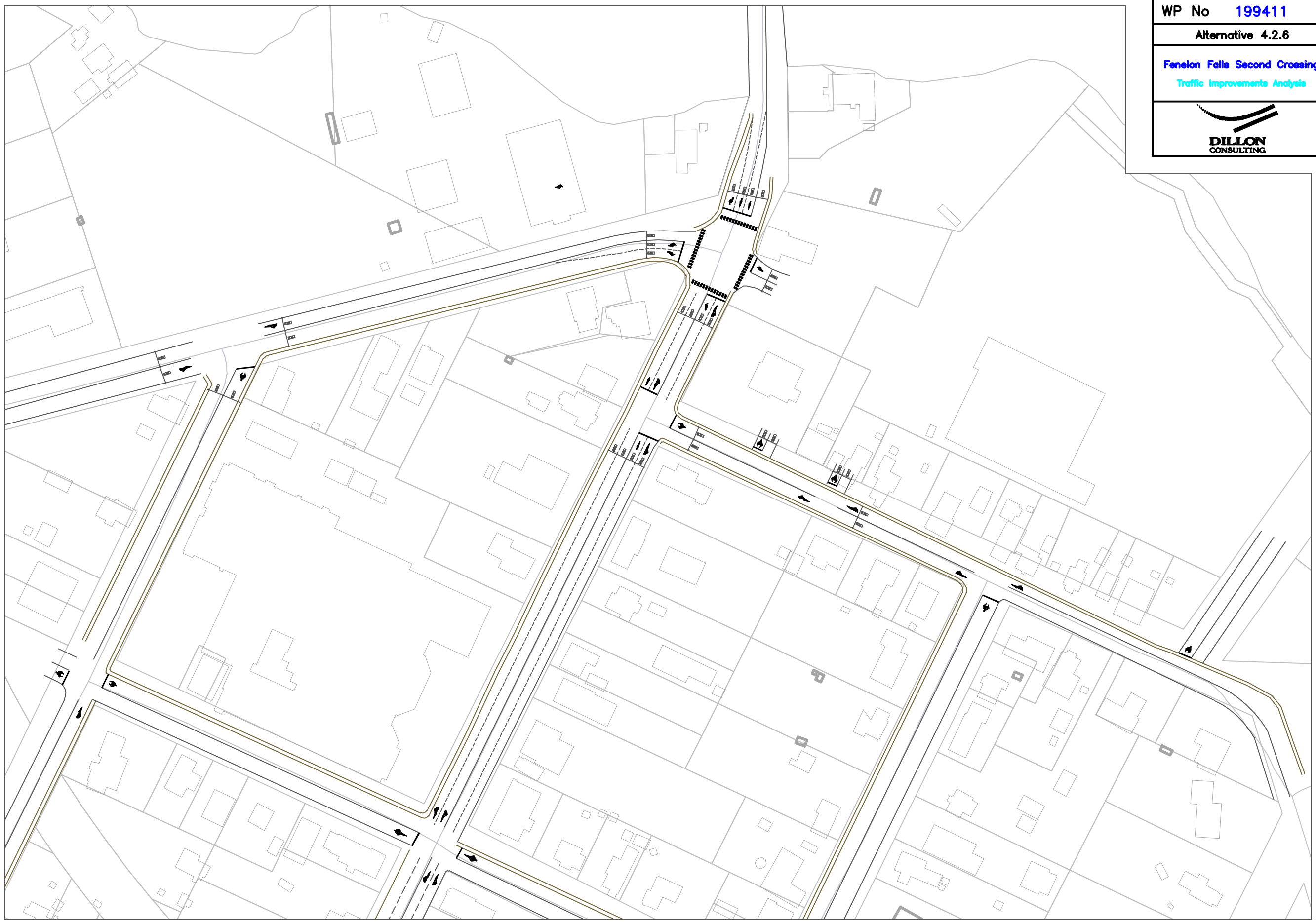
Alternative 4.2.6

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING

SHEET 6



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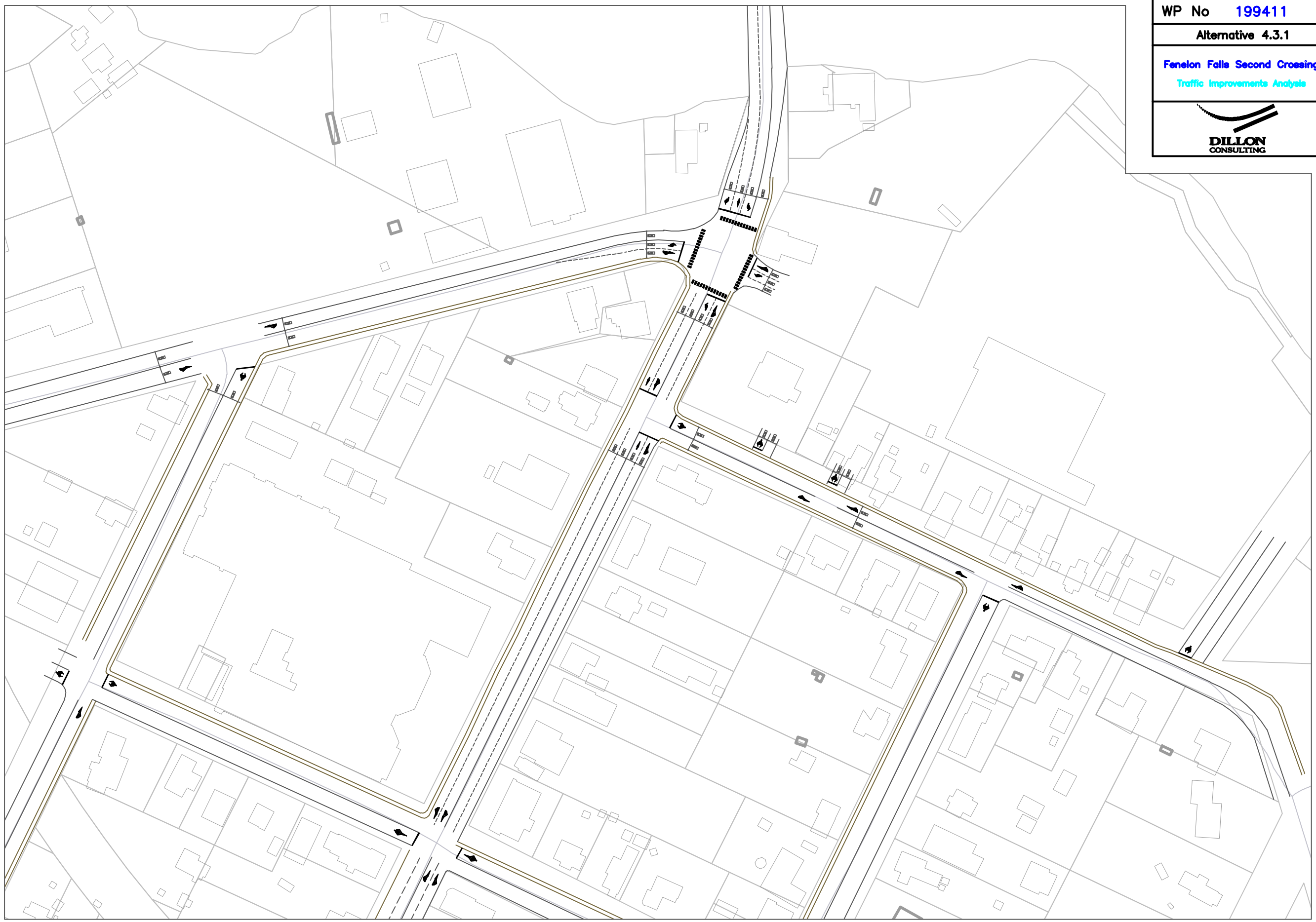
Alternative 4.3.1

SHEET 7

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



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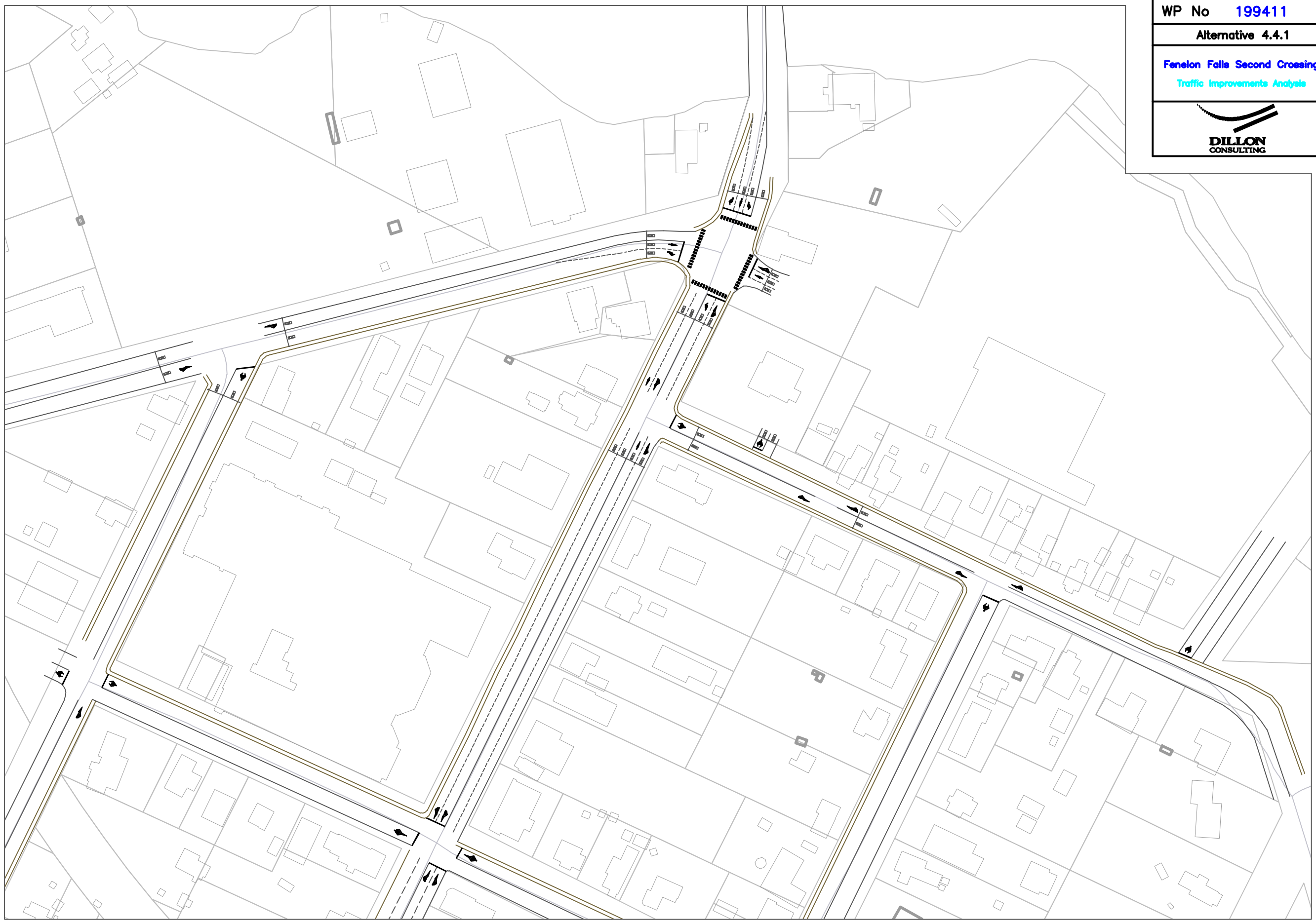
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SHEET 8

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



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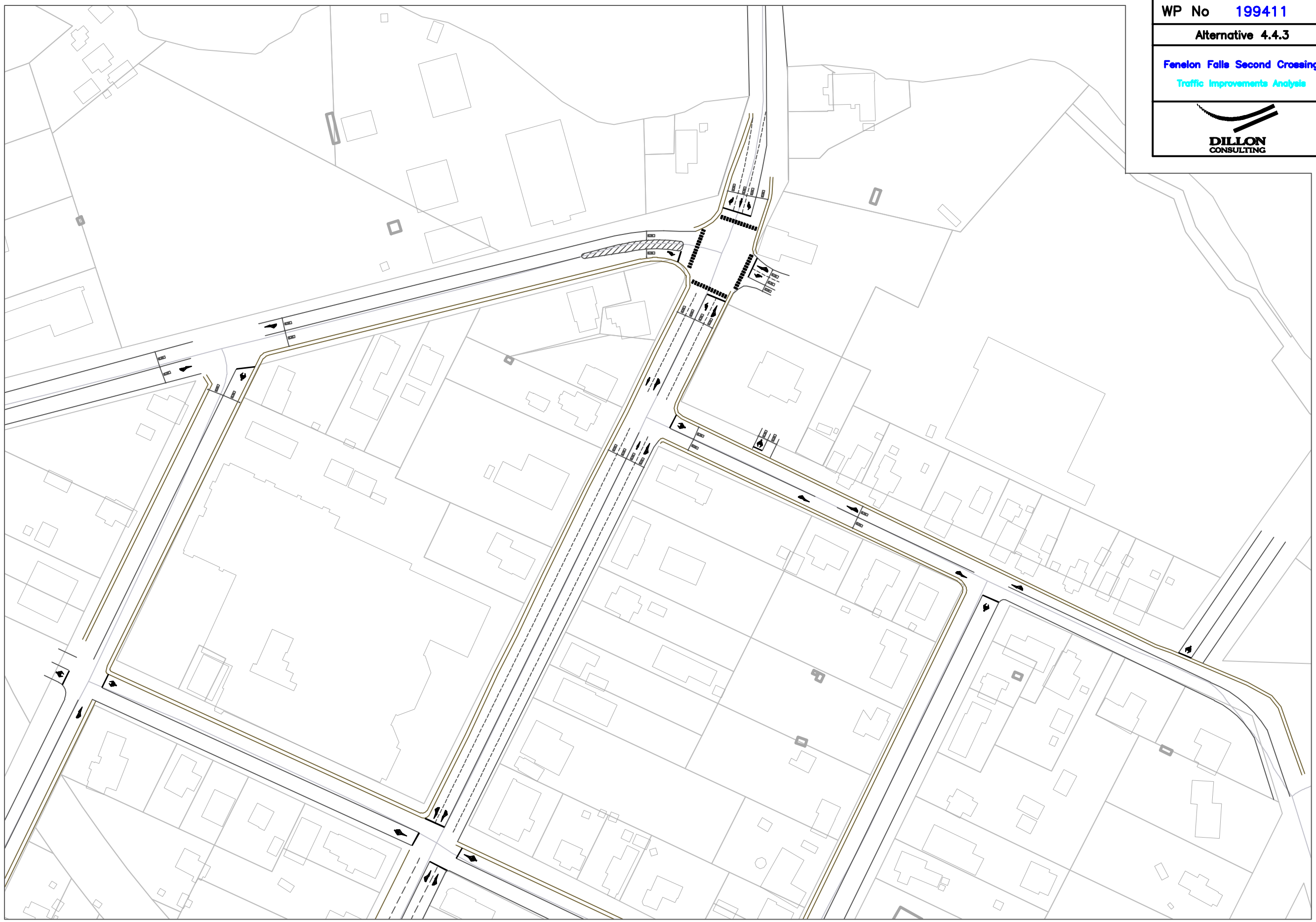
Alternative 4.4.3

SHEET 9

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



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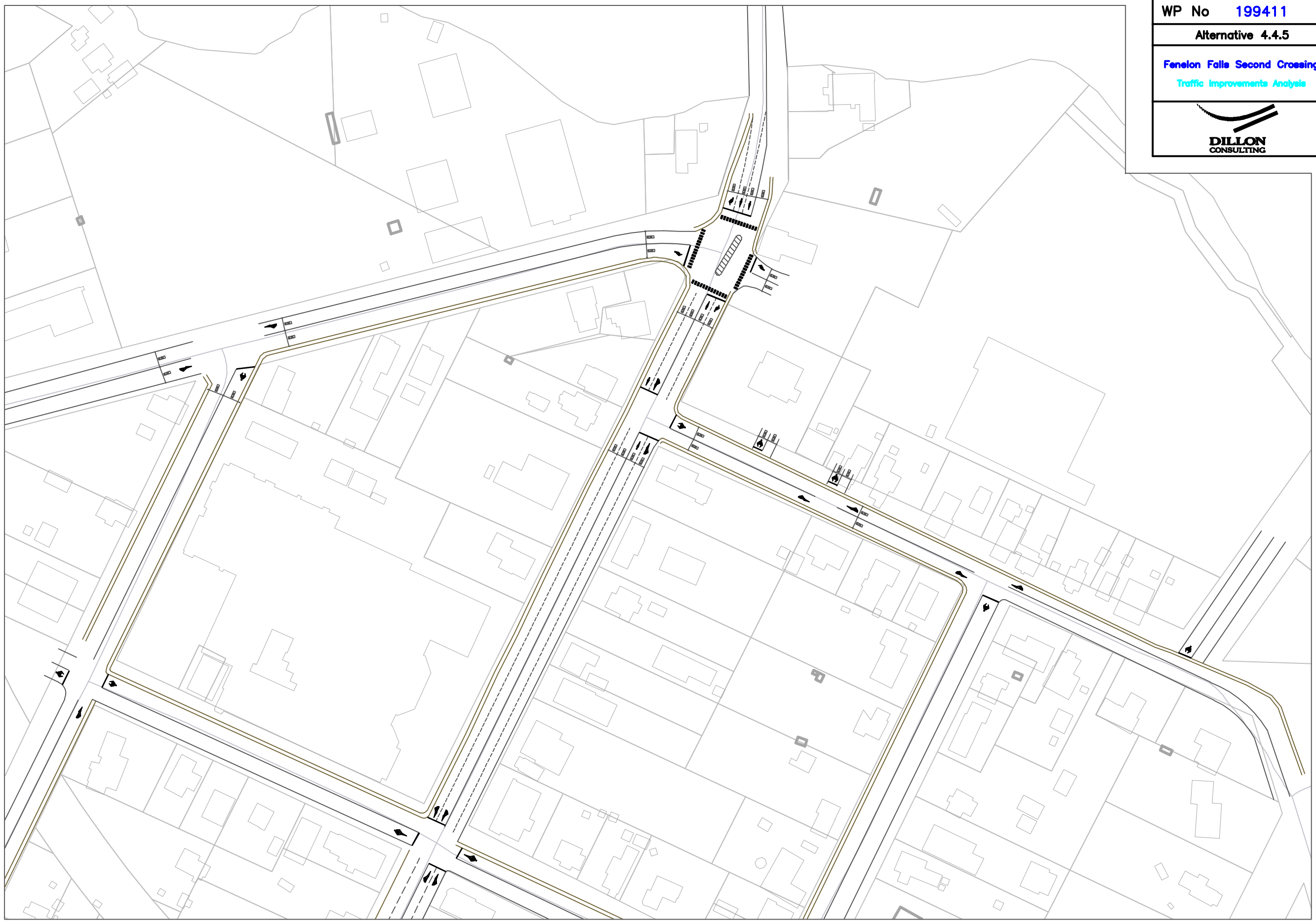
Alternative 4.4.5

SHEET 10

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



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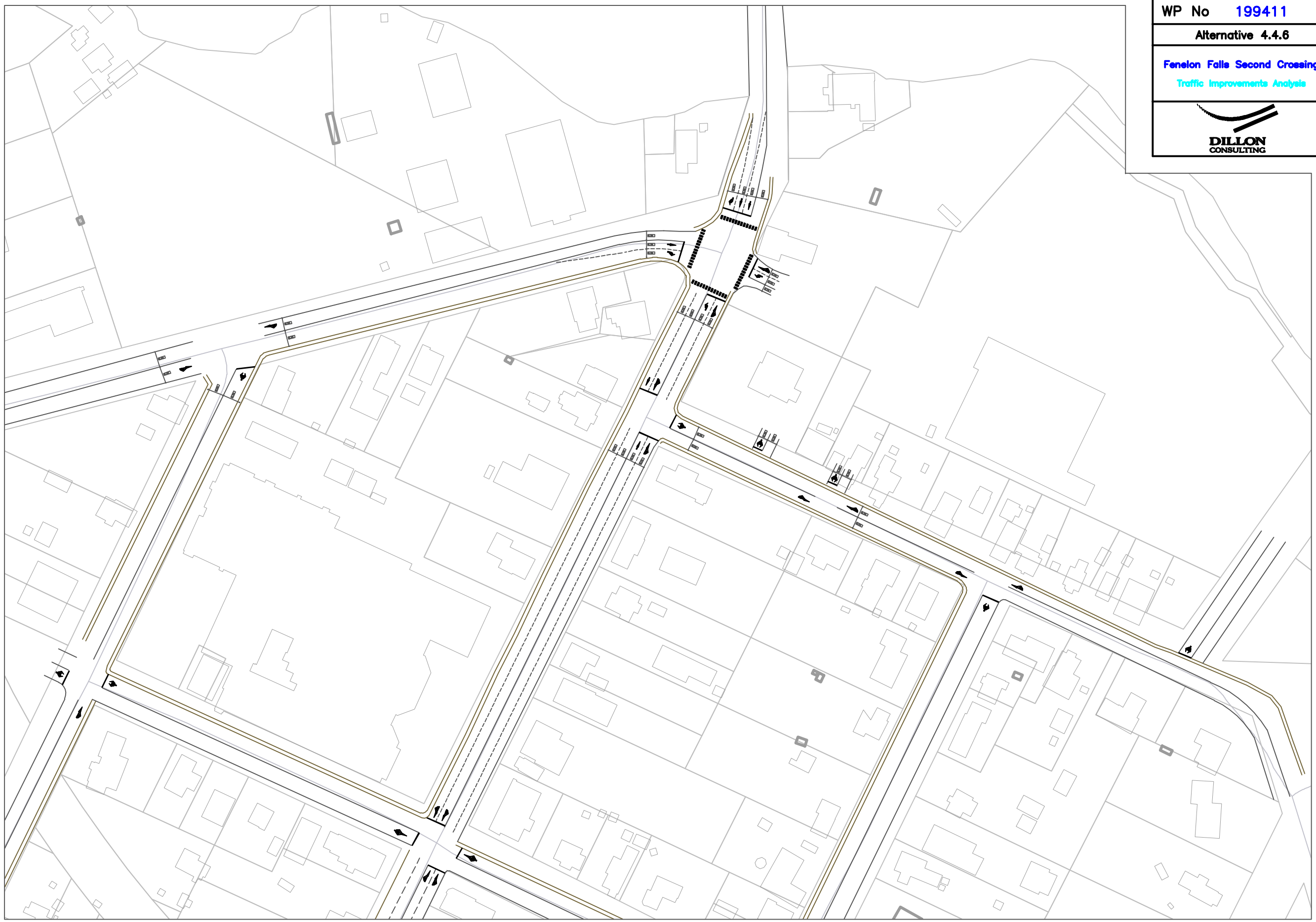
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Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING

SHEET 11



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Appendix B

Detailed Implementation Drawings

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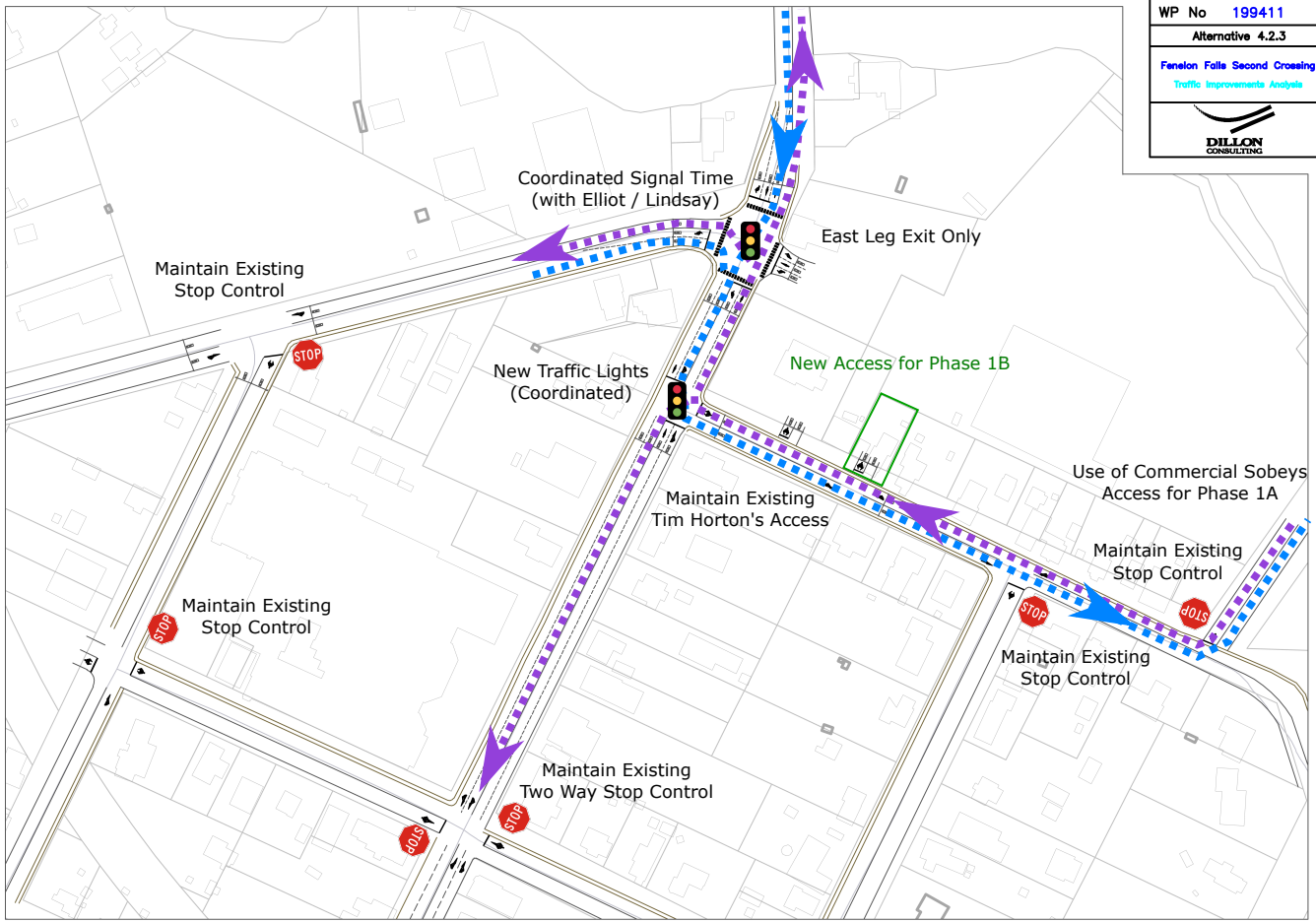
Alternative 4.2.3

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING

SHEET 3



Legend:

- Rerouted Inbound Traffic
- Rerouted Outbound Traffic
- Phase 1B

NOT TO SCALE

METRIC

WP No 199411

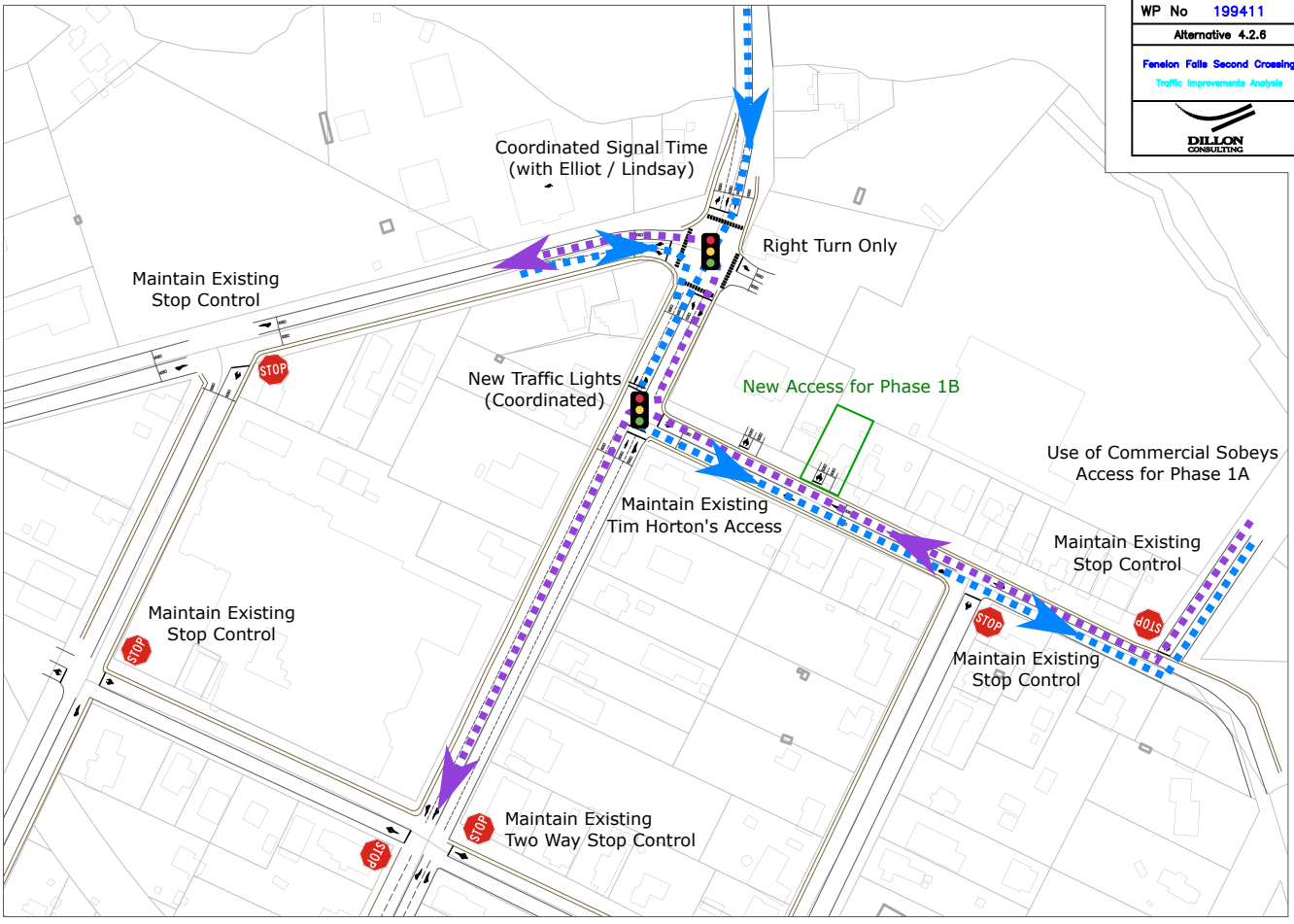
Alternative 4.2.6

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING

SHEET 6



Legend:

- Rerouted Inbound Traffic
- Rerouted Outbound Traffic
- Phase 1B

NOT TO SCALE

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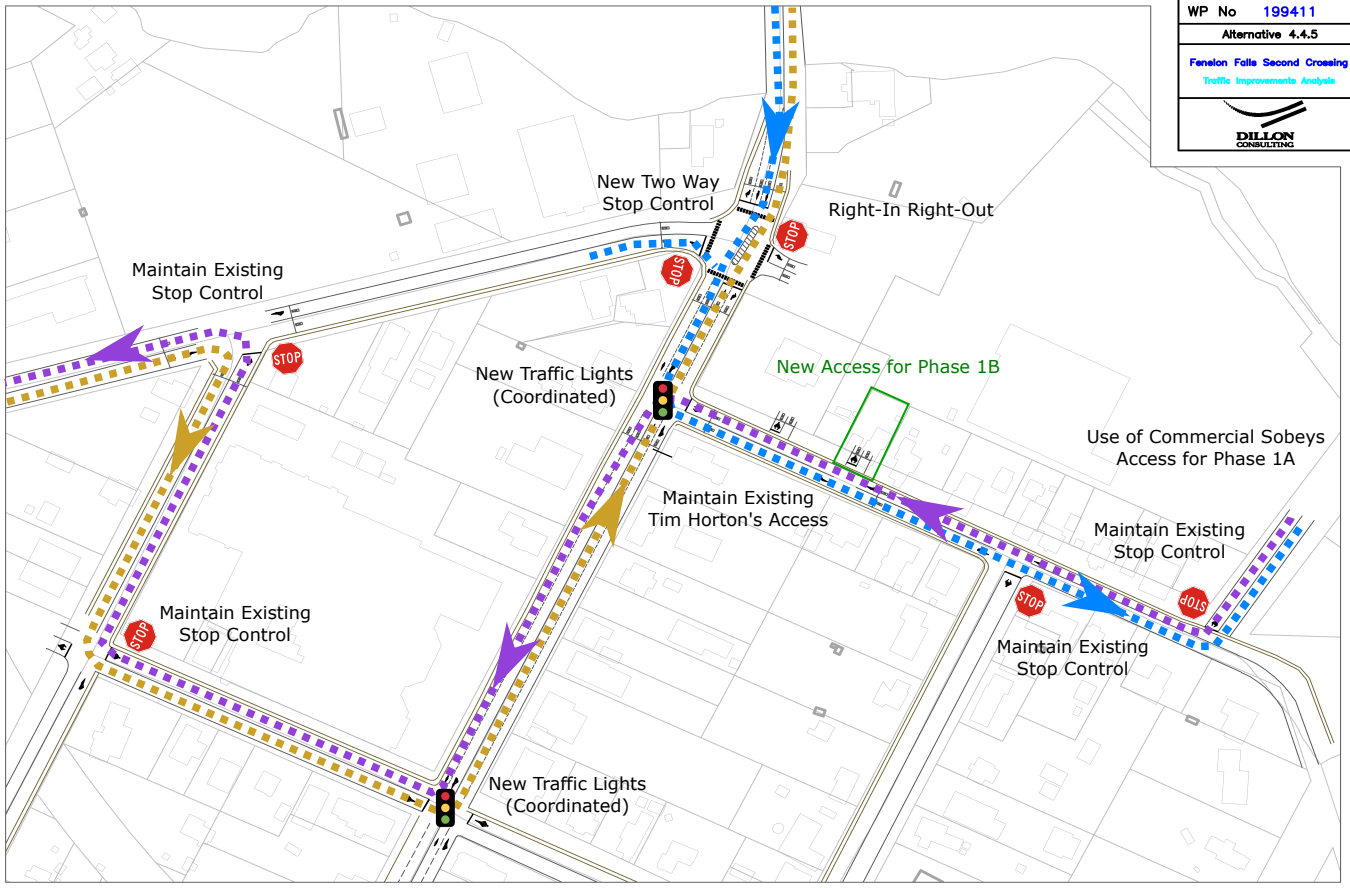
Alternative 4.4.5

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING

SHEET 7



Legend:

- Rerouted Inbound Traffic
- Rerouted Outbound Traffic
- Rerouted External Traffic
- Phase 1B

NOT TO SCALE

METRIC

WP No 199411

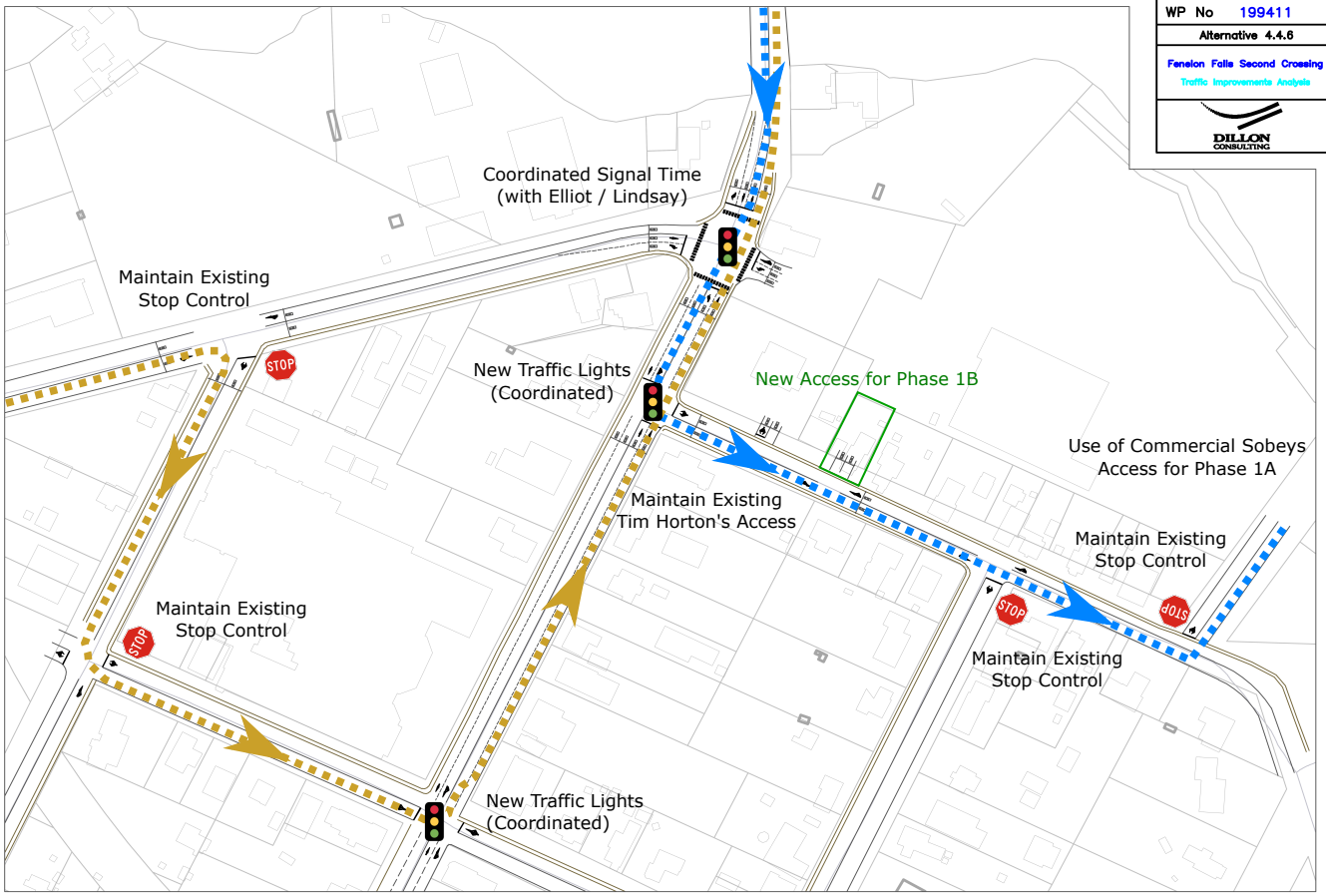
Alternative 4.4.6

SHEET 8

Fenelon Falls Second Crossing

Traffic Improvements Analysis

DILLON CONSULTING



Legend:

Rerouted Inbound Traffic

Rerouted External Traffic

Phase 1B

NOT TO SCALE