

GEI Consultants

Saugeen Shores

Project Planning

Moore Bridge (SS-09): Existing Conditions & Review of Bridge Alternatives

Town of Saugeen Shores, Ontario

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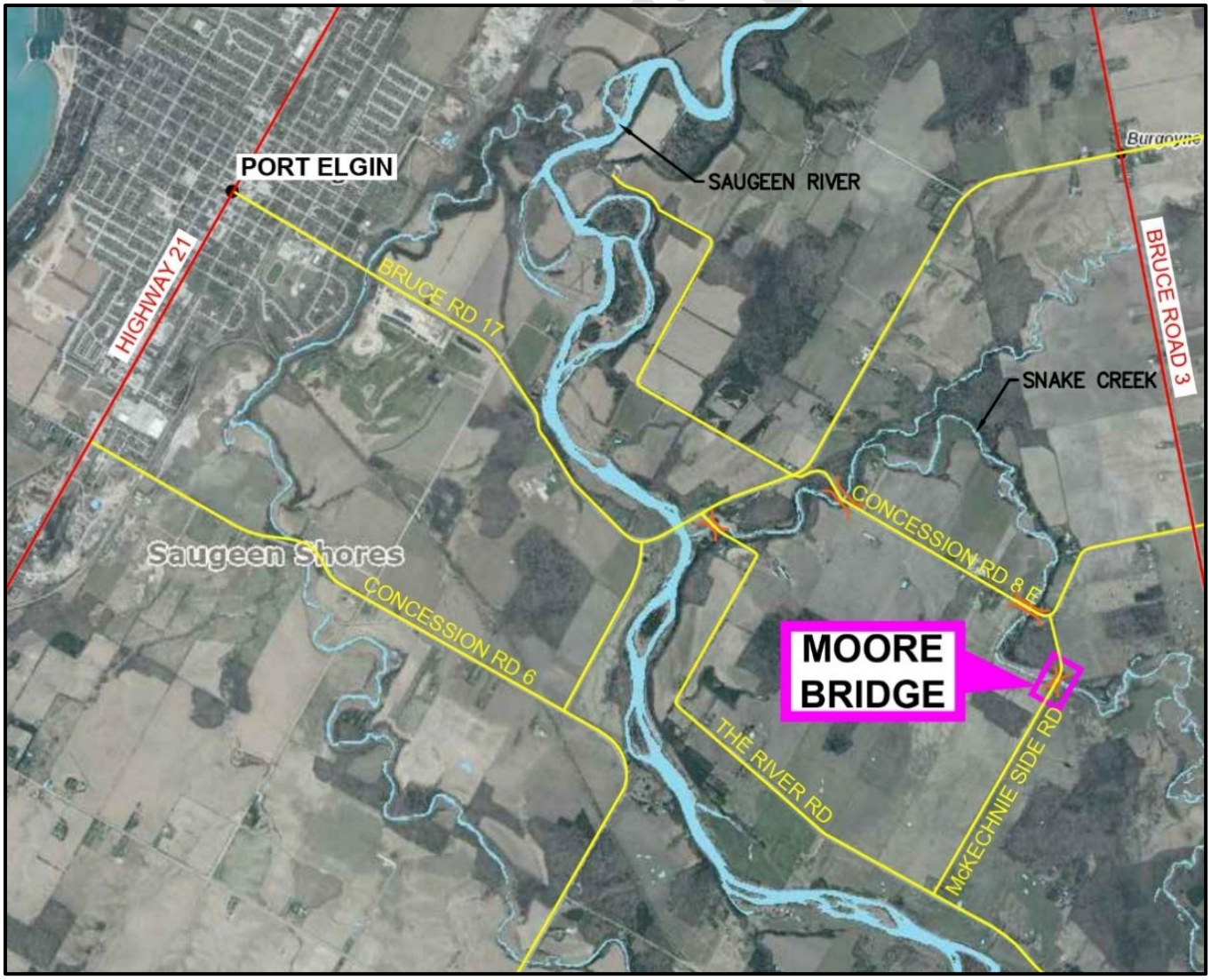
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1. Introduction

1.1. Project Description

In the spring of 2024, the Town of Saugeen Shores (the Town) retained GEI Consultants Canada Ltd. (GEI) to undertake a project planning process, generally to follow the Municipal Class Environmental Assessment (EA) process, to address the deteriorated condition of Moore Bridge (Structure No. SS-09). The structure is located approximately 7 kilometers southeast of Port Elgin, between Concession Road 8E and The River Road in the Town of Saugeen Shores, where shown on Figure 1-1. More specifically, the bridge forms part of McKechnie Sideroad and spans over Snake Creek.

Figure 1-1. Site Location Map and General Surroundings



Moore Bridge, which is a one-lane single span steel truss structure, has been closed to vehicular traffic for more than a decade. Alternative solutions considered generally include the removal, rehabilitation, or replacement of the structure. It is important to note that the rehabilitation and replacement alternatives would simultaneously require consideration for the design and profile of the road approaches to an appropriate standard (Photo 1). The associated road works would occur within the existing 20 meter right-of-way along McKechnie Sideroad, including approximately 425 meters to the north of the bridge to Concession Road 8E and an additional 1.5 kilometers to the south to The River Road.

Photo 1: Photo of Moore Bridge showing the single lane road approaches



1.2. Project Planning Process

The Municipal Class Environmental Assessment (EA) process outlines a comprehensive planning process that provides a rational approach to consider the environmental and technical advantages and disadvantages of a reasonable range of alternatives and their trade-offs to determine a preferred alternative (i.e., decision for an infrastructure project).

Municipal infrastructure projects are subject to the Ontario Environmental Assessment Act (EA Act). The Class Environmental Assessment (Class EA) is an approved self-assessment process under the EA Act for a specific group or "class" of projects. The Municipal Class EA (Municipal Engineers Association 2007, as amended in March 2023) applies to municipal infrastructure projects including roads, water, and wastewater.

Based on the alternatives being considered with comparison to Table A for Municipal Roads projects (MCEA Manual, Municipal Engineering Association, March 2023 - Appendix 1), the subject Moore Bridge project is EXEMPT from the EA process regardless of the preferred alternative selected. The basis for the project exemption includes the following considerations:

- Based on the findings of the Cultural Heritage Evaluation Report, enclosed in Appendix A, Moore Bridge was determined not to have Cultural Heritage Value or Interest.

- Bridge replacement options identified do not consider a structure greater than two-lanes in width. It is noted that the revised definition of 'Bridge Capacity' in the MCEA Manual (March 2023) states that increasing the width of a narrow bridge (i.e., a one lane bridge with two-way traffic) to the current standard to accommodate two-way traffic (i.e., a two-lane bridge) is not considered an increase in capacity.

1.3. Project Scope

Although this project is not being advanced through a more formalized EA process, this report has been prepared to document the project planning and decision making process and to consolidate the background information and reports. The general format of the report is as follows:

i. Description of the existing structure and the surrounding environment.
ii. Summary of the background studies completed to date.
iii. Identification of the range of bridge alternatives considered to address the deteriorated condition of the structure.
iv. General review of the anticipated 'environmental' effects. The 'environment', as defined in the EA Act, includes the natural, social, cultural, technical and economic environments.
v. Description of the rationale for the Recommended Alternative.

2. Background

2.1. Existing Structure

According to the information available, Moore Bridge was constructed circa 1920. The existing structure is a single span steel truss bridge with a cast-in-place concrete deck. The bridge has a total deck length of approximately 24.8 meters and a total deck width of 4.1 meters. The clear width (i.e., inside barriers) is 3.7 meters and the clear span (i.e., inside face of abutment measured parallel to the roadway) is approximately 24.2 meters. Two steel truss girders support a reinforced concrete deck with a granular wearing surface. There are wingwalls on each quadrant retaining the roadway which has been elevated through approximately half of the river basin to reduce the overall bridge span.

The bridge was reportedly closed in 2013 due to severe deterioration of the wing walls and abutments. Bridge inspection reports have noted the structure to be in poor condition due to the considerable deterioration observed, suggesting that bridge rehabilitation (or repair) may no longer be a viable alternative.

2.2. Site Setting

McKechnie Sideroad consists of a 'double track' granular surface with organic growth in the center and along the road shoulders. This road is not currently maintained in the winter. Moore Bridge provides a travelled width of 3.7 meters, which is slightly narrower than the approaching road widths of approximately 4.7 meters. It is noted that the existing sightline for southbound traffic is poor due to a bend in the road located within proximity to the structure (i.e., within 40 meters). At the previously posted speed limit of 80 km/hr, this poor sightline has the potential to cause a safety risk to the driving public.

The bridge itself spans over Snake Creek. The creek generally meanders from east to west and drains into the Saugeen River. As shown in Figure 1-1, the portion of Snake Creek that runs under Moore Bridge flows westerly for about 400 meters, where it then takes a 90° turn to the north where it crosses Concession Road 8E. The creek then

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meanders to the south, crossing Concession Road 8E and The River Road, before discharging into the Saugeen River. As described in the Scoped Environmental Impact Study (Aboud, October 2024), enclosed in Appendix B, downstream of the bridge the creek bottom is dominated by cobble, with varying amounts of gravel, sand, and boulders present. Upstream of the structure, the substrate is more variable than downstream, consisting of primarily gravel and sand in the pool habitats, with cobble dominance in the riffles (i.e., in areas with stream flow). The banks of the creek are well vegetated on both sides.

Based on the available Ministry of the Environment, Conservation and Parks (MECP) water well records, the depth to bedrock in the vicinity of Moore Bridge is estimated to be greater than 50 meters. Boreholes advanced to a depth of 6.7 meters as part of the Geotechnical Investigations completed to support this undertaking describe the shallow overburden to generally be comprised of a surficial sand and gravel grading to silty-sand and gravel road base, underlain by a brown silt and clay to silty clay, sandy silt and terminating in a grey silt till. The Geotechnical Investigation, which includes the borehole logs, is enclosed in Appendix C.

The bridge and its surroundings fall within the Saugeen Valley Conservation Authority (SVCA) screening limits. The area is designated as Hazard Lands, as defined in the Bruce County Official Plan. It is recognized that the quality and character of hydrologic systems, features and functions will need to be maintained (or enhanced).

2.3. Bridge Usage and Alternate Routes (Pre and Post Closure)

Prior to the closure of Moore Bridge, the structure was used by vehicular traffic and agricultural equipment. The majority of the road and bridge usage was local traffic and traffic volumes were low. The Annual Average Daily Traffic (AADT) in 1992 was reported to be 25 vehicles. Although the closure of the bridge did not occur until 20-years later, it is not thought that the AADT increased significantly during this period – in other words the traffic volumes likely remained low. In addition, the bridge was used, and continues to be used, by pedestrians and ATVs.

From the north, the bridge served as a more direct route between Concession Road 8E and The River Road, particularly for properties situated proximal to McKechnie Sideroad. However, traffic movements to/from the south are constrained by the Saugeen River that runs parallel to, and along the south side of The River Road. Therefore, all southbound traffic from The River Road was required, and continues to be required, to travel west to Bruce Road 17 or east to Bruce Road 3, before travelling in a southerly direction.

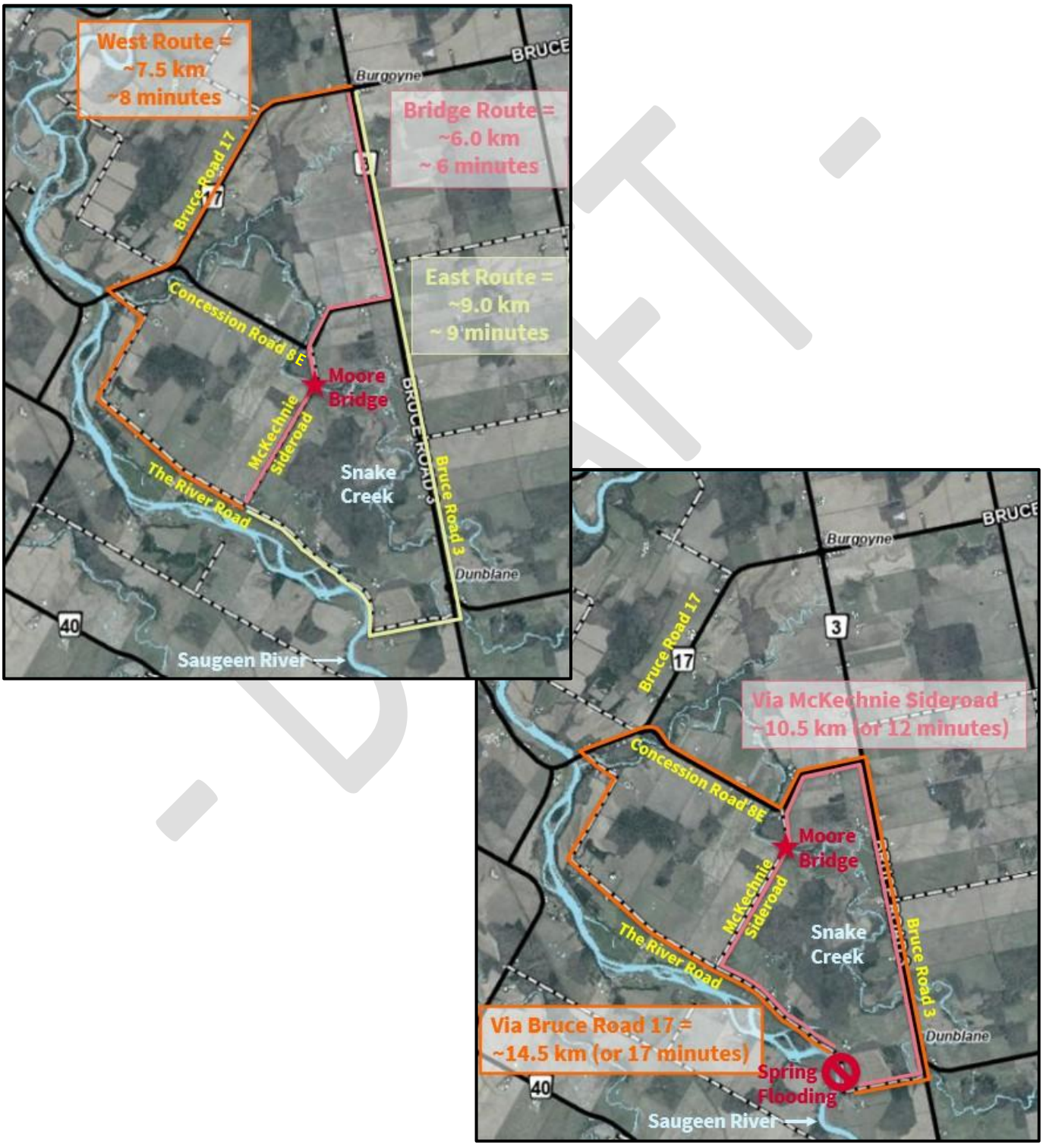
Since the closure of the bridge, local traffic traveling from The River Road to/from the north has been required to travel to the east to Bruce Road 3 or west to Bruce Road 17 before travelling north towards Burgoyne. With respect to travel between Burgoyne and the intersection of The River Road with McKechnie Sideroad, it is estimated that the closure of Moore Bridge adds approximately 1.5 km, or ±2 minutes of travel time, when compared to traveling directly north on McKechnie Sideroad to Concession Road 8E, then continuing north to Burgoyne (Figure 2-1).

With the closure of Moore Bridge, the greatest impact to local residents related to travel distance/time likely happens when seasonal flooding occurs on The River Road in the road section to the east, approximately 950 meters west of Dunblane. When this occurs, persons wishing to access areas on either side of the flooded area are required to detour around the flooding using Concession Road 8E. In the absence of a connection to The River Road via McKechnie Sideroad, traffic is required to detour further west to Bruce Road 17. Under this scenario, this adds approximately 4 km, or up to an estimated 5 minutes of travel time (Figure 2-1).

With respect to the impact to residents along McKechnie Sideroad, within 110 meters of its intersection with The River Road, the driveway for two property parcels is directly connected to McKechnie Sideroad including 5 McKechnie Sideroad and 12 McKechnie Sideroad. No direct access to residences is provided along the remainder of McKechnie Sideroad. To the north of the bridge, property access is achieved via direct connection to Concession

Road 8E. It is noted that a portion of the agricultural property at 157 Concession 8E is situated to the northeast of the meander in Snake Creek (i.e., a portion of the property is situated on both sides of Snake Creek). However, as the area to the northeast remains wooded, access to the agricultural lands on the subject property does not appear to be hindered by the closure of Moore Bridge.

Figure 2-1. Alternate Routes: Northbound Traffic Movements and Under Spring Conditions



3. Background Studies

3.1. Cultural Environment

3.1.1. Cultural Heritage

Archaeological Services Incorporated (ASI) was retained to complete a Cultural Heritage Evaluation Report (CHER) to help inform the course of action for the aging structure. The structure is a single-span Warren pony truss bridge constructed circa 1920. As the bridge was constructed before 1956, it required a CHER to determine cultural heritage value or interest as part of the project planning process.

The report includes an evaluation of the cultural heritage value or interest of the structure as determined by the criteria in Ontario Regulation 9/06 of the Ontario Heritage Act. The evaluation determined that the bridge does not have design and physical, historical and associative, or contextual value in the local context. The subject bridge was constructed by an unknown engineer at an unconfirmed date, it is not a good representative example of this common structure type in the local context, and it is not significant in terms of age or length.

As recommended by ASI, on November 18, 2024, the results of the CHER were submitted to the planning staff at the Town of Saugeen Shores, the Bruce County Historical Society, and to the Ministry of Citizenship and Multiculturalism (MCM) for review and comment. Within response comments from the MCM provided in correspondence dated January 17, 2025, the MCM confirmed that *'the report was overall consistent with the requirements, guidance, and standards of the MCEA and with best practice guidance prepared by MCM'*. No other comments were received. A copy of the CHER (Final Report – April 2025) is enclosed in Appendix A.

3.1.2. Archaeological Assessment

Parslow Heritage Consultancy (PHC) was retained to complete a Stage 1 and Stage 2 archaeological assessment for the study area adjacent to Bridge SS-09 (i.e., Moore Bridge) located within the right-of-way (ROW) associated with McKechnie Sideroad in the Town of Saugeen Shores. The study area specific to the archaeological assessment consisted of a 70 meter stretch of the McKechnie Sideroad ROW, including Moore Bridge; the width of the study area was 20 meters. A copy of the Report (August 2024) is enclosed in Appendix A.

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property or within a given area. In accordance with the MCM's 2001 Standards and Guidelines for Consultant Archaeologists, which lists features or characteristics that are indicative of archaeological potential, the following statements can be made:

- The study area is bisected by a navigable waterway (i.e., Snake Creek); and,
- The study area is adjacent to a historic transportation route.

As such, the Stage 1 background assessment concluded that the study area exhibited archaeological potential and should undergo Stage 2 assessment via test pit survey. The objectives of the Stage 2 assessment are to determine if there are archaeological resources present on the property and to assess whether the identified resources have cultural heritage value or interest. Based on the results of the assessments, the following was recommended:

1. Areas of previous disturbance have low archaeological potential, and no further archaeological assessment is recommended for these areas.
2. The Stage 2 test pit survey did not result in the identification of archaeological materials. No further archaeological assessment is recommended for these areas.

The Stage 1 and 2 archaeological assessment included engagement with and participation by an archaeological monitor from Saugeen Ojibway Nation (SON). In correspondence dated October 31, 2024, SON Archaeology confirmed review of the report and found no concerns. A copy of this correspondence is included in Appendix A.

In a letter dated November 21, 2024, the MCM confirmed the entry of the Stage 1 and Stage 2 Assessment Report into the Ontario Public Register of Archaeological Reports (Appendix A).

3.2. Natural Heritage: Environmental Impact Study

A Scoped Environmental Impact Study (EIS) was completed by Aboud and Associates Inc. (Aboud) in October 2024 to characterize and document natural heritage features within the study area, assess impacts, and to propose reasonable measures to mitigate potential impacts to natural heritage features. A copy of the EIS Report is provided in Appendix B. The EIS contains the following conclusions:

Biological Constraints

Surveys were conducted for Ecological Land Classification (ELC) and Botanical Inventory, Breeding Birds, significant Wildlife Habitat, Species at Risk Habitat and Aquatic Habitat.

i. One SAR was detected within the study area: Eastern Meadowlark. Habitat for this SAR was greater than 20 meters from the bridge and will not be impacted by the proposed work.
ii. Suitable habitat may be present in the study area for species listed as Threatened or Endangered (SAR bats), which are afforded Habitat Protection.
iii. Assumed Significant Wildlife Habitat is present in the form of Special Concern and Rare Wildlife Species, as habitat for Monarch, Yellow-banded Bumble Bee, and Eastern Ribbonsnake, is present in the study area.
iv. The study area includes a reach of Snake Creek.

Impact Assessment

Impacts of the bridge alternatives as well as generalized impacts from the construction of the bridge were assessed to determine their extent and mitigation guidelines. These can be summarized as follows:

i. Potential impacts primarily involve the removal of herbaceous vegetation communities, site grading, impact to aquatic habitat, wildlife disturbance, and sediment run-off.
ii. There are opportunities in the study area for edge enhancement, restoration, and compensation planting to mitigate and offset potential impacts.

Avoidance, Mitigation and Compensation Recommendations

Recommendations specific to the natural heritage features are provided to ensure protection of natural heritage features and function within and adjacent to the proposed bridge. Through the implementation of the proposed mitigation, restoration, and compensation, no negative impacts are expected to the natural heritage system. Recommendations are outlined in Section 7.0 of the EIS, enclosed in Appendix B, and can generally be summarized as follows:

1. Implement an Erosion and Sediment Control Plan (ESC) following guidelines provided in the “Greater Golden Horseshoe Area Conservation Authorities’ Erosion and Sediment Control Guideline for Urban Construction”.

2. Install and monitor a silt and sediment control barrier. Silt fences should be inspected weekly during construction and following a storm event of 25mm of rainfall within 24 hours.
3. ESC measures to be kept in place until construction is completed and disturbed soils have been vegetated.
4. ESC measures should be implemented such that they isolate the work area, to reduce the potential for wandering wildlife inside the work area.
5. The area of construction disturbance should be kept to a minimum.
6. Control access and movement of equipment and people.
7. Minimize the use of equipment in sensitive areas. Equipment is to be limited to the construction allowance area and is not to encroach within the adjacent natural communities.
8. Accumulated sediment and debris to be removed before silt fence is removed.
9. All disturbed areas will be re-vegetated or restored with site appropriate indigenous plants wherever opportunities exist.
10. Time activities to avoid wildlife disturbance during critical life stages, as follows:
    a. No in-water works are permitted from March 15 to July 15, as per MNRF timing windows for the protection of fish and fish habitat.
    b. Avoid removal of trees and vegetation during the generalized breeding bird nesting period from April 1 to August 31 and tree removal during the bat maternity window of April 1 to September 30. If limited removal of herbaceous vegetation and shrubs is to occur during the general nesting period, a nest search should be completed by a skilled and experienced biologist/ecologist.
    c. Net off the bridge by April 1 to prevent any bird nesting.
11. Where in-water works cannot be conducted per the applicable codes of practice, submit a DFO Request for Review to identify any potential risks to fish and fish habitat.
12. If dewatering within the study area is deemed necessary, ensure fish rescue is completed by a qualified biologist/ecologist prior to dewatering being completed.
13. Choose designs and materials that will minimize impact.
14. Limit any cleaning solutions or paint used on the bridge and take appropriate precautions to avoid products entering the watercourse.

The report generally concludes that, through implementing the mitigation measures identified, none of the project alternatives to repair, replace or remove Moore Bridge would result in significant long-term negative impacts to natural heritage features identified within and adjacent to the bridge location. The natural features within the study area will be protected through mitigation and restoration recommendations.

Further, the proposed removal and potential replacement of Moore Bridge can occur in accordance with the SVCA's policies, the Bruce County Official Plan, the Town of Saugeen Shores Official Plan, and the Town of Saugeen Shores Zoning By-Law because it has been demonstrated that any impact to the hydrologic or ecological functions will be minimized through the recommended mitigation measures. The implementation of appropriate mitigation measures and restoration of disturbed areas would be considered further through the design and construction planning.

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3.3. Geotechnical Report

3.3.1. Foundations – Spread Footings

Prior to completing preliminary cost estimates for each alternative, GEI completed a geotechnical study in the vicinity of the bridge to determine what foundation options would be suitable for each alternative. A copy of the Geotechnical Investigation is enclosed in Appendix C. The Geotechnical Investigation (December 2024) found that a suitable bearing material, consisting of a dry and compact to hard grey silt till, is located approximately 5.5 meters below the existing road grade. Therefore, conventional spread footings were determined to be a suitable option for the foundation of a replacement structure.

3.3.2. Dewatering

Should bridge replacement be preferred, bridge footings would need to be constructed in dry conditions. Dry conditions may be achieved by installing a cofferdam or by diverting the creek through a temporary channel adjacent to the work site. The Geotechnical Investigation recommended that a braced sheet pile cofferdam be used to isolate the embankments for the construction of the foundations (i.e., spread footings) and abutments. Other cofferdam options (e.g. sand/pea stone bags or similar) would likely require a larger footprint, possibly extending beyond the right-of-way, and may not be as effective because groundwater infiltration through the shallow overburden soils (above the hard silt till) would be expected to be significant. Greater groundwater infiltration would increase the dewatering volumes (i.e., pumping rate), making construction more challenging. It is noted that the contractor would ultimately be responsible for controlling flow in Snake Creek during construction.

Although construction would be expected to be in early summer as work cannot commence in the water until permits allow, groundwater control would be required to maintain the working areas sufficiently dewatered for the construction of spread footings and abutments. Discharge from dewatering operations would need to be directed to a vegetated area away from the watercourse. All sediment and erosion control measures would be required to be implemented in accordance with SVCA and DFO requirements.

The taking of water greater than 50,000 liters per day is regulated through the Ontario Water Resources Act (OWRA). In certain cases, construction dewatering less than 400,000 L/day can be permitted through the Environmental Activity Site Registry (EASR) process. Water takings of greater than 400,000 L/day is regulated through a Permit to Take Water.

3.3.3. SVCA Floodplain and Safe Access & Egress Requirements

GEI Consultants completed a review of the SVCA Floodplain and Safe Access & Egress requirements for Moore Bridge. The report entitled *'Preliminary Floodplain Assessment and Safe Access & Egress Requirements'* (Letter Report dated December 18, 2024) outlining the analysis and findings (herein referred to as the Floodplain Report) is enclosed in Appendix D. Safe access and egress refers to the accessibility and capability of both vehicles and pedestrians to enter and exit a location during flooding events and during emergency situations.

The assessment focused on the floodplain characteristics and hydraulic conveyance of the bridge crossing to better understand the hydraulic effects under existing conditions. In addition to understanding the hydraulic effects, further analysis of the theoretical conditions required to meet the Safe Access & Egress standards was provided. The hydraulic modelling for the Moore Bridge was completed using the River Analysis System modeling software program HEC-RAS. The model was used to determine what changes would be required to meet the Safe Access & Egress requirements using the greater of the 1:100-Year–24 hour SCS Type II or the Regional (i.e., Hurricane Hazel) design storm.

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In accordance with the SVCA Environmental Planning and Regulations Policies Manual (Amended Oct 16, 2018), herein referred to as the SVCA Policy Manual, Safe Access means locations where during the Regulatory Flood (Hurricane Hazel), the following three criteria must be met:

i. Flow velocity does not exceed 1.0 m/s;
ii. The product of depth and velocity does not exceed 0.4 m^2/s; and
iii. The depth of flooding along access routes to residential units does not exceed 0.8 meters.

The report focused on three (3) modelling scenarios and included an assessment to determine if they could meet the Safe Access & Egress requirements, including:

i. Existing conditions of the floodplain, the in-situ characteristics of the watercourse and the existing safe access & egress conditions.
ii. Option for a 50% increase in bridge span and any associated watercourse alterations that may be required to suit the bridge expansion.
iii. Determination of the minimum required alterations to meet the SVCA safe access & egress requirements should the bridge expansion need to function as an operational road (i.e., 50% increase in bridge span and 1m rise in deck elevation).

3.3.4. Existing Conditions

Modelling indicates that under Regional Storm conditions the minimum flood elevation immediately upstream of the bridge is 213.41 meters. As the top of the existing bridge deck is at an elevation of 211.73 meters, the bridge is expected to overtop to a depth of 1.68 meters. Under these conditions the runoff velocity at the top of the bridge is estimated to be 1.97 m/s, almost double the velocity stipulated in the SVCA Policy Manual. Therefore, the SVCA criteria is not achieved for the bridge under existing conditions.

As the existing structure cannot provide Safe Access & Egress under Regional Storm conditions, it is unlikely that the SVCA would issue a permit for the construction of a replacement structure where the bridge geometry is not modified sufficiently to meet the criteria outlined in SVCA Policy Manual. Therefore, if the Town were to consider bridge replacement, it is recommended that the bridge geometry be adjusted. As existing conditions are not adequate, further analysis of the theoretical conditions required to meet the Safe Access & Egress standards was completed and is presented below.

3.3.5. 50% Increase in Bridge Span

To estimate what geometric changes would be required to meet the SVCA Safe Access & Egress requirements, a second analysis was performed by increasing the bridge span by 50% to 37.2 meters while maintaining the bridge at its current elevation. This adjustment was intended to significantly increase the conveyance area below the bridge and between the abutments.

Under these conditions, modelling indicates that under Regional Storm conditions the minimum flood elevation immediately upstream of the bridge would be 212.98 meters. As the top of the bridge deck is at an elevation of 211.73 meters, the bridge would be expected to overtop to a depth of 1.25 meters and the runoff velocity at the top of the bridge is estimated to be 2.2 m/s, greater than double the velocity stipulated in the SVCA Policy Manual. Therefore, the SVCA requirements would not be achieved if bridge reconfigurations were limited to increasing the span by 50%. As this change does not meet the minimum requirements, additional geometric changes would be required.

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3.3.6. 50% Increase in Bridge Span and 1m Increase in Abutment Height

In the second analysis modelled (i.e., increasing span by 50% to 37.2 meters), the flood elevation above the deck was approximately 1.25 meters. The third analysis therefore included an increase in the bridge deck elevation by 1.0 meters, to an elevation of 212.73 meters, to reduce the flood elevation immediately upstream of the structure.

Under these conditions, modelling indicates that under Regional Storm conditions the minimum flood elevation immediately upstream of the bridge would be 212.08 meters. As the top of the deck would be increased to 212.73 meters, the bridge would not be expected to overtop. In other words, the deck top would remain in the dry and the SVCA requirements for Safe Access & Egress would be achieved. Therefore, should replacement of the structure be considered, the replacement bridge would require major design changes. The cost implications of these geometric changes have been incorporated into the cost estimates for each of the alternatives considered in Section 5 of this report.

3.4. Utilities: Proximal to Structure

Utility companies were contacted to provide locates prior to the geotechnical drilling. The area in the vicinity of the bridge was reported to be clear of Bruce Telecom and Hydro One utilities. It is noted that overhead wires cross McKechnie Sideroad at its intersection with Concession Road 8E. However, it is our understanding that no utilities run along the length of this right-of-way.

4. Review of Alternatives

The existing bridge was reportedly constructed circa 1920. The Ontario Structure Inspection Manual (OSIM) report, completed by GM BluePlan Engineering (now GEI Consultants) on October 27, 2012, recommended that, if access to the roadway was still required, Moore Bridge be replaced, OR that the bridge be permanently closed, noting that McKechnie Sideroad was not maintained in the winter.

For this undertaking, the identified problems are generally as follows:

- The existing structure has significant deterioration and structural inspections have suggested that repair may no longer be a viable option.
- Due to the advanced state of deterioration, the structure should either be removed or replaced.
- Since 2013, bridge use has been limited to pedestrian traffic and ATVs, providing no benefit to local vehicular traffic and agriculture equipment.
- Should the bridge be re-opened to vehicular traffic, McKechnie Sideroad would require significant upgrades along a 2-kilometer section of road.

The alternative solutions considered to address the deteriorating condition of Moore Bridge include the following:

i. Do Nothing
ii. Repair the existing structure
iii. Bridge Removal
iv. Replace with pedestrian bridge
v. Replace with a single lane bridge
vi. Replace with a two-lane bridge

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A summary and discussion of each of the alternative solutions is presented in the following sections. The three replacement options would be designed for a minimum service life of 75 years and would be designed to a load carrying capacity deemed appropriate for the bridge usage (i.e., pedestrian vs. vehicular) and location, as per applicable standards and guidelines.

It is noted that cost estimates provided herein were prepared with limited design details and are based on probable conditions affecting the project. Therefore, they are intended to reflect the approximate magnitude of the project costs. A more detailed assessment of overall project costs would be evaluated during the design phase for a given alternative.

Replacement Alternative: Culvert-Type Crossing

It is recognized that the maintenance of a river crossing for vehicular use at this location only considers replacement with a bridge type structure. A culvert type crossing is not considered. Culverts, which are defined as structures that form an opening through the soil (i.e. reinforced concrete box culvert or corrugated steel pipe), may be considered for smaller waterways and short spans. As an alternative, for wider waterways, several culverts in series may be considered, however the hydraulic capacity would be greatly reduced. Consequently, upstream flooding and/or flooding over the road would be likely during high flows. Also, the natural riverbed would be more significantly affected by any culvert and associated fill. Therefore, for mainly technical (recommended span length of greater than 30 meters) and environmental reasons, a culvert type structure is not considered a reasonable alternative for the replacement of Moore Bridge and is not considered further herein.

4.1. Do Nothing

The 'Do Nothing' alternative maintains existing conditions. It does not address the issues identified but is considered as a baseline against which to compare other alternatives. The 'Do Nothing' alternative would permit the structure to remain in service, remaining closed to vehicular traffic and agricultural equipment, while continuing to be available for use by pedestrians and ATVs.

Ultimately, a 'Do Nothing' approach would eventually lead to a catastrophic failure (i.e., collapse) which could lead to injury, damage to the river system, and the requirement for emergency removal of the structure. The 'Do Nothing' alternative is considered inappropriate and, therefore, consideration and a decision for action will be necessary moving forward. The 'Do Nothing' alternative may be implemented at any time during the planning process prior to implementation of the selected alternative.

4.2. Repair the Existing Structure

Rehabilitation of the existing structure would entail completing repairs to the various elements of the bridge that have been identified as deficient to extend its service life. As previously noted, the OSIM report completed in 2012 suggests that rehabilitation of this bridge may no longer be an economically viable option due to the poor condition of various elements of the structure. The existing bridge displays considerable deterioration, and major repairs would be required on the steel trusses, bridge deck, abutment walls, and wingwalls. Ultimately, repairs would only serve to extend the service life of the bridge in the short term and would not necessarily restore the structures functionality as a vehicular bridge. Should bridge repairs result in restoring the functionality of the bridge for vehicular traffic, the poor condition of McKechnie Sideroad, a road section of approximately 2-kilometers, would need to be simultaneously addressed.

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It is estimated that the cost of repairs required to rehabilitate the structure would be in the range of $700,000 to $1.1M. This cost does not include for improvements to McKechnie Sideroad. In addition, it is likely that on-going inspection and maintenance costs would be highest for this alternative.

As the posted load limit of the bridge would remain uncertain and the required improvements to McKechnie Sideroad would incur significant additional expense to the Town, it is anticipated that the benefits to the community of repairing the existing structure to potentially resume some traffic loading would be minimal. In consideration of the age of the structure and the reported extent of deterioration, rehabilitating the bridge in an effort to potentially make the structure seasonally accessible to primarily local vehicular traffic for the short term would be significantly more costly when compared to the 75-year service life associated with a new bridge that could provide service year-round.

4.3. Remove Structure Completely

This alternative considers that the existing single lane bridge previously carried a relatively small volume of traffic seasonally (i.e., closed in the winter), that the 2-kilometer section of McKechnie Sideroad would require significant improvements and, given the recommended major design changes that include increasing the span by 50% (to 37.2 meters) and raising the bridge by one meter (Preliminary Floodplain Assessment, December 2024), the relative cost of replacement may outweigh the relative benefits. Further, as the bridge has been closed since 2012, and was not maintained in the winter prior to that time, alternative travel routes appear to be well established.

Under this scenario, the bridge would be removed, and McKechnie Sideroad would be permanently closed to vehicular traffic. In other words, McKechnie Sideroad could become an unmaintained right-of-way. However, the Town would need to continue to maintain the most southerly section of McKechnie Sideroad, approximately 100 to 150 meters in length, to provide access to the two residential properties near the intersection of McKechnie Sideroad with The River Road. A turn-around may be considered as this southerly section of road would become a dead end.

With respect to Snake Creek, the banks on both sides of the river would be restored to a more natural condition. Adjacent grading and waterway embankments could be cut back to reduce the impediment to the natural river basin, and rehabilitated. Restoration alternatives would be reviewed and planned in consultation with the SVCA.

It is assumed that under this scenario, McKechnie Sideroad would become an unmaintained ROW, similar to existing conditions. It is estimated that the cost for bridge removal and the restoration of the riverbanks would be in the range of $600K to $800K. Future inspection and maintenance costs would be eliminated. When compared to the bridge repair and bridge replacement alternatives, the majority of which would simultaneously require upgrades to the 2-kilometer section of McKechnie Sideroad, this alternative would be most economical. It is noted that prior to bridge closure, Moore Bridge was situated on a narrow, gravel road where winter maintenance was not provided. In addition, no residences depend on this structure for access.

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4.4. Bridge Replacement Alternatives

4.4.1. Replace with a Pedestrian Bridge

This alternative involves the complete removal of the existing structure and replacement with a single span pedestrian bridge. This alternative would maintain the level of service which has been in place since closure, including use by pedestrians and recreational vehicles.

A narrower deck width of approximately 2.0 meters would be considered to provide sufficient clear width (i.e., between the barriers) for pedestrian and recreational vehicle use. In addition, based on the Floodplain Report, major design changes including a 50% increase in span to 37.2 meters and a raised deck height (by 1 meter), would be required to meet the SVCA requirements for Safe Access & Egress. Based on our preliminary assessment, the effort associated with replacement with a pedestrian bridge would be extensive. However, this alternative would achieve maintaining a non-vehicular river crossing and would eliminate the need and associated costs to complete upgrades to McKechnie Sideroad.

Signage indicating that vehicular traffic is prohibited and/or load capacity restrictions would be required. To prevent vehicular traffic from using the bridge, the use of barriers could be considered. As the entire sideroad is a single lane roadway, construction access and staging may be challenging. It is estimated that the cost to remove the existing structure and replace it with a pedestrian bridge would be in the range of $1.6M to $2.0M (includes for construction costs and engineering fees). Inspection and maintenance costs would be relatively low in the short term and would be expected to increase as the structure ages.

4.4.2. Replace with a One-Lane Bridge

This alternative involves the complete removal of the existing structure and replacement with a single span, single lane bridge. The Ministry of Transportation Ontario (MTO) Structural Manual, Division 1 – Exceptions to the CHBDC, Section 2 – Appendix A Guidelines for the Design of Bridges on Low Volume Roads, notes that for low volume roads with an annual average daily traffic count (AADT) of less than 400 vehicles, single lane bridges are acceptable under certain conditions. The Structural Manual recommends a width between 4.0 meters and 4.9 meters wide so long as horizontal and vertical sight distances are provided on each approach. As the structure would have a maximum width of 4.9 meters, larger agricultural equipment would still be required to use Bruce Road 17 or Bruce Road 3 to travel between The River Road and Concession Road 8E. In addition, based on the Floodplain Report, major design changes including a 50% increase in span to 37.2 meters and a raised deck height (by 1 meter) would be required to meet the SVCA requirements for Safe Access & Egress.

It would be recommended that the speed limit on McKechnie Sideroad be decreased to 50 km/h to reduce the risk of a collision. In addition to reducing the speed limit, it is thought that the alignment of southbound road approach located to the north of the bridge may be deficient (subject to a more detailed review). In consideration of the bend in the road approximately 40 meters to the north and the steep road approach, the road may need to be re-designed to meet the applicable road design standards – in other words adjustments to the vertical and horizontal road alignments may be needed to improve sightlines. This would have the potential to increase the overall project complexity and could result in the need to acquire some additional land along the existing right-of-way. Raising the road elevation could be considered but may be undesirable as it would likely involve retaining wall installation and/or extensive slope control.

At the time that Moore Bridge was closed, McKechnie Sideroad was a single lane gravel road that extended between Concession Road 8E to The River Road. Should the Town opt to invest in replacing the bridge with a structure that is capable of supporting vehicular traffic, then it would be reasonable to expect that the 2-kilometer section of McKechnie Sideroad would be improved from its current condition to, at minimum, a two lane gravel road.

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Therefore, this alternative includes for the reconstruction of McKechnie Sideroad including clearing, grubbing, excavation, granular placement and compaction, and ditching along the entire length of the roadway.

The "Replace Structure with Single Lane Bridge" alternative would be extensive and meeting the current MTO standards while working with existing grades and conditions would be challenging. The capital investment for this alternative is estimated to be in the range of $3.0M and $3.5M (construction and engineering fees). The replacement of the structure would represent an increase in the level of service by providing a third access route to The River Road. Inspection and maintenance costs would be relatively low in the short term and would be expected to increase as the structure ages.

4.4.3. Replace with a Two-Lane Bridge

This alternative involves the removal of the existing structure and replacement with a single span, two lane bridge. The subject bridge would be designed to support full traffic loads in accordance with the Canadian Highway Bridge Design Code and would also include a sidewalk to maintain the current pedestrian level of service. In addition, based on the Floodplain Report, major design changes including a 50% increase in span to 37.2 meters and a raised deck height (by 1 meter), would be required to meet the SVCA requirements for Safe Access & Egress. The new structure would be wide enough to accommodate agricultural vehicles, removing the need for larger equipment to detour via Bruce Road 17 or Bruce Road 3.

Similar to the one-lane replacement alternative, the approaches to the structure would require improvements to conform to vertical and horizontal alignment constraints. McKechnie Sideroad would also require extensive improvements to widen the road to 2 lanes and fully utilize the new structure. This would include clearing, grubbing, excavation, granular placement and compaction, and ditching along the entire length of the roadway. Land acquisition along the road approach to the north of the bridge may also be required (subject to further review).

With respect to the level of service, this alternative represents the most significant improvement as it would accommodate vehicular traffic, agricultural equipment, pedestrians and recreational vehicles. However, due to the location of the river crossing, a significant increase in traffic flow would not be anticipated. As there are more direct routes in both the east-west and north-south directions, traffic volumes would likely be limited to local residents. This alternative also represents the most extensive project option with the highest capital investment. It is estimated that this alternative would cost the Town greater than $5.0 M (construction and engineering fees). Inspection and maintenance costs would be relatively low in the short term and would be expected to increase as the structure ages.

5. Recommended Alternative

The project planning process for Moore Bridge is being completed to assess the various alternatives for this bridge crossing. The determination of the Recommended Alternative is based on an assessment of the various 'environments', including the advantages and disadvantages of various alternatives and their trade-offs. Since a 'Do Nothing' approach would maintain the existing closed bridge and would lead to eventual failure, which is considered inappropriate, consideration and a decision for action is necessary. Therefore, potential alternatives being considered herein generally include bridge rehabilitation, bridge removal, and three bridge replacement options.

Based on the site conditions, the findings of the Floodplain Report and general assessment of alternatives presented herein, bridge removal is recommended. Some of the key factors considered in the determination of bridge removal as the recommended alternative include, but are not limited to, the following:

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1. The need to remove or replace the structure is imminent. Bridge rehabilitation will only delay the requirement to address a more permanent solution.
2. When bridge removal is compared to bridge replacement, which would require the Town to simultaneously complete road improvements along the 2-kilometer section of McKechnie Sideroad, the capital costs for removal are significantly less. In addition, the long term costs associated with inspections and maintenance would be eliminated. Considering the relatively low volume of traffic that uses this local road, the costs associated with maintaining a crossing at this location, including replacement and ongoing maintenance, appear to outweigh the benefits.
3. Moore Bridge has been 'temporarily' closed for more than 10 years. The impact of permanent bridge closure, and the associated potential to change much of McKechnie Sideroad into an unmaintained right-of-way (i.e., not including the most southerly extent where it provides access to 2 residences), will be most felt by the local community, which has continued to use the bridge for recreational purposes (i.e., pedestrians and ATVs). However, the impact of permanently removing this river crossing to the community as a whole are thought to be minimal.
4. Moore Bridge is not considered to be an integral part of the Town's broader transportation system in that it does not contribute significantly to the efficient movement of personal, commercial and emergency vehicles through the area. As there are more efficient routes available to facilitate the more regional traffic movements through the area, in both the north-south and east-west directions, the indirect economic impact of a permanent bridge closure is expected to be minimal, if any.
5. The bridge primarily facilitates access between Concession Road 8E and The River Road. Therefore, removal of the structure will primarily impact the inhabitants along The River Road and to a lesser degree those residing along Concession Road 8E. It mainly serves to provide a more direct connection to the agricultural communities located directly to the north and south of Snake Creek, between Bruce Road 17 and Bruce Road 3. Southbound traffic movements from The River Road are further constrained by the Saugeen River, therefore traffic must travel to the east towards Bruce Road 3 or west towards Bruce Road 17 before continuing to the south.
6. In terms of travel distance and time, between Burgoyne and the intersection of The River Road with McKechnie Sideroad, it is estimated that the closure of Moore Bridge adds approximately 1.5 km, or about two (2) minutes of travel time, when compared to traveling directly north on McKechnie Sideroad to Concession Road 8E, then continuing north to Burgoyne. In the worst case scenario, the greatest impact to local residents related to travel distance/time likely happens when seasonal flooding occurs on The River Road in the road section to the east, approximately 950 meters west of Dunblane. When this occurs, persons wishing to access areas on either side of the flooded area are required to detour around the flooding using Concession Road 8E. In the absence of a connection to The River Road via McKechnie Sideroad, traffic is required to detour further west to Bruce Road 17. Under this scenario, this adds approximately 4 km, or up to an estimated 5 minutes of travel time.
7. With bridge removal, access to all properties would still be maintained, therefore there is no apparent need to re-establish a vehicular crossing at this location.
8. With the implementation of the recommended mitigation measures, it is anticipated that impacts to the natural environment in the short term will be minimal. In the long term, removal of the bridge will improve the flow of Snake Creek under normal conditions and storm events by removing impediments from the floodplain and will enhance the natural environment as the original river basin will become reestablished.
9. Capital and on-going maintenance costs associated with bridge replacement would be greater than the 'one-time' cost that would be realized for bridge removal.

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With respect to bridge replacement, this alternative would likely address many of the concerns of the local community. As would be expected, given that bridge replacement would facilitate a greater number of activities, from the perspective of the local community it is likely considered to be more favorable than bridge removal. However, the benefit to the broader community would be limited, as is suggested by the low traffic volumes (i.e., AADT of less than 100) previously reported and the absence of winter maintenance. Therefore, in consideration of the limited connectivity to the overall road network, the low traffic volumes primarily limited to local vehicular traffic, and the cost to replace the structure and upgrade the 2-kilometer section of McKechnie Sideroad, the justification for the need to maintain this river crossing is difficult to establish. Therefore, bridge removal is recommended.

6. Approvals

6.1. Saugeen Valley Conservation Authority

The study area, including Snake Creek, is located within the jurisdiction and Screening Limits of the Saugeen Valley Conservation Authority (SVCA). The role of the SVCA is to ensure that the natural environment and natural hazards are respected, protected, avoided and/or accommodated. The SVCA is governed by the Conservation Authorities Act of Ontario. Changes to the Conservation Authorities Act and its regulations came into effect on April 1, 2024, and included the replacement of SVCA's regulation 169/06 with O.Reg.41/24. The purpose of the Conservation Authorities Act is to provide for the organization and delivery of programs and services that further conservation, restoration, development, and management of natural resources in watersheds in Ontario.

Under Section 28 of the Conservation Authorities Act and O.Reg.41/24 'Prohibited Activities, Exemptions and Permits', the SVCA has a mandate 'to prevent loss of life, property damage and social disruption from flood and erosion processes and the conservation of local ecosystems'. Under O.Reg.41/24, consultation and submission of a permit application may be required prior to undertaking any alterations or development within a mapped SVCA regulated area. If the conservation authority is satisfied that the proposed work will address their mandate, the SVCA may issue a permit for that development.

The removal and potential replacement of Moore Bridge is considered to be public infrastructure which is permitted when interfering with a watercourse crossing and within the regulated area, subject to the activity being approved through a satisfactory EA process and/or if it has been demonstrated to the satisfaction of SVCA that the development is acceptable on the natural features and hydrologic and ecological functions of the area.

Although permits are typically sought during the detailed design phase for a given project, consultation with the Conservation Authority early in the project planning process is often recommended to confirm (or negate) that site conditions have the potential to support the proposed works. To date, the Scoped EIS and the Preliminary Floodplain Assessment and Safe Access & Egress Requirements (December 2024) have been circulated to the SVCA for review. Development, interference or alteration within a Regulated Area may be permitted where it can be demonstrated through appropriate technical studies/assessments, site plans, and/or other plans as required by the governing Conservation Authority, that there are no negative effects. As such, as noted in SVCA correspondence (dated January 9, 2025), when the Town plans to proceed with bridge works, the SVCA would require a site visit and additional information, such as preliminary design drawings, whether the abutments would be removed, if the banks of the watercourse would be altered, and details related to the erosion protection measures. Under O.Reg.41/24, a permit from the SVCA will be required prior to any bridge works.

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6.2. Fisheries Act, 1985

To ensure compliance with the Fisheries Act (1985), a DFO Self-Assessment should be completed at detailed design to determine if the works can be completed under the appropriate codes of practice. As per the findings of the Scoped EIS (Aboud, 2024), a DFO Request for Review (RFR) of the detailed design may be required. Where works can not comply or fall outside of the purview of the codes of practice, then a DFO RFR is required, and should be completed by a qualified biologist/ecologist. If it is determined that proposed actions may cause serious harm to fish that cannot be mitigated for, then a Fisheries Act Authorization would be required.

6.3. Department of Fisheries and Oceans

The Department of Fisheries and Oceans (DFO) requires activities near or in the watercourse to comply with the fish and fish habitat protection provisions of the Fisheries Act by incorporating measures to avoid (i) causing the death of fish and/or (ii) harmful alteration, disruption or destruction of fish habitat resulting from the work, undertaking or activity.

As outlined by the DFO, impacts to fish and fish habitat resulting from bridge works can be avoided by implementing measures to protect fish and fish habitat and/or mitigation measures to minimize potential impacts identified. Prevention and mitigations measures generally include the following:

1. Design and construction planning should consider carrying out works on land, and above the high water mark, where possible.
2. In water work should be planned to respect timing windows to protect fish, including their eggs, juveniles, spawning adults, and the organisms upon which they feed and migrate.
3. Measures to maintain riparian vegetation should be implemented, such as avoiding tree removal and using existing roads/disturbed areas, wherever possible. As recommended in the EIS, disturbed areas should be re-vegetated or restored.
4. Fish passage should be maintained within the waterway. Changes to the flow or water level and/or obstructing or interfering with the movement and migration of fish has the potential to impact fish and fish habitat.
5. Ensuring proper sediment control to avoid introducing sediment (i.e., clay, silt and sand) into the water. Erosion and sediment control plans will be developed and implemented. These will generally include the following provisions generally recommended by the DFO:
    - installing effective erosion and sediment control measures to stabilize all erodible and exposed areas.
    - regularly inspecting and maintaining the erosion and sediment control measures during all phases of the project.
    - keeping the erosion and sediment control measures in place until all disturbed ground has been permanently stabilized.
    - installing a settling basin and/or a filtration system for water flowing onto the site and water being pumped or diverted from the site, including (i) holding back runoff water until suspended sediment has resettled in the settling basin and runoff water is clear.; and (ii) dewatering gradually to prevent sediment resuspension and bank destabilization.
    - disposing of and stabilizing all excavated material away from waterbodies and ensuring sediment re-entry to the watercourse is prevented.

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- heeding weather advisories and scheduling work to avoid wet and rainy periods that may result in high flow volumes and/ or increase erosion and sedimentation.
- regularly monitoring the watercourse for signs of sedimentation during all phases of the construction and taking corrective action if required.
- using biodegradable erosion and sediment control materials whenever possible and removing all exposed non-biodegradable erosion and sediment control materials once site is stabilized.
- operating machinery on land in stable dry areas.
- Limiting the impacts to stream banks.

6. Preventing the entry of deleterious substances into the waterbody. Deleterious substances may be prevented from entering the watercourse by:
    - avoiding depositing any deleterious substances in the watercourse.
    - keeping an emergency spill kit on site.
    - developing a response plan to be implemented immediately in the event of a spill of a deleterious substance. This plan may include the following provisions:
        - stopping work and containing deleterious substances to prevent dispersal.
        - reporting any spills of sewage, oil, fuel or other deleterious material whether near or directly into a water body.
        - ensuring clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.
        - cleaning up and appropriately disposing of the deleterious substances.
    - planning activities near water such that materials and chemicals don't enter the watercourse, including, but not limited to, grout, paint, primers, degreasers, rust solvents, poured concrete, and blasting abrasives.
    - maintaining all machinery on site in a clean condition and free of fluid leaks to prevent any deleterious substances from entering the water.
    - washing, refueling and servicing machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.
    - disposing all waste materials (including construction, demolition, excavation, commercial logging) above the high water mark of nearby waterbodies to prevent entry.
    - ensuring that building material used in a watercourse is handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

The implementation of appropriate mitigation measures and restoration of disturbed areas will be considered through design and construction planning. A DFO Request for Review should be submitted that this stage of the project.

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7. Public Consultation

7.1. Notification

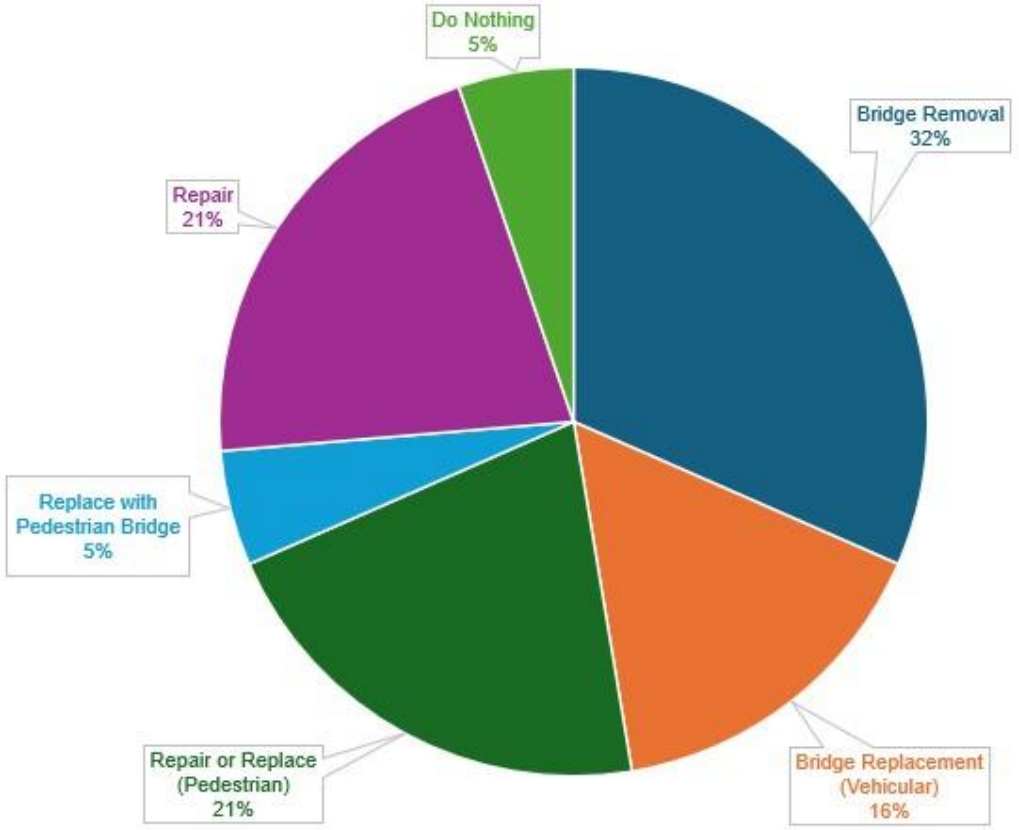
The Town posted a dedicated project website for the Moore Bridge project on December 1, 2025. The website provided a general overview of the project and included a link to key project documentation. Residents that subscribe to the 'Engage Saugeen Shores' website received direct notification for the project. The project webpage also provided a link to submit comments. It was requested that comments be received by December 15, 2025. Comments and feedback received, along with responses, are included in Appendix E.

In an effort to reach the broader public, the project was also posted on other social media platforms that the Town offers (i.e., Facebook, Instagram and linked-in). Links to the project website were also shared on these social media platforms. In addition, notices were hand delivered to the two residences on McKechnie Sideroad, near its intersection with The River Road.

7.2. Summary of Comments Received

Of the 19 respondents that provided comments/feedback regarding the Moore Bridge project, a total of six (6) persons supported the recommended bridge removal, and three (3) persons supported replacement with a structure that would support the movement of vehicles and agricultural equipment. The remaining 10 respondents indicated support for maintaining a river crossing with uses limited to various modes of active transportation (i.e., non-vehicular), either by repairing the bridge, replacing it with a pedestrian bridge or leaving the existing structure as is (i.e., the Do Nothing Alternative).

Summary of Public Response – Breakdown of Support for Various Bridge Alternatives



A general summary of the key comments conveyed to the project team is provided below.

- The rationale provided in support of the recommendation to remove the bridge included associated improvements to the natural environment (i.e., floodplain and restoration of the riverbanks) and the effective use of the Town's financial resources.
- Approximately half of the respondents supported maintaining a river crossing to support various modes of active transportation (i.e., walking, cycling, ATV, horses, etc.) by either repairing the bridge, replacement with a pedestrian bridge, or leaving the bridge as is. The structure would not support vehicles and agricultural equipment and improvements to the right-of-way could be avoided.
- The rationale for maintaining a river crossing for active transportation included providing an alternate safer route for the 'growing' cycling community and the Mennonite community, effectively avoiding a 650m section of Bruce Road 17 or a 3.7 km section along Bruce Road 3. In addition, several residents use it for walking.
- Several respondents referred to project cost. Those that supported bridge removal recognized that this was preferable from an economic perspective. Other respondents noted that the estimated cost to repair the bridge was only slightly greater than the cost for removal. However, it is noted that the overall cost associated with bridge repair would be significantly greater in the long term. Once repaired, costs associated with ongoing inspection, maintenance and repairs would continue to be incurred. Further, the bridge rehabilitation alternative would ultimately delay bridge removal and associated costs.
- The rationale provided in support of replacement with a vehicular bridge included its importance to the local rural community as a 'connecting link' and the provision for a less dangerous route of travel for the local agricultural community, effectively avoiding a 650m section of Bruce Road 17 or a 3.7 km section along Bruce Road 3. In addition, it was suggested that the AADT of 25 vehicles (reported in 1992) underestimated the actual bridge usage.

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Appendix A Cultural Environment: Background Information

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Cultural Heritage Evaluation Report

Moore Bridge
SS-09

Town of Saugeen Shores, Ontario

Final Report

Prepared for:

GEI Consultants Canada
1260 2nd Avenue East
Owen Sound ON N4K 2J3

Archaeological Services Inc. File: 24CH-095

September 2024 (revised November 2024 and April 2025)



Executive Summary

Archaeological Services Incorporated was contracted by GEI Consultants Canada on behalf of the Town of Saugeen Shores to conduct a Cultural Heritage Evaluation Report (C.H.E.R.) for the Moore Bridge (SS-09) in the Town of Saugeen Shores, Ontario. The C.H.E.R. is being completed as part of the project planning process to determine the appropriate course of action for the aging bridge. The structure is a single-span Warren pony truss bridge constructed circa 1920 that carries McKechnie Sideroad over Snake Creek approximately 400 metres south of Concession Road 8 East. As the subject bridge was constructed before 1956, it requires a C.H.E.R. to determine cultural heritage value or interest as part of this Environmental Assessment (Municipal Engineers Association, 2023).

This report includes an evaluation of the cultural heritage value or interest of the structure as determined by the criteria in Ontario Regulation 9/06 of the *Ontario Heritage Act*. This evaluation determined that the bridge does not have design and physical, historical and associative, or contextual value in the local context. The subject bridge was constructed by an unknown engineer at an unconfirmed date, it is not a good representative example of this common structure type in the local context, and it is not significant in in terms of age or length.

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

1. The proponent should submit this report for review and comment to planning staff at the Town of Saugeen Shores, Bruce County Historical Society, the Ministry of Citizenship and Multiculturalism, and to any other relevant stakeholder that has an interest in the heritage of the subject bridge. Any feedback will be incorporated into this report prior to finalization. The final report should be submitted to the local history holdings of the Bruce County Public Library for archival purposes.

Report Accessibility Features

This report has been formatted to meet the Information and Communications Standards under the *Accessibility for Ontarians with Disabilities Act*, 2005 (A.O.D.A.). Features of this report which enhance accessibility include: headings, font size and colour, alternative text provided for images, and the use of periods within acronyms. Given this is a technical report, there may be instances where additional accommodation is required in order for readers to access the report's information. If additional accommodation is required, please contact Annie Veilleux, Manager of the Cultural Heritage Division at Archaeological Services Incorporated, by email at aveilleux@asiheritage.ca or by phone 416-966-1069 ext. 255.

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- Lindsay Graves

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1.0 Introduction

Archaeological Services Incorporated (A.S.I.) was contracted by GEI Consultants Canada on behalf of the Town of Saugeen Shores to conduct a Cultural Heritage Evaluation Report (C.H.E.R.) for the Moore Bridge (SS-09) in the Town of Saugeen Shores, Ontario. The structure is a single-span Warren pony truss bridge constructed circa 1920 that carries McKechnie Sideroad over Snake Creek approximately 400 metres south of Concession Road 8 East.

1.1 Project Overview

This C.H.E.R. is being completed to support the project planning process being completed to address structural deficiencies in the subject bridge and to determine a preferred alternative for the structure. A 2013 Bridge Assessment Report evaluated the bridge as being in poor condition and recommended the closure of the bridge due to instability at the bearing seats (B.M. Ross & Associates Limited, 2013). The bridge has been closed to traffic since 2012 (GEI Consultant Canada email communication), with McKechnie Sideroad being used only for access to adjacent agricultural fields in the vicinity of the bridge. A 2022 Bridge Inspection Summary Report recommended that the structure be removed or replaced with a pedestrian crossing in the next six to ten years (GM BluePlan Engineering Ltd., 2022a).

The subject bridge is not identified as a built heritage resource by the municipality and is not included on the *Ontario Heritage Bridge List* (Ministry of Transportation, 2010). As the subject bridge was constructed before 1956, it requires a C.H.E.R. to determine cultural heritage value or interest as part of this Environmental Assessment (Municipal Engineers Association, 2023). Part B of the completed Criteria for Evaluating Potential for Cultural Heritage Resources checklist that demonstrates the requirement for a C.H.E.R. is provided in Appendix A. Research was completed to investigate, document, and evaluate the cultural heritage value of the subject bridge. The C.H.E.R. was conducted by John Sleath, Cultural Heritage Specialist, under the senior project management of Lindsay Graves, Manager, Cultural Heritage, A.S.I.



Figure 1: Location of Moore Bridge on McKechnie Sideroad over Snake Creek in the Town of Saugeen Shores, County of Bruce. Source: (c) Open Street Map contributors, Creative Commons n.d.

1.2 Legislation and Policy Context

Pursuant to the *Environmental Assessment Act* (Ministry of the Environment 1990), applicable infrastructure projects are subject to heritage assessment and/or evaluation to identify built heritage resources and cultural heritage landscapes and to determine related impacts on identified heritage properties (Ministry of Transportation, 2007). Infrastructure projects have the potential to impact built heritage resources and cultural heritage landscapes in a variety of ways such as loss or displacement of resources through removal or demolition and the disruption of resources by introducing physical, visual, audible, or atmospheric elements that are not in keeping with the resources and/or their setting.

The analysis used throughout the cultural heritage evaluation process addresses cultural heritage resources under other various pieces of legislation and their supporting guidelines. These policies form the broad context which frame this assessment, and are included as relevant to this undertaking based on professional opinion and with regard for best practices:

- *Environmental Assessment Act* (Ministry of the Environment 1990);
- *Ontario Heritage Act* (Ontario Heritage Act, R.S.O. c. O.18, [as Amended in 2023], 1990);
- *Ontario Heritage Tool Kit* (Ministry of Citizenship and Multiculturalism, 2006);
- *Ontario Heritage Bridge Guidelines* (Ministry of Culture and Ministry of Transportation, 2008);
- *Municipal Bridges Criteria for Evaluating Potential for Cultural Heritage Resources* (Municipal Engineers Association, 2023); and
- *Ontario Regulation 160/02, Standards for Bridges* (Public Transportation and Highway Improvement Act, R.S.O. 1990, c.P.50, 2002).

1.3 Approach to Cultural Heritage Evaluation Reports

The scope of a C.H.E.R. is guided by the *Ontario Heritage Tool Kit* (Ministry of Citizenship and Multiculturalism, 2006).

Generally, C.H.E.R.s include the following components:

- A general description of the history of the study areas as well as detailed historical summaries of property ownership and building(s) development;
- A description of the cultural heritage landscapes and built heritage resources that are under evaluation in this report;
- Representative photographs of the exterior and interior of a building or structure, and character-defining architectural details;
- A cultural heritage resource evaluation guided by the *Ontario Heritage Act* criteria;
- A summary of heritage attributes;
- Historical mapping, photographs; and
- A location plan.

Using background information and data collected during the site visits, the property is evaluated using criteria contained within Ontario Regulations 9/06 of the *Ontario Heritage Act*. The criteria require a full understanding, given the resources available, of the history, design and associations of all cultural heritage resources of the property in the community context. If a property meets one criterion in Ontario Regulation 9/06, it is eligible for inclusion on a municipal heritage register as a non-designated, listed property. If a property meets two or more criteria, then it is eligible for designation under the *Ontario Heritage Act* (Ministry of Citizenship and Multiculturalism, 1990).

2.0 Community Engagement

The following section outlines the community consultation that was undertaken to gather and review information about the subject bridge.

2.1 Community Information Gathering

The following stakeholders were contacted with inquiries regarding the heritage status and for information concerning the subject bridge and any additional adjacent built heritage resources or cultural heritage landscapes:

- Sarah Bonderud, Deputy Clerk, Town of Saugeen Shores (website portal inquiry sent 26 August 2024). Requested information on the subject bridge, confirmation that the bridge has no existing heritage recognition, and confirmation that the adjacent properties at 5 and 12 McKechnie Sideroad are listed on the Saugeen Shores Heritage Register. A response on 27 August 2024 confirmed that neither the bridge or adjacent properties are designated under the *Ontario Heritage Act*, however the properties at 5 and 12 McKechnie Sideroad are listed on the heritage register.
- Bruce County Historical Society (website portal inquiry sent 26 August 2024) requested any information on the subject bridge, including archival photographs or historical maps. A response was outstanding at the time of report submission.
- The Ministry of Citizenship and Multiculturalism (M.C.M., email communication 26 and 30 August 2024). Email correspondence confirmed that at this time there are no properties designated by the Minister and that they are not aware of any Provincial Heritage Properties within or adjacent to the study area.
- The Ontario Heritage Trust (email communications 26 August and 4 September 2024). A response indicated that there are no conservation easements or Trust-owned properties within or adjacent to the study area.

2.2 Community Engagement

Community engagement was undertaken through submission of the project Notice of Commencement to stakeholders, including Indigenous groups. Further consultation will be undertaken through submission of this Cultural Heritage Evaluation Report (C.H.E.R.) for review and comment to municipal heritage staff, the M.C.M., and any other relevant stakeholder with an interest in this project. Additional consultation may also be undertaken through Public Information Centres (P.I.C.s) or public presentations conducted as part of the project. Any comments received though ongoing consultation and stakeholder review will be included as appropriate in the final report.

Indigenous Nations Engagement for this project was completed with the Saugeen Ojibwa Nation during preparation of an associated Stage 1 Archaeological Assessment prepared by another consultant. The Saugeen Ojibwa Nation was contacted on 24 June 2024 regarding the project; however, no response had been received at the time of draft report preparation (GEI Consulting email communication 15 July 2024). Future engagement with Indigenous Nations should request any feedback related to known or potential built heritage resources and cultural heritage landscapes adjacent to the subject bridge. Any additional information will be considered and incorporated into the final report.

2.3 Agency Review

The draft report was submitted to the Town of Saugeen Shores and the M.C.M. for review and comment. Feedback received was considered and incorporated into this report as appropriate. M.C.M. confirmed that the C.H.E.R. is overall consistent with the requirement, guidance, and standards of the Municipal Class Environmental Assessment and with best practice guidance prepared by M.C.M. (M.C.M. email communication 17 January 2025). The final C.H.E.R. will be submitted to the Bruce County Historical Society for their information.

3.0 Description of the Structure and Crossing

The following section provides a description of the subject bridge and crossing.

3.1 Existing Conditions

Moore Bridge is a single-span Warren pony truss bridge resting on cast-in-place concrete abutments (Figure 2). The structure carries McKechnie Sideroad over Snake Creek, a tributary of the Saugeen River. The subject bridge was constructed circa 1920 based on the designs of an unknown engineer, most likely employed with the former Township of Saugeen, and is not known to have undergone any documented structural rehabilitations, though steel flexbeam guardrails were added at an unknown date.

Moore Bridge is on McKechnie Sideroad approximately 400 metres south of Concession Road 8 East in the Town of Saugeen Shores. The subject bridge was closed to traffic in 2012 (GEI Consultants Canada email communication), and since that time, no vehicular crossing has been available on the roadway. McKechnie Sideroad is a single lane gravel road that is not maintained over the winter. At the time of field review (July 2024), the roadway was overgrown and appears to only be used by farmers to access their adjacent agricultural fields. The bridge is located in a rural agricultural context with active agricultural lands to the southeast, southwest, and northeast of the crossing, and an undeveloped wooded area to the northwest (Figure 3). Snake Creek is a meandering river that flows in a general east-to-west orientation in the vicinity of the bridge. It joins with Burgoyne Creek approximately 3.5 kilometres downstream, which then drains into the main branch of the Saugeen River west of Port Elgin, approximately five kilometres downstream of the subject crossing.



Figure 2: West elevation of Moore Bridge, looking southeast (A.S.I., 2024)

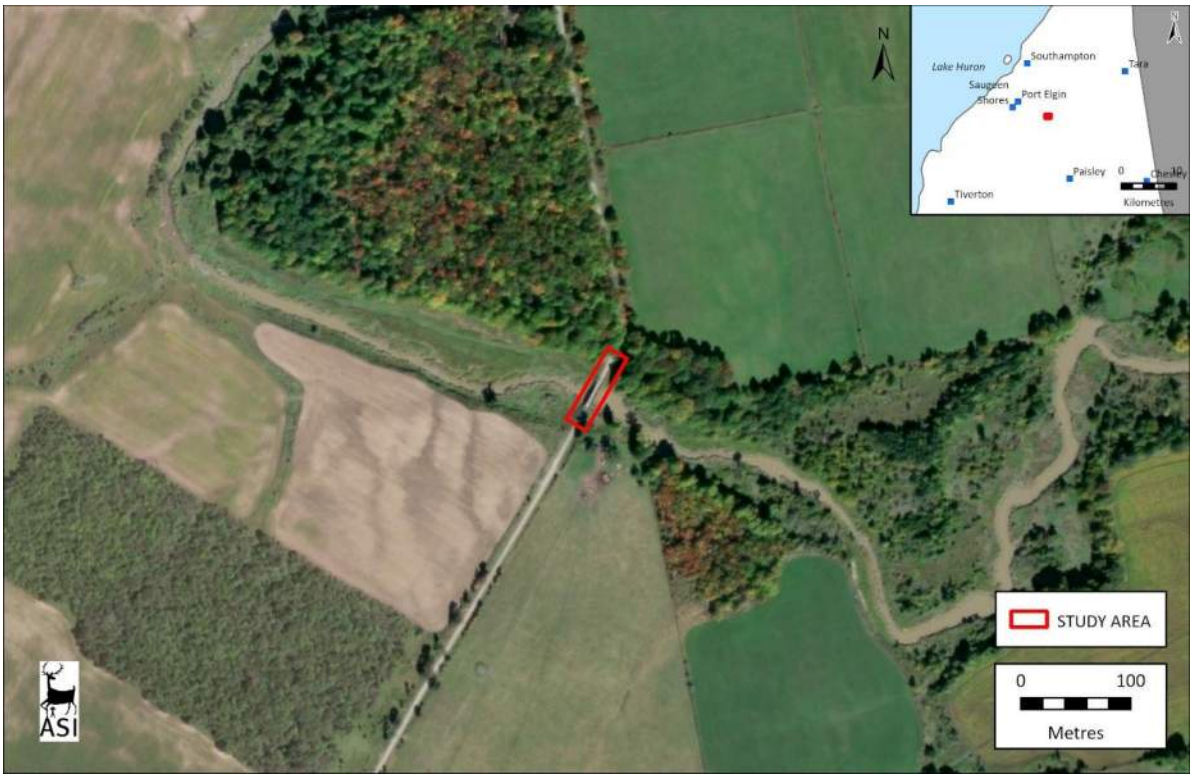


Figure 3: Aerial image of the subject bridge in the Town of Saugeen Shores (Google Maps)

3.2 Heritage Recognitions

The subject bridge is not recognized as a known or potential heritage property by the Town of Saugeen Shores, Bruce County, or the province.

3.3 Adjacent Lands

The subject bridge is located in a rural agricultural context with active farmscapes to the southeast, southwest, and northeast. The property to the southwest of the bridge at 5 McKechnie Sideroad, and the property to the southeast at 12 McKechnie Sideroad, are both included as listed properties in the Saugeen Shores Heritage Register (Town of Saugeen Shores, 2019), Phase 3 (*By-law* 55-2018). Residences and agricultural outbuildings on these properties are located at the intersection of McKechnie Sideroad and The River Road approximately 1.5 kilometres south of the subject bridge. No adjacent properties are designated Part IV under the *Ontario Heritage Act.*

4.0 Research

This section provides: the results of primary and secondary research; a discussion of historical or associative value; a discussion of physical and design value; a discussion of contextual value; and results of comparative analysis.

4.1 List of Key Sources, Report Limitations, and Site Visit Information

The following section describes the sources consulted and research activities undertaken by Archaeological Services Incorporated (A.S.I.) for this report.

4.1.1 Key Sources

Background historical research, which includes consulting primary and secondary source documents, photos, and historic mapping, was undertaken to identify early settlement patterns and broad agents or themes of change in the study area. In addition, online historical research was undertaken through the

websites of the following libraries and archives to build upon information gleaned from other primary and secondary materials:

- Bruce County Public Library, Port Elgin Branch

Available federal, provincial, and municipal heritage inventories and databases were also consulted to obtain information about the properties. These included:

- Saugeen Shores Heritage Register (Town of Saugeen Shores, 2019), Phase 3 (*By-law* 55-2018);
- The *Ontario Heritage Act Register* (Ontario Heritage Trust, n.d.b);
- The *Places of Worship Inventory* (Ontario Heritage Trust, n.d.c);
- The inventory of Ontario Heritage Trust easements (Ontario Heritage Trust, n.d.a);
- The Ontario Heritage Trust's *An Inventory of Provincial Plaques Across Ontario*: a PDF of Ontario Heritage Trust Plaques and their locations (Ontario Heritage Trust, 2023);
- Parks Canada's *Directory of Federal Heritage Designations*, an online database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses (Parks Canada, n.d.b);
- Parks Canada's *Historic Places* website, an online register that provides information on historic places recognized for their heritage value at all government levels (Parks Canada, n.d.a);
- Inventory of bridges included at *Historicbridges.com*; and

No previous consultant reports associated with potential above-ground cultural heritage resources and archaeological resources in the vicinity of the subject bridge in the Town of Saugeen Shores were available for review as part of this assessment.

A full list of references consulted can be found in Section 7.0 of this document.

4.1.2 Research and Report Limitations

No original design drawings of the subject bridge were available as part of this assessment, which presents a research limitation as the engineer responsible for designing the structure and the date of the design is unknown. A complete Ontario Structural Inspection Manual (O.S.I.M.) Inspection Report was also requested; however, no such reporting is on file with the Town of Saugeen Shores. Original design drawings, rehabilitation drawings, O.S.I.M. reports, archival photographs, contract tender documents, and any additional information on the subject bridge were requested by A.S.I. from GEI Consultants Canada at project commencement; however, none were available at the time of report submission (email communication 15 July 2024).

4.1.3 Site Visit

A site visit to the subject bridge was conducted on 17 July 2024 by John Sleath of A.S.I. The site visit included photographic documentation of the exterior of the structure from the McKechnie Sideroad right-of-way. Permission to Enter private property was not required for adjacent properties, as all work was conducted from the publicly-accessible right-of-way.

4.2 Discussion of Historical or Associative Value

Historically, the bridge was located between Lot 23, Concession 8 and Lot 24 Concession 7 in the former Township of Saugeen, County of Bruce. The municipality is now known as the Town of Saugeen Shores.

4.2.1 Summary of Early Indigenous History in Southern Ontario

Current archaeological evidence indicates humans were present in southern Ontario approximately 13,000 years before present (B.P.) (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 B.P., the

environment had progressively warmed (Edwards & Fritz, 1988) and populations now occupied less extensive territories (Ellis & Deller, 1990).

Between approximately 10,000-5,500 B.P., 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 B.P.; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest archaeological evidence for cemeteries dates to approximately 4,500-3,000 B.P. and is interpreted by archaeologists to be indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Brown, 1995, p. 13; Ellis et al., 1990, 2009).

Between 3,000-2,500 B.P., populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 B.P. and exchange and interaction networks broaden at this time (Spence et al., 1990, pp. 136, 138) and by approximately 2,000 B.P., evidence exists for small community camps, focusing on the seasonal harvesting of resources (Spence et al., 1990, pp. 155, 164). By 1,500 B.P. 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 B.P. - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch & Williamson, 2013, pp. 13–15). As is evident in detailed Anishinaabek ethnographies, winter was a period during which some families would depart from the larger group as it was easier to sustain smaller populations (Rogers, 1962). 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 B.P., lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (C.E.), larger settlement sites focused on horticulture begin to dominate the archaeological record. Seasonal dispersal of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson, 1990, p. 317). By 1300-1450 C.E., archaeological research focusing on these horticultural societies note that this episodic community dispersal was no longer practised and these populations now occupied sites throughout the year (Dodd et al., 1990, p. 343). By the mid-sixteenth century these small villages had coalesced into larger communities thought to house several thousand people (Birch et al., 2021). Through this process, the socio-political organization of these First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed. Other First Nation communities continued to practice residential mobility and to harvest available resources across landscapes they returned to seasonally/annually.

The Odawa are first described in the historical record 1615 when Samuel de Champlain encountered a group of Odawas at the mouth of the French River (Langton & Ganong, 1971, p. 44). The Odawa were an Algonquian Nation who occupied Bruce County, Grey County and Manitoulin Island. The Odawa subsisted primarily from fishing but also practiced horticulture and were extensively involved in trade. They were known to co-reside with Iroquoian populations (Thwaites, 1896, p. 125). The oral tradition from Nawash and Saugeen suggests that the ancestors of the Saugeen Ojibway Nation occupied the area as early as 7,500 years ago.

In Bruce County, archaeological evidence is indicative of some residential stability related to the practice of agriculture (e.g. Nodwell Site, Rankin 2000). The archaeological evidence of Huron-Wendat/Tionontate material culture on Odawa sites, the proximity of contemporary Huron-Wendat and Tionontate and Odawa sites to each other, and the historically documented alliance between the Odawa and the Neutral Nations are all indicative of cooperation between Algonquian and Iroquoian populations in Bruce and Grey Counties (Fox, 1990).

The region of Bruce and Grey Counties is not specifically addressed in the contemporary documentary sources; however, the later dispersal of the Haudenosaunee from the region in the late seventeenth century is confirmed by Ojibway oral tradition (Copway 1850:80 and 88).

By 1600 C.E., the Confederation of Nations were encountered by the first European explorers and missionaries in Simcoe County. By the 1640s, devastating epidemics and the traditional enmity between the Haudenosaunee[1] and the Attawandaron and the Huron-Wendat (and their Algonquian allies such as the Nippissing and Odawa) led to their dispersal from southern Ontario. Shortly afterwards, the Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario.

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 arrival of European trade goods in the sixteenth century, Europeans themselves in the seventeenth century, and increasing settlement efforts in the eighteenth century all significantly impacted traditional ways of life in Southern Ontario. Over time, war and disease contributed to death, dispersion, and displacement of many Indigenous peoples across the region. The Euro-Canadian population grew in both numbers and power through the eighteenth and nineteenth centuries and treaties between colonial administrators and First Nations representatives began to be negotiated. The subject bridge is in the boundaries of Treaty 45 ½ (the Saugeen Tract Purchase), signed in 1836.

[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 nations - 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.

The subject bridge is located in the traditional territory of the Saugeen Ojibway Nation (S.O.N.) the collective name for the Saugeen Ojibway First Nation and the Chippewas of Nawash Unceded First Nation, known as *Saukiing Anishnaabekiing*. *Saukiing Anishnaabekiing* includes the Saugeen Peninsula (or Bruce Peninsula), the waters and islands of Lake Huron and Georgian Bay surrounding the Saugeen Peninsula, and extends south to include the Maitland River watershed and east to include the Nottawasaga River watershed in part of Grey, Bruce, Huron, Perth, Wellington, Dufferin, and Simcoe Counties (Saugeen Ojibway Nation, 2011).

The subject crossing is within Treaty 45 ½ (Saugeen Tract Purchase) which was agreed upon on August 9, 1836 along with Treaty 45 (Treaty of Manitowaning/Manitoulin Island Treaty). The treaty covers land of the Saugeen Ojibway Nation's traditional territory. The treaty was signed by representatives of the Crown and Anishinaabek leaders in Manitowaning during an annual distribution of gifts for Indigenous peoples (Ministry of Indigenous Affairs, 2022). In exchange for the 1.5 million acres the Crown was to provide economic assistance in the form of housing and the means to cultivate land as well as protection from white settlers' encroachment onto their lands. The land covered by Treaty 45 ½ extends from the town of Arthur in the southeast to approximately the town of Kingsbridge on Lake Huron to the southwest, then north to Southampton in the northwest and across to the northwestern corner of the former Sydenham Township on Georgian Bay in the northeast (Ministry of Indigenous Affairs, 2020; *Treaty History | Saugeen Ojibway Nation Environment Office*, n.d.).

With the signing of the 1818 Lake Simcoe-Nottawasaga Treaty 18 and the 1836 "Saugeen Tract Agreement" Treaty 45 ½, Ojibway chiefs granted the Crown approximately 1.5 million acres of land south of the Peninsula in an effort to secure a land base on Manitoulin Island along the shores of Lake Huron and southern Georgian Bay (Crown-Indigenous Relations and Northern Affairs, 2016). In exchange for the land surrendered under Treaty 45 ½, the Crown promised to protect the Saugeen Peninsula forever (Saugeen Ojibway Nation, 2021b).

The Saugeen continued using their traditional territory for hunting, medicine gathering, sugaring camps and fish spawning. Euro-Canadian settlement continued to encroach upon the Peninsula and in 1847 Queen Victoria issued a Royal Declaration to support the rights of the Saugeen Ojibway Nation. The Declaration also established strict rules for the purchase and surrender of Indigenous lands in Canada and confirmed that the Bruce Peninsula belonged to the S.O.N. Additional acts were passed in 1850 and 1851 to protect lands from squatters and loggers, such as the 1851 Half Mile Strip Treaty 67 which surrendered over 4,000 acres for the Crown to build a road joining Owen Sound and Southampton (Saugeen Ojibway Nation, 2021a). These documents did little to stem the tide of Euro-Canadian settlement.

In 1994 a claim was submitted to the Crown arguing that the 1854 Treaty 72 was not valid as the Crown had not fulfilled its duty to the S.O.N. and Chippewas of Nawash Unceded First Nation to protect them from the effects of colonization and that they were misled by the Crown during negotiations for the treaty (Olthuis Kleer Townshend L.L.P., 2021). In 2003 the S.O.N. and the Chippewas of Nawash Unceded First nation subsequently filed a joint claim for Aboriginal Title to portions of Lake Huron and Georgian Bay (Olthuis Kleer Townshend L.L.P., 2021). The trial addressing these claims began in 2019 and a decision was reached in 2021 (Olthuis Kleer Townshend L.L.P., 2021). The court rejected S.O.N.'s Aboriginal Title claim but agreed that the Crown breached its honour by failing to uphold its promise to protect the Saugeen Peninsula forever.

4.2.2 Historical Euro-Canadian Township Survey and Settlement

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed existing transit routes established by Indigenous peoples 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 (A.S.I. 2006). Early European settlements occupied similar locations as Indigenous settlements as they were generally accessible by trail or water routes, and would have been in locations with good soil and suitable topography to ensure adequate drainage.

Throughout the period of initial European settlement, Indigenous groups continued to inhabit Southern Ontario, and continued to fish, gather, and hunt within their traditional and treaty territories, albeit often with legal and informal restrictions imposed by colonial authorities and settlers. In many cases, Indigenous peoples acted as guides and teachers, passing on their traditional knowledge to Euro-Canadian settlers, allowing them to sustain themselves in their new homes. Indigenous peoples entered into economic arrangements and partnerships, and often inter-married with settlers. However, pervasive and systemic oppression and marginalization of Indigenous peoples also characterized Euro-Canadian colonization, with thousands being displaced from their lands, denied access to traditional and treaty hunting, fishing, and collecting grounds, and forced to assimilate with Euro-Canadian culture through mandatory attendance at Day and Residential Schools (Ray, 2005; Rogers & Smith, 1994).

Township of Saugeen/Town of Saugeen Shores

Historically, the bridge was located between Lot 23, Concession 8 and Lot 24 Concession 7 in the former Township of Saugeen, County of Bruce. The municipality is now known as the Town of Saugeen Shores.

Saugeen Township was the second township incorporated in Bruce County in 1854 (Bruce County Museum & Cultural Centre, n.d.). It is also the smallest township. Beginning in 1852, Alexander Vidal surveyed Saugeen Township and divided it into farm and town lots (Robertson, 1988). The 1851 census reported approximately 200 people living in the township, most of which were Scottish and English born (Bruce County Museum & Cultural Centre, n.d.). The majority of early Euro-Canadian settlers arrived by way of the Saugeen River (Robertson, 1988), then after 1851, German settlers arrived from Waterloo County

(Robertson, 1988). Southampton was incorporated as a town in 1858. The Wellington Grey Bruce Railway line to Southampton opened in 1876, after which time trains played a large role in the settlement of the township with the transport of farm goods and local industry products.

The former municipalities of the Town of Port Elgin, Town of Southampton and Township of Saugeen, were amalgamated in 1998 to form the Corporation of the Town of Port Elgin-Saugeen-Southampton, with a later amendment naming it the Town of Saugeen Shores (Town of Saugeen Shores, 2018).

4.2.3 Saugeen River

The subject bridge is on Snake Creek, which is a small tributary on the drainage of the Lower Main Saugeen River (Saugeen Conservation, 2008). The overall Saugeen watershed encompasses an area of 4,675 square kilometres within the counties of Bruce, Dufferin, Grey, Huron and Wellington (Saugeen Conservation, 2023). The watercourse is the third largest river system in Southern Ontario, and stretches approximately 198 kilometres from its headwaters in the Dundalk Highlands to Southampton where it empties into Lake Huron (Saugeen Conservation, 2022).

Snake Creek joins with Burgoyne Creek approximately 3.5 kilometres downstream, which then drains into the main branch of the Saugeen River west of Port Elgin, approximately five kilometres downstream of the subject crossing. The creek is a meandering watercourse that flows in a general east-to-west orientation in the vicinity of the bridge.

4.2.4 Engineer/Constructor/Designer

The subject bridge was designed by an unknown individual who is assumed to have been an engineer with the former Township of Saugeen; however, this could not be verified at the time of report preparation. The subject bridge was constructed by an unknown contractor at an unconfirmed date, suspected to be circa 1920, based on a review of background information and historical mapping.

4.2.5 Early Ontario Bridges

Bridges were a necessity from the earliest days of road construction and were important to economic and social life, especially as mills were situated along the rivers. Crossing rivers by bridge was easier than fording. Settlements sprang up where the mills were serviced by bridges. Construction of railways in Ontario began in the 1850s which made it necessary to have reliable bridges able to withstand the weight of locomotives. In addition, good road bridges were required so farmers could transport their produce to local railway stations (Region of Waterloo: Planning, Housing, and Community Services, 2004). Most road bridge designs that evolved were based on principles derived from railroad construction.

In Ontario, the timber bridge dominated the landscape in rural areas from 1780 to 1880, and persisted into the early twentieth century (Cuming, 1983). Most nineteenth-century bridges in southern Ontario were built of timber. Short spans were beam structures, and longer spans employed simple trusses, such as King and Queen Post trusses. Stone and wrought iron materials were also employed, but due to higher costs and a lack of skilled craftsmen such structures were generally restricted to market towns (T.R.C.A., 2011).

By the 1890s, steel and concrete were becoming the materials of choice when constructing bridges given that both were less expensive and more durable than their wood and wrought iron predecessors (T.R.C.A., 2011). Steel truss structures were very common by 1900, as were steel girder bridges. After the First World War, the increase in personal vehicles meant that stronger bridges were necessary. The Pratt truss and the Warren truss dominated the early twentieth century and were typically used for spans up to 400 feet (Comp & Jackson, 1977). The use of concrete in bridge construction was introduced at the beginning of the twentieth century, and by the 1930s, it was challenging steel as the primary bridge construction material in Ontario. Today, concrete is the primary bridge building material on Ontario roads (T.R.C.A., 2011).

4.2.6 Truss Bridge Overview

As mentioned above, steel truss and steel girder structures were very common by 1900, and early truss bridges were commonly made from a series of straight steel bars. In general, most steel truss bridges were constructed at the turn of the twentieth century. After the First World War the increase in personal vehicles meant that stronger bridges were necessary. The Pratt truss and the Warren truss dominated the early twentieth-century and were typically used for spans up to 400 feet (Comp & Jackson, 1977).

A pony (half-through) truss bridge consists of a deck between the top of and bottom chords with no top lateral bracing. These bridges required less labour and material to erect than through trusses and were subsequently more cost effective. However, due to a lack of added stability, these bridges were suitable only for shorter spans. The pony truss became popular in the early twentieth century, though their popularity waned with the widespread adoption of concrete as a primary building material by the 1930s.

The Warren truss design has been widely used and adapted in North America, particularly in the twentieth century. The design was patented by James Warren and Theobald Willoughby Monsani in 1848 and consists of a “W” pattern of alternately placed members in tension and compression (Cleary, 2007, p. 243). The addition of a vertical member intersecting the horizontal members, as displayed on the Moore Bridge, was a common modification to the design. The Warren truss type became the design of choice for steel rail and road bridges in the mid-twentieth century, with Warren deck trusses common for multiple span structures (Cleary, 2007, p. 251).

4.2.7 Historical Chronology and Setting of the Subject Crossing

The following provides a brief overview of the historical chronology of the subject crossing. It is based on a variety of primary and secondary source materials, including maps and historical photographs.

The subject bridge was constructed circa 1920 based on bridge typology and a review of historical mapping; however, no documentation was available during report preparation to confirm this. It is assumed to be an original structure at the crossing.

The 1851 *Map of the Township of Saugeen* (Vidal, 1851) and the 1880 *Illustrated Historical Atlas of the County of Grey and Bruce* were reviewed to determine the historical setting of the subject bridge in the nineteenth century (Figure 4 and Figure 5). 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.

The nineteenth-century maps demonstrate the area in the vicinity of the subject bridge was sparsely populated and had a rural agricultural land use at the time. The 1851 map depicts the survey of the area into lots and concessions; however, no structures or property owners are noted (Figure 4). McKechnie Sideroad is depicted in its extant alignment south of Snake Creek, which then intersects with a roadway that follows the boundaries between Concessions 7 and 8 to the west and Range 1 West of Saugeen Road to the east. It is unclear if all the roads depicted in the 1851 map were constructed, as the 1880 *Illustrated Historical Atlas* depicts a different road configuration (Figure 5). The 1880 map depicts the portion of McKechnie Sideroad south of the creek in its extant alignment; however, it does not depict the portion of the road north of the subject bridge, suggesting that no bridge existed at the crossing at the time. The roadway that follows the concession divisions to the southeast of the subject crossing is depicted in a similar alignment as the 1851 map, which continues south to the intersection of modern-day The River Road. The 1880 map depicts the property southeast of the bridge under the ownership of W. Gowanlock, with a residence noted at the southwest corner in the location of the extant residence at The River Road. The property to the north and east of the crossing is owned by Jas. Sibbald, with a residence located northeast of the bridge

fronting on modern-day Bruce Road 3. The subject bridge is not depicted in these maps; however, Snake Creek is illustrated in its extant alignment.

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 1929, 1946, 1954, and 1993 (Figure 6 to Figure 9). 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. Generally, these maps demonstrate that the study area retained a rural agricultural context throughout the late nineteenth century and into the late twentieth century.

The 1929 topographical map demonstrates McKechnie Sideroad and Snake Creek in their extant alignment; however, no bridge is depicted (Figure 6). The roadway following concession lines from immediately east of the bridge that connects with The River Road that was previously depicted in nineteenth-century mapping is not included, suggesting it was an informal road or it had closed by this time. As the road alignments in the area are in the same configuration as encountered during field review, it is suspected that the subject bridge had been constructed by 1929 to facilitate crossing Snake Creek. However, no bridge is specifically depicted. The construction of the subject bridge is described in Section 4.2.8.

The 1946 topographic map is the first map in this series that illustrates a structure at the crossing; however, no information on the material of the structure is noted (Figure 7). A barn is illustrated on the west side McKechnie Sideroad south of the bridge, at which time it was owned by James Moore, who lived in a log house with his family on McKechnie Sideroad just north of the ‘creek bridge’, which is assumed to be the subject bridge (as relayed in a 1967 account of the Moore Place, Part of Lot 23 Concession 8 (Burgoyne Women’s Institute, 1967)). The 1954 aerial photograph (Figure 8) depicts the crossing in a similar context as the 1946 topographical map and in a similar context to what was observed during field review, with the road and creek in the extant alignment and bound by wooded areas in the creek valley. The 1993 map

depicts McKechnie Sideroad, Snake Creek, and the subject bridge; however, the barn to the south has been removed (Figure 9). No bridge construction material is depicted in this map.



Figure 4: The location of the subject bridge overlaid on the 1851 *Map of the Township of Saugeen.* (Vidal, 1851)

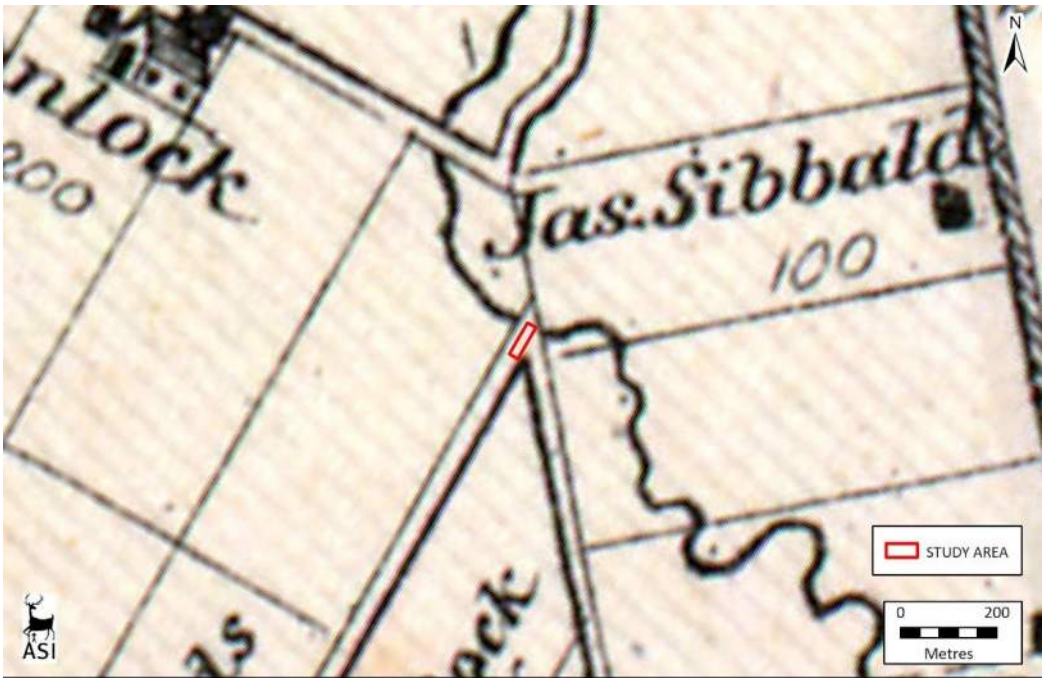


Figure 5: The location of the subject bridge overlaid on the 1880 *Illustrated Historical Atlas of the County of Grey and Bruce.* (Belden, 1880)



Figure 6: The location of the subject bridge overlaid on the 1929 topographical map (Department of National Defence, 1929)

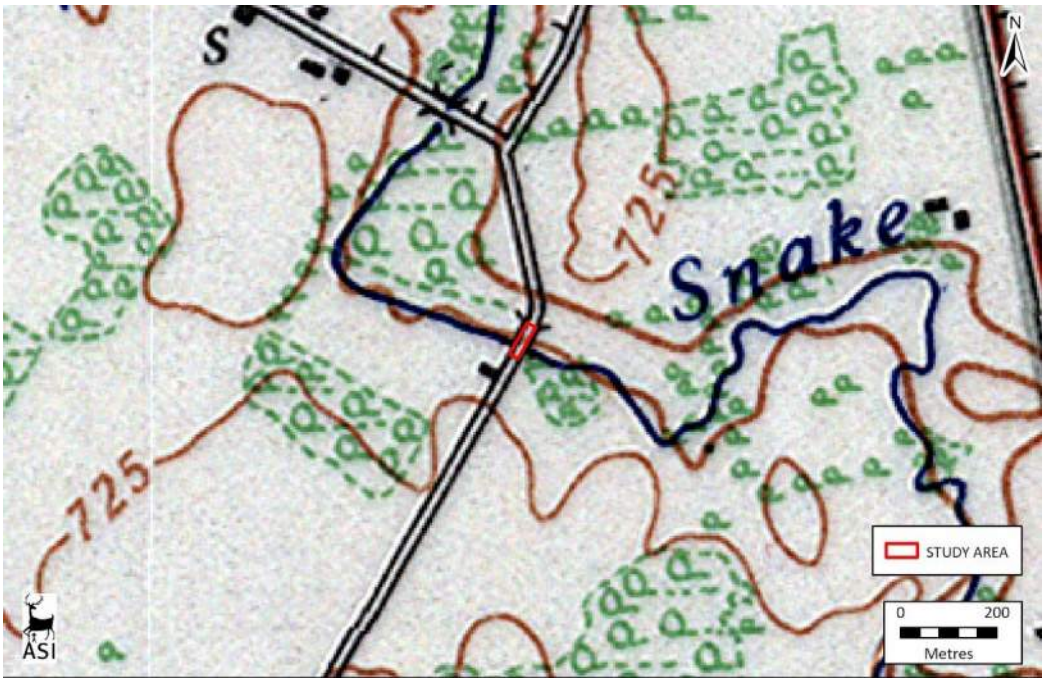


Figure 7: The location of the subject bridge overlaid on the 1946 topographical map (Department of National Defence, 1946)



Figure 8: The location of the subject bridge overlaid on a 1954 aerial photograph. (Hunting Survey Corporation Limited, 1954)

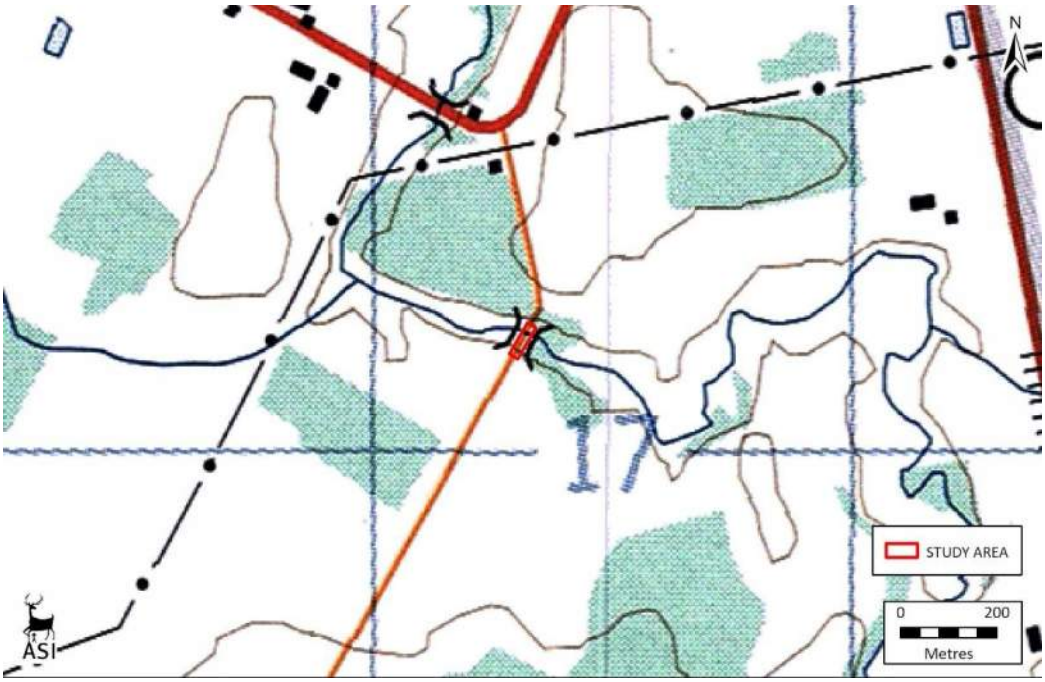


Figure 9: The location of the subject bridge overlaid on the 1993 topographic map of Chesley. (Department of Energy, Mines and Resources Canada, 1993)

4.2.8 Bridge Construction, Evolution, and Alterations

To construct the bridge, the cast-in-place concrete abutments would have been poured within a wooden formwork around reinforcing steel. Based on the formwork impressions on the abutments observed during field review, it appears that wooden boards were used for the face of the formwork.

Once the abutments were constructed, the subject bridge could be assembled at the crossing. While it could not be confirmed at the time of report preparation, each truss is assumed to have been assembled off-site by the company that manufactured the bridge, and then transported to site for final assembly at the crossing. As the bridge is a short span (approximately 25 metres), transporting each truss pre-assembled is considered to be feasible. Further, given that the connections are riveted, completing truss assembly with rivets in an off-site workshop would have been more efficient in terms of time and effort, and produce connections with greater strength, than completing the entire assembly at the crossing. Prefabricated truss bridges like this could be

easily designed and constructed to specific sizes based on the lengths required, with many prominent manufactures such as the Hamilton Bridge Company and Dominion Bridge Company able to produce structures for municipal roads and railways (Cleary, 2007; Workers' City, 2015).

Steel flexbeam guardrails were added to the inside face of the truss members at an unknown date. Apart from this modification, the subject bridge is not known to have undergone any upgrades, structural repairs, or rehabilitations.

4.3 Discussion of Physical and Design Value

Results of background research into pony truss bridges in general and outputs of the site visit were reviewed as part of this assessment to evaluate and describe the physical and design value of the subject bridge. No original structural drawings, rehabilitation drawings, or Ontario Structure Inspection Manual (O.S.I.M.) report of the subject bridge were available for review. The only detailed engineering reporting available to review was a Bridge Assessment Report (B.M. Ross & Associates Limited, 2013). The field review was undertaken to conduct photographic documentation of the bridge crossing and to collect data relevant for completing a heritage evaluation of the structure. The following description of the structure and existing conditions is based on a combination of the results of the field review and historical background research on the subject crossing. Photographic documentation of the current conditions of the bridge is provided in Figure 10 to Figure 22. Further, photographs of comparative pony truss bridges in Bruce County are also provided in Section 4.5.1.

4.3.1 Physical Characteristics

The Moore Bridge is a single-span, five panel Warren pony truss bridge with riveted connections resting on cast-in-place concrete abutments. The structure was built to carry one lane of McKechnie Sideroad over Snake Creek, and has a length of approximately 25 metres and a width of approximately 4.5 metres.

The superstructure of the subject bridge is a riveted Warren pony truss, which includes a top and bottom chord supported by a series of vertical and diagonal members to distribute the weight of the structure and the live loading of vehicles to the abutments. Verticals in the truss are riveted steel lattice, while diagonals are composed of two steel L-beams riveted together. Gusset plates attach the verticals and diagonals to the top and bottom chords with rivets. Transverse steel I-beams are located beneath the deck, and connect the bottom chords of each truss. Steel I-beam stringers oriented parallel to the trusses rest on these beams, which support the cast-in-place concrete deck. Views of the bridge soffit were not available during field review (17 July 2024) due to overgrown vegetation, and high water levels in the creek; however, a review of photographs of the bridge on *historicbridges.org* appear to depict wooden boards overlaying the stringers[2]. Steel cross bracing is located on the underside of the superstructure.

The substructure of the subject bridge is cast-in-place reinforced concrete with wingwalls angled relative to the watercourse. The abutments and wingwalls are backfilled with earth at the bridge approaches. The water in the creek was touching the wingwalls at the time of field review.

The deck of the subject bridge is cast-in-place concrete with integrated concrete curbs. The deck features steel pipe drains that divert rainwater directly to the creek below. Steel flexbeam guardrails are on the truss interior to protect against damage from vehicles, and a round steel tube railing, potentially a pedestrian barrier, is located above that. The bridge was designed to carry one lane of agricultural and vehicular traffic over the creek, but it has been closed to traffic since 2012 and large concrete barriers located on the north and south portal prevent access. A 10 tonne load limit sign in on the southwest portal, and bridge closure signs and hazard signs are on the approaches.

Snake Creek drains from east to west under the subject bridge, and features a wide floodplain west of the crossing. The creek floodplain is in predominantly

[2] See Photos: McKechnie Sideroad Bridge

tall grass, but larger established trees are also located to the north of the river. McKechnie Sideroad is a single-lane gravel road that connects to The River Road in the south and to Concession Road 8 East in the north. The road follows the surveyed lot lines, and as a result, features a northwest-southeast alignment south of the river and a north-south alignment immediately north of the bridge. The road was not maintained over winter prior to its closure in 2012, and since that time, is not believed to have undergone any maintenance. The roadway is primarily used as an access road for farm equipment to reach the adjacent agricultural fields. The bridge is in a rural agricultural landscape, with active agricultural fields to the southeast, southwest, and northeast of the crossing.

4.3.2 Existing Conditions Photographs



Figure 10: West elevation of Moore Bridge, looking southeast (A.S.I., 2024)



Figure 11: Oblique view of the west elevation, looking south (A.S.I., 2024)



Figure 12: East elevation, looking northwest (A.S.I., 2024)



Figure 13: North abutment, looking north from the bank southwest of the bridge (A.S.I., 2024)



Figure 14: South abutment, looking south (A.S.I., 2024)



Figure 15: Angled wingwall on the northwest quadrant, looking southeast. Note the wooden board formwork impressions in the concrete (A.S.I., 2024)



Figure 16: Bridge deck, looking north from the south portal (A.S.I., 2024)



Figure 17: Bridge deck, looking south from the north portal (A.S.I., 2024)



Figure 18: Interior of west truss, looking northwest. Note the flexbeam guardrail and pipe railing (A.S.I., 2024)



Figure 19: Interior of east truss, looking southeast (A.S.I., 2024)



Figure 20: Detailed of riveted connection on west truss at the south portal, looking northwest (A.S.I., 2024)



Figure 21: Bridge closure sign and concrete barrier at south approach, looking north (A.S.I., 2024)



Figure 22: Bridge closure sign and concrete barrier at north approach, looking south (A.S.I., 2024)

4.4 Discussion of Contextual Value

The following section discusses the contextual value of the subject bridge.

4.4.1 Setting and Character of the Bridge and Surroundings

The subject bridge was built to carry McKechnie Sideroad in a northeast-southwest orientation over Snake Creek a rural agricultural setting in the former Township of Saugeen. The bridge was closed to traffic in 2012. The surrounding area generally consists of agricultural lands to the south and northeast, and a wooded area to the northwest. Snake Creek features a wide floodplain with tall grass at the crossing, which is bound by established trees on the north bank (Figure 23 to Figure 26).

The subject bridge has supported vehicular and farm equipment traffic on McKechnie Sideroad in the rural agricultural setting since its construction in the early twentieth century. The subject bridge is believed to have been the first bridge constructed at this crossing since the establishment of McKechnie Sideroad in the mid nineteenth century. While an original structure at the crossing, the subject bridge was not constructed during the initial development of the agricultural context in the nineteenth century, and does not have strong historical links to the nineteenth century context. As the subject bridge had only been seasonally maintained and not accessible during the winter months, it is not believed to have carried a significant traffic volume, was not an important crossing to local motorists, and did not have a significant or prominent visual link to its surroundings.

The subject bridge supports the rural agricultural character of the surroundings as an original structure at this crossing. However, as the agricultural context has not changed in the five years since the bridge's closure to agricultural equipment, this bridge is not a crucial crossing point of the creek and therefore does not strongly support this context.



Figure 23: Snake Creek, looking west from the subject bridge. Note the wide floodplain with tall grass, and established trees to the right (A.S.I., 2024)



Figure 24: One Lane sign on McKechnie Sideroad north of the subject bridge in a wooded area, looking southeast (A.S.I., 2024)



Figure 25: McKechnie Sideroad, looking north from the north approach. Note the active agricultural fields on both sides of the roadway (A.S.I., 2024)



Figure 26: Bridge closure sign at the intersection with Concession Road 8 East, looking south down McKechnie Sideroad towards the subject bridge (A.S.I., 2024)

4.4.2 Community Landmark

The subject bridge is located on a single lane roadway and was closed to traffic in 2012. Prior to closure, McKechnie Sideroad was a seasonal road with no winter maintenance, indicating that it had low traffic volume and would not have been used as a major throughfare in the area. Since bridge closure in 2012, the roadway to the north and south of the crossing has continued to be used as an agricultural road for farmers to access their adjacent fields. The bridge is not visible from nearby roadways due to topography and tree cover, and as such, the bridge has very low visibility in the landscape. The subject bridge is not considered to be a significant community landmark.

4.5 Comparative Analysis

The Moore Bridge is a single span Warren pony truss bridge that measures approximately 25 metres in length and 4.5 metres in width that was constructed circa 1920. For the purposes of this comparative analysis, the Town of Saugeen Shores Bridge Inventory (GM BluePlan Engineering Ltd., 2022b), M.T.O. Bridge Inventory (West Region)(Ministry of Transportation, 2017), and the inventory on *Historicbridges.org* were reviewed for information on similar pony truss bridges in the local area. According to this comparative sample, there are 16 half-through truss structures in Bruce County, including the subject bridge, and two additional structures in the M.T.O. West Region. Information on the construction dates and lengths of the bridges is incomplete, which limits the effectiveness of this analysis. A list of bridges used in this comparative analysis is provided in Appendix C.

4.5.1 Comparable Pony Truss Structures

Of the 18 comparative pony truss structures reviewed as part of this analysis, with only seven included information on construction dates. These dates range from 1912 (Snake Creek Private Bridge, Figure 27), to 1963 (Ausable River Bridge, Figure 28). The subject bridge, with a presumed construction date of circa 1920, is the second oldest structure where dates are noted; however, it is one of ten similarly sized Warren pony truss bridges with riveted connections,

suggesting these structures were also built in generally the same time period. As these ten comparative bridges are inferred to be constructed in the same approximate period, the subject bridge is not considered to be significant in terms of date of construction. The Snake Creek Private Bridge, constructed in 1912, is the oldest riveted Warren pony truss bridge in this comparative analysis (Figure 27).

Only six comparative structures in this analysis have information on lengths, which range from approximately 25 metres to 62 metres. While the subject bridge is the shortest example with length included at 25 metres in length with five panels, it is one of 12 Warren pony truss bridges with between four and six panels, suggesting they are of similar lengths. Therefore, the subject bridge is not significant in terms of length. The Ausable River Bridge, with a length of 62 metres over three spans is the longest in this comparative analysis and the only structure that is greater than one span (Figure 28).

Examples of rivet connected Warren pony truss bridges of similar scale to the subject bridge on Snake Creek in Bruce County are available in the inventories of *Historicbridges.org*. Some examples of similar structures on Snake Creek in this comparative analysis include the following:

- B Line Bridge, a single-span four panel rivet connected Warren pony truss that carries B Line over Snake Creek in the Township of Arran-Elderslie in Bruce County. The bridge length and date of construction are unknown (Figure 29).
- Snake Creek Private Drive Bridge, a single-span five panel rivet connected Warren pony truss that carries a private drive over Snake Creek in the Township of Arran-Elderslie in Bruce County. The bridge was constructed in 1912 and its length is unknown (Figure 27).
- Young's Bridge North and South, nearly identical single-span five panel rivet connected Warren pony truss bridges that carry Sideroad 15 over Snake Creek in the Township of Arran-Elderslie in Bruce County. The bridges were constructed in 1939 (Figure 30).

Pony truss bridges in general were common structures on municipal roadways as their sizes could be scaled with relative ease to fit a given crossing length. In this respect, pony truss bridges were economical to design, construct, and install at a crossing, and are considered to be common early-mid twentieth century features in rural agricultural settings.



Figure 27: Snake Creek Private Drive Bridge (Holth, 2024b)



Figure 28: Ausable River Bridge (Google Streetview)



Figure 29: B Line Bridge over Snake Creek (Holth, 2024a)



Figure 30: Young's Bridge North (Holth, 2024c)

4.5.2 Summary

Based on the inventory of comparable bridges above, the subject bridge is one of 18 comparative pony truss structures in this sample. While the construction dates of many of the structures is unknown, they are all assumed to have been constructed in the early-mid twentieth century. Further, not all of the structures have dimensions documented, and as such, the relative size of structures is in some cases inferred based on photographic evidence, but they are generally single span structures.

The subject bridge, assumed to have been constructed circa 1920, is not believed to be significant in terms of age of construction, as there are many comparable examples of rivet-connected pony truss bridges with similarly unconfirmed construction dates. These comparative structures are all believed to be early-mid twentieth century constructions, during which time riveted pony truss bridges were commonly employed on rural roadways due to their ease of design and construction and their proven durability.

The subject bridge is not significant in the local context in terms of overall length, or number of spans. The subject bridge is the shortest known example in the comparative sample with a length of 25 metres over five panels. It is one of 12 Warren pony truss bridges with between four and six panels, suggesting they are of similar lengths.

The subject bridge is not a good representation of a Warren pony truss design type as there are other more notable examples that are older, have greater lengths, and are in better structural condition within the comparative sample. The subject bridge is not notable in terms of the overall length, number of spans, or number of panels in the local context.

5.0 Heritage Evaluation

The evaluation of Moore Bridge using the criteria set out in Ontario Regulation 9/06 is presented in the following section (Section 5.1). The following evaluation has been prepared in consideration of data regarding the design, historical/associative, and contextual values in the County of Bruce and Town of Saugeen Shores.

5.1 Ontario Regulation 9/06

Evaluation of the Moore Bridge using Ontario Regulation 9/06 of the *Ontario Heritage Act.*

The property has design value or physical value because it:

1. is a rare, unique, representative or early example of a style, type, expression, material or construction method:
    - Moore Bridge is a single-span riveted steel Warren pony truss bridge with an approximate length of 25 metres that was constructed circa 1920s to carry one lane of predominantly rural and agricultural McKechnie Sideroad traffic over Snake Creek. The comparative analysis demonstrates that the subject bridge is not significant in terms of length, number of spans, or age of construction, as there are

many examples of similar structures in the local context. It is not an early example of this bridge type, nor is it rare or unique as there are numerous examples of similar bridges crossing Snake Creek in Bruce County. Finally, the bridge is not a good representative example of this structure type in the local context as there are other similar bridges with an earlier construction date, greater overall length, and in better structural condition.

- The subject bridge does not meet this criterion.

2. displays a high degree of craftsmanship or artistic merit:
   - The subject bridge is constructed using common steel elements assembled with shop riveting in an off-site location prior to being moved in pieces to the subject crossing. The subject bridge is does not exhibit any construction techniques or artistic embellishments that are considered to be greater than industry standard at the time.
   - The subject bridge does not meet this criterion.

3. demonstrates a high degree of technical or scientific achievement:
   - The subject bridge is a common example of a Warren pony truss bridge over a short-span crossing, and is not believed to have required a high degree of technical or scientific achievement to design or build.
   - The subject bridge does not meet this criterion.

The property has historical value or associative value because it:

4. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community:
   - The subject bridge was constructed at an unknown date, presumably circa 1920, to support the established agricultural context of the area. As the subject bridge is one of many small crossings over Snake Creek and other tributaries of the Saugeen River in the area, and it was designed and constructed by unknown individuals, it is not believed to have any strong or overt connections to any theme, event, belief, person, activity, or organization within the community.

- The subject bridge does not meet this criterion.

5. yields, or has the potential to yield, information that contributes to an understanding of a community or culture:
   - As the subject bridge is a common example of a common twentieth century bridge type designed and built by unknown individuals at an unconfirmed date, it is not believed to have potential to yield additional information of the local community.
   - The subject bridge does not meet this criterion.

6. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community:
   - The subject bridge was designed by an unknown engineer, presumably with the engineering department of the former Township of Saugeen Shores. It was built by an unknown constructor at an unconfirmed date.
   - The subject bridge does not meet this criterion.

The property has contextual value because it:

7. is important in defining, maintaining or supporting the character of an area:
   - The subject bridge was constructed at an unknown date, presumably circa 1920, to support the established agricultural context of the area. As the early-mid twentieth century subject bridge was built in an agricultural landscape that was established in the mid and late nineteenth century, the subject bridge is not evocative of the early settlement or development of this agricultural context. The circa 1920 bridge is one of many similar structures over the many river and creek crossings in the local context, and it does not strongly or overtly define, maintain, or support the mid-late nineteenth century rural agricultural context.
   - The subject bridge does not meet this criterion.

8. is physically, functionally, visually or historically linked to its surroundings:
    - The subject bridge is believed to be the first structure at the subject crossing, and has been at the location for approximately 100 years. However, the bridge was closed to traffic in 2012, and as such, the functional and physical connection of the structure to the agricultural landscape was severed as agricultural equipment had to use other roadways to cross the creek. As the agricultural context has not changed in the five years since the bridge's closure to agricultural equipment, this bridge is not a crucial crossing point of the creek and therefore does not strongly support this context. Further, as the subject bridge had only been seasonally maintained and not accessible during the winter months, it is not believed to have carried a significant traffic volume, was not an important crossing to local motorists, and did not have a significant or prominent visual link to its surroundings. Finally, as the subject bridge was not constructed during the initial development of the agricultural context in the nineteenth century, it does not have strong historical links to the nineteenth century context.
    - The subject bridge does not meet this criterion.

9. is a landmark:
    - Prior to its closure in 2012, the subject bridge was a seasonally-accessible structure that primarily served as a crossing and access point for farmers and light equipment to their fields immediately adjacent to the crossing. It is not visible from any roadways other than McKechnie Sideroad, which has low traffic volumes and is effectively a farm access path. As the subject bridge has low visibility, is on a minor roadway, is not a gateway feature, and does not act as a political boundary, it is not considered to be a local landmark.
    - The subject bridge does not meet this criterion.

Based on available information, it has been determined that the Moore Bridge does not meet any of the criteria contained in Ontario Regulation 9/06 of the *Ontario Heritage Act*.

6.0 Conclusions and Recommendations

This evaluation was prepared in consideration of data regarding the design, historical/associative, and contextual values within the Town of Saugeen Shores. This evaluation determined that the Moore Bridge does not meet the criteria outlined in Ontario Regulation 9/06 of the *Ontario Heritage Act*, and therefore does not have cultural heritage value or interest at the local level. As the subject bridge does not have cultural heritage value or interest, no Statement of Cultural Heritage Value or Interest is included herein.

The following recommendations are proposed:

1. The proponent should submit this report for review and comment to planning staff at the Town of Saugeen Shores, Bruce County Historical Society, the Ministry of Citizenship and Multiculturalism, and to any other relevant stakeholder that has an interest in the heritage of the subject bridge. Any feedback will be incorporated into this report prior to finalization. The final report should be submitted to the local history holdings of the Bruce County Public Library for archival purposes.

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Appendix A: Criteria for Evaluating Potential for Cultural Heritage Resources Checklist

Municipal Bridges
Criteria for Evaluating Potential for Cultural Heritage Resources
(revised July 7, 2023)

This checklist was prepared by the Municipal Engineers Association in consultation with the Ministry of Citizenship and Multiculturalism (MCM) to assist with undertaking cultural heritage due diligence as per the requirements of the Municipal Class Environmental Assessment.

Project Name: Moore Bridge (SS-09) Removal/Replacement Municipal Class Environmental Assessment
Location: McKechnie Sideroad over Snake Creek

Municipality: Town of Saugeen Shores

Project Engineer: GEI Consultants

Checklist completed by: John Sleath, Cultural Heritage Specialist, Archaeological Services Inc.

Date: 4 September 2024

NOTE: Complete all sections of Checklist. Both Built Heritage Resources/Cultural Heritage Landscapes (B) and Archaeological (C) Sections must be satisfied before proceeding.

Questions apply to the entire study area including temporary storage or work areas as well as temporary roads/detours, except as otherwise stated.

Please have the following available, when requesting information related to the screening questions below:
• a clear map showing the location and boundary of the property or project area
• large scale and small scale showing nearby township names for context purposes
• the municipal addresses of all properties within the project area
• the lot(s), concession(s), and parcel number(s) of all properties within a project area
Answer each question in succession and follow the instructions in blue. Continue until all questions are answered or a definitive conclusion is reached.

Refer to the Appendix for additional details and resources to assist in answering select questions.

Font Colour
Green – MEA's Advice
Blue - Instructions

PART B – SCREENING FOR BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person to undertake technical cultural heritage studies as identified at the end of Part B.

Screening Questions	**Response**	
Part B1: Screening for Recognized Cultural Heritage Value or Interest		
1. Is the proposed undertaking consistent with an approved conservation plan, if one exists?	Yes ☐	No ☒
If you answered **YES**, then it is not necessary to complete the remaining questions in the checklist. The proponent will include this information in the project file and follow the recommendations of the conservation plan during project planning and implementation.		
If you answered **NO**, continue to question 2.		
2. Has the bridge and the study area been evaluated before and found not be of cultural heritage value or interest (CHVI)?	Yes ☐	No ☒
If you answered **YES**, it is not necessary to complete the remaining questions in the Part B. The proponent will summarize the previous evaluation and add this checklist to the project file, with appropriate documentation demonstrating that a cultural heritage evaluation was undertaken. Proceed to Part C: Screening for Archaeological Resources.		
If you answered **NO**, continue to question 3.		
3. Is the bridge, or a parcel of land in the study area:		
a. designated under the *Ontario Heritage Act*?	Yes ☐	No ☒
b. subject to an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act?*	Yes ☐	No ☒
c. included on a register or inventory of heritage properties maintained by the municipality?	Yes ☐	No ☒
d. subject to a notice of • intention to designate (under Part IV of the *Ontario Heritage Act)*? • a Heritage Conservation District study area by-law (under Part V of the *Ontario Heritage Act*)?	Yes ☐	No ☒

e. included in MCM's list of provincial heritage properties?	Yes ☐	No ☒
f. designated under the *Heritage Railway Stations Protection Act*?	Yes ☐	No ☒
g. designated under the *Heritage Lighthouse Protection Act*?	Yes ☐	No ☒
h. identified as a Federal Heritage Building by Federal Heritage Buildings Review Office?	Yes ☐	No ☒
i. a National Historic Site or part of one?	Yes ☐	No ☒
j. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	Yes ☐	No ☒
If you answered **YES** to any of the questions 3a through 3h, a Heritage Impact Assessment is necessary. Proceed to Part C.		
If you answered **YES** to either of questions 3i or 3j, follow the direction in the conservation and management documents for the National Historic Site or UNESCO World Heritage Site. Proceed to Part C.		
If you answered **NO** to all of the above questions, continue to Part B2		

Part B2: Screening for potential Cultural Heritage Value or Interest		
4. Will the proposed project involve a bridge structure that was: a) constructed less than 40 years ago?	Yes ☐	No ☒
b) constructed after 1956 with a plain concrete substructure, and the superstructure construction is with common steel and/or concrete products involving one of the following four bridge types? - Rigid Frame - Precast Girders with Concrete Deck - Culvert or Simple Span - Steel Girders/Concrete Deck	Yes ☐	No ☒
If you answered **YES** to 4 (a) or (b), continue this Part.		
If you answered **NO** to both 4 (a) and (b), the bridge has potential CHVI. Proceed to Part B3 to screen for potential impacts.		
5. Will the project involve replacement of a bridge's substructure, or any alteration of adjacent lands?	Yes ☐	No ☐
If you answered **YES**, continue this Part to screen for potential CHVI of the property/location.		
If you answered **NO**, proceed to Part C.		

6. Is the bridge or project area described by an on-site municipal, provincial or federal commemorative or interpretive plaque?	Yes ☐	No ☐
7. Does the project area contain a parcel of land that has or is adjacent to a known burial site or cemetery?	Yes ☐	No ☐
8. Does the proposed project involve a crossing of a Canadian Heritage River?	Yes ☐	No ☐
9. Is there local or Indigenous knowledge or accessible documentation suggesting that the property (or project area) is situated on a parcel of land that:		
a. Is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area? (For example: buildings or landscape features accessible to the public or readily noticeable and widely known, complexes of buildings, monuments, ruins)	Yes ☐	No ☐
b. Has a special association with a community, person or historical event? (For example: Indigenous sacred site, traditional-use area, battlefield, birthplace of an individual of importance to the community, etc.)	Yes ☐	No ☐
c. Contains or is part of a cultural heritage landscape (for example, an Indigenous trail, historic road or rail corridor, park, designed garden, unique landform, or any other area in which multiple features are valued together for their interrelationship, meaning or association)?	Yes ☐	No ☐
If you answered **YES** to one or more of questions 6, 7, 8 or 9, there is potential for built heritage resources and/or cultural heritage landscapes in the study area. Continue to Part B3 to screen for potential impacts.		
If you answered **NO**, there is a low potential for built heritage resources and/or cultural heritage landscapes to be impacted. Proceed to Part C.		

B3 Screening for potential Cultural Heritage Impacts to the Bridge Structure		
10. a) Will the proposed project leave the substructure of the bridge unchanged?	Yes ☐	No ☒
b) Is the substructure of the bridge constructed with plain concrete with no untypical elements?	Yes ☒	No ☐
If you answered **YES** to either 10 (a) or (b), proceed to question 11.		
If you answered **NO** to both 10 (a) and (b), there is potential for cultural heritage impacts on the bridge structure. You need to hire a qualified person(s) to undertake a CHER for the existing bridge area. Continue to Part C.		
11. a) Is the superstructure of the bridge constructed with common steel and/or concrete products involving one of the following four bridge types? - Rigid Frame - Precast with Concrete Deck - Culvert or Simple Span - Steel Girders/Concrete Deck	Yes ☐	No ☒
b) Will the finished product replicate the existing superstructure?	Yes ☐	No ☒
If you answered **YES** to **both** 11 (a) and (b), continue to 12.		
If you answered **NO** to **either** 11 (a) or (b), there is potential for cultural heritage impacts on the bridge structure. You need to hire a qualified person(s) to undertake a CHER for the existing bridge area. Proceed to Part C.		
12. a) Is work proposed on the parapet walls/railings of the bridge?	Yes ☐	No ☐
b) If YES to (a), are the parapet walls/railings contain materials other than plain concrete and steel, or any untypical elements?	Yes ☐	No ☐
If you answered **YES** to both 12 (a) and (b), continue to question 12 (c).		
If you answered **NO** to either 12 (a) or (b), there is low potential for cultural heritage impacts on the bridge structure. Proceed to Part C.		
c) Is the purpose of the work being done on the parapet walls/railings to upgrade them to meet current crash test standards?	Yes ☐	No ☐
If you answered **YES**, proceed with reconstructing the parapet walls/railings to a **sympathetic design**; see guidance in the Appendix. Hire a qualified person(s) to undertake a CHER if this is not practicable. Proceed to Part C.		
If you answered **NO**, there is potential for cultural heritage impacts on the bridge structure. You need to hire a qualified person(s) to undertake a CHER for the existing bridge area. Continue to Part C: Screening for Archaeological Resources.		

Appendix B: Qualified Persons Involved in the Project

Lindsay Graves, M.A., C.A.H.P.
Senior Cultural Heritage Specialist, Assistant Manager - Cultural Heritage Division

The Senior Project Manager for this Cultural Heritage Evaluation Report is **Lindsay Graves** (M.A., Heritage Conservation), Senior Cultural Heritage Specialist and Assistant Manager for the Cultural Heritage Division. She was responsible for: overall project scoping and approach; development and confirmation of technical findings and study recommendations; application of relevant standards, guidelines and regulations; and implementation of quality control procedures. Lindsay is academically trained in the fields of heritage conservation, cultural anthropology, archaeology, and collections management and has over 15 years of experience in the field of cultural heritage resource management. This work has focused on the assessment, evaluation, and protection of above ground cultural heritage resources. Lindsay has extensive experience undertaking archival research, heritage survey work, heritage evaluation and heritage impact assessment. She has also contributed to cultural heritage landscape studies and heritage conservation plans, led heritage commemoration and interpretive programs, and worked collaboratively with multidisciplinary teams to sensitively plan interventions at historic sites/places. In addition, she is a leader in the completion of heritage studies required to fulfill Class Environmental Assessment processes and has served as Project Manager for over 100 heritage assessments during her time at Archaeological Services Incorporated (A.S.I.). Lindsay is a member of the Canadian Association of Heritage Professionals.

John Sleath, M.A.
Cultural Heritage Specialist, Project Manager - Cultural Heritage Division

The Project Manager for this Cultural Heritage Evaluation Report is **John Sleath** (M.A.), who is a Cultural Heritage Specialist and Project Manager within the

Cultural Heritage Division with A.S.I. He was responsible for the day-to-day management activities, including scoping of research activities and site surveys and drafting of study findings and recommendations. John has worked in a variety of contexts within the field of cultural heritage resource management for the past 15 years, as an archaeologist and as a cultural heritage professional. An exposure to both land-based and underwater archaeology and above ground cultural heritage assessments has provided John with a holistic understanding of heritage in a variety of contexts. In 2015 John began working in the Cultural Heritage Division researching and preparing a multitude of cultural heritage assessment reports and for which he was responsible for a variety of tasks including: completing archival research, investigating built heritage and cultural heritage landscapes, report preparation, historical map regression, and municipal consultation. Since 2018 John has been a project manager responsible for a variety of tasks required for successful project completion. This work has allowed John to engage with stakeholders from the public and private sector, as well as representatives from local municipal planning departments, government agencies, museums, and Indigenous communities. John has conducted hundreds of cultural heritage assessments across Ontario, with a focus on transit and rail corridor infrastructure including bridges and culverts.

Appendix C: Inventory of Comparative Bridges

Table 1: Inventory of Comparative Bridges on Historicbridges.org

Bridge	Location	Type	Length	Date
Arranvale Bridge	Mill Road Over Sauble River in Arranvale (Arran-Elderslie): Bruce County, Ontario, Canada	Metal 6 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	
B Line Bridge	B Line Over Snake Creek in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 4 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	
Bannerman Bridge	Concession Road 14 Over Teeswater River in South Bruce: Bruce County, Ontario, Canada	Metal 6 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	Built 1939 By: Ontario Bridge Company of Toronto, Ontario
Bruce-Saugeen Townline Bridge	Bruce-Saugeen Townline (CR-11) Over Mill Creek in Saugeen Shores: Bruce County, Ontario, Canada	Metal 6 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	
Chesley Bridge	Chesley Heritage Trail Over North Saugeen River in Chesley (Arran-Elderslie): Bruce County, Ontario, Canada	Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	

Dudgeon Bridge	Greenock-Brant Road Over Teeswater River in Brockton: Bruce County, Ontario, Canada	Metal Rivet-Connected Lattice (Quadruple Warren) Pony Truss, Fixed and Approach Spans: Concrete Slab, Fixed	49 metres	Built By: Hugh Watt and Thomas French Pearse
McKechnie Sideroad Bridge	**McKechnie Sideroad Over Snake Creek in Saugeen Shores: Bruce County, Ontario, Canada**	**Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed**	**1 Span**	
McPherson Bridge	Concession Road 8 Over Teeswater River in South Bruce: Bruce County, Ontario, Canada	Metal Rivet-Connected Lattice (Quadruple Warren) Pony Truss, Fixed	34 metres.	
Sideroad 25 Bridge	Sideroad 25 Over North Saugeen River in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	Built By: Dickson Bridge Works Company of Campbellford, Ontario
Sideroad 5 Bridge	Sideroad 5 Over North Saugeen River in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 7 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	
Snake Creek Private Bridge	Private Drive Over Snake Creek in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	Built 1912 By: Corbet Foundry and Machine Company of

				Owen Sound, Ontario
South Pine River Private Bridge	Private Driveway Over South Pine River in Huron-Kinloss: Bruce County, Ontario, Canada	Metal 4 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	
Walkers Bridge	Allenford Road Over Sauble River in South Bruce Penninsula: Bruce County, Ontario, Canada	Metal 6 Panel Rivet-Connected Warren Pony Truss, Fixed	29 metres	
Youngs Bridge North	Sideroad 15 Over Snake Creek in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	Built 1939 By: Ontario Bridge Company of Toronto, Ontario
Youngs Bridge South	Sideroad 15 Over Snake Creek in Arran-Elderslie: Bruce County, Ontario, Canada	Metal 5 Panel Rivet-Connected Warren Pony Truss, Fixed	1 Span	Built 1939 By: Ontario Bridge Company of Toronto, Ontario

Table 2: Inventory of Comparative Bridges in M.T.O. West Region

ID	STRUCTURE	TYPE 1	HWY NAME	YEAR BUILT	# OF SPANS	SPAN DETAILS (metres)
35 - 5/	SAUGEEN RIVER BR SOUTH	Half Through Truss (PONY)	89	1953	1	Total=35.8 (1)=35.8;
14 - 3/	Ausable River Bridge	Half Through Truss (PONY)	21	1963	3	Total=62 (1)=12;(2)=38;(3)=12;

Table 3: O.S.I.M. Inventory of Comparative Bridges in the Town of Saugeen Shores (provided by GEI Consultants)

Bridge Number	**Description**	**Construction Date**
SS-01	Concrete Barrel Arch	1955
SS-02	Concrete Deck on Prestressed Girders	2012
SS-03	Concrete Deck on Prestressed Girders	1980
SS-05	Concrete Deck on Prestressed Girders	1979
SS-06	Steel Through Truss	Closed in 2020
SS-07	Concrete Deck on Steel Girders	1961
SS-08	Concrete Girder on Prestressed Girders	2002
SS-09	**Steel Truss**	
SS-11	Concrete Deck on Prestressed Girders	1969
SS-12	Triple Span Thickened Concrete Slab	1962
SS-13	Steel Arch Deck Truss	1958
SS-16	Rigid Frame Box Culvert	Unknown
SS-17	Rigid Frame Box Culvert	1950
SS-18	Rigid Frame Box Culvert	1967

Ministry of Citizenship and Multiculturalism

Heritage Planning Unit
Heritage Operations Branch
Citizenship, Inclusion and Heritage Division
5th Flr, 400 University Ave
Toronto, ON M5G 1S7
Tel.: 416-305-0757

Ministère des Affaires civiques et du Multiculturalisme

Planification relative au patrimoine
Opérations relatives au patrimoine
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Ontario

January 17, 2025 EMAIL ONLY

Andrea Nelson
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MCM File	**:**	**0021991**
Proponent	**:**	**Town of Saugeen Shores**
Subject	**:**	**Municipal Class Environmental Assessment – Cultural Heritage Evaluation Report (CHER)**
Project	**:**	**Moore Bridge (SS-09)**
Location	**:**	**Town of Saugeen Shores, Bruce County**

Dear Andrea Nelson:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Cultural Heritage Evaluation Report (CHER, dated September 2024/revised November 2024 and prepared by Archaeological Services Inc.) for the above-referenced project.

MCM's interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage.

Project Summary
Archaeological Services Incorporated was contracted by GEI Consultants Canada on behalf of the Town of Saugeen Shores to conduct a CHER for the Moore Bridge (SS-09) in the Town of Saugeen Shores, Ontario. The CHER is being completed as part of the project planning process to determine the appropriate course of action for the aging bridge.

The structure is a single-span Warren pony truss bridge constructed circa 1920 that carries McKechnie Sideroad over Snake Creek approximately 400 metres south of Concession Road 8 East. As the subject bridge was constructed before 1956, it requires a CHER to determine cultural heritage value or interest (CHVI) as part of this environmental assessment under the Municipal Class EA (Municipal Engineers Association, 2023).

Comments
The CHER concluded that the Moore Bridge does not meet the criteria outlined in Ontario Regulation 9/06 of the *Ontario Heritage Act*, and therefore does not have CHVI. The report recommends that the CHER be circulated to MCM and other interested parties.

We have reviewed the above-referenced CHER and find that the report is overall consistent with the requirements, guidance, and standards of the MCEA and with best practice guidance prepared by MCM.

We also understand that the CHER was (or will be) submitted to other interested parties for review and comment. Should there be any revisions to the CHER, please send us the final report for our records.

MCM would appreciate if you could confirm the Schedule for this undertaking under the MCEA. Note that we haven't received any notices for this project. Please send any notices, reports, and/or documentation via email to both Karla Barboza and me.

Thank you for the opportunity to review the CHER. If you have any questions or require clarification, please do not hesitate to contact me.

Sincerely,

Erika Leclerc
Heritage Planner
Erika.leclerc@ontario.ca

Copied to: Jay Pausner, Town of Saugeen Shores
Ruhul Amin, Town of Saugeen Shores
Zakary Stewart, GEI Consultants Canada
John Sleath, ASI
Karla Barboza, MCM

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

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 an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery and Procurement, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

Stage 1 and 2 Archaeological Assessment, Bridge SS-09, McKechnie Sideroad Right-of-Way Between Lot 23, Concession 8 and Lot 24, Concession 7, Geographic Township of Saugeen, Now Town of Saugeen Shores, Bruce County Ontario

Project Number: 2024-0091

PIF: P1056-0268-2024

Report Type: Original Report

Report Date: August 23, 2024

Licensee: Ms. Jamie Lemon, M.A.

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Executive Summary

Parslow Heritage Consultancy (PHC) completed a Stage 1 and 2 archaeological assessment for GEI Consultants Inc., on behalf of the Town of Saugeen Shores (the Proponent), for the study area adjacent to Bridge SS-09 located within the road right-of-way (ROW) associated with McKechnie Sideroad, Town of Saugeen Shores, Bruce County, Ontario. The ROW is located between Lot 23, Concession 8 and Lot 24, Concession 7, Geographic Township of Saugeen, now Town of Saugeen Shores, Bruce County, Ontario (Map 1). The Stage 1 and 2 archaeological assessment was completed as part of the project planning process to determine the appropriate course of action for the aging bridge.

The study area consists of a 70 m stretch of the existing ROW; the width of the study area is 20 m. The study area contains an existing steel Pony Truss bridge which crosses a tributary of the Saugeen River known as Burgoyne Creek. The study area is approximately 1400 square metres (0.14 ha), or 0.35 ac in in size.

The objectives of the Stage 1 archaeological assessment are to gather information about the study area's geography, history, current land conditions, as well as any previous archaeological research and listed archaeological sites on or within the vicinity. Methods to achieve these objectives include:

- Review of relevant historic and environmental literature pertaining to the study area
- Review of an updated listing of archaeological sites within 1 km from the Ministry of Citizenship and Multiculturalism's (MCM) Archaeological Sites Database
- Review of all archaeological assessments within 50 m of the study area
- Consultation with individuals knowledgeable about the study area
- Review of historic maps and aerial imagery of the study area

The Stage 1 background assessment concluded that the study area exhibited archaeological potential and should undergo Stage 2 assessment via test pit survey. The objectives of the Stage 2 assessment are to determine if there are archaeological resources present on the property and to assess whether the identified resources have cultural heritage value or interest.

The Stage 1 and 2 archaeological assessment included engagement with and participation by an archaeological monitor from Saugeen Ojibway Nation. The draft Stage 1 and 2 archaeological assessment report will be provided to Saugeen Ojibway Nation (SON) for review.

Based on the results of the Stage 1 and 2 archaeological assessment of the study area the following recommendations are provided:

1) Areas of previous disturbance have low archaeological potential and no further archaeological assessment is recommended for these areas.
2) The Stage 2 test pit survey did not result in the identification of archaeological materials. No further archaeological assessment is recommended for these areas.

It is requested that this report be entered into the Ontario Public Register of Archaeological Reports, as provided for in Section 65.1 of the Ontario Heritage Act.

Project Personnel

Project Manager/Licensee	Jamie Lemon, M.A. (P1056)
Field Director	Jamie Lemon, M.A. (P1056)
Field Technician	Chris Lemon, B.Sc., Dip. Heritage, CAHP (R289)
Report Preparation	Chris Lemon

Acknowledgements

Andrea Nelson	GEI Consultants Inc.
Zakary Stewart	GEI Consultants Inc.
Kove Sartor	Saugeen Ojibway Nation
Robert Martin	Saugeen Ojibway Nation

Project Context

This section of the report provides the context for the archaeological assessment and covers three areas: development context, historical context, and archaeological context.

Development Context

Parslow Heritage Consultancy (PHC) completed a Stage 1 and 2 archaeological assessment for GEI Consultants Inc., on behalf of the Town of Saugeen Shores (the Proponent), for the study area adjacent to Bridge SS-09 located within the road right-of-way (ROW) associated with McKechnie Sideroad, Town of Saugeen Shores, Bruce County, Ontario. The ROW is located between Lot 23, Concession 8 and Lot 24, Concession 7, Geographic Township of Saugeen, now Town of Saugeen Shores, Bruce County, Ontario (Map 1). The Stage 1 and 2 archaeological assessment was completed as part of project planning process to determine the appropriate course of action for the aging bridge.

The study area consists of a 70 m stretch of the existing ROW; the width of the study area is 20 m. The study area contains an existing steel Pony Truss bridge which crosses a tributary of the Saugeen River known as Burgoyne Creek. The study area is approximately 1400 square metres (0.14 ha), or 0.35 ac in in size.

The objectives of the Stage 1 archaeological assessment are to gather information about the study area's geography, history, current land conditions, as well as any previous archaeological research and listed archaeological sites on or within the vicinity. Methods to achieve these objectives include:

- Review of relevant historic and environmental literature pertaining to the study area
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- Review of all archaeological assessments within 50 m of the study area
- Consultation with individuals knowledgeable about the study area
- Review of historic maps and aerial imagery of the study area

The objectives of the Stage 2 assessment are to determine if there are archaeological resources present on the property and to assess whether the identified resources have cultural heritage value or interest.

The Stage 1 and 2 archaeological assessment included engagement with and participation by an archaeological monitor from Saugeen Ojibway Nation. The draft Stage 1 and 2 archaeological assessment report will be provided to Saugeen Ojibway Nation (SON) for review.

Permission to enter the study area for the purposes of the Stage 1 and 2 archaeological assessment were provided by the Town of Saugeen Shores, with no limitations placed on that access.

All archaeological work documented in this report was completed under the MCM's *Standards and Guidelines for Consultant Archaeologists.*

Historical Context

This section describes the past and present land use of the study area and surrounding regions, and any other relevant historical information gathered through the background research.

Indigenous History

Indigenous peoples of southern Ontario have left behind archaeologically significant resources throughout the province that show continuity with past peoples even if not recorded in historic Euro-Canadian documents. Archaeological research in Bruce County has in the past been limited, largely due to a lack of cultural resource management and research-based archaeological assessments. Table 1 provides a general cultural chronology of Indigenous occupation of southern Ontario (Ellis and Ferris 1990). Additional information, with region-specific data, is provided below.

TABLE 1: OVERVIEW OF THE CULTURAL CHRONOLOGY OF SOUTHERN ONTARIO

Period	Characteristics	Time	Comments
Early Paleo	Fluted Points	9,000 – 8,400 BC	Caribou hunters
Late Paleo	Hi-Lo Points	8,400 – 8,000 BC	Smaller but more numerous sites
Early Archaic	Kirk, Nettling, and Bifurcate Base Points	8,000 – 6,000 BC	Slow population growth
Middle Archaic I	Stanley/Neville, Stemmed Points	6,000 – 4,000 BC	Environment similar to present
Middle Archaic II	Thebes, Otter Creek Points	4,000 – 3,000 BC	
Middle Archaic III	Brewerton Side and Corner Notched Points	3,000 – 2,000 BC	
Late Archaic I	Narrow Point (Lamoka, Normanskill)	2,000 – 1,800 BC	Increasing site size
	Broad Point (Genesee, Adder Orchard)	1,800 – 1,500 BC	Large chipped lithic tools
	Small Point (Crawford Knoll, Innes, Ace-of-Spades)	1,500 – 1,100 BC	Introduction of bow hunting
Terminal Archaic	Hind Points	1,100 – 950 BC	Emergence of formal cemeteries
Early Woodland	Meadowood Points	950 – 400 BC	Introduction of pottery

Middle Woodland		400 BC – AD 900	Increased sedentism, introduction of corn
Late Woodland	Early Ontario	AD 900 – 1,300	Emergence of agricultural villages
	Middle Ontario	AD 1,300 – 1,400	Large longhouses (100m+)
	Late Ontario	AD 1,400 – 1,650	Tribal warfare and displacement
Contact	Various Algonkian and Iroquoian Groups	AD 1,700 – 1,875	Early written records and treaties

Paleoindian Period

The first human populations to inhabit southern Ontario arrived between 12,000 and 10,000 years ago, after the end of the Wisconsin Glacial Period, and consisted of groups that had been living south of the Great Lakes. The ensuing period is referred to as the Paleo-Indian Period (Ellis and Deller 1990).

Ontario's first peoples moved across the landscape in small groups (i.e. bands or family units of no more than 25-35 people) and followed a pattern of seasonal mobility extending over large territories. In this area, caribou may have provided the staple of Paleo-Indian diet, supplemented by wild plants, small game, birds, and fish (TMHC 2018).

Early Paleo-Indian sites tend to be located in elevated locations on well-drained loamy soils. Many of the known sites were located on former beach ridges associated with glacial lakes. There are a few extremely large Early Paleo-Indian sites; it appears that these sites were formed when the same general locations were occupied for short periods of time over the course of several generations of people. Smaller Early Paleo-Indian camps are scattered throughout the interior of southwestern and south-central Ontario, usually situated adjacent to wetlands.

Research suggests that population densities were very low during the Early Paleo-Indian Period (Ellis and Deller 1990:54). By the Late Paleo-Indian Period (8400-8000 BC) the environment of southern Ontario was dominated by closed coniferous forests with some minor deciduous elements. Large game species that had been hunted in the early part of the Paleo-Indian Period had moved further north by this time. Similar to early Paleo-Indian peoples, late Paleo-Indian peoples covered large territories as they followed seasonal resource fluctuations. On a wider regional basis, Late Paleo-Indian projectile points are substantially more common than Early Paleo-Indian materials, suggesting an increase in population.

A search of the MCM's archaeological sites database using Bruce County as a query identified one Paleo site in Bruce County. This site, BcHi-36, is located on part of Lot 12, Concession 9, Geographic Township of Saugeen, and represent a Late Paleo Site.

Archaic Period

A change in lifeways beginning circa 8000 BC heralds what archaeologists call the Archaic Period. During the Early Archaic Period (8000-6000 BC), the jack and red pine forests that characterized the Late Paleo-Indian environment were replaced by forests dominated by white

pine with some associated deciduous trees (Ellis et al. 1990). One of the more notable changes in the Early Archaic Period is the appearance of side and corner-notched projectile points, as well as the introduction of ground stone tools such as celts and axes. The introduction of these types of tools suggests the beginnings of woodworking and also suggests some reduction in the degree of seasonal movement. A seasonal pattern of warm season river or lakeshore settlements and interior cold weather occupations has been documented in the archaeological record (TMHC 2018). Reliance on food resources like fish, deer, and nuts becomes more noticeable through time. Archaeologically, there is evidence of larger sites and aggregation camps.

During the Middle Archaic Period (6000-2500 BC) the introduction of netsinkers suggests that fishing was becoming an important part of subsistence practices. Another characteristic of the Middle Archaic is an increased reliance on local, often poor quality chert resources for the manufacturing of projectile points. It is likely that during earlier periods, when groups occupied large territories, it was possible to visit a primary outcrop of high-quality chert at least once during a seasonal round. During the Middle Archaic, groups inhabited smaller territories that often did not encompass a source of high-quality raw material. In these instances, lower quality materials which had been deposited by glaciers in the local till and river gravels were utilized. During the latter part of the Middle Archaic Period long distance trade routes began to develop. Groups in southern Ontario took part in long distance trade, acquiring native copper tools manufactured from a source located northwest of Lake Superior (Ellis et al. 1990).

The increase of documented Late Archaic (2500-950 BC) sites compared to Early or Middle Archaic sites suggests continued population growth. It is during the Late Archaic that recognizable cemeteries (burial pits) appear. Before this time individuals were buried close to the location where they died. The summer/winter seasonal round that continued through the Late Archaic led to evidence of secondary burials for individuals who died during winter months, whose remains were later transported to summer-time macroband occupation sites (Walker 2015).

A search of the MCM's archaeological sites database using Bruce County as a query identified there are currently 49 registered Archaic sites in Bruce County.

Woodland Periods

Circa 1000 AD, the archaeological record in southern Ontario documents the emergence of larger, semi-permanent settlements; corn horticulture was also adopted as a subsistence practice around this time. These developments are most often associated with Iroquoian-speaking populations who resided in southern Ontario upon the arrival of the first Europeans. Pre-contact Iroquoian sites are identified by evidence of longhouses, pottery decorated with identifiable motifs, triangular projectile points, clay pipes, and ground stone artifacts. Generally, the pre-contact Indigenous presence in much of southern Ontario reflects occupation by Northern Iroquoian speakers. During and following the Iroquois Wars of the mid-17th century and the dispersal of the Iroquoian-speaking Huron-Petun and Neutral, a considerable reduction in the extent of territory occupied by Iroquoian speakers occurred in southern Ontario. Iroquoian groups lived in close proximity to and interacted with more mobile Algonquin speakers, most notably the Odawa (or "Ottawa") and Ojibwa in the region surrounding the study area.

The study area and surrounding area was occupied by Algonkian-speaking groups who were likely influenced by Iroquoian-speaking groups, both before and after European contact. It has been presumed that occupation of Bruce County before about 1690 would have been by Iroquoians, with Algonkian speakers from northern Ontario moving southward circa 1690;

however, the Middle Woodland Saugeen Complex, known from archaeological sites in the Saugeen River valley, is most often interpreted as Algonkian (Fiedel 1999), arguing for an occupation of the territory by Algonkian speakers since circa 400 BC – AD 900. The best known of these sites is the Donaldson site, approximately 10 km northwest of the study area. Wright (1974) believed that the isolated occurrence of a later, palisaded village at the Middle Ontario Iroquoian-like Nodwell site represented Iroquoian speakers in Bruce County at this time. However, Rankin (2000) posits that the Nodwell village represents a short-lived sedentary farming experiment by Algonkian-speaking hunter-gatherers. The Nodwell site is located approximately 6 km northwest of the study area.

During the Late Woodland period, there is evidence that the study area could have been inhabited by Algonkian- or Iroquoian-speaking groups, or a combination of groups. As described by GAL (2015:2):

While it is difficult to trace ethnic affiliation during the period of initial contact between Aboriginal and European groups, Koenig states that "there is no doubt that some native groups regularly occupied sites on the [Bruce] peninsula at the end of [the early historic] period" (2005:62). Feest and Feest (1978) imply that the Bruce [Saugeen] Peninsula was Odawa territory from 1616 and early 17th century French glass trade beads at the Glen and Cripps sites on the northern tip of the Bruce [Saugeen] Peninsula appear to attest to this (Fox 1990). Fox not only points to Odawa (or Ottawa) settlement on the Bruce [Saugeen] Peninsula during the mid-1600s at Hunter's Point, but also to sites in the southern Bruce County littoral such as the Hunter site on the Saugeen Reserve, dating about 1600 (1990), as well as the Inverhuron-Lucas site (1990). Abandonment of this area by the Odawa seems to have occurred, at least briefly, in the mid-1600s due to the Iroquois Wars (Fox 1990).

By 1690, Algonkian speakers from the north appear to have begun to repopulate Huron and Bruce County (Rogers 1978).

A search of the MCM's archaeological sites database using Bruce County as a query identified there are currently 61 registered Woodland sites in Bruce County.

Historic Period

The first documented Euro-Canadian visit to the Bruce Peninsula dates to the early 1600s, when Samuel de Champlain and Jesuit missionaries Jean de Brébeuf and Francesco-Giuseppe Bressani visited the nearby area with Indigenous guides. At this time, the Bruce Peninsula was occupied by Algonquin speaking Odawa groups who maintained a close relationship with the Iroquoian speaking Petun peoples living along the southern shore of Nottawasaga Bay (Fox 1990). As detailed in TMHC (2018:10):

> *The Ojibwa (a.k.a. the "Chippewa", who called themselves "Anishnabe") who are also Algonquian speakers, lived in the region extending from the Georgian Bay area to the north shore of Lake Superior prior to European contact (Schmalz 1991). Both the Odawa and Ojibwa were disrupted and displaced by Iroquois hostilities in the 1650s (Schmalz 1977), but regrouped by the last quarter of the 17th century (Ferris 1989) and returned to their homeland. About the year 1696, a fierce battle between the Ojibwa and Iroquois nations took place at Saugeen (present site of Southampton), resulting in the Ojibwa moving into the area where they remain today on a reserve adjoining the eastern boundary of the Town of Southampton. The Ojibwa then retained all territories won during the battles until they surrendered them to the Crown more than a century later.*
>
> *The (Saugeen) Ojibwa surrendered portions of Grey and Wellington Counties in 1818 (McMullen 1997:28). This was done with the understanding that they would have*

continued use of Bruce County and that they would receive annuities for the lands surrendered. Further land was surrendered in the area with the establishment of the Huron Tract in 1825, later to be followed by the surrender of Bruce County in 1836 (Lee 2004:21). The surrender of Bruce County did not include the Bruce Peninsula, known as the Saugeen Peninsula by the resident Ojibwa. The Neyaashiinigmiing Indian Reserve Number 27 on the southeast side of the Bruce Peninsula (Nawash Ojibwa) and the Saugeen Indian Reserve Number 29 above Southampton (Saugeen Ojibwa) were established in 1854 (Chippewas of Nawash 2014).

Furthermore, Schmalz (1977:1) indicates that a group of Ojibwa (including Mississauga), Potawatomi (sic), Ottawa and Caughnawaga settled in the Saugeen Township. The Chippewas of Saugeen First Nation and the Chippewas of Nawash First Nation share the same traditional territories in southwestern Ontario. They were a part of the ancient Three Fires Confederacy of Ojibwa, Odawa, and Pottawatomi. Throughout the 18th century the Saugeen Territory was inhabited by several generations of Ojibwa whose immediate territory was threatened neither by war nor by European settlers. Some of these Ojibwa were the Wahbadicks, the Newashes, the Wahwahnoses, and the Metegwob who fished, trapped and hunted along the many rivers, streams and lakes of their lands.

What was to become Saugeen Township formed part of a parcel of land that was subject to a surrender by the Ojibwa to the Crown in 1836 called the Treaty of Manitowaning (Lee 2004:21). The land surrendered accounted for 1,500,000 acres (Schmalz 1977:233). The Treaty formalized the surrender of the County of Bruce which included the townships of Saugeen, Arran, Bruce, Elderslie, Kincardine, Greenock, Brant, Huron, Kinloss, Culross, and Carrick (Robertson 1906). The Treaty was concluded by Sir Francis Bond Head at Manitowaning on August 9, 1836. Shortly thereafter, the townships were surveyed for settlement.

Beginning in the 1830s, the Bruce Peninsula and surrounding areas became the focus of Methodist missionary work. Methodist missionaries became very involved with the Ojibway settlements of Nawash and Saugeen (Enemikeese 1867; McMullen 1997).

Historic Saugeen Metis

The Historic Saugeen Métis are descendants from unions between European traders and Saugeen Ojibway Nation women who traded at Southampton and throughout the Lake Huron watershed. On a wider regional scale, “the genesis of a new Indigenous people called the Métis resulted from the subsequent intermarriage of these mixed ancestry individuals” (MNO 2023). These Métis “lived, fished, hunted, trapped and harvested the lands and waters of the Bruce Peninsula, the Lake Huron proper shoreline and its watershed” (Historic Saugeen Métis, n.d.).

During the 18th century Métis people began to identify as a separate Indigenous group, with Métis populations located throughout Ontario (Stone & Chaput 1978). During the early 19th century, many Métis families moved to Kincardine, Owen Sound, Penetanguishene, and Parry Sound. In 1982, the Métis were federally recognized as one of the distinct Indigenous peoples in Canada.

The contemporary Saugeen Métis community covers an area approximately 275 kms along the Lake Huron shoreline from Tobermory to south of Goderich (Historic Saugeen Métis n.d.).

First Nations Treaties

The study area is at the northern edge of Treaty Number 45 ½ (referred to below as the Treaty of Manitowaning), the first major treaty specific to the Saugeen Peninsula; the treaty was signed

in 1836, the same year Sir Francis Bond Head took up his post as Lieutenant Governor of Upper Canada. As detailed in Wright (2017:217-220):

> *The Jesuit reduction model inspired Head's proposal in Saugeen…Shortly after his arrival in Upper Canada in 1836, Head set out to secure 1.5 million acres of Saugeen Territory.*
>
> *Head attended the annual gift-giving ceremonies at Manitoulin Island in 1836 and called all Saugeen who were present to attend discussions regarding a land surrender. Approximately 7000 peoples from different Indigenous groups were expected at the ceremonies, and Head was supposed to be in attendance in order to do a general inspection of 'Indian settlements'. The annual gift-giving ceremonies were not a meeting called for the expressed intent of treaty negotiations, so Bond Head's meeting with the Saugeen was in violation of the terms set forth in the Royal Proclamation of 1763. He told those who attended the meeting that the encroachment of white settlers was inevitable, and the government could only help them protect their way of life if the Saugeen Ojibway Nation agreed to remove themselves to reserves. The treaty document states that "your Great Father (the government) engages forever to protect you from encroachment of whites", with regard to the reserved lands. Head claimed that the Saugeen Ojibway Nation "cheerfully gave up this great tract of land"; however, an eyewitness to the proceedings had a very different account…Whether it was 'cheerfully' or 'with tears in their eyes', both accounts indicate that members of the Saugeen Ojibway Nation in attendance agreed to Treaty 45 ½. However, the fact that the negotiations took place unannounced and not on the territories under discussion made the treaty illegal. Furthermore, three of the four principal chiefs – Nawash, Wahbadick, and Wahwahnosh – did not sign the treaty document. This was an additional factor that should have immediately nullified the document. Head was aware of the property protocol for negotiating treaties, but he had chosen to not follow protocols.*

Saugeen Ojibway Nation disputed the legitimacy of Treaty Number 45 ½ almost immediately; in 1843 the government recognized that Head had violated treaty protocol, but the government was not willing to renegotiate (Wright 2017). Saugeen Ojibway Nation's title and treaty claim against the Government of Canada is in progress, with court proceedings commencing in 2019:

> *SON's Treaty Claim was also about its relationship to its homelands. In 1836, SON agreed to Treaty 45 1⁄2, which surrendered 1.5 million acres of its lands south of Owen Sound to the Crown. In exchange for those rich farming lands, the Crown made SON an important promise: to protect the Saugeen (Bruce) Peninsula for SON, forever. But, 18 years later the Crown came back for a surrender of the Peninsula. The Crown said that they could no longer protect SON's remaining lands from settlers, and Treaty 72 was signed in 1854 where SON surrendered most of the Peninsula.*
>
> *Justice (Wendy) Matheson 's decision agreed with SON that there was a treaty promise to protect the Peninsula for SON, and found that the Crown breached that treaty promise. She said that the Crown could have and should have done more to protect SON's lands on the Peninsula. Because it didn't, she found that the Crown breached its honour. Justice Matheson concluded that one of the Crown's negotiators, T.G. Anderson, breached the honour of the Crown by saying that the Crown would not honour its promise to protect the Peninsula.*
>
> OKT 2023

Prior to 1836, the Saugeen Ojibway Nation's territory included over 2 million acres. Between 1836 and 1861, after the Crown obtained five separate treaties, the territory was reduced by over 98%, to under 29,000 acres.

Bruce County and Township of Saugeen

In the 1840s, a number of petitions were made to the Crown Lands Department demanding for the opening of more lands suitable for Euro-Canadian peoples. At this time, Upper Canada was a favoured destination for immigrants, and the numbers were rising each year. In 1845, there were 25,375 new settlers, which increased to 89,440 in 1847, and the population of Upper Canada grew 100% between 1842 and 1852 (Robertson 1906). As demand for lands increased, plans were made to open the "Queen's Bush" for settlement, which was passed by an Order-in-Council on April 19, 1847.

Alex Wilkinson was directed to begin surveying the tract in 1847 and began at Wawanosh Township in neighbouring Huron County, and running a line to Lake Huron and plotting the first lots within the Townships of Kinloss and Huron (Robertson 1906). During this time, Wilkinson surveyed part of what would become Bruce County; his survey ran from the southeast corner of Kinloss to the lake and northward along the shoreline, but did not continue on to the interior of the county. Some of the tract remained unsurveyed at this time, including 11 townships that would eventually form part of Bruce County (Robertson 1906).

Prior to the first settlers in the county, the area was used by fur trappers, which is evidenced by the remains of forts at Cape Crocker, Stokes Bay, Red Bay, and Southampton (Robertson 1906). The first permanent Euro-Canadian settlers in Bruce County arrived in 1848 following the Wilkinson survey, during which time there were only about a dozen lots ready for Euro-Canadian settlement. The communities of Kincardine and Southampton were the first in the county to become established by Euro-Canadians, with the remainder of the county infilling by immigrants somewhat rapidly, due to the government's offer of free land grants on select concessions (Robertson 1906). In order to obtain the free land grants settlers had to agree to continuous settlement, clearing of 12 acres within four years, and building a home that was at least 18 feet by 24 feet (Robertson 1906).

As Euro-Canadians moved into the county it was still referred to as the "Queen's Bush" and fell into the Huron District. It was not until May 30, 1849 that an Act of Parliament divided the district of Huron into three united counties: Huron, Perth, and Bruce (Robertson 1906). Bruce County was named after James Bruce, who was Earl of Elgin and Kincardine and Governor-General of Upper Canada at the time the "Queen's Bush" was surveyed. At the same time the Act of Parliament was passed, the townships within Bruce County were established, and the land between Lake Huron and Georgian Bay (Bruce Peninsula), which had been set aside as reserve land, were annexed to form part of the County of Waterloo (Robertson 1906). This land was later withdrawn from Waterloo County in 1851 and transferred to Bruce County. The counties remained united until 1866, when legislation was passed separating them.

The Township of Saugeen, the smallest of the townships of Bruce County, was surveyed in 1851 by Alexander Vidal; the towns of Southampton and Port Elgin were integral part of the early history of the township, each being incorporated in 1858 and 1874, respectively. The 1851 Census of Canada recorded about 200 people in Saugeen Township; most were Scottish or English born, with only 19 born in Canada. The opening of the Wellington Grey Bruce Railway Line to Southampton in 1876 played a large role in the prosperity of Saugeen Township, for both business and pleasure.

Past and Current Uses of Study Area

Table 2 documents the document review undertaken for the Stage 1 and 2 archaeological assessment. The study area is located in a rural area outside the Town of Port Elgin.

TABLE 2: REVIEW OF HISTORICAL MAPS AND RECORDS

Date	Map/Record	Comments
1835	Upper Canada (David H. Burr)	Study area within London District, portion of Saugeen River depicted, no other description in general area
1880 (Map 3)	Map of the Township of Saugeen (H. Belden and Co.)	No buildings illustrated within or adjacent to study area, unclear if a bridge established over Burgoyne Creek.
1946	Topographic Map Sheet 041A05 (Port Elgin, 1:63,000)	No building illustrated within study area, one building illustrated south of study area. Bridge illustrated across creek (noted as Snake Creek at this time).
1954 (Map 4)	Aerial photograph	No building illustrated within study area, resolution difficult to determine if a building south of study area is present. Bridge illustrated across creek (noted as Snake Creek at this time).

Archaeological Context

Archaeological Sites and Previous Assessments

According to the MCM's archaeological sites database, there are no previously reported archaeological sites within 1 km of the study area.

When the site search is expanded to 3 km around the study area, 14 archaeological sites ranging from the Late Archaic Period to Historic Period have been previously identified. This speaks to the use of the immediate area around the study area during pre-contact and historical periods, though this knowledge is not necessarily reflected in the current archaeological records, due to a lack of archaeological assessments in the immediate area.

A search of archaeological fieldwork carried out within the limits of, or immediately adjacent (within 50 m) to, the study area found that no archaeological assessments have been undertaken.

The Natural and Physical Environment

The study area is situated within the Huron Fringe physiographic region. According to Chapman and Putnam (1984:161), the Huron Fringe physiographic region:

> *….comprises the wave-cut terraces of glacial Lake Algonkian and Lake Nipissing with their boulders, gravel bars and sand dunes….Across the mouth of the Saugeen Valley, Lake Algonkian built a massive beach of sand and gravel. Behind it was a lagoon in which fine sand and silt were deposited to a considerable depth. Delta Sands were spread outside the beach, also, ending at a distinct bluff about half a mile from the present shore. The terrace below the bluff is ribbed with gravel bars built by Lake Nipissing and, as is the case along so much of the shoreline, the waves have washed most of the overburden off the bedrock on the lower or Nipissing terrace…*

The soils of the study area are identified as Bottom Land and comprised of variable poorly drained alluvial soils (Hoffman and Richards 1954)

Relic shoreline features of the post-glacial Nipissing Great Lakes and Lake Algomnquin are present in the general vicinity of the study area, including lake beds, gravel bars, beach ridges, erosional bluffs, and sand dunes. Landscape features of relic shorelines continued to be used for millennia after waters receded; in the area east of Lake Huron from the Southampton through to Port Elgin areas, Indigenous settlements and cemeteries were located along the Main Lake Algonquin gravel bar and the edge of the Nipissing Great Lakes shore bluff, both of which are well inland from the current Lake Huron shoreline. (Fitzgerald 2010). The Main Glacial Lake Algonquin strandline is located approximately 7 km west of the study area, while the Nipissing Great Lakes shoreline is located approximately 10 km west of the study area.

Field Methods

The Stage 1 and 2 archaeological assessment was conducted under archaeological consulting license P1056 issued to Jamie Lemon by the MCM (P1056-0268-2024). Jamie Lemon was on site as the field director during the Stage 2 fieldwork.

The Stage 1 and 2 fieldwork was conducted on August 7, 2024. The weather during the property inspection was sunny and warm. Assessment conditions were ideal and at no time were the field, weather, or lighting conditions detrimental to the identification of field conditions.

The study area currently consists of a municipal road ROW that has been subject to extensive fill in order to raise the banks of Burgoyne creek in order to accommodate a steel Pony Truss bridge. The surface of the ROW is comprised of gravel and the fill slopes down from the road surface to the alluvial deposits of the flood plain. The study area is approximately 1400 square metres (0.14 ha), or 0.35 ac in in size.

Relatively undisturbed areas were observed immediately adjacent to the break in slope of the fill material used to construct the roadbed. Per MCM's *Standards and Guidelines for Consultant Archaeologists*, the undisturbed portions of the study area were subject to test pit survey at 5 m intervals. All test pits were approximately 30 cm in diameter and excavated, where possible, to within the first 5 cm of subsoil and examined for stratigraphy, cultural features, or evidence of fill. All soil was screened through 6 mm mesh to facilitate the recovery of cultural material. All test pits were backfilled once complete. In addition to excavation of test pits in undisturbed areas test pits were opened in areas of previous disturbance to confirm conditions.

The soils of the study area were found to consist of a mix of clay and sand alluvial soils. Undisturbed test pits were excavated to a depth of 25-30 cm.

Dr. Robert Martin, representative of SON's Environmental Office, was on site during the Stage 2 fieldwork.

Images 1-8 document the Stage 1 and 2 fieldwork results; Map 5 provides the Stage 1 property inspection results and photographic key.

Record of Finds

No archaeological materials were identified during the Stage 2 test pit survey. An inventory of the documentary record generated in the field is provided in Table 3.

TABLE 3: RECORD OF DOCUMENTATION

Document Type	Location of Document	Additional Comments	Quantity
Field Notes	PHC Office	Stored digitally in project file	1 page
Maps Provided by Client	PHC Office	Stored digitally in project file	1 map
Digital Photographs	PHC Office	Stored digitally in project file	35 photographs

Analysis and Conclusions

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. In accordance with the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* the following are features or characteristics that indicate archaeological potential:

- Previously identified archaeological sites;
- Water sources:
  - Primary water sources (lakes, rivers, streams, creeks);
  - Secondary water sources (intermittent streams and creeks; springs; marshes; swamps);
- Features indicating past water sources (e.g. glacial lake shorelines indicated by the presence of raised gravel, sand, or beach ridges; relic river or stream channels indicated by clear dip or swale in the topography; shorelines of drained lakes or marshes; and cobble beaches);
- Accessible or inaccessible shoreline (e.g. high bluffs, swamps or marsh fields by the edge of a lake; sandbars stretching into marsh);
- Elevated topography (eskers, drumlins, large knolls, 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;
  - Scarce raw minerals (e.g. quartz, copper, ochre or outcrops of chert);
- Early Euro-Canadian industry (fur trade, mining, logging);
- Areas of Euro-Canadian settlement; and,
- Early historical transportation routes, properties listed on a municipal register or designated under the Ontario Heritage Act.

In recommending a Stage 2 property survey based on determining archaeological potential for a study area, MCM stipulates the following:

- No areas within 300 m of a previously identified site; water sources; areas of early Euro-Canadian Settlement; or locations identified through local knowledge or informants can be recommended for exemption from further assessment;
- No areas within 100 m of early transportation routes can be recommended for exemption from further assessment; and,
- No property listed on a municipal register or designated under the *Ontario Heritage Act* can be exempt from further assessment.

Archaeological Integrity

A negative indicator of archaeological potential is extensive land disturbance. This includes widespread earth movement activities that would have eradicated or relocated any cultural material to such a degree that the information potential and cultural heritage value or interest has been lost.

Section 1.3.2 of the MCM 2011 Standards and Guidelines for Consultant Archaeologists states that:

> *Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources (MCM 2011:18)*

The types of disturbance referred to above include, but are not restricted to, quarrying, sewage and infrastructure development, building footprints, and major landscaping involving grading below topsoil.

Archaeological Potential for the Study Area

Based on the features or characteristics of archaeological potential listed in the previous section, the following statements can be made:

- The study area is bisected by a navigable waterway; and,
- The study area is adjacent to a historic transportation route.

When the above noted criteria are considered, the study area exhibits potential for the identification of archaeological resources, save for where the study area has been previously disturbed by the roadbed.

Conclusion

While the Stage 1 archaeological background assessment concluded that most of the study area exhibited low archaeological potential due to previous disturbance resulting from the historic construction of a roadbed and associated bridge, the Stage 1 did identify limited areas of undisturbed soils immediately adjacent to the roadbed. Stage 2 test pit assessment of undisturbed soils was undertaken and no archaeological materials were encountered during the Stage 2 test pit survey.

Recommendations

Based on the results of the Stage 1 and 2 archaeological assessment of the study area the following recommendations are provided:

1) Areas of previous disturbance have low archaeological potential and no further archaeological assessment is recommended for these areas.
2) The Stage 2 test pit survey did not result in the identification of archaeological materials. No further archaeological assessment is recommended for these areas.

It is requested that this report be entered into the Ontario Public Register of Archaeological Reports, as provided for in Section 65.1 of the Ontario Heritage Act.

Advice on Compliance with Legislation

Advice on the compliance with legislation is not part of the archaeological record. However, for the benefit of the proponent and approval authority in the land use planning and development process, the report must include the following standard statements:

- This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c O.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 fieldwork and report recommendations ensure the conservation, protection, and preservation 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 Citizenship and Multiculturalism, a letter will be issue by the ministry stating that there are no further concerns with regards 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 fieldwork on the site, submitted a report to the Minister stating 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 representative of a new archaeological site or sites 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 Section 48(1) of the *Ontario Heritage Act*.
- The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified.

Closure and Study Limitations

This report was prepared by Parslow Heritage Consultancy Inc. for the exclusive use of GEI Consultants Inc. as a Stage 1 and 2 archaeological assessment for the study area located within the limits of the road ROW associated with Bridge SS09 on McKechnie Sideroad, Geographic Township of Saugeen, now Town of Saugeen Shores, Bruce County, Ontario.

All information, recommendations and opinions provided in this report are for the sole benefit of the Proponent. No other party may use or rely on this report or any portion thereof without the Proponent's or PHC's express written consent. Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Proponent in the design of the specific project. Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain archaeological resources. The sampling strategies incorporated in this study, if any, comply with those identified in the Ministry of Citizenship and Multiculturalism's 2011 *Standards and Guidelines for Consultant Archaeologists*. We trust that the information presented in this report meets your current requirements.

Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Parslow Heritage Consultancy Inc.



Jamie Lemon, M.A.

Senior Archaeologist

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Images



FIGURE 1: OVERVIEW OF STUDY AREA, FACING SOUTHWEST



FIGURE 2: ELEVATION OF FILLED ROAD SURFACE ON WEST SIDE OF STUDY AREA IN RELATION TO NATURAL GROUND LEVEL OF FLOOD PLAIN, FACING SOUTH-SOUTHWEST



FIGURE 3: ELEVATION OF FILLED ROAD SURFACE ON EAST SIDE OF STUDY AREA IN RELATION TO NATURAL GROUND LEVEL OF FLOOD PLAIN, FACING SOUTH



FIGURE 4: TEST PITTING AT BASE OF ROADBED FILL, FACING NORTH



FIGURE 5: TEST PITTING UNDISTURBED FLOOD PLAIN AT BASE OF ROAD FILL, FACING NORTHEAST



FIGURE 6: CONFIRMING FILL VIA TEST PITTING, FACING NORTH-NORTHEAST



FIGURE 7: FILL MATERIAL COMPRISING ROADBED, FACING NORTH



FIGURE 8: ALLUVIAL SAND CLAY MIX OF UNDISTURBED AREA SOIL, FACING NORTH

Maps



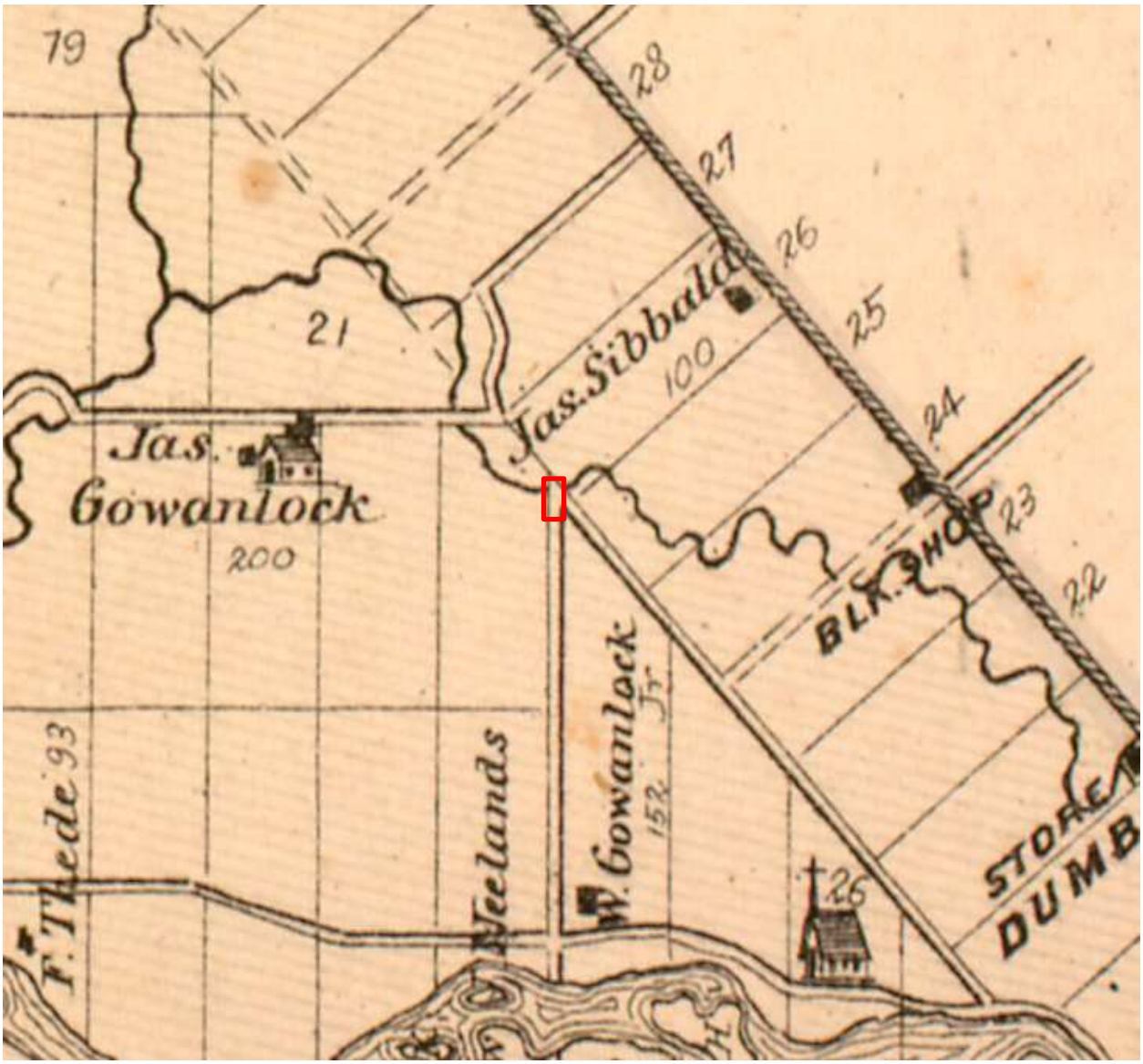
MAP 1: STUDY AREA ON TOPOGRAPHIC MAP (SOURCE: MNRF 2023)

- Study Area



MAP 2: STUDY AREA ON AERIAL IMAGE (SOURCE: MNRF 2023)

- Study Area



MAP 3: STUDY AREA ON 1880 HISTORICAL ATLAS MAP

▭ - Study area



MAP 4: STUDY AREA ON 1954 AERIAL IMAGE

▭ - Study area



MAP 5: STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENT RESULTS (SCALE 1:500)

- Study area
- Waterbody within ROW study area, no in water impacts planned
- Area of slope in excess of 20 degrees, low archaeological potential
- Area of previous disturbance, low archaeological potential
- Area of archaeological potential, test pit survey at 5 m interval
- Photo location and direction

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Jamie Lemon

From: SON Archaeology <archaeology@saugeenojibwaynation.ca>
Sent: October 31, 2024 1:46 PM
To: Jamie Lemon
Subject: Re: Report Review Request - Bridge SS09, Town of Saugeen Shores

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon Jamie,

SON Archaeology has reviewed the report and finds no concerns.

Miigwech,

Kove Sartor
SON Archaeology Department
Resource & Infrastructure Department

Environme
Office

10129 Hwy 6
Georgian Bluffs, ON
N0H 2T0
saugeenojibwaynation.ca

On Wed, Oct 30, 2024 at 11:43 AM Jamie Lemon <jlemon@peninsulaheritage.ca> wrote:

> Good morning Kove,
>
> I hope all is well with you. Please find attached a Stage 1 and 2 archaeological assessment report, for SON review. This assessment is for bridge SS09 in the Town of Saugeen Shores. Dr. Robert Martin was on site with us for this work earlier this year.
>
> Please let us know if there are any comments following your review.

Ministry of Citizenship and Multiculturalism (MCM)

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Nov 21, 2024

Jamie Lemon (P1056)
Parslow Heritage Consultancy Inc.
948 Greenock-Brant Cargill ON N0G 1J0

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 and 2 Archaeological Assessment, Bridge SS-09, McKechnie Sideroad Right-of-Way Between Lot 23, Concession 8 and Lot 24, Concession 7, Geographic Township of Saugeen, Now Town of Saugeen Shores, Bruce County Ontario ", Dated Aug 23, 2024, Filed with MCM on N/A, MCM Project Information Form Number P1056-0268-2024, MCM File Number 0021991

Dear Mrs. Lemon:

The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.[1]

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to Archaeology@Ontario.ca

cc. Archaeology Licensing Officer
Andrea Nelson,GEI Consultants Inc.
Lukas Heathers,Town of Saugeen Shores

1*In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.*

Appendix B Natural Environment: Background Information

DRAFT

Moore Bridge, McKechnie Sideroad

Town of Saugeen Shores, Bruce County

Scoped Environmental Impact Study

Prepared for:

GEI Consultants Inc.

1260 2nd Avenue East

Owen Sound, ON N4K 2J3

Project Number:

AA24-068A

Report Date:

October 31, 2024

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Wildlife Ecologist	Brynn Varcoe

Version History

Version	Date	Issue	Author	Approved
Draft for Client	August 26, 2024	1	H. Dixon	C. Ross
Final for Client	October 31, 2024	2	H. Dixon	C. Ross

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Information obtained during the site investigations or received from third parties does not exhaustively cover all possible environmental conditions or circumstances that may exist in the study area. If a service is not expressly indicated, it should not be assumed that it was provided. Any discussion of the environmental conditions is based upon information provided and available at the time the conclusions were formulated.

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Nothing in this report is intended to constitute or provide a legal opinion. Aboud & Associates Inc. makes no representation as to the requirements of or compliance with environmental laws, rules, regulations, or policies established by federal, provincial, or local government bodies. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

Any conclusions or recommendations made in this report reflect Aboud & Associates Inc. judgment based on conditions observed at the time of the site visit on the date(s) set out in this report and on the interpretation of data made in the reports, based on the studies specifically identified in the report.

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1.0 Introduction

The Town of Saugeen Shores is considering the removal and possible replacement of the Moore Bridge on McKechnie Side Road ~450 m south of Concession Road 8 E (east of Port Elgin) with a pedestrian bridge. Aboud and Associates (AA) has been retained by GEI Consultants Inc. (GEI) on behalf of the Town of Saugeen Shores to complete a scoped Environmental Impact Study (EIS). The scoped EIS is being completed as part of the project planning process to determine the appropriate course of action for the aging bridge.

1.1 Proposed Development

The structure is a 24.5 m steel truss bridge with a concrete deck that is in poor condition and is currently closed. As part of the project planning process, various options are being considered, including bridge removal and bridge replacement. This study will determine the short- and long-term plan for the crossing.

1.2 Existing Land Use and Study Area

The study area includes the subject structure outlined in *Figure 1*, as well as adjacent lands up to 120 metres surrounding the subject area, where access to lands is permitted (right of way).

The bridge is within the Saugeen Valley Conservation Authority (SVCA) screening area, including Snake Creek. Per Ontario Regulation 41/24, approval of the activity through a satisfactory EA process is necessary.

The Bruce County Official Plan Schedule A identifies that the bridge is within Agricultural Areas and Hazard Lands.

The Saugeen Shores Official Plan and Zoning By-law identifies that the bridge is within the Environmental Protection (EP) zone, with the subject area including Agricultural (A) zoning.

1.3 Existing Regulations

The Provincial Planning Statement (PPS 2024), Endangered Species Act (ESA 2007), Fisheries Act (FA 1985), Species at Risk Act (SARA, 2002), Policies of the SVCA and Ontario Regulation 41/24, Bruce County Official Plan (2024), Town of Saugeen Shores Official Plan (2014 consolidation), and Town of Saugeen Shores Zoning By-law 75-2006 are relevant to the rehabilitation/replacement of Blatchford Bridge, and are outlined in

detail in *Appendix 1*, including the policy, sections, applicable details, conformity and any proposed mitigation or permitting requirements as it relates to these policies.

1.4 Terms of Reference

Based upon the above Acts, Policies and Regulations, Terms of Reference (ToR) for the Scoped EIS were developed and submitted to the SVCA and Bruce County on June 17, 2024. The county provided comments on the ToR on July 8, 2024. A phone call with the SVCA and related follow-up email on July 11, 2024 stated that the SVCA wanted to review a site plan and perform a site visit before taking further action with this file. The ToR and associated correspondence are provided in *Appendix 2.*

2.0 Methods

2.1 Background Review

A background information review was conducted, of both biological and physical features within the vicinity of the study area. The following resources were consulted during this review:

- Aerial photography of the subject site,
- County of Bruce Official Plan (2024 Consolidation)
- Environmental Impact Study Guideline, The Corporation of the County of Bruce (2009)
- Town of Saugeen Shores Official Plan (2014 consolidation),
- Town of Saugeen Shores Zoning By-law 75-2006 (2024),
- Bruce County mapping, accessed June 13, 2024
- SVCA mapping of approximate regulated and approximate screening areas, accessed June 13, 2024,
- Environmental Planning and Regulations Policy, SVCA Environmental Planning and Regulations Policies Manual (2017),
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- Ontario Butterfly Atlas. Toronto Entomologists' Association, accessed March 12, 2024,
- Aquatic Species at Risk Map. Department of Fisheries and Oceans, accessed March 12, 2024,
- Aquatic Resource Area Survey Points and Line Segments, Land Information Ontario, accessed June 10, 2024

2.2 Vegetation

2.2.1 Ecological Land Classification

Ecological Land Classification (ELC) surveys were completed on June 18, 2024. Site investigation details are provided in *Appendix 3*. Due to not having permission to access the private properties within the study area, the ELC survey was conducted from the roadside, within the Right of Way. Surveys were completed by qualified Ecologist, Shannon Davison, OMNRF Certified in Ecological Land Classification. Vegetation communities within the study area were characterized and delineated following the Ecological Land Classification (ELC) system for Southern Ontario 1st approximation; community codes used generally follow the 2nd approximation (Lee, et al., 1998, 2008). Boundaries of ELC communities were mapped using aerial images and field observations (*Figure 1*). Digitized ELC data sheets are provided in *Appendix 4*.

Identified ELC communities were cross referenced with the NHIC Ontario Plant Community List (NHIC 2015) to determine the presence of rare plant communities (S3-S1). The Subnational, or Provincial Ranks (S Rank) are assigned by the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) to help assign protection priorities.

2.2.2 Botanical Inventory

Concurrent with ELC evaluations, the subject lands were inventoried as best as possible from the right of way to provide a comprehensive summer botanical inventory. Site investigation details are provided in *Appendix 3*.

Identified vascular plant species were compared to provincial and federal SAR lists (COSARO, SARA), provincial ranks (NHIC 2015), global ranks, and Waterloo Region Significant Species List (Region of Waterloo, 1999) to assess federal, provincial, regional, and local conservation status of each species. English colloquial names and scientific binomials of plant species generally follow the Database of Vascular Plants of Canada (VASCAN 2016).

Identification of environmentally sensitive plant species was completed based on assignment of a coefficient of conservatism value (CC) for each native species (Oldham, et al., 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to specific natural habitat parameters. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters. These species may be more sensitive to environmental changes (Mortarello et. al., 2010).

A list of all identified plant species is provided in *Appendix 5*. The list provides botanical names, common names, provincial rarity rank (S-rank), global rarity rank (G-rank), provincial Species at Risk status (SARO), federal Species at Risk status (SARA), local

rarity/significance within Grey County (Oldham 1993), CC and coefficient of wetness (CW). Plant species that could only be identified to genus were not assigned the above information.

2.3 Wildlife

2.3.1 Incidental Wildlife Observations

Incidental observations of wildlife were recorded during all field visits. Site investigation details are provided in *Appendix 3*.

2.3.2 Breeding Bird Surveys

Breeding bird surveys were conducted by Brynn Varcoe, Terrestrial Ecologist, to determine if significant breeding bird habitat occurs within, or adjacent to, the study area. Two surveys were conducted, comprised of 10-minute point counts positioned at a pre-determined location. Surveys followed the Ontario Breeding Bird Atlas: Guide for Participants (Bird Studies Canada, 2001). The highest observed level of breeding evidence was used to assign breeding status (i.e., confirmed, possible, probable or observed) to each species.

Surveys were performed during the peak breeding season for the bulk of species in southern Ontario (last week of May through early July) and were spaced at least 10 days apart in order to determine presumed permanent territories through territorial singing males. The two surveys took place on the mornings of June 10 and July 4, 2024, between 30 minutes before dawn and 5 hours after dawn. The point count locations are illustrated on *Figure 1*, full survey results are provided in *Appendix 6*, and detailed survey dates and weather information are provided in *Appendix 3*.

2.3.3 Bat Maternity Habitat Surveys

As surveys took place over spring and summer 2024, no leaf-off bat maternity habitat assessment took place. However, concurrent with the ELC and botanical inventory, an assessment on the suitability of trees as bat maternity habitat was conducted on trees in the vicinity of the bridge, to see if a leaf-off survey for bat maternity habitat was necessary.

2.3.4 Significant Wildlife Habitat

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criterion Schedule 6E (2015b), the study area was considered for the

presence of Significant Wildlife Habitat (e.g., specialized habitats for wildlife, and habitat for species of conservation concern). An assessment of the study area for all SWH is provided in *Appendix 7.*

2.3.5 Species at Risk Habitat

A thorough review of background documents was conducted to compile a master list of all Species at Risk, and species with conservation designation that may occur in the study area. A review of the site, along with habitat requirements for each species was conducted; the site was then evaluated for potential habitat using Ecological Land Classification, guidance from MNRF documents, and on-site knowledge acquired through field surveys. An assessment of the study area for candidate habitat for SAR is provided in *Appendix* 8.

2.4 Aquatic Habitat Assessment

Aquatic habitat assessments (AHA) were completed by Heather Dixon, Aquatic Ecologist, on June 18, 2024. The assessment was completed in an effort to classify stream features present to help inform decisions and mitigate any potential risks to fish and fish habitat as a result of the potential work. Data were collected upstream and downstream of the bridge, where access was allowed and where the creek maintained a safe wading depth. The following criteria were used to characterize features present at each station:

- mean channel width;
- mean wetted width;
- max water depth;
- percent stream shading;
- buffer width;
- substrate;
- flow pattern;
- channel morphology;
- instream cover;
- bank characteristics; and
- presence of specific site features.

Detailed survey and weather information are provided in *Appendix 3*.

3.0 Existing Conditions

3.1 Background Review

3.1.1 Wildlife Atlases-Species of Conservation Concern

A thorough background search of the study area and adjacent lands has been completed using the resources noted in Section 2.1. The species of conservation concern, including those listed under the ESA and/or SARA as well as those with S-ranks of S1-S3, identified in the background search are identified in *Table 1*. *Table 1* includes the identified species, the sources where they were identified, their currents statuses under COSSARO, the ESA, COSEWIC, and SARA, as well as their provincial, national, and global ranks.

The findings of this review are presented in *Table 1* and *Appendix 9*. An assessment of the study area for candidate habitat for these SAR is included in *Appendix 8*.

3.1.2 Ministry of Natural Resources and Forestry

A request for information was sent to the MNRF, Aurora Midhurst Owen Sound District, on June 13, 2024. A response was provided on June 14, 2024 with information on Snake Creek, with further enquiry providing a suggested restricted in-water timing window March 15-July 15. The request for information and response are included in *Appendix 10*.

3.1.3 Ministry of Environment, Conservation and Parks

A request for information was sent to the Ministry of Environment, Conservation and Parks (MECP) on June 13, 2024 to inquire whether any further Species at Risk may occur in the study area. No response was received from MECP, but the Natural Heritage Information Centre (NHIC) responded on June 19, 2024, stating that there were no additional SAR present than those found in the background review. The request for information and response is included in *Appendix 10*.

Table 1. Species at Risk Identified in Background Review

Source	Common Name	Scientific Name	COSSARO	SARO	COSEWIC	SARA	S-RANK	G-RANK	N-RANK	Area sensitive	Area required (ha)	PIF Species (BCR 13)
ORAA (2012)	Western Chorus Frog - Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	NL	NAR	THR	THR	S4	G5TNR	N4			
OBBA, eBird (2018)	Bank Swallow	*Riparia riparia*	THR	THR	THR	THR	S4B	G5	N5B,N5M			✓
OBBA	Barn Swallow	*Hirundo rustica*	SC	SC	THR	THR	S4B	G5	N3N4B,N3N4M			
OBBA, NHIC	Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	THR	S4B	G5	N5B,N4N5M	✓	>10ha	✓
OBBA	Canada Warbler	*Wilsonia canadensis*	SC	SC	SC	THR	S4B	G5	N4B,N3M	✓	>30ha	
OBBA, NHIC	Eastern Meadowlark	*Sturnella magna*	THR	THR	THR	THR	S4B,S3N	G5	N4B,NUM	✓	>10ha	✓
OBBA, NHIC	Eastern Wood-Pewee	*Contopus virens*	SC	SC	SC	SC	S4B	G5	N5B,N5M			✓
eBird (2015)	Golden Eagle	*Aquila chrysaetos*		END	NAR		S1B,S4N	G5	N4N5B,N4N5N,N4N5M			
OBBA	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	SC	SC	S4B	G5	N4N5B,N4N5M	✓	>10ha	✓
OBBA	Loggerhead Shrike	*Lanius ludovicianus*	END	END	END	END	S1B	G4	N3B,N3M	✓	>25ha	✓
OBBA	Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	END	END	END	S3	G5	N4B,N3M			✓
OBBA	Short-eared Owl	*Asio flammeus*	THR	THR	THR	SC	S4?B,S2S3N	G5	N4B,N3N,N4M	✓	>75ha	✓
OBBA	Wood Thrush	*Hylocichla mustelina*	SC	SC	THR	THR	S4B	G4	N4B,NUM			✓
OBA (2023)	Monarch	*Danaus plexippus*	SC	SC	END	SC	S2N,S4B	G5	N3B,NNRM			
ORAA (2018)	Midland Painted Turtle	*Chrysemys picta marginata*	NAR	NAR	SC	SC	S4	G5T5	N4			
ORAA (2006)	Snapping Turtle	*Chelydra serpentina*	NL	SC	SC	SC	S4	G5T5	N4			

3.2 Vegetation

3.2.1 Ecological Land Classification and Botanical Inventory

The community polygons identified during the ELC survey are summarized in *Table 2* below. Field forms and a comprehensive vascular plant list for the entire study area are presented in *Appendices 4 and 5*, respectively.

Table 2. Ecological Land Classification

ELC Code	Vegetation Type	Community Description
Mixed Meadow (MEM)		
MEMM3	Dry- Fresh Mixed Meadow	This community lies on both sides of Snake Creek to the west of McKechnie Sideroad, and on the south side of Snake Creek to the east of McKechnie Sideroad. There is no canopy, and the subcanopy consists of rare instances of American Elm (*Ulmus americana*). The understorey consists of Hawthorn species (*Crataegus* sp.), Riverbank Grape (*Vitis riparia*), Common Buckthorn (*Rhamnus cathartica*), Wild Red Raspberry (*Rubus idaeus ssp. strigosus*), and Cow-parsnip (*Heracleum maximum*). The ground layer consists of Goldenrod species (*Solidago sp.*), Awnless Brome (*Bromus inermis*), Canada Anemone (*Anemonastrum canadense*), Common Milkweed (*Asclepias syriaca*), Tufted Vetch (*Vicia cracca*), Reed Canary Grass (*Phalaris arundinacea*), Field Horsetail (*Equisetum arvense*), Tall Meadow-rue (*Thalictrum pubescens*), Tall Buttercup (*Ranunculus acris*), Wild Carrot (*Daucus carota*), Oxeye Daisy (*Leucanthemum vulgare*), and Stinging Nettle (*Urtica dioica*).
Deciduous Forest (FOD)		

Table 2. Ecological Land Classification

ELC Code	Vegetation Type	Community Description
FODM5-1	Dry- Fresh Sugar Maple Deciduous Forest	This community occurs on the west side of McKechnie Sideroad. The canopy is dominated by Sugar Maple (*Acer saccharum*), which also dominates the subcanopy along with instances of White Ash (*Fraxinus americana*), and American Elm. The understorey consists of White Ash, Common Buckthorn, Prickly Gooseberry (*Ribes cynosbati*), American Basswood (*Tilia americana*), Alternate-leaved Dogwood (*Cornus alternifolia*), and Choke Cherry (*Prunus virginiana*). The ground layer consists of Oxeye Daisy, Tufted Vetch, Eastern White Cedar (*Thuja occidentalis*), Black Raspberry (*Rubus occidentalis*), Zig-zag Goldenrod (*Solidago flexicaulis*), Large False Solomon's Seal (*Maianthemum racemosum*), Orchard Grass (*Dactylis glomerata*), Broad-leaved Enchanter's Nightshade (*Circaea canadensis*), Garden Bird's-foot Trefoil (*Lotus corniculatus*), Annual Fleabane (*Erigeron annuus*), Hairy-nerved Carrionflower (*Smilax lasioneura*), Chicory (*Cichorium intybus*), Spiked Sedge (*Carex spicata*), and Bull Thistle (*Cirsium vulgare*).
FODM5-6	Dry- Fresh Sugar Maple - Basswood Deciduous Forest	This community occurs east of McKechnie Sideroad on either side of Snake Creek. The canopy consists of Sugar Maple, White Ash, American Basswood, and Black Cherry (*Prunus serotina*). The subcanopy consists of White Ash, Eastern White Cedar, Sugar Maple, and American Basswood. The understory consists of White Ash, Common Buckthorn, Riverbank Grape, Wild Red Raspberry, and Alternate-leaved Dogwood. The ground layer consists of Eastern White Cedar, Prickly Gooseberry, Oxeye Daisy, Orchard Grass, Tall Buttercup, Goldenrod species, Zig-zag Goldenrod, Virginia Creeper (*Parthenocissus quinquefolia*), Common Dandelion (*Taraxacum officinale*), Canada Thistle (*Cirsium arvense*), Herb-robert (*Geranium robertianum*), White Campion (*Silene latifolia*), Yellow Goat's-beard (*Tragopogon dubius*), White Trillium (*Trillium grandiflorum*), and Drooping Woodland Sedge (*Carex arctata*).
Open Aquatic (OA)		

Table 2. Ecological Land Classification

ELC Code	Vegetation Type	Community Description
OAO	Open Aquatic	Snake Creek runs through the centre of the study area, passing under Moore Bridge. The understorey on the banks consists of Heart-leaved Willow (*Salix eriocephala*), Sandbar Willow (*Salix interior*), and Narrow-leaved Cattail (*Typha latifolia*). The ground layer consists of Soft-stemmed Bulrush (*Schoenoplectus tabernaemontani*), Fowl Bluegrass (*Poa palustris*), Broad-leaved Arrowhead (*Sagittaria latifolia*), Lakebank Sedge (*Carex lacustris*), and Harlequin Blue Flag (*Iris versicolor*).
Open Agriculture (OAG)		
OAGM1	Annual Row Crops	These communities occur on the northern and southern edges of the study area.
OAGM4	Open Pasture	This community occurs on the southeastern edge of the study area.

3.2.2 Botanical Inventory

A detailed botanical field inventory of the study area completed from the roadside identified 52 species of vascular plants. All identified plant species are listed in *Appendix 5*. Two additional species were identified only to the level of genus and have not been designated as native or non-native or included in the overall species count.

Of the 52 species identified, 34 species (65%) are native, and 18 species (35%) are exotic or cultivars.

3.2.2.1 Species at Risk, Regional and Local Significance

No vegetation communities listed in *Table 2* are considered rare in the province.

Most of the native species are ranked S5 (secure in Ontario) or SNA (S-Rank not applicable) with one species, White Ash, ranked S4 (apparently secure in Ontario), and an additional species, Virginia Creeper, ranked S4?, indicating uncertainty in its ranking. No S1-S3 species were observed in the study area. None of the species observed in the study area had a coefficient of conservatism of 7 to 10. This indicates the presence of species with moderate to high tolerance for environmental ranges, which may be less impacted by minor site alteration or environmental disturbance.

No nationally or provincially rare, threatened, or endangered species were found.

3.3 Wildlife

3.3.1 Incidental Wildlife Observations

All incidental wildlife observations made outside formal field surveys are presented in *Table 3*. All observations were of single individuals unless otherwise stated.

Table 3. Incidental Wildlife Observations

Common Name	Scientific Name	Taxa	Date	Location/Notes
American Toad	*Anaxyrus americanus*	Amphibian	June 18, 2024	Observed during aquatic habitat assessment
Green Frog	*Lithobates clamitans*	Amphibian	June 18, 2024	Approximately five heard calling during aquatic habitat assessment.
American Kestrel	*Falco sparverius*	Bird	June 10, 2024	Observed incidentally during the first breeding bird survey.
Baltimore Oriole	*Icterus galbula*	Bird	June 10, 2024	Observed incidentally during the first breeding bird survey.
Blue Jay	*Cyanocitta cristata*	Bird	July 4, 2024	Observed incidentally during the second breeding bird survey.
Brown-headed Cowbird	*Molothrus ater*	Bird	June 10, 2024	Observed incidentally during the first breeding bird survey.
Common Yellowthroat	*Geothlypis trichas*	Bird	June 18, 2024	Observed during aquatic habitat assessment
Eastern Meadowlark	*Sturnella magna*	Bird	June 10, 2024	Two pairs observed incidentally during the first breeding bird survey. Species at Risk.
Eastern Phoebe	*Sayornis phoebe*	Bird	June 10, 2024	One pair observed incidentally during the first breeding bird survey.
Hairy Woodpecker	*Leuconotopicus villosus*	Bird	July 4, 2024	Observed incidentally during the second breeding bird survey.
Indigo Bunting	*Passerina cyanea*	Bird	June 18, 2024	Observed during aquatic habitat assessment
Mourning Dove	*Zenaida macroura*	Bird	June 10, 2024	Observed incidentally during the first breeding bird survey.

Table 3. Incidental Wildlife Observations

Northern Cardinal	*Cardinalis cardinalis*	Bird	July 4, 2024	Observed during second breeding bird survey outside the point count radius.
Northern Harrier	*Circus hudsonius*	Bird	June 10, 2024	One pair observed incidentally during the first breeding bird survey.
Pileated Woodpecker	*Dryocopus pileatus*	Bird	June 10 and 18, 2024	Observed incidentally during the first breeding bird survey, ELC and summer botanical surveys.
Red-winged Blackbird	*Agelaius phoeniceus*	Bird	June 18, 2024	Observed during aquatic habitat assessment, and ELC and summer botanical surveys.
Song Sparrow	*Melospiza melodia*	Bird	June 18 and July 7, 2024	Observed during aquatic habitat assessment and incidentally during the second breeding bird survey.
Wild Turkey	*Meleagris gallopavo*	Bird	June 10, 2024	Observed incidentally during the first breeding bird survey.
Yellow Warbler	*Dendroica petechia*	Bird	June 10 and 18, 2024	Observed incidentally during the first breeding bird survey and aquatic habitat assessment.
Cabbage White	*Pieris rapae*	Butterfly	June 18, 2024	Observed during ELC and summer botanical surveys.
Crayfish sp.	Unknown species	Crustacean	June 18, 2024	Observed during aquatic habitat assessment
Ebony Jewelwing	*Calopteryx maculata*	Damselfly	June 18, 2024	Multiple observed during aquatic habitat assessment
Larval fish	Unknown species	Fish	June 18, 2024	Observed during aquatic habitat assessment

3.3.2 Breeding Bird Surveys

The results of the Breeding Bird Survey (BBS) are presented in *Table 4.* During BBS visits, a total of 20 species were detected during point counts.

It is important to note that, despite high levels of breeding evidence, a given species may not have been breeding specifically in the area in which it was observed. This is

particularly true where species were only detected during one of the Breeding Bird Surveys. These species may have been foraging in these areas or, may have been wandering during post-breeding dispersal. However, in order to ensure that all potential breeding bird species have been captured by this survey, any species exhibiting possible, probable, or confirmed breeding behaviour was considered to be breeding in the study area. Therefore, 17 species were presumed to be breeding within the study area: Mourning Dove, Eastern Phoebe, Red-eyed Vireo, American Crow, House Wren, Gray Catbird, European Starling, American Robin, American Goldfinch, Vesper Sparrow, Song Sparrow, Baltimore Oriole, Red-winged Blackbird, Common Yellowthroat, American Redstart, Yellow Warbler, and Indigo Bunting. The Breeding Bird Survey results in their entirety can be found in *Appendix 6.*

Table 4. Point Count Surveys- Highest Breeding Evidence (HBE)

Common Name	Scientific Name	COSSARO	COSEWIC	SARA	S-RANK	G-RANK	Area sensitive	Area required (ha)	PIF priority species	June 10		July 4		FINAL HBE
										TOTAL	HBE	TOTAL	HBE	
Mourning Dove	*Zenaida macroura*				S5	G5				0	NA	1	S	S
Ring-billed Gull	*Larus delawarensis*				S5	G5				4	FO	0	NA	FO
Eastern Phoebe	*Sayornis phoebe*				S5B	G5				0	NA	2	CF	CF
Red-eyed Vireo	*Vireo olivaceus*				S5B	G5				0	NA	2	S	S
American Crow	*Corvus brachyrhynchos*				S5	G5				0	H	0	NA	H
Tree Swallow	*Tachycineta bicolor*				S4S5 B	G5				3	FO	0	NA	FO
House Wren	*Troglodytes aedon*				S5B	G5				0	NA	1	S	S
Gray Catbird	*Dumetella carolinensis*				S5B, S3N	G5				0	NA	1	S	S
European Starling	*Sturnus vulgaris*				SNA	G5				1	S	0	NA	S
American Robin	*Turdus migratorius*				S5	G5				2	S	3	T	T
American Goldfinch	*Carduelis tristis*				S5	G5				0	NA	2	S	S
Vesper Sparrow	*Pooecetes gramineus*				S4B	G5			✓	1	S	0	NA	S
Song Sparrow	*Melospiza melodia*				S5	G5				4	P	6	T	T
Baltimore Oriole	*Icterus galbula*				S4B	G5			✓	1	S	0	NA	S
Red-winged Blackbird	*Agelaius phoeniceus*				S5	G5				5	S	7	T	T
Common Grackle	*Quiscalus quiscula*				S5	G5				1	FO	0	NA	FO
Common Yellowthroat	*Geothlypis trichas*				S5B, S3N	G5				3	S	2	T	T
American Redstart	*Setophaga ruticilla*				S5B	G5	✓	>100ha		1	S	0	NA	S
Yellow Warbler	*Dendroica petechia*				S5B	G5				0	NA	1	S	S
Indigo Bunting	*Passerina cyanea*				S5B	G5				1	S	1	T	T

Legend: | *S-Rank*: | *Breeding Evidence:*

COSSARO: Committee on the status of Species at Risk Ontario COSEWIC: Committee on the status of Endangered Wildlife in Canada SARA: Species at Risk Act	S5: Secure—Common, widespread, and abundant in the province S4: Apparently Secure—Uncommon but not rare S3: Vulnerable—Vulnerable, relatively few populations *G-Rank:* G5: Very common globally; demonstrably secure B: Breeding—Conservation status refers to the breeding population of the species in the nation or state/province. N: Non-breeding—Conservation status refers to the non-breeding population of the species in the nation or state/province. M: Migrant—Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or state/province.	Observed FO- Flyover Possible H-suitable habitat S-singing male Probable T-presumed territory P- Pair observed in suitable nesting habitat Confirmed CF- Adult carrying food for young

3.3.2.1 SAR, Regional, and Local Significance

No SAR were identified in the study area. Most species detected in the study area are ranked as either S5 (Secure) or S4 (Apparently Secure) in Ontario.

3.3.2.2 Regional Priority Species

The Ontario Landbird Conservation Plan (OLCP): Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13 has identified a number of species that are considered conservation priorities for the region (Ontario Partners in Flight, 2008). Two priority species were identified during the breeding bird surveys: Vesper Sparrow and Baltimore Oriole.

3.3.3 Bat Maternity Habitat Surveys

Full leaf-off surveys were not performed, but an inspection of the health of trees adjacent to the bridge which occurred during the botanical inventory did not identify any potential candidate bat snags.

3.3.4 Significant Wildlife Habitat

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criterion Schedule 6E (2015), we have determined that assumed SWH is present in the form of Habitat for Special Concern and Rare Wildlife Species, as habitat for Monarch, Yellow-banded Bumble Bee, and Eastern Ribbonsnake. See *Appendix 7* for a detailed assessment of SWH.

Assumed habitat for Monarch and Yellow-banded Bumble Bee was identified within the Dry-Fresh Mixed Meadow community. No individuals were observed during the field investigations. Monarch were identified as present during the background wildlife review, while for Yellow-Banded Bumble Bee Bruce County is identified in provincial and/or federal species occurrence mapping as being an area where this species occurs, it did not appear in the background wildlife review. Since studies were not completed to determine if larval Monarch or bees were present, this ELC community has been assumed to be Significant Habitat for Special Concern and Rare Species (*Figure 2*). To prevent any potential impact to habitat, any required vegetation removal should take place in the Fall, and be followed by reseeding/planting with native seeds and/or plants.

There is potential for Eastern Ribbonsnake habitat to occur within the study area as the creek features dense riparian areas in the Dry-Fresh Mixed Meadow community. No individuals were observed during the site visit and, while Bruce County is identified in provincial and/or federal species occurrence mapping as being an area where this species occurs, it did not appear in the background wildlife review. As targeted studies for this species were not completed, this ELC community has been assumed to be Significant Habitat for Special Concern and Rare Species (*Figure 2*). To prevent any potential impact to habitat, any required vegetation removal should be scheduled in the fall when snakes will be in hibernacula. Areas where vegetation has been removed should be reseeded/planted immediately with native seeds and/or plants. Erosion and Sediment Control (ESC) measures should be implemented such that they isolate the work area, to reduce the potential for wandering snakes entering the work area.

3.3.5 Species at Risk Habitat

A thorough review of background documents was conducted to compile a master list of all Species at Risk, and species with conservation designations that may occur in the study area. Species at Risk listed as special concern are discussed in detail in section 3.3.4. Based on the background review and site assessment, suitable habitat for SAR bats listed as threatened or endangered has the potential to occur within the study area, and confirmed habitat for Eastern Meadowlark was identified in the Open Pasture community on the south side of the bridge.

All SAR bats in Ontario have the potential to occur within the study area due to the presence of forested habitat close to a watercourse and the bridge. No individuals were observed during site visits. No candidate trees were identified within the expected limits of work, however the forested communities within the study area may include trees that meet the criteria. No impacts are expected to the woodland. The proposed work is unlikely to have an impact on this SAR, assuming no tree removal is required during the

structure replacement. If tree removals are unavoidable, any proposed removals should occur outside the bat maternity window (April 1-September 30). If tree removals are likely, a bat habitat maternity habitat assessment should take place during leaf-off (late October to early May).

Two pairs of Eastern Meadowlark were observed on the east side of McKechnie Sideroad in the Open Pasture Community on the south side of the bridge. As this habitat will not be impacted by the proposed removal or replacement of Moore Bridge, this species will not be affected by work.

See *Appendix 8* for a detailed assessment of Species at Risk Habitat.

3.4 Aquatic Habitat Assessment

An extended aquatic habitat assessment to map habitat features present along the section of Snake Creek in the study area took place on June 18, 2024. The water was relatively turbid during the assessment. Downstream of the bridge the measured channel width of the creek varied between 6.14 m and 8.77 m. Depths varied between 14 cm in riffles and 53 cm in deeper pool areas. The flow regime downstream of the bridge was largely in the form of glides, with intermittent riffle and pool features. The creek featured minimal stream shading, and had a buffer width of at least 55 m on the upstream left bank, and a buffer width of at least 15 m on the upstream right bank. Undercut banks due to erosion were present on both banks of the stream. The substrate was dominated by cobble across the whole downstream section, with varying amounts of gravel, sand, and boulder also present. Mussel shells were found on the bank in this area, but were likely washed downstream from further up the creek, as the substrates are not preferable to most mussel species. The banks were well vegetated on both sides. Boulders were present in the downstream section of the creek, and instream cover was relatively low at 15% boulder. The low stream shading and in-stream cover, combined with the warm, turbid water limits the quality of the available habitat for fish. Crayfish and juvenile fish were observed, but no adult fish were seen. No barriers to fish movement were noted. Habitat mapping is provided for the downstream section of Snake Creek in *Figure 3*. Site photos are given in *Appendix 11.*

Upstream of the bridge the aquatic habitat was more variable in terms of widths and depths. The measured channel width of the creek varied between 6.56 m and 20.20 m. Depths varied between 22 cm in riffles and 80 cm in the deeper pool areas. The flow regime upstream of the bridge consisted mostly of two large pools separated by a glide, and riffles above the pools in the narrower portion of the creek. The creek featured minimal stream shading, had a buffer width of at least 65 m on the upstream left bank, and a buffer width of at least 10 m on the upstream right bank. Erosion and undercutting

of the creek banks occurred in the upstream section of the creek. The substrate was more variable than downstream, consisting of largely gravel and sand in the pool habitats, with cobble dominance demonstrated in the riffles. The gravel and sand substrates which are more present upstream offer good habitat for mussels, The banks were well vegetated. Boulders were sparsely present in the creek, and emergent vegetation in the form of Soft-stemmed Bulrush was common around the pool directly upstream of the bridge. The substrates, vegetation, and variable present in the creek provide moderate habitat for fish species, although a lack of stream shading, and low in-stream cover is noted. No barriers to fish passage were observed. Habitat mapping is provided for the upstream section of the Snake Creek in *Figure 4*. Site photos are given in *Appendix 11.*

Vascular plants within the riparian area included Heart-leaved Willow, Sandbar Willow, Narrow-leaved Cattail, Soft-stemmed Bulrush, Fowl Bluegrass, Broad-leaved Arrowhead, Lakebank Sedge, and Harlequin Blue Flag.

3.5 Geology and Soils

The study area contains Bottomland, Saugeen, Brady, and Fox soils (Hoffman and Richards, 1954). The Bottomland soils are variable in texture, topography, and stoniness (Hoffman and Richards, 1954). They are low lying, alluvial soils that occur on stream courses that are subject to periodic flooding, and are immature with poorly defined horizons (Hoffman and Richards, 1954). In the study area Bottomland soils make up the soils in and immediately adjacent to Snake Creek. The Saugeen soils in the study area are silt clay loams loams which are part of the Brown Forest-Grey Brown Podzolic Intergrades and are lacustrine in origin (Hoffman and Richards, 1954). They are stone-free, smooth, and moderately sloping, and have good drainage (Hoffman and Richards, 1954). The Saugeen soils occur to the south of the bridge below the Bottomland soils, The Brady soils are a sandy loam from the Grey Brown Podzolic Great Group, formed from well-sorted sandy outwash (Hoffman and Richards, 1954). The drainage is imperfect, and the soils are smooth, stone-free, and very gently sloping (Hoffman and Richards, 1954). The Brady soils occur on the northwestern edge of the study area. The Fox soils in the study area are sandy loams which are part of the Grey Brown Podzolic Great Group, formed from well-sorted sandy outwash (Hoffman and Richards, 1954). They have good drainage, and the soils are smooth, stone-free, and very gently sloping (Hoffman and Richards, 1954). The Fox soils occur on either side of McKechnie Sideroad north of the bridge.

4.0 Impact Analysis

The proposed development will result in impacts to the existing natural features. The structure is proposed to be removed or replaced in the same location as the existing structure. Subject to future detailed design, through the implementation of proposed mitigation the impact will be minor to none.

4.1 Potential Impacts and Mitigation Recommendations

A detailed assessment of the impacts (potential and actual) and mitigation measures is provided in *Appendix 12*. The expected impacts include loss of vegetation and wildlife habitat, disturbance of wildlife species and impacts to nesting birds, disturbance of riparian vegetation that will result in a loss of shade and increased temperature to the creek, increased erosion, sedimentation, and turbidity, loss of fish spawning habitat, changes to drainage and surface runoff, increased soil compaction, and linkage interruption along the watercourse.

Mitigation methods include:

- the development and implementation of an ESC plan, including ESC fencing to isolate the site and prevent the entrance of wildlife,
- netting off the bridge to exclude nesting birds before April 1,
- removal of vegetation outside of sensitive timing windows (April 1-August 31),
- Where avoidance is not possible, nest searches prior to vegetation removal in the breeding bird nesting window,
- Tree removals outside of the bird nesting and bat maternity windows (April 1-September 30),
- performing the work outside of the restricted in-water timing windows (March 15-July 15),
- maintaining site vegetation or restoring with native species as soon as possible,
- controlling access and movement of equipment and people,
- scheduling grading to avoid high run-off events, and
- minimizing changes to land contours and natural drainage.

5.0 Legislation and Policy Compliance

5.1 Provincial Planning Statement

Moore Bridge is considered transportation infrastructure and is therefore exempt from the constraints applied to development. The natural resources adjacent to the existing structure must still be given consideration, and impacts must be minimized where possible.

To fulfill the requirement under the PPS, natural features were inventoried and assessed for potential and actual impacts based on the proposed replacement of the structure. Assumed SWH and suitable habitat for SAR can be found in the Mixed Meadow and Deciduous Forest communities, which will potentially be disturbed by the bridge removal and possible replacement. Revegetation of the site following construction with native plants will help to mitigate these effects. Confirmed habitat for Eastern Meadowlark occurs in the Open Pasture community, but this community will not be affected by the proposed bridge work.

5.2 Endangered Species Act

The Endangered Species Act (2007) provides protection to species designated as Threatened or Endangered on the Species at Risk in Ontario list (2021). The habitat of some Species at Risk is also protected under the ESA. Protected habitat is habitat identified as essential for life processes including breeding, rearing, feeding, hibernation, and migration.

One SAR (Eastern Meadowlark) was identified during site investigations, suitable habitat for SAR bats is also present. The habitat occupied by the Eastern Meadowlark was more than 20 metres from the bridge, and is not expected to be impacted by the work. Trees that may provide maternity habitat for SAR bats may occur in the Deciduous Forest communities, although no candidate trees were identified in the vicinity of the bridge. Any impacts to the habitat of SAR bats may require an authorization under the ESA, in consultation with the MECP. If tree removals are proposed, a bat maternity habitat survey should occur to assess whether any trees proposed for removal are potential bat maternity habitat. Through the proposed mitigation, the bridge removal and possible replacement complies with the ESA.

5.3 Fisheries Act, 1985

To ensure compliance with the *Fisheries Act (1985)*, a DFO Self-Assessment should be completed at detailed design to determine if the works can be completed under the appropriate codes of practice. Based on this review a DFO Request for Review (RFR) of the detailed design may be required. Where works can not comply, or fall outside of the purview of the codes of practice, then a DFO RFR is required, and should be completed by a qualified biologist/ecologist. If it is determined that proposed actions may cause serious harm to fish that cannot be mitigated for, then a Fisheries Act Authorization would be required.

5.4 Species at Risk Act

No Federal lands are present in the study area and no aquatic SAR or habitat for aquatic SAR has been identified in the study area. One migratory bird SAR (Eastern Meadowlark) was identified in agricultural habitat on the southeastern edge of the study area that will not be impacted by work to the bridge. Therefore, this project is in compliance with the Species at Risk Act.

5.5 Saugeen Valley Conservation Authority

The study area is entirely within the SVCA approximate screening area and contains a watercourse crossing.

The removal and potential replacement of Moore Bridge is considered to be public infrastructure which is permitted when interfering with a watercourse via a watercourse crossing, and within the regulated area subject to the activity being approved through a satisfactory EA process and/or if it has been demonstrated to the satisfaction of SVCA that the development is acceptable on the natural features and hydrologic and ecological functions of the area.

This area is already impacted by the existing structure, and it is expected that any new impacts to the natural heritage features will be minor to none. Hydrological impacts to the watercourse and changes to flood capacity should be minimized through detailed design if a replacement bridge is constructed. Appropriate mitigation measures should be applied through design and construction planning and disturbed areas restored or enhanced where appropriate. See Section 7.0 for recommendations.

5.6 Bruce County Official Plan (2024)

The Bruce County Official Plan (2024 consolidation) indicates the presence of Hazard Lands in the Study Area. Candidate SWH and SAR habitat has been identified in the study area, and the Official Plan states that no development except for infrastructure is permitted in SWH or SAR habitat.

Based on the findings of the EIS and the recommended mitigation outlined in *Appendix 12* and section 7, prior, during and post-construction, ensures that the removal and potential replacement of Moore Bridge will not impact the ecological functions or environmental features and will not contravene the Bruce County Official Plan.

5.7 Town of Saugeen Shores Official Plan (2014 consolidation)

The Saugeen Shores Official Plan indicates that the bridge is within the environmental hazard area. The Official Plan requires that an EIS be completed that demonstrates that no negative impacts will occur to SWH, SAR habitat, fish habitat, and environmental hazard lands. Completing the EIS to the satisfaction of the SVCA and other approval agencies will result in this project conforming to the Official Plan.

5.8 Town of Saugeen Shores Zoning By-law 75-2006 (2024)

The study area is zoned Environmental Protection and Agriculture under the by-law. Completing the EIS to the satisfaction of the SVCA and other approval agencies will result in this project conforming to the by-law.

6.0 Summary and Conclusions

It is the opinion of AA that by implementing the mitigation measures identified in *Section 4* and *Appendix 12*, that the removal and potential replacement of Moore Bridge will result in no significant long-term negative impacts to natural heritage features identified in the study area. The natural features within the study area will be protected through mitigation and restoration recommendations. Below is a summary of the affected natural heritage features, constraints, and impacts. Recommendations for associated mitigation and/or protection measures are identified in *Section 4* and *Appendix 12.*

6.1 Biological Constraints

1. Surveys were conducted for Ecological Land Classification and Botanical Inventory, Breeding Birds, Significant Wildlife Habitat, Species at Risk Habitat and Aquatic Habitat.

2. One SAR was detected within the study area: Eastern Meadowlark. Habitat for this SAR was greater than 20 metres from the bridge and will not be impacted by the proposed work.

3. Suitable habitat may be present in the study area for species listed as Threatened or Endangered (SAR bats), which are afforded Habitat Protection.

4. Assumed SWH is present in the form of Special Concern and Rare Wildlife Species, as habitat for Monarch, Yellow-banded Bumble Bee, and Eastern Ribbonsnake, is present in the study area.

5. The study area includes a reach of Snake Creek.

6.2 Impact Assessment

1. Generalized impacts due to the replacement of the bridge were assessed to determine their extent and mitigation guidelines have been provided.

2. Potential impacts primarily involve the removal of herbaceous vegetation communities, site grading, impact to aquatic habitat, wildlife disturbance, and sediment run-off.

3. There are opportunities in the study area for edge enhancement, restoration, and compensation planting to mitigate and offset potential impacts.

6.3 Legislation and Policy Compliance

1. Assumed SWH and suitable SAR habitat near the bridge will be disturbed during construction. However, there will be no negative impacts to these natural features or their ecological functions through implementation of mitigation such as revegetation of the disturbed areas with native plants. Confirmed SAR habitat is present within the study area, but is greater than 20 metres from the bridge, and will not be disturbed by the proposed work.
2. The proposed removal and potential replacement of Moore Bridge can occur in accordance with the SVCA's policies, the Bruce County OP, the Town of Saugeen Shores OP, and the Town of Saugeen Shores Zoning By-law because it has been demonstrated that any impact to the hydrologic or ecological functions will be minimized through the recommended mitigation measures. The implementation of appropriate mitigation measures and restoration of disturbed areas will be considered through design and construction planning.

7.0 Recommendations

The following recommendations are provided to ensure protection of natural heritage features and function within and adjacent the severed parcel from the proposed development.

1. Implement Erosion and Sediment Control Plan (ESC) following guidelines provided in the “Greater Golden Horseshoe Area Conservation Authorities’ Erosion and Sediment Control Guideline for Urban Construction”.

2. Install and monitor a silt and sediment control barrier:
    1. Silt fence to be inspected weekly during construction and following a storm event of 25mm of rainfall within 24 hours.

3. ESC measures to be kept in place until construction is completed and disturbed soils have been vegetated.

4. ESC measures should be implemented such that they isolate the work area, to reduce the potential for wandering wildlife inside the work area.

5. The area of construction disturbance shall be kept to a minimum.

6. Control access and movement of equipment and people.

7. Minimize the use of heavy equipment in sensitive areas. Equipment is to be limited to the construction allowance area and is not to encroach within the adjacent natural communities.

8. Accumulated sediment and debris to be removed before silt fence is removed.

9. All disturbed areas will be re-vegetated or restored with site appropriate indigenous plants wherever opportunities exist.

10. Time activities to avoid wildlife disturbance during critical life stages:
    a) No in-water works are permitted from March 15-July 15, as per MNRF timing windows for the protection of fish and fish habitat.
    b) Avoid removal of trees and vegetation during the generalized breeding bird nesting period from April 1 to August 31 and tree removal during the bat maternity window of April 1 to September 30. If limited removal of herbaceous vegetation and shrubs is to occur during the general nesting

period, a nest search is to be completed by a skilled and experienced biologist/ecologist.

c) Net off the bridge by April 1 to prevent any bird nesting.

11. Where in water works cannot be conducted per the applicable codes of practice, submit a DFO Request for Review to identify any potential risks to fish and fish habitat.

12. If dewatering within the study area is deemed necessary, ensure a fish rescue is completed by a qualified biologist/ecologist prior to dewatering being completed.

13. Choose designs and materials that will minimize impacts.

14. Limit any cleaning solutions or paint used on the bridge and take appropriate precautions to avoid products entering the watercourse.

Prepared By:

ABOUD & ASSOCIATES INC.



Heather Dixon, PhD.
Aquatic Ecologist

Reviewed By:



Cheryl-Anne Ross, B. Sc.,
Ecology Lead & Wildlife Ecologist
OMNR Certified Ecological Land Classification
OMNR Certified Wetland Evaluation

7.0 References

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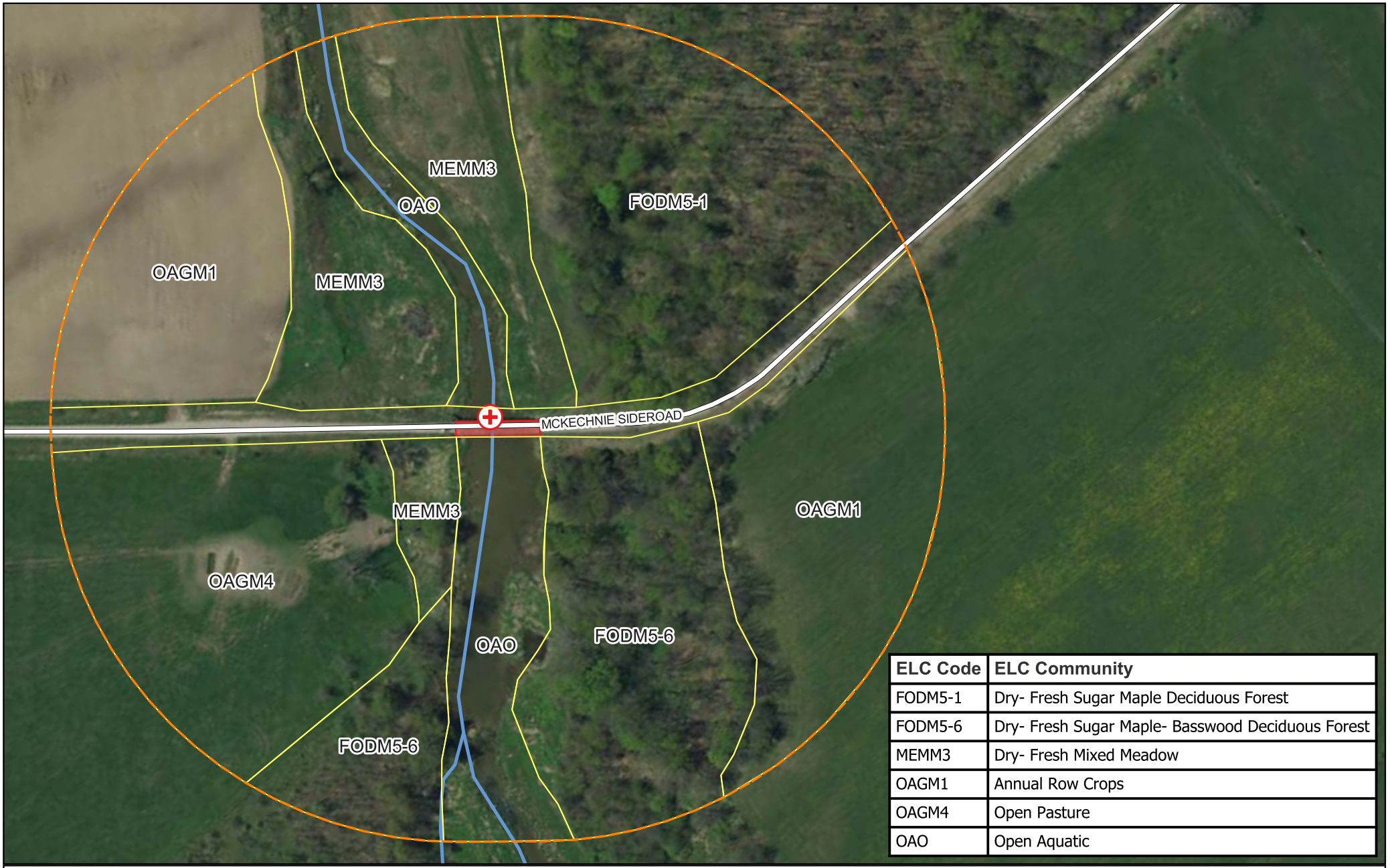
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Authorities Consulted

Edwards, Hannah. Management Biologist. MNRF. Email Correspondence.

Dillon, Ryan. Resource Management Coordinator. MNRF. Email Correspondence.

FIGURES



ELC Code	ELC Community
FODM5-1	Dry- Fresh Sugar Maple Deciduous Forest
FODM5-6	Dry- Fresh Sugar Maple- Basswood Deciduous Forest
MEMM3	Dry- Fresh Mixed Meadow
OAGM1	Annual Row Crops
OAGM4	Open Pasture
OAO	Open Aquatic

LEGEND

- STUDY AREA
- MOORE BRIDGE
- SNAKE CREEK
- BBS POINT COUNT
- ECOLOGICAL LAND CLASSIFICATION

Information Sources:
1. Orthophotography provided by First Base Solutions. Accessed March 2024.
2. Roads and watercourse provided by LIO. Accessed March 2024.

Title:
EXISTING CONDITIONS & SURVEY LOCATIONS

Project:
MOORE BRIDGE
SAUGEEN SHORES, ON

Date: OCTOBER 2024
Project: AA24-068A
Scale: 1 : 1500

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Figure No: 1



LEGEND

- STUDY AREA
- MOORE BRIDGE
- SNAKE CREEK
- EASTERN MEADOWLARK
- SUITABLE SAR BAT HABITAT
- CONFIRMED EASTERN MEADOWLARK HABITAT
- ASSUMED SIGNIFICANT WILDLIFE HABITAT FOR MONARCH, YELLOW-BANDED BUMBLE BEE, AND EASTERN RIBBONSNAKE

Information Sources:
1. Orthophotography provided by First Base Solutions. Accessed March 2024.
2. Roads and watercourse provided by LIO. Accessed March 2024.

Title:

NATURAL HERITAGE FEATURES & CONSTRAINTS

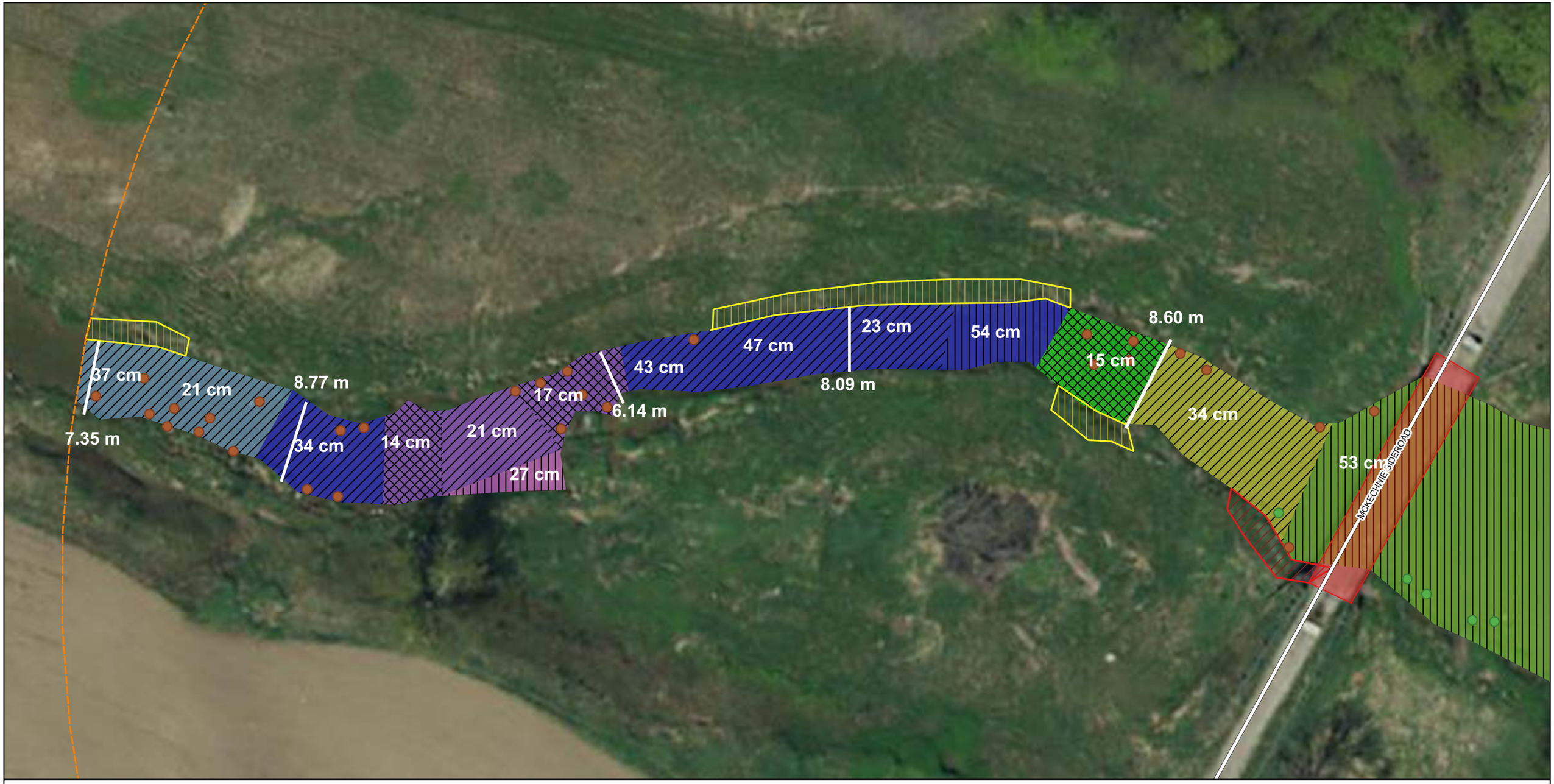
Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

Date: OCTOBER 2024
Project: AA24-068A
Scale: 1 : 1500

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Figure No: 2



LEGEND

- STUDY AREA
- MOORE BRIDGE
- EROSION
- UNDERCUTTING
- GLIDE
- POOL
- RIFFLE
- BOULDER
- EMERGENT VEGETATION
- 85 COBBLE, 15 BOULDER
- 60 COBBLE, 25 GRAVEL, 15 SAND
- 80 COBBLE, 15 BOULDER, 15 GRAVEL
- 60 COBBLE, 30 BOULDER, 10 GRAVEL
- 40 BOULDER, 40 GRAVEL, 20 COBBLE
- 50 SILTY SAND, 25 GRAVEL, 25 COBBLE
- 50 BOULDER, 10 COBBLE, 20 GRAVEL, 20 SAND

Information Sources:

1. Orthophotography provided by First Base Solutions. Accessed June 2024.
2. Road mapping provide by Land Information Ontario. Accessed June 2024.

Title:

AQUATIC HABITAT MAPPING: DOWNSTREAM

Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

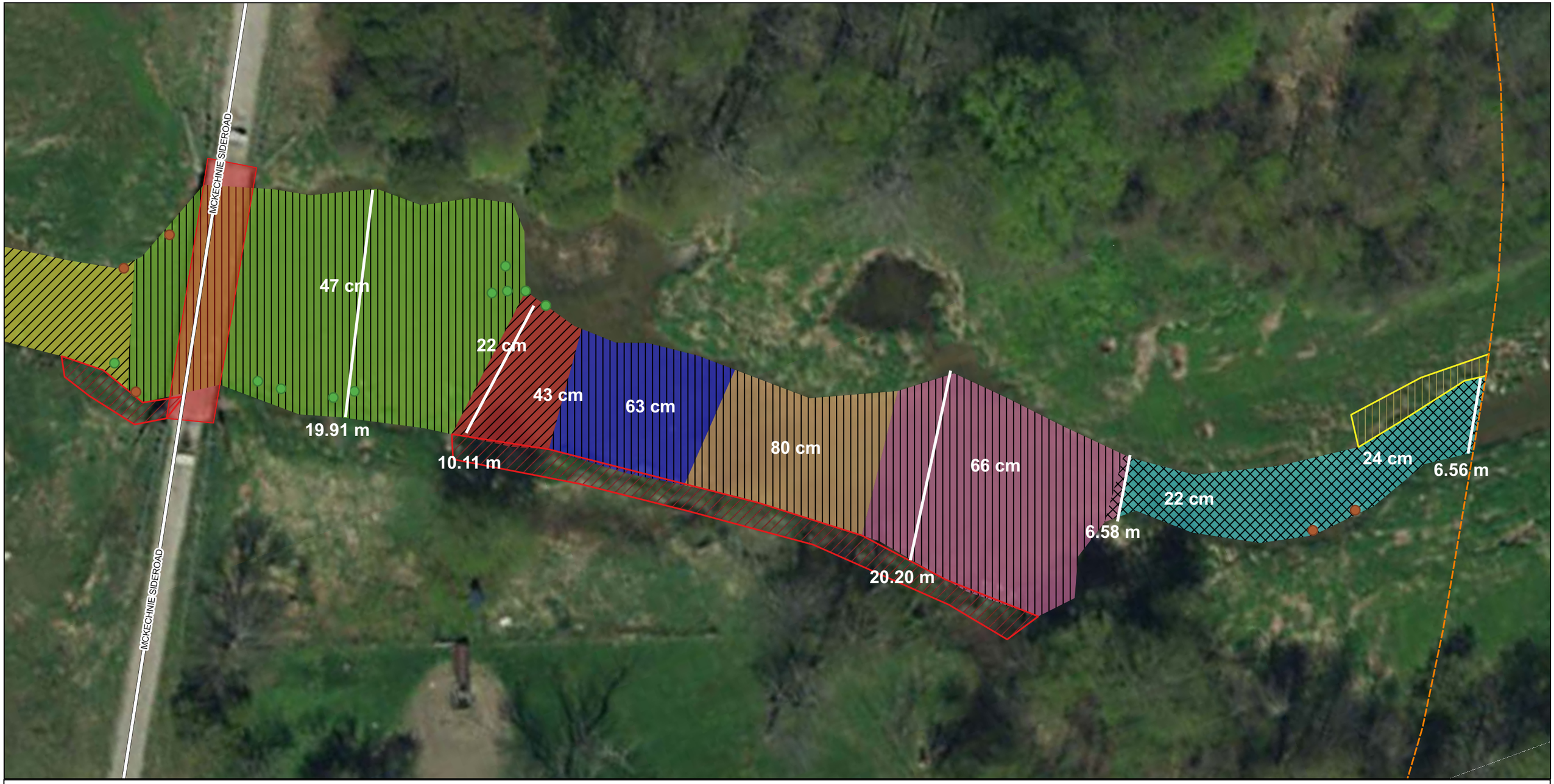
Date: JUNE 2024

Project: AA24-068A

Scale: 1 : 350

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Figure No: 3



LEGEND

- STUDY AREA
- MOORE BRIDGE
- EROSION
- UNDERCUTTING
- GLIDE
- POOL
- RIFFLE
- BOULDER
- EMERGENT VEGETATION
- 70 GRAVEL, 30 SAND
- 80 COBBLE, 20 BOULDER
- 60 COBBLE, 30 BOULDER, 10 GRAVEL
- 70 COBBLE, 20 BOULDER, 10 GRAVEL
- 50 GRAVEL, 30 BOULDER, 20 COBBLE
- 50 SILTY SAND, 25 GRAVEL, 25 COBBLE
- 50 BOULDER, 10 COBBLE, 20 GRAVEL, 20 SAND

Information Sources:

1. Orthophotography provided by First Base Solutions. Accessed June 2024.
2. Road mapping provide by Land Information Ontario. Accessed June 2024.

Title:

AQUATIC HABITAT MAPPING: UPSTREAM

Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

Date: JUNE 2024

Project: AA24-068A

Scale: 1 : 350

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Figure No: 4

APPENDIX 1
Applicable Policies and Conformity

Policy	Relevant Sections of the Policy	Policy Constraints Within the Study Area	Project Policy Conformity	Proposed Mitigation
Provincial Planning Statement (2024)	Section 4.1 Natural Heritage including sections 4.1.4, 4.1.5, 4.1.7, and 4.1.8.	Assumed Significant Wildlife Habitat (SWH) and habitat of endangered species present in Study Area.	Assumed SWH will be disturbed near the bridge, with the removal of vegetation. Candidate SAR habitat is present for Eastern Meadowlark, but is sufficiently distant from the proposed work that it will not be affected by it.	Vegetation to be replanted with native species.
Endangered Species Act (2007)	Subsection 9(1) Clause 10(1)(a) Clause 16(5) Clause 17(1) Section 23.9 (1)	Species at Risk and their habitat are potentially present in the Study Area.	Suitable SAR habitat will be disturbed during the bridge rehabilitation, with the removal of vegetation. Candidate SAR habitat is present for Eastern Meadowlark, but is sufficiently distant from the proposed work that it will not be affected by it.	The project will need to be assessed for compliance with the ESA at detailed design to determine if permitting or an IGF is required. Vegetation to be replanted with native species.
Fisheries Act	Section 34.4 (1) Section 35 (1)	Fish and fish bearing waters are present in the Study Area.	Fish identified during aquatic habitat assessment.	The project will need to be assessed for compliance with the Fisheries Act. If it is determined that proposed actions will cause the harmful alteration, disruption or destruction of fish habitat that cannot be mitigated, then a Fisheries Act

Policy	Relevant Sections of the Policy	Policy Constraints Within the Study Area	Project Policy Conformity	Proposed Mitigation
				Authorization will be required.
Species at Risk Act	Subsection 32 (1) and (2) Subsection 33 Subsection 34(1) Subsection 58 (1)	Habitat for aquatic SAR and migratory bird SAR potentially present in study area.	No habitat for aquatic SAR identified in study area following field studies. Habitat for Eastern Meadowlark present within the study area, but at a sufficient distance from the bridge that it will not be impacted by the work.	No mitigation necessary
Saugeen Valley Conservation Authority	Policy 4.5.2.2 Policy 4.15.1-1	Alteration within a regulated area and watercourse crossings.	Development within a regulated area and interference with a watercourse is allowed providing mitigation methods are followed, and technical studies must have been completed to the satisfaction of the SVCA or through a satisfactory EA process.	Mitigation as described in *Appendix 12* will be utilized to prevent negative effects to the study area from the rehabilitation. Infrastructure is being maintained under an environmental assessment process.
Bruce County Official Plan (2024 consolidation)	Section 4.3.2.7 Section 4.3.2.10 Section 4.3.3	Development within or adjacent to Hazard Lands, fish habitat, assumed SWH, and SAR habitat.	Infrastructure development permitted within these areas if it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.	This EIS has demonstrated that there will be no negative impacts on the natural features and areas or their ecological functions, provided mitigation described in *Appendix 12* are utilized.

Policy	Relevant Sections of the Policy	Policy Constraints Within the Study Area	Project Policy Conformity	Proposed Mitigation
Town of Saugeen Shores Official Plan (2014 consolidation)	Section 2.6.3.2 Section 2.6.3.4 Section 2.6.4.2 Section 2.6.5.1 Section 2.6.5.2 Section 2.6.12.1 Section 3.18.3.1	Development within or adjacent to Hazard Lands, fish habitat, assumed SWH, and SAR habitat.	Development permitted within these areas if it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.	This EIS has demonstrated that there will be no negative impacts on the natural features and areas or their ecological functions, provided mitigation described in *Appendix 12* are utilized.
Town of Saugeen Shores Zoning By-law 75-2006 (2024)	Section 22.3	Study area is zoned Natural Environment.	Completing the EIS to the satisfaction of the SVCA will result in this project conforming to the by-law.	No specific mitigation needed.

APPENDIX 2
Terms of Reference and Approval

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HABITAT RESTORATION
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RAVINE STEWARDSHIP PLANS
NATURALIZATION PLANS
INTERPRETIVE DESIGN
MONITORING
CONTRACT ADMINISTRATION

ENVIRONMENTAL STUDIES
SUBWATERSHED STUDIES
ENVIRONMENTAL IMPACT STATEMENTS
ECOLOGICAL LAND CLASSIFICATION
WETLAND EVALUATION
VEGETATION ASSESSMENT
BOTANICAL INVENTORIES
WILDLIFE SURVEYS
MONITORING

LANDSCAPE ARCHITECTURE
MASTER PLANNING
RESIDENTIAL COMMUNITIES
COMMERCIAL/INDUSTRIAL
HEALTHCARE AND EDUCATION
STREETSCAPES
PARKS AND OPEN SPACES
TRAIL SYSTEMS
GREEN ROOFS
CONTRACT ADMINISTRATION

EXPERT OPINION
OMB TESTIMONY
LEGAL PROCEEDINGS
PEER REVIEW
RESEARCH
EDUCATION

June 17, 2024

Our Project No.: AA24-068A
Sent by email: m.armstrong@svca.on.ca
bcplwa@brucecounty.on.ca

Matt Armstrong
Environmental Planning and Regulations Coordinator
Saugeen Valley Conservation Authority
1078 Bruce Road 1, Box 150
Formosa, ON N0G 1W0

&

Bruce County Planning and Development Department
30 Park St., P.O. Box 70
Walkerton, ON N0G 2V0

Re: Moore Bridge, Town of Saugeen Shores
Terms of Reference – Natural Environment Assessment Report

Dear Mr. Armstrong & the Bruce County Planning and Development Department:

This document outlines the Terms of Reference (ToR) of the Natural Environment Assessment Report for the proposed removal and potential replacement of Moore Bridge (structure SS-09) within the Town of Saugeen Shores. Please review the terms and circulate to relevant staff for discussion and approval.

BACKGROUND

The Town of Saugeen Shores is considering the removal and possible replacement of the Moore Bridge on McKechnie Side Road ~450 m south of Concession Road 8 E (east of Port Elgin) with a pedestrian bridge. As a result, a Municipal Class EA is required. As part of the Municipal Class EA, the Municipality requires the completion of a scoped EIS to characterize the natural environment and propose reasonable measures to mitigate any potential impacts that may arise through the EA process and determine any mitigation requirements based on the outcome of the EA.

The bridge is within the Saugeen Valley Conservation Authority (SVCA) screening area, including Snake Creek. Per Ontario Regulation 41/24, approval of the activity through a satisfactory EA process is necessary.

The Bruce County Official Plan Schedule A identifies that the bridge is within Agricultural Areas and Hazard Lands.

The Saugeen Shores Official Plan and Zoning By-law identifies that the bridge is within the Environmental Protection (EP) zone, with the subject area including Agricultural (A) zoning.

In preparing the Terms of Reference, the following sources were reviewed for background information:

- Aerial photography of the subject site,
- County of Bruce Official Plan (2024 Consolidation)
- Environmental Impact Study Guideline, The Corporation of the County of Bruce (2009)
- Town of Saugeen Shores Official Plan (2014 consolidation),
- Town of Saugeen Shores Zoning By-law 75-2006 (2024),
- Bruce County mapping, accessed June 13, 2024
- SVCA mapping of approximate regulated and approximate screening areas, accessed June 13, 2024,
- Environmental Planning and Regulations Policy, SVCA Environmental Planning and Regulations Policies Manual (2017)
- Natural Heritage Information Center, Make-a-map, accessed March 12, 2024,
- Ontario Nature. Ontario Reptile and Amphibian Atlas: a citizen science project to map the distribution of Ontario's reptiles and amphibians. 2019, accessed March 12, 2024,
- Ontario Breeding Bird Atlas. Bird Studies Canada, 2007, accessed March 12, 2024,
- Atlas of the Mammals of Ontario. Dobbyn, 1994, accessed March 12, 2024,
- iNaturalist, accessed June 10, 2024,
- eBird. Cornell Lab of Ornithology. accessed June 10, 2024,
- Ontario Butterfly Atlas. Toronto Entomologists' Association, accessed March 12, 2024,
- Aquatic Species at Risk Map. Department of Fisheries and Oceans, accessed March 12, 2024,
- Aquatic Resource Area Survey Points and Line Segments, Land Information Ontario, accessed June 10, 2024,

STUDY AREA

The study area is the subject structure and up to 120 m beyond the structure, where access is permitted (*Figure 1*).

As needed, the lands adjacent to the structure may require further access to assist with understanding the characteristics and functions of natural heritage features. Where access is restricted, information will be acquired through existing background information and what can be observed from the edge of the accessible lands.

Lands outside of the field study area, or where access is not provided, will be reviewed from existing background information (e.g., Bruce County Official Plan).

PLANNING CONTEXT

Provincial Policy Statement (2020)

The *Provincial Policy Statement* ([PPS] OMMHA 2020) provides policy direction on matters of provincial interest related to land use planning and development.

In regards to Natural Heritage Protection the PPS states that:

"*Natural features and areas shall be protected for the long term.*"

And that:

"*The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features."*

Development and site alteration shall not be permitted in:

a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6Eand 7E;
b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
c) Significant valley lands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
d) Significant wildlife habitat;
e) Significant areas of natural and scientific interest; and
f) Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b)"

The PPS (2020) also states that:

- *"Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements."*

- *"Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements."*

- *"Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*

- *"Development and site alteration shall be restructured in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored. Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions."*

Under *Section 1.6.8.6*, these significant resources shall be given consideration in the planning of significant transportation infrastructure.

Moore Bridge is considered infrastructure and therefore is not prohibited on lands containing significant resources. However, natural features must be documented and considered when evaluating potential impacts of the proposed works.

Endangered Species Act, 2007

The *Endangered Species Act* (ESA) (Subsection 9(1)) states that:

"No person shall,

a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;

b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,

i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,

ii) any part of a living or dead member of a species referred to in subclause (i),

iii) anything derived from a living or dead member of a species referred to in subclause (i); or

c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).

Clause 10(1)(a) of the ESA also states that:

"No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species."

Clause 16(5) of the ESA states that:

"An agreement entered into under this section may require the authorized party under the agreement to pay a species conservation charge to the Agency in accordance with Section 20.3 if an impacted species under the agreement is also a conservation fund species."

Clause 17(1) of the ESA states:

"The Minister may issue a permit to a person that, with respect to a species specified in the permit that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species, authorizes the person to engage in an activity specified in the permit that would otherwise be prohibited by Section 9 or 10. 2007, c. 6, s. 17(1)."

Fisheries Act, 1985

The study area contains fish-bearing waters in the form of Snake Creek. This area and the fish within are protected under the Federal Fisheries Act, 1985. The Fisheries Act provides protection for the sustainability and ongoing productivity of Canada's recreational, commercial, and Aboriginal fisheries.

Section 35 (1) of the Fisheries Act states that:
"No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat."

The Fisheries Act requires that projects and activities avoid causing serious harm to fish and fish habitat unless authorized to do so by the Department of Fisheries and Oceans Canada (DFO). This applies to work conducted in or near waterbodies that support direct or indirect fish habitat. Within the context of the removal or replacement of the bridge, any proposed actions that could impact fish or fish habitat would need to be assessed for compliance with the Fisheries Act. If it is determined that proposed actions

will cause serious harm to fish, which cannot be mitigated for, then a Fisheries Act Authorization would be required.

Species at Risk Act (S.C. 2002, c. 29)

The Species at Risk Act (SARA) includes prohibitions to protect listed wildlife species. Prohibitions of SARA within the Province of Ontario generally apply to species present on federal lands and all aquatic Species at Risk (SAR).

SARA subsection 32 (1) and (2) states that:

No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.
And,
No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual.

SARA subsection 33 also states that:

No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.

SARA subsection 34(1), identifies where SARA does not apply in the Province:

With respect to individuals of a listed wildlife species that is not an aquatic species or a species of birds that are migratory birds protected by the Migratory Birds Convention Act, 1994, sections 32 and 33 do not apply in lands in a province that are not federal lands unless an order is made under subsection (2) to provide that they apply.

SARA subsection 58 (1) identified the restrictions to the destruction of critical Habitat, and states that:

Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if…b)the listed species is an aquatic species; or….

Where impacts may occur or are expected, agreements or permits may be entered into with the appropriate ministry, as outlined in section 73, which states:

(1) The competent minister may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed wildlife species, any part of its critical habitat or the residences of its individuals.

(2) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that
(a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
(b) the activity benefits the species or is required to enhance its chance of survival in the wild; or
(c) affecting the species is incidental to the carrying out of the activity.

3) The agreement may be entered into, or the permit issued, only if the competent minister is of the opinion that

> *(a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;*
> *(b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and*
> *(c) the activity will not jeopardize the survival or recovery of the species.*

The Species at Risk Act requires that projects and activities avoid causing serious harm to Species at Risk or their habitat unless authorized to do so. This applies to work conducted in or near waterbodies that support species at risk fish, or their critical habitat. Any proposed actions that could impact species at risk or their habitat would need to be assessed for compliance. If it is determined that proposed actions will cause serious harm to species at risk that cannot be mitigated, then a Species at Risk Act Authorization would be required.

Bruce County Official Plan (2024)

The Bruce County Official Plan Schedule A identifies that the bridge is within Agricultural Areas and Hazard Lands. The study area may also contain significant wildlife habitat, the habitat of threatened and endangered species, and fish habitat.

Section 4.3.2.7 states that:

"It is the policy of County Council that development except for infrastructure permitted by the Provincial Policy Statement shall not be permitted within significant portions of the habitat of threatened and endangered species."

Section 4.3.2.10 states that:
"It is the policy of County Council that no development except for essential municipally owned infrastructure shall be permitted within areas of significant wildlife habitat provided no adverse environmental impact will result."

Section 4.3.4 states that:
"Written permission maybe required from the applicable Conservation Authority pursuant to Ontario Regulations – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses where development or site grading is proposed within a Regulated Area as shown on schedules filed with the Conservation Authority where such mapping exists or otherwise generally within or near the Hazard Lands designation."

Saugeen Valley Conservation Authority

A portion of the study area is mapped as within the approximate screening area by the SVCA. Policy 4.5.2.2 of the Environmental Planning and Regulations Policy SVCA Environmental Planning and Regulations Policies Manual states:

"*Development, interference or alteration within a Regulated Area will be permitted only where it can be demonstrated to the Authority's satisfaction that:*

- *Susceptibility to natural hazards is not increased or new hazards created;*
- *There are no adverse hydraulic or fluvial impacts on rivers, creeks, streams, or watercourses;*
- *Grading (e.g. placing and removing fill) is minimized and maintains stage-storage discharge relationships and floodplain flow regimes for a range of rainfall events, including regulatory storm;*
- *There are no negative or adverse hydrologic impacts on wetlands;*
- *Pollutions, sedimentation and erosion during construction and post construction is minimized using best management practices including site, landscape, infrastructure and/or facility design (whichever is applicable based on the scale and scope of the project), construction controls, and appropriate remedial measures;*
- *Intrusions on hydrologic functions are avoided, and no adverse impacts to hydrologic functions will occur;*

- *Groundwater discharge areas which support hydrologic functions on-site and adjacent to the site are avoided;*
- *Groundwater recharge areas which support significant natural features or hydrologic or ecological functions on-site and adjacent to the site will be maintained or enhanced;*
- *Access for emergency works and maintenance of flood or erosion control work is available;*
- *Works are constructed, repaired and/or maintained according to accepted engineering principles and approved engineering standards or to the satisfactions or the SVCA, whichever is applicable based on the scale and scope of the project; and*
- *The control of flooding, erosion, pollution or the conservation of land is not adversely affected during and post development, interference or alteration."*

With regards to the conditions under which an SVCA permit can be granted for watercourse crossings, policy 4.15.1-1 states:

"If it has been demonstrated to the satisfaction of the SVCA that the interference is acceptable on the natural features and hydrologic and ecological functions of the watercourse. At a minimum, plans should demonstrate the following based on the morphological characteristics of the watercourse:

a) culverts have an open bottom where feasible and where it is not feasible, culverts are appropriately embedded into the watercourse;

b) crossing location, width and alignment should be compatible with stream morphology which typically requires location of the crossing on a straight and shallow/riffle reach of the watercourse with the crossing situated at right angles to the watercourse;

c) the crossing is sized and located such that there is no increase in upstream or downstream erosion or flooding;

d) the design should consider fish and wildlife passage; and

e) have regard for upstream and downstream effects when installing/replacing a culvert."

In addition, SVCA is authorized under Section 28 of the Conservation Authorities Act to implement and enforce the Prohibited Activities, Exemptions and Permits Regulation (Ontario Regulation 41/24).

Town of Saugeen Shores Official Plan (2014 consolidation)

The Saugeen Shores Official Plan indicates that the bridge is within the Environmental Hazard area. The study area may also contain significant wildlife habitat, the habitat of threatened and endangered species, and fish habitat.

Section 2.6.3.2 states that:
"No development or site alteration shall be permitted in habitat of endangered or threatened species or species at risk."

Section 2.6.3.4 states that:
"Development and site alteration may be permitted on adjacent lands only if it has been demonstrated through an Environmental Impact Statement that there will be no negative impacts on the habitat of endangered or threatened species."

Section 2.6.4.2 states that:
"Development or site alteration proposed in or adjacent to significant wildlife habitat is not permitted unless an Environmental Impact Statement has been approved by Council which demonstrates that there will be no negative impact on the significant wildlife habitat."

Section 2.6.5.1 states that:
"Where development is proposed in a water feature or adjacent to a water feature that has the potential to contain fish habitat, an Environmental Impact Statement shall be required."

Section 2.6.5.2 states that:
"Development and site alteration shall not be permitted in fish habitat, except in accordance with Provincial and Federal requirements."

Section 2.6.12.1 states that:
"It is a policy of the Town to require land use proposals within and/or abutting lands designated as Environmental Hazard to be reviewed by Council and appropriate government agencies in order to ensure that development which has the potential to seriously impair ecological processes and natural features by virtue of the type and scale of the proposed land use or the cumulative impacts of it and other land uses in its vicinity is not permitted within the Plan area. The Environmental Impact Statement shall assist in determining whether the development should be permitted, and if so, what environmental safeguards shall be necessary."

Section 3.18.3.1 states that:

"Permitted uses in the Environmental Hazard designation include conservation uses, forestry, passive outdoor recreation, public greenspace, parks and public utilities."

Town of Saugeen Shores Zoning By-law 75-2006 (2024)

The zoning designations for the Town of Saugeen Shores are available through the Bruce County online mapping. The Saugeen Shores Official Plan and Zoning By-law identifies that the bridge is within the Environmental Protection (EP) zone, with the subject area including Agricultural (A) zoning.

Section 22.3 states:
"Other than buildings and structures existing at the date of passing of this By-law, no buildings or structures are permitted unless for flood control purposes and/or in accordance with the regulations of the Conservation Authority or other appropriate Approval Authority."

BACKGROUND REVIEW

The species of conservation concern, including those listed under the ESA and/or SARA as well as those with S-Ranks of S1-S3, identified in the background search are identified in Table 1. Table 1 includes the identified species, their current statuses under the ESA, SARA, and COSEWIC as well as their provincial, national, and global ranks.

Table 1. Species of conservation concern identified in background review

Source	Common Name	Scientific Name	COSSARO	ESA	COSEWIC	SARA	S-Rank	G-Rank	N-Rank
ORAA (2012)	Western Chorus Frog - Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	NL	NAR	THR	THR	S4	G5TNR	N4
OBBA, eBird (2018)	Bank Swallow	*Riparia riparia*	THR	THR	THR	THR	S4B	G5	N5B,N5M
OBBA	Barn Swallow	*Hirundo rustica*	SC	SC	THR	THR	S4B	G5	N3N4B,N3N4M
OBBA, NHIC	Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	THR	S4B	G5	N5B,N4N5M
OBBA	Canada Warbler	*Wilsonia canadensis*	SC	SC	SC	THR	S4B	G5	N4B,N3M
OBBA, NHIC	Eastern Meadowlark	*Sturnella magna*	THR	THR	THR	THR	S4B,S3N	G5	N4B,NUM
OBBA, NHIC	Eastern Wood-Pewee	*Contopus virens*	SC	SC	SC	SC	S4B	G5	N5B,N5M
eBird (2015)	Golden Eagle	*Aquila chrysaetos*		END	NAR		S1B,S4N	G5	N4N5B,N4N5N,N4N5M
OBBA	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	SC	SC	S4B	G5	N4N5B,N4N5M
OBBA	Loggerhead Shrike	*Lanius ludovicianus*	END	END	END	END	S1B	G4	N3B,N3M

OBBA	Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	END	END	END	S3	G5	N4B,N3M
OBBA	Short-eared Owl	*Asio flammeus*	THR	THR	THR	SC	S4?B,S2S3N	G5	N4B,N3N,N4M
OBBA	Wood Thrush	*Hylocichla mustelina*	SC	SC	THR	THR	S4B	G4	N4B,NUM
OBA (2023)	Monarch	*Danaus plexippus*	SC	SC	END	SC	S2N,S4B	G5	N3B,NNRM
ORAA (2018)	Midland Painted Turtle	*Chrysemys picta marginata*	NAR	NAR	SC	SC	S4	G5T5	N4
ORAA (2006)	Snapping Turtle	*Chelydra serpentina*	NL	SC	SC	SC	S4	G5T5	N4

PROPOSED TERMS OF REFERENCE

A. Confirm Terms of Reference

1. Review background information, (e.g., proposed development, relevant sections of natural heritage system components of the County and Municipality OPs, investigation of Wildlife Atlases and NHIC).
2. Prepare a Draft Terms of Reference and provide to Bruce County and the SVCA for Approval.

B. Field Assessment

3. Complete an MECP Request for Information and determine if any additional Species at Risk have been identified in the study area.
4. Complete an MNRF Request for Information to acquire fish timing windows and wetland information.
5. Conduct a screening of all background information and the site to determine the potential for the presence of Species at Risk (SAR).
6. Conduct one site visit to characterize vegetation communities using the ELC system (MNRF) and complete a one-season (spring or summer) botanical inventory of the Study Area during the growing season.
7. Conduct a breeding bird survey of the study area, following the protocol of the Ontario Breeding Bird Atlas (Bird Studies Canada, 2004). The breeding bird survey requires two, focused, early morning site visits during the period between late May and early July.
8. Complete a Bat Habitat Assessment, review trees meeting the MNDNRF criteria (>10 cm DBH) within the proposed area of construction disturbance and immediately adjacent area (5 m) and identify trees that meet the criteria for bat maternity habitat and require consideration under the ESA.
9. Complete a characterization of the study area for any additional significant natural heritage features, per the PPS by applying provincial protocols and criteria to site features.
10. Conduct an aquatic assessment and aquatic habitat investigation to characterize the present watercourse and identify any fisheries constraints including a review of substrates and suitability for species at risk (120m up and downstream).
11. Investigate the study area for the presence of significant wildlife habitat during all surveys.
12. Investigate the study area for presence of species at risk and species at risk habitat during all surveys.
13. Record observations of incidental wildlife during all site visits.

D. Environmental Impact Study Report

14. Analyze findings and prepare a map that shows:

- Identified natural heritage features, and functions and landscape level features (e.g., linkages, forest interior habitat), the proposed area of work, ELC vegetation communities and, other noteworthy features as needed.
- Locations of other natural heritage features from background literature searches (e.g., mammal atlas, herpetofauna atlas, County's OP).

15. Summarize the options proposed and provide associated metrics, including visual representations of the structure's footprint and proposed setbacks from confirmed limits of natural features.
16. Conduct an impact assessment by reviewing the proposed preferred option's direct, indirect, and induced (i.e., residual, ongoing) impacts on the natural features. Show the limits of expected impact and assess for minimizing impacts to ecological features and functions. This will involve discussions with the proponent and AA.
17. Provide policy rationale for expected impacts to natural heritage features.
18. Identify options for mitigation or rehabilitation of the site, during and post construction.
19. Identify the preferred options from a natural heritage perspective.
20. Review the DFO requirements for projects near water and standard to determine if a request for review is required.
21. Prepare the draft Environmental Impact Study (EIS) of the identified options including mitigation measures, and identifies additional requirements, such as permits or registration under the ESA or DFO.
22. Submit finalized EIS to client for review followed by distribution to County, Municipality, and SVCA.

Kind Regards,

ABOUD & ASSOCIATES INC.



Heather Dixon, PhD
Aquatic Ecologist

Figure 1. Study Area

Appendix 1. Candidate Significant Wildlife Habitat
Appendix 2. Candidate Species at Risk Habitat

Cc: Andrea Nelson, GEI Consultants Inc.
Cheryl-Anne Ross, Aboud & Associates Inc.



LEGEND

- MOORE BRIDGE
- STUDY AREA
- SNAKE CREEK

Information Sources:

1. Orthophotography provided by First Base Solutions. Accessed March 2024.
2. Roads and watercourse provided by LIO. Accessed March 2024.

Title:

STUDY AREA

Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

Date: MARCH 2024

Project: AA24-068A

Scale: 1 : 1500

ABOUD & ASSOCIATES INC.

Consulting Arborists • Ecologists • Landscape Architects

Figure No: 1

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	Candidate SWH present (Field survey type required)
1	Waterfowl stopover and Staging Areas (terrestrial)	Seasonal Concentration Areas	- Fields with Sheet water in spring (incl. agricultural)	- Mixed species aggregations of 100 or more individuals confirms SWH	None, no habitat present.
2	Waterfowl Stopover and Staging (Aquatic)	Seasonal Concentration Areas	- Ponds, marshes, lakes, bays, coastal inlets and watercourses and reservoirs - SWTP & SWMP are not SWH	- Aggregations of 100 or more listed species for 7 days (i.e. >700 waterfowl use days) confirms SWH	None, no habitat present
3	Shorebird Migratory stopover	Seasonal Concentration Areas	- Shorelines of Lakes, rivers, wetlands, beaches, bars; seasonally flooded, muddy, and un-vegetated shoreline habitat	- 3 or more listed species and >1000 shorebird use days, or >100 whimbrel, confirms SWH	None, no habitat present.
4	Raptor Wintering Area	Seasonal Concentration Areas	- Combination of upland field and woodland habitat >20ha total (includes,>15ha upland field) - least disturbed sites, idle, fallow or lightly grazed field/meadow best	- 1 or more Short-eared Owl, or at least 10 individuals and 2 listed species for a minimum of 20 days, and 3 of 5 years, confirms SWH	Habitat potentially present, will be assessed during ELC.
5	Bat Hibernacula	Seasonal Concentration Areas	- Caves, mine shafts, underground foundations, karsts. - buildings are not SWH	- All sites with confirmed hibernating bats, confirms SWH	None, no habitat present.
6	Bat Maternity Colony	Seasonal Concentration Areas	- All forested ecosites, FOD, FOC, FOM, SWD, SWM, SWC with >10/ha trees (>25cm DBH) in early stages of decay (class 1-3) - buildings are not SWH	- >10 Big Brown Bats, >5 adult female Silver-haired Bats confirms SWH	Bat habitat assessment; candidate trees present.
7	Turtle Wintering Area	Seasonal Concentration Areas	- Areas with permanent water deep enough not to freeze, with mud/soft substrates	- 5 over-wintering Midland Painted Turtles, 1 or more Northern Map Turtle or Snapping Turtle confirms SWH	Snake Creek present, aquatic habitat assessment required.
8	Reptile Hibernaculum	Seasonal Concentration Areas	- Sites below the frost line; rock barren, crevice and cave, talus, alvar, rock piles, slopes, stone fences, and crumbling foundations	- Presence of hibernacula with minimum 5 individuals of 1 snake species/ individuals of 2 or more species confirms SWH. - Congregations of a minimum of 5 snakes of 1 species/ individuals of 2 or more snake species, near potential hibernacula on sunny warm days in spring and fall confirms SWH	Candidate habitat may be present, site will be assessed during ELC.

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	Candidate SWH present (Field survey type required)
9	Colonially-nesting Bird Habitat (cliff/bank)	Seasonal Concentration Areas	- Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, barns	- 1 or more nest sites with 8 or more Cliff Swallow or, 50 Bank Swallow and Rough-winged Swallow pairs during the breeding season.	None, no habitat present.
10	Colonially-nesting Bird Habitat (Tree/shrub)	Seasonal Concentration Areas	- Live or dead standing trees in wetlands, lakes, islands and peninsulas, occasionally shrubby and emergent vegetation	- 5 or more active Great-blue Heron or other listed species nests	None, no habitat present.
11	Colonially-nesting Bird Habitat (Ground)	Seasonal Concentration Areas	- Rocky islands or peninsulas within a lake or large river (natural or artificial)	- >25 active nests of Herring Gull, Ring-billed Gull, >5 active nests of Common Tern, or >2 active nests of Caspian Tern. 5 or more pairs of Brewer's Blackbird. Any active nesting colony of Little Gull, Great Black-backed Gull.	None, no habitat present.
12	Migratory Butterfly Stopover Area	Seasonal Concentration Areas	- At least 10ha, with undisturbed field/meadow and forest or woodland edge habitat present, within 5km of Lake Ontario.	- Presence of Monarch use days >5000 or >3000 where there is a mix of Monarch with Painted Ladies or White Admirals	None, no habitat present.
13	Land bird Migratory Stopover Area	Seasonal Concentration Areas	- Woodlots >5ha in size - within 5km of Lake Ontario	- Use by >200 birds/day, with >35species, with at least 10sp recorded on 5 different survey dates.	None, no habitat present.
14	Deer Yarding Areas	Seasonal Concentration Areas	- ELC communities providing Thermal cover (FOM, FOC, SWM, SWC, CUP2, CUP3, FOD3, CUT)	- Deer yards are managed by MNRF, available through district offices and LIO.	None, no habitat present
15	Deer Winter Congregation Areas	Seasonal Concentration Areas	- All forested ecosites >100ha - Conifer Plantations <50ha may be used	- Deer management is the responsibility of the MNRF. - Contact MNRF or LIO for known deer winter areas.	None, no habitat present
16	Cliffs & Talus Slopes	Rare Vegetation Communities	- Cliff: vertical to near vertical bedrock >3m in height - Talus slope: rock rubble at the base of a cliff made up of coarse rocky debris	- Confirm any ELC Vegetation Type for Cliffs or Talus Slopes	None, no habitat present.
17	Sand Barren	Rare Vegetation Communities	- Exposed, sparsely vegetated & caused by lack of moisture, fires, and erosion.	- area >0.5ha in size - Confirm any ELC vegetation Type for Sand Barren - Not dominated by exotic or introduced species	None, no habitat present.

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	Candidate SWH present (Field survey type required)
18	Alvar	Rare Vegetation Communities	- Level, mostly un-fractured calcareous bedrock feature, overlain by a thin veneer or soil	- area >0.5ha in size - Field Studies that identify four of the five Alvar Indicator Species - Not dominated by exotic or introduced species	None, no habitat present
19	Old Growth Forest	Rare Vegetation Communities	- >30ha forests with at least 10ha interior habitat and multi-layered canopy	- Dominant Tree Species >140 years old - No recognizable signs forestry practices (old stumps)	None, no habitat present
20	Savannah	Rare Vegetation Communities	- Tall Grass Prairie Habitat with 25%-60% Tree cover - Remnant sites such as Railway Right of ways are not SWH	- No minimum size and must be restored to a natural state. - Confirm one or more savannah indicator species. - Not dominated by exotic or introduced species	None, no habitat present
21	Tallgrass Prairie	Rare Vegetation Communities	- Ground cover dominated by prairie grasses with <25% tree cover. - Remnant sites such as Railway Right of ways are not SWH	- No minimum size and must be restored to a natural state. - Confirm one or more prairie indicator species. - Not dominated by exotic or introduced species	None, no habitat present
22	Other Rare Vegetation Communities	Rare Vegetation Communities	- All Provincially Rare S1, S2, S3 Vegetation Communities (Appendix M of SWHTG)	- Field Studies Confirming ELC vegetation type is a rare vegetation community	None, no habitat present
23	Waterfowl Nesting Areas	Specialized Habitats for Wildlife	- Upland Habitat, adjacent to Wetland ELC ecosites (except SWC, SWM) - Extends 120m from a wetland (>0.5ha) and any small wetlands (<0.5ha) within a cluster of at least 3. - Upland area at least 120m wide	- Presence of 3 or more nesting pairs of listed species excluding Mallards - Presence of 10 or more nesting pairs including mallards - Any active Black Duck nesting site	None, no habitat present
24	Bald Eagle or Osprey Nesting, Foraging and Perching Habitat	Specialized Habitats for Wildlife	- Forest communities, adjacent to riparian areas - Osprey nests usually at top of tree - Bald Eagle nest usually in super canopy tree in a notch within canopy	- Studies confirm one or more active Bald Eagle or Osprey nest. - Alternate nests included in SWH. - Nests must be used annually, if found inactive, must be known inactive at least 3 years, or suspected unused for 5 years if unknown	None, no habitat present

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	Candidate SWH present (Field survey type required)
25	Woodland Raptor Nesting Habitat	Specialized Habitats for Wildlife	- Forested communities, forested swamp communities and cultural Plantations - Natural Forested/conifer plantations >30ha with >10ha interior habitat (200m buffer)	- One or more active nest of listed species	None, no habitat present
26	Turtle Nesting Areas	Specialized Habitats for Wildlife	- Exposed Mineral soil (sand or gravel) adjacent (<100m) or within shallow marsh, shallow submerged, shallow floating, bog or fen communities. - Located in open sunny areas, away from roads and less prone to predation - Municipal and provincial road shoulders are not SWH.	- Confirm 5 or more nesting Midland Painted Turtles, 1 or more nesting Northern Map Turtle or Snapping Turtle	None, no habitat present
27	Seeps and Springs	Specialized Habitats for Wildlife	- Areas where ground water comes to the surface. - Any forested area within the headwaters of a stream or river system	- Confirm site with 2 or more seeps/springs. -	None, no habitat present
28	Amphibian Breeding Habitat (woodland)	Specialized Habitats for Wildlife	- Breeding pools within woodlands - Wetland, pond, or pool >500m^2 within or adjacent (<120m) to a woodland. - Woodlands with permanent ponds, or those with water until mid-July more likely to be used.	- Confirm Breeding population of 1 or more listed newt/salamander species, 2 or more of the listed frog species with at least 20 individuals (adults or egg masses), 2 or more of the listed frog species with call code levels of 3. - Wetland adjacent to woodlands includes travel corridor connecting features as SWH.	None, no habitat present
29	Amphibian Breeding Habitat (Wetland)	Specialized Habitats for Wildlife	- Swamp, marsh, fen, bog, open aquatic, and shallow aquatic ELC communities. - Typically isolated from woodlands (>120m) but includes larger wetlands with primarily aquatic species (bull frogs) that are adjacent to woodlands. - Wetlands >500m2 - Presence of shrubs & logs - Bullfrogs require permanent water bodies and abundant emergent vegetation.	- Confirm Breeding populations of 1 or more listed newt/salamander species, or 2 or more listed frog/toad species with at least 20 individuals (adults or egg masses), or 2 or more listed frog/toad species with a call code level of 3 - Or any wetland with confirmed breeding Bullfrog.	None, no habitat present

#	**Significant wildlife habitat (SWH)**	**Candidate SWH type**	**Candidate SWH criteria**	**Criteria for SWH confirmation**	**Candidate SWH present** (Field survey type required)
30	Area-sensitive Breeding Bird Habitat	Specialized Habitats for Wildlife	- Habitats where interior breeding birds are breeding. - Large mature (>60 years) forest stands or woodlots >30ha. - Forest and swamp ELC communities - Interior habitat at least 200m from edge	- Presence of nesting or breeding pairs of 3 or more of the listed species - Any site with Cerulean Warbler or Canada Warbler is SWH -	None, no habitat present
31	Marsh Bird Breeding Habitat	Habitats of Species of Conservation Concern	- Some meadow marsh, shallows submerged, shallow floating, mixed shallow floating, fen, and bog communities (see SWH Ecoregion guide for specifics) - Nesting occurs in wetlands; all wetland habitat is considered with presence of shallow water with emergent aquatic vegetation - Green heron at edge of water sheltered by shrubs and trees.	- 5 or more nesting pairs of Sedge Wren or Marsh Wren, 1 pair of Sandhill Crane, or breeding by any combination of 5 or more of the listed species - Any Wetland with 1 or more breeding pair Black Tern, Trumpeter Swan, Green Heron or Yellow Rail	None, no habitat present
32	Open Country Bird Breeding Habitat	Habitats of Species of Conservation Concern	- Grassland area >30ha (natural & cultural fields and meadows) - Grasslands not class 1 or 2 agriculture (no row crops or intensive hay or livestock pasturing) - Mature hayfields or pasture at least 5 years old	- Nesting or breeding of 2 or more of the listed species. - Field with 1 or more Short-eared Owls	Habitat potentially present. Breeding bird surveys required.
33	Shrub/Early Successional Bird Breeding Habitat	Habitats of Species of Conservation Concern	- Cultural thickets, savannah, and woodland habitat - Large field area succeeding to shrub and thicket habitat >10ha in size - Patches of shrub ecosite may be complexed into larger old field ecosites for some species	- Confirm nesting or breeding of 1 of the listed indicator species and at least 2 of the common species - Habitat with Yellow-breasted Chat Or Golden-winged Warbler is SWH	None, no habitat present

#	**Significant wildlife habitat (SWH)**	**Candidate SWH type**	**Candidate SWH criteria**	**Criteria for SWH confirmation**	**Candidate SWH present** (Field survey type required)
34	Terrestrial Crayfish	Habitats of Species of Conservation Concern	- Meadow marsh, shallow marsh, swamp thicket, deciduous swamp, and mixed swamp communities - Cultural meadow with inclusions of meadow marsh may be used - Wet edges of marshes and wet meadows should be surveyed for crayfish	- Presence of 1 or more individuals of listed species or their chimneys in suitable habitat	None, no habitat present
35	Special Concern & Rare Wildlife Species	Habitats of Species of Conservation Concern	- All Special concern and Provincially Rare plant and animal species - Where an element occurrence is identified within a 1 or 10km grid for a species listed, linking candidate habitat on the site must be completed to ELC ecosites	- Assessment/inventory of site for identified special concern or rare species completed during time of year when species is present or easily identifiable. - Habitat must be easily mapped and cover an important life stage component (specific nesting habitat, foraging)	Suitable habitat for special concern and provincially rare species. ELC, botanical inventory, aquatic habitat assessment, and breeding bird surveys required.
36	Amphibian Movement Corridor	Wildlife Movement Corridors	- Corridors may occur in all ecosites associated with water. - Presence of significant amphibian breeding indicates the requirement for identifying corridors. - Movement corridors between breeding habitat and summer habitat	- Corridors typically include areas with native vegetation, with several layers of vegetation, unbroken by roads, waterways or waterbodies are most significant - At least 15 of vegetation on both sides of the waterway or up to 200m wide of woodland habitat with gaps of <20m - Shorter corridors are more significant than longer, but amphibians must be able to get to and from their summer breeding habitat	None, no habitat present.
37	Deer Movement Corridor	Wildlife Movement Corridors	- May occur in all forested ecosites. - Determined when deer wintering habitat is confirmed as SWH	- Corridors at least 200m wide with gaps <20m leading to wintering habitat. - Unbroken by roads and residential areas - Shorter corridors are more significant	ELC, spring botanical, SAR and SWH assessment, and investigation of aerial photos.

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Western Chorus Frog – Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	Amphibians	NAR	THR	S4	MNRF Species Occurrence Mapping, ORAA (2012)	Generally found in lowland communities, such as swamps, inhabiting lowland shrubs and grasses in the community, near breeding habitat. Breeding occurs in lowland, ephemeral ponds, devoid of predatory fish species (COSEWIC 2008a).	No habitat present in study area.	None needed.
Hungerford's Crawling Water Beetle	*Brychius hungerfordi*	Butterflies, bees, damselflies, dragonflies & insects	END	END	S1	MNRF Species Occurrence Mapping	Specialist of small to medium-sized streams characterized by a moderate to fast flow, good stream aeration, cool temperatures, inorganic substrates, and alkaline water conditions. Often found immediately downstream from culverts, beaver dams, and human-made dams (COSEWIC 2011)	No habitat present in study area.	None needed.
Lake Huron Grasshopper	*Trimerotopis huroniana*	Butterflies, bees, damselflies, dragonflies & insects	THR	THR	S2	MNRF Species Occurrence Mapping	Exclusively inhabits open dunes on Lake Huron, Michigan and Superior. Occurs most commonly on the foredune, a sand ridge predominantly covered with Marram Grass and Long-leaved Reed Grass (COSEWIC 2015)	No habitat present in study area.	None needed.
Monarch	*Danaus plexippus*	Butterflies, bees, damselflies, dragonflies & insects	SC	SC	S2N, S4B	MNRF Species Occurrence Mapping, OBA (2023)	Requires milkweed for larval feeding, other wildflower species are also important for adult feeding when milkweed is not in flower; often found in abandoned farmland, along roadsides, and other open spaces (COSEWIC 2010b)	Habitat potentially present in study area.	ELC and botanical inventory.
West Virginia White	*Pieris virginenisis*	Butterflies, bees, damselflies, dragonflies & insects	SC	NAR	S3	MNRF Species Occurrence Mapping	Found in rich deciduous and mixed forests and swamps with a poorly vegetated shrub layer. The larvae feed only on the leaves of a few host plants, including the Two-leaved Toothwort (*Cardamine diphylla*) and cut-leaved toothwort (Burke 2013).	Habitat potentially present in study area.	ELC and botanical inventory.
Yellow-banded Bumble Bee	*Bombus terricola*	Butterflies, bees, damselflies, dragonflies & insects	SC	SC	S3S5	MNRF Species Occurrence Mapping	Occur in a diverse range of habitat, including mixed woodlands, farmlands, urban areas, montane meadows, prairie grasslands and boreal habitats. Queens overwinter underground and in decomposing organic material such as rotting lots (COSEWIC 2015)	Habitat potentially present in study area.	ELC and botanical inventory.
Bank Swallow	*Riparia riparia*	Birds	THR	THR	S4B	MNRF Species Occurrence Mapping, OBBA, eBird (2018)	Breeds in a variety of natural and artificial bank type habitat, such as bluffs, stream and river banks, sand and gravel pits, piles of sand, topsoil and other material. Nests are typically in vertical or near-vertical surfaces (COSEWIC 2013b).	No habitat present in study area.	None needed.
Barn Swallow	*Hirundo rustica*	Birds	SC	THR	S5B	MNRF Species Occurrence Mapping, OBBA	Occurs in farmland, along lake/river shorelines, in wooded clearings and in urban populated areas. Nesting may occur inside or outside buildings; under bridges and in road culverts (COSEWIC 2011a).	Habitat potentially present in study area.	Breeding bird survey.
Barn Owl	*Tyto alba*	Birds	END	END	S1	MNRF Species Occurrence Mapping	Requires open habitat for foraging, such as old fields and pastures, that provide habitat for rodents, and uses a variety of natural and man-made structures for nesting (COSEWIC 2010e)	Habitat potentially present in study area.	Breeding bird survey.
Bobolink	*Dolichonyx oryzivorus*	Birds	THR	THR	S4B	MNRF Species Occurrence Mapping, OBBA, NHIC	Nest in grassland habitats, including hayfields and meadows with a mixture of grasses and broad-leaved forbs with a high litter cover. Area Sensitive, with increased density in grasslands greater than 10ha (Renfrew et. al. 2015)	Habitat potentially present in study area.	Breeding bird survey.

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Canada Warbler	*Wilsonia canadensis*	Birds	SC	THR	S4B	MNRF Species Occurrence Mapping, OBBA	Prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer (COSEWIC 2008b).	No habitat present in study area.	None needed.
Cerulean Warbler	*Setophaga cerulea*	Birds	THR	END	S3B	MNRF Species Occurrence Mapping	Occur in older, mature, deciduous forests, preferentially oak-maple composition, with a full, to partially open canopy, and little to no understory cover. Often in bottomland forests, or adjacent to treed swamplands (COSEWIC 2010f).	No habitat present in study area.	None needed.
Common Nighthawk	*Chordeiles minor*	Birds	SC	THR	S4B	MNRF Species Occurrence Mapping	Breeds in open habitat, on the ground, in areas with no vegetation, including sand dunes, burned areas, open forests, railways, and gravel rooftops. Eggs are laid directly on the ground (COSEWIC 2007b).	No habitat present in study area.	None needed.
Eastern Meadowlark	*Sturnella magna*	Birds	THR	THR	S4B	MNRF Species Occurrence Mapping, OBBA, NHIC	Nest in grassland habitats, including hayfields, pasture, savannahs, and other open areas. Preferential habitat includes areas with good grass and thatch (litter) cover (Jaster et. al. 2012).	Habitat potentially present in study area.	Breeding bird survey.
Eastern Whip-poor-will	*Caprimulgus vociferus*	Birds	THR	THR	S4B	MNRF Species Occurrence Mapping	Often found breeding in semi-open habitats, with little ground cover, and canopy openings allowing light to penetrate the forest floor, often associated with pine or oak, savannahs and barrens, early-successional poplar stands and open conifer plantations (COSEWIC 2009a)	No habitat present in study area.	None needed.
Eastern Wood-Pewee	*Contopus virens*	Birds	SC	SC	S4B	MNRF Species Occurrence Mapping, OBBA, NHIC	Associated with mid-age mixed and deciduous forest stands, often dominated by Maple (Acer), Elm (Ulmus) or Oak (Quercus), and include areas with clear-cuts, openings or forest edges. Also prefers forest stands with little to no understory vegetation (COSEWIC 2012a).	Habitat potentially present in study area.	Breeding bird survey.
Evening Grosbeak	*Coccothraustes vespertinus*	Birds	SC	SC	S4B	MNRF Species Occurrence Mapping	Breeding habitat includes open, mature mixed wood forests, where fir species and/or White Spruce are dominant, and Spruce Budworm is abundant (COSEWIC 2016)	No habitat present in study area.	None needed.
Golden Eagle	*Aquila chrysaetos*	Birds	END	NAR	S2B	eBird (2015)	Inhabit open and semi-open habitats, including prairie, arctic and alpine tundra, savannah, spruce woodlands and barren areas. Typically nests on cliffs but have been documented nesting in the upper third of deciduous and coniferous trees along riparian corridors (Wyshynski & Pulfer. 2015).	No habitat present in study area.	None needed.
Golden-winged Warbler	*Vermivora chrysoptera*	Birds	SC	THR	S4B	MNRF Species Occurrence Mapping	Nests in early successional shrub habitat, with adjacent forest edges for singing perches, often in hydro cut-overs, recently logged areas and beaver marshes (COSEWIC 2006a).	Habitat potentially present in study area.	Breeding bird survey.
Grasshopper Sparrow	*Ammodramus savannarum*	Birds	SC	SC	S4B	MNRF Species Occurrence Mapping, OBBA	Prefers moderately open grasslands and prairies with patchy bare ground; avoids grasslands with extensive shrub cover (Vickery 1996).	Habitat potentially present in study area.	Breeding bird survey.
Henslow's Sparrow	*Ammodramus henslowii*	Birds	END	END	SHB	MNRF Species Occurrence Mapping	Breeds in grassland habitat and is area sensitive. Grasslands with tall, dense cover a thick thatch layer, and are greater than 30ha, but preferentially larger than 100ha are preferred (COSEWIC 2011b).	Habitat potentially present in study area.	Breeding bird survey.
King Rail	*Rallus elegans*	Birds	END	END	S2B	MNRF Species Occurrence Mapping	Occupies a wide variety of freshwater marsh habitat types. Large marshes, especially those that contain a range of water level conditions and a mosaic oh habitats, are thought to be preferred (COSEWIC 2011.	No habitat present in study area.	None needed.
Least Bittern	*Ixobrychus exilis*	Birds	THR	THR	S4B	MNRF Species Occurrence Mapping	Breeds in large marshes (>5ha) with emergent vegetation, typically cattails, with at least 50% open water, and relatively stable water levels (COSEWIC 2009b).	No habitat present in study area.	None needed.
Loggerhead Shrike	*Lanius ludovicianus*	Birds	END	END	S2B	MNRF Species Occurrence Mapping, OBBA	Nests in open, low, grassy habitat with scattered shrubs. Presence of thorny shrubs, such as hawthorn, or barbwire fencing required for impaling prey. Only two recent areas of breeding in the province (Carden Plain and Napanee Plain) (Environment Canada 2015).	No habitat present in study area.	None needed.

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Olive-sided Flycatcher	*Contupus cooperi*	Birds	SC	THR	S4B	MNRF Species Occurrence Mapping	Associated with natural forest openings (usually conifer or mixed), and edges of forests adjacent wetlands or watercourses, will also use open and semi-open forests and clear-cuts. Presence of tall snags and residual live trees required for nesting and foraging (COSEWIC 2007c).	Habitat potentially present in study area.	Breeding bird survey.
Peregrine Falcon	*Falco peregrinus*	Birds	SC	SC	S3B	MNRF Species Occurrence Mapping	Nests on cliff-ledges (50-200m preferred) near foraging areas. Also nests on anthropomorphic structures, such as tall building ledges, bridges, quarries, mines and cuts for road beds (COSEWIC, 2007a).	No habitat present in study area.	None needed.
Piping Plover	*Charadrius melodus*	Birds	END	END	S1B	MNRF Species Occurrence Mapping	Nesting habitat occurs in complex and dynamic beach-dune ecosystems that are maintained by coastal, climate-related, processes such as storm events, water and wave-action, ice-scouring and wind (Kirk, 2013).	No habitat present in study area.	None needed.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Birds	END	THR	S4B	MNRF Species Occurrence Mapping, OBBA	Found in a variety of open areas, with a high density of dead or dying trees, particularly forests dominated by oak or beech (COSEWIC 2007d).	No habitat present in study area.	None needed.
Short-eared Owl	*Asio flammeus*	Birds	THR	SC	S2N, S4B	MNRF Species Occurrence Mapping, OBBA	Breeds in open habitats, including grasslands, old pasture marshes, bogs, and sand-sage. Nests are scrapes, located on the ground (COSEWIC 2008c).	Habitat potentially present in study area.	Breeding bird survey.
Wood Thrush	*Hylocichla mustelina*	Birds	SC	THR	S4B	MNRF Species Occurrence Mapping, OBBA	Prefers second growth moist deciduous forests, with tall trees, and a dense understory of low saplings and an open forest floor with decaying leaf litter. Often nests in saplings, shrubs or occasionally dead stumps (COSEWIC 2012b).	Habitat potentially present in study area.	Breeding bird survey.
Northern Brook Lamprey	*Ichtyomyzon fossor*	Fish	SC	SC	S3	MNRF Species Occurrence Mapping	Found in clear streams and rivers with rocky or gravelly substrates and presence of fine sands and uni-directional current for egg adherence, larval stage requires soft substrates for burrowing (COSEWIC 2007d).	Habitat potentially present in study area.	Aquatic habitat assessment.
Northern Sunfish (Great Lakes-Upper St. Lawrence Population)	*Lepomis peltastes*	Fish	SC	SC	S3	MNRF Species Occurrence Mapping	Prefers shallow, vegetated areas of warm lakes, ponds, and slowly flowing watercourses. Usually occurs in clear waters and is considered intolerant of siltation. Substrate usually consists of sand and gravel, as in the Thames River (COSEWIC 2016)	No habitat present in study area.	None needed.
Shortjaw Cisco	*Coregonus zenithicus*	Fish	THR	THR	S2	MNRF Species Occurrence Mapping	In Lakes Superior, Michigan, and Huron they inhabit waters 55 to 144m in depth, although they have been recorded from as deep as 183m and occasionally in more shallow water (COSEWIC 2003)	No habitat present in study area.	None needed.
Shortnose Cisco	*Coregonus reighardi*	Fish	END	END	SH	MNRF Species Occurrence Mapping	Reported at depth ranging from 22m to 146m. Lives in clear coldwater environment year-round. No further information is known about its habitat preferences (COSEWIC 2005)	No habitat present in study area.	None needed.
American Badger	*Taxidea taxus*	Mammals	END	END	S1	MNRF Species Occurrence Mapping	Associated with open habitat, including agricultural hedgerows, grasslands, fallow habitat and open linear corridors in forests. Soil composition must be coherent to maintain structure for digging and tunneling, usually coarse silts to fine sands, in Ontario usually found in areas of sandy and loam soils. Prey availability is also important for site suitability (COSEWIC, 2012c).	Habitat potentially present in study area.	ELC and botanical inventory.
Eastern Red Bat	*Lasiurus borealis*	Mammals	NL	END	S4	MNRF Species Occurrence Mapping	Typically roosts among the foliage of trees and occasionally shrubs. They use both deciduous and coniferous forests of any age class, but in some parts of their range will avoid conifer species when suitable deciduous species are present. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. They forage in both forested and non-forested habitats, in both open and semi-cluttered habitats, both above and below forest canopies, and in both early and later stage forests (COSEWIC 2023).	Habitat potentially present in study area.	Bat habitat assessment

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Eastern Small-footed Myotis	*Myotis leibii*	Mammals	END	NA	S2S3	MNRF Species Occurrence Mapping	Associated with hilly or mountainous terrain, in or near coniferous or deciduous forest habitat. Maternity roosts located in cracks and crevices of talus slopes and rocky outcrops, or, occasionally in bridges, old buildings, hollow trees (or loose bark) and caves and mines during the maternity season. Hibernate singly or in small clusters in mines and caves (NatureServe, 2015).	Habitat potentially present in study area.	Bat habitat assessment
Hoary Bat	*Lasiurus cinereus*	Mammals	NL	END	S4	MNRF Species Occurrence Mapping	Roosts solitarily in trees, with preferences including maple, oak, ash, alder, hemlock, and redwood trees. Typically roosts among the foliage of trees and occasionally shrubs, and use both deciduous and coniferous forests, of any age class. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. Forages in the open, and suitable habitats may include wetlands, grasslands and open fields with patchily distributed trees (COSEWIC 2023).	Habitat potentially present in study area.	Bat habitat assessment
Little Brown Myotis	*Myotis lucifugus*	Mammals	END	END	S3	MNRF Species Occurrence Mapping	Hibernate in Caves; maternity colonies located in warm sites, often associated with human habitation; including attics, old buildings, under bridges, rock crevices and cavities in canopy trees in wooded areas (COSEWIC, 2013c).	Habitat potentially present in study area.	Bat habitat assessment
Northern Myotis	*Myotis septentrionalis*	Mammals	END	END	S3	MNRF Species Occurrence Mapping	Hibernate in Caves; maternity colonies usually located in trees, and are closely associated with specific tree characteristics and density of suitable trees. Characterized by tall, large diameter trees in early stages of decay, located in openings in mature forest canopies (COSEWIC, 2013c).	Habitat potentially present in study area.	Bat habitat assessment
Silver-haired Bat	*Lasionycteris noctivagans*	Mammals	NL	END	S4	MNRF Species Occurrence Mapping	Roosting occurs primarily under bark and in the cavities of trees, making them reliant on habitats where large, decaying trees are available. Roosts in a variety of large diameter coniferous and deciduous trees. When taken as a whole, the data indicate that the species does select specific attributes of trees to roost in. However, these attributes are not specific to particular tree species or type (deciduous or coniferous specifically) across the species range. Roost-tree species and type differ depending on the region but tree size, height, roost aspect, and cavity temperature are important characteristics. Deciduous species (especially *Populus* spp.) often have decay characteristics that make them ideal as roost sites, particularly in older forests where these features are more likely to occur. Heart-rot infections at the site of limb breakages often result in large well-protected inner chambers and large sheets of exfoliating bark are ideal for roosting. In other parts of their range, coniferous species are used. Several studies report the frequent use of old woodpecker cavities (COSEWIC 2023).	Habitat potentially present in study area.	Bat habitat assessment
Tri-colored Bat	*Perimyotis subflavus*	Mammals	END	END	S3?	MNRF Species Occurrence Mapping	Hibernate in caves, abandoned mines, wells, and tunnels. Summer roosts include clumps of dead foliage and lichens, typically found in forested habitat close to water sources. May also use anthropogenic structures such as barns for maternity roosts. Foraging habitat includes forested riparian areas over water in relatively open areas (Environment Canada.2015).	Habitat potentially present in study area.	Bat habitat assessment
Blanding's Turtle	*Emydoidea blandingii*	Reptiles	THR	THR	S3	MNRF Species Occurrence Mapping	Use a variety of eutrophic wetland habitat types, including lakes, ponds, watercourses, marshes, man-made channels, farm fields, coastal areas and bays. Seasonal overland terrestrial movements up to 2.5 km occur to reach nesting and overwintering areas, generally through wooded coniferous or mixed forest habitat. Nests are usually laid in loose sand or organic soil (COSEWIC 2005b).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Midland Painted Turtle	*Chrysemys picta marginata*	Reptiles	NL	SC	S4	MNRF Species Occurrence Mapping, ORAA (2018)	Occupy slow moving, relatively shallow and well-vegetated wetlands and water bodies with abundant basking sites and organic substrate. Found in association with submergent aquatic plants, which are used for cover and feeding. Semi -tolerant of human-altered landscapes, occasionally found occupying urban ponds and lands subject to anthropogenic disturbance. Suitable nesting habitat includes open, often south-facing, and sloped areas with sandy-loamy and/or gravel substrate usually within 1200 m of aquatic active season habitats. Overwinter in shallow water with deep sediment (COSEWIC 2018).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Northern Map Turtle	*Graptemys geographica*	Reptiles	SC	SC	S3	MNRF Species Occurrence Mapping	Highly aquatic species, found in deep, large waterbodies, including Lakes and large rivers, with abundant basking sites. Emerge onto land only during nesting, which occurs in soft sand or soil. Waterbodies with slow currents, soft mud bottoms and abundant aquatic vegetation are preferred (COSEWIC, 2002b).	No habitat present in study area.	None needed.

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Snapping Turtle	*Chelydra serpentina*	Reptiles	SC	SC	S4	MNRF Species Occurrence Mapping, ORAA (2006)	Inhabit slow-moving waters with soft, muck bottom and dense aquatic vegetation. Ponds, sloughs and shallow bays are all often used as summering and overwintering habitat (COSEWIC 2008d).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Spotted Turtle	*Clemmys guttata*	Reptiles	END	END	S2	MNRF Species Occurrence Mapping	Found in wetlands with high organic content, including bogs, fens, marshes, woodland streams, sedge meadows, and shallow bays. Only one population is known from Wellington County, in Luther Marsh. Preferential to unpolluted shallow water with aquatic vegetation and soft substrates. Presence of Sphagnum moss, sedge tussocks, cattails and water lilies, may be important to Canadian populations (COSEWIC, 2002b).	No habitat present in study area.	None needed.
Wood Turtle	*Glyptemys insculpta*	Reptiles	END	THR	S2	MNRF Species Occurrence Mapping	Generally found in forested landscapes, associated with clear freshwater streams and associated floodplains. Preferential to streams with year-round current, with sandy or gravelly-sandy bottoms. Streams used are typically meandering with frequent oxbows. Overwintering associated with stable, high concentration dissolved oxygen in pools, under mud or under overhanging banks. Nesting occurs in open areas with high sun exposure, typically within 10 to 50m of aquatic habitat. Home ranges are typically linear, following streams (Environment Canada, 2016).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Eastern Ribbonsnake	*Thamnophis sauritus*	Reptiles	SC	SC	S4	MNRF Species Occurrence Mapping	A semi-aquatic species that inhabits dense, low- vegetation, edges of ponds, streams, marshes, fens and bogs, with open sunlit areas for basking (COSEWIC 2002c).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Milksnake	*Lampropeltis triangulum*	Reptiles	SC	SC	S4	MNRF Species Occurrence Mapping	Habitat generalists often associated with edge habitat, meadows, prairies, pastures, rocky outcrops and human disturbances such as hydro corridors and railway embankments. Habitat is usually close to a water source. Hibernation occurs in a variety of natural and man-made features, including rotting logs, old foundations, basements and burrows (COSEWIC 2014).	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Queensnake	*Regina septemvittata*	Reptiles	END	END	S2	MNRF Species Occurrence Mapping	Associated with rocky streams and rivers, but occasionally found in marsh, pond and lake shore habitats. Usually found within 3m of the shoreline and only at sites where there is an abundance of crayfish (COSEWIC 2010)	Habitat potentially present in study area.	Aquatic habitat assessment, ELC, and botanical inventory.
Massassauga Rattlesnake	*Sistrurus catenatus*	Reptiles	SC	THR	S3	MNRF Species Occurrence Mapping	Only historic observations of Masassauga in the north western portion of Wellington County. Found in wet prairies, old fields, peatlands, rock barrens and coniferous forests, with open-areas, and areas of dense shrub cover. Hibernate in damp areas below the frost line (COSEWIC, 2012b).	No habitat present in study area.	None needed.
American Ginseng	*Panax quinquefolius*	Vascular plants	END	END	S2	MNRF Species Occurrence Mapping	Occur in moist, rich, undisturbed, mature Sugar Maple dominated deciduous woodlands. Often, colonies are located at the bottom of south facing slopes (COSEWIC, 2000).	Habitat potentially present in study area.	ELC and botanical inventory.
American Hart's Tongue Fern	*Asplenium scolopendrium*	Vascular plants	SC	SC	S3	MNRF Species Occurrence Mapping	Grows on rocks or rocky substrates and requires calcareous soils, preferential to sites with dolomitic limestone, in Ontario found in upper talus and mid-slopes of the Niagara Escarpment (Environment Canada 2013).	No habitat present in study area.	None needed.
Broad Beech Fern	*Phegopteris hexagonoptera*	Vascular plants	SC	SC	S3	MNRF Species Occurrence Mapping	Prefers rich, undisturbed deciduous forest, particularly mature Beech-maple forests. Typically occurs in moister areas such as lower valley slopes, bottomlands and even swamps. Primarily a shade-tolerant species and is unlikely to withstand major opening of the forest canopy (van Overbeeke et. al., 2013)	No habitat present in study area.	None needed.
Butternut	*Juglans cinerea*	Vascular plants	END	END	S2?	MNRF Species Occurrence Mapping	Occur in rich moist sites, that are well-drained, often found along stream banks or gravelly sites. Butternut is shade intolerant (COSEWIC, 2003b).	Habitat potentially present in study area.	ELC and botanical inventory.
Dwarf Lake Iris	*Iris lacustris*	Vascular plants	SC	SC	S3	MNRF Species Occurrence Mapping	Grows on alvars, dolostone bedrock shorelines, sand or gravel beach ridges, and in openings in coniferous woodlands. Wildfire is likely important, as natural succession eventually causes conditions to become unsuitable (COSEWIC 2010)	No habitat present in study area.	None needed.
Eastern Prairie-fringed Orchid	*Platanthera leucophaea*	Vascular plants	END	END	S2	MNRF Species Occurrence Mapping	Habitat includes fens, wet tallgrass prairie and moist old fields with open growing conditions. Species does not flower annually (Environment Canada 2012).	Habitat potentially present in study area.	ELC and botanical inventory.

Common name	Scientific name	Group	SARO	Cosewic	S-rank	Background sources	Habitat requirements	Candidate habitat in study area	Field studies recommended
Gattinger's Agalinis	*Agalinis gattingeri*	Vascular plants	END	END	S2S3	MNRF Species Occurrence Mapping	Native to both alvar and tallgrass prairie habitat and requires open unshaded conditions for growth (Environment and Climate Change Canada 2019)	Habitat potentially present in study area.	ELC and botanical inventory.
Goldenseal	*Hydrastis canadensis*	Vascular plants	SC	THR	S2	MNRF Species Occurrence Mapping	Occurs in deciduous woodlands that experience periodic flooding (that is, floodplain). Generally found on slightly acidic soils under closed to semi-open canopies (adjacent to walking paths, sloughs and drainage ways, in woodlot edges, previously flooded areas and successional forests) (COSEWIC 2019)	No habitat present in study area.	None needed.
Hill's Pondweed	*Potamogeton hillii*	Vascular plants	SC	SC	S2S3	MNRF Species Occurrence Mapping	Occur in cold clear calcareous streams, ponds, and ditches, which are alkaline in nature (COSEWIC 2005c).	No habitat present in study area.	None needed.
Hill's Thistle	*Cirsium hillii*	Vascular plants	THR	THR	S3	MNRF Species Occurrence Mapping	Found in a variety of open, dry, sandy, fire-prone habitats, including such communities as gravel hill or bluff prairies, dry mesic to mesic sand prairies, pine barrens, oak barrens, sand dunes, oak savannah, and open woods (COSEWIC 2004)	No habitat present in study area.	None needed.
Houghton's Goldenrod	*Solidago houghtonii*	Vascular plants	THR	SC	S2?	MNRF Species Occurrence Mapping	Grows on seasonally wet limestone alvars, calcareous beach sands, or interdunal wetlands along the Great Lakes shoreline (COSEWIC 2005)	No habitat present in study area.	None needed.
Lakeside Daisy	*Tetraneuris herbacea*	Vascular plants	SC	THR	S3	MNRF Species Occurrence Mapping	Commonly found in alvar habitats, but occasionally occurs in prairies and cliffs. Habitat is seasonally wet in spring and fall and moderately drought-like in the summer (COSEWIC 2002)	No habitat present in study area.	None needed.
Pitcher's Thistle	*Cirsium pitcheri*	Vascular plants	THR	SC	S2	MNRF Species Occurrence Mapping	Found only on sand dunes and sandy beaches. Ideal habitat is open, dry, loose sand with sparse or no vegetation immediately surrounding or shading the thistles (COSEWIC 2010)	No habitat present in study area.	None needed.
Small White Lady's-slipper	*Cypripedium candidum*	Vascular plants	END	THR	S1	MNRF Species Occurrence Mapping	Grows in remnant fragments of moist, calcareous native prairie openings. This includes patches of prairie remnants in roadside ditches surrounded by agricultural fields (COSEWIC 2014)	No habitat present in study area.	None needed.
Tuberous Indian Plantain	*Arnoglossum plantagineum*	Vascular plants	SC	SC	S2	MNRF Species Occurrence Mapping	Habitat includes open, sunny areas in wet calcareous soils, including wet meadows and shoreline fens (COSEWIC 2002).	No habitat present in study area.	None needed.

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Heather Dixon

From: Alyssa Gowing <a.gowing@svca.on.ca>
Sent: Thursday, July 18, 2024 1:50 PM
To: Nelson, Andrea; Stewart, Zakary
Cc: Lukas Heathers; Heather Dixon
Subject: RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

Caution. Outside Sender

Great, thanks for confirming Andrea.

Alyssa Gowing
Regulations Officer
Saugeen Valley Conservation Authority

From: Nelson, Andrea <ANelson@geiconsultants.com>
Sent: Thursday, July 18, 2024 1:04 PM
To: Alyssa Gowing <a.gowing@svca.on.ca>; Stewart, Zakary <ZStewart@geiconsultants.com>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>
Subject: RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

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Alyssa,
Thank you for your email. At this time we are in the early stages of the project and a project direction has not yet been resolved (i.e., bridge removal or replacement). As indicated in your email, once the project direction is confirmed and preliminary design drawings are available, the SVCA will be contacted to arrange a site meeting.

Kind Regards,
Andrea

GEI
ANDREA NELSON
Project Manager
519.376.1805...2219 cell: 519.372.4678
1260-2nd Avenue East | Owen Sound, Ontario N4K 2J3 | Canada



From: Alyssa Gowing <a.gowing@svca.on.ca>
Sent: Thursday, July 11, 2024 10:36 AM
To: Stewart, Zakary <ZStewart@geiconsultants.com>; Stewart, Zakary <ZStewart@geiconsultants.com>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>; Nelson, Andrea <ANelson@geiconsultants.com>

Subject: [EXT] RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

EXTERNAL EMAIL

Good morning Zach,
I just spoke with Heather Dixon (cc'd), Aboud & Associates, and she indicated that you are overseeing this project on behalf of TOSS staff.

It is the understanding of SVCA staff that this proposal includes the removal of the existing structure and potential replacement with a smaller 'walking bridge' structure. In order for SVCA staff to move forward with our review of this proposal, it would be helpful if you could share any site plans or preliminary design drawings you may have related to this project with me. Once I receive a plan, I will need to perform an inspection at the site to assess the natural hazards present. I can then follow-up with you to outline what SVCA policy criteria will need to be addressed in a future application to the Authority seeking permission to remove/replace the bridge.

At this time, SVCA staff will await submission of a site plan/design drawings from you before taking any further action with this file.

If you have any questions or concerns, please do not hesitate to reach out.

Kind regards,
Alyssa Gowing
Regulations Officer
Saugeen Valley Conservation Authority
1078 Bruce Road 12, PO Box 150, Formosa ON N0G 1W0
Phone: 519-364-1255 ext 244
a.gowing@svca.on.ca
www.saugeenconservation.ca

From: Heather Dixon <Heather@aboudtng.com>
Sent: Monday, June 17, 2024 6:14 PM
To: Matt Armstrong <m.armstrong@svca.on.ca>; bcplwa@brucecounty.on.ca
Cc: Cheryl-Anne Ross <Cheryl@aboudtng.com>; ANelson@geiconsultants.com
Subject: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

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Good evening,

Please see the attached draft Terms of Reference for a Scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON. The draft Terms of Reference have been developed based on information received from the proponent, and a review of the applicable municipal, provincial, and federal guidelines that apply to this project. We would appreciate your review and comments on the Terms of Reference in order to finalize the proposed scope of work required for the scoped EIS.

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist
ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

Aboud & Associates Inc. is located within the Between the Lakes Purchase (Treaty 3); the treaty lands and territory of the Mississaugas of the Credit.

Heather Dixon

From: Jack Van Dorp <JVanDorp@brucecounty.on.ca>
Sent: Monday, July 8, 2024 9:09 AM
To: Heather Dixon
Cc: Bruce County Planning - Lakeshore Hub; Mark Paoli
Subject: RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

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Dear Heather,

Thank you for reaching out regarding this Terms of Reference.

Comments are as follows:

- The County does not have a role in the decision-making process related to this public works project, or an interest in it, and we encourage the Town to ensure that its decisions conform to the Official Plan that is in effect.

- It is our understanding that the study area is outside the area covered by the local Official Plan, and so perhaps the reference to the Town of Saugeen Shores Official Plan can be removed from the TOR.

- For areas outside the coverage of a local Official Plan the County Official Plan functions as the local plan.

Kind regards,

Jack.

From: Heather Dixon < >
Sent: Monday, June 17, 2024 6:14 PM
To: Matt Armstrong <m.armstrong@svca.on.ca>; Bruce County Planning - Inland Hub <bcplwa@brucecounty.on.ca>
Cc: Cheryl-Anne Ross <Cheryl@aboudtng.com>; ANelson@geiconsultants.com
Subject: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

You don't often get email from heather@aboudtng.com. Learn why this is important

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Good evening,

Please see the attached draft Terms of Reference for a Scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON. The draft Terms of Reference have been developed based on information received from the proponent, and a review of the applicable municipal, provincial, and federal guidelines that apply to this project. We would appreciate your review and comments on the Terms of Reference in order to finalize the proposed scope of work required for the scoped EIS.

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist
ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

Aboud & Associates Inc. is located within the Between the Lakes Purchase (Treaty 3); the treaty lands and territory of the Mississaugas of the Credit.

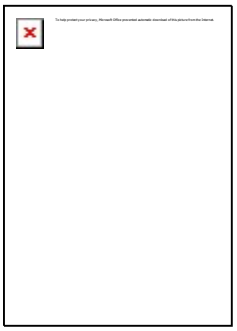
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Klarika Hamer
Applications Technician
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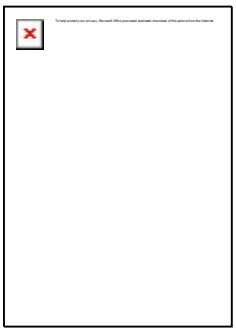
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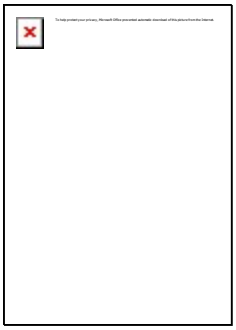
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APPENDIX 3
Site Investigation Details

SURVEY	TIME	DATE	STAFF	TEMP.	WIND (beaufort)	CLOUD COVER (%)	PRECIP.	PRECIP. LAST 24 HOURS
Breeding Bird Point Count 1	08:07-08:17	10-Jun-24	Brynn Varcoe	9	1	100	None	Yes-light
Ecological Land Classification and Summer Botanical	10:45-11:45	18-Jun-24	Shannon Davison	29	2	40	None	Yes-light
Aquatic Habitat Assessment	10:45-13:00	18-Jun-24	Heather Dixon	29	2	40	None	Yes-light
Breeding Bird Point Count 2	09:05-09:15	04-Jul-24	Brynn Varcoe	22	0	10	None	None

APPENDIX 4
Ecological Land Classification Forms

Roadside ELC CLASSIFICATION

PROJ. NO./NAME: Moore Bridge (P24043)		**POLYGON:** E	
SURVEYOR(S): SD	**DATES:** June 18, 2024		
START: 10:43	**END:** 12:02	**COORDINATES:**	

POLYGON DESCRIPTION

SYSTEM	SITE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL	☐ OPEN WATER	☐ LACUSTRINE	☑ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ SHALLOW WATER	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☑ SURFICIAL DEP.	☑ BOTTOMLAND		☐ EMERGENT	☐ RIVER
	☐ BEDROCK	☐ TERRACE		☐ FLOATING-LVD.	☐ STREAM
		☐ VALLEYSLOPE		☐ GRAMINOID	☐ MARSH
		☐ TABLELAND		☐ FORB	☐ SWAMP
		☐ ROLL. UPLAND		☐ LICHEN	☐ FEN
		☐ CLIFF		☐ BRYOPHYTE	☐ BOG
		☐ TALUS	COVER	☐ DECIDUOUS	☐ BARREN
		☐ CREVICE/CAVE	☑ OPEN	☐ CONIFEROUS	☑ MEADOW
		☐ ALVAR	☐ SHRUB	☑ MIXED	☐ PRAIRIE
		☐ ROCKLAND	☐ TREED		☐ THICKET
		☐ BEACH/BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

COMMUNITY CLASSIFICATION

COMMUNITY CLASS: Meadow	**CODE:** ME
COMMUNITY SERIES: Mixed Meadow	**CODE:** MEM
ECOSITE: Dry- Fresh Mixed Meadow	**CODE:** MEMM3
VEGETATION TYPE:	**CODE:**
INCLUSION:	**CODE:**
COMPLEX:	**CODE:**

STAND COMPOSITION								
STANDING SNAGS:	N	<10	N	10-24	N	25-50	N	>50
COMMUNITY AGE:								

NOTES:

LAYERS: C = CANOPY SC = SUBCANOPY U = UNDERSTOREY GL = GRD LAYER
ABUNDANCE* CODES: N= NONE R= RARE O= OCCASIONAL A= ABUNDANT D= DOMINANT
** Abundance not representative of interior of community.*

SPECIES	LAYER			
	C	SC	U	GL
Ulmus americana		R		
Crataegus sp.			R	
Rhamnus cathartica			R	
Rubus idaeus ssp. strigosus			R	R
Vitis riparia			R	R
Rosa multiflora				R

SPECIES	LAYER			
	C	SC	U	GL
Bromus inermis				O
Solidago sp.				A-O
Anemonastrum canadense				O-R
Asclepias syriaca				R
Vicia cracca				R
Phalaris arundinacea				A-O
Equisetum arvense				R
Thalictrum pubescens				R
Ranunculus acris				R
Daucus carota				O-R
Heracleum maximum			R	
Leucanthemum vulgare				R
Urtica dioica				A-O

Representative Photographs of Vegetation Community:





Roadside ELC

CLASSIFICATION

PROJ. NO./NAME: Moore Bridge (P24043)		**POLYGON:** D
SURVEYOR(S): SD	**DATES:** June 18, 2024	
START: 10:43	**END:** 12:02	**COORDINATES:**

POLYGON DESCRIPTION

SYSTEM	SITE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL	☐ OPEN WATER	☐ LACUSTRINE	☑ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ SHALLOW WATER	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☑ SURFICIAL DEP.	☐ BOTTOMLAND		☐ EMERGENT	☐ RIVER
	☐ BEDROCK	☐ TERRACE		☐ FLOATING-LVD.	☐ STREAM
		☐ VALLEYSLOPE		☐ GRAMINOID	☐ MARSH
		☐ TABLELAND		☐ FORB	☐ SWAMP
		☑ ROLL. UPLAND		☐ LICHEN	☐ FEN
		☐ CLIFF		☐ BRYOPHYTE	☐ BOG
		☐ TALUS	COVER	☑ DECIDUOUS	☐ BARREN
		☐ CREVICE/CAVE		☐ CONIFEROUS	☐ MEADOW
		☐ ALVAR	☐ OPEN	☐ MIXED	☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH/BAR	☑ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☑ FOREST
					☐ PLANTATION

COMMUNITY CLASSIFICATION

COMMUNITY CLASS:	Forest	**CODE:** FO
COMMUNITY SERIES:	Deciduous Forest	**CODE:** FOD
ECOSITE:	Dry- Fresh Sugar Maple Deciduous Forest	**CODE:** FODM5
VEGETATION TYPE:	Dry- Fresh Sugar Maple Deciduous Forest	**CODE:** FODM5-1
INCLUSION:		**CODE:**
COMPLEX:		**CODE:**

STAND COMPOSITION								
STANDING SNAGS:	N	<10	O	10-24	N	25-50	N	>50
COMMUNITY AGE:	Mid-aged							

NOTES:

LAYERS: C = CANOPY SC = SUBCANOPY U = UNDERSTOREY GL = GRD LAYER
ABUNDANCE* CODES: N= NONE R= RARE O= OCCASIONAL A= ABUNDANT D= DOMINANT
** Abundance not representative of interior of community.*

SPECIES	LAYER			
	C	SC	U	GL
Acer saccharum	D	A		
Fraxinus americana		O-R	O-R	
Thuja occidentalis				R
Ulmus americana		O-R		
Tilia americana			R	
Prunus virginiana			O	
Cornus alternifolia			O	
Rhamnus cathartica			O	
Ribes cynosbati			R	
Rubus occidentalis				R

SPECIES	LAYER			
	C	SC	U	GL
Leucanthemum vulgare				R
Solidago flexicaulis				A-O
Maianthemum racemosum				O-R
Dactylis glomerata				R
Circaea canadensis				O
Vicia cracca				R
Lotus corniculatus				R
Erigeron annuus				R
Cichorium intybus				R
Carex spicata				R
Smilax lasioneura				R
Cirsium vulgare				R

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Roadside ELC

CLASSIFICATION

PROJ. NO./NAME: Moore Bridge (P24043)		**POLYGON:** C	
SURVEYOR(S): SD	**DATES:** June 18, 2024		
START: 10:43	**END:** 12:02	**COORDINATES:**	

POLYGON DESCRIPTION

SYSTEM	SITE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☐ TERRESTRIAL	☑ OPEN WATER	☐ LACUSTRINE	☑ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ SHALLOW WATER	☑ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☑ AQUATIC	☐ SURFICIAL DEP.	☐ BOTTOMLAND		☑ EMERGENT	☑ RIVER
	☐ BEDROCK	☐ TERRACE		☐ FLOATING-LVD.	☐ STREAM
		☐ VALLEYSLOPE		☐ GRAMINOID	☐ MARSH
		☐ TABLELAND		☐ FORB	☐ SWAMP
		☐ ROLL. UPLAND		☐ LICHEN	☐ FEN
		☐ CLIFF		☐ BRYOPHYTE	☐ BOG
		☐ TALUS	COVER	☐ DECIDUOUS	☐ BARREN
		☐ CREVICE/CAVE	☑ OPEN	☐ CONIFEROUS	☐ MEADOW
		☐ ALVAR	☐ SHRUB	☐ MIXED	☐ PRAIRIE
		☐ ROCKLAND	☐ TREED		☐ THICKET
		☐ BEACH/BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

COMMUNITY CLASSIFICATION

COMMUNITY CLASS: Open Water	**CODE:** OA
COMMUNITY SERIES: Open Aquatic	**CODE:** OAO
ECOSITE:	**CODE:**
VEGETATION TYPE:	**CODE:**
INCLUSION:	**CODE:**
COMPLEX:	**CODE:**

STAND COMPOSITION								
STANDING SNAGS:	N	<10	N	10-24	N	25-50	N	>50
COMMUNITY AGE:								

NOTES:

LAYERS: C = CANOPY SC = SUBCANOPY U = UNDERSTOREY GL = GRD LAYER
ABUNDANCE* CODES: N= NONE R= RARE O= OCCASIONAL A= ABUNDANT D= DOMINANT
** Abundance not representative of interior of community.*

SPECIES	LAYER			
	C	SC	U	GL
Salix interior			O	
Salix eriocephala			R	

SPECIES	LAYER			
	C	SC	U	GL
Schoenoplectus tabernaemontani				O
Poa palustris				R
Typha latifolia			O	
Sagittaria latifolia				R
Iris versicolor				R
Carex lacustris				O-R

Representative Photographs of Vegetation Community:





Roadside ELC

CLASSIFICATION

PROJ. NO./NAME: Moore Bridge (P24043)		**POLYGON:** B
SURVEYOR(S): SD	**DATES:** June 18, 2024	
START: 10:43	**END:** 12:02	**COORDINATES:**

POLYGON DESCRIPTION

SYSTEM	SITE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL	☐ OPEN WATER	☐ LACUSTRINE	☑ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☐ SHALLOW WATER	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☑ SURFICIAL DEP.	☐ BOTTOMLAND		☐ EMERGENT	☐ RIVER
	☐ BEDROCK	☐ TERRACE		☐ FLOATING-LVD.	☐ STREAM
		☐ VALLEYSLOPE		☐ GRAMINOID	☐ MARSH
		☐ TABLELAND		☐ FORB	☐ SWAMP
		☑ ROLL. UPLAND		☐ LICHEN	☐ FEN
		☐ CLIFF		☐ BRYOPHYTE	☐ BOG
		☐ TALUS	COVER	☑ DECIDUOUS	☐ BARREN
		☐ CREVICE/CAVE		☐ CONIFEROUS	☐ MEADOW
		☐ ALVAR	☐ OPEN	☐ MIXED	☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH/BAR	☑ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☑ FOREST
					☐ PLANTATION

COMMUNITY CLASSIFICATION

COMMUNITY CLASS:	Forest	**CODE:** FO
COMMUNITY SERIES:	Deciduous Forest	**CODE:** FOD
ECOSITE:	Dry- Fresh Sugar Maple Deciduous Forest	**CODE:** FODM5
VEGETATION TYPE:	Dry- Fresh Sugar Maple - Basswood Deciduous Forest	**CODE:** FODM5-6
INCLUSION:		**CODE:**
COMPLEX:		**CODE:**

STAND COMPOSITION								
STANDING SNAGS:	N	<10	N	10-24	R	25-50	R	>50
COMMUNITY AGE:	Mid-aged							

NOTES:

LAYERS: C = CANOPY SC = SUBCANOPY U = UNDERSTOREY GL = GRD LAYER
ABUNDANCE* CODES: N= NONE R= RARE O= OCCASIONAL A= ABUNDANT D= DOMINANT
** Abundance not representative of interior of community.*

SPECIES	LAYER			
	C	SC	U	GL
Fraxinus americana	O-R	O-R	O-R	
Thuja occidentalis		O-R		R
Acer saccharum	A-O	O		
Prunus serotina	O-R			
Tilia americana	O	O		
Rhamnus cathartica			O	
Vitis riparia			O	
Rubus idaeus ssp. strigosus			R	
Parthenocissus quinquefolia				O
Cornus alternifolia			A-O	
Ribes cynosbati				R

SPECIES	LAYER			
	C	SC	U	GL
Leucanthemum vulgare				R
Dactylis glomerata				R
Taraxacum officinale				R
Cirsium arvense				R
Solidago sp.				O
Geranium robertianum				O
Silene latifolia				R
Tragopogon dubius				R
Solidago flexicaulis				A-O
Trillium grandiflorum				R
Ranunculus acris				R
Carex arctata				O-R

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APPENDIX 5
Vascular Plant List

Plant Type [1]	Scientific Name	Common Name	CC [2]	CW [3]	SARO Status [4]	SARA Status [5]	Global Rank [6]	Prov. Rank [7]	Bruce County [8]
TR	*Acer saccharum*	Sugar Maple	4	3			G5	S5	X
FO	*Anemonastrum canadense*	Canada Anemone	3	-3			G5	S5	X
FO	*Asclepias syriaca*	Common Milkweed	0	5			G5	S5	X
GR	*Bromus inermis*	Awnless Brome	*	5			G5	SNA	I
SE	*Carex arctata*	Drooping Woodland Sedge	5	5			G5	S5	X
SE	*Carex lacustris*	Lakebank Sedge	5	-5			G5	S5	X
SE	*Carex spicata*	Spiked Sedge	*	5			GNR	SNA	I
FO	*Cichorium intybus*	Chicory	*	5			GNR	SNA	I
FO	*Circaea canadensis*	Broad-leaved Enchanter's Nightshade	2	3			GNR	S5	X
FO	*Cirsium arvense*	Canada Thistle	*	3			G5	SNA	I
FO	*Cirsium vulgare*	Bull Thistle	*	3			GNR	SNA	I
SH	*Cornus alternifolia*	Alternate-leaved Dogwood	6	3			G5	S5	X
TR	*Crataegus* sp.	Hawthorn species							
GR	*Dactylis glomerata*	Orchard Grass	*	3			GNR	SNA	I
FO	*Daucus carota*	Wild Carrot	*	5			GNR	SNA	I
FE	*Equisetum arvense*	Field Horsetail	0	0			G5	S5	X
FO	*Erigeron annuus*	Annual Fleabane	0	3			G5	S5	X
TR	*Fraxinus americana*	White Ash	4	3			G5	S4	X
FO	*Geranium robertianum*	Herb-robert	2	3			G5	S5	I
FO	*Heracleum maximum*	Cow-parsnip	3	-3			G5	S5	R
FO	*Iris veriscolor*	Harlequin Blue Flag	5	-5			G5	S5	X
FO	*Leucanthemum vulgare*	Oxeye Daisy		5			GNR	SNA	I
FO	*Lotus corniculatus*	Garden Bird's-foot Trefoil	*	3			GNR	SNA	I
FO	*Maianthemum racemosum*	Large False Solomon's Seal	4	3			G5	S5	X
VW	*Parthenocissus quinquefolia*	Virginia Creeper	6	3			G5	S4?	
GR	*Phalaris arundinacea*	Reed Canary Grass	0	-3			G5	S5	X
GR	*Poa palustris*	Fowl Bluegrass	5	-3			G5	S5	X
TR	*Prunus serotina*	Black Cherry	3	3			G5	S5	X
SH	*Prunus virginiana*	Choke Cherry	2	3			G5	S5	X
FO	*Ranunculus acris*	Tall Buttercup	*	0			G5	SNA	I
SH	*Rhamnus cathartica*	Common Buckthorn	*	0			GNR	SNA	I
SH	*Ribes cynosbati*	Prickly Gooseberry	4	3			G5	S5	X
SH	*Rosa multiflora*	Multiflora Rose	*	3			GNR	SNA	

Plant Type [1]	Scientific Name	Common Name	CC [2]	CW [3]	SARO Status [4]	SARA Status [5]	Global Rank [6]	Prov. Rank [7]	Bruce County [8]
SH	*Rubus idaeus ssp. strigosus*	Wild Red Raspberry	2	3			G5	S5	X
SH	*Rubus occidentalis*	Black Raspberry	2	5			G5	S5	X
FO	*Sagittaria latifolia*	Broad-leaved Arrowhead	4	-5			G5	S5	X
SH	*Salix eriocephala*	Heart-leaved Willow	4	-3			G5	S5	X
SH	*Salix interior*	Sandbar Willow	1	-3			GNR	S5	
SE	*Schoenoplectus taebernaemontani*	Soft-stemmed Bulrush	5	-5			G5	S5	X
FO	*Silene latifolia*	White Campion	*	5			GNR	SNA	I
VI	*Smilax lasioneura*	Hairy-nerved Carrionflower	5	5			G5	S4S5	U
FO	*Solidago flexicaulis*	Zig-zag Goldenrod	6	3			G5	S5	X
FO	*Solidago sp.*	Goldenrod species							
FO	*Taraxacum officinale*	Common Dandelion	*	3			G5	SNA	I
FO	*Thalictrum pubescens*	Tall Meadow-rue	5	-3			G5	S5	X
TR	*Thuja occidentalis*	Eastern White Cedar	4	-3			G5	S5	X
TR	*Tilia americana*	Basswood	4	3			G5	S5	X
FO	*Tragopogon dubius*	Yellow Goat's-beard	*	5			GNR	SNA	I
FO	*Trillium grandiflorum*	White Trillium	5	3			G5	S5	X
FO	*Typha latifolia*	Narrow-leaved Cattail	1	-5			G5	S5	X
TR	*Ulmus americana*	American Elm	3	-3			G5	S5	X
FO	*Urtica dioica*	Stinging Nettle	*	0			G5T5?	SNA	
FO	*Vicia cracca*	Tufted Vetch	*	5			GNR	SNA	I
VW	*Vitis riparia*	Riverbank Grape	0	0			G5	S5	X

1.	Plant Types: AL = Algae; FE = Fern; FO = Forb; GR = Grass; LC = Lichen; LV = Liverwort; MO = Moss; RU = Rush; SE = Sedge; SH = Shrub; TR = Tree; VI = Herbaceous vine; VW = Woody Vine
2.	CC: Coefficient of Conservatism reflects a species' fidelity to a specific habitat. Range from 0 to 10; 10 = very conservative, not likely in disturbed habitats, 1 = least conservative, likely found in a broad range of habitat. * = value not assigned because they are non-native
3.	CW: Coefficient of Wetness reflects a species' affinity for wet soil conditions. Range from -5 to 5; -5 = obligate wetland species, 5 = obligate upland species
4.	SARO: Status under the Provincial Endangered Species Act, listed on the Species at Risk in Ontario (SARO) list. In order of severity, statuses include: EXP = Extirpated; END = Endangered; THR = Threatened; SC = Special Concern
5.	SARA: Status under the National Species at Risk Act (SARA), assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In order of severity, statuses include: EXP = Extirpated; END = Endangered; THR = Threatened; SC = Special Concern
6.	Global rarity rank. Range from G1 to G5; G1 = Extremely rare, G5 = Very Common. NR = Unranked; U = Unrankable
7.	Provincial rarity rank. Range from S1 to S5; S1 = Extremely rare, S5 = Very Common. NR = Unranked; U = Unrankable
8.	Distribution and Status of the Vascular Plants of Southwestern Ontario (Oldham, 1993): I- Non-native, X- Native, Common; U- Uncommon; R- Rare

APPENDIX 6
Breeding Bird Survey

															PC 1	Habitat: Woodland/agriculture														
															round1	date: June 10, 2024						round2	date: July 4, 2024						Max Summaries		SITE SUMMARY	
LIST	COMMON NAME	SCIENTIFIC NAME	CODES	COSSARO	SARO	COSEWIC	SARA	SCHEDULE	S-RANK	G-RANK	COSEWIC_DATE	AREA SENSITIVE	AREA REQUIRED	PIF SPECIES	>50	50-100	>100	FO	total	HBE	>50	50-100	>100	FO	total	HBE	TOTAL	HBE	TOTAL	HBE
1065	Mourning Dove	*Zenaida macroura*	MODO						S5	G5									0	NA	1				1	S	1	S	1	S
1109	Ring-billed Gull	*Larus delawarensis*	RBGU						S5	G5								4	0	NA					0	NA	0	FO	0	FO
1176	Eastern Phoebe	*Sayornis phoebe*	EAPH						S5B	G5									0	NA	1	1			2	CF	2	CF	2	CF
1182	Red-eyed Vireo	*Vireo olivaceus*	REVI						S5B	G5									0	NA		2			2	S	2	S	2	S
1187	American Crow	*Corvus brachyrhynchos*	AMCR						S5	G5							3		0	H					0	NA	0	H	0	H
1195	Tree Swallow	*Tachycineta bicolor*	TRES						S4S5B	G5								3	0	NA					0	NA	0	FO	0	FO
1207	House Wren	*Troglodytes aedon*	HOWR						S5B	G5									0	NA	1				1	S	1	S	1	S
1213	Gray Catbird	*Dumetella carolinensis*	GRCA						S5B,S3N	G5									0	NA		1			1	S	1	S	1	S
1216	European Starling	*Sturnus vulgaris*	EUST						SNA	G5					1				1	S					0	NA	1	S	1	S
1223	American Robin	*Turdus migratorius*	AMRO						S5	G5					2				2	S	1	2			3	T	5	T	5	T
1235	American Goldfinch	*Carduelis tristis*	AMGO						S5	G5									0	NA		2			2	S	2	S	2	S
1249	Vesper Sparrow	*Pooecetes gramineus*	VESP						S4B	G5				✓		1			1	S					0	NA	1	S	1	S
1254	Song Sparrow	*Melospiza melodia*	SOSP						S5	G5					1	3			4	P	2	4			6	T	10	T	10	T
1264	Baltimore Oriole	*Icterus galbula*	BAOR						S4B	G5				✓		1			1	S					0	NA	1	S	1	S
1265	Red-winged Blackbird	*Agelaius phoeniceus*	RWBL						S5	G5					2	3			5	S	3	4			7	T	12	T	12	T
1269	Common Grackle	*Quiscalus quiscula*	COGR						S5	G5								1	0	NA					0	NA	0	FO	0	FO
1284	Common Yellowthroat	*Geothlypis trichas*	COYE						S5B,S3N	G5					2	1			3	S	1	1			2	T	5	T	5	T
1286	American Redstart	*Setophaga ruticilla*	AMRE						S5B	G5		✓	>100ha			1			1	S					0	NA	1	S	1	S
1294	Yellow Warbler	*Dendroica petechia*	YEWA						S5B	G5									0	NA		1			1	S	1	S	1	S
1306	Northern Cardinal	*Cardinalis cardinalis*	NOCA						S5	G5									0	NA			1		0	NA	0	NA	0	NA
1308	Indigo Bunting	*Passerina cyanea*	INBU						S5B	G5					1				1	S		1			1	T	2	T	2	T

Breeding Evidence:

Observed
FO-flyover
X- species observed in breeding season

Possible
H-suitable habitat
S-singing male

Probable
M-multiple singing individuals
P-pair observed in suitable habitat
T-presumed territory based on presence of singing bird at least one week apart
D-courtship or display
V-visiting probabale nest site
A-agitated behaviour
B-brood patch or cloacal protuberance
N-nest building by wrens or woodpeckers

Confirmed
NB-nest building
AE-adult entering, occupying or leaving nest site
NU-empty nest used in the same season
FY-recently fledged young
DD-distraction display
FS-adult carrying fecal sac
CF-adult carrying food
NE-nest with eggs
NY-nest with young

APPENDIX 7
Significant Wildlife Habitat Assessment

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
1	Waterfowl Stopover and Staging Areas (Terrestrial)	Seasonal concentration areas of animals	- Fields with sheet water in spring (incl. agricultural)	- Mixed species aggregations of 100 or more individuals confirms SWH	Flooded field ecosite and 100-300m radius is the SWH	No habitat matching criteria identified in study area.	No	None required	No
2	Waterfowl Stopover and Staging (Aquatic)	Seasonal concentration areas of animals	- Ponds, marshes, lakes, bays, coastal inlets and watercourses and reservoirs - SWTP & SWMP are not SWH	- Aggregations of 100 or more listed species for 7 days (i.e., >700 waterfowl use days) confirms SWH	Aquatic ecosite and 100m radius is the SWH	No habitat matching criteria identified in study area.	No	None required	No
3	Shorebird Migratory Stopover	Seasonal concentration areas of animals	- Shorelines of Lakes, rivers, wetlands, beaches, bars; seasonally flooded, muddy, and un-vegetated shoreline habitat	- 3 or more listed species and >1000 shorebird use days, or >100 whimbrel, confirms SWH	Shoreline ecosite and 100m radius is the SWH	No habitat matching criteria identified in study area.	No	None required	No
4	Raptor Wintering Area	Seasonal concentration areas of animals	- Combination of upland field and woodland habitat >20ha total (includes,>15ha upland field) - Least disturbed sites, idle, fallow or lightly grazed field/meadow best	- 1 or more Short-eared Owl, or at least 10 individuals and 2 listed species for a minimum of 20 days, and 3 of 5 years, confirms SWH	Ecosite communities (field and woodland) is the SWH	No habitat matching criteria identified in study area.	No	None required	No
5	Bat Hibernacula	Seasonal concentration areas of animals	- Caves, mine shafts, underground foundations, karsts. - Buildings are not SWH	- All sites with confirmed hibernating bats, confirms SWH	Ecosite and 200m radius is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
6	Bat Maternity Colony	Seasonal concentration areas of animals	- All forested ecosites, FOD, FOC, FOM, SWD, SWM, SWC with >10/ha trees (>25cm DBH) in early stages of decay (class 1-3) - Buildings are not SWH	- >10 Big Brown Bats, >5 adult female Silver-haired Bats confirms SWH	Entire woodland or forest stand ELC ecosite containing colony is the SWH	Forested ecosites present in Study area with trees >25cm DBH.	Yes	Studies recommended pre-construction in areas if tree removal will occur in candidate habitat.	Unknown
7	Turtle Wintering Area	Seasonal concentration areas of animals	- Areas with permanent water deep enough not to freeze, with mud/soft substrates	- 5 over-wintering Midland Painted Turtles, 1 or more Northern Map Turtle or Snapping Turtle confirms SWH	Mapped ELC ecosite, or deep pool element where turtles overwinter is the SWH	Snake Creek present in study area with deep waters	Yes	No turtles identified incidentally or observed in community during spring and summer surveys, and substrates not suitable for overwintering.	No
8	Reptile Hibernaculum	Seasonal concentration areas of animals	- Sites below the frost line; rock barren, crevice and cave, talus, alvar, rock piles, slopes, stone fences, and crumbling foundations	- Presence of hibernacula with minimum 5 individuals of 1 snake species/ individuals of 2 or more species confirms SWH. - Congregations of a minimum of 5 snakes of 1 species/ individuals of 2 or more snake species, near potential hibernacula on sunny warm days in spring and fall confirms SWH	Feature hibernacula is in, and 30m radius is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
9	Colonially-nesting Bird Habitat (Cliff/bank)	Seasonal concentration areas of animals	- Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, barns	- 1 or more nest sites with 8 or more Cliff Swallow or, 50 Bank Swallow and Rough-winged Swallow pairs during the breeding season.	Colony and 50m radius around peripheral nest are the SWH	No habitat matching criteria identified in study area.	No	None required	No
10	Colonially-nesting Bird Habitat (Tree/shrub)	Seasonal concentration areas of animals	- Live or dead standing trees in wetlands, lakes, islands and peninsulas, occasionally shrubby and emergent vegetation	- 5 or more active Great-blue Heron or other listed species nests	Edge of the colony plus minimum 300m radius, or extent of the forest ecosite, or entire island <15ha is the SWH	No habitat matching criteria identified in study area.	No	None required	No
11	Colonially-nesting Bird Habitat (Ground)	Seasonal concentration areas of animals	- Rocky islands or peninsulas within a lake or large river (natural or artificial)	- >25 active nests of Herring Gull, Ring-billed Gull, >5 active nests of Common Tern, or >2 active nests of Caspian Tern. 5 or more pairs of Brewer's Blackbird. Any active nesting colony of Little Gull, Great Black-backed Gull.	Edge of colony plus min 150m radius or extent of ELC ecosite, or island <3ha is the SWH	No habitat matching criteria identified in study area.	No	None required	No
12	Migratory Butterfly Stopover Area	Seasonal concentration areas of animals	- At least 10ha, with undisturbed field/meadow and forest or woodland edge habitat present, within 5km of Lake Ontario.	- Presence of Monarch use days >5000 or >3000 where there is a mix of Monarch with Painted Ladies or White Admirals	Field/meadow and forest/woodland is the SWH	No habitat matching criteria identified in study area, >5km from Lake Ontario	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
13	Land bird Migratory Stopover Area	Seasonal concentration areas of animals	- Woodlots >5ha in size - Within 5km of Lake Ontario	- Use by >200 birds/day, with >35species, with at least 10sp recorded on 5 different survey dates.	Woodlot is the SWH	No habitat matching criteria identified in study area, >5km from Lake Ontario	No	None required	No
14	Deer Yarding Areas	Seasonal concentration areas of animals	- ELC communities providing Thermal cover (FOM, FOC, SWM, SWC, CUP2, CUP3, FOD3, CUT)	- Deer yards are managed by MNRF, available through district offices and LIO.	LIO mapping	No Deer Yarding areas identified on LIO Mapping	No	None required.	No
15	Deer Winter Congregation Areas	Seasonal concentration areas of animals	- All forested ecosites >100ha - Conifer Plantations <50ha may be used	- Deer management is the responsibility of the MNRF. - Contact MNRF or LIO for known deer winter areas.	LIO mapping	No Deer Winter Congregation areas identified on LIO Mapping	No	None required.	No
16	Cliffs & Talus Slopes	Rare vegetation communities	- Cliff: vertical to near vertical bedrock >3m in height - Talus slope: rock rubble at the base of a cliff made up of coarse rocky debris	- Confirm any ELC Vegetation Type for Cliffs or Talus Slopes	Area of ELC sites: TAO, TAS, TAT, CLO, CLS, CLT	No habitat matching criteria identified in study area.	No	None required	No
17	Sand Barren	Rare vegetation communities	- Exposed, sparsely vegetated & caused by lack of moisture, fires, and erosion.	- Area >0.5ha in size - Confirm any ELC vegetation Type for Sand Barren - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
18	Alvar	Rare vegetation communities	- Level, mostly un-fractured calcareous bedrock feature, overlain by a thin veneer or soil	- Area >0.5ha in size - Field Studies that identify four of the five Alvar Indicator Species - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
19	Old Growth Forest	Rare vegetation communities	- >30ha forests with at least 10ha interior habitat and multi-layered canopy	- Dominant Tree Species >140 years old - No recognizable signs forestry practices (old stumps)	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
20	Savannah	Rare vegetation communities	- Tall Grass Prairie Habitat with 25%-60% Tree cover - Remnant sites such as Railway Right of ways are not SWH	- No minimum size and must be restored to a natural state. - Confirm one or more savannah indicator species. - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
21	Tallgrass Prairie	Rare vegetation communities	- Ground cover dominated by prairie grasses with <25% tree cover. - Remnant sites such as Railway Right of ways are not SWH	- No minimum size and must be restored to a natural state. - Confirm one or more prairie indicator species. - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
22	Other Rare Vegetation Communities	Rare vegetation communities	- All Provincially Rare S1, S2, S3 Vegetation Communities (Appendix M of SWHTG)	- Field Studies Confirming ELC vegetation type is a rare vegetation community	Area of ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
23	Waterfowl Nesting Areas	Specialized habitat for wildlife	- Upland Habitat, adjacent to Wetland ELC ecosites (except SWC, SWM) - Extends 120m from a wetland (>0.5ha) and any small wetlands (<0.5ha) within a cluster of at least 3. - Upland area at least 120m wide	- Presence of 3 or more nesting pairs of listed species excluding Mallards - Presence of 10 or more nesting pairs including mallards - Any active Black Duck nesting site	SWH may be greater than or less than 120m from the wetland edge and must provide enough habitat for waterfowl to successfully nest	No habitat matching criteria identified in study area.	No	None required	No
24	Bald Eagle or Osprey Nesting, Foraging and Perching Habitat	Specialized habitat for wildlife	- Forest communities, adjacent to riparian areas - Osprey nests usually at top of tree - Bald Eagle nest usually in super canopy tree in a notch within canopy	- Studies confirm one or more active Bald Eagle or Osprey nest. - Alternate nests included in SWH. - Nests must be used annually, if found inactive, must be known inactive at least 3 years, or suspected unused for 5 years if unknown	- Active nest plus 300m for OSPR - Active nest plus 400-800m for BAEA	No habitat matching criteria identified in study area.	No	None required	No
25	Woodland Raptor Nesting Habitat	Specialized habitat for wildlife	- Forested communities, forested swamp communities and cultural Plantations - Natural Forested/conifer plantations >30ha with >10ha interior habitat (200m buffer)	- One or more active nest of listed species	Nest protection radius: - RSHA, NOGA 400m - BAOW 200m. - Broad-winged Hawk, COHA 100m - SSHA 50	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
26	Turtle Nesting Areas	Specialized habitat for wildlife	- Exposed Mineral soil (sand or gravel) adjacent (<100m) or within shallow marsh, shallow submerged, shallow floating, bog or fen communities. - Located in open sunny areas, away from roads and less prone to predation. - Municipal and provincial road shoulders are not SWH.	- Confirm 5 or more nesting Midland Painted Turtles, 1 or more nesting Northern Map Turtle or Snapping Turtle	Area or sites with exposed mineral soils, plus a radius of 30-100m around the nesting area is the SWH.	No habitat matching criteria identified in study area.	No	None required	No
27	Seeps and Springs	Specialized habitat for wildlife	- Areas where ground water comes to the surface. - Any forested area within the headwaters of a stream or river system	- Confirm site with 2 or more seeps/springs.	Area of ELC forest ecosite containing seep/spring is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
28	Amphibian Breeding Habitat (Woodland)	Specialized habitat for wildlife	- Breeding pools within woodlands - Wetland, pond, or pool >500m^2 within or adjacent (<120m) to a woodland. - Woodlands with permanent ponds, or those with water until mid-July more likely to be used.	- Confirm Breeding population of 1 or more listed newt/salamander species, 2 or more of the listed frog species with at least 20 individuals (adults or egg masses), 2 or more of the listed frog species with call code levels of 3. - Wetland adjacent to woodlands includes travel corridor connecting features as SWH.	Wetland area, plus 230m radius of woodland is the SWH.	No habitat matching criteria identified in study area.	No	None required	No
29	Amphibian Breeding Habitat (Wetland)	Specialized habitat for wildlife	- Swamp, marsh, fen, bog, open aquatic, and shallow aquatic ELC communities. - Typically isolated from woodlands (>120m) but includes larger wetlands with primarily aquatic species (bull frogs) that are adjacent to woodlands. - Wetlands >500m2 - Presence of shrubs & logs - Bullfrogs require permanent water bodies and abundant emergent vegetation.	- Confirm Breeding populations of 1 or more listed newt/salamander species, or 2 or more listed frog/toad species with at least 20 individuals (adults or egg masses), or 2 or more listed frog/toad species with a call code level of 3 - Or any wetland with confirmed breeding Bullfrog.	- ELC ecosite and shoreline is the SWH. - Movement corridors (SWH) must be considered if this habitat is significant	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
30	Area-sensitive Breeding Bird Habitat	Specialized habitat for wildlife	- Habitats where interior breeding birds are breeding. - Large mature (>60 years) forest stands or woodlots >30ha. - Forest and swamp ELC communities - Interior habitat at least 200m from edge	- Presence of nesting or breeding pairs of 3 or more of the listed species - Any site with Cerulean Warbler or Canada Warbler is SWH	ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
31	Marsh Bird Breeding Habitat	Habitats of species of conservation concern considered SWH	- Some meadow marsh, shallows submerged, shallow floating, mixed shallow floating, fen, and bog communities (see SWH Ecoregion guide for specifics) - Nesting occurs in wetlands, all wetland habitat is considered with presence of shallow water with emergent aquatic vegetation - Green heron at edge of water sheltered by shrubs and trees.	- 5 or more nesting pairs of Sedge Wren or Marsh Wren, 1 pair of Sandhill Crane, or breeding by any combination of 5 or more of the listed species - Any Wetland with 1 or more breeding pair Black Tern, Trumpeter Swan, Green Heron or Yellow Rail	ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
32	Open Country Bird Breeding Habitat	Habitats of species of conservation concern considered SWH	- Grassland area >30ha (natural & cultural fields and meadows) - Grasslands not class 1 or 2 agriculture (no row crops or intensive hay or livestock pasturing) - Mature hayfields or pasture at least 5 years old	- Nesting or breeding of 2 or more of the listed species - Field with 1 or more Short-eared Owls	Contiguous ELC ecosite is the SWH	No habitat matching criteria identified in study area.	No	None required	No
33	Shrub/Early Successional Bird Breeding Habitat	Habitats of species of conservation concern considered SWH	- Cultural thickets, savannah, and woodland habitat - Large field area succeeding to shrub and thicket habitat >10ha in size - Patches of shrub ecosite may be complexed into larger old field ecosites for some species	- Confirm nesting or breeding of 1 of the listed indicator species and at least 2 of the common species - Habitat with Yellow-breasted Chat or Golden-winged Warbler is SWH	SWH is contiguous ELC ecosite field/thicket area	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
34	Terrestrial Crayfish	Habitats of species of conservation concern considered SWH	- Meadow marsh, shallow marsh, swamp thicket, deciduous swamp, and mixed swamp communities - Cultural meadow with inclusions of meadow marsh may be used - Wet edges of marshes and wet meadows should be surveyed for crayfish	- Presence of 1 or more individuals of listed species or their chimneys in suitable habitat	Area of ELC ecosite or Eco element area of meadow marsh or swamp within the larger ecosite area is the SWH	No habitat matching criteria identified in study area.	No	None required	No

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
35	Special Concern & Rare Wildlife Species	Habitats of species of conservation concern considered SWH	- All Special concern and Provincially Rare plant and animal species - Where an element occurrence is identified within a 1 or 10km grid for a species listed, linking candidate habitat on the site must be completed to ELC ecosites	- Assessment/inventory of site for identified special concern or rare species completed during time of year when species is present or easily identifiable - Habitat must be easily mapped and cover an important life stage component (specific nesting habitat, foraging)	SWH is the finest ELC scale that protects the form and function of the habitat	No element occurrences for Special Concern or rare Wildlife Species identified within 1km of the study area Background Atlas review identified eight special concern species within 10km of the Study Area - Midland Painted Turtle (ORAA) - Snapping Turtle (ORAA) - Barn Swallow (OBBA) - Canada Warbler (OBBA) - Eastern Wood-pewee (OBBA, NHIC) - Grasshopper Sparrow (OBBA) - Wood Thrush (OBBA) - Monarch (OBA)	Yes-Woodlands within 120m may provide habitat for Eastern-Wood-pewee and Wood Thrush. Areas along watercourses may provide habitat for Eastern Ribbonsnake	One season Botanical Survey, ELC, Breeding Bird Survey, Aquatic Habitat Assessment, and incidental wildlife.	No individuals of any special concern or rare species present. Assumed habitat present for Monarch, Yellow-banded Bumble Bee, and Eastern Ribbonsnake

#	Significant wildlife habitat (SWH)	Candidate SWH type	Candidate SWH criteria	Criteria for SWH confirmation	SWH protected area	Site assessment details	Candidate SWH	Field studies required/ completed	Confirmed SWH
36	Amphibian Movement Corridor	Animal movement corridors	- Corridors may occur in all ecosites associated with water. - Presence of significant amphibian breeding indicates the requirement for identifying corridors - Movement corridors between breeding habitat and summer habitat	- Corridors typically include areas with native vegetation, with several layers of vegetation, unbroken by roads, waterways or waterbodies are most significant - At least 15 of vegetation on both sides of the waterway or up to 200m wide of woodland habitat with gaps of <20m - Shorter corridors are more significant than longer, but amphibians must be able to get to and from their summer breeding habitat	Corridor is the SWH	No habitat matching criteria identified in study area.	No	None required	No
37	Deer Movement Corridor	Animal movement corridors	- May occur in all forested ecosites. - Determined when deer wintering habitat is confirmed as SWH	- Corridors at least 200m wide with gaps <20m leading to wintering habitat - Unbroken by roads and residential areas - Shorter corridors are more significant	Corridor is the SWH	No habitat matching criteria identified in study area.	No	None required	No

APPENDIX 8
Species at Risk Habitat Assessment

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Western Chorus Frog – Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	Amphibians	NAR	THR	S4	MNRF species occurrence mapping, ORAA (2012)	Generally found in lowland communities, such as swamps, inhabiting lowland shrubs and grasses in the community, near breeding habitat. Breeding occurs in lowland, ephemeral ponds, devoid of predatory fish species (COSEWIC 2008a).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2008. COSEWIC assessment and update status report on the Western Chorus Frog (*Pseudacris triseriata*) Carolinian population and Great Lakes/St. Lawrence – Canadian Shield population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.
Hungerford's Crawling Water Beetle	*Brychius hungerfordi*	Butterflies, bees, damselflies, dragonflies & insects	END	END	S1	MNRF species occurrence mapping	Specialist of small to medium-sized streams characterized by a moderate to fast flow, good stream aeration, cool temperatures, inorganic substrates, and alkaline water conditions. Often found immediately downstream from culverts, beaver dams, and human-made dams (COSEWIC 2011)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Hungerford's Crawling Water Beetle (*Brychius hungerfordi*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 40 pp.
Lake Huron Grasshopper	*Trimerotopis huroniana*	Butterflies, bees, damselflies, dragonflies & insects	THR	THR	S2	MNRF species occurrence mapping	Exclusively inhabits open dunes on Lake Huron, Michigan and Superior. Occurs most commonly on the foredune, a sand ridge predominantly covered with Marram Grass and Long-leaved Reed Grass (COSEWIC 2015)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2015. COSEWIC assessment and status report on the Lake Huron Grasshopper (*Trimerotropis huroniana*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 32 pp.
Monarch	*Danaus plexippus*	Butterflies, bees, damselflies, dragonflies & insects	SC	SC	S2N, S4B	MNRF species occurrence mapping, OBA (2023)	Requires milkweed for larval feeding, other wildflower species are also important for adult feeding when milkweed is not in flower; often found in abandoned farmland, along roadsides, and other open spaces (COSEWIC 2010b)	Milkweed present in open meadow habitat, but no individuals identified incidentally during field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Monarch (*Danaus plexippus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp.
West Virginia White	*Pieris virginenisis*	Butterflies, bees, damselflies, dragonflies & insects	SC	NAR	S3	MNRF species occurrence mapping	Found in rich deciduous and mixed forests and swamps with a poorly vegetated shrub layer. The larvae feed only on the leaves of a few host plants, including the Two-leaved Toothwort (*Cardamine diphylla*) and cut-leaved toothwort (Burke 2013).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Peter S. Burke. 2013. Management Plan for the West Virginia White (*Pieris virginiensis*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. v + 44 pp.
Yellow-banded Bumble Bee	*Bombus terricola*	Butterflies, bees, damselflies, dragonflies & insects	SC	SC	S3S5	MNRF species occurrence mapping	Occur in a diverse range of habitat, including mixed woodlands, farmlands, urban areas, montane meadows, prairie grasslands and boreal habitats. Queens overwinter underground and in decomposing organic material such as rotting lots (COSEWIC 2015)	Farmlands and open meadow habitat, but no individuals identified incidentally during field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2015. COSEWIC assessment and status report on the Yellow-banded Bumble Bee (*Bombus terricola)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 60 pp. *rank considered out of date
Bank Swallow	*Riparia riparia*	Birds	THR	THR	S4B	MNRF species occurrence mapping, OBBA, eBird (2018)	Breeds in a variety of natural and artificial bank type habitat, such as bluffs, stream and river banks, sand and gravel pits, piles of sand, topsoil and other material. Nests are typically in vertical or near-vertical surfaces (COSEWIC 2013b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Bank Swallow (*Riparia riparia*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 48 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Barn Swallow	*Hirundo rustica*	Birds	SC	THR	S5B	MNRF species occurrence mapping, OBBA	Occurs in farmland, along lake/river shorelines, in wooded clearings and in urban populated areas. Nesting may occur inside or outside buildings; under bridges and in road culverts (COSEWIC 2011a).	Bridge structure present, but no nests or individuals were identified during targeted field surveys.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow (*Hirundo rustica)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.
Barn Owl	*Tyto alba*	Birds	END	END	S1	MNRF species occurrence mapping	Requires open habitat for foraging, such as old fields and pastures, that provide habitat for rodents, and uses a variety of natural and man-made structures for nesting (COSEWIC 2010e)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Barn Owl (*Tyto alba)* (Eastern population and Western population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiv + 34 pp.
Bobolink	*Dolichonyx oryzivorus*	Birds	THR	THR	S4B	MNRF species occurrence mapping, OBBA, NHIC	Nest in grassland habitats, including hayfields and meadows with a mixture of grasses and broad-leaved forbs with a high litter cover. Area Sensitive, with increased density in grasslands greater than 10ha (Renfrew et. al. 2015)	Pasture habitat present in study area, but species not identified as present following targeted surveys.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Renfrew, R., A.M. Strong, N.G. Perlut, S.G. Martin and T.A. Gavin. 2015. Bobolink (*Dolichonyx oryzivorus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Birds of North America Online: http://bna.birds.cornell.edu/bna/species/176
Canada Warbler	*Wilsonia canadensis*	Birds	SC	THR	S4B	MNRF species occurrence mapping, OBBA	Prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer (COSEWIC 2008b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2008. COSEWIC assessment and status report on the Canada Warbler (*Wilsonia Canadensis*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 35 pp. (www.sararegistry.gc.ca/status/status_e.cfm).
Cerulean Warbler	*Setophaga cerulea*	Birds	THR	END	S3B	MNRF species occurrence mapping	Occur in older, mature, deciduous forests, preferentially oak-maple composition, with a full, to partially open canopy, and little to no understory cover. Often in bottomland forests, or adjacent to treed swamplands (COSEWIC 2010f).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Cerulean Warbler (*Dendroica cerulea*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.
Common Nighthawk	*Chordeiles minor*	Birds	SC	THR	S4B	MNRF species occurrence mapping	Breeds in open habitat, on the ground, in areas with no vegetation, including sand dunes, burned areas, open forests, railways, and gravel rooftops. Eggs are laid directly on the ground (COSEWIC 2007b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2007. COSEWIC assessment and status report on the Common Nighthawk (*Chordeiles minor)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 25 pp.
Eastern Meadowlark	*Sturnella magna*	Birds	THR	THR	S4B	MNRF species occurrence mapping, OBBA, NHIC	Nest in grassland habitats, including hayfields, pasture, savannahs, and other open areas. Preferential habitat includes areas with good grass and thatch (litter) cover (Jaster et. al. 2012).	Pasture habitat present in study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Observed near McKechnie Sideroad in grassland.	Jaster, Levi A., William E. Jensen and Wesley E. Lanyon. (2012). Eastern Meadowlark (*Sturnella magna*), The Birds of North America (P. G. Rodewald, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America: https://birdsna.org/Species-Account/bna/species/easmea
Eastern Whip-poor-will	*Caprimulgus vociferus*	Birds	THR	THR	S4B	MNRF species occurrence mapping	Often found breeding in semi-open habitats, with little ground cover, and canopy openings allowing light to penetrate the forest floor, often associated with pine or oak, savannahs and barrens, early-successional poplar stands and open conifer plantations (COSEWIC 2009a)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2009. COSEWIC assessment and status report on the Whip-poor-will (*Caprimulgus vociferus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Eastern Wood-Pewee	*Contopus virens*	Birds	SC	SC	S4B	MNRF species occurrence mapping, OBBA, NHIC	Associated with mid-age mixed and deciduous forest stands, often dominated by Maple (Acer), Elm (Ulmus) or Oak (Quercus), and include areas with clear-cuts, openings or forest edges. Also prefers forest stands with little to no understory vegetation (COSEWIC 2012a).	Deciduous woodland present in study area, but no individuals observed during field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-Pewee (*Contopus virens*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.
Evening Grosbeak	*Coccothraustes vespertinus*	Birds	SC	SC	S4B	MNRF species occurrence mapping	Breeding habitat includes open, mature mixed wood forests, where fir species and/or White Spruce are dominant, and Spruce Budworm is abundant (COSEWIC 2016)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2016. COSEWIC assessment and status report on the Evening Grosbeak (*Coccothraustes vespertinus)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 64 pp.
Golden Eagle	*Aquila chrysaetos*	Birds	END	NAR	S2B	eBird (2015)	Inhabit open and semi-open habitats, including prairie, arctic and alpine tundra, savannah, spruce woodlands and barren areas. Typically nests on cliffs but have been documented nesting in the upper third of deciduous and coniferous trees along riparian corridors (Wyshynski & Pulfer. 2015).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Wyshynski, S.A. and T.L. Pulfer. 2015. Recovery Strategy for the Golden Eagle (*Aquila chrysaetos*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vi + 43 pp.
Golden-winged Warbler	*Vermivora chrysoptera*	Birds	SC	THR	S4B	MNRF species occurrence mapping	Nests in early successional shrub habitat, with adjacent forest edges for singing perches, often in hydro cut-overs, recently logged areas and beaver marshes (COSEWIC 2006a).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2006. COSEWIC assessment and status report on the Golden-winged Warbler (*Vermivora chrysoptera*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 30 pp.
Grasshopper Sparrow	*Ammodramus savannarum*	Birds	SC	SC	S4B	MNRF species occurrence mapping, OBBA	Prefers moderately open grasslands and prairies with patchy bare ground; avoids grasslands with extensive shrub cover (Vickery 1996).	Pasture habitat present in study area, but species not identified as present following targeted surveys.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Vickery, Peter D. 1996. Grasshopper Sparrow (*Ammodramus savannarum*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/239\
Henslow's Sparrow	*Ammodramus henslowii*	Birds	END	END	SHB	MNRF species occurrence mapping	Breeds in grassland habitat and is area sensitive. Grasslands with tall, dense cover a thick thatch layer, and are greater than 30ha, but preferentially larger than 100ha are preferred (COSEWIC 2011b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Henslow's Sparrow (*Ammodramus henslowii)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 37 pp.
King Rail	*Rallus elegans*	Birds	END	END	S2B	MNRF species occurrence mapping	Occupies a wide variety of freshwater marsh habitat types. Large marshes, especially those that contain a range of water level conditions and a mosaic oh habitats, are thought to be preferred (COSEWIC 2011.	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2011. COSEWIC assessment and status report on the King Rain (*Rallus elegans*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 32 pp.
Least Bittern	*Ixobrychus exilis*	Birds	THR	THR	S4B	MNRF species occurrence mapping	Breeds in large marshes (>5ha) with emergent vegetation, typically cattails, with at least 50% open water, and relatively stable water levels (COSEWIC 2009b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2009. COSEWIC assessment and update status report on the Least Bittern (*Ixobrychus exilis*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 36 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Loggerhead Shrike	*Lanius ludovicianus*	Birds	END	END	S2B	MNRF species occurrence mapping, OBBA	Nests in open, low, grassy habitat with scattered shrubs. Presence of thorny shrubs, such as hawthorn, or barbwire fencing required for impaling prey. Only two recent areas of breeding in the province (Carden Plain and Napanee Plain) (Environment Canada 2015).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment Canada. 2015. Recovery Strategy for the Loggerhead Shrike, *migrans* subspecies (*Lanius ludovicianus migrans*), in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vii + 35 pp.
Olive-sided Flycatcher	*Contupus cooperi*	Birds	SC	THR	S4B	MNRF species occurrence mapping	Associated with natural forest openings (usually conifer or mixed), and edges of forests adjacent wetlands or watercourses, will also use open and semi-open forests and clear-cuts. Presence of tall snags and residual live trees required for nesting and foraging (COSEWIC 2007c).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2007. COSEWIC assessment and status report on the Olive-sided Flycatcher (*Contopus cooperi*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 25 pp.
Peregrine Falcon	*Falco peregrinus*	Birds	SC	SC	S3B	MNRF species occurrence mapping	Nests on cliff-ledges (50-200m preferred) near foraging areas. Also nests on anthropomorphic structures, such as tall building ledges, bridges, quarries, mines and cuts for road beds (COSEWIC, 2007a).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2007. COSEWIC assessment and update status report on the Peregrine Falcon (*Falco peregrinus*) (*pealei* subspecies - *Falco peregrinus* and *pealei anatum/tundrius* - *Falco peregrinus anatum/tundrius*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 45 pp.
Piping Plover	*Charadrius melodus*	Birds	END	END	S1B	MNRF species occurrence mapping	Nesting habitat occurs in complex and dynamic beach-dune ecosystems that are maintained by coastal, climate-related, processes such as storm events, water and wave-action, ice-scouring and wind (Kirk, 2013).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Kirk, D. A. 2013. Recovery Strategy for the Piping Plover (*Charadrius melodus*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. Vi + 61 pp.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Birds	END	THR	S4B	MNRF species occurrence mapping, OBBA	Found in a variety of open areas, with a high density of dead or dying trees, particularly forests dominated by oak or beech (COSEWIC 2007d).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2007. COSEWIC assessment and update status report on the Red-headed Woodpecker (*Melanerpes erythrocephalus)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp.
Short-eared Owl	*Asio flammeus*	Birds	THR	SC	S2N, S4B	MNRF species occurrence mapping, OBBA	Breeds in open habitats, including grasslands, old pasture marshes, bogs, and sand-sage. Nests are scrapes, located on the ground (COSEWIC 2008c).	Pasture habitat present in study area, but species not identified as present following targeted surveys.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2008. COSEWIC assessment and update status report on the Short-eared Owl (*Asio flammeus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Wood Thrush	*Hylocichla mustelina*	Birds	SC	THR	S4B	MNRF species occurrence mapping, OBBA	Prefers second growth moist deciduous forests, with tall trees, and a dense understory of low saplings and an open forest floor with decaying leaf litter. Often nests in saplings, shrubs or occasionally dead stumps (COSEWIC 2012b).	Deciduous woodland present in study area, but no individuals observed during field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2012. COSEWIC assessment and status report on the Wood Thrush (*Hylocichla mustelina*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Northern Brook Lamprey	*Ichtyomyzon fossor*	Fish	SC	SC	S3	MNRF species occurrence mapping	Found in clear streams and rivers with rocky or gravelly substrates and presence of fine sands and uni-directional current for egg adherence, larval stage requires soft substrates for burrowing (COSEWIC 2007d).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2007. COSEWIC assessment and update status report on the northern brook lamprey (*Ichthyomyzon fossor)* (Great Lakes – Upper St. Lawrence populations and Saskatchewan – Nelson population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 30 pp.
Northern Sunfish (Great Lakes-Upper St. Lawrence Population)	*Lepomis peltastes*	Fish	SC	SC	S3	MNRF species occurrence mapping	Prefers shallow, vegetated areas of warm lakes, ponds, and slowly flowing watercourses. Usually occurs in clear waters and is considered intolerant of siltation. Substrate usually consists of sand and gravel, as in the Thames River (COSEWIC 2016)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2016. COSEWIC assessment and status report on the Northern Sunfish (*Lepomis peltastes*) Saskatchewan- Nelson River populations and the Great Lakes- Upper St. Lawrence populations, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 51 pp.
Shortjaw Cisco	*Coregonus zenithicus*	Fish	THR	THR	S2	MNRF species occurrence mapping	In Lakes Superior, Michigan, and Huron they inhabit waters 55 to 144m in depth, although they have been recorded from as deep as 183m and occasionally in more shallow water (COSEWIC 2003)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2003. COSEWIC assessment and updates status report on the Shortjaw Cisco (*Coregonus zenithicus)*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 19 pp.
Shortnose Cisco	*Coregonus reighardi*	Fish	END	END	SH	MNRF species occurrence mapping	Reported at depth ranging from 22m to 146m. Lives in clear coldwater environment year-round. No further information is known about its habitat preferences (COSEWIC 2005)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2005. COSEWIC assessment and update status report on the Shortnose Cisco (*Coregonus reighardi)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 14 pp.
American Badger	*Taxidea taxus*	Mammals	END	END	S1	MNRF species occurrence mapping	Associated with open habitat, including agricultural hedgerows, grasslands, fallow habitat and open linear corridors in forests. Soil composition must be coherent to maintain structure for digging and tunneling, usually coarse silts to fine sands, in Ontario usually found in areas of sandy and loam soils. Prey availability is also important for site suitability (COSEWIC, 2012c).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2012. COSEWIC assessment and status report on the American Badger (*Taxidea taxus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. iv + 63 pp.
Eastern Red Bat	*Lasiurus borealis*	Mammals	NL	END	S4	MNRF species occurrence mapping	Typically roosts among the foliage of trees and occasionally shrubs. They use both deciduous and coniferous forests of any age class, but in some parts of their range will avoid conifer species when suitable deciduous species are present. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. They forage in both forested and non-forested habitats, in both open and semi-cluttered habitats, both above and below forest canopies, and in both early and later stage forests (COSEWIC 2023).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2023. COSEWIC assessment and status report on the Hoary Bat *Lasiurus cinereus*, Eastern Red Bat *Lasiurus borealis* and Silver-haired Bat, *Lasionycteris noctivagans*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxi + 100 pp. (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html).

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Eastern Small-footed Myotis	*Myotis leibii*	Mammals	END	NA	S2S3	MNRF species occurrence mapping	Associated with hilly or mountainous terrain, in or near coniferous or deciduous forest habitat. Maternity roosts located in cracks and crevices of talus slopes and rocky outcrops, or, occasionally in bridges, old buildings, hollow trees (or loose bark) and caves and mines during the maternity season. Hibernate singly or in small clusters in mines and caves (NatureServe, 2015).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.
Hoary Bat	*Lasiurus cinereus*	Mammals	NL	END	S4	MNRF species occurrence mapping	Roosts solitarily in trees, with preferences including maple, oak, ash, elder, hemlock, and redwood trees. Typically roosts among the foliage of trees and occasionally shrubs, and use both deciduous and coniferous forests, of any age class. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. Forages in the open, and suitable habitats may include wetlands, grasslands and open fields with patchily distributed trees (COSEWIC 2023).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2023. COSEWIC assessment and status report on the Hoary Bat *Lasiurus cinereus*, Eastern Red Bat *Lasiurus borealis* and Silver-haired Bat, *Lasionycteris noctivagans*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxi + 100 pp. (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html).
Little Brown Myotis	*Myotis lucifugus*	Mammals	END	END	S3	MNRF species occurrence mapping	Hibernate in Caves; maternity colonies located in warm sites, often associated with human habitation; including attics, old buildings, under bridges, rock crevices and cavities in canopy trees in wooded areas (COSEWIC, 2013c).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.
Northern Myotis	*Myotis septentrionalis*	Mammals	END	END	S3	MNRF species occurrence mapping	Hibernate in Caves; maternity colonies usually located in trees, and are closely associated with specific tree characteristics and density of suitable trees. Characterized by tall, large diameter trees in early stages of decay, located in openings in mature forest canopies (COSEWIC, 2013c).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Silver-haired Bat	*Lasionycteris noctivagans*	Mammals	NL	END	S4	MNRF species occurrence mapping	Roosting occurs primarily under bark and in the cavities of trees, making them reliant on habitats where large, decaying trees are available. Roosts in a variety of large diameter coniferous and deciduous trees. When taken as a whole, the data indicate that the species does select specific attributes of trees to roost in. However, these attributes are not specific to particular tree species or type (deciduous or coniferous specifically) across the species range. Roost-tree species and type differ depending on the region but tree size, height, roost aspect, and cavity temperature are important characteristics. Deciduous species (especially *Populus* spp.) often have decay characteristics that make them ideal as roost sites, particularly in older forests where these features are more likely to occur. Heart-rot infections at the site of limb breakages often result in large well-protected inner chambers and large sheets of exfoliating bark are ideal for roosting. In other parts of their range, coniferous species are used. Several studies report the frequent use of old woodpecker cavities (COSEWIC 2023).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2023. COSEWIC assessment and status report on the Hoary Bat *Lasiurus cinereus*, Eastern Red Bat *Lasiurus borealis* and Silver-haired Bat, *Lasionycteris noctivagans*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxi + 100 pp. (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html).
Tri-colored Bat	*Perimyotis subflavus*	Mammals	END	END	S3?	MNRF species occurrence mapping	Hibernate in caves, abandoned mines, wells, and tunnels. Summer roosts include clumps of dead foliage and lichens, typically found in forested habitat close to water sources. May also use anthropogenic structures such as barns for maternity roosts. Foraging habitat includes forested riparian areas over water in relatively open areas (Environment Canada 2015).	Suitable trees likely present within the forest communities, but none were identified in the immediate vicinity of McKechnie Sideroad or the bridge.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment Canada. 2015. Recovery Strategy for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. ix + 110 pp
Blanding's Turtle	*Emydoidea blandingii*	Reptiles	THR	THR	S3	MNRF species occurrence mapping	Use a variety of eutrophic wetland habitat types, including lakes, ponds, watercourses, marshes, man-made channels, farm fields, coastal areas and bays. Seasonal overland terrestrial movements up to 2.5 km occur to reach nesting and overwintering areas, generally through wooded coniferous or mixed forest habitat. Nests are usually laid in loose sand or organic soil (COSEWIC 2005b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2005. COSEWIC assessment and update status report on the Blanding's Turtle (*Emydoidea blandingii*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 40 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Midland Painted Turtle	*Chrysemys picta marginata*	Reptiles	NL	SC	S4	ORAA (2018)	Occupy slow moving, relatively shallow and well-vegetated wetlands and water bodies with abundant basking sites and organic substrate. Found in association with submergent aquatic plants, which are used for cover and feeding. Semi -tolerant of human-altered landscapes, occasionally found occupying urban ponds and lands subject to anthropogenic disturbance. Suitable nesting habitat includes open, often south-facing, and sloped areas with sandy-loamy and/or gravel substrate usually within 1200 m of aquatic active season habitats. Overwinter in shallow water with deep sediment (COSEWIC 2018).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2018. COSEWIC assessment and status report on the Midland Painted Turtle (*Chrysemys picta marginata*) and the Eastern Painted Turtle (*Chrysemys picta picta*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 107 pp.
Northern Map Turtle	*Graptemys geographica*	Reptiles	SC	SC	S3	MNRF species occurrence mapping	Highly aquatic species, found in deep, large waterbodies, including Lakes and large rivers, with abundant basking sites. Emerge onto land only during nesting, which occurs in soft sand or soil. Waterbodies with slow currents, soft mud bottoms and abundant aquatic vegetation are preferred (COSEWIC, 2002b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2002. COSEWIC assessment and status report on the Northern Map Turtle (*Graptemys geographica*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 34 pp.
Snapping Turtle	*Chelydra serpentina*	Reptiles	SC	SC	S4	MNRF species occurrence mapping, ORAA (2006)	Inhabit slow-moving waters with soft, muck bottom and dense aquatic vegetation. Ponds, sloughs and shallow bays are all often used as summering and overwintering habitat (COSEWIC 2008d).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle (*Chelydra serpentina*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.
Spotted Turtle	*Clemmys guttata*	Reptiles	END	END	S2	MNRF species occurrence mapping	Found in wetlands with high organic content, including bogs, fens, marshes, woodland streams, sedge meadows, and shallow bays. Only one population is known from Wellington County, in Luther Marsh. Preferential to unpolluted shallow water with aquatic vegetation and soft substrates. Presence of Sphagnum moss, sedge tussocks, cattails and water lilies, may be important to Canadian populations (COSEWIC, 2002b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2004. COSEWIC assessment and update status report on the Spotted Turtle (*Clemmys guttata*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Wood Turtle	*Glyptemys insculpta*	Reptiles	END	THR	S2	MNRF species occurrence mapping	Generally found in forested landscapes, associated with clear freshwater streams and associated floodplains. Preferential to streams with year-round current, with sandy or gravelly-sandy bottoms. Streams used are typically meandering with frequent oxbows. Overwintering associated with stable, high concentration dissolved oxygen in pools, under mud or under overhanging banks. Nesting occurs in open areas with high sun exposure, typically within 10 to 50m of aquatic habitat. Home ranges are typically linear, following streams (Environment Canada, 2016).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment Canada. 2016. Recovery Strategy for the Wood Turtle (*Glyptemys insculpta*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. v + 48 pp.
Eastern Ribbonsnake	*Thamnophis sauritus*	Reptiles	SC	SC	S4	MNRF species occurrence mapping	A semi-aquatic species that inhabits dense, low- vegetation, edges of ponds, streams, marshes, fens and bogs, with open sunlit areas for basking (COSEWIC 2002c).	Stream edges present, but no individuals observed incidentally during field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2002. COSEWIC assessment and status report on the Eastern Ribbonsnake (*Thamnophis sauritus*). Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Milksnake	*Lampropeltis triangulum*	Reptiles	SC	SC	S4	MNRF species occurrence mapping	Habitat generalists often associated with edge habitat, meadows, prairies, pastures, rocky outcrops and human disturbances such as hydro corridors and railway embankments. Habitat is usually close to a water source. Hibernation occurs in a variety of natural and man-made features, including rotting logs, old foundations, basements and burrows (COSEWIC 2014).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2014. COSEWIC assessment and status report on the Eastern Milksnake (*Lampropeltis Triangulum*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 61 pp.
Queensnake	*Regina septemvittata*	Reptiles	END	END	S2	MNRF species occurrence mapping	Associated with rocky streams and rivers, but occasionally found in marsh, pond and lake shore habitats. Usually found within 3m of the shoreline and only at sites where there is an abundance of crayfish (COSEWIC 2010)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Queensnake (*Regina septemvittata)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 34 pp.
Massassauga Rattlesnake	*Sistrurus catenatus*	Reptiles	SC	THR	S3	MNRF species occurrence mapping	Only historic observations of Masassauga in the north western portion of Wellington County. Found in wet prairies, old fields, peatlands, rock barrens and coniferous forests, with open-areas, and areas of dense shrub cover. Hibernate in damp areas below the frost line (COSEWIC, 2012b).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2012. COSEWIC assessment and status report on the Massasauga (*Sistrurus catenatus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 84 pp.
American Ginseng	*Panax quinquefolius*	Vascular plants	END	END	S2	MNRF species occurrence mapping	Occur in moist, rich, undisturbed, mature Sugar Maple dominated deciduous woodlands. Often, colonies are located at the bottom of south facing slopes (COSEWIC, 2000).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2000. COSEWIC assessment and update status report on the American Ginseng (*Panax quinquefolius*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 17 pp.
American Hart's Tongue Fern	*Asplenium scolopendrium*	Vascular plants	SC	SC	S3	MNRF species occurrence mapping	Grows on rocks or rocky substrates and requires calcareous soils, preferential to sites with dolomitic limestone, in Ontario found in upper talus and mid-slopes of the Niagara Escarpment (Environment Canada 2013).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment Canada. 2013. Management Plan for the Hart's-tongue Fern (*Asplenium scolopendrium*) in Canada. Species at Risk Act Management Plan Series. Environment Canada, Ottawa. iii + 16 pp

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Broad Beech Fern	*Phegopteris hexagonoptera*	Vascular plants	SC	SC	S3	MNRF species occurrence mapping	Prefers rich, undisturbed deciduous forest, particularly mature Beech-maple forests. Typically occurs in moister areas such as lower valley slopes, bottomlands and even swamps. Primarily a shade-tolerant species and is unlikely to withstand major opening of the forest canopy (van Overbeeke et. al., 2013)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	van Overbeeke, J.C., J.V. Jalava and R.H. Donley. 2013. Management Plan for the Broad Beech Fern (*Phegopteris hexagonoptera*) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. V + 25 pp.
Butternut	*Juglans cinerea*	Vascular plants	END	END	S2?	MNRF species occurrence mapping	Occur in rich moist sites, that are well-drained, often found along stream banks or gravelly sites. Butternut is shade intolerant (COSEWIC, 2003b).	Stream banks present in study area, but no individuals observed during targeted field studies.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2003. COSEWIC assessment and status report on the butternut (*Juglans cinerea*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp.
Dwarf Lake Iris	*Iris lacustris*	Vascular plants	SC	SC	S3	MNRF species occurrence mapping	Grows on alvars, dolostone bedrock shorelines, sand or gravel beach ridges, and in openings in coniferous woodlands. Wildfire is likely important, as natural succession eventually causes conditions to become unsuitable (COSEWIC 2010)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Dwarf Lake Iris (*Iris lacustris)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 29 pp.
Eastern Prairie-fringed Orchid	*Platanthera leucophaea*	Vascular plants	END	END	S2	MNRF species occurrence mapping	Habitat includes fens, wet tallgrass prairie and moist old fields with open growing conditions. Species does not flower annually (Environment Canada 2012).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment Canada. 2012. Recovery Strategy for the Eastern Prairie Fringed-orchid (*Platanthera leucophaea*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. ii + 11 pp. + Appendices.
Gattinger's Agalinis	*Agalinis gattingeri*	Vascular plants	END	END	S2S3	MNRF species occurrence mapping	Native to both alvar and tallgrass prairie habitat and requires open unshaded conditions for growth (Environment and Climate Change Canada 2019)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	Environment and Climate Change Canada. 2019. Recovery Strategy for the Gattinger's Agalinis (*Agalinis gattingeri*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. 3 parts, 44 pp. + vi + 33 pp. + 7 pp.
Goldenseal	*Hydrastis canadensis*	Vascular plants	SC	THR	S2	MNRF species occurrence mapping	Occurs in deciduous woodlands that experience periodic flooding (that is, floodplain). Generally found on slightly acidic soils under closed to semi-open canopies (adjacent to walking paths, sloughs and drainage ways, in woodlot edges, previously flooded areas and successional forests) (COSEWIC 2019)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2019. COSEWIC assessment and status report on the Goldenseal (*Hydrastis canadensis)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 35 pp.
Hill's Pondweed	*Potamogeton hillii*	Vascular plants	SC	SC	S2S3	MNRF species occurrence mapping	Occur in cold clear calcareous streams, ponds, and ditches, which are alkaline in nature (COSEWIC 2005c).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2005c COSEWIC assessment and update status report on the Hill's Pondweed (*Potamogeton hillii*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 19 pp.

Common name	Scientific name	Group	SARO	COSEWIC	S-rank	Background sources	Habitat requirements	Suitable habitat in study area	Field studies completed/ required	Observed by AA	Reference
Hill's Thistle	*Cirsium hillii*	Vascular plants	THR	THR	S3	MNRF species occurrence mapping	Found in a variety of open, dry, sandy, fire-prone habitats, including such communities as gravel hill or bluff prairies, dry mesic to mesic sand prairies, pine barrens, oak barrens, sand dunes, oak savannah, and open woods (COSEWIC 2004)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2004. COSEWIC assessment and status report on Hill's thistle (*Cirsium hillii)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 34 pp.
Houghton's Goldenrod	*Solidago houghtonii*	Vascular plants	THR	SC	S2?	MNRF species occurrence mapping	Grows on seasonally wet limestone alvars, calcareous beach sands, or interdunal wetlands along the Great Lakes shoreline (COSEWIC 2005)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2005. COSEWIC assessment and status report on the Houghton's Goldenrod (*Solidago houghtonii)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 17 pp.
Lakeside Daisy	*Tetraneuris herbacea*	Vascular plants	SC	THR	S3	MNRF species occurrence mapping	Commonly found in alvar habitats, but occasionally occurs in prairies and cliffs. Habitat is seasonally wet in spring and fall and moderately drought-like in the summer (COSEWIC 2002)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2002. COSEWIC assessment and status report on the Lakeside Daisy (*Hymenoxys herbacea)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Pitcher's Thistle	*Cirsium pitcheri*	Vascular plants	THR	SC	S2	MNRF species occurrence mapping	Found only on sand dunes and sandy beaches. Ideal habitat is open, dry, loose sand with sparse or no vegetation immediately surrounding or shading the thistles (COSEWIC 2010)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Pitcher's Thistle (*Cirsium pitcher)* in Canada. Committee on the Status of Endangered Wildlife. Ottawa. x + 32 pp.
Small White Lady's-slipper	*Cypripedium candidum*	Vascular plants	END	THR	S1	MNRF species occurrence mapping	Grows in remnant fragments of moist, calcareous native prairie openings. This includes patches of prairie remnants in roadside ditches surrounded by agricultural fields (COSEWIC 2014)	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC. 2014. COSEWIC assessment and status report on the Small White Lady's-slipper (*Cypripedium candidum)* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 48 pp.
Tuberous Indian Plantain	*Arnoglossum plantagineum*	Vascular plants	SC	SC	S2	MNRF species occurrence mapping	Habitat includes open, sunny areas in wet calcareous soils, including wet meadows and shoreline fens (COSEWIC 2002).	No habitat present in the study area.	ELC, summer botanical inventory, aquatic habitat assessment, and breeding bird survey.	Not observed.	COSEWIC 2002. COSEWIC assessment and update status report on the tuberous Indian-plantain (*Arnoglossum plantagineum*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 11 pp.

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APPENDIX 9
Background Wildlife List

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
	BUTTERFLIES & MOTHS												
OBA (2009)	Least Skipper	*Ancyloxypha numitor*						S5	G5	N5			
OBA (2022)	Silver-spotted Skipper	*Epargyreus clarus*						S4	G5	N5			
OBA (2022)	Hobomok Skipper	*Poanes hobomok*						S5	G5	N5			
OBA (2022)	European Skipper	*Thymelicus lineola*						SNA	G5	NNA			
OBA (2003)	Northern Broken-Dash	*Wallengrenia egeremet*						S5	G5	N5			
OBA (2016)	Bronze Copper	*Lycaena hyllus*						S5	G4G5	N5			
OBA (2022)	Banded Hairstreak	*Satyrium calanus*						S4	G5	N4N5			
OBA (2005)	Coral Hairstreak	*Satyrium titus*						S5	G4G5	N5			
OBA (2023), iNat (2023)	Milbert's Tortoiseshell	*Aglais milberti*						S5	G5	N5			
OBA (2005)	Meadow Fritillary	*Boloria bellona*						S5	G5	N5			
OBA (2014)	Common Wood-Nymph	*Cercyonis pegala*						S5	G5	N5			
OBA (2018)	Common Ringlet	*Coenonympha tullia*						S5	G5	N5			
OBA (2023)	Monarch	*Danaus plexippus*	SC	SC	END	SC	Schedule 1	S2N,S4B	G5	N3B,NNRM			
OBA (2004)	Northern Pearly-Eye	*Enodia anthedon*						S5	G5	N5			
OBA (2011)	Viceroy	*Limenitis archippus*						S5	G5	N5			
OBA (2022)	White Admiral	*Limenitis arthemis arthemis*						S5	G5T5	N5			
OBA (2013)	Red-spotted Purple	*Limenitis arthemis astyanax*						S5	G5T5	N5			
OBA (2003)	Mourning Cloak	*Nymphalis antiopa*						S5	G5	N5			
OBA (2021), iNat (2021)	Compton Tortoiseshell	*Nymphalis l-album*						S5	G5	N5			
OBA (2013)	Northern Crescent	*Phyciodes cocyta*						S5	G5	N5			
OBA (2005)	Pearl Crescent	*Phyciodes tharos*						S4	G5	N5			
OBA (2015)	Eastern Comma	*Polygonia comma*						S5	G5	N5			
OBA (2009)	Question Mark	*Polygonia interrogationis*						S5	G5	N5B,N4N5M			
OBA (2013)	Aphrodite Fritillary	*Speyeria aphrodite*						S5	G5	N5			
OBA (2009)	Great Spangled Fritillary	*Speyeria cybele*						S5	G5	N5			
OBA (2020)	Red Admiral	*Vanessa atalanta*						S5B	G5	N5B,N5M			
OBA (2003)	Painted Lady	*Vanessa cardui*						S5B	G5	N5B,N5M			
OBA (2014)	American Lady	*Vanessa virginiensis*						S5	G5	N5B,N5M			
OBA (2011)	Pipevine Swallowtail	*Battus philenor*						SNA	G5	NNA			
OBA (2003)	Canadian Tiger Swallowtail	*Papilio canadensis*						S5	G5	N5			
OBA (2008)	Giant Swallowtail	*Papilio cresphontes*						S4	G5	N4			
OBA (2013)	Black Swallowtail	*Papilio polyxenes*						S5	G5	N5			

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
OBA (2004)	Orange Sulphur	*Colias eurytheme*						S5	G5	N5B,N5M			
OBA (2016)	Clouded Sulphur	*Colias philodice*						S5	G5	N5			
OBA (2022)	Cabbage White	*Pieris rapae*						SNA	G5	NNA			
iNat (2016)	American Rubyspot	*Hetaerina americana*						S4	G5	N4			
	AMPHIBANS												
ORAA (2018)	American Toad	*Anaxyrus americanus*						S5	G5	N5			
ORAA (2012)	Spring Peeper	*Pseudacris crucifer*						S5	G5	N5			
ORAA (2012)	Western Chorus Frog - Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	NL	NAR	THR	THR	Schedule 1	S4	G5TNR	N4			
ORAA (1996)	American Bullfrog	*Lithobates catesbeianus*						S4	G5	N5	✓		
ORAA (2019)	Green Frog	*Lithobates clamitans*						S5	G5	N5			
ORAA (1998)	Northern Leopard Frog	*Lithobates pipiens*		NAR	NAR			S5	G5	N5			
ORAA (1987)	Wood Frog	*Lithobates sylvaticus*						S5	G5	N5			
ORAA (1981)	Spotted Salamander	*Ambystoma maculatum*						S4	G5	N5			
ORAA (2015)	Eastern Red-backed Salamander	*Plethodon cinereus*						S5	G5	N5			
	SNAKES AND LIZARDS												
ORAA (1989)	Northern Watersnake	*Nerodia sipedon sipedon*		NAR	NAR			S5	G5T5	N5			
ORAA (1981)	Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*						S5	G5	N5			
ORAA (1981)	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*						S5	G5T5	N5			
	TURTLES												
ORAA (2006)	Snapping Turtle	*Chelydra serpentina*	NL	SC	SC	SC	Schedule 1	S4	G5T5	N4			
ORAA (2018)	Midland Painted Turtle	*Chrysemys picta marginata*	NAR	NAR	SC	SC	Schedule 1	S4	G5T5	N4			
	BIRDS												
OBBA, eBird (2024)	Canada Goose	*Branta canadensis*						S5	G5	N5B,N5N,N5M			
OBBA	Wood Duck	*Aix sponsa*						S5B, S3N	G5	N5B,N4N5N,N5M			
OBBA	Blue-winged Teal	*Anas discors*						S3B,S4M	G5	N5B,N5M			
OBBA	Mallard	*Anas platyrhynchos*						S5	G5	N5B,N5N,N5M			
eBird (2024)	Common Goldeneye	*Bucephala clangula*						S5	G5	N5B,N5N,N5M	✓		
eBird (2024)	Common Merganser	*Mergus merganser*						S5	G5	N5B,N5N,N5M	✓		
OBBA, eBird (2024)	Wild Turkey	*Meleagris gallopavo*						S5	G5	N5			

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
OBBA, eBird (2018)	Ruffed Grouse	*Bonasa umbellus*						S5	G5	N5			
eBird (2024)	Pied-billed Grebe	*Podilymbus podiceps*						S4B,S2N	G5	N5B,N4N5N,N5M			
OBBA, eBird (2023)	Rock Pigeon	*Columba livia*						SNA	G5	NNA			
OBBA, eBird (2024)	Mourning Dove	*Zenaida macroura*						S5	G5	N5B,N5N,N5M			
OBBA	Black-billed Cuckoo	*Coccyzus erythropthalmus*						S4S5B	G5	N5B,N5M			✓
OBBA	Yellow-billed Cuckoo	*Coccyzus americanus*						S4B	G5	N4B,NUM			
OBBA	Ruby-throated Hummingbird	*Archilochus colubris*						S5B	G5	N5B,N5M			
eBird (2024)	Sandhill Crane	*Grus canadensis*						S5B,S3N	G5	N5B,N1N,N5M	✓	>40ha	
OBBA, eBird (2013)	Killdeer	*Charadrius vociferus*						S4B	G5	N5B,N4N5N,N5M			
OBBA	Upland Sandpiper	*Bartramia longicauda*						S2B	G5	N5B,N5M	✓	>25ha	
OBBA	American Woodcock	*Scolopax minor*						S4B	G5	N5B,N5M			
OBBA	Wilson's Snipe	*Gallinago delicata*						S5B	G5	N5B,N5M			
OBBA, eBird (2013)	Spotted Sandpiper	*Actitis macularius*						S5B	G5	N5B,N3N,N5M			
eBird (2024)	Herring Gull	*Larus argentatus*						S4B,S5N	G5	N5B,N5N,N5M			
eBird (2013)	Double-crested Cormorant	*Phalacrocorax auritus*		NAR	NAR			S5B,S4N	G5	N5M,N3N4N,N5M			
OBBA	Green Heron	*Butorides virescens*						S4B	G5	N4N5B,N3N4N,N4N5M			
OBBA, eBird (2024)	Turkey Vulture	*Cathartes aura*						S5B, S3N	G5	N5B,N5M			
eBird (2015)	Golden Eagle	*Aquila chrysaetos*		END	NAR		Schedule 1	S1B,S4N	G5	N4N5B,N4N5N,N4N5M			
OBBA	Northern Harrier	*Circus cyaneus*		NAR	NAR			S5B,S4N	G5	N5B,N4N	✓	>30ha	✓
OBBA	Sharp-shinned Hawk	*Accipiter striatus*		NAR				S5	G5	N5B,N5N,N5M	✓	>30ha	
OBBA	Cooper's Hawk	*Accipiter cooperii*		NAR	NAR			S4	G5	N5B,N5N,N4N5M	✓	>10ha	
eBird (2023)	Bald Eagle	*Haliaeetus leucocephalus*	NAR	NAR	NAR			S4	G5	N5B,N5N,N5M	✓		✓
OBBA, eBird (2020)	Red-tailed Hawk	*Buteo jamaicensis*		NAR	NAR			S5	G5	N5B,N5N,N5M			
eBird (2023)	Rough-legged Hawk	*Buteo lagopus*		NAR	NAR			S1B,S4N	G5	N5B,N5N,N5M			
OBBA	Eastern Screech-Owl	*Megascops asio*		NAR	NAR			S4	G5	N4N5			
OBBA	Great Horned Owl	*Bubo virginianus*						S4	G5	N5			
OBBA	Short-eared Owl	*Asio flammeus*	THR	THR	THR	SC	Schedule1	S4?B,S2S3N	G5	N4B,N3N,N4M	✓	>75ha	✓
OBBA, eBird (1998)	Belted Kingfisher	*Megaceryle alcyon*						S5B,S4N	G5	N5B,N4N5N,N5M			✓
OBBA	Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	END	END	END	Schedule1	S3	G5	N4B,N3M			✓
OBBA, eBird (2024)	Red-bellied Woodpecker	*Melanerpes carolinus*						S5	G5	N4B,N4N,N3M			
OBBA	Yellow-bellied Sapsucker	*Sphyrapicus varius*						S5B,S3N	G5	N5B,N5M	✓	2-5ha	

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
OBBA	Downy Woodpecker	*Picoides pubescens*						S5	G5	N5			
OBBA, eBird (2024)	Hairy Woodpecker	*Picoides villosus*						S5	G5	N5B,N5N,NUM	✓	4-8ha	
OBBA, eBird (2024)	Northern Flicker	*Colaptes auratus*						S5	G5	N5B,N5N,N5M			✓
OBBA, eBird (2023)	Pileated Woodpecker	*Dryocopus pileatus*						S5	G5	N5	✓	>40ha	
OBBA	American Kestrel	*Falco sparverius*						S4	G5	N5B,N1N,N5M			✓
OBBA	Great Crested Flycatcher	*Myiarchus crinitus*						S5B	G5	N5B,N5M			
OBBA	Eastern Kingbird	*Tyrannus tyrannus*						S4B	G5	N5B,N5M			✓
OBBA, NHIC	Eastern Wood-Pewee	*Contopus virens*	SC	SC	SC	SC	No Schedule	S4B	G5	N5B,N5M			✓
OBBA	Alder Flycatcher	*Empidonax alnorum*						S5B	G5	N5B,N5M			
OBBA	Willow Flycatcher	*Empidonax traillii*						S4B	G5	N5B,N5M			✓
OBBA	Least Flycatcher	*Empidonax minimus*						S5B	G5	N5B,N5M	✓	>100ha	
OBBA, eBird (2024)	Eastern Phoebe	*Sayornis phoebe*						S5B	G5	N5B,N5M			
OBBA	Warbling Vireo	*Vireo gilvus*						S5B	G5	N5B,N5M			
OBBA, eBird (2024)	Red-eyed Vireo	*Vireo olivaceus*						S5B	G5	N5B,N5N,N5M			
OBBA	Loggerhead Shrike	*Lanius ludovicianus*	END	END	END	END	Schedule1	S1B	G4	N3B,N3M	✓	>25ha	✓
OBBA, eBird (2024)	Blue Jay	*Cyanocitta cristata*						S5	G5	N5B,N5N,NNRM			
OBBA, eBird (2024)	American Crow	*Corvus brachyrhynchos*						S5	G5	N5B,N5N,N5M			
eBird (2023)	Common Raven	*Corvus corax*						S5	G5	N5			
OBBA, eBird (2024)	Black-capped Chickadee	*Poecile atricapillus*						S5	G5	N5			
OBBA	Horned Lark	*Eremophila alpestris*						S4	G5	N5B,N5N,N5M			
OBBA, eBird (2018)	Bank Swallow	*Riparia riparia*	THR	THR	THR	THR	No Schedule	S4B	G5	N5B,N5M			✓
OBBA, eBird (2013)	Tree Swallow	*Tachycineta bicolor*						S4S5B	G5	N5B,N5M			
OBBA	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*						S4B	G5	N5B,N5M			
OBBA	Barn Swallow	*Hirundo rustica*	SC	SC	THR	THR	No Schedule	S4B	G5	N3N4B,N3N4M			
OBBA	Cliff Swallow	*Petrochelidon pyrrhonota*						S4S5B	G5	N5B,N5M			
eBird (1982)	Golden-crowned Kinglet	*Regulus satrapa*						S5	G5	N5B,N5N,N5M			
eBird (2018)	Ruby-crowned Kinglet	*Corthylio calendula*						S5B,S3N	G5	N5B,N5N,N5M			
OBBA, eBird (2024)	Cedar Waxwing	*Bombycilla cedrorum*						S5	G5	N5B,N5N,N5M			
OBBA	Red-breasted Nuthatch	*Sitta canadensis*						S5	G5	N5B,N5N,N5M	✓	>10ha	
OBBA, eBird (2024)	White-breasted Nuthatch	*Sitta carolinensis*						S5	G5	N5	✓	>10ha	
OBBA, eBird (2024)	Brown Creeper	*Certhia americana*						S5	G5	N5B,N5N,N5M	✓	>30ha	
OBBA, eBird (2024)	House Wren	*Troglodytes aedon*						S5B	G5	N5B,N5M			

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
OBBA	Gray Catbird	*Dumetella carolinensis*						S5B,S3N	G5	N5B,N5M			
OBBA	Brown Thrasher	*Toxostoma rufum*						S4B	G5	N5B,NUN,N5M			✓
OBBA, eBird (2023)	European Starling	*Sturnus vulgaris*						SNA	G5	NNA			
OBBA	Eastern Bluebird	*Sialia sialis*		NAR	NAR			S5B,S4N	G5	N5B,N5M			
OBBA	Wood Thrush	*Hylocichla mustelina*	SC	SC	THR	THR	No Schedule	S4B	G4	N4B,NUM			✓
OBBA, eBird (2024)	American Robin	*Turdus migratorius*						S5	G5	N5B,N4N5N,N5M			
OBBA	House Sparrow	*Passer domesticus*						SNA	G5	NNA			
OBBA	House Finch	*Carpodacus mexicanus*						SNA	G5	N5			
OBBA, eBird (2024)	American Goldfinch	*Carduelis tristis*						S5	G5	N5B,N5N,N5M			
eBird (2023)	Snow Bunting	*Plectrophenax nivalis*						S4N	G5	N5B,N5N,N5M			
OBBA	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	SC	SC	No Schedule	S4B	G5	N4N5B,N4N5M	✓	>10ha	✓
OBBA, eBird (2024)	Chipping Sparrow	*Spizella passerina*						S5B,S3N	G5	N5B,N5M			
OBBA	Clay-colored Sparrow	*Spizella pallida*						S4B	G5	N5B,N5M			
OBBA	Field Sparrow	*Spizella pusilla*						S4B,S3N	G5	N4B,NUM			✓
eBird (1982)	Fox Sparrow	*Passerella iliaca*						S5B,S3N	G5	N5B,N4N5N,N5M			
eBird (1982)	Dark-eyed Junco	*Junco hyemalis*						S5	G5	N5B,N5N,N5M			
OBBA, eBird (2018)	White-throated Sparrow	*Zonotrichia albicollis*						S5	G5	N5B,N5N,N5M			
OBBA	Vesper Sparrow	*Pooecetes gramineus*						S4B	G5	N5B,N5M			✓
OBBA	Savannah Sparrow	*Passerculus sandwichensis*						S5B,S3N	G5	N5B,N4N,N5M	✓	>50ha	✓
OBBA, eBird (2024)	Song Sparrow	*Melospiza melodia*						S5	G5	N5B,N5N,N5M			
OBBA, NHIC	Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	THR	No Schedule	S4B	G5	N5B,N4N5M	✓	>10ha	✓
OBBA, NHIC	Eastern Meadowlark	*Sturnella magna*	THR	THR	THR	THR	No Schedule	S4B,S3N	G5	N4B,NUM	✓	>10ha	✓
OBBA	Orchard Oriole	*Icterus spurius*						S4B	G5	N5B,N5M			
OBBA, eBird (2024)	Baltimore Oriole	*Icterus galbula*						S4B	G5	N5B,N5M			✓
OBBA, eBird (2024)	Red-winged Blackbird	*Agelaius phoeniceus*						S5	G5	N5B,N5N,N5M			
OBBA, eBird (1983)	Brown-headed Cowbird	*Molothrus ater*						S5	G5	N5B,NUN,N5M			
OBBA	Brewer's Blackbird	*Euphagus cyanocephalus*						S2	G5	N5B,N4N5M,N5M			
OBBA, eBird (1982)	Common Grackle	*Quiscalus quiscula*						S5	G5	N5B,NUN,N5M			
OBBA, eBird (2018)	Ovenbird	*Seiurus aurocapilla*						S5B	G5	N5B,N5M	✓	>70ha	
OBBA	Nashville Warbler	*Vermivora ruficapilla*						S5B	G5	N5B.N5M			
OBBA	Mourning Warbler	*Oporornis philadelphia*						S5B	G5	N5B,N5M			
OBBA	Common Yellowthroat	*Geothlypis trichas*						S5B,S3N	G5	N5B,N5M			
OBBA, eBird (2024)	American Redstart	*Setophaga ruticilla*						S5B	G5	N5B,N5M	✓	>100ha	

SOURCE	COMMON NAME	SCIENTIFIC NAME	COSSARO[1]	ESA[2]	COSEWIC[3]	SARA[4]	SCHEDULE	S-RANK[5]	G-RANK[6]	N-RANK[7]	AREA SENSITIVE[8]	AREA REQUIRED[8]	PIF SPECIES[9]
OBBA, eBird (2018)	Yellow Warbler	*Dendroica petechia*						S5B	G5	N5B,N5M			
eBird (2018)	Black-throated Green Warbler	*Dendroica virens*						S5B	G5	N5B,N5M	✓	>30ha	
OBBA	Canada Warbler	*Wilsonia canadensis*	SC	SC	SC	THR	Schedule1	S4B	G5	N4B,N3M	✓	>30ha	
OBBA	Scarlet Tanager	*Piranga olivacea*						S5B	G5	N5B,N4N5M	✓	>20ha	
OBBA, eBird (2024)	Northern Cardinal	*Cardinalis cardinalis*						S5	G5	N5			
OBBA, eBird (2018)	Rose-breasted Grosbeak	*Pheucticus ludovicianus*						S5B	G5	N5B,N5M			✓
OBBA	Indigo Bunting	*Passerina cyanea*						S5B	G5	N5B,N5M			
	MAMMALS												
OMA	White-tailed Deer	*Odocoileus virginianus*						S5	G5	N5			
OMA	Red Fox	*Vulpes vulpes*						S5	G5	N5			
OMA	Striped Skunk	*Mephitis mephitis*						S5	G5	N5			
OMA	American Mink	*Neovison vison*						S4	G5	N5			
OMA	Northern Raccoon	*Procyon lotor*						S5	G5	N5			
OMA	Beaver	*Castor canadensis*						S5	G5	N5			
OMA	Muskrat	*Ondatra zibethicus*						S5	G5	N5			
OMA	Woodchuck	*Marmota monax*						S5	G5	N5			
OMA	Eastern Gray Squirrel	*Sciurus carolinensis*						S5	G5	N5			
OMA	Eastern Chipmunk	*Tamias striatus*						S5	G5	N5			
OMA	Red Squirrel	*Tamiasciurus hudsonicus*						S5	G5	N5			
	FISH												
ARA (1973)	Northern Hog Sucker	*Hypentelium nigricans*						S4	G5	N4			
ARA (1973)	Spotfin Shiner	*Cyprinella spiloptera*						S4	G5	N4N5			
ARA (1973)	Common Shiner	*Luxilus cornutus*						S5	G5	N5			
ARA (1973)	Longnose Dace	*Rhinichthys cataractae*						S5	G5	N5			
ARA (1973)	Creek Chub	*Semotilus atromaculatus*						S5	G5	N5			
ARA (1973)	Rock Bass	*Ambloplites rupestris*						S5	G5	N5			
ARA (1973)	Rainbow Darter	*Etheostoma caeruleum*						S4	G5	N4			
ARA (1973)	Iowa Darter	*Etheostoma exile*						S5	G5	N5			
ARA (1973)	Johnny Darter	*Etheostoma nigrum*						S5	G5	N5			
ARA (1973)	Logperch	*Percina caprodes*						S5	G5	N5			
ARA (1973)	Brown Bullhead	*Ameiurus nebulosus*						S5	G5	N5			

Legend:

COSSARO: Committee on Species at Risk Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
SARA: Species at Risk Act
ESA: Endangered Species Act
END: Endangered
THR: Threatened
SC: Special Concern
NAR: Not At Risk
NL: Not listed
DD: Data Deficient

N- and S-Rank:

S1: Critically Imperiled—Critically imperiled in the jurisdiction (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the jurisdiction, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the jurisdiction, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the jurisdiction
SX: Presumed Extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not Applicable—The species is not a suitable target for conservation activities
S#S#: Range Rank—Indicates a range of uncertainty about the status of the species
S#B- Breeding Status Rank
S#N- Non Breeding Status Rank
?: Indicates uncertainty in the assigned rank

G-Rank:

G1: Extremely rare globally
G1G2: Extremely rare to very rare globally
G2: Very rare globally
G2G3: Very rare to uncommon globally
G3: Rare to uncommon globally
G3G4: Rare to common globally
G4: Common globally
G4G5: Common to very common globally
G5: Very common globally; demonstrably secure
T: Denotes that the rank applies to a subspecies or variety

Source Codes

OBA: Ontario Butterfly Atlas
ORAA: Ontario Reptile and Amphibian Atlas
OMA: Ontario Mammal Atlas
OBBA: Ontario Breeding Bird Atlas
eBird: eBird
ARA: Aquatic Resource Area Survey Points and Line Segments
DFO: Department of Fisheries and Oceans Species at Risk Mapping
iNat: iNaturalist
NHIC: Natural Heritage Information Centre

References:

1.COSSARO Status Endangered Species Act, 2007 (Bill 184). Schedules 1- 5. January 25, 2023.
2.Species at Risk in Ontario List. Endangered Species Act, 2007 (Ontario Regulation 230/08). January 25, 2023.
3.COSEWIC Status COSEWIC. 2014. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada. January 25, 2023.
4.Species at Risk Act (2002). Schedules 1- 3. May 21, 2024.
5.Provincial Rarity Rank. NatureServe. 2023.
6.Global Rarity Rank. NatureServe. 2023.
7.National Rank. NatureServe. 2023.
8.Significant Wildlife Habitat Technical Guide. Ontario Ministry of Natural Resources. 2000. Appendix C: A list of area sensitive species and key references.
9.Ontario Partners in Flight (PIF). 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain (North American Bird Conservation Region 13), Priorities, Objectives and Recommended Actions. Environment Canada (Ontario Region) and Ontario Ministry of Natural Resources. Final Draft, November, 2008.

APPENDIX 10
Agency Communication

ABOUD & ASSOCIATES INC.
Consulting Arborists • Ecologists • Landscape Architects

3-5 Edinburgh Road South
Guelph . Ontario
N1H 5N8

T: 519.822.6839
info@aboudtng.com
www.aboudtng.com

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HEALTHCARE AND EDUCATION
STREETSCAPES
PARKS AND OPEN SPACES
TRAIL SYSTEMS
GREEN ROOFS
CONTRACT ADMINISTRATION

EXPERT OPINION
OMB TESTIMONY
LEGAL PROCEEDINGS
PEER REVIEW
RESEARCH
EDUCATION

June 13, 2024

Our Project #: AA24-068A
Sent by email: SAROntario@ontario.ca

Ministry of the Environment, Conservation and Parks
Permissions and Compliance Section, Species at Risk Branch

Re: Moore Bridge, Town of Saugeen Shores
Request for Species at Risk and Local Site Information

To whom it may concern,

Please accept this request for information regarding Species at Risk and any other possible site constraints or information as it applies to a scoped EIS for the proposed removal of Moore Bridge on McKechnie Side Road ~450 m south of Concession Road 8 E in the Town of Saugeen Shores, Bruce County, and possible replacement with a pedestrian bridge (Figure 1). The information provided will be used to inform the Terms of Reference and field program, which will be prepared in consultation with the Town, County, and Saugeen Valley Conservation Authority.

Project Proponent and Location

Proponent: Town of Saugeen Shores

Township/Municipality: Town of Saugeen Shores, Bruce County

UTM Coordinates: 17T 474302.07 E 4917216.92 N

Proposed Activity

The Town of Saugeen Shores is proposing the removal of Moore Bridge on McKechnie Side Road, ~450 m south of Concession Road 8 E. The structure may be replaced by a pedestrian bridge. A scoped EIS will be undertaken as part of a Class B Environmental Assessment, which will include a SAR assessment to determine if SAR, or their habitat, are likely to be harmed during the removal and potential replacement of the subject structure with a pedestrian crossing.

Existing Site Conditions

Moore Bridge is located on McKechnie Side Road, where it crosses Snake Creek. The study area comprises the subject structure and up to 120 metres from it, where access is provided (Figure 1).

Background Information

A thorough background search has been completed using available resources provided online related to the subject properties and adjacent lands. In preparing this Request for Information, the following sources were reviewed for background information:

- Natural Heritage Information Center, Make-a-map, accessed March 12, 2024.
- Ontario Nature. Ontario Reptile and Amphibian Atlas: a citizen science project to map the distribution of Ontario's reptiles and amphibians, accessed March 12, 2024.
- Bird Studies Canada. Atlas of Breeding Birds of Ontario 2 (2001-2005) & 3 (2021-present). Accessed March 12, 2024.
- Federation of Ontario Naturalists, Atlas of the Mammals of Ontario. 1994. Accessed March 12, 2024
- iNaturalist. Accessed June 10, 2024.
- eBird. Cornell Lab of Ornithology. Accessed June 10, 2024.
- Ontario Nature. Ontario Butterfly Atlas. Accessed March 12, 2024.
- Department of Fisheries and Oceans. Aquatic Species at Risk Map. Accessed March 28, 2024.
- MNRF Aquatic Resource Area Resource Points and Line Segments. Accessed June 10, 2024

The species of conservation concern, including those listed under the ESA and/or SARA as well as those with S-Ranks of S1-S3, identified in the background search are identified in *Table 1*. *Table 1* includes the identified species, their current statuses under the ESA, SARA and COSEWIC as well as their provincial, national, and global ranks.

Table 1. Species of conservation concern identified in background review

Source	Common Name	Scientific Name	COSSARO	ESA	COSEWIC	SARA	S-Rank	G-Rank	N-Rank
ORAA (2012)	Western Chorus Frog - Great Lakes / St. Lawrence - Canadian Shield Population	*Pseudacris triseriata pop. 2*	NL	NAR	THR	THR	S4	G5TNR	N4
OBBA, eBird (2018)	Bank Swallow	*Riparia riparia*	THR	THR	THR	THR	S4B	G5	N5B,N5M
OBBA	Barn Swallow	*Hirundo rustica*	SC	SC	THR	THR	S4B	G5	N3N4B,N3N4M
OBBA, NHIC	Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	THR	S4B	G5	N5B,N4N5M
OBBA	Canada Warbler	*Wilsonia canadensis*	SC	SC	SC	THR	S4B	G5	N4B,N3M
OBBA, NHIC	Eastern Meadowlark	*Sturnella magna*	THR	THR	THR	THR	S4B,S3N	G5	N4B,NUM
OBBA, NHIC	Eastern Wood-Pewee	*Contopus virens*	SC	SC	SC	SC	S4B	G5	N5B,N5M
eBird (2015)	Golden Eagle	*Aquila chrysaetos*		END	NAR		S1B,S4N	G5	N4N5B,N4N5N,N4N5M
OBBA	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	SC	SC	S4B	G5	N4N5B,N4N5M
OBBA	Loggerhead Shrike	*Lanius ludovicianus*	END	END	END	END	S1B	G4	N3B,N3M
OBBA	Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	END	END	END	S3	G5	N4B,N3M
OBBA	Short-eared Owl	*Asio flammeus*	THR	THR	THR	SC	S4?B,S2S3N	G5	N4B,N3N,N4M

OBBA	Wood Thrush	*Hylocichla mustelina*	SC	SC	THR	THR	S4B	G4	N4B,NUM
OBA (2023)	Monarch	*Danaus plexippus*	SC	SC	END	SC	S2N,S4B	G5	N3B,NNRM
ORAA (2018)	Midland Painted Turtle	*Chrysemys picta marginata*	NAR	NAR	SC	SC	S4	G5T5	N4
ORAA (2006)	Snapping Turtle	*Chelydra serpentina*	NL	SC	SC	SC	S4	G5T5	N4

Please contact the undersigned should you require additional information of the above.

Sincerely,

ABOUD & ASSOCIATES INC.



Heather Dixon, PhD
Aquatic Ecologist
heather@aboudtng.com

Attachment: Figure 1



LEGEND

- MOORE BRIDGE
- STUDY AREA
- SNAKE CREEK

Information Sources:

1. Orthophotography provided by First Base Solutions. Accessed March 2024.
2. Roads and watercourse provided by LIO. Accessed March 2024.

Title:

STUDY AREA

Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

Date: MARCH 2024

Project: AA24-068A

Scale: 1 : 1500

ABOUD & ASSOCIATES INC.

Consulting Arborists • Ecologists • Landscape Architects

Figure No: 1

Heather Dixon

From: NHIC-Requests (MNRF) <nhicrequests@ontario.ca>
Sent: Wednesday, June 19, 2024 4:38 PM
To: Heather Dixon
Cc: NHIC-Requests (MNRF)
Subject: RE: Request for SAR Information for Moore Bridge, Town of Saugeen Shores, Bruce County, ON (AA23-068A)

Caution. Outside Sender

Hi Heather,

Thank you for contacting the Ontario Natural Heritage Information Centre. The information on Make-a-Map should be sufficient for site screening / gathering background information for environmental impact studies. The data on Make-a-Map are updated a couple of times a year. Unfortunately we don't have capacity to screen individual project sites for each of our clients. I ran a quick query and we don't have data from your project site for species you haven't already identified.

On Make-a-Map, if there is no 1-kilometre square in your area of interest, that means we don't have any data for that area. It doesn't necessarily mean there aren't any species at irks or other natural heritage features or values in that area. It may be that the area has never been surveyed or data have not been reported to us.

I hope this helps. If you have additional questions, please let us know.

Best regards,
Martina

Martina Furrer
Natural Heritage Information Centre | Science and Research Branch
Ministry of Natural Resources | Ontario Public Service
705-755-2159 | NHICrequests@ontario.ca

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Please note: As part of providing accessible customer service, if you have any accommodation needs, require communication supports, or alternate formats please let me know.

From: Heather Dixon <Heather@aboudtng.com>
Sent: Wednesday, June 19, 2024 6:30 PM
To: NHIC-Requests (MNRF) <nhicrequests@ontario.ca>
Cc: Cheryl-Anne Ross <Cheryl@aboudtng.com>
Subject: RE: Request for SAR Information for Moore Bridge, Town of Saugeen Shores, Bruce County, ON (AA23-068A)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hello Matthew,

We are not looking for sensitive data, but for records of any SAR that have not been added to the NHIC Make-A-Map for these squares yet. We do not need exact locations or anything beyond what would be published on the Make-a-Map. MECP used to provide this data, but does not seem to any more.

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist
ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

Aboud & Associates Inc. is located within the Between the Lakes Purchase (Treaty 3); the treaty lands and territory of the Mississaugas of the Credit.

From: NHIC-Requests (MNRF) <nhicrequests@ontario.ca>
Sent: Tuesday, June 18, 2024 10:21 AM
To: Heather Dixon <Heather@aboudtng.com>
Subject: Re: Request for SAR Information for Moore Bridge, Town of Saugeen Shores, Bruce County, ON (AA23-068A)

Caution. Outside Sender

Hi Heather,

Thank you for your email. Please see the NHIC sensitive data form to fill out an application. Once you have done so, please provide a shapefile for the study site and we would be happy to provide you with a data package.

NHIC's data access request form.

Matthew, NHIC Information Officer

From: Heather Dixon <Heather@aboudtng.com>
Sent: Thursday, June 13, 2024 3:01 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Cheryl-Anne Ross <Cheryl@aboudtng.com>; NHIC-Requests (MNRF) <nhicrequests@ontario.ca>
Subject: Request for SAR Information for Moore Bridge, Town of Saugeen Shores, Bruce County, ON (AA23-068A)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good afternoon,

Please accept the attached request for SAR information for the proposed rehabilitation or replacement of Moore Bridge, Town of Saugeen Shores, Bruce County, ON. Please contact me if you have any questions. We appreciate your prompt response to our request.

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist
ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

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BOTANICAL INVENTORIES
WILDLIFE SURVEYS
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COMMERCIAL/INDUSTRIAL
HEALTHCARE AND EDUCATION
STREETSCAPES
PARKS AND OPEN SPACES
TRAIL SYSTEMS
GREEN ROOFS
CONTRACT ADMINISTRATION

EXPERT OPINION
OMB TESTIMONY
LEGAL PROCEEDINGS
PEER REVIEW
RESEARCH
EDUCATION

June 13, 2024

Our Project #: AA24-068A
Sent by email: scp.aurora@ontario.ca

Ministry of Natural Resources and Forestry
Aurora Midhurst Owen Sound District
50 Bloomington Road
Aurora, ON L4G 0L8

Re: Moore Bridge, Town of Saugeen Shores, Bruce County, ON
Request for Local Site Information

Dear MNRF Staff:
Please accept this request for Information regarding:
☐ Wetland Mapping and/or Evaluation and Data Records
☒ Fish Dot Information
☐ ANSI Mapping and/or check-sheet

Any other possible site constraints or information as it applies to a scoped EIS for the proposed removal of Moore Bridge on McKechnie Side Road (Figure 1), including timing windows and thermal regime. The information provided will be used to inform the Terms of Reference and field program, which will be prepared in consultation with the Town, County, and Saugeen Valley Conservation Authority.

Project Proponent and Location

Proponent: Town of Saugeen Shores

Township/Municipality: Town of Saugeen Shores, Bruce County

UTM Coordinates: 17T 474302.07 E 4917216.92 N

Proposed Activity

The Town of Saugeen Shores is proposing the removal of Moore Bridge on McKechnie Side Road, ~450 m south of Concession Road 8 E. The structure may be replaced by a pedestrian bridge. A scoped EIS will be undertaken as part of a Class B Environmental Assessment, which will include a SAR assessment to determine if SAR, or their habitat, are likely to be harmed during the removal and potential replacement of the subject structure.

Existing Site Conditions

Moore Bridge is located on McKechnie Side Road, where it crosses Snake Creek. The study area comprises the subject structure and up to 120 metres from it, where access is provided (Figure 1).

Background Information

A thorough background search has been completed; using available resources provided online related to the subject lands and adjacent lands and is listed below:

1. The Aquatic Resources Area (ARA) Survey Point and Line Segment mapping indicated the presence of 11 species of fish within 1 km of the study area. Thermal regime is unknown.

2. A review of the Saugeen Valley Conservation Authority (SVCA) mapping showed that the bridge is within the SVCA screening area, including Snake Creek.

Please contact the undersigned should you require additional information of the above.

Yours truly,

ABOUD & ASSOCIATES INC.



Heather Dixon, PhD
Aquatic Ecologist
heather@aboudtng.com

Attachment: Figure 1



LEGEND

- MOORE BRIDGE
- STUDY AREA
- SNAKE CREEK

Information Sources:

1. Orthophotography provided by First Base Solutions. Accessed March 2024.
2. Roads and watercourse provided by LIO. Accessed March 2024.

Title:

STUDY AREA

Project:

MOORE BRIDGE
SAUGEEN SHORES, ON

Date: MARCH 2024

Project: AA24-068A

Scale: 1 : 1500

ABOUD & ASSOCIATES INC.

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Figure No: 1

Heather Dixon

From: Edwards, Hannah (She/Her) (MNRF) <Hannah.Edwards@ontario.ca>
Sent: Friday, June 14, 2024 11:30 AM
To: Heather Dixon
Cc: Dillon, Ryan (MNRF)
Subject: Licence to Collect Fish for Scientific Purposes #AMOS-2023-FWCA-00302/1103911

Caution. Outside Sender

Hi Heather,

Ryan sent your request for a timing window to me for review.

The location where the bridge work is occurring has mainly spring spawning species present. I would suggest the timing window of March 15-July 15 for the work to protect fish from impacts of any in-water works.

Please let me know if you have questions, or if you would like to discuss?

Thanks!

Hannah Edwards
(A) Management Biologist | Aurora Midhurst Owen Sound District
Ministry of Natural Resources and Forestry | Ontario Public Service
226-668-2913 | hannah.edwards@ontario.ca

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From: Heather Dixon <Heather@aboudtng.com>
Sent: Friday, June 14, 2024 10:11 AM
To: Dillon, Ryan (MNRF) <Ryan.Dillon@ontario.ca>
Subject: RE: Licence to Collect Fish for Scientific Purposes #AMOS-2023-FWCA-00302/1103911

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Ryan,

Would you be able to confirm the MNRF timing windows for that section of Snake Creek?

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist

ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

Aboud & Associates Inc. is located within the Between the Lakes Purchase (Treaty 3); the treaty lands and territory of the Mississaugas of the Credit.

From: Dillon, Ryan (MNRF) <Ryan.Dillon@ontario.ca>
Sent: Friday, June 14, 2024 9:47 AM
To: Heather Dixon <Heather@aboudtng.com>
Subject: RE: Licence to Collect Fish for Scientific Purposes #AMOS-2023-FWCA-00302/1103911

Caution. Outside Sender

Hi Heather,

I received your ARA survey point information. I have this info below

When consultants are asking about fish information, they can be directed to our online resources.

In Geohub, they can search for Aquatic Resource Area survey point, Aquatic Resource Area Line Segment, and Aquatic Resource Area Polygon Segment. Each one of those provides different information that the consultants can use.

If a consultant has specific questions, you can direct their inquiry to me.

Also this is a quick data pull if it is enough info for you.

ARA Survey Point: Snake Cr.

OGF_ID	113639411
ARA_IDENT	MH-5123-SNA
WATERBODY_LID	
CORPORATE_WATERBODY_NAME	Snake Cr.
OFFICIAL_WATERBODY_NAME	Snake Creek
WATERBODY_ALIAS_NAME1	
WATERBODY_ALIAS_NAME2	
FISHERIES_MANAGEMENT_ZONE_ID	16
SURVEY_SITE_DESCR	
SURVEY_METHOD	
SURVEY_METHOD_OTHER_DESCR	
SURVEY_SITE_LENGTH	
SURVEY_DATE	June 25 1973
SURVEY_TIME	
SURVEYOR_AGENCY	
SURVEYOR_DESCR	
LOCAL_REFERENCE_DESCR	Snake Creek 1973 - #1
AIR_TEMPERATURE	
WATER_TEMPERATURE	

FISH_SPECIES_SUMMARY	Brown Bullhead,Common Shiner,Creek Chub,Iowa Darter,Johnny Darter,Logperch,Longnose Dace,Northern Hog Sucker,Rainbow Darter,Rock Bass,Spotfin Shiner
CONDUCTIVITY	
SECCHI_DEPTH	
COMMENTS	2FC-07 -- Snake Creek 1973 - #1 Station #2
FISHNET_PROJECT_CODE	
OSAP_SITE_CODE	
OSAP_STREAM_CODE	
SCIENTIFIC_COLLECTOR_LIC_NUM	
SCIENTIFIC_COLLECTOR_REP_NUM	
GEOG_UNIT_DESCR	
SENSITIVITY_CLASS	Non-Sensitive
SENSITIVITY_DATE	August 24 2016
SENSITIVITY_RATIONALE	No Restriction Needed

Thanks,

Ryan Dillon (he / him)
A/Resource Management Coordinator | Regional Operations Division
Ministry of Natural Resources and Forestry | Ontario Public Service
226-668-4190 | ryan.dillon@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

Please note: As part of providing accessible customer service, if you have any accommodation needs, require communication supports, or alternate formats please let me know.

APPENDIX 11
Site Photos

AQUATIC HABITAT ASSESSMENT




Photos showing riffle habitats downstream (left) and upstream (right) of the bridge




Photos showing erosion (left) and emergent vegetation (right) upstream of the bridge.




Photos showing undercutting (left) and large boulder patches (right) downstream of the bridge.

APPENDIX 12
Mitigation

ACTIVITY	PROJECT PHASE	POTENTIAL IMPACTS	INITIAL IMPACT RATING[1,3]	MITIGATION RECOMMENDATIONS/COMMENTS	FINAL IMPACT RATING[2,3]	PROPOSED IMPLEMENTATION PHASE	MONITORING/ FOLLOW-UP RECOMENDATIONS
Vegetation Removal – Clearing & Grubbing *Upland Area*	Site Preparation and Servicing	Loss of vegetation and wildlife habitat	Minor	▪ Avoidance of significant wildlife habitat ▪ Implicate design to avoid or minimize loss of vegetation and edge habitat. ▪ Implement compensation plan where possible, using native tree, shrub, and vegetative species.	Minor-None	Site Preparation and Servicing, Construction, Site Restoration	
Vegetation Removal – Clearing & Grubbing *Upland Area*	Site Preparation and Servicing	Disturbance of wildlife species	Minor-None	▪ Avoid removal or destruction of animal movement corridors. ▪ Time activities to avoid wildlife disturbance during important life stages	None	Site Preparation and Servicing, Construction	
Vegetation Removal – Clearing & Grubbing *Upland Area*	Site Preparation and Servicing	Impacts to nesting birds protected under the Migratory Bird Convention Act	Moderate	▪ Net off the structure prior to April 1 to prevent bird nesting. ▪ Complete all vegetation removal outside the Environment Canada breeding bird nesting window (April 1- August 31) ▪ Where vegetation removal must occur during the nesting window, conduct a bird nest survey to determine locations of active nests prior to construction works including installation of Erosion Sediment Control (ESC) fence and any site clearing. ▪ Create nest protection zones where active bird nests are found.	None	Site Preparation and Servicing, Construction, Site Restoration	Monitor active nests (as needed, e.g., weekly) until inactive.
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Loss of shade, resulting in increased water temperatures	Moderate-Minor	▪ Maintain or restore riparian vegetation where possible ▪ Planting plan to be implemented	Minor	Site Preparation and Servicing, Construction, Site Restoration	Monitor restoration areas until established.
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Bank erosion and sedimentation during rainfall events	Minor	▪ Implement ESC plan as per GGH erosion and sediment guidelines ▪ Stabilize banks where necessary, prior to construction.	None	Site Preparation and Servicing, Construction, Site Restoration	Monitor ESC fence weekly, and after a major storm event for any breaks, and repair.

ACTIVITY	PROJECT PHASE	POTENTIAL IMPACTS	INITIAL IMPACT RATING[1,3]	MITIGATION RECOMMENDATIONS/COMMENTS	FINAL IMPACT RATING[2,3]	PROPOSED IMPLEMENTATION PHASE	MONITORING/ FOLLOW-UP RECOMENDATIONS
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Reduced vegetation and insect inputs to waterbody	Minor	▪ Plant appropriate native species, using local stock ▪ Planting plan to be implemented	Minor-None	Site Restoration	Monitor restoration areas until established.
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Disturbance to riparian species	Moderate-Minor	▪ Maintain or restore riparian vegetation where possible ▪ Planting plan to be implemented	Minor	Site Preparation and Servicing, Construction, Site Restoration	Monitor restoration areas until established.
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Loss of fish spawning habitat	Moderate-Minor	▪ Maintain important wildlife areas ▪ Maintain fish passage through creek	None	Construction	
Vegetation Removal – Clearing & Grubbing *Shoreline/ Riparian Areas*	Site Preparation and Servicing	Changes in temperature regime for fish species	Moderate-Minor	▪ Maintain or restore riparian vegetation and buffers where possible ▪ Planting plan to be implemented	Minor-None	Site Preparation and Servicing, Construction, Site Restoration	Monitor restoration areas until established.
Grading	Site Preparation and Servicing	Increased erosion, sedimentation, and turbidity	Moderate	▪ Maintain or restore vegetative buffers ▪ Develop & implement an ESC Plan as per GGH erosion and sediment guidelines ▪ Planting plan to be implemented	Minor-None	Site Preparation and Servicing, Construction, Site Restoration	Monitor ESC fence weekly, and after a major storm event for any breaks, and repair
Grading	Site Preparation and Servicing	Increase nutrient inputs and contaminants to waterbodies	Moderate	▪ Develop & implement ESC Plan per GGH Erosion and Sediment guidelines (TRCA, 2019) ▪ Designate areas for equipment storage.	Minor-None	Site Preparation and Servicing, Construction, Site Restoration	Monitor ESC fence weekly, and after a major storm event for any breaks, and repair

ACTIVITY	PROJECT PHASE	POTENTIAL IMPACTS	INITIAL IMPACT RATING[1,3]	MITIGATION RECOMMENDATIONS/COMMENTS	FINAL IMPACT RATING[2,3]	PROPOSED IMPLEMENTATION PHASE	MONITORING/ FOLLOW-UP RECOMENDATIONS
Grading	Site Preparation and Servicing	Increased soil compaction	Moderate	▪ Control access and movement of equipment and people	Minor	Site Preparation and Servicing, Construction, Site Restoration	
Grading	Site Preparation and Servicing	Changes to drainage	Minor	▪ Schedule grading to avoid high runoff volumes. ▪ Minimize changes to land contours and natural drainage	None	Construction	
Grading	Site Preparation and Servicing	Changes to surface runoff	Minor	▪ Maintain streams and timing, quantity of flows.	None	Construction	
Grading	Site Preparation and Servicing	Changes in soil moisture, tree cover and vegetation	Moderate	▪ Minimize the area and duration of soil exposure	Minor	Construction	
Grading	Site Preparation and Servicing	Disturbance to wildlife	Minor	▪ Time activities and conduct work outside timing windows of sensitive species and avoid sensitive periods (breeding birds, fish spawning)	Minor-None	Site Preparation and Servicing, Construction	
Grading	Site Preparation and Servicing	Alteration or destruction of wildlife habitat	Minor	▪ Identify sensitive species prior to work and design grading to avoid disturbing sensitive species.	Minor-None	Site Preparation and Servicing, Construction	
Grading	Site Preparation and Servicing	Wildlife entering construction areas	Minor	▪ Develop & implement ESC plan to exclude wildlife	Minor-None	Site Preparation and Servicing, Construction	Monitor ESC fence weekly, and after a major storm event for any breaks, and repair
Roads – Water Crossings	Construction	Increased erosion, sedimentation, and turbidity	Moderate-Minor	▪ Develop and implement sediment and erosion control plan	Minor-None	Site Preparation and Servicing, Construction, Site Restoration	Monitor ESC fence weekly, and after a major storm event for any breaks, and repair Monitor restoration areas until established.

ACTIVITY	PROJECT PHASE	POTENTIAL IMPACTS	INITIAL IMPACT RATING[1,3]	MITIGATION RECOMMENDATIONS/COMMENTS	FINAL IMPACT RATING[2,3]	PROPOSED IMPLEMENTATION PHASE	MONITORING/ FOLLOW-UP RECOMENDATIONS
Roads – Water Crossings	Construction	Loss of riparian vegetation	Moderate	• Re-vegetate as soon as possible	Minor	Post-construction Site Restoration	Monitor restoration areas until established.
Roads – Water Crossings	Construction	Linkage interruption along watercourse	Minor	• Extend bridges beyond shoreline to allow land-based wildlife passage	None	Construction	

LEGEND:

[1] *Initial Impact* is a relative rating of the expected impact to occur in the absence of any mitigation measures. It evaluates the impact based on the duration, reversibility, extend of influence, frequency, existing ecological site context, likelihood of occurring and cumulative effects.

[2] *Actual Impact* is the expected impact in consideration of implementation of mitigation measures or where potential impact may cause little to no actual impact.

[3] *Impact Rating*

None: An event that, if it occurs, will cause no foreseeable impact.
Minor: An event that, if it occurs, will cause small, reversible, and geographically localized impact that can be easily mitigated.
Moderate: Significant but reversible, OR irreversible and geographically localized, impact that requires significant mitigation.
Severe: Significant AND irreversible impact on the environment, impacts cannot be fully mitigated.

- Urban Forestry
- Ecological Restoration
- Landscape Architecture
- Environmental Studies
- Expert Opinion

ABOUD & ASSOCIATES INC.
Consulting Arborists • Ecologists • Landscape Architects
3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8 . 519.822.6839 . www.aboudtng.com



Nelson, Andrea

From: Vivian Vanceeder <v.vanceeder@svca.on.ca>
Sent: January 9, 2025 4:29 PM
To: Nelson, Andrea
Cc: Heather@aboudtng.com; Stewart, Zakary; lukas.heathers@saugeenshores.ca; ruhul.amin@saugeenshores.ca
Subject: [EXT] RE: Floodplain Assessment - Moore Bridge, Town of Saugeen Shores, County of Bruce, ON

EXTERNAL EMAIL

Good Afternoon,

My name is Vivian Vanceeder, and I am the staff person here at SVCA that has been re-assigned your file from Alyssa. Thank you for providing the preliminary floodplain assessment. Please note that if the Town of Saugeen Shores decides to remove Moore Bridge, SVCA would require a site visit and additional information before any works could be completed. This would include but is not limited to information on if the abutments will be removed or left in place, if the banks of the watercourse will be altered, and what erosion protection will be installed.

Kind Regards,

Vivian Vanceeder
Regulations Officer
1078 Bruce Road 12, P.O. Box 150, Formosa ON N0G 1W0
Office: 519-364-1255 Ext. 243
v.vanceeder@svca.on.ca
www.saugeenconservation.ca

From: Nelson, Andrea <ANelson@geiconsultants.com>
Sent: December 19, 2024 9:42 AM
To: Alyssa Gowing <a.gowing@svca.on.ca>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>; Ruhul Amin <ruhul.amin@saugeenshores.ca>; Stewart, Zakary <ZStewart@geiconsultants.com>
Subject: RE: Floodplain Assessment - Moore Bridge, Town of Saugeen Shores, County of Bruce, ON

[CAUTION]: This email originated from outside of the organization. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Alyssa,
The project direction for the Moore Bridge project has been further advanced. Please find below a link to the Preliminary Floodplain Assessment for Moore Bridge – McKechnie Sideroad. This link will be valid for 20 days (please save the report to your records).
https://sendafile.gmblueplan.ca/uploads/12-18-24_132426_2405129-_Moore_Bridge_Floodplain_Assessment_Report_-_December_18__2024_-_secured.pdf

Based on the findings of the 'Preliminary Floodplain Assessment and Safe Access & Egress Requirements - Moore Bridge', bridge removal will likely be recommended to the Town of Saugeen Shores as any type of structure would require major design changes. This recommendation will be brought to Town Council for approval (or otherwise) in the late winter/early spring. During previous consultation regarding this bridge project, the SVCA had requested to be contacted to arrange a site meeting once the project direction had been further advanced. At this time, we are providing you with the Floodplain Assessment report for review and comment. We will continue to provide updates through the project planning phase and will reach out to you in the spring to arrange a site meeting.

Kind Regards,
Andrea

GEI
ANDREA NELSON
Project Manager
519.376.1805...2219 cell: 519.372.4678
1260-2nd Avenue East | Owen Sound, Ontario N4K 2J3 | Canada

From: Alyssa Gowing <a.gowing@svca.on.ca>
Sent: Thursday, July 18, 2024 1:50 PM
To: Nelson, Andrea <ANelson@geiconsultants.com>; Stewart, Zakary <ZStewart@geiconsultants.com>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>
Subject: [EXT] RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

EXTERNAL EMAIL

Great, thanks for confirming Andrea.

Alyssa Gowing
Regulations Officer
Saugeen Valley Conservation Authority

From: Nelson, Andrea <ANelson@geiconsultants.com>
Sent: Thursday, July 18, 2024 1:04 PM
To: Alyssa Gowing <a.gowing@svca.on.ca>; Stewart, Zakary <ZStewart@geiconsultants.com>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>
Subject: RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

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Alyssa,
Thank you for your email. At this time we are in the early stages of the project and a project direction has not yet been resolved (i.e., bridge removal or replacement). As indicated in your email, once the project direction is confirmed and preliminary design drawings are available, the SVCA will be contacted to arrange a site meeting.

Kind Regards,
Andrea

GEI
ANDREA NELSON
Project Manager
519.376.1805...2219 cell: 519.372.4678
1260-2nd Avenue East | Owen Sound, Ontario N4K 2J3 | Canada

From: Alyssa Gowing <a.gowing@svca.on.ca>
Sent: Thursday, July 11, 2024 10:36 AM
To: Stewart, Zakary <ZStewart@geiconsultants.com>; Stewart, Zakary <ZStewart@geiconsultants.com>
Cc: Lukas Heathers <lukas.heathers@saugeenshores.ca>; Heather Dixon <Heather@aboudtng.com>; Nelson, Andrea <ANelson@geiconsultants.com>
Subject: [EXT] RE: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

EXTERNAL EMAIL

Good morning Zach,
I just spoke with Heather Dixon (cc'd), Aboud & Associates, and she indicated that you are overseeing this project on behalf of TOSS staff.

It is the understanding of SVCA staff that this proposal includes the removal of the existing structure and potential replacement with a smaller 'walking bridge' structure. In order for SVCA staff to move forward with our review of this proposal, it would be helpful if you could share any site plans or preliminary design drawings you may have related to this project with me. Once I receive a plan, I will need to perform an inspection at the site to assess the natural hazards present. I can then follow-up with you to outline what SVCA policy criteria will need to be addressed in a future application to the Authority seeking permission to remove/replace the bridge.

At this time, SVCA staff will await submission of a site plan/design drawings from you before taking any further action with this file.

If you have any questions or concerns, please do not hesitate to reach out.

Kind regards,
Alyssa Gowing
Regulations Officer
Saugeen Valley Conservation Authority
1078 Bruce Road 12, PO Box 150, Formosa ON N0G 1W0

Phone: 519-364-1255 ext 244
a.gowing@svca.on.ca
www.saugeenconservation.ca

From: Heather Dixon <Heather@aboudtng.com>
Sent: Monday, June 17, 2024 6:14 PM
To: Matt Armstrong <m.armstrong@svca.on.ca>; bcplwa@brucecounty.on.ca
Cc: Cheryl-Anne Ross <Cheryl@aboudtng.com>; ANelson@geiconsultants.com
Subject: Draft Terms of Reference for a scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON (AA24-068A)

[CAUTION]: This email originated from outside of the organization. Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Good evening,

Please see the attached draft Terms of Reference for a Scoped EIS for the proposed removal and potential replacement of Moore Bridge, Town of Saugeen Shores, County of Bruce, ON. The draft Terms of Reference have been developed based on information received from the proponent, and a review of the applicable municipal, provincial, and federal guidelines that apply to this project. We would appreciate your review and comments on the Terms of Reference in order to finalize the proposed scope of work required for the scoped EIS.

Many thanks,

Heather Dixon, PhD (she/her) . Aquatic Ecologist
ABOUD & ASSOCIATES INC. 3-5 Edinburgh Road South . Guelph . Ontario . N1H 5N8
519.781.1581 www.aboudtng.com . heather@aboudtng.com

Aboud & Associates Inc. is located within the Between the Lakes Purchase (Treaty 3); the treaty lands and territory of the Mississaugas of the Credit.

Appendix C Geotechnical Investigation

DRAFT



GEI Consultants

Saugeen Shores

Geotechnical Investigation

Moore Bridge (SS-09)

Town of Saugeen Shores, Ontario

Submitted to:
Town of Saugeen Shores
600 Tomlinson Drive
Port Elgin, Ontario, NOH 2C0

Submitted by:
GEI Consultants Canada Ltd.
1260 2nd Avenue East, Unit 1
Owen Sound, Ontario, N4K 2J3
519.376.1805

December 2024
Project No. 2405129



Ethan C.J. Webb, P.Eng.
Project Engineer

Bill E. Dubeau, P.Eng.
Senior Project Manager

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Appendices

Appendix A Borehole Logs

Appendix B Grain-Size Analysis

Appendix C Analytical and Certificate of Analysis

Certification

PREPARED BY:
GEI Consultants Canada Ltd.



Ethan C.J. Webb, P.Eng.
Project Engineer

CHECKED BY:
GEI Consultants Canada Ltd.



Bill E. Dubeau, P.Eng.
Senior Project Manager

EW/BD:clw

\\geiconsultants.com\Data\Data_Storage\Working\SAUGEEN SHORES ON, TOWN OF\2405129 Moore Bridge (SS-09)\Geotech\2405129 - Geotech Invest - Moore Bridge.docx

1. Introduction

The Town of Saugeen Shores (Town) is evaluating an existing bridge structure along McKechnie Sideroad, southeast of the community of Port Elgin, Ontario. GEI Consultants Canada Ltd. (GEI) has been retained by the Town to provided engineering services for the possible replacement of the structure, including a geotechnical investigation to determine the subsurface conditions and the associated soil design parameters.

The existing bridge is a single span, steel truss structure supported on cast in place abutments. An investigation plan was developed that included the advancement of two (2) boreholes on the north and south approaches to the bridge on July 3, 2024.

A review of background material and the information collected during the site investigation is compiled below to provide recommendations for foundation construction, dewatering, backfill and roadway structure.

2. Background

2.1. Site Location and Features

The Moore Bridge, Saugeen Structure 09, is located along McKechnie Sideroad, just south of Concession Road 8 E. The location of the bridge is shown on the Figure No. 1. It spans across Snake Creek, a tributary of the Saugeen River. Snake Creek is meandering on either side of the structure, before straightening within 200m of the structure to flow in northwest direction.

The bridge is currently closed to vehicular traffic, with concrete blocks placed on either side to restrict traffic. McKechnie Sideroad is a gravel roadway, with a "double track" granular surface and organic growth on the shoulders and centre of the road. The road bends on the northside to cross Snake Creek in a perpendicular direction. When the road bends, the grade drops approximately 5m to match the elevation of the bridge deck, and the roadway continues with the grade increasing towards the south after the bridge. The bridge deck is currently an asphalt surface.

2.2. Geology and Physiography

The "Physiography of Southern Ontario", Chapman and Putnam, 1985, identifies the project area as part of the Huron Fringe physiographic region, and bordering the Saugeen Clay Plain. The Huron Fringe is characterized by boulders, gravel bars and sand dunes, typical of the wave-cut terraces of glacial Lake Algonquin and Lake Nipissing, characterize the local geology within the region. Within the Saugeen Valley area, a large beach of sand was created in which is backed by sand and silt deposits inland towards the Moore Bridge. The nearby Saugeen Clay Plain region is characterized by deep stratified clay deposits.

Based on the Quaternary Geology of Ontario mapping (Map 2556), the surficial soils are identified as coarse-textured glaciolacustrine deposits consisting of sand, gravel, minor silt, and clay. The "Soils of Bruce County", Soil Survey Report No. 17, local area soils are part of the Bridgman series; described as sand, stone free and with excessive drainage.

Review of local Ministry of Environment, Conservation and Parks Well Records was completed to obtain a general idea of the overburden soils and depth to bedrock in the area. According to the well logs, the shallow overburden in the area consists of sand and gravel underlain by clay. Based on a review of available well logs and geological information, the limestone/dolostone bedrock is estimated to be approximately 45 to 70 metres below ground surface (mbgs). Depth to groundwater in the vicinity of the site is variable and estimated to be 2 to 8 mbgs.

3. Subsurface Investigation

3.1. Field Work

To investigate the sub-surface conditions near the structure, two (2) boreholes were advanced on the north and south approaches. The borehole locations are presented on Figure No. 2. Under the supervision of GEI staff, the boreholes were drilled using a track mounted drill rig supplied and operated by London Soil Test Ltd. The boreholes were advanced using 0.14 m ø (5-1/2" ø) hollow stem augers with the samples being collected with a 0.05 m ø (2" ø) split spoon sampler. The boreholes were drilled to a depth of 6.0 mbgs (20 ft.)

Standard penetration tests were conducted generally at 0.76m and 1.52m intervals and the blow counts (N-values) recorded for the 0.45m (18") split spoon sampler, as noted in the appended logs (Appendix "A"). The compactness and/or density of the soil strata has been inferred from these results. Observed groundwater conditions were also recorded during the drilling and water levels were taken shortly thereafter. The soil stratigraphy and groundwater conditions were also recorded with depth and are presented in the appended Borehole Logs (Appendix "A").

At the location of BH-1, a monitoring well was installed to observe the shallow groundwater and was finished with a flush mount casing within the roadway.

The surface elevations at the borehole locations were surveyed by GEI in a UTM grid coordinate system and elevations refenced to Canadian Geodetic vertical datum and expressed in metres (m). The soil samples were collected and stored in separate containers for transportation to the GEI laboratory in our Owen Sound office for further classification, testing and storage.

3.2. Subsurface Conditions

As presented on the Borehole Location Plan (Figure No. 2), the two boreholes were located approximately 3 meters beyond the end of the existing bridge to investigate the soil conditions near the existing structure.

In general, the subsurface conditions between the two boreholes were consistent, with the boreholes advanced through the surficial sand and gravel, underlying silty sand and gravel road base to a brown silt and clay to silty clay, sandy silt and terminating in the grey silt till.

3.2.1. Sand and Gravel

Both boreholes were advanced through the existing gravel road surface. The sand and gravel were found to be varied thickness, with 50mm noted at BH-1 and 200mm noted at BH-2.

Underlying the surface layer of gravel, the encountered road base was varied between the two boreholes. At BH-1, the sand and gravel contained some silt and was noted to be moist and compact with an N value of 19.

At BH-2, there was a predominately silty sand road base encountered with trace clay. The silty sand was moist and compact, with an N value of 11.

3.2.2. Sand with Silt

Underlying the surficial sand and gravel and road base layers, a brown sand with silt was encountered that contained a little clay and trace gravel. The sand and silt were generally loose, with N values ranging from 6 to 3 with depth. The silt and sand were considered moist, with moisture contents from laboratory testing varying from 16% to 22%

3.2.3. Silty Clay

A layer of silty clay was encountered under the silt and clay. At the location of BH-1, the silty clay was a dark brown colour, transitioning to grey. The silty clay was moist, with laboratory determined moisture contents of 20% to 23% and N values ranging from 5 to 6, indicating a firm consistency.

3.2.4. Sandy Silt

Under the silty clay, that subsurface transitioned to a silt containing more sand content was encountered. The sandy silt was moist to wet, with moisture contents of 24% to 25% and N-values of 3 to 6, indicating the soil is soft to firm.

3.2.5. Silt Till

The two boreholes were terminated within a grey silt till that contained trace sand and gravel. It is inferred from the drilling resistance that there were cobbles and boulders encountered through the soil. The till was dry and compact to hard, with N-values of 33 to 89

3.3. Groundwater Conditions

During the drilling of the boreholes, moisture conditions of the samples were noted across the site and the majority of the soils encountered were moist, with wet conditions encountered above the till.

A monitoring well installed at the location of BH-1, with the water level measured on July 24, 2024, at 208.73 m. The water level within Snake Creek was found to be 208.15m, and the bottom of the creek near elevation 207.58m.

The monitoring wells is to be decommissioned prior to construction by a licensed person as per O. Reg. 903/90.

3.4. Initial Environmental Sampling

During the field investigation, selected soils samples were initially screened for potential environmental impacts. This was done visually and through checking the odour to determine if any petroleum hydrocarbons (PHCs) impacted or volatile organic compounds (VOCs) soils were present at the borehole locations. The samples screened, were from boreholes in proximity to the nearby roadways. No PHC of VOC impacts were evident from the samples at the boreholes. Further screening of soil samples for metals and inorganic parameters was undertaken by submitting samples to Bureau Veritas Laboratories (BVL) in Mississauga, ON. Two samples from each of the borehole locations were sent for analytical testing. The Laboratory Certificates of Analysis are provided in Appendix 'C' and the results are summarized in Table 1. The results of the findings are discussed in Section 5.6.

The submission of the soil samples for chemical analysis is considered only an initial screen of the sampling area to inform possible excess soil management. The submission of the soil samples for chemical analysis is considered only an initial screen of the area sampled and does not constitute a Phase 2 Environmental Site Assessment (ESA).

4. Discussions and Recommendations

It is understood that the Town is considering multiple options regarding the future use of the Moore Bridge. This includes replacing the structure with a bridge designed for vehicular traffic, installing a new pedestrian bridge or removing the structure with no future crossing.

4.1. Foundations – Spread Footings

Conventional spread footings are expected to be selected option for the foundation of the proposed structure replacement in both vehicular and pedestrian use cases. The footing elevation would typically be 1.5m below the bottom of the river, which is ±206.08m, and approximately 5.5m below the road surface. At this elevation the founding soils are expected to be the hard silt till.

Spread footings founded on the undisturbed silt till may be designed using a bearing capacity of 150 kPa at Serviceability Limit States (SLS) and 210 kPa at Ultimate Limit States (ULS). It is recommended to pour a 100mm thick mud mat of lean concrete to protect the founding soils from disturbance after excavation.

At the depths discussed, suitable frost cover will be provided to the spread footings along with scour protection.

4.2. Sheet Pile Cofferdam

A braced sheet pile cofferdam is expected to be utilized to allow for the construction of the spread footings. The installation and construction of a sheet pile cofferdam, along with the associated excavation and dewatering, should only be carried out by experienced contractors.

For the design of the temporary sheet pile cut off walls, the following soil parameters may be assumed:

	Soil Types		
Soil Parameters	**Sand with Silt (Loose)**	**Silty Clay (Firm)**	**Silt Till (Hard)**
Internal Friction Angle (ϕ)	30°	28°	28°
Bulk Unit Weight (γ)	20 kN/m^3	19 kN/m^3	19 kN/m^3
Undrained Sheer Strength (S_u)	0 kPa	25 kPa	100 kPa

To provide adequate groundwater control and prevent piping/heaving, the driven tip of the sheeting should extend to be terminated in the silt till. Once the sheets are in place, conventional sumps at low points will be required to dewater the interior of the excavation. The joints of the sheets should be monitored on a continual basis to ensure that water leakage does not exceed manageable levels.

For sheet pile walls, the passive earth pressure resistance and at-rest earth pressure of the sand can be calculated using the following values:

- Buoyant Unit Weight of Soil Below Water Level = 11.2 kN/m^3
- Passive Earth Pressure Coefficient, K_p = 3.0
- At-Rest Earth Pressure Coefficient, K_a = 0.5

It is noteworthy that temporary protective structures, bracing, shoring anchors and sheeting are the responsibility of the contractor and shall be designed by a Professional Engineer licensed to practice in Ontario. These components of a cofferdam system shall also meet all requirements of the Ontario Health and Safety Act (OSHA) and Regulations for Construction Projects and Trench Excavators Protection Act. In addition, the arrangement any sheet piled cofferdam should not increase the risk of upstream flooding.

4.3. Excavation and Dewatering

Once the watertight cofferdam sheeting is in place, conventional sumps and pumping will be required to dewater the interior of the excavation. The discharge from the pumping shall be pumped into a filtration device or sediment basin. The joints of the sheets should be monitored to ensure that water leakage is kept to reasonable levels. With appropriate bracing and required staging, excavation within the cofferdam can be extended to the designed grades. Seepage from the differential "head" between the river and cofferdam is expected be manageable by the Contractor with pumps.

Excavations are to be made in accordance with Section 226 of the Ontario Regulation 213/91. The soils below the water table are considered saturated or submerged and can be classified as Type 4 soil. The hard till could be exempt from the Type 4 designation, and maybe classified as Type 2. The designation of the hard till under the groundwater can be verified during construction. Where sufficient dewatering is maintained, the loose sand and firm silt and clay soils may be classified as Type 3 soils. The upper compacted roadbed granular materials may be considered as Type 2 soils.

The sides of open excavations within the Type 4 soil should not be made any steeper than 3 horizontal units to 1 vertical unit from the bottom of the excavation. In Type 3 soils, the side slopes cannot be any steeper than 45° from the bottom of the excavation.

Where the excavations cannot be sloped as required due to elevated water levels and restricted access, the installation of bracing and shoring must be carried out according to OHSA Regulations.

Although construction is expected to be in the early summer as work cannot commence in the water until permits allow, groundwater control will be required to maintain the working areas sufficiently dewatered for construction of the spread footing. The taking of water in excess of 50,000 litres per day is regulated through the Ontario Water Resources Act (OWRA). In certain cases, construction dewatering less than 400,000 L/day can be permitted through the Environmental Activity Site Registry (EASR) process. Water taking over 400,000 L/day is regulated through the Permit to Take Water (PTTW).

4.4. Backfilling

The backfilling of the bridge abutments will be completed with imported Granular 'B' material to the subgrade elevation for the roadbase and be compacted to a minimum 95% SPMDD in lifts that do not exceed 300mm to minimize settlement at the approaches. Temporary dewatering will be required for the lower lifts of backfill and until 0.75m above the water level to achieve the desired compaction. At the minimum density, the angle of internal friction of the granular backfill would be in the order of 30°. The at rest earth coefficient would then be in the order of 0.50. The weight of the backfill compacted to 95% may be taken as 21 kN/m^3. The lateral earth pressure against the wall will increase uniformity with depth and the pressure, p, at any depth, h, can be determined by the following equation:

$$p = K(\gamma h + q)$$

where K = earth pressure coefficient for "at rest" condition (0.50 from above)

γ = unit weight of Granular "B" backfill, 21.0 kN/m^3

q = effective value of any surcharge acting close to the wall in kPa

h = height of wall in meters

The above expression assumes the backfill to be granular and free draining.

Subdrains are recommended to be installed on the backsides of the structure and should be comprised of 150mm Ø perforated pipe with filter sock, surrounded by 19mm Ø clear stone wrapped in a woven geotextile. It is recommended that the backfilling operation be reviewed during construction to monitor the quality of the material and the degree of compaction being achieved.

4.5. Roadway Reconstruction

It is anticipated that the proposed structure replacement will maintain the current alignment and profile of McKechnie Sideroad. Where organic material is encountered for the side slope reconstruction, a minimum excavation depth of 0.6m is recommended. For frost tapers, the standard 10 to 1 slope is recommended.

If the option to replace the structure with a bridge designed for vehicular traffic is selected, the majority of McKechnie Sideroad would need to be reconstructed to be suitable for traffic based on the current conditions. The bridge would likely be finished with an asphalt surface while the roadway would be granular.

It is recommended the final subgrade surface be proof rolled to determine any loose, soft, or unstable areas of the subgrade. Any areas which reveal unsuitable conditions should be sub-excavated and backfilled using suitable materials such as imported Granular "B" which must be compacted to at least 95% of the material's SPMDD at the subgrade level. Based on the nature of the sub-soil and the type of reconstruction proposed, the pavement structure overlying the subgrade should consist of the following:

Pavement Layer	Min. Compaction Requirement	Light Duty Min. Component Thickness
Surface Course Asphaltic Concrete: HL3 (OPSS 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)	92% MRD (OPSS.MUNI 310)	50 mm
Binder Course Asphaltic Concrete: HL8 (OPSS 1150) with PG 58-28 Asphalt Cement (OPSS.MUNI 1101)		50 mm
Base Course: Granular A (OPSS.MUNI 1010)	100% SPMDD (OPSS.MUNI 501)	150 mm
Subbase Course: Granular B Type I (OPSS.MUNI 1010)		300 mm

If a pedestrian bridge option is selected, restoration of the road surface will likely be limited to areas disturbed during construction, with the surface being restored with Granular 'A'. The remaining portions of McKechnie Sideroad would remain as is.

4.6. Chemical Screening Results and Initial Findings

As discussed in previous sections, soil samples were screened in the field for any visible or odour evidence of impacted soils. Further screening for metals and inorganics parameters was performed in the laboratory to provide initial data for possible soil management. Two samples collected from BH-1 and BH-2 at a depth of 0.76 to 1.52 mbgs were selected for analysis. The results were compared to Table 1 and Table 2 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (July 2011). Based on the analytical findings, the soils samples collected from the identified locations meet the guidelines of Table 1 and Table 2 for the tested parameters. The submission of the soil samples for chemical analysis is considered only an initial screen in the sampling area to inform possible excess soil management requirements.

If the soils are to be removed from the site, there are exemptions to O. Reg 406/19 which are outlined in the document Rules for Soil Management and Excess Soil Quality Standards. It is recommended that the excess soils from this project be appropriately inspected/tested and managed, with the involvement of, and to the satisfaction of all the parties involved and the site-specific requirements. To facilitate this, a soil management plan is recommended to be developed for the project. If a filing notice under Ontario Regulation 406/19 (i.e., the Excess Soils Reg), will be required, additional effort will be required than under the "due diligence" process.

When filing is completed, a qualified person is required to complete the planning requirements including preparation and submission of the following:

1. Assessment of Past Uses Report (APU) – covered through completion of a Phase One ESA,
2. Sampling and Analysis Plan (SAP),
3. Soil Characterization Report,
4. Destination Assessment Report.

The scope of work to support the transport and re-use of excess soils and ensure compliance with O. Reg. 406/19 is summarized as follows:

- Completion of an SAP based on the findings of the APU Report.
- Collection of supplemental soil samples beyond the geotechnical study that may be required to meet requirements of the Soil Rules,
- Preparation and submission of a Soil Characterization Report with recommendations and options for soil use/re-use.
- Preparation and submission of a Destination Assessment Report
- Filing of Notice on the RPRA Excess Soil Registry for the Source Site (assuming excess soil is less than 10,000 m3),
- Documentation and filing of tracking documents (as provided by contractor)

Once the design is completed and as part of the contracting and construction process, the owner must make it clear with the contractors the requirements and responsibilities for soil management as required.

5. Limitations

The discussion and recommendations in this report are based upon information gathered at the borehole locations and available geological and physiographical information of general nature for the area. Sub-surface and groundwater conditions are variable and will differ in area beyond the investigated boreholes. As a result, conditions may become apparent during further investigation or construction, which would not be detected or anticipated at the time the site investigation, was performed and when this report was prepared.

The information in this report is intended for the sole use of the Town of Saugeen Shores and their agents. GEI Consultants Canada Ltd. accepts no liability for use of this information by third parties on the basis of information provided in this initial geotechnical report. Use of the information is made at the sole risk of the third parties.

The final scope and limits of the proposed works have not been confirmed and therefore comments made within this report are made in general only to assist the owner and designers for the project in question. Furthermore, the number of boreholes may not be sufficient to determine all the factors that may affect the construction methods and costs. For this reason, Contractors bidding on this project or undertaking the construction should make their own interpretation of the factual information presented within this report and then draw their own conclusion on the sub-surface conditions and how it will affect the methods and cost of construction.

We recommend that we be retained to ensure that all the necessary stripping, sub-grade preparation, and compaction requirements are met, and to be available to confirm that the soil conditions do not deviate from those presented within this report.

Tables

Table 1. Soil Samples – Analytical Results

Table 1: Soil Samples - Analytical Results

Sample ID	Guideline 2011 Table 1 Background	Guideline 2011 Table 2 Non-Potable GW	BH-1	BH-2
Sample Depth (mbgs)	Res/Park/ Inst/Ind/ Comm/Comm'ty	Res/Park/Inst	0.76-1.52	0.76-1.52
Sampling Date	Coarse Grained	Coarse Grained	3-Jul-2024	3-Jul-2024
METALS AND INORGANICS [ug/g]				
Antimony	1.3	7.5	<0.20	<0.20
Arsenic	18	18	2.8	2.2
Barium	220	390	38	30
Beryllium	2.5	4	0.43	0.36
Boron (Hot Water Soluble)	NV	1.5	0.12	0.15
Cadmium	1.2	1.2	0.11	0.11
Chromium	70	160	16	15
Chromium VI	0.66	8	<0.18	<0.18
Cobalt	21	22	6.5	5.8
Copper	92	140	14	6.5
Lead	120	120	5.5	4.6
Mercury	0.27	0.27	<0.050	<0.050
Molybdenum	2	6.9	<0.50	<0.50
Nickel	82	100	14	12
Selenium	1.5	2.4	<0.50	<0.50
Silver	0.5	20	<0.20	<0.20
Thallium	1	1	0.092	0.056
Vanadium	86	86	21	18
Zinc	290	340	32	26
pH (pH Units)	NV	NV	7.92	7.73
Conductivity (ms/cm)	0.57	0.7	0.19	0.1
Sodium Adsorption Ratio	2.4	5	0.24	0.33
Cyanide, Free	0.051	0.051	<0.01	0.01
Chloride	NV	NV	-	-
Boron (Total)	36	120	10	6.1
Uranium	2.5	23	0.45	0.35

Notes:

1. Criteria are from the Soil, Groundwater, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011.
2. Parameters that are in **bold** exceed the Table 1 (background) criteria of the Standard.
3. Parameters that are shaded exceed the applicable Table 3 (Non-Potable Groundwater) criteria of the Standard for Residential/Parkland/Institutional property use.

Figures

Figure 1. Site Location Plan

Figure 2. Borehole Location Plan



SOURCE: Map created using NAD_1983_UTM_ZONE_17N, © COUNTY OF BRUCE
(HTTPS://MAPS.BRUCECOUNTY.ON.CA/GEOCORTEX/HTML5VIEWER/INDEX.HTML?VIEWER=BRUCEMAPS)

GEOTECH MOORE BRIDGE MCKECHNIE SIDEROAD, ON	GEI Consultants	SITE LOCATION MAP
TOWN OF SAUGEEN SHORES PORT ELGIN, ON	Project 2405129	DEC 2024 Fig. 1



LEGEND:

BH-10
GRD 201.50
BOREHOLE 2024
LOCATION & ELEVATION
AT GRADE

SOURCE:

MAP CREATED USING NAD_1983_UTM_ZONE_17N, © COUNTY OF BRUCE
(HTTPS://MAPS.BRUCECOUNTY.ON.CA/GEOCORTEX/HTML5VIEWER/INDEX.HTML?VIEWER=BRUCEMAPS)

GEOTECH MOORE BRIDGE MCKECHNIE SIDEROAD, ON	GEI Consultants	BOREHOLE LOCATION PLAN
TOWN OF SAUGEEN SHORES PORT ELGIN, ON	Project 2405129	DEC 2024 Fig. 2

GIBBONS, ANTHONY B:\Working\SAUGEEN SHORES ON, TOWN OF\2405129 Moore Bridge (SS-09)\Drawings\2405129 Moore Bridge (SS-09) Figure 1 & 2.dwg - 12/3/2024

Appendix A Borehole Logs

RECORD OF BOREHOLE No. 01

Project Number: 2405129
Project Client: Town of Saugeen Shores
Project Name: Geotech - Moore Bridge
Project Location: Saugeen Shores
Drilling Location: See Borehole Plan
Local Benchmark:

Drilling Method: Hollow Stem Augers
Drilling Machine:
Logged By: EW
Northing:
Date Started: Jul 03/24
Reviewed By:
Easting:
Date Completed: Jul 03/24

GEI Consultants

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa); Penetration Testing (SPT / DCPT)	Combustible Organic Vapour - Hex; Combustible Organic Vapour - IBL; Total Organic Vapour (ppm); Atterberg Limits; Water Content (%)	Instrumentation Installation	GR	SA	SI	CL
0.0 211.9	SAND AND GRAVEL: 50 mm					0	211							
0.8 211.1	SILTY SAND AND GRAVEL: Compact, brown, moist	SS	1		19	1	210	19	6					
	SILT AND CLAY: Trace gravel, firm, brown, moist	SS	2		6			6	21					
2.3 209.6		SS	3		5	2	209	5	16					
	SILTY CLAY: Firm, dark brown with grey and brown mottling, moist	SS	4		5			5	23					
3.4 208.5		SS	5		6	3	208	6	25					
4.6 207.3	SANDY SILT: Firm, brown, moist					4	207							
	SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, hard, dry	SS	6		89	5	206	89	8					
6.7 205.2		SS	7		50	6		50	5					
	Borehole Terminated at 6.7 m													

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 19/24 at depth of: 3.7 m.
Groundwater Elevation: 208.2 m

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www.geiconsultants.com

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: 1 :50

RECORD OF BOREHOLE No. 02

Project Number: 2405129
Project Client: Town of Saugeen Shores
Project Name: Geotech - Moore Bridge
Project Location: Saugeen Shores
Drilling Location: See Borehole Plan
Local Benchmark:

Drilling Method: Hollow Stem Augers
Logged By: EW
Reviewed By:
Drilling Machine:
Northing:
Easting:
Date Started: Jul 03/24
Date Completed: Jul 03/24

GEI Consultants

Depth (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	Elevation (m)
0.0	SAND AND GRAVEL: 200 mm					211.7
	SILTY SAND: Trace clay, compact, brown, moist	SS	1		11	
0.8						210.9
	SILT AND CLAY: Firm to soft, brown with grey mottling, moist	SS	2		6	
		SS	3		3	
2.3						209.4
	SILTY CLAY: Firm, grey, moist					
2.6						209.1
	SANDY CLAY: Some silt, firm, grey, moist	SS	4		6	
3.4						208.3
	SANDY SILT: Soft, brown, moist	SS	5		3	
4.6						207.1
	SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders hard, grey, moist	SS	6		33	
		SS	7		73	
6.7						205.0
	Borehole Terminated at 6.7 m					

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour - Hex
▲ Combustible Organic Vapour - IBL
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Groundwater depth encountered on completion of drilling: Dry
Groundwater depth observed on:
Cave depth after auger removal: Open
Groundwater Elevation:

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Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Explanation of Boring Log'.

Scale: 1 :50

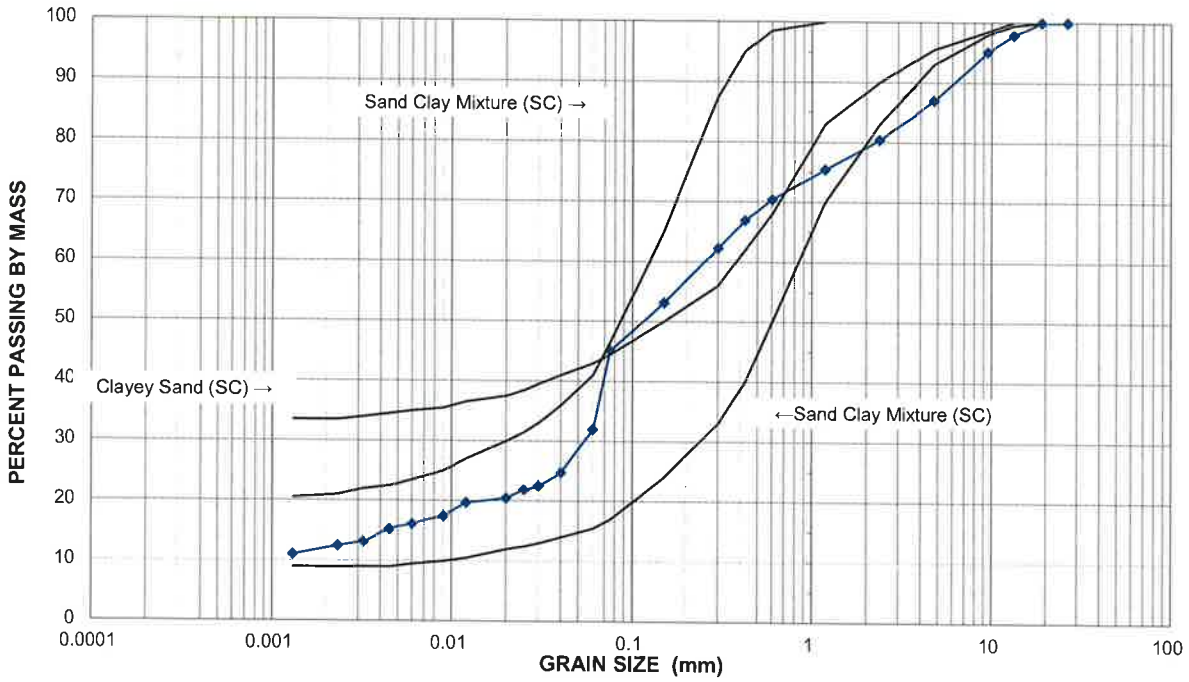
Appendix B Grain-Size Analysis

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, London, Hamilton, GTA
1260 - 2nd Avenue E., Unit 1 Owen Sound, ON N4K 2J3
Phone 519-376-1805 Fax 519-376-8977 www.GMBluePlan.ca

PARTICLE SIZE ANALYSIS

PROJECT:	Moore Bridge (SS-09)	FILE NO.:	2405129
LOCATION:	Moore Bridge, ON	LAB SAMPLE NO.:	S-5571 (RCVD Jul 22)
CLIENT :	Town of Saugeen Shores	SAMPLE DATE:	July 3, 2024
SOIL TYPE:	Silty Sand with a litlle Gravel & Clay	SAMPLED BY:	EW
GRAPH # :	8 - Clayey Sands, Sand-Clay Mixtures	SOURCE:	BH-1 @ 2.5ft

PARTICLE SIZE DISTRIBUTION



←		FINE	MEDIUM	COARSE	FINE	COARSE
CLAY	SILT	SAND			GRAVEL	

SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE	HYDROMETER PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE
26.5	100.0	0.0600	32.1
19	100.0	0.0400	24.8
13.2	97.8	0.0300	22.7
9.5	95.1	0.0250	21.9
4.75	87.0	0.0200	20.5
2.36	80.4	0.0120	19.8
1.180	75.5	0.0090	17.6
0.600	70.5	0.0060	16.1
0.425	66.9	0.0045	15.4
0.300	62.3	0.0032	13.2
0.150	53.1	0.0023	12.5
0.075	45.1	0.0013	11.1

D_{10} : 0.0009 mm **D_{60} :** 0.3 mm **Cu :** 333

Coefficient of Permeability: 8.1×10^{-7} cm/sec **"T" Time : Over 50 mins/cm**

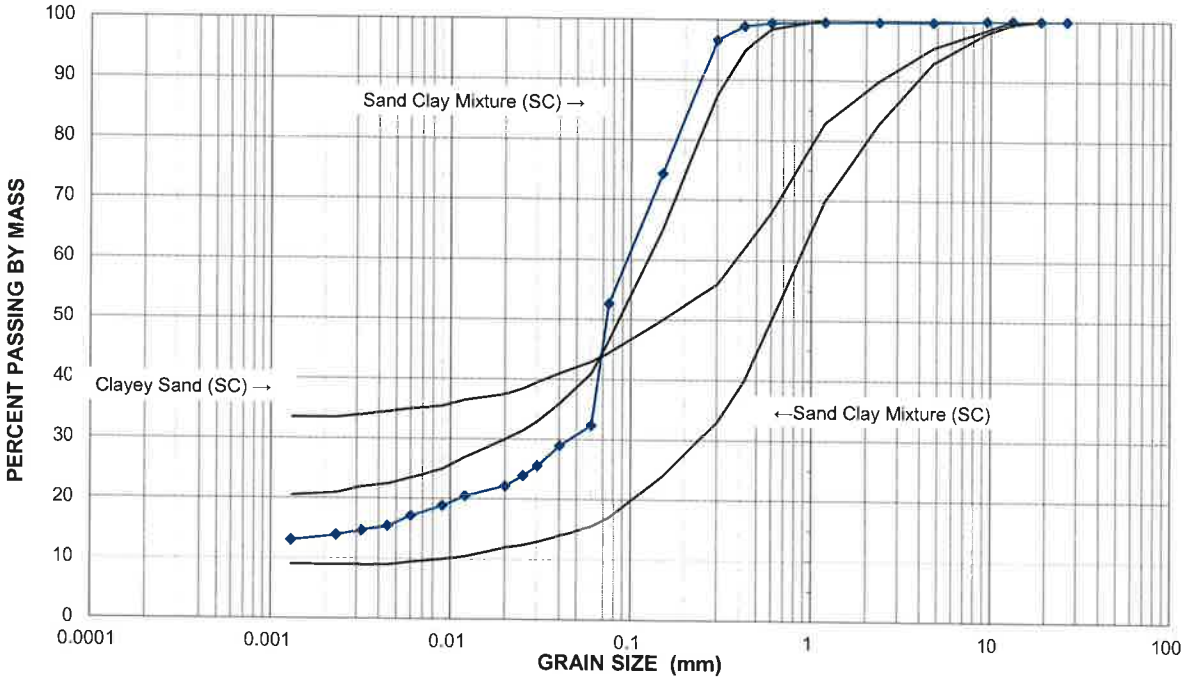
Comments: D10 value extrapolated.

GM BluePlan Engineering Limited
Guelph, Owen Sound, Listowel, Kitchener, London, Hamilton, GTA
1260 - 2nd Avenue E., Unit 1 Owen Sound, ON N4K 2J3
Phone 519-376-1805 Fax 519-376-8977 www.GMBluePlan.ca

PARTICLE SIZE ANALYSIS

PROJECT:	Moore Bridge (SS-09)	FILE NO.:	2405129
LOCATION:	Moore Bridge, ON	LAB SAMPLE NO.:	S-5572 (RCVD Jul 22)
CLIENT :	Town of Saugeen Shores	SAMPLE DATE:	July 3, 2024
SOIL TYPE:	Sand with Silt and a little Clay	SAMPLED BY:	EW
GRAPH # :	8 - Clayey Sands, Sand-Clay Mixtures	SOURCE:	BH-2 @ 7.5 ft

PARTICLE SIZE DISTRIBUTION



←		FINE	MEDIUM	COARSE	FINE	COARSE
CLAY	SILT	SAND			GRAVEL	

SIEVE SIZE PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE	HYDROMETER PARTICLE DIA. (mm)	PERCENT PASSING SAMPLE
26.5	100.0	0.0600	32.4
19	100.0	0.0400	29.0
13.2	100.0	0.0300	25.6
9.5	100.0	0.0250	23.9
4.75	99.7	0.0200	22.2
2.36	99.7	0.0120	20.5
1.180	99.7	0.0090	18.8
0.600	99.5	0.0060	17.2
0.425	99.0	0.0045	15.5
0.300	96.6	0.0032	14.6
0.150	74.4	0.0023	13.8
0.075	52.7	0.0013	12.9

D_{10} : 0.0001 mm **D_{60} :** 0.1 mm **Cu :** 1000

Coefficient of Permeability: 1 x 10^{-8} cm/sec **"T" Time :** >50 mins/cm

Comments: D10 Value Extrapolated

Appendix C Analytical and Certificate of Analysis

Your P.O. #: 2405129
Your Project #: 2405129
Site Location: SAUGEEN SHORES
Your C.O.C. #: N/A

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2024/07/19
Report #: R8242137
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4L3567
Received: 2024/07/12, 09:30

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hot Water Extractable Boron	2	2024/07/17	2024/07/18	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	2	2024/07/17	2024/07/17	CAM SOP-00457	OMOE E3015 m
Conductivity	2	2024/07/18	2024/07/18	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	2	2024/07/18	2024/07/18	CAM SOP-00436	EPA 3060A/7199 m
Acid Extractable Metals by ICPMS	2	2024/07/18	2024/07/18	CAM SOP-00447	EPA 6020B m
Moisture	2	N/A	2024/07/15	CAM SOP-00445	Carter 2nd ed 70.2 m
pH CaCl2 EXTRACT	2	2024/07/17	2024/07/17	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	2	N/A	2024/07/18	CAM SOP-00102	EPA 6010C

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your P.O. #: 2405129
Your Project #: 2405129
Site Location: SAUGEEN SHORES
Your C.O.C. #: N/A

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2024/07/19
Report #: R8242137
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4L3567
Received: 2024/07/12, 09:30

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
19 Jul 2024 17:37:22

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: ashton.gibson@bureauveritas.com
Phone# (905)817-5765

==========

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Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4L3567
Report Date: 2024/07/19

GM BluePlan Engineering Limited
Client Project #: 2405129
Site Location: SAUGEEN SHORES
Your P.O. #: 2405129
Sampler Initials: EW

O.REG 153 METALS & INORGANICS PKG (SOIL)

Bureau Veritas ID		ZSD801			ZSD801			ZSD802		
Sampling Date		2024/07/03			2024/07/03			2024/07/03		
COC Number		N/A			N/A			N/A		
	UNITS	BH-1	RDL	QC Batch	BH-1 Lab-Dup	RDL	QC Batch	BH-2	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A	0.24 (1)		9513584				0.33 (1)		9513584
Inorganics										
Conductivity	mS/cm	0.19	0.002	9522159				0.10	0.002	9522159
Available (CaCl2) pH	pH	7.92		9520133				7.73		9520133
WAD Cyanide (Free)	ug/g	<0.01	0.01	9519540				0.01	0.01	9519540
Chromium (VI)	ug/g	<0.18	0.18	9522106	<0.18	0.18	9522106	<0.18	0.18	9522106
Metals										
Hot Water Ext. Boron (B)	ug/g	0.12	0.050	9519979				0.15	0.050	9519979
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	9522260				<0.20	0.20	9522260
Acid Extractable Arsenic (As)	ug/g	2.8	1.0	9522260				2.2	1.0	9522260
Acid Extractable Barium (Ba)	ug/g	38	0.50	9522260				30	0.50	9522260
Acid Extractable Beryllium (Be)	ug/g	0.43	0.20	9522260				0.36	0.20	9522260
Acid Extractable Boron (B)	ug/g	10	5.0	9522260				6.1	5.0	9522260
Acid Extractable Cadmium (Cd)	ug/g	0.11	0.10	9522260				0.11	0.10	9522260
Acid Extractable Chromium (Cr)	ug/g	16	1.0	9522260				15	1.0	9522260
Acid Extractable Cobalt (Co)	ug/g	6.5	0.10	9522260				5.8	0.10	9522260
Acid Extractable Copper (Cu)	ug/g	14	0.50	9522260				6.5	0.50	9522260
Acid Extractable Lead (Pb)	ug/g	5.5	1.0	9522260				4.6	1.0	9522260
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	9522260				<0.50	0.50	9522260
Acid Extractable Nickel (Ni)	ug/g	14	0.50	9522260				12	0.50	9522260
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	9522260				<0.50	0.50	9522260
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	9522260				<0.20	0.20	9522260
Acid Extractable Thallium (Tl)	ug/g	0.092	0.050	9522260				0.056	0.050	9522260
Acid Extractable Uranium (U)	ug/g	0.45	0.050	9522260				0.35	0.050	9522260
Acid Extractable Vanadium (V)	ug/g	21	5.0	9522260				18	5.0	9522260
Acid Extractable Zinc (Zn)	ug/g	32	5.0	9522260				26	5.0	9522260
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	9522260				<0.050	0.050	9522260

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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Bureau Veritas Job #: C4L3567
Report Date: 2024/07/19

GM BluePlan Engineering Limited
Client Project #: 2405129
Site Location: SAUGEEN SHORES
Your P.O. #: 2405129
Sampler Initials: EW

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		ZSD801	ZSD802		
Sampling Date		2024/07/03	2024/07/03		
COC Number		N/A	N/A		
	UNITS	BH-1	BH-2	RDL	QC Batch
Inorganics					
Moisture	%	12	19	1.0	9516297

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C4L3567
Report Date: 2024/07/19

GM BluePlan Engineering Limited
Client Project #: 2405129
Site Location: SAUGEEN SHORES
Your P.O. #: 2405129
Sampler Initials: EW

TEST SUMMARY

Bureau Veritas ID: ZSD801
Sample ID: BH-1
Matrix: Soil

Collected: 2024/07/03
Shipped:
Received: 2024/07/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9519979	2024/07/17	2024/07/18	Medhat Nasr
Free (WAD) Cyanide	TECH	9519540	2024/07/17	2024/07/17	Prgya Panchal
Conductivity	AT	9522159	2024/07/18	2024/07/18	Gurparteek KAUR
Hexavalent Chromium in Soil by IC	IC/SPEC	9522106	2024/07/18	2024/07/18	Rupinder Sihota
Acid Extractable Metals by ICPMS	ICP/MS	9522260	2024/07/18	2024/07/18	Viviana Canzonieri
Moisture	BAL	9516297	N/A	2024/07/15	Raj Patel
pH CaCl2 EXTRACT	AT	9520133	2024/07/17	2024/07/17	Taslima Aktar
Sodium Adsorption Ratio (SAR)	CALC/MET	9513584	N/A	2024/07/18	Automated Statchk

Bureau Veritas ID: ZSD801 Dup
Sample ID: BH-1
Matrix: Soil

Collected: 2024/07/03
Shipped:
Received: 2024/07/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	9522106	2024/07/18	2024/07/18	Rupinder Sihota

Bureau Veritas ID: ZSD802
Sample ID: BH-2
Matrix: Soil

Collected: 2024/07/03
Shipped:
Received: 2024/07/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9519979	2024/07/17	2024/07/18	Medhat Nasr
Free (WAD) Cyanide	TECH	9519540	2024/07/17	2024/07/17	Prgya Panchal
Conductivity	AT	9522159	2024/07/18	2024/07/18	Gurparteek KAUR
Hexavalent Chromium in Soil by IC	IC/SPEC	9522106	2024/07/18	2024/07/18	Rupinder Sihota
Acid Extractable Metals by ICPMS	ICP/MS	9522260	2024/07/18	2024/07/18	Viviana Canzonieri
Moisture	BAL	9516297	N/A	2024/07/15	Raj Patel
pH CaCl2 EXTRACT	AT	9520133	2024/07/17	2024/07/17	Taslima Aktar
Sodium Adsorption Ratio (SAR)	CALC/MET	9513584	N/A	2024/07/18	Automated Statchk

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Bureau Veritas Job #: C4L3567
Report Date: 2024/07/19

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 2405129
Site Location: SAUGEEN SHORES
Your P.O. #: 2405129
Sampler Initials: EW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9516297	Moisture	2024/07/15							6.4	20
9519540	WAD Cyanide (Free)	2024/07/17	109	75 - 125	103	80 - 120	<0.01	ug/g	NC	35
9519979	Hot Water Ext. Boron (B)	2024/07/18	102	75 - 125	100	75 - 125	<0.050	ug/g	3.6	40
9520133	Available (CaCl2) pH	2024/07/17			100	97 - 103			0.21	N/A
9522106	Chromium (VI)	2024/07/18	44 (1)	70 - 130	91	80 - 120	<0.18	ug/g	NC	35
9522159	Conductivity	2024/07/18			105	90 - 110	<0.002	mS/cm	0.64	10
9522260	Acid Extractable Antimony (Sb)	2024/07/18	92	75 - 125	102	80 - 120	<0.20	ug/g	NC	30
9522260	Acid Extractable Arsenic (As)	2024/07/18	93	75 - 125	99	80 - 120	<1.0	ug/g	1.8	30
9522260	Acid Extractable Barium (Ba)	2024/07/18	NC	75 - 125	99	80 - 120	<0.50	ug/g	2.8	30
9522260	Acid Extractable Beryllium (Be)	2024/07/18	96	75 - 125	99	80 - 120	<0.20	ug/g	2.9	30
9522260	Acid Extractable Boron (B)	2024/07/18	96	75 - 125	104	80 - 120	<5.0	ug/g	2.4	30
9522260	Acid Extractable Cadmium (Cd)	2024/07/18	93	75 - 125	97	80 - 120	<0.10	ug/g	NC	30
9522260	Acid Extractable Chromium (Cr)	2024/07/18	96	75 - 125	95	80 - 120	<1.0	ug/g	5.4	30
9522260	Acid Extractable Cobalt (Co)	2024/07/18	91	75 - 125	98	80 - 120	<0.10	ug/g	4.7	30
9522260	Acid Extractable Copper (Cu)	2024/07/18	91	75 - 125	97	80 - 120	<0.50	ug/g	4.8	30
9522260	Acid Extractable Lead (Pb)	2024/07/18	93	75 - 125	99	80 - 120	<1.0	ug/g	1.9	30
9522260	Acid Extractable Mercury (Hg)	2024/07/18	99	75 - 125	103	80 - 120	<0.050	ug/g	NC	30
9522260	Acid Extractable Molybdenum (Mo)	2024/07/18	91	75 - 125	93	80 - 120	<0.50	ug/g	3.7	30
9522260	Acid Extractable Nickel (Ni)	2024/07/18	96	75 - 125	98	80 - 120	<0.50	ug/g	6.1	30
9522260	Acid Extractable Selenium (Se)	2024/07/18	96	75 - 125	102	80 - 120	<0.50	ug/g	NC	30
9522260	Acid Extractable Silver (Ag)	2024/07/18	92	75 - 125	96	80 - 120	<0.20	ug/g	NC	30
9522260	Acid Extractable Thallium (Tl)	2024/07/18	92	75 - 125	99	80 - 120	<0.050	ug/g	5.1	30
9522260	Acid Extractable Uranium (U)	2024/07/18	97	75 - 125	100	80 - 120	<0.050	ug/g	3.0	30
9522260	Acid Extractable Vanadium (V)	2024/07/18	99	75 - 125	98	80 - 120	<5.0	ug/g	4.4	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9522260	Acid Extractable Zinc (Zn)	2024/07/18	NC	75 - 125	98	80 - 120	<5.0	ug/g	5.6	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The sample was reanalyzed with the same results.

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Bureau Veritas Job #: C4L3567
Report Date: 2024/07/19

GM BluePlan Engineering Limited
Client Project #: 2405129
Site Location: SAUGEEN SHORES
Your P.O. #: 2405129
Sampler Initials: EW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

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Appendix D Well Record

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A406142

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
Organization	**Email Address**
Town of Saugeen Shores	lukas.heathers@saugeenshores.ca

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	600	Tomlinson Drive	Port Elgin

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0H 2C0	519-832-2008

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	n/a	McKechnie Side Road	

Lot	Concession	County/District/Municipality
		BRUCE

City/Town	Province	Postal Code
Saugeen Shores	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	474321	4917247	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 20 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Gravel			0	1
Brown	Silt			1	15
Grey	Till			15	20

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	1	Concrete	0.155
1	8	Bentonite	1.71
8	20	Silica Sand	2.96

5. Method of Construction *

☐ Cable Tool ☑ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☑ Augering ☐ Direct Push
☐ Other (specify)

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify)

7. Status of Well *

☐ Water Supply ☐ Replacement Well ☐ Test Hole
☐ Recharge Well ☐ Dewatering Well ☑ Observation and/or Monitoring Hole
☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality
☐ Abandoned, other (specify)
☐ Other (specify)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.154	0	10
6	Steel	0.125	0	1

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2.375	Plastic	0.01	10	20

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	20	6.5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☑ No		2024/07/03

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
London Soil Test Ltd.	7190

Business Address

Unit Number	Street Number	Street Name *
	712078	Southgate Sdrd 71

City/Town/Village *	Province	Postal Code *
Dundalk	ON	N0C 1B0

Business Telephone Number	Business Email Address
519-455-5777	info@londonsoil.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
McIntosh	Tyler	4960

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
McIntosh	Tyler	info@londonsoil.com

Signature	Date Submitted (yyyy/mm/dd)
Tyler McIntosh Digitally signed by Tyler McIntosh DN: cn=Tyler McIntosh, o=London Soil Test Ltd., ou, email=info@londonsoil.com, c=CA Date: 2024.07.23 08:36:22 -04'00'	2024/07/23

17. Ministry Use Only

Audit Number

MSKA UL5Z

Appendix D Preliminary Floodplain Assessment and Safe Access and Egress Requirements

- DRAFT -

Wednesday, December 18, 2024
Project No. 2405129

VIA EMAIL: ruhul.amin@saugeenshores.ca

Re: Preliminary Floodplain Assessment and Safe Access & Egress Requirements
Moore Bridge – McKechnie Sideroad
Town of Saugeen Shores

Dear Ruhul :

GEI Consultants Canada Ltd. (GEI) has been retained to review the Saugeen Valley Conservation Authority's (SVCA) Floodplain and Safe Access requirements for Moore Bridge located on McKechnie Sideroad in the Town of Saugeen Shores. This assessment focuses on the floodplain characteristics and the hydraulic modelling of the bridge. The modelling attempts to estimate the floodplain flow depths and flow velocities within the floodplain of Snake Creek in the immediate area of the bridge.

The report focuses on three (3) modelling scenarios. Scenario 1 focuses on the existing conditions of the floodplain, the in situ hydraulic characteristics of the watercourse and bridge and the existing safe access/egress conditions. Scenario 2 focuses on the option of a 50% increase in structure span and any associated watercourse alterations that may be required to suit the bride expansion. Scenario 3 focuses on the minimum required alterations to meet the SVCA Safe Access & Egress requirements should the bridge expansion need to function as a operational road.

Objective

The objective of this assessment is to review the floodplain characteristics and hydraulic conveyance of the Moore Bridge crossing to better understand its hydraulic effects under the existing conditions in accordance with the current SVCA Safe Access & Egress requirements. In addition to understanding the hydraulic effects, further analysis of the theoretical conditions required to meet the Safe Access & Egress standards will be provided if existing conditions are not adequate.

The analysis, results and recommendations will be completed based on the following established criteria:

- the estimated peak runoff flow rate for the upstream catchment is to be computing using the greater of the 1:100-year - 24-Hour SCS Type II or the Regional Storm (Hurricane Hazel) design storm;
- review of the SVCA safe access and egress requirements under current conditions; and
- estimate the minimum alterations required to satisfy the SVCA safe access and egress requirements.

Existing Bridge Description

Moore Bridge is located on McKechnie Sideroad approximately 0.43 km south of Concession Road 8 East and 1.58 km north of The River Road. Based on historical data, the bridge was built in 1920 and has been closed for approximately 10 years due to poor structural condition. Under existing conditions, the steel truss bridge spans 24.8 m and has a road deck width of 3.7 m. The elevation at the top of the concrete deck is approximately 211.73 m.

We have enclosed Figure 1 – Site Location Map for reference.

Catchment Area and Watershed Characteristics

The bridge is located within Catchment Area 100 (CA100) for Snake Creek of the Saugeen River, which is approximately 13,152 Ha (32,499.30 acres). Surface water runoff throughout the catchment generally flows from southeast to northwest, traversing at the catchment area.

We have enclosed Figure 2 - Existing Watershed Area Map for reference

To define the boundaries of CA100, a variety of sources have been reviewed and utilized to determine the catchment area and land use characteristics. Resources references include:

- Ontario Watershed Information Tool (OWIT):
  https://www.ontario.ca/page/ontario-watershed-information-tool-owit

- Land Information Ontario (LIO) Warehouse and Ontario Basic Mapping (OBM):
  https://geohub.lio.gov.on.ca/search?q=lio%20topographic%20data%20cashe

- Aerial photographs provided by:
  i) Grey County Maps; https://maps.grey.ca/ ;

  ii) Bruce County Maps; https://www.brucecounty.on.ca/maps ; and

  iii) Saugeen Valley Conservation Maps;
  https://www.saugeenconservation.ca/en/permits-and-planning/maps-and-gis.aspx.

The boundaries of CA100 (13,152 Ha) have been determined based on the Ontario Watershed Information Tool (OWIT), on-site review, and has been verified by traditional Ontario Base Mapping (OBM). Land use within the area is predominantly agricultural, treed areas with several locations of low-lying marsh/wetland area within the reaches of the catchment.

Utilizing the various resources noted above, we have determined and verified through the Ontario Watershed Information Tool (OWIT) each land use within CA100 is:

- approximately 2% of CA100 is impervious surfaces including roads and building rooftops;
- approximately 7% of CA100 contains treed areas;
- approximately 11% of CA100 contains low-lying marsh/wetland and watercourse features;
- approximately 60% of CA100 contains crop land; and
- approximately 20% of CA100 contains meadow land, pastureland, and forests.

Soil Information

In preparation of the hydrological analysis and modelling, the Bruce County Soil Survey Report No. 16 and Grey County Soil Survey Report No. 17, prepared by the Canadian Department of Agriculture and the Ontario Department of Agriculture, were utilized to determine the Principal Soil Series, Soil Type and Hydrological Soil Groups contained within the overall catchment.

The overall catchment consists of 23 different soil types and 6 different hydrological soil classifications. These types and classifications range from Waterloo Sand-Loam with a Hydrological Soil Group Class A, Fox Silt-Loam 2 – Class AB, Osprey Loam 2 – Class B, Harkaway Silt-Loam 2 – Class BC, Chesley Clay-Loam 3 – Class C, and Bottom Land Soil – Class D.

We have enclosed a copy of the CN Curve Number calculations illustrating the different soil types for reference.

Hydrological (Visual OTTHYMO) Modelling

To estimate the peak runoff flow rates to Catchment 100 (CA100), a Visual OTTHYMO model has been developed based on the drainage catchment information presented in this report.

The Visual OTTHYMO model parameters for Catchment 100 (CA100) have been calculated based on the catchment parameters noted above and Intensity-Duration-Frequency (IDF) Curves obtained from the Owen Sound IDF Rainfall Station (ID 6116132), with 37 years of relevant rainfall data (1965-2006). The Regional Design Storm (Hurricane Hazel) rainfall data has also been utilized in accordance with the SVCA requirements.

The 1:100-Year 24-Hour SCS Type II Rainfall Data calculated for the model has been calculated using the following intensity equation:

$$I = ATc^{B}$$

The IDF Curve information can be viewed at the Government of Canada website *Engineering Climate Datasets - Climate - Environment and Climate Change Canada (weather.gc.ca)* and is enclosed in Appendix A for reference.

To aid in the overall hydrologic and catchment analysis of the subject site and to determine the modelling parameters, watershed characteristics such as land slope, land use and soil type are utilized to estimate the peak runoff flow rate for the catchment. The following parameters have been developed and used in the hydrological model for CA100:

a)	Average Catchment Slope (%):	= 0.4 %
b)	Composite Soil Conservation Service Number (SCS CN):	= 73.59
c)	Initial Abstraction (IA):	= 7.26 mm
d)	Time of Concentration (Airport Method):	= 10.01 Hours
e)	Time-to-Peak (Tp):	= 6.68 Hours

The calculations for each parameter are enclosed in Appendix A for reference.

1:100-Year and Regional Storm Peak Flows

The 1:100-Year-24-Hour SCS Type II and the Regional Storm Event (Hurricane Hazel) Peak Runoff Flood Rate have been calculated and are summarized in Table1 below.

Table 1 – Estimated Peak Runoff Flow Rates

Design Storm	Flow Rate (m^3/s)
100-Year - 24 Hour SCS Type II	154.75
Regional (Hurricane Hazel)	387.01

HEC RAS Modelling (Scenario 1 - Existing Conditions)

HEC-RAS Hydraulic Analysis software has been used to analyze the hydraulic function of Moore Bridge regarding Snake Creek watercourse crossing at McKechnie Sideroad. The purpose is to estimate the expected water surface elevations under Regional Storm peak runoff flow rates and the approximated depth of flooding. A site-specific topographic survey of the bridge, watercourse (Snake Creek) and surrounding area has been completed by GEI to validate the topography and the existing bridge elevations.

As indicated in the current SVCA Policies, the greater of the Regional Storm (Hurricane Hazel) or the 100-Year return period flood shall be used to determine flow rates for the watershed. For estimating the flood depth within the watershed in the immediate area of the bridge the Regional Flow rate of 387.01 m^3/s was used in the HEC-RAS program as previously determined in this design brief.

The Regional (Hurricane Hazel) water surface elevations for the existing conditions are summarized in Table 2 below for the flood elevations in the vicinity of the bridge.

Table 2 –Existing Floodplain Water Surface Elevations and Velocities (HEC RAS)

Cross-Section ID No.	Location of Station	100 -Year (W.S. Elevation) (m)	100 -Year (velocity) (m/s)	Regional Storm (W.S. Elevation) (m)	Regional Storm (velocity) (m/s)
10	U/S of the Bridge	211.19	1.55	213.52	1.52
9		211.19	1.41	213.50	1.58
8		211.15	1.58	213.48	1.70
7		211.16	1.34	213.49	1.56
6		211.14	1.29	213.47	1.50
5		211.06	1.79	213.41	1.97
4.5	Bridge				
4	D/S of the Bridge	210.74	2.55	211.95	3.50
3		210.78	1.94	212.03	2.63
2		210.76	1.93	212.01	2.61
1		210.71	1.91	211.97	2.51

As shown in the above table, the minimum flood elevation immediately upstream of the bridge is 213.41 m under the Regional Storm conditions. As the top of the deck is at an elevation 211.73 m, the bridge is expected to overtop to a depth of 1.68 m. The runoff velocity at the top of the bridge is estimated to be 1.97 m/s under the Regional Storm.

We have enclosed Figure 3 – Existing Floodplain for reference.

Safe Access Egress (Scenario 1 – Existing Conditions)

Safe access and egress refer to the accessibility and capability of both vehicles and pedestrians to enter and exit a location during flood events and during emergency situations.

In accordance with the SVCA Environmental Planning and Regulations Policies Manual (Amended Oct 16, 2018) Safe Access means locations were during the Regulatory Flood (Hurricane Hazel), the:

- flow velocity does not exceed 1.0 m/s;
- the product of depth and velocity does not exceed 0.4 m^2/s; and
- the depth of flooding along access routes to residential units does not exceed 0.8 m.

Further, additional depth requirements are suggested by the SVCA to be 2.0 m along access routes to commercial or industrial buildings or structures, and the depth of flooding adjacent to residential units does not exceed 1.2 m or 2.0 m adjacent to commercial or industrial buildings or structures.

Based on the analysis above, there is approximately 1.68 m of flooding at the bridge and the runoff velocity is 1.97 m/s. Therefore, the above criteria is not achieved for the bridge under existing conditions. We have enclosed Figure 3 – Existing Floodplain Floodplain Limits for reference.

HEC RAS Modelling (Scenario 2 – Analysis 2- With 50% increased Bridge Span)

A second analysis was performed by increasing the bridge span by 50% (37.2 m) and altering the bridge abutments to suit.

The Regional (Hurricane Hazel) water surface elevations for Analysis 2 are summarized in Table 3 below for the flood elevations in the vicinity of the bridge.

Table 3 –Analysis 2- Floodplain Water Surface Elevations and Velocities (HEC RAS)

Cross-Section ID No.	Location of Station	100 -Year (W.S. Elevation) (m)	100 -Year (velocity) (m/s)	Regional Storm (W.S. Elevation) (m)	Regional Storm (velocity) (m/s)
10	U/S of the Bridge	210.97	1.79	213.14	1.70
9		210.97	1.58	213.12	1.74
8		210.92	1.79	213.09	1.89
7		210.94	1.49	213.10	1.72
6		210.91	1.44	213.07	1.67
5		210.82	1.94	212.98	2.20
4.5	Bridge				
4	D/S of the Bridge	210.79	2.02	212.01	2.92
3		210.78	1.94	212.03	2.63
2		210.76	1.93	212.01	2.61
1		210.71	1.91	211.97	2.51

As shown in the above table, the minimum flood elevation immediately upstream of the bridge is 212.98 m under the Regional Storm conditions. As the top of the deck is at an elevation 211.73 m. the bridge would overtop to a depth of 1.25 m. The runoff velocity at the top of the bridge would be 2.2 m/s under the Regional Storm conditions.

We have enclosed Figure 4 – Scenario 2 Estimate Floodplain Limits for reference.

Safe Access Egress (Scenario 2 - with 50% increased Bridge Span)

Based on the analysis above, there is approximately 1.25 m of flooding at the bridge and the runoff velocity is 2.2 m/s. Therefore, the above criteria are not achieved for the bridge under Scenario 2 conditions.

HEC RAS Modelling (Scenario 3- With 50% increased Bridge Span And 1m Higher Deck)

Analysis 3 was performed by increasing the bridge span by 50% (37.2 m) and raising the deck elevation by 1 m to 212.73 m.

The Regional (Hurricane Hazel) water surface elevations for Analysis 3 are summarized in Table 4 below for the flood elevations in the vicinity of the bridge.

Table 4 –Analysis 3- Floodplain Water Surface Elevations and Velocities (HEC RAS)

Cross-Section ID No.	Location of Station	100 -Year (W.S. Elevation) (m)	100 -Year (velocity) (m/s)	Regional Storm (W.S. Elevation) (m)	Regional Storm (velocity) (m/s)
10	U/S of the Bridge	210.97	1.79	212.50	2.10
9		210.97	1.58	212.48	2.10
8		210.92	1.79	212.42	2.32
7		210.94	1.49	212.44	2.07
6		210.91	1.44	212.39	2.03
5		210.82	1.94	212.08	3.15
4.5	Bridge				
4	D/S of the Bridge	210.79	2.02	211.96	3.22
3		210.78	1.94	212.03	2.63
2		210.76	1.93	212.01	2.61
1		210.71	1.91	211.97	2.51

As shown in the above table, the minimum flood elevation immediately upstream of the bridge is 212.08 m under the Regional Storm conditions. As the top of the deck is at an elevation 212.73 m the bridge is not expected to overtop.

We have enclosed Figure 5 – Scenario 3 Estimated Floodplain Limits for reference.

Safe Access Egress (With 50% increased Bridge Span And 1m Higher Deck)

Based on the analysis above, there is no flooding at the bridge, therefore above criteria is achieved for the bridge under the Analysis 3.

Conclusion and Recommendations

Based on the analyses above, Moore Bridge does not meet the current SVCA requirements for Safe Access & Egress under the existing condition, nor does it meet the requirements when a 50% wider span bridge is modelled (Scenario 2).

However, the bridge structure meets the SVCA requirements for Safe Access & Egress when the bridge span is increased by 50% and is raised by 1 m (Scenario 3). The bridge would require major design changes, along with the surrounding areas, which are beyond the scope of this report.

Report Limitations

The information contained herein is for information purposes only; suitable only for estimations and approximation purposes for the preliminary analysis of the watershed hydrology, and river/bridge hydraulics and does not constitute Final Design.

In closing, we trust this is satisfactory for your needs at this time. Should you have any questions, please do not hesitate to contact our office.

Sincerely,

GEI Consultants Canada Ltd.



Rasvinder Singh, E.I.T.
Technical Specialist



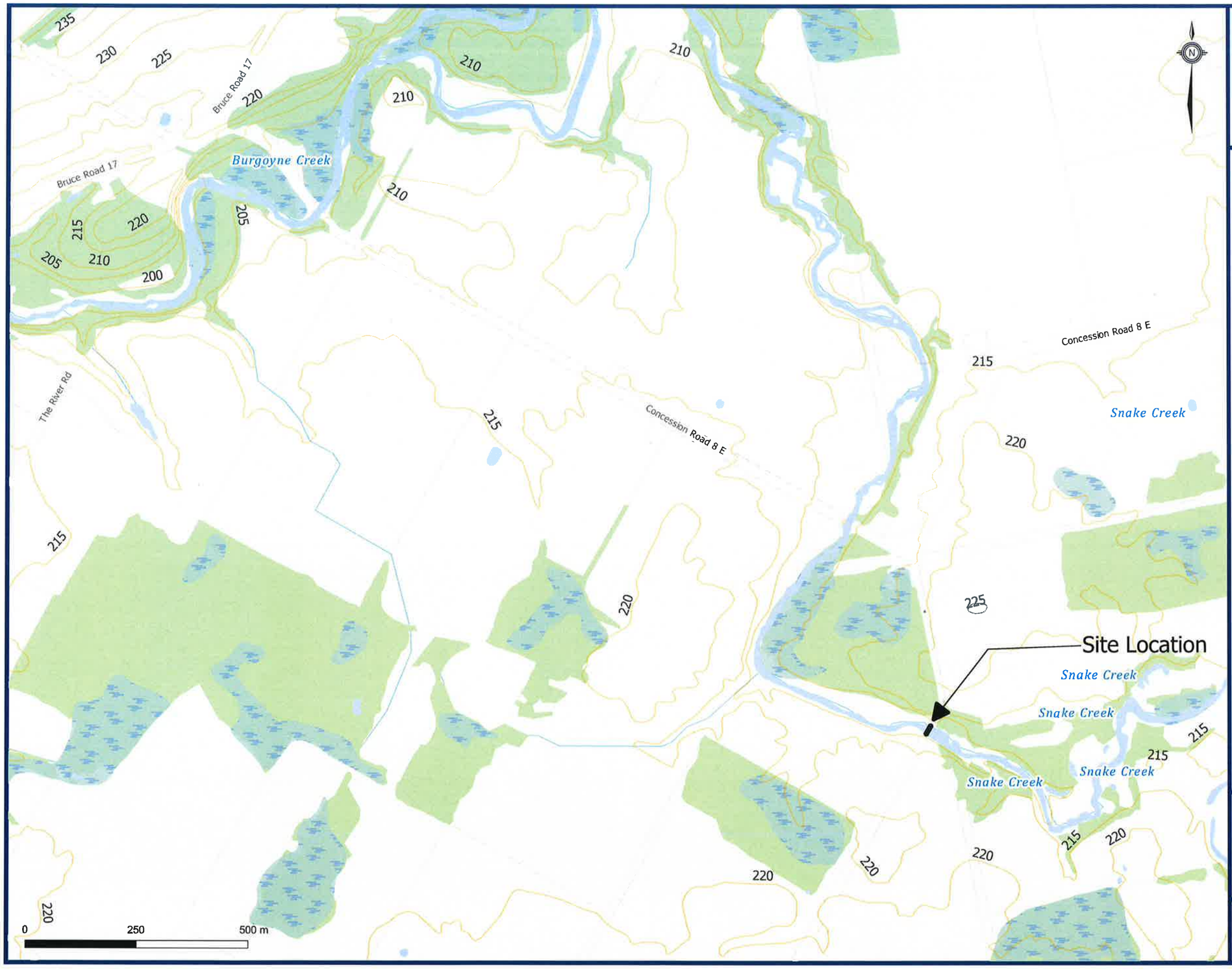
Darren D. Hewgill, B.Eng., P.Eng.
Senior Project Manager

RS/DDH/

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\\geiconsultants.com\Data\Data_Storage\Working\SAUGEEN SHORES ON, TOWN OF\2405129 Moore Bridge (SS-09)\SWM\Floodplain Assessment\2405129- Floodplain Assessment and Safe Access Analysis Letter revised.docx

Figures



2405129 - Moore Bridge

Contours
Watercourse
Site Location
Wetland With Significance
Wooded Area

Figure 1

Site Location Map

GEI Consultants

December, 2024
2405129
Projection EPSG:2958

2405129 - Moore Bridge

- Watershed Area
- Wetland With Significance
- Wooded Area

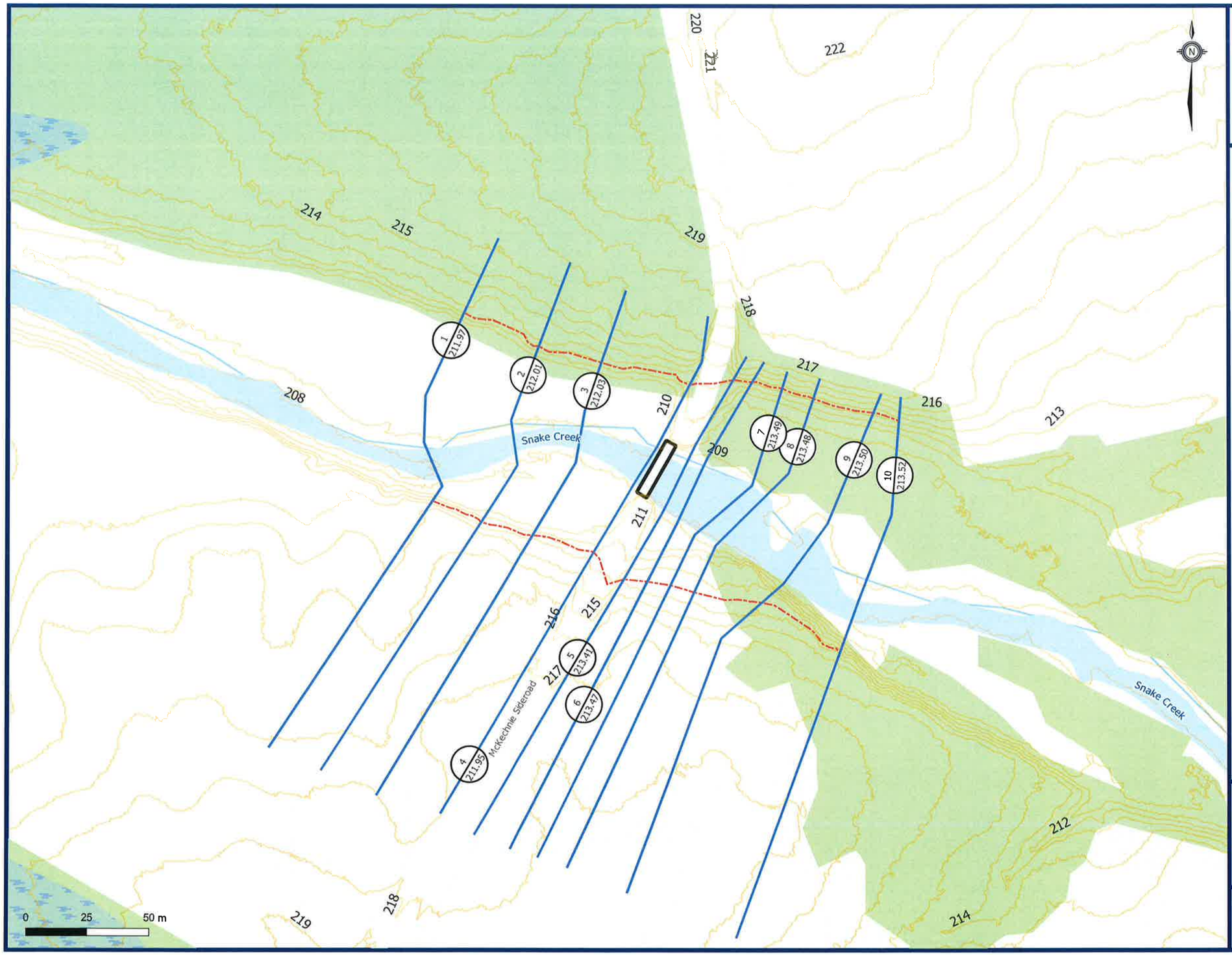
Site Location

Figure 2

Watershed Area Map

GEI Consultants

November, 2025
2405129
Projection EPSG:2958



2405129 - Moore Bridge

- Existing Cross Sections
- 1m contours
- Watecourse
- Wetland With Significance
- Wooded Area
- Existing Floodplain

Figure 3

Existing Floodplain (Scenario 1)

GEI Consultants

December, 2024
2405129
Projection EPSG:2958

2405129 - Moore Bridge

- Cross Sections
- 1m contours
- Watecourse
- Wetland With Significance
- Wooded Area
- Floodplain

Figure 4

Scenario 2 Floodplain Limit

GEI Consultants

December, 2024
2405129
Projection EPSG:2958

2405129 - Moore Bridge

- Cross Sections
- 1m contours
- Watecourse
- Wetland With Significance
- Wooded Area
- Floodplain

Figure 5

Scenario 3 Floodplain Limit

GEI Consultants

December, 2024
2405129
Projection EPSG:2958

Appendix A

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2022/10/31

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OWEN SOUND MOE ON 6116132

Latitude: 44 35'N Longitude: 80 56'W Elevation/Altitude: 178 m

Years/Années : 1965 - 2006 # Years/Années : 37

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****

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

****

Year / Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
1965	12.7	16.0	23.9	28.7	32.3	35.1	35.1	35.1	35.1
1966	6.9	8.9	13.2	18.8	21.8	22.1	30.5	32.0	32.3
1967	11.4	15.7	21.3	38.1	43.9	43.9	43.9	46.5	52.6
1968	14.7	19.6	24.4	31.2	43.9	56.4	63.8	68.1	75.9
1969	6.6	13.0	17.0	22.9	30.2	39.4	49.3	71.9	71.9
1970	10.2	18.8	25.4	32.5	41.4	42.7	42.7	55.6	55.6
1971	7.6	12.2	17.3	26.9	36.1	39.1	55.6	55.6	55.9
1972	7.4	13.2	18.3	19.3	20.1	23.6	36.8	42.7	42.7
1973	5.8	10.2	12.4	16.3	16.5	16.5	18.3	29.7	33.5
1974	6.6	10.4	11.7	16.3	18.8	23.9	43.9	43.9	45.0
1975	6.9	9.4	9.4	11.2	17.0	17.0	24.6	25.4	25.4
1976	7.1	13.2	17.3	22.4	22.6	22.6	29.2	31.7	34.8
1977	13.0	14.7	18.0	22.9	22.9	25.1	26.9	37.3	37.3
1979	18.4	26.0	26.4	30.4	32.1	32.2	41.1	47.1	48.3
1980	9.4	16.1	19.8	30.8	32.0	41.3	45.7	45.7	72.4
1981	-99.9	-99.9	-99.9	-99.9	14.5	19.7	29.4	40.6	41.4
1982	11.8	11.8	12.0	12.0	12.6	23.0	52.6	56.6	56.8
1983	5.6	7.8	8.2	15.7	27.3	38.2	46.8	50.0	53.4
1984	6.9	11.4	15.6	22.3	36.4	45.1	47.0	47.0	47.0
1985	10.1	16.0	18.0	22.4	25.9	32.1	44.8	62.4	73.0
1986	4.6	8.4	11.2	12.4	16.2	16.3	39.2	43.3	60.9

1987	9.0	13.5	15.1	15.1	15.5	15.8	17.0	28.0	28.0
1988	11.4	14.2	18.0	21.0	24.8	27.7	35.9	45.0	54.0
1989	6.9	12.1	12.7	13.5	13.9	14.0	-99.9	-99.9	47.2
1990	10.6	15.0	18.7	27.4	34.1	35.9	40.0	45.4	45.4
1991	5.6	7.0	8.1	8.3	10.5	18.0	27.3	28.6	38.9
1992	4.8	7.4	8.4	8.9	14.1	18.2	27.9	43.3	47.5
1993	7.7	15.4	23.1	25.9	27.9	28.6	33.1	39.0	49.9
1994	5.2	10.4	15.4	27.4	32.4	32.6	35.7	35.7	48.0
1995	7.6	12.0	12.5	12.5	16.4	21.6	30.5	33.2	38.7
1996	10.8	15.3	18.1	27.8	32.5	41.7	47.0	55.9	55.9
1999	7.2	11.1	15.2	20.6	21.7	21.7	36.5	40.8	42.4
2000	7.2	14.1	18.0	33.0	53.0	70.3	79.3	79.5	80.5
2001	5.2	9.0	11.6	14.6	21.4	24.4	30.8	35.6	42.0
2002	8.2	11.0	12.8	15.8	16.4	25.8	53.0	54.8	65.2
2003	11.2	16.3	20.6	24.5	30.5	32.2	32.4	32.4	48.1
2004	6.5	9.7	11.3	16.9	27.8	35.4	54.6	70.8	76.2
2006	12.2	17.4	20.0	30.6	53.1	74.8	74.8	76.6	85.8
# Yrs. Années	37	37	37	37	38	38	37	37	38
Mean Moyenne	8.7	13.1	16.2	21.5	26.6	31.4	40.6	46.3	51.2
Std. Dev. Écart-type	3.1	3.9	4.9	7.6	10.9	14.0	13.8	14.1	15.1
Skew. Dissymétrie	1.08	0.96	0.23	0.13	0.73	1.39	0.89	0.76	0.58
Kurtosis	4.39	5.17	2.55	2.32	3.23	5.37	4.30	3.09	2.87

*-99.9 Indicates Missing Data/Données manquantes

Warning: annual maximum amount greater than 100-yr return period amount
Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

Year/Année	Duration/Durée	Data/Données	100-yr/ans
1979	5 min	18.4	18.4
1979	10 min	26.0	25.2

****

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	8.2	10.9	12.7	15.0	16.7	18.4	37
10 min	12.4	15.9	18.1	21.0	23.1	25.2	37
15 min	15.4	19.8	22.7	26.3	29.0	31.7	37
30 min	20.3	27.0	31.5	37.1	41.3	45.5	37

1 h	24.8	34.5	40.8	48.9	54.9	60.9	38
2 h	29.1	41.5	49.7	60.1	67.8	75.5	38
6 h	38.4	50.5	58.6	68.7	76.3	83.8	37
12 h	44.0	56.5	64.7	75.2	83.0	90.7	37
24 h	48.7	62.0	70.9	82.0	90.3	98.5	38

****

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	98.0	130.8	152.4	179.8	200.2	220.3	37
	+/- 11.0	+/- 18.5	+/- 24.9	+/- 33.6	+/- 40.2	+/- 46.9	37
10 min	74.6	95.2	108.7	125.9	138.7	151.3	37
	+/- 6.9	+/- 11.6	+/- 15.6	+/- 21.1	+/- 25.2	+/- 29.4	37
15 min	61.7	79.1	90.6	105.2	116.0	126.8	37
	+/- 5.8	+/- 9.8	+/- 13.3	+/- 17.9	+/- 21.4	+/- 24.9	37
30 min	40.6	54.1	63.0	74.3	82.7	91.0	37
	+/- 4.5	+/- 7.6	+/- 10.3	+/- 13.8	+/- 16.6	+/- 19.3	37
1 h	24.8	34.5	40.8	48.9	54.9	60.9	38
	+/- 3.2	+/- 5.4	+/- 7.3	+/- 9.8	+/- 11.7	+/- 13.6	38
2 h	14.6	20.8	24.9	30.1	33.9	37.7	38
	+/- 2.0	+/- 3.5	+/- 4.7	+/- 6.3	+/- 7.5	+/- 8.8	38
6 h	6.4	8.4	9.8	11.5	12.7	14.0	37
	+/- 0.7	+/- 1.1	+/- 1.5	+/- 2.1	+/- 2.5	+/- 2.9	37
12 h	3.7	4.7	5.4	6.3	6.9	7.6	37
	+/- 0.3	+/- 0.6	+/- 0.8	+/- 1.1	+/- 1.3	+/- 1.5	37
24 h	2.0	2.6	3.0	3.4	3.8	4.1	38
	+/- 0.2	+/- 0.3	+/- 0.4	+/- 0.6	+/- 0.7	+/- 0.8	38

****

Table 3 : Interpolation Equation / Équation d'interpolation: R = A*T^B

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)
RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)
T = Rainfall duration (h) / Durée de la pluie (h)

****

Statistics/Statistiques	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans
Mean of RR/Moyenne de RR	36.3	47.8	55.4	65.0	72.2	79.3
Std. Dev. /Écart-type (RR)	34.8	45.4	52.5	61.4	68.1	74.7

Std. Error/Erreur-type	10.4	13.9	16.3	19.4	21.7	24.0
Coefficient (A)	21.8	28.8	33.5	39.3	43.7	48.0
Exponent/Exposant (B)	-0.701	-0.703	-0.704	-0.705	-0.706	-0.706
Mean % Error/% erreur moyenne	10.2	12.2	13.1	13.8	14.3	14.8

Appendix B

Catchment #	100
Total Area (Ha) =	13152

Project Name	Moore Bridge
Project Number	2405129
Date	12/5/2024
Designed	RS
Checked	DDH

					Crop and Other Improved			Pasture and other Unimproved			Woodland/Forest			Wetlands			Impervious			Average CN
Soil Type	Hydological Soil Group	Hydological Soil Group	Area (%)	Area (Ha)	Area (ha)	%age	CN	Area	%age	CN	Area	%age	CN	Area	%age	CN	Area	%age	CN	
Wiarton2	si l	BC	0.1%	10.6	6.36	60%	78	2.12	20%	71	0.742	7%	65	1.166	11%	50	0.212	2%	98	0.058843218
Wiarton1	l	B	0.3%	35.5	21.3	60%	74	7.1	20%	65	2.485	7%	58	3.905	11%	50	0.71	2%	98	0.186029501
Waterloo 2	s l	A	7.4%	978.2	586.92	60%	66	195.64	20%	58	68.474	7%	50	107.602	11%	50	19.564	2%	98	4.623244526
Saugeen 2	si c l	C	4.0%	522.9	313.74	60%	82	104.58	20%	76	36.603	7%	71	57.519	11%	50	10.458	2%	98	3.054623403
Saugeen 1	si l	BC	1.6%	204.5	122.7	60%	78	40.9	20%	71	14.315	7%	65	22.495	11%	50	4.09	2%	98	1.135230003
Parkhill 1	l	BC	0.1%	13.2	7.92	60%	78	2.64	20%	71	0.924	7%	65	1.452	11%	50	0.264	2%	98	0.07327646
Osprey 2	l	B	1.1%	148.2	88.92	60%	74	29.64	20%	65	10.374	7%	58	16.302	11%	50	2.964	2%	98	0.776607664
Muck	m	B	0.3%	34.8	20.88	60%	74	6.96	20%	65	2.436	7%	58	3.828	11%	50	0.696	2%	98	0.182361314
Listowel 2	si l	BC	6.3%	826.2	495.72	60%	78	165.24	20%	71	57.834	7%	65	90.882	11%	50	16.524	2%	98	4.586440237
Harkaway 2	si l	BC	4.9%	649.4	389.64	60%	78	129.88	20%	71	45.458	7%	65	71.434	11%	50	12.988	2%	98	3.604979775
Harkaway 1	l	B	13.6%	1786.7	1072.02	60%	74	357.34	20%	65	125.069	7%	58	196.537	11%	50	35.734	2%	98	9.362786192
Fox 2	s l	AB	0.7%	97.2	58.32	60%	70	19.44	20%	62	6.804	7%	54	10.692	11%	50	1.944	2%	98	0.485113139
Elderslie 2	si c l	C	27.1%	3559.2	2135.52	60%	82	711.84	20%	76	249.144	7%	71	391.512	11%	50	71.184	2%	98	20.79176825
Elderslie 1	si l	BC	6.3%	830.4	498.24	60%	78	166.08	20%	71	58.128	7%	65	91.344	11%	50	16.608	2%	98	4.609755474
Elderslie 3	c l	C	3.0%	388.1	232.86	60%	82	77.62	20%	76	27.167	7%	71	42.691	11%	50	7.762	2%	98	2.267162637
Donnybrook 2	s l	AB	0.7%	93.5	56.1	60%	70	18.7	20%	62	6.545	7%	54	10.285	11%	50	1.87	2%	98	0.466646898
Chesley 2	si c l	C	15.9%	2096.4	1257.84	60%	82	419.28	20%	76	146.748	7%	71	230.604	11%	50	41.928	2%	98	12.24653376
Chesley 3	c l	C	0.3%	38.9	23.34	60%	82	7.78	20%	76	2.723	7%	71	4.279	11%	50	0.778	2%	98	0.227242016
Burford 2	l	AB	0.0%	5.4	3.24	60%	70	1.08	20%	62	0.378	7%	54	0.594	11%	50	0.108	2%	98	0.02695073
Brady	s l	AB	0.5%	65.9	39.54	60%	70	13.18	20%	62	4.613	7%	54	7.249	11%	50	1.318	2%	98	0.328898723
Bottom Land	S	D	4.3%	568.5	341.1	60%	86	113.7	20%	81	39.795	7%	77	62.535	11%	50	11.37	2%	98	3.486125684
Berrian 2	s l	AB	1.4%	177.6	106.56	60%	70	35.52	20%	62	12.432	7%	54	19.536	11%	50	3.552	2%	98	0.886379562
Bottom Land	S	D	0.2%	20.7	12.42	60%	86	4.14	20%	81	1.449	7%	77	2.277	11%	50	0.414	2%	98	0.126935447
			100%	13152.0								100%								73.59

Initial Abstraction (Ia)	7.26 mm

Tc Calculations

Bransby - Williams Formula (For C > 0.4)			Airport Method (For C < 0.4)		
Maximum Catchment Elevation	322.69	m	Maximum Catchment Elevation	322.69	m
Mainimum Catchment Elevation	206.59	m	Mainimum Catchment Elevation	206.59	m
Catchment Length	29000.00	m	Catchment Length	29000.00	m
Catchment Slope	0.004		Catchment Slope	0.004	
Catchment Area	13152.00	Ha	Catchment Area	13152.00	Ha
Time of Concentration (Tc) (Minutes)	768.93	minutes	Time of Concentration (Tc) (Minutes)	600.76	minutes
Time of Concentration (Tc) (Hours)	12.82	Hours	Time of Concentration (Tc) (Hours)	10.01	Hours
Time to Peak (Tp)	8.54	hours	Time to Peak (Tp)	6.68	hours
Runoff coefficient used	**0.30**				

Project Number: 2405129 **Location:** Town of Saugeen Shores **Prepared By:** RS

Project Name: Moore Bridge **Date:** December-24 **Checked By:** DDH

Runoff Coefficient Calculations

Crossing No. and Sta.	Soil Texture	Woodland						Pasture/Meadows						Cultivated						Urban or Bare Rock							Lake and Wetland		Composite C Value	Total Area
		Flat (0% to 5%)		Rolling (5% to 10%)		Hilly (10% to 30%)		Flat (0% to 5%)		Rolling (5% to 10%)		Hilly (10% to 30%)		Flat (0% to 5%)		Rolling (5% to 10%)		Hilly (10% to 30%)		% Imperv.	Flat (0% to 5%)		Rolling (5% to 10%)		Hilly (10% to 30%)		A (ha)	C		
		A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C	A (ha)	C		A (ha)	C	A (ha)	C	A (ha)	C				(ha)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	Open Sand Loam		0.08		0.12	0	0.18		0.1	0	0.15	0	0.22		0.22	0	0.3	0	0.4	50		0.4	0	0.5	0	0.55				
	Loam or Silt Loam	920.64	0.25		0.3		0.35	2630.4	0.28		0.35		0.4	7891.2	0.35		0.45		0.65	0.5	263.04	0.55		0.65		0.7	1446.72	0.05	0.3000	13152.000
	Clay Loam or Clay		0.35		0.42		0.52		0.4		0.45		0.55		0.55		0.6		0.7	0.7		0.75		0.8		0.95				
	Open Sand Loam		0.08		0.12		0.18		0.1		0.15		0.22		0.22		0.3		0.4	50		0.4		0.5		0.55				
	Loam or Silt Loam		0.25		0.3		0.35		0.28		0.35		0.4		0.35		0.45		0.65	50		0.55		0.65		0.7		0.05	#DIV/0!	0.000
	Clay Loam or Clay		0.35		0.42		0.52		0.4		0.45		0.55		0.55		0.6		0.7	0.7		0.75		0.8		0.85				
	Open Sand Loam		0.08		0.12		0.18		0.1		0.15		0.22		0.22		0.3		0.4	50		0.4		0.5		0.55				
	Loam or Silt Loam		0.25		0.3		0.35		0.28		0.35		0.4		0.35		0.45		0.65	0.5		0.55		0.65		0.7		0.05	#DIV/0!	0.0
	Clay Loam or Clay		0.35		0.42		0.52		0.4		0.45		0.55		0.55		0.6		0.7	0.7		0.75		0.8		0.85				
	Open Sand Loam		0.08		0.12		0.18		0.1		0.15		0.22		0.22		0.3		0.4	0.3		0.4		0.5		0.55				
	Loam or Silt Loam		0.25		0.3		0.35		0.28		0.35		0.4		0.35		0.45		0.65	50		0.55		0.65		0.7		0.05	#DIV/0!	0.0
	Clay Loam or Clay		0.35		0.42		0.52		0.4		0.45		0.55		0.55		0.6		0.7	0.7		0.75		0.8		0.85				
	Open Sand Loam		0.08		0.12		0.18		0.1		0.15		0.22		0.22		0.3		0.4	0.3		0.4		0.5		0.55				
	Loam or Silt Loam		0.25		0.3		0.35		0.28		0.35		0.4		0.35		0.45		0.65	0.5		0.55		0.65		0.7		0.05		
	Clay Loam or Clay		0.35		0.42		0.52		0.4		0.45		0.55		0.55		0.6		0.7	0.7		0.75		0.8		0.85				

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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497c03-7a45-4575-8de8-31eedd5bc7a5\s
  Summary filename:
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DATE: 09/26/2024                          TIME: 04:36:01

USER:



COMMENTS: _____________________________________________________________


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  ********************************************
  ** SIMULATION : 100yr 24hr 15min SCS Type II  **
  ********************************************


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|    READ STORM    |    Filename: C:\Users\rassin4128\AppD
|                  |              ata\Local\Temp\
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	c252b120-24c9-4f9e-a041-28a0ec1e4769\a2388c8c
Ptotal=122.19 mm	Comments: 100yr 24hr 15min SCS Type II (MTO)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.20	12.50	17.60	18.75	2.20
0.25	1.34	6.50	2.20	12.75	9.04	19.00	2.20
0.50	1.34	6.75	2.20	13.00	9.04	19.25	2.20
0.75	1.34	7.00	2.20	13.25	6.60	19.50	2.20
1.00	1.34	7.25	2.69	13.50	6.60	19.75	2.20
1.25	1.34	7.50	2.69	13.75	5.13	20.00	2.20
1.50	1.34	7.75	2.69	14.00	5.13	20.25	1.47
1.75	1.34	8.00	2.69	14.25	3.67	20.50	1.47
2.00	1.34	8.25	3.18	14.50	3.67	20.75	1.47
2.25	1.59	8.50	3.18	14.75	3.67	21.00	1.47
2.50	1.59	8.75	3.42	15.00	3.67	21.25	1.47
2.75	1.59	9.00	3.42	15.25	3.67	21.50	1.47
3.00	1.59	9.25	3.91	15.50	3.67	21.75	1.47
3.25	1.59	9.50	3.91	15.75	3.67	22.00	1.47
3.50	1.59	9.75	4.40	16.00	3.67	22.25	1.47
3.75	1.59	10.00	4.40	16.25	2.20	22.50	1.47
4.00	1.59	10.25	5.62	16.50	2.20	22.75	1.47
4.25	1.96	10.50	5.62	16.75	2.20	23.00	1.47
4.50	1.96	10.75	7.58	17.00	2.20	23.25	1.47
4.75	1.96	11.00	7.58	17.25	2.20	23.50	1.47
5.00	1.96	11.25	11.73	17.50	2.20	23.75	1.47
5.25	1.96	11.50	11.73	17.75	2.20	24.00	1.47
5.50	1.96	11.75	36.17	18.00	2.20		
5.75	1.96	12.00	149.56	18.25	2.20		
6.00	1.96	12.25	17.60	18.50	2.20		

CALIB		
NASHYD (0100)	Area (ha)=*******	Curve Number (CN)= 73.6
ID= 1 DT=15.0 min	Ia (mm)= 7.26	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 6.68	

Unit Hyd Qpeak (cms)= 75.201

PEAK FLOW (cms)= 154.751 (i)
TIME TO PEAK (hrs)= 20.000
RUNOFF VOLUME (mm)= 64.094
TOTAL RAINFALL (mm)= 122.190
RUNOFF COEFFICIENT = 0.525

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2015)
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         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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d8aedf-6ada-4e71-a451-dc93bf22ff0e\s


DATE: 09/26/2024                          TIME: 04:36:01

USER:



COMMENTS: _____________________________________________________________


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  ********************************************
  ** SIMULATION : Hazel                      **
  ********************************************


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|    READ STORM    |    Filename: C:\Users\rassin4128\AppD
|                  |              ata\Local\Temp\
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| | c252b120-24c9-4f9e-a041-28a0ec1e4769\5b0ee6bd
| Ptotal=212.00 mm | Comments: Hazel

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB	
NASHYD (0100)	Area (ha)=******* Curve Number (CN)= 73.6
ID= 1 DT=15.0 min	Ia (mm)= 7.26 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 6.68

NOTE: RAINFALL WAS TRANSFORMED TO 15.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 75.201

PEAK FLOW (cms)= 387.008 (i)
TIME TO PEAK (hrs)= 16.000
RUNOFF VOLUME (mm)= 141.666
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.668

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

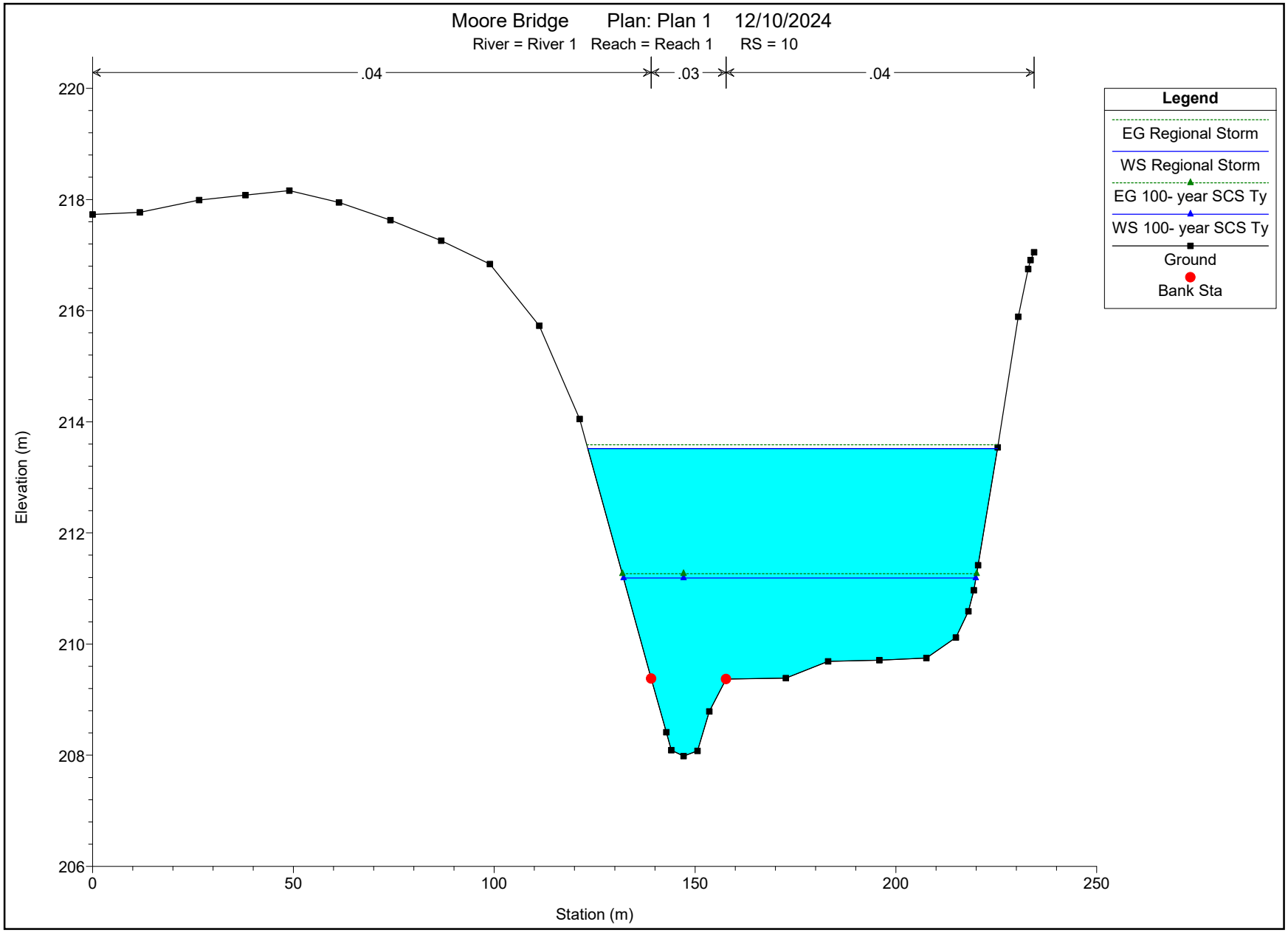
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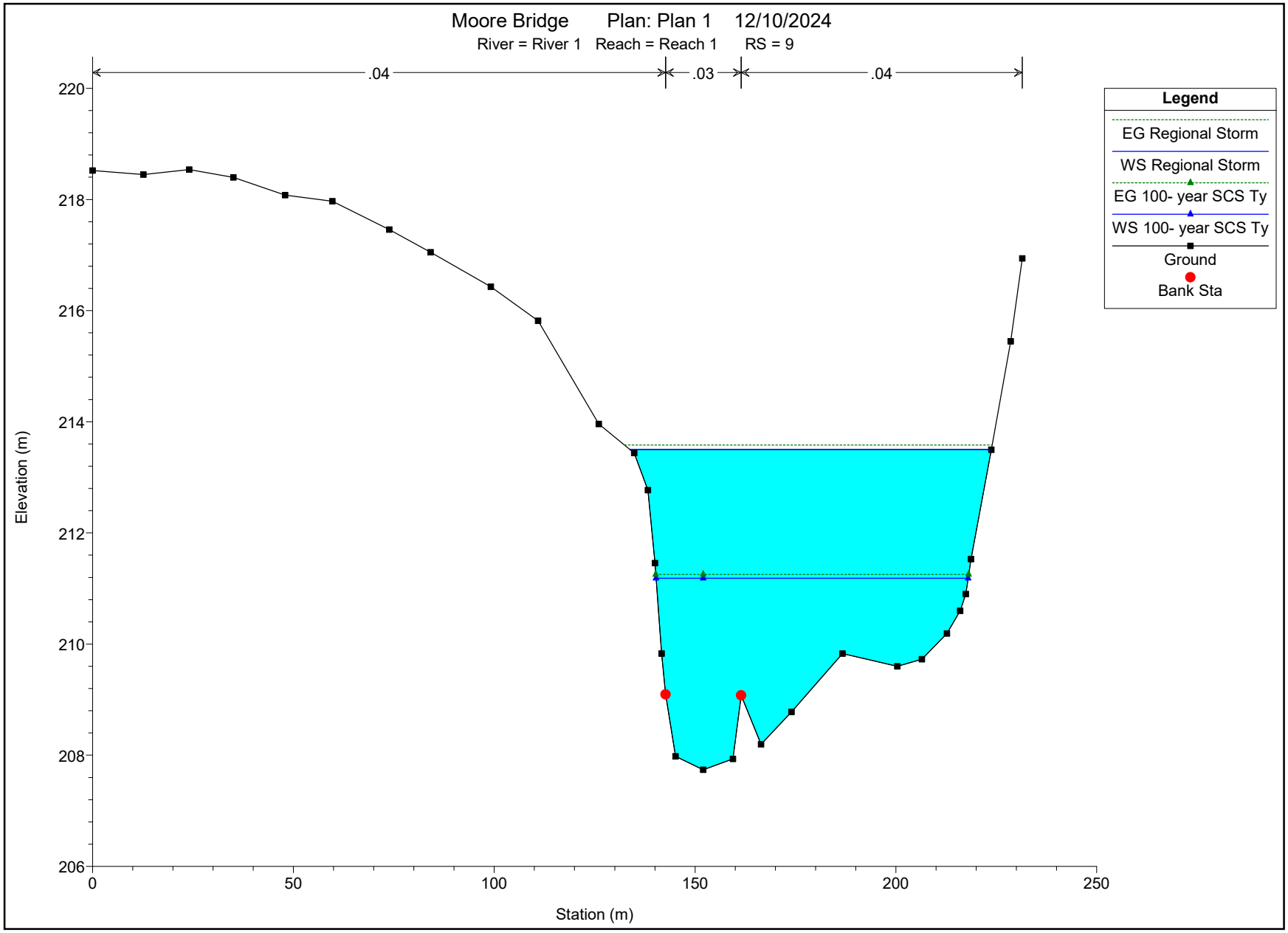
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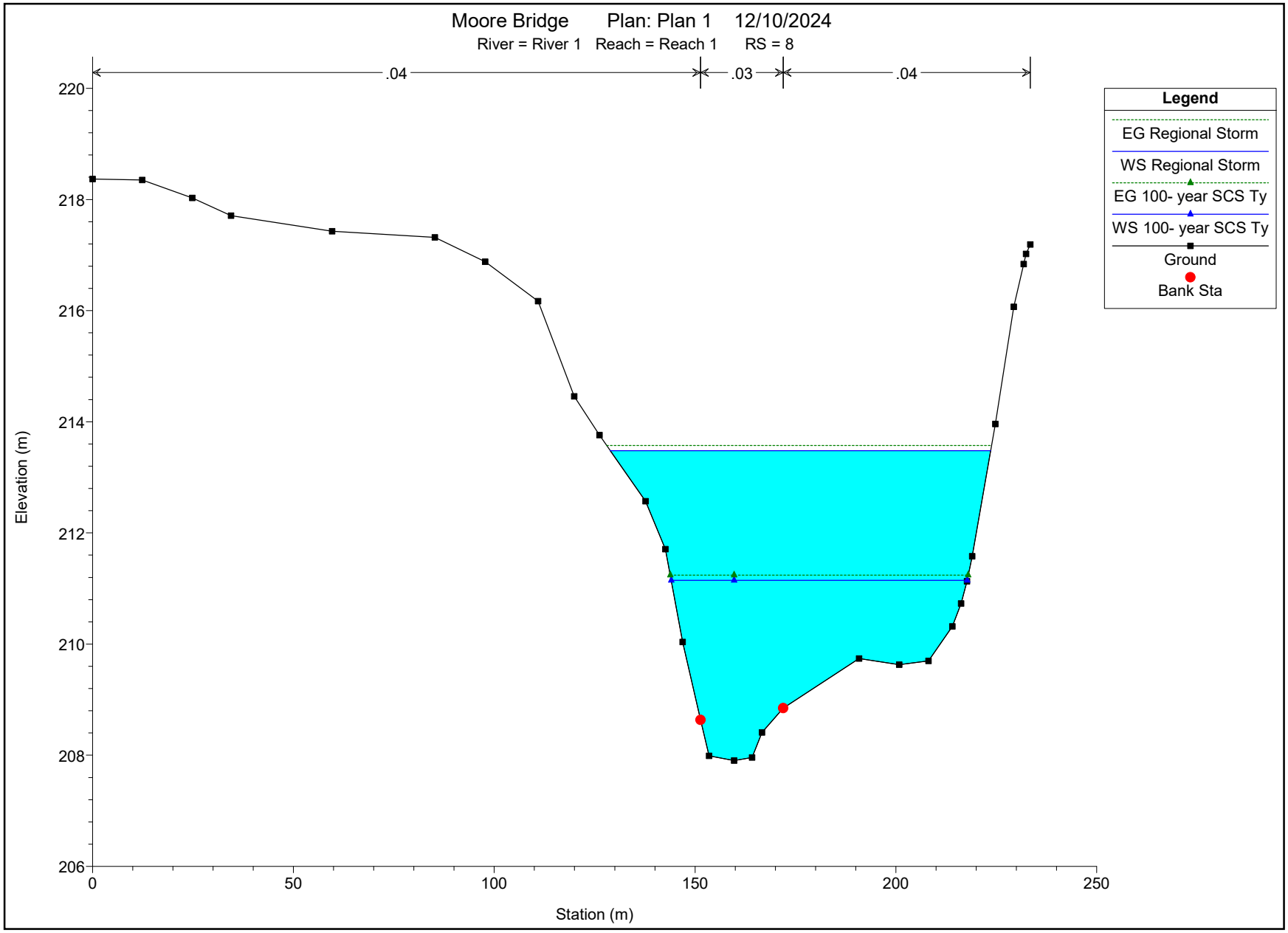
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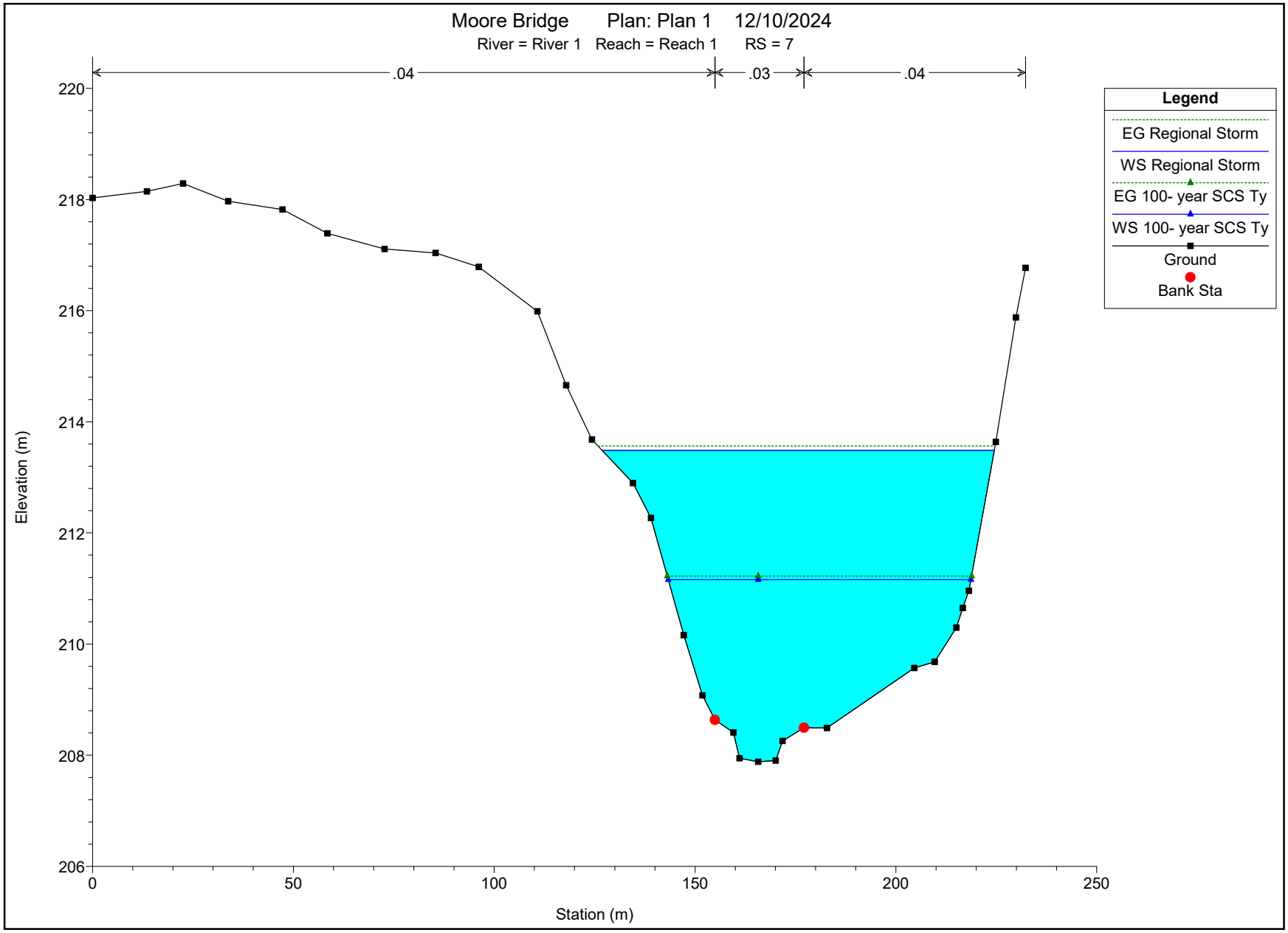
HEC-RAS Plan: Plan 1 River: River 1 Reach: Reach 1

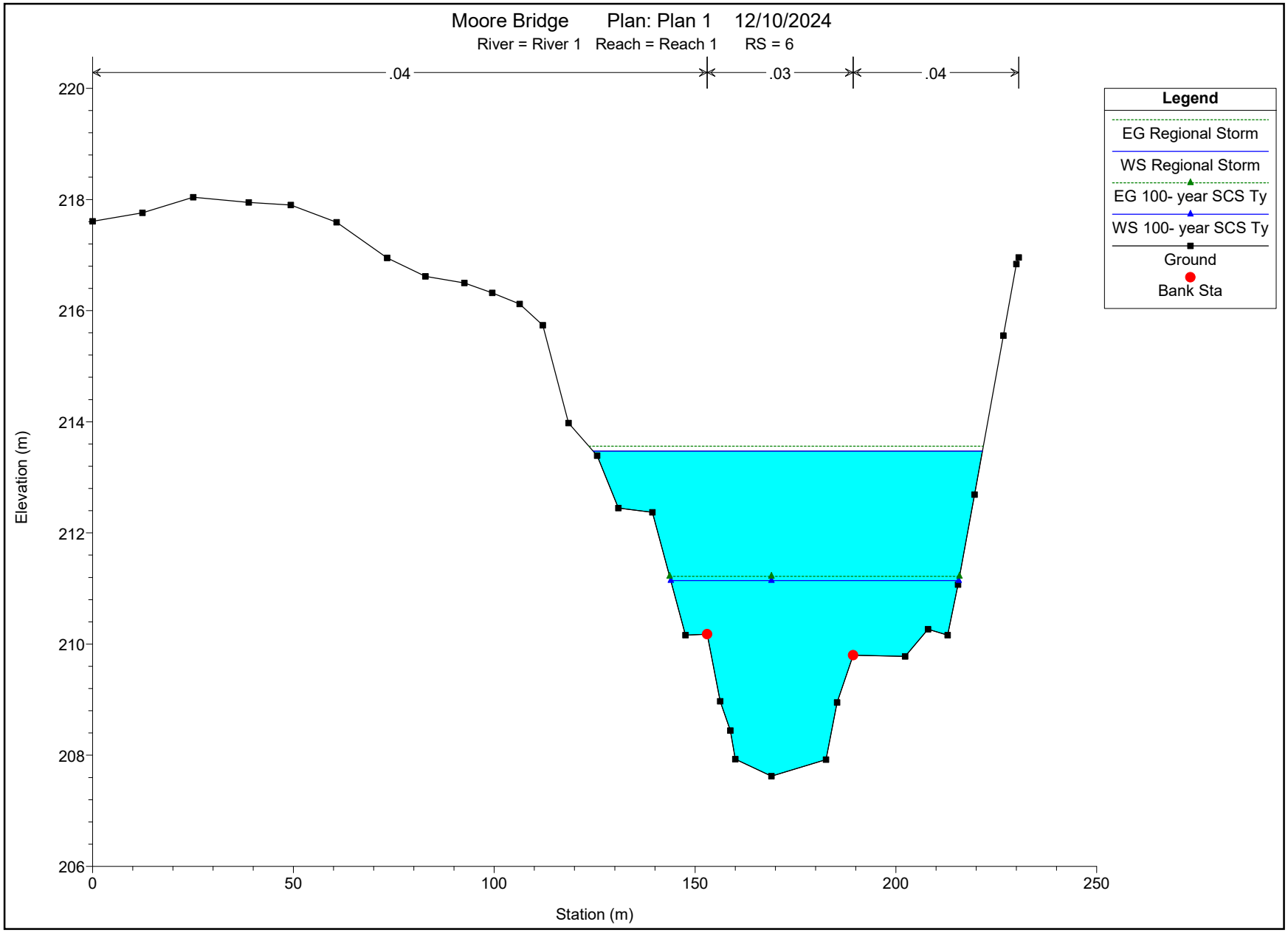
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 1	10	Regional Storm	387.01	207.98	213.52		213.59	0.000249	1.52	369.83	102.03	0.22
Reach 1	10	100- year SCS Ty	154.75	207.98	211.19		211.27	0.000598	1.55	148.83	87.74	0.30
Reach 1	9	Regional Storm	387.01	207.74	213.50		213.58	0.000240	1.58	350.69	90.01	0.21
Reach 1	9	100- year SCS Ty	154.75	207.74	211.19		211.25	0.000398	1.41	159.68	77.70	0.25
Reach 1	8	Regional Storm	387.01	207.90	213.48		213.57	0.000284	1.70	332.01	94.71	0.24
Reach 1	8	100- year SCS Ty	154.75	207.90	211.15		211.24	0.000530	1.58	139.69	73.70	0.29
Reach 1	7	Regional Storm	387.01	207.88	213.49		213.57	0.000238	1.56	355.79	97.70	0.22
Reach 1	7	100- year SCS Ty	154.75	207.88	211.16		211.22	0.000377	1.34	159.88	75.39	0.25
Reach 1	6	Regional Storm	387.01	207.62	213.47		213.56	0.000228	1.50	335.95	96.90	0.21
Reach 1	6	100- year SCS Ty	154.75	207.62	211.14		211.22	0.000372	1.29	142.36	71.70	0.24
Reach 1	5	Regional Storm	387.01	207.74	213.41	210.83	213.55	0.000375	1.97	283.73	93.82	0.27
Reach 1	5	100- year SCS Ty	154.75	207.74	211.06	209.59	211.21	0.000662	1.79	97.48	51.87	0.33
Reach 1	4.5		Bridge									
Reach 1	4	Regional Storm	387.01	207.64	211.95	211.34	212.41	0.001944	3.50	153.60	74.71	0.58
Reach 1	4	100- year SCS Ty	154.75	207.64	210.74	210.09	211.03	0.001738	2.55	73.58	52.00	0.51
Reach 1	3	Regional Storm	387.01	207.72	212.03		212.25	0.001126	2.63	208.71	77.25	0.44
Reach 1	3	100- year SCS Ty	154.75	207.72	210.78		210.91	0.001060	1.94	115.06	72.44	0.40
Reach 1	2	Regional Storm	387.01	207.46	212.01		212.22	0.001114	2.61	211.01	78.06	0.43
Reach 1	2	100- year SCS Ty	154.75	207.46	210.76		210.88	0.001053	1.93	116.23	73.22	0.39
Reach 1	1	Regional Storm	387.01	207.75	211.97	210.83	212.19	0.001001	2.51	216.57	82.89	0.41
Reach 1	1	100- year SCS Ty	154.75	207.75	210.71	210.06	210.85	0.001001	1.91	114.62	78.53	0.39

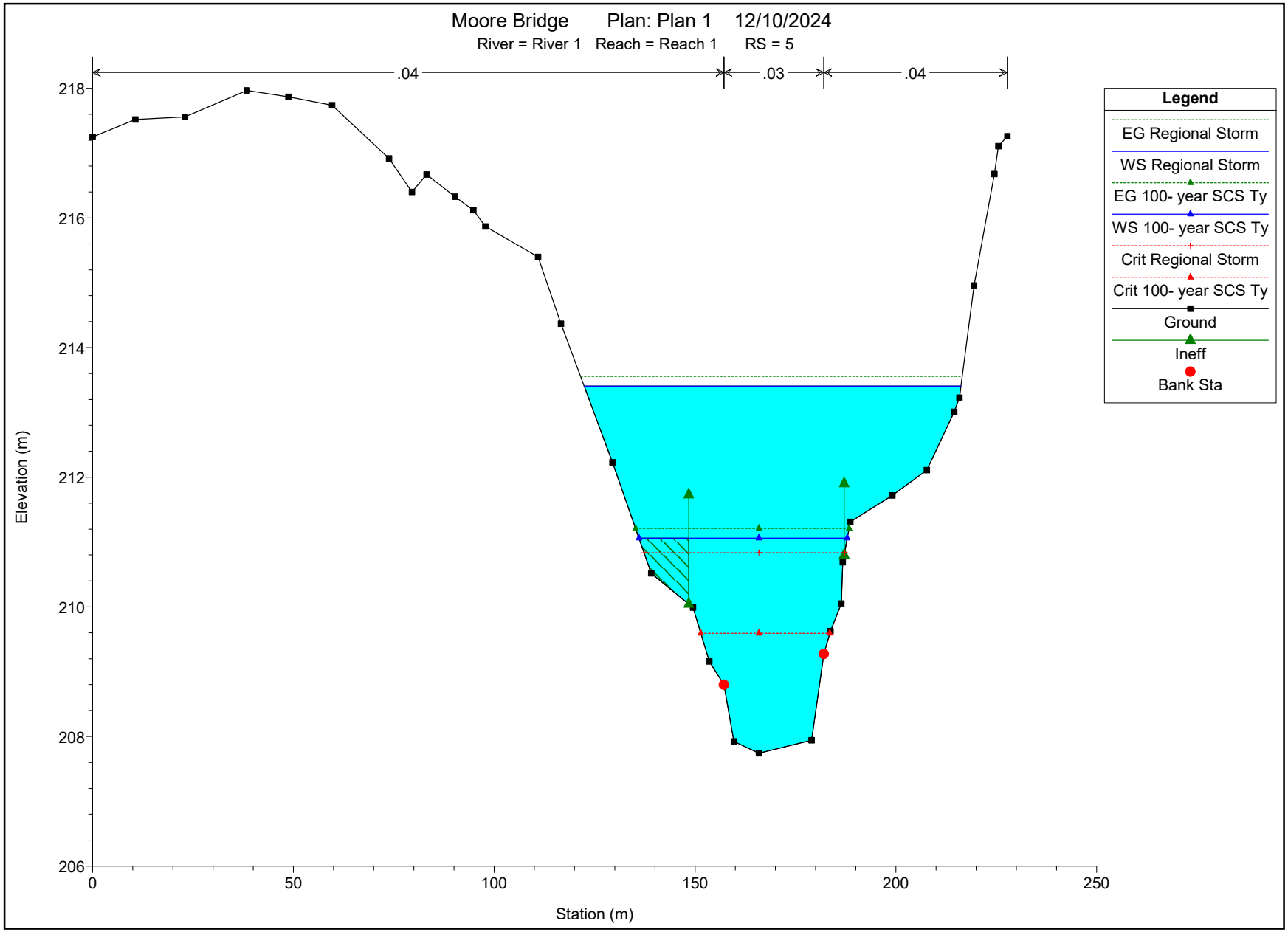

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 10
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

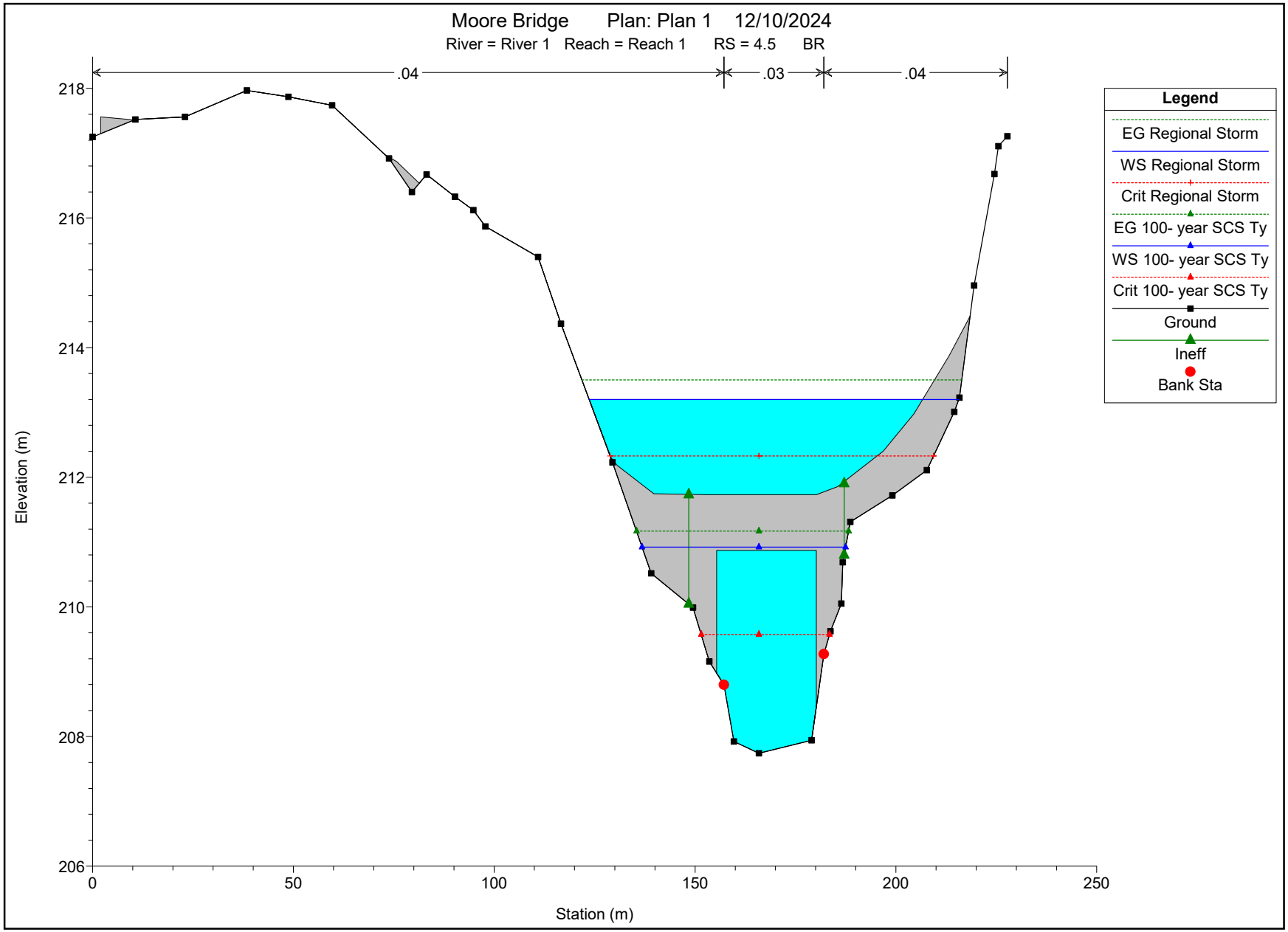

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 9
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

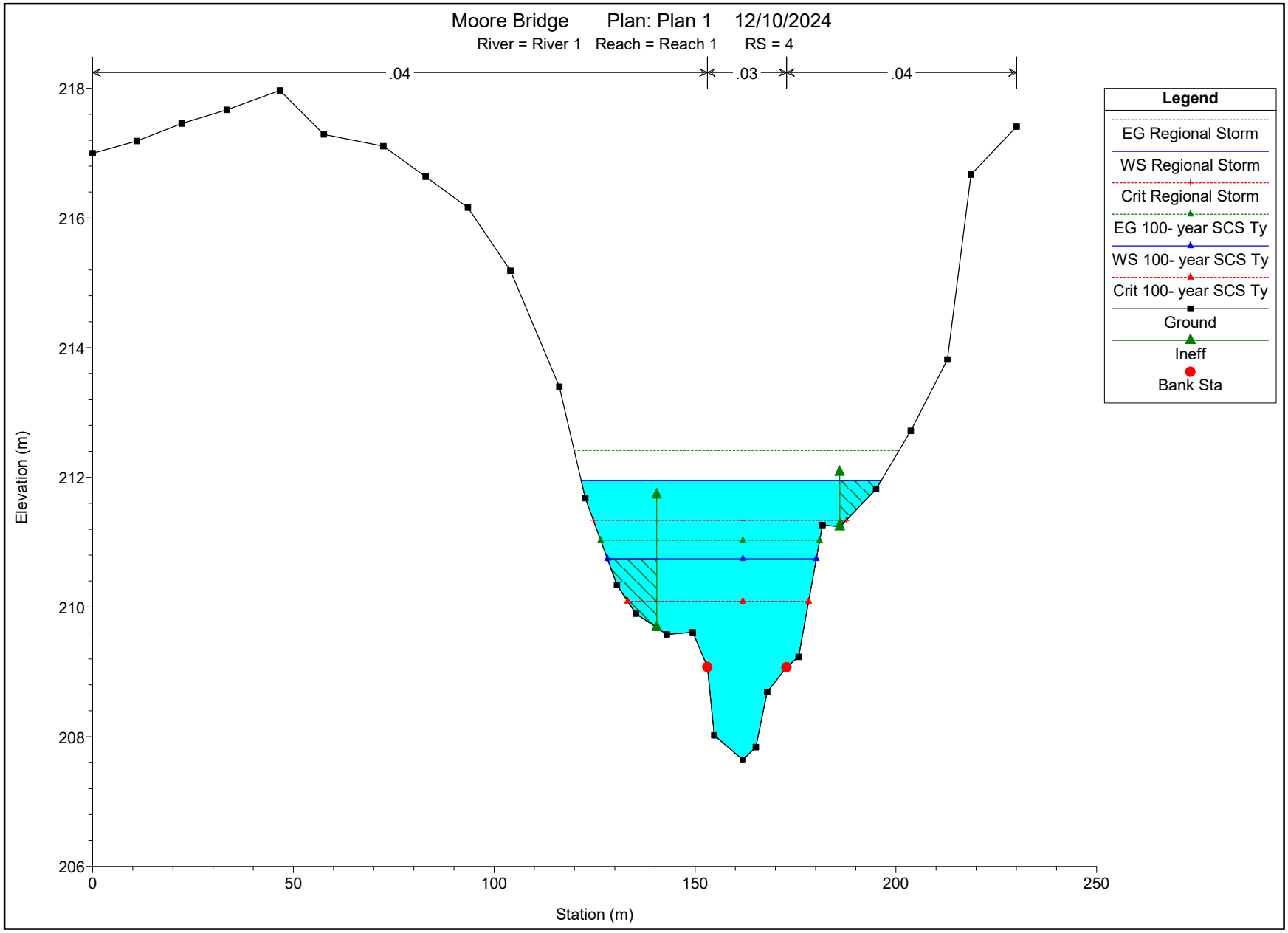

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 8
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

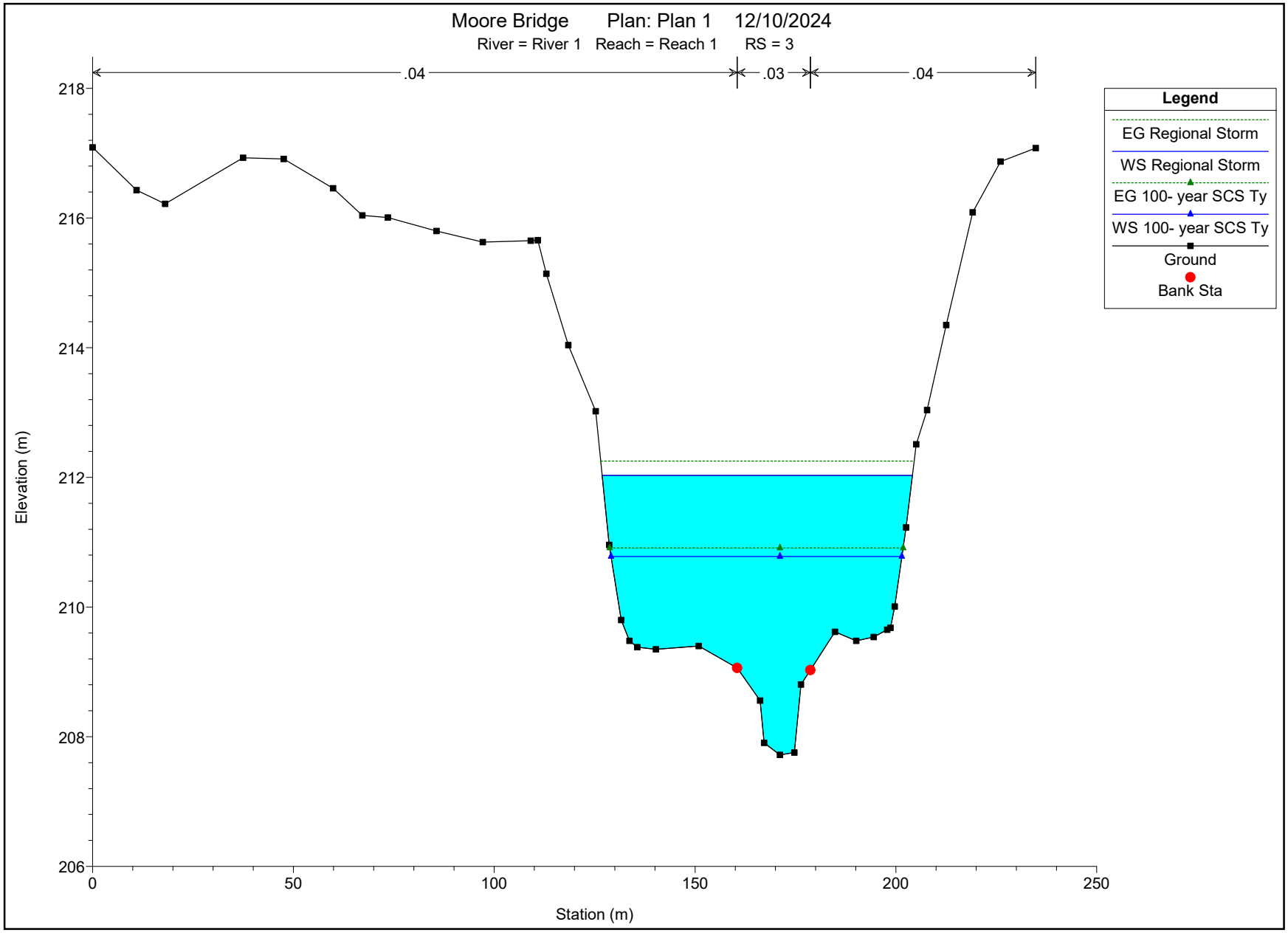

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 7
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

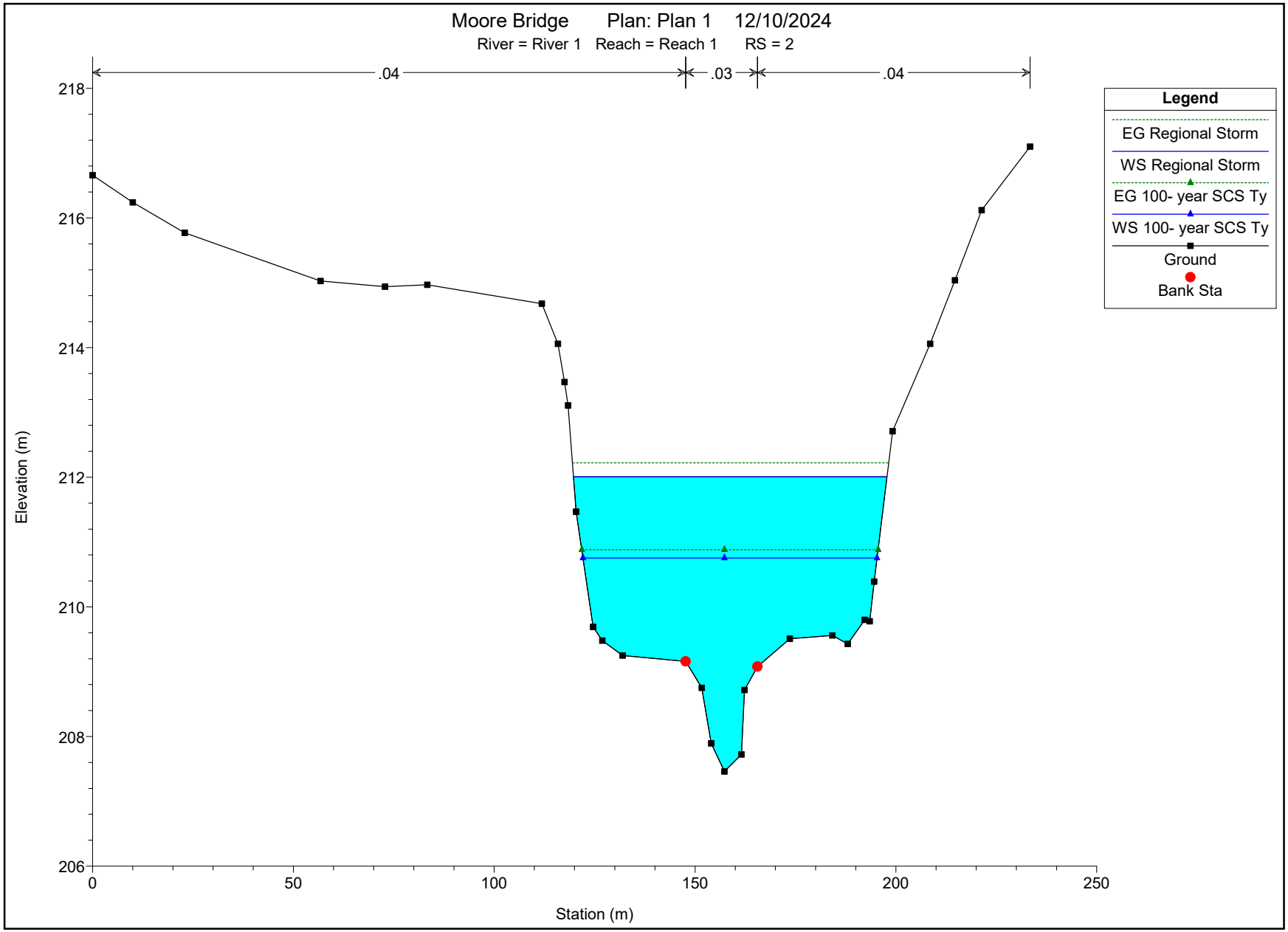

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 6
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

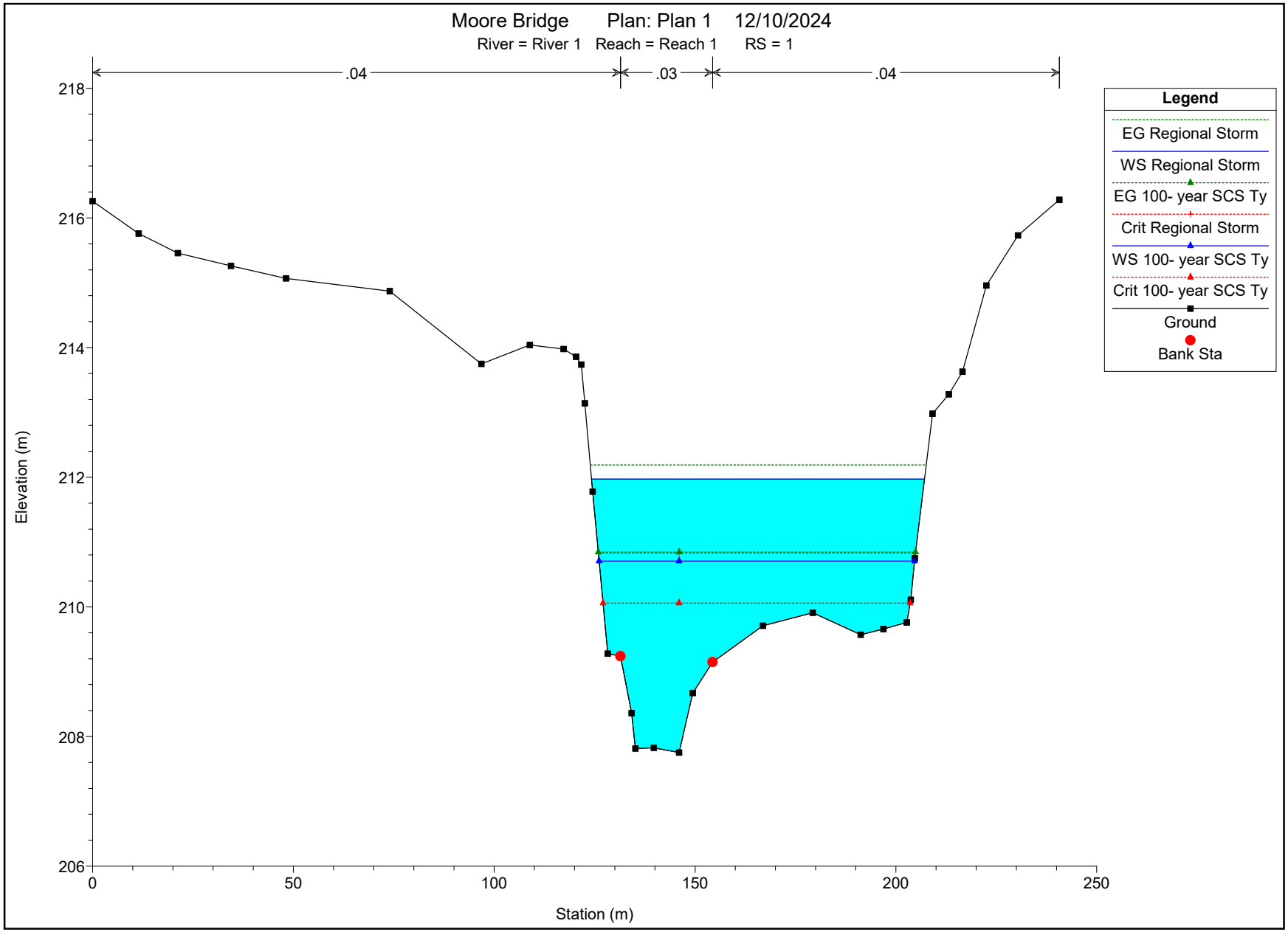

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 5
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit Regional Storm
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 4.5 BR
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
Crit Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 4
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
Crit Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

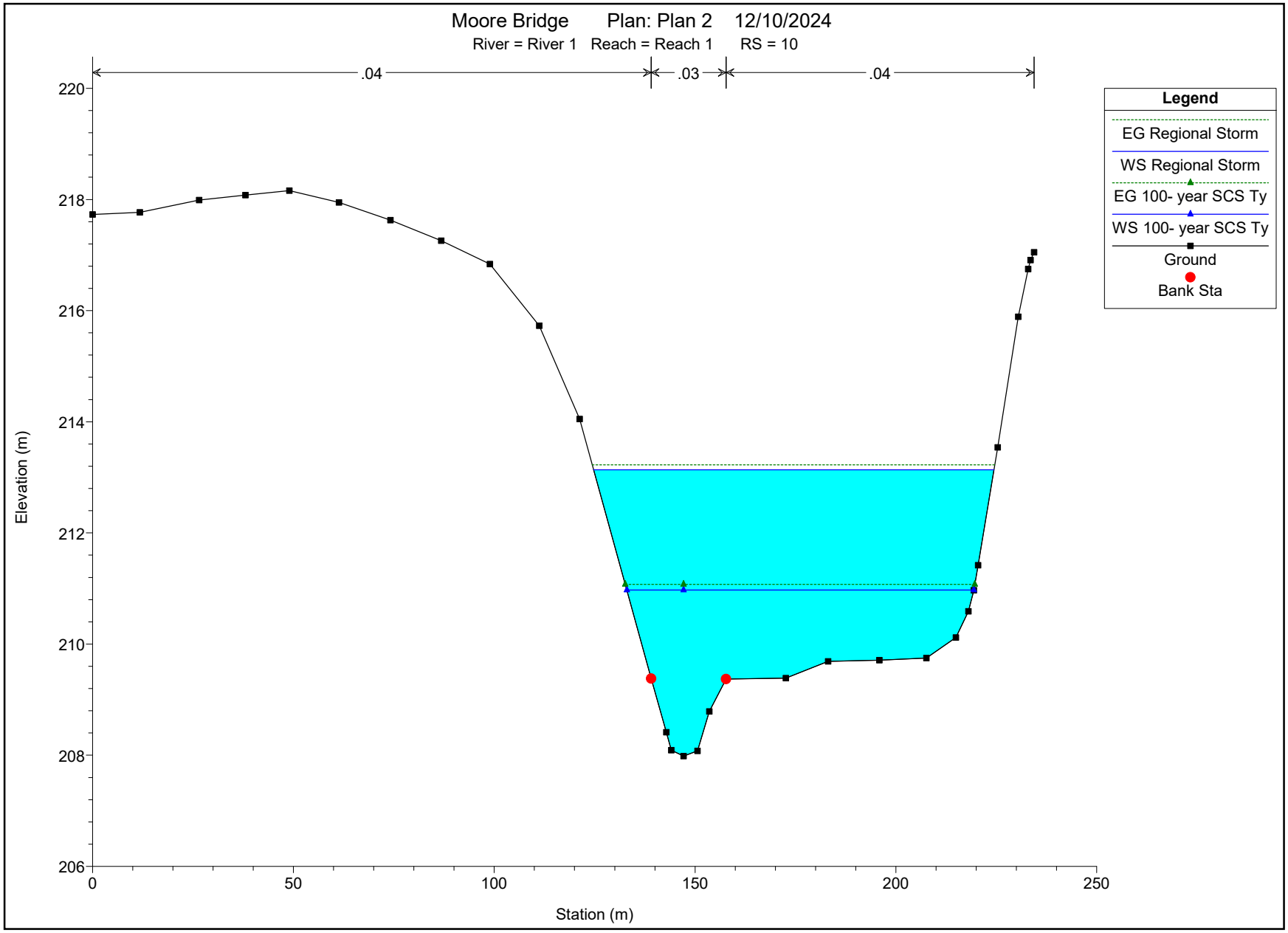

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 3
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

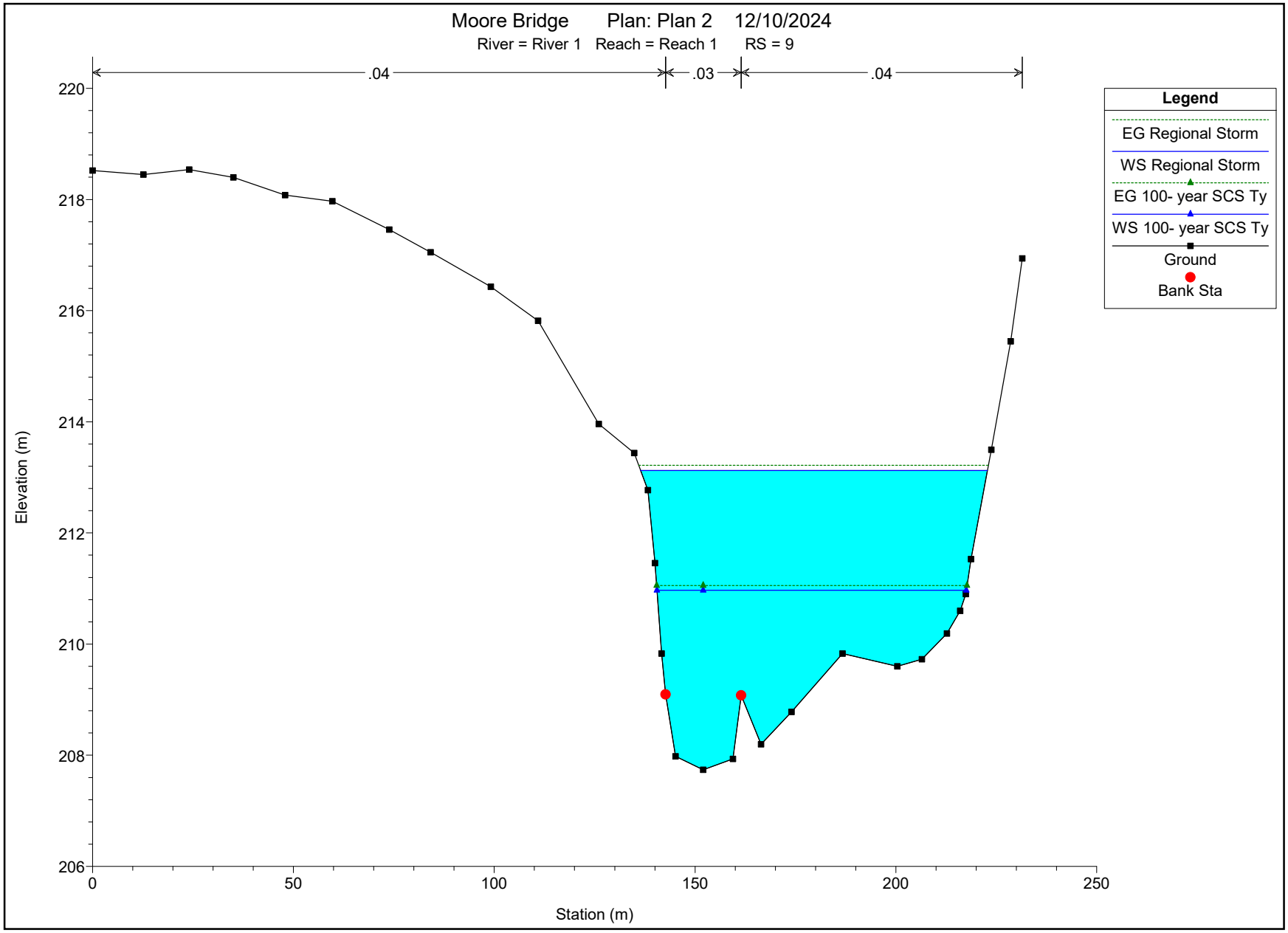

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 2
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

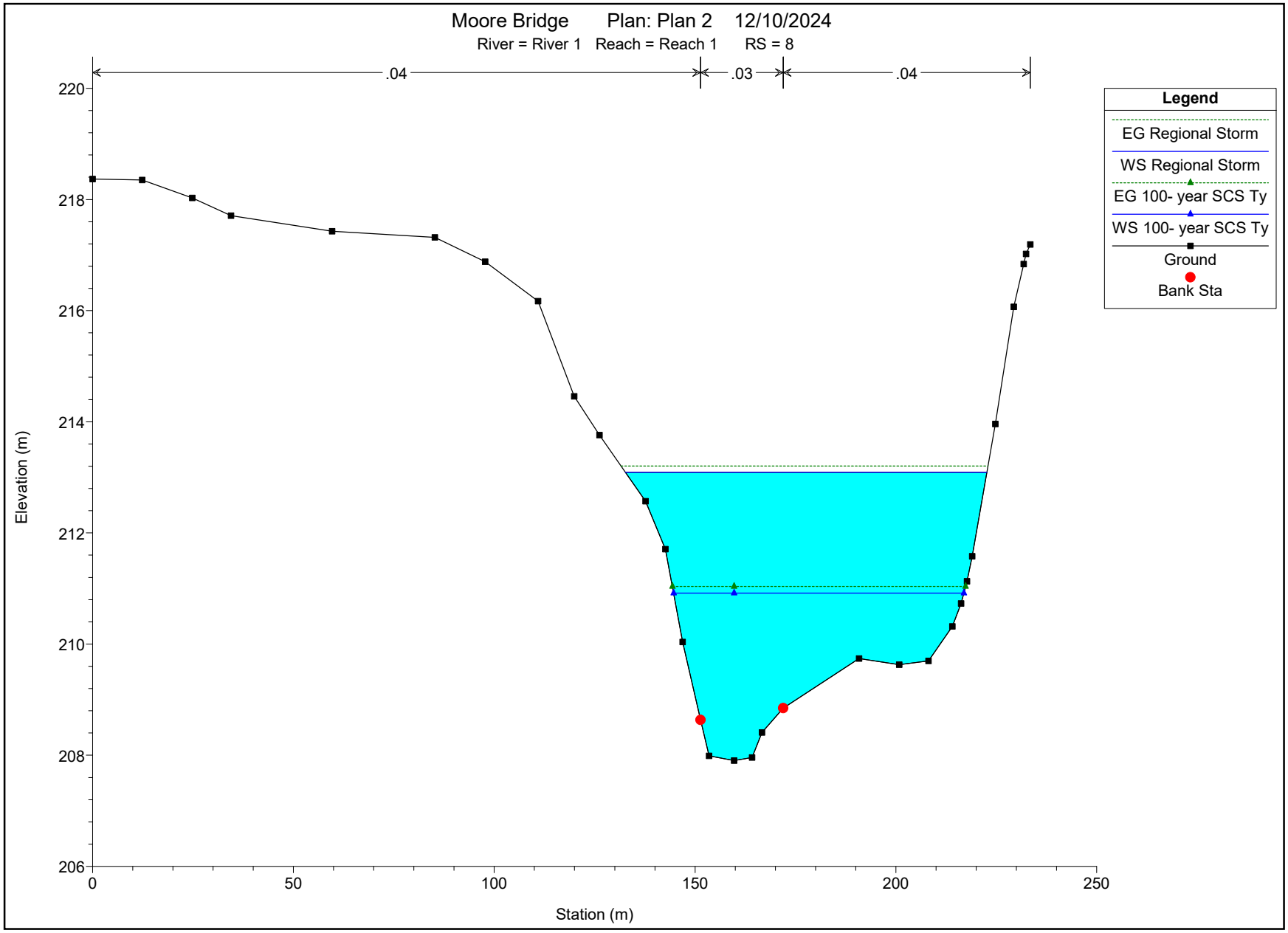

Moore Bridge Plan: Plan 1 12/10/2024
River = River 1 Reach = Reach 1 RS = 1
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
Crit Regional Storm
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

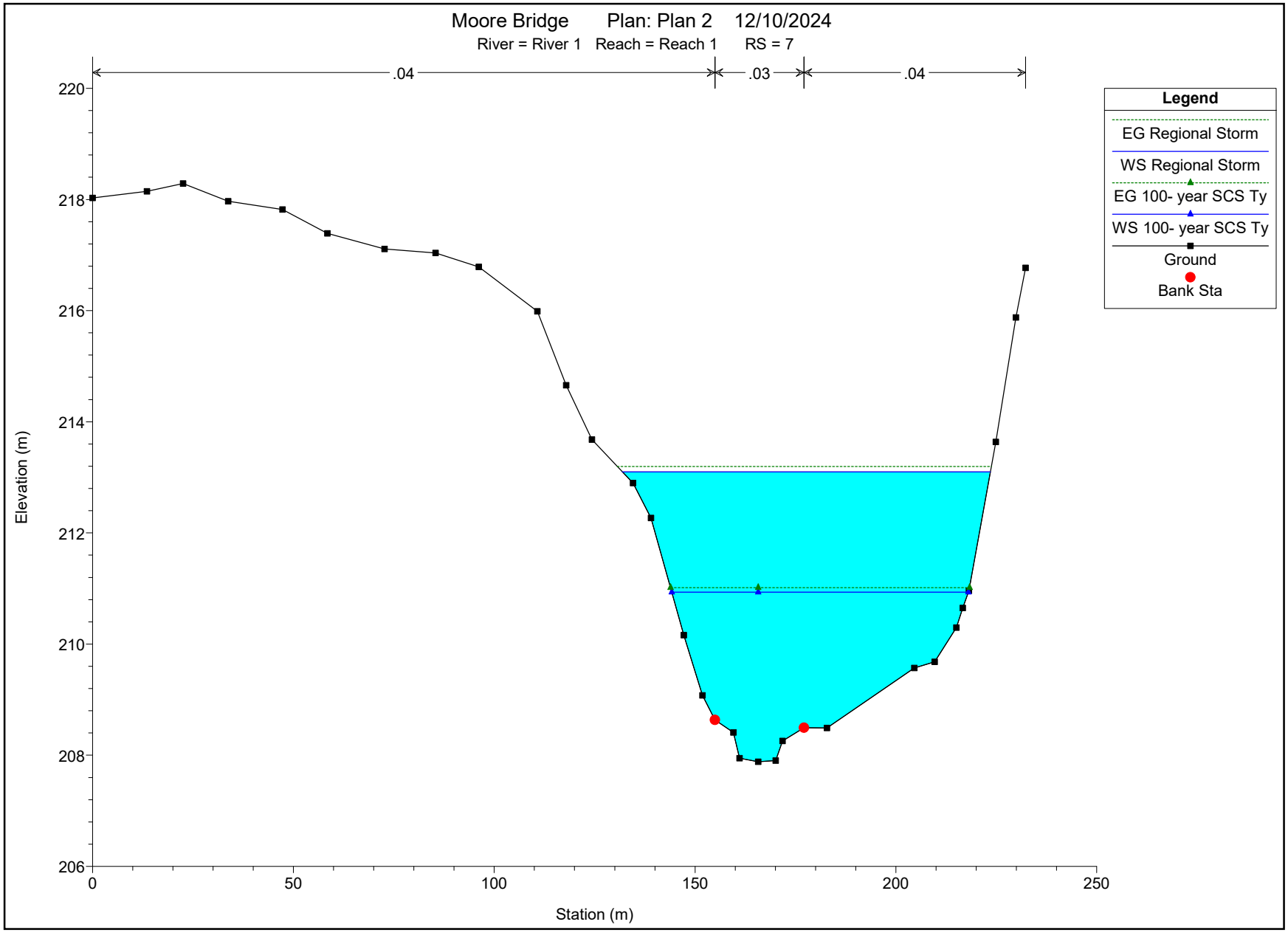
HEC-RAS Plan: Plan 2 River: River 1 Reach: Reach 1

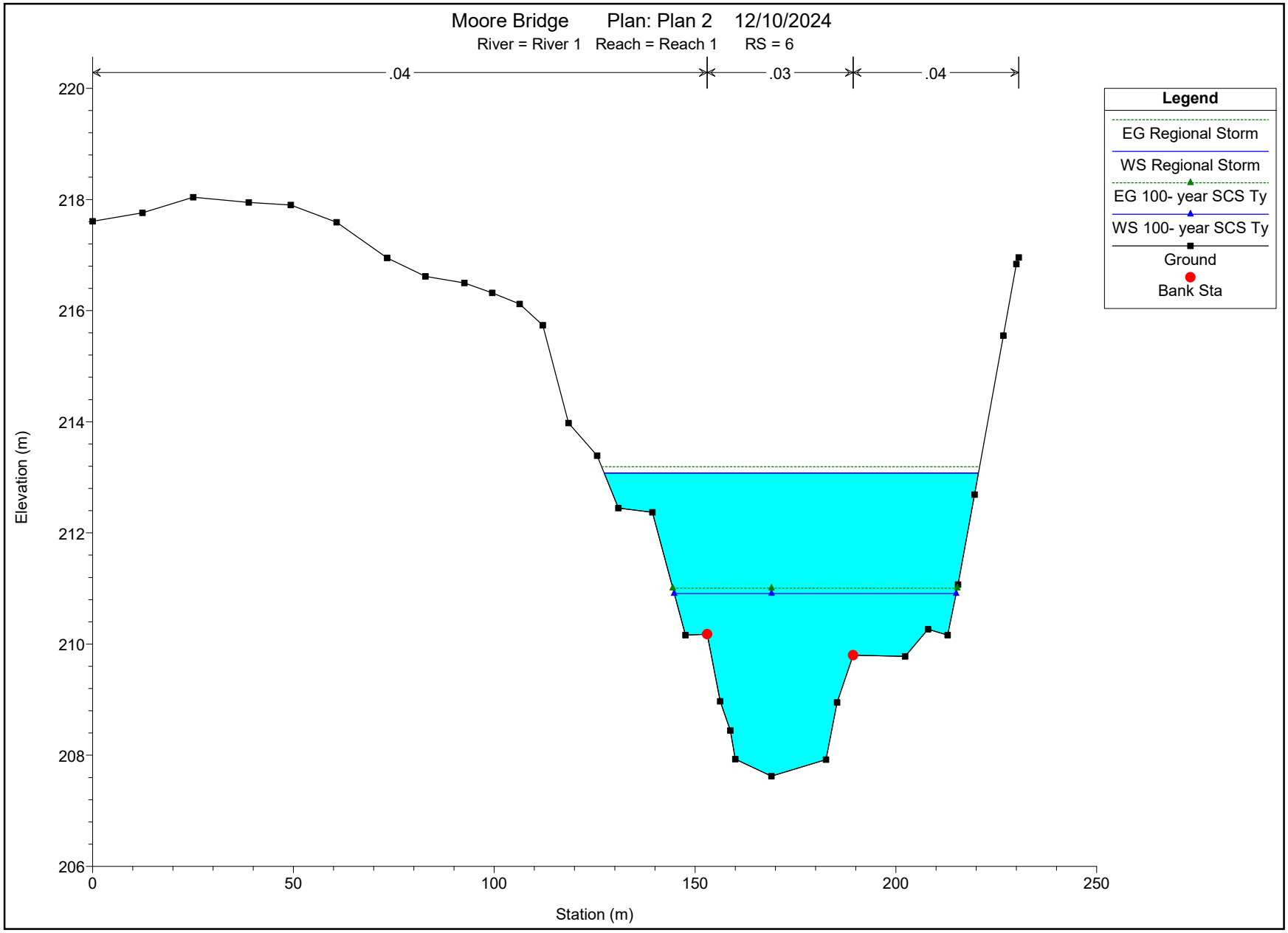
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 1	10	Regional Storm	387.01	207.98	213.14		213.22	0.000344	1.70	331.50	99.70	0.25
Reach 1	10	100- year SCS Ty	154.75	207.98	210.97		211.08	0.000890	1.79	129.90	86.39	0.36
Reach 1	9	Regional Storm	387.01	207.74	213.12		213.22	0.000322	1.74	317.15	86.32	0.25
Reach 1	9	100- year SCS Ty	154.75	207.74	210.97		211.06	0.000550	1.58	142.96	77.04	0.29
Reach 1	8	Regional Storm	387.01	207.90	213.09		213.21	0.000390	1.89	295.87	89.98	0.27
Reach 1	8	100- year SCS Ty	154.75	207.90	210.92		211.04	0.000763	1.79	122.75	72.29	0.35
Reach 1	7	Regional Storm	387.01	207.88	213.10		213.20	0.000319	1.72	319.03	91.63	0.25
Reach 1	7	100- year SCS Ty	154.75	207.88	210.94		211.02	0.000522	1.49	143.01	73.88	0.29
Reach 1	6	Regional Storm	387.01	207.62	213.07		213.19	0.000313	1.67	298.45	93.16	0.24
Reach 1	6	100- year SCS Ty	154.75	207.62	210.91		211.01	0.000517	1.44	125.91	70.20	0.28
Reach 1	5	Regional Storm	387.01	207.74	212.98	210.78	213.18	0.000523	2.20	245.19	89.40	0.32
Reach 1	5	100- year SCS Ty	154.75	207.74	210.82	209.55	211.00	0.000869	1.94	88.32	49.77	0.37
Reach 1	4.5		Bridge									
Reach 1	4	Regional Storm	387.01	207.64	212.01	210.86	212.34	0.001258	2.92	175.37	75.46	0.47
Reach 1	4	100- year SCS Ty	154.75	207.64	210.79	209.79	210.97	0.000993	2.02	91.47	56.75	0.39
Reach 1	3	Regional Storm	387.01	207.72	212.03		212.25	0.001126	2.63	208.71	77.25	0.44
Reach 1	3	100- year SCS Ty	154.75	207.72	210.78		210.91	0.001060	1.94	115.06	72.44	0.40
Reach 1	2	Regional Storm	387.01	207.46	212.01		212.22	0.001114	2.61	211.01	78.06	0.43
Reach 1	2	100- year SCS Ty	154.75	207.46	210.76		210.88	0.001053	1.93	116.23	73.22	0.39
Reach 1	1	Regional Storm	387.01	207.75	211.97	210.83	212.19	0.001001	2.51	216.57	82.89	0.41
Reach 1	1	100- year SCS Ty	154.75	207.75	210.71	210.06	210.85	0.001001	1.91	114.62	78.53	0.39

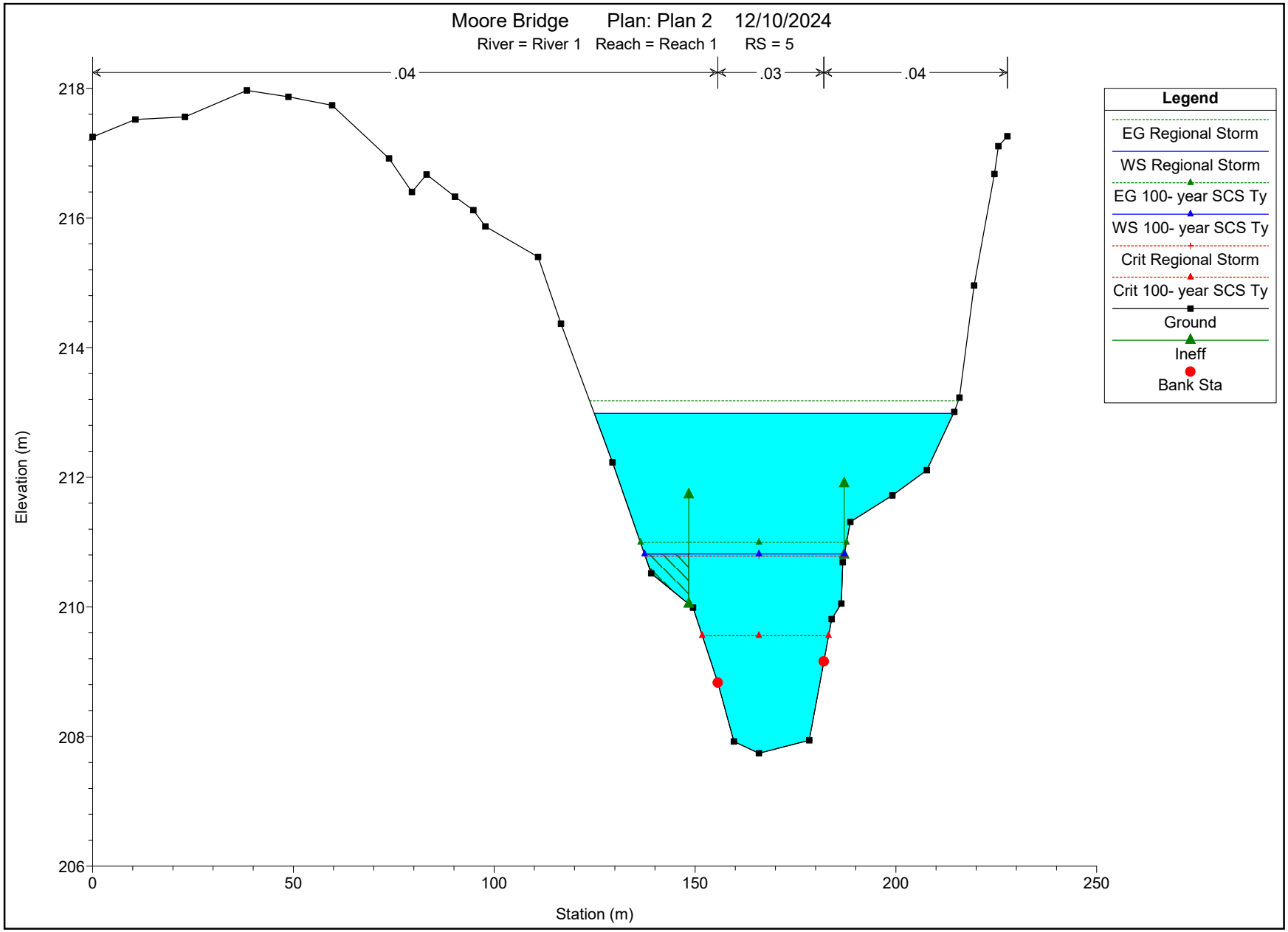

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 10
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

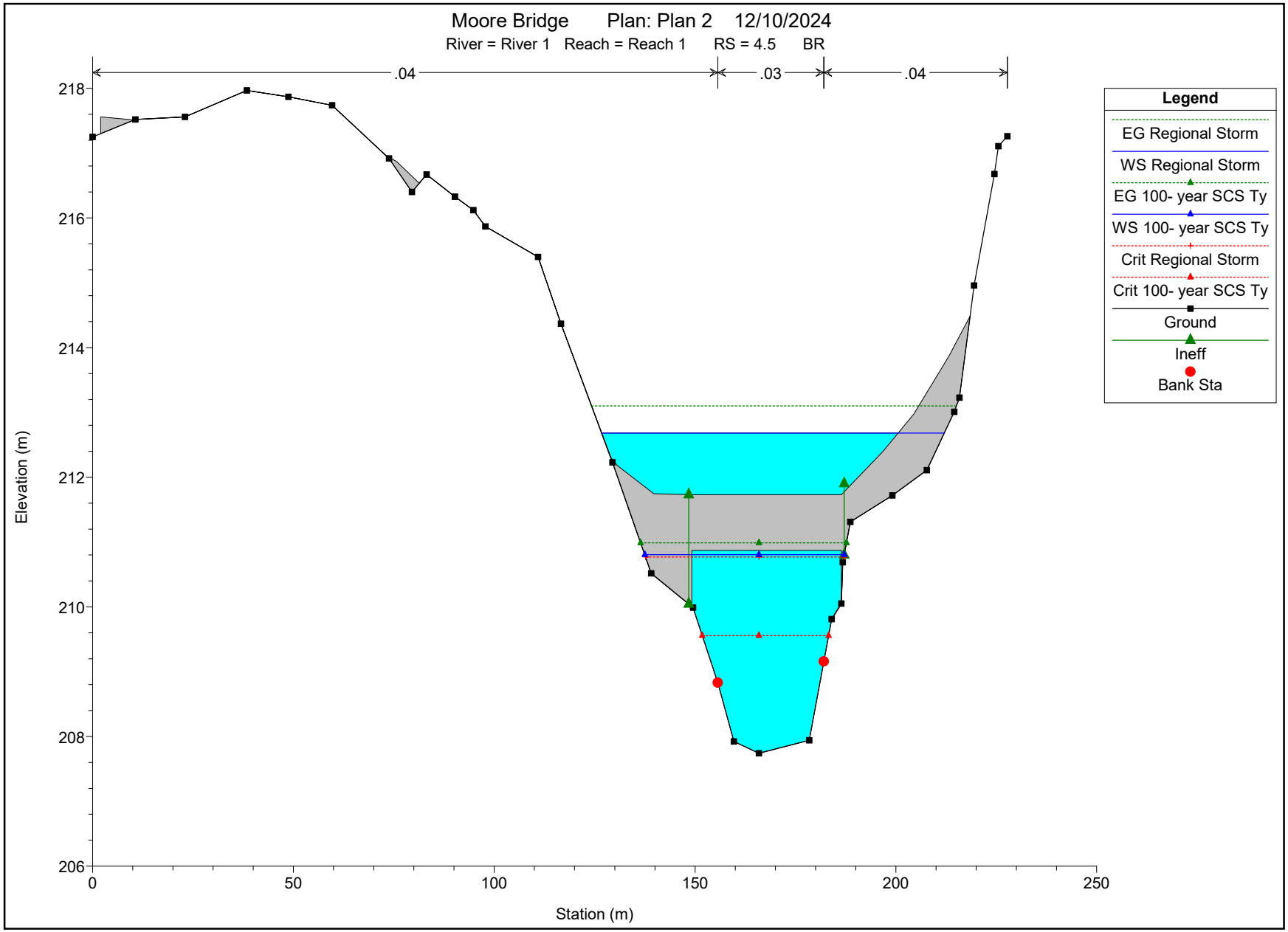

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 9
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

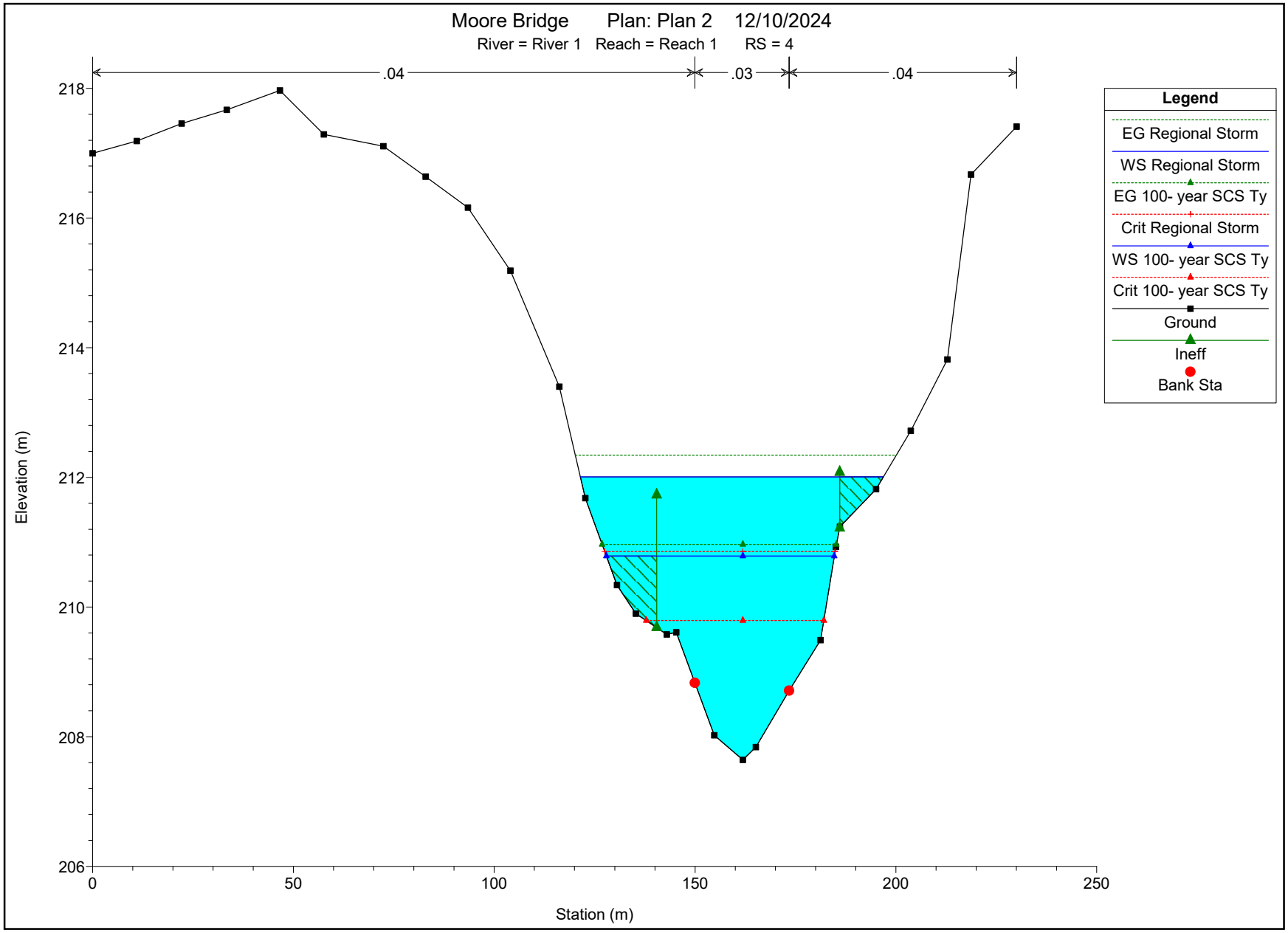

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 8
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

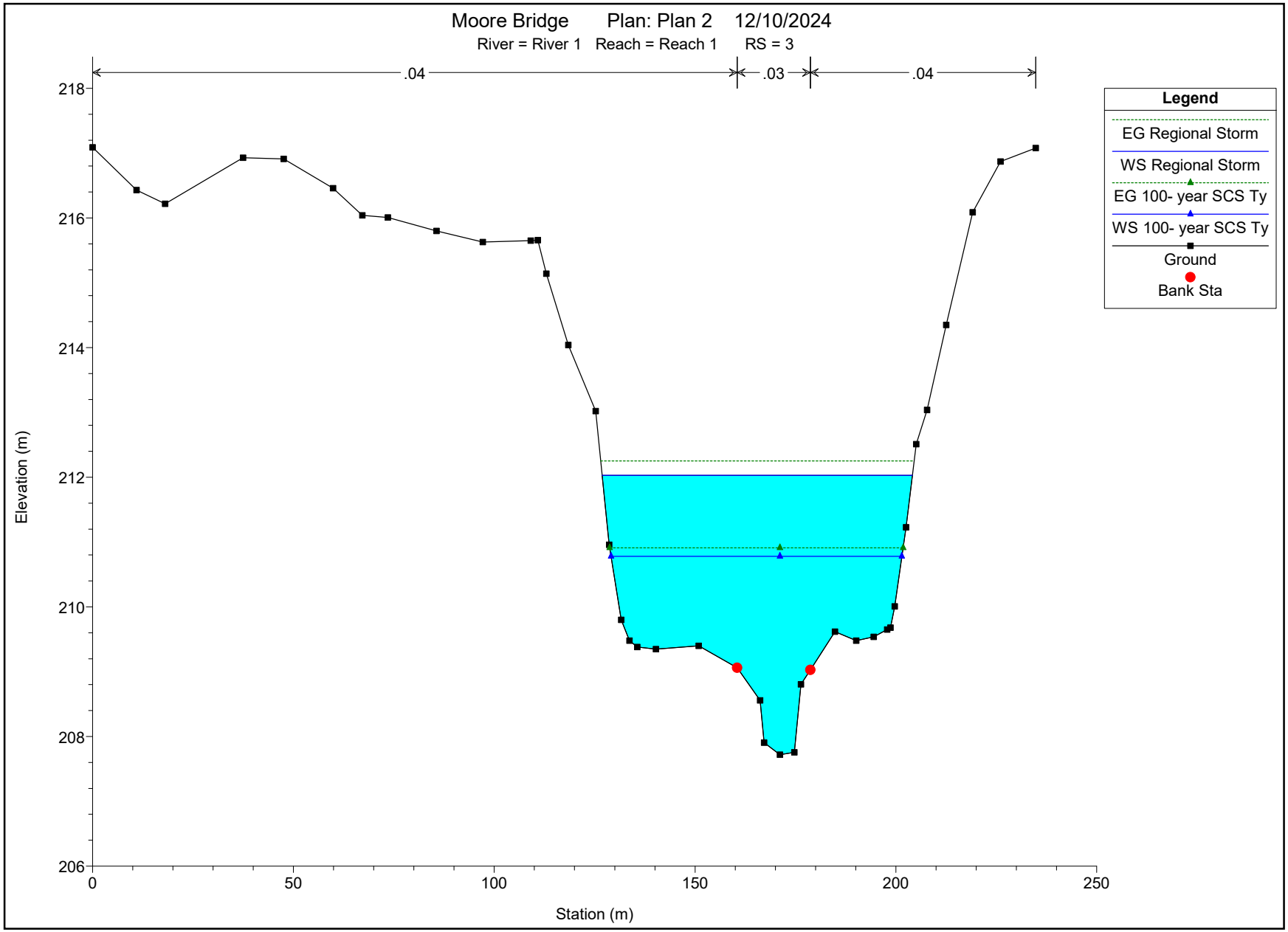

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 7
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

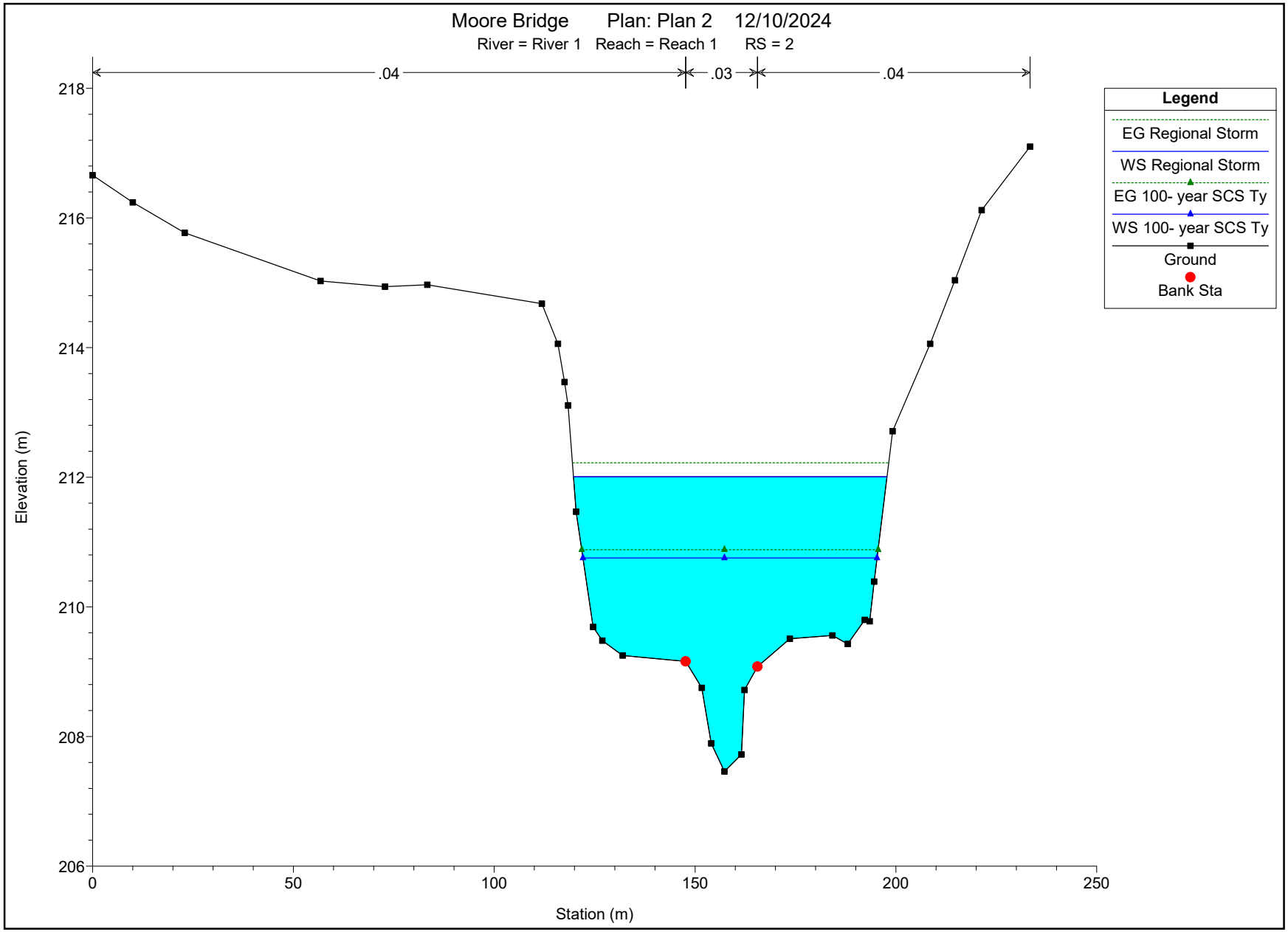

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 6
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

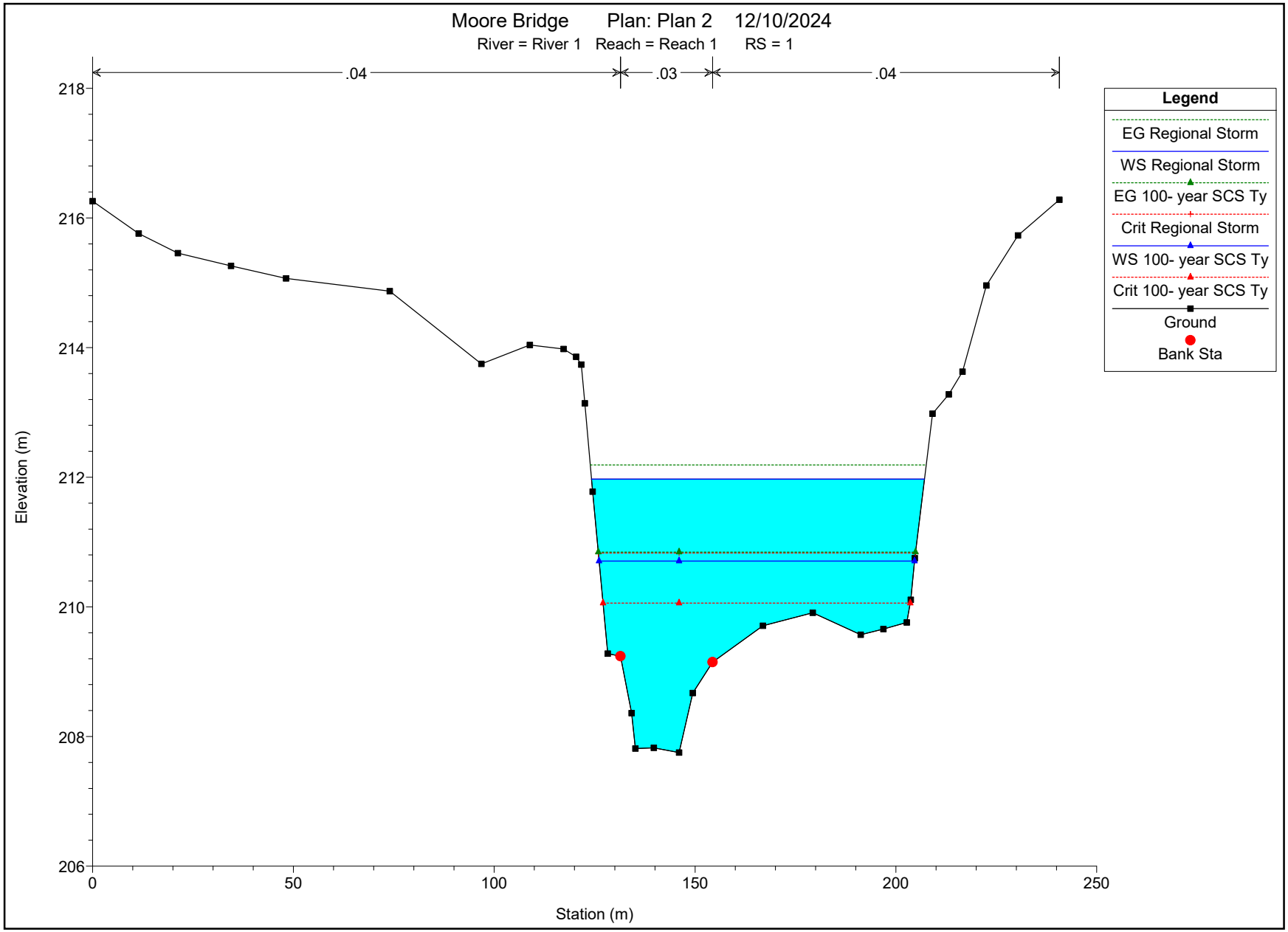

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 5
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit Regional Storm
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 4.5 BR
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit Regional Storm
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 4
.04
.03
.04
218
216
214
212
210
208
206
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
Crit Regional Storm
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta

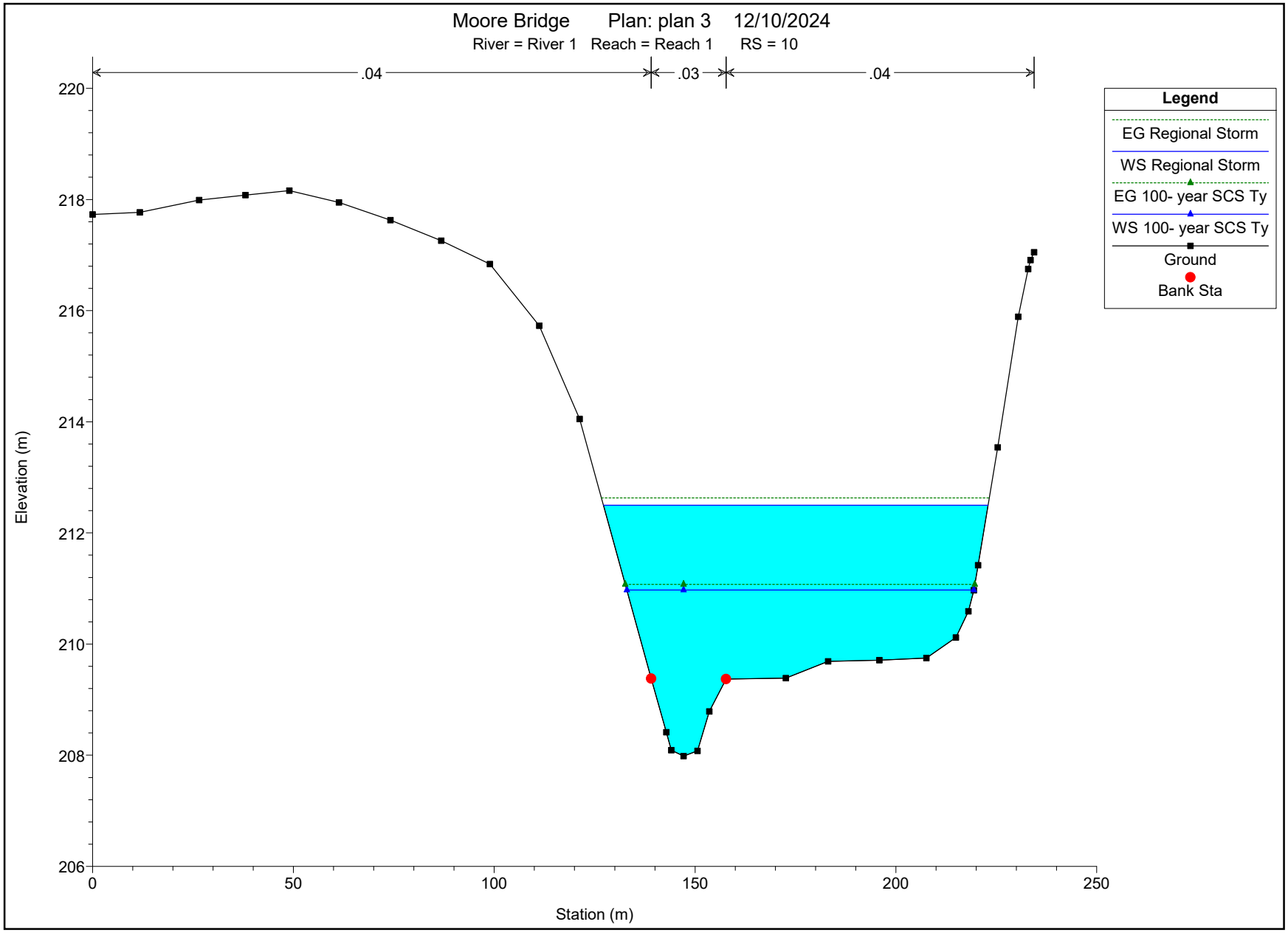

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 3
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

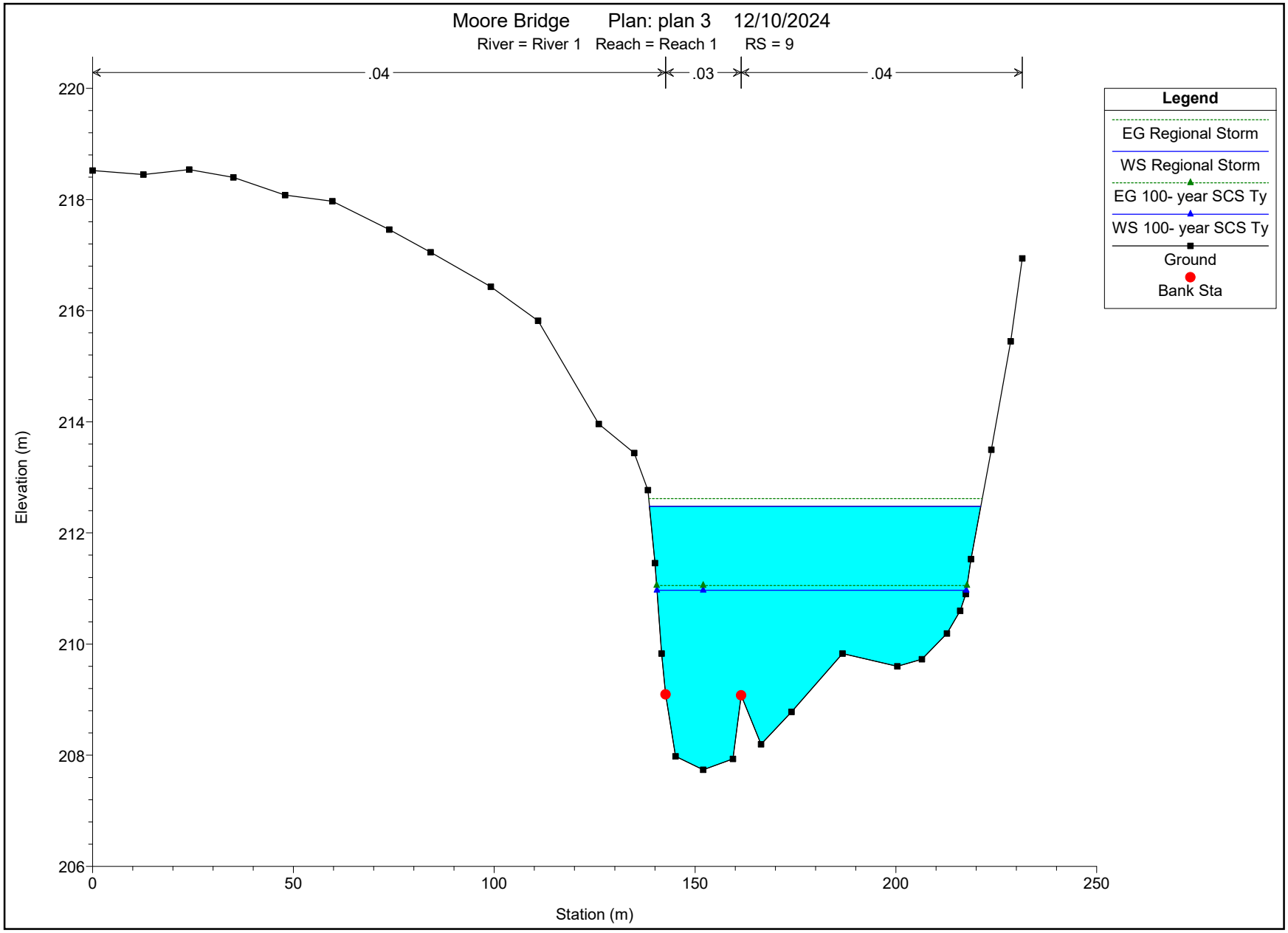

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 2
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

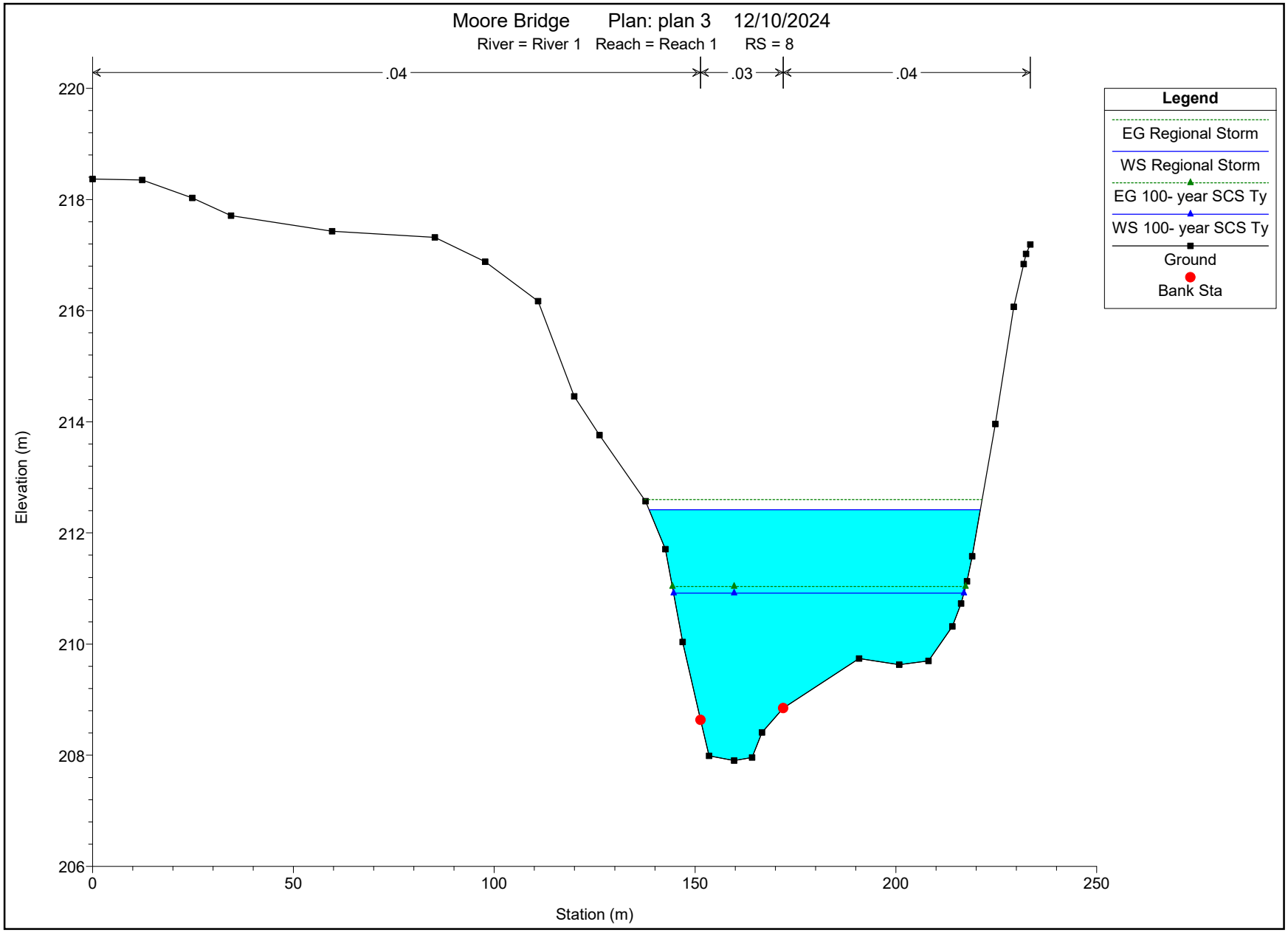

Moore Bridge Plan: Plan 2 12/10/2024
River = River 1 Reach = Reach 1 RS = 1
.04
.03
.04
218
216
214
212
210
208
206
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
Crit Regional Storm
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Bank Sta

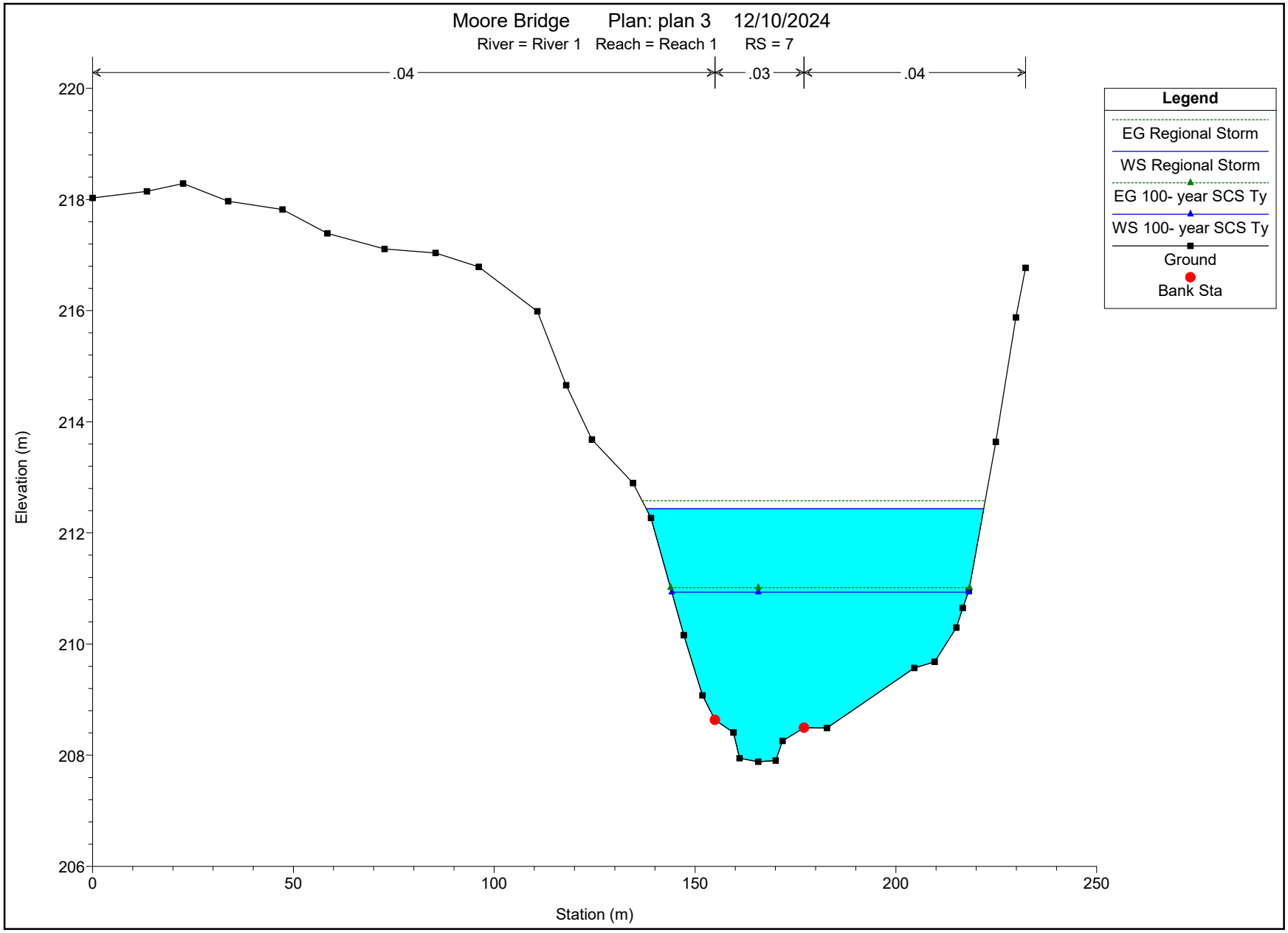
HEC-RAS Plan: Plan 3 River: River 1 Reach: Reach 1

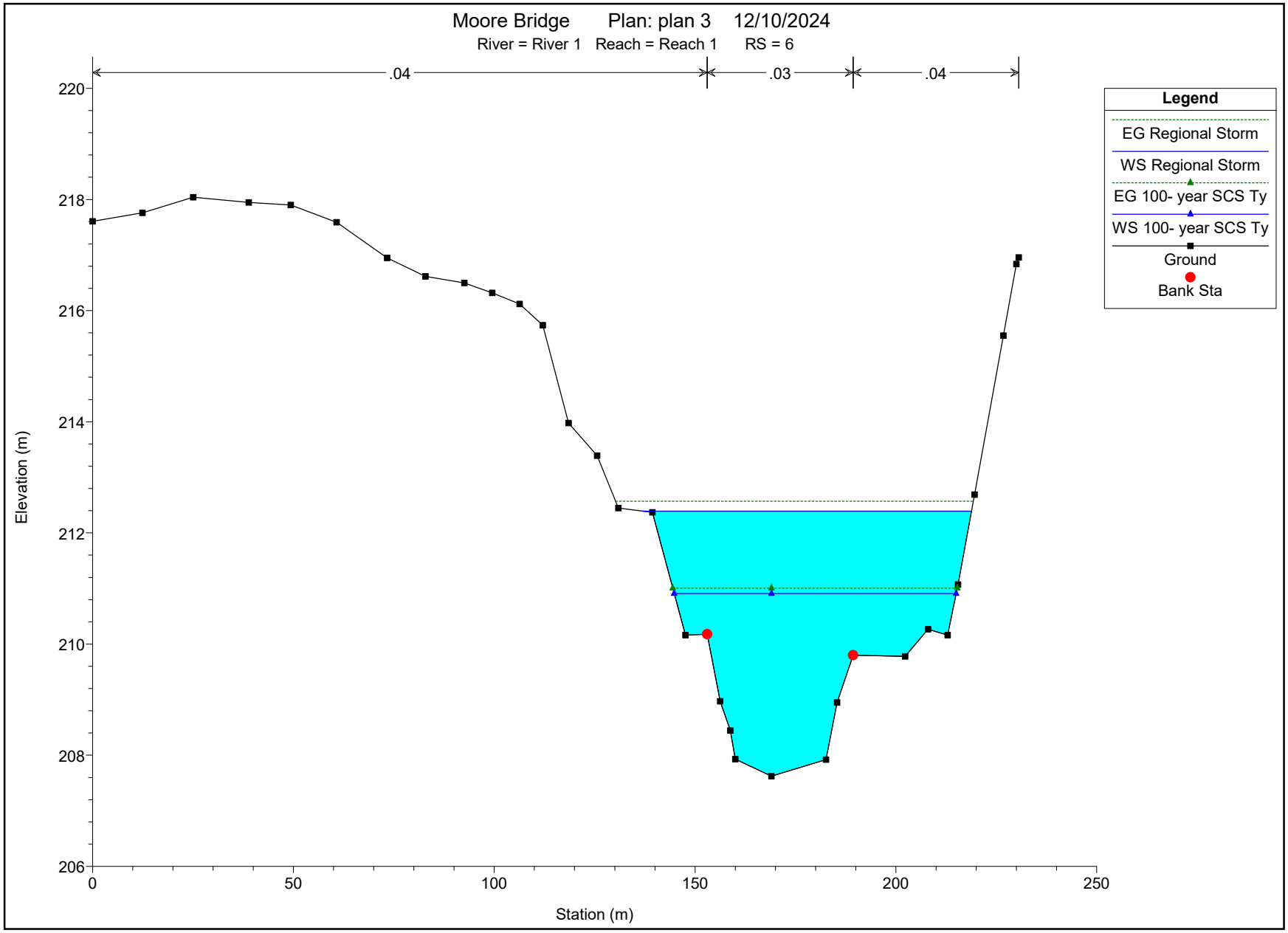
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 1	10	Regional Storm	387.01	207.98	212.50		212.63	0.000643	2.10	268.90	95.78	0.34
Reach 1	10	100- year SCS Ty	154.75	207.98	210.97		211.08	0.000889	1.79	129.93	86.39	0.36
Reach 1	9	Regional Storm	387.01	207.74	212.48		212.62	0.000562	2.10	263.01	82.49	0.32
Reach 1	9	100- year SCS Ty	154.75	207.74	210.97		211.06	0.000549	1.58	142.99	77.04	0.29
Reach 1	8	Regional Storm	387.01	207.90	212.42		212.60	0.000718	2.32	238.16	82.45	0.36
Reach 1	8	100- year SCS Ty	154.75	207.90	210.92		211.04	0.000762	1.79	122.79	72.29	0.35
Reach 1	7	Regional Storm	387.01	207.88	212.44		212.58	0.000560	2.07	261.10	84.06	0.32
Reach 1	7	100- year SCS Ty	154.75	207.88	210.94		211.02	0.000521	1.49	143.04	73.89	0.29
Reach 1	6	Regional Storm	387.01	207.62	212.39		212.57	0.000572	2.03	236.92	81.93	0.32
Reach 1	6	100- year SCS Ty	154.75	207.62	210.91		211.01	0.000516	1.44	125.94	70.20	0.28
Reach 1	5	Regional Storm	387.01	207.74	212.08	210.78	212.54	0.001401	3.15	137.10	76.70	0.50
Reach 1	5	100- year SCS Ty	154.75	207.74	210.82	209.55	211.00	0.000869	1.94	88.34	49.77	0.37
Reach 1	4.5		Bridge									
Reach 1	4	Regional Storm	387.01	207.64	211.96	210.86	212.40	0.001546	3.22	144.78	74.83	0.52
Reach 1	4	100- year SCS Ty	154.75	207.64	210.79	209.79	210.97	0.000993	2.02	91.46	56.75	0.39
Reach 1	3	Regional Storm	387.01	207.72	212.03		212.25	0.001126	2.63	208.71	77.25	0.44
Reach 1	3	100- year SCS Ty	154.75	207.72	210.78		210.91	0.001060	1.94	115.06	72.44	0.40
Reach 1	2	Regional Storm	387.01	207.46	212.01		212.22	0.001114	2.61	211.01	78.06	0.43
Reach 1	2	100- year SCS Ty	154.75	207.46	210.76		210.88	0.001053	1.93	116.23	73.22	0.39
Reach 1	1	Regional Storm	387.01	207.75	211.97	210.83	212.19	0.001001	2.51	216.57	82.89	0.41
Reach 1	1	100- year SCS Ty	154.75	207.75	210.71	210.06	210.85	0.001001	1.91	114.62	78.53	0.39

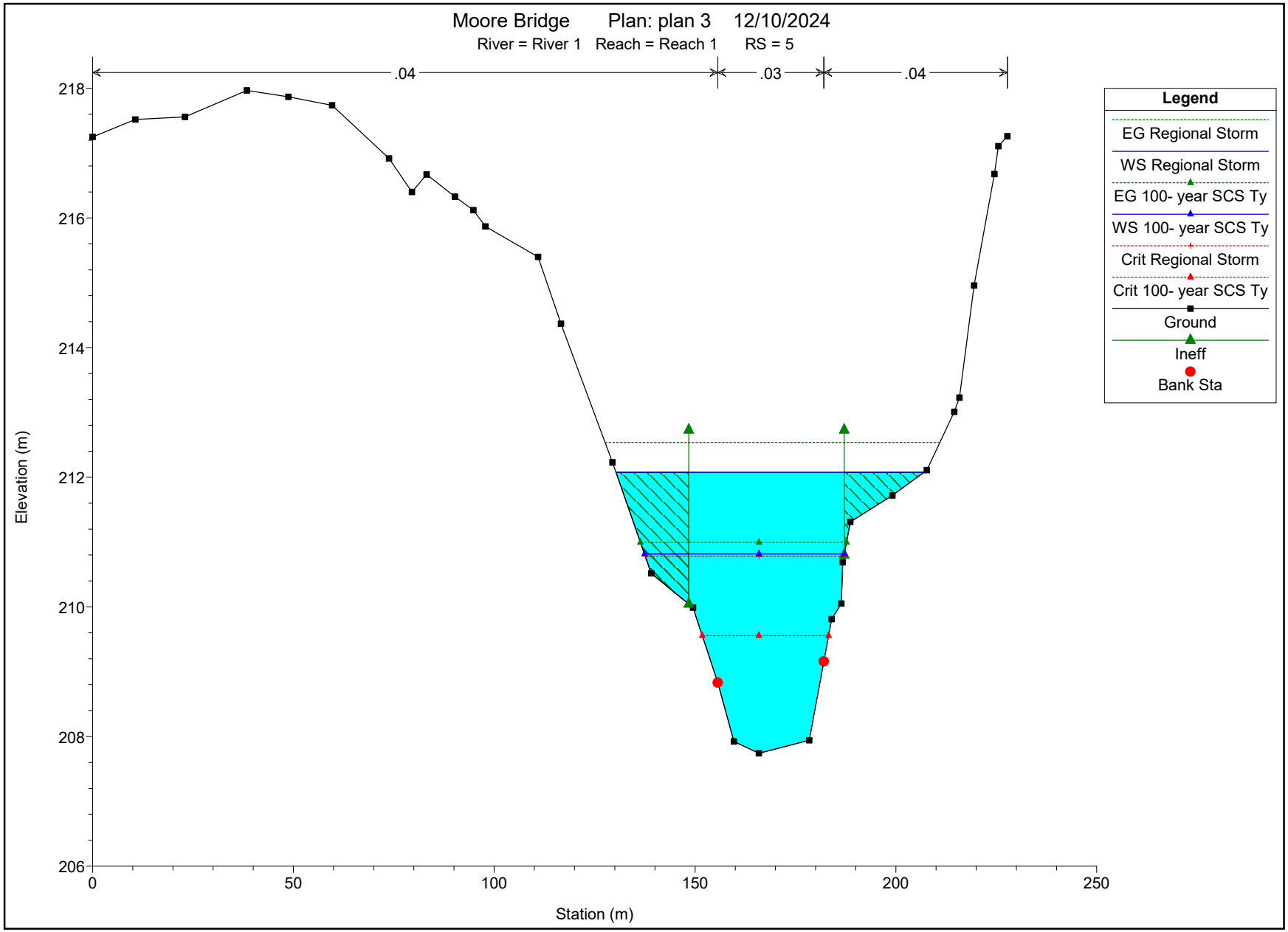

Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 10
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)

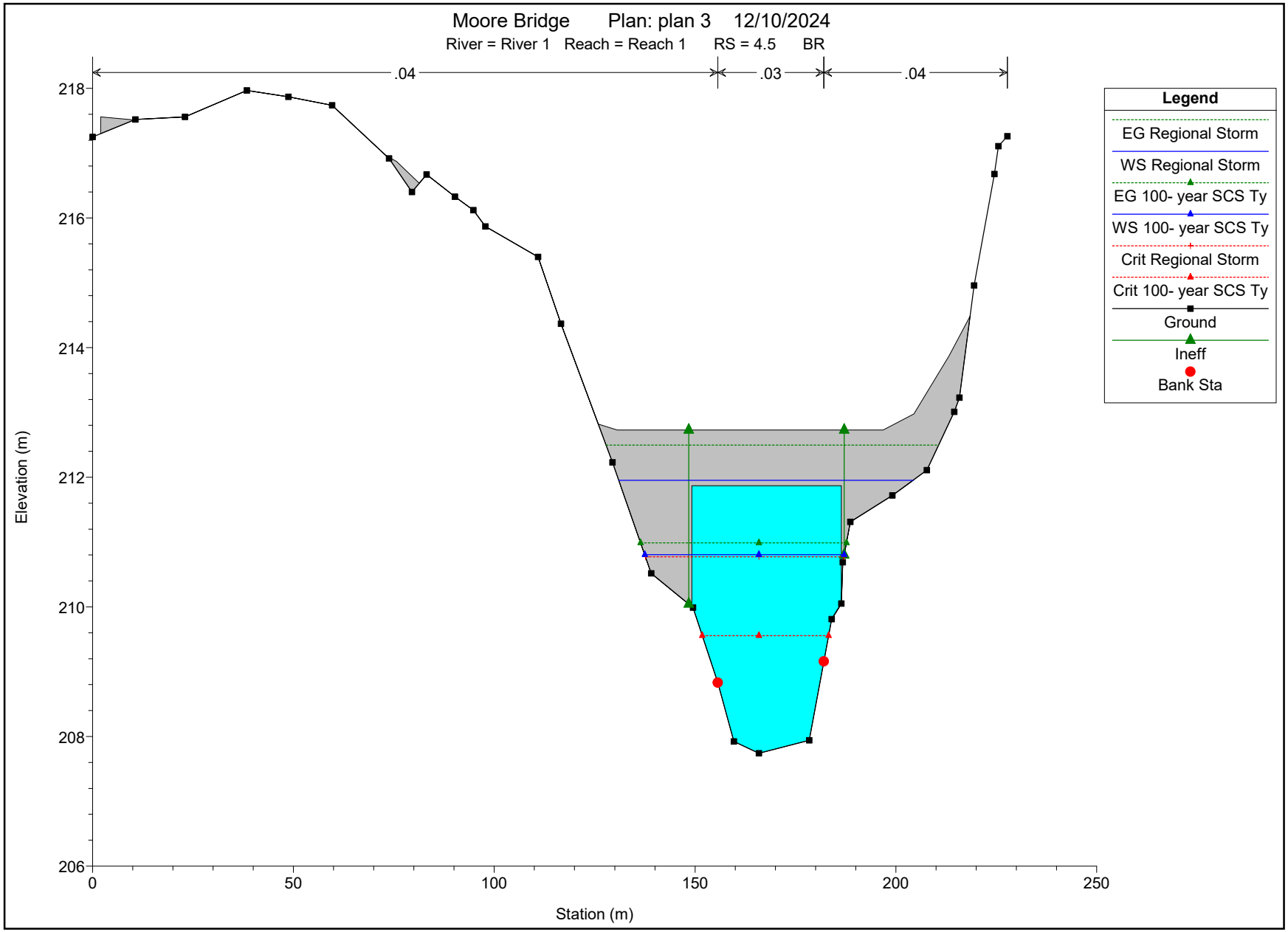

Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 9
.04
.03
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Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
218
216
214
212
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208
206
0
50
100
150
200
250
Station (m)

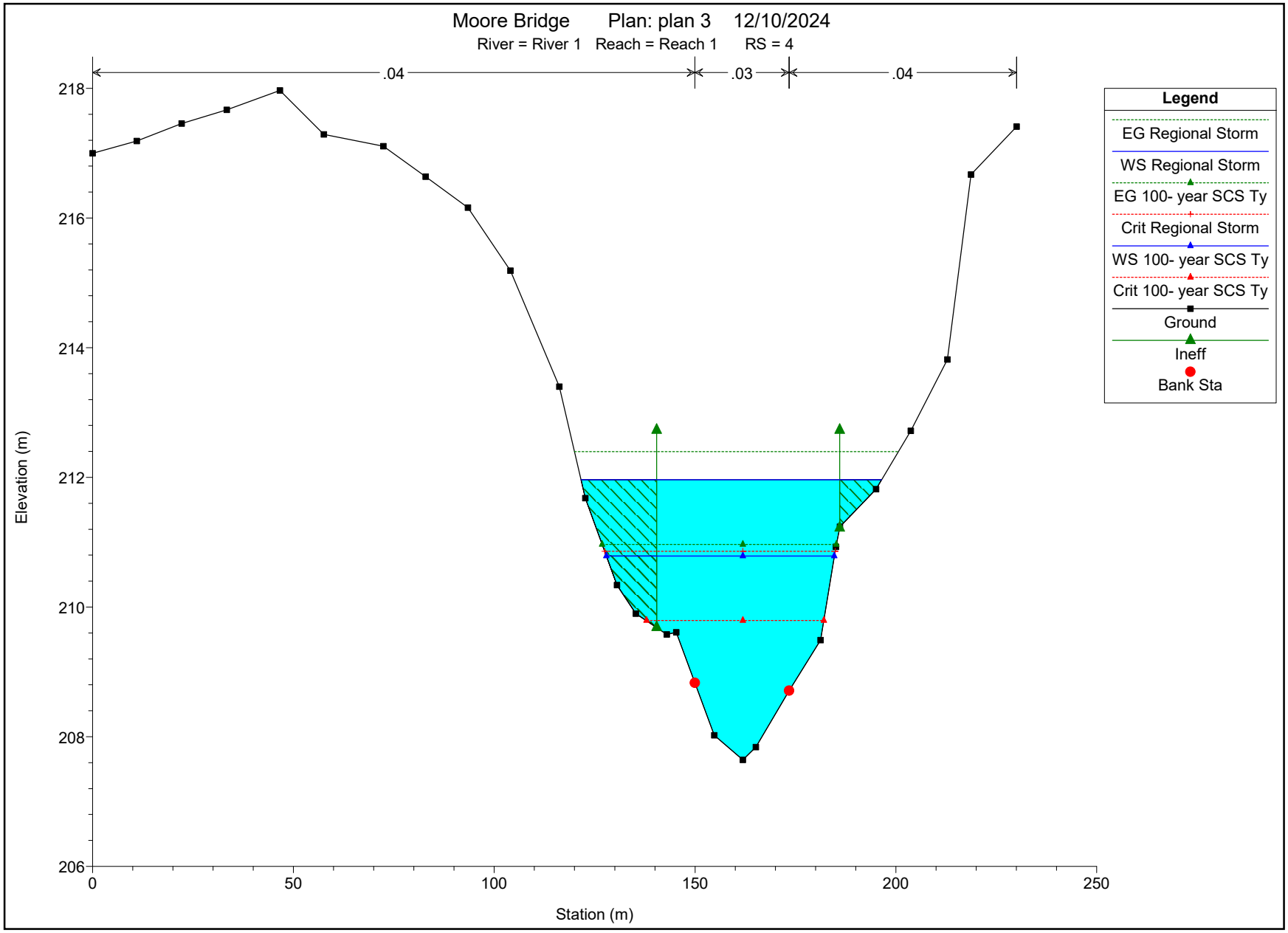

Moore Bridge Plan: plan 3 12/10/2024
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.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
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216
214
212
210
208
206
0
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150
200
250
Station (m)

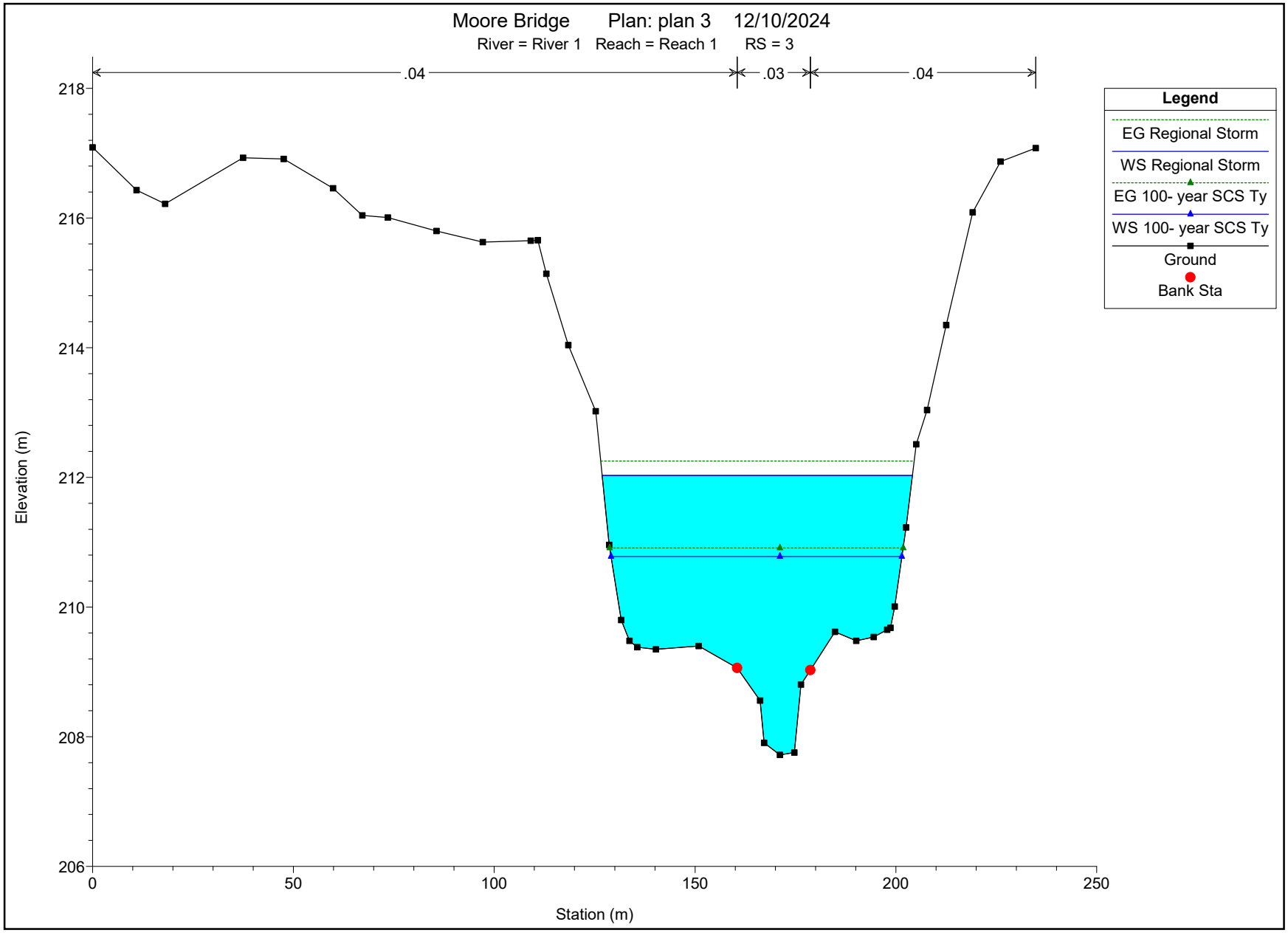

Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 7
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
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250
Station (m)

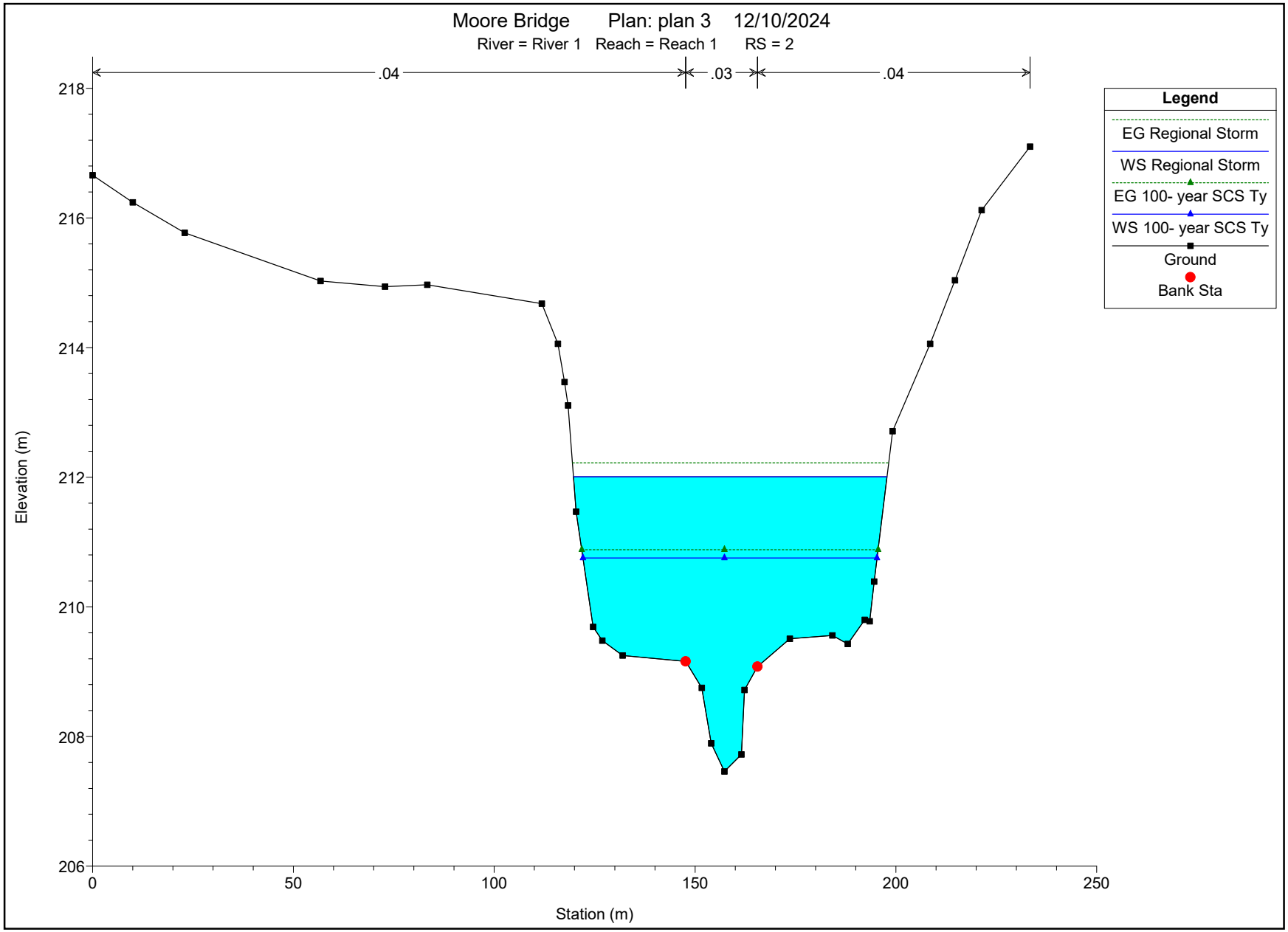

Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 6
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
220
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216
214
212
210
208
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0
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250
Station (m)

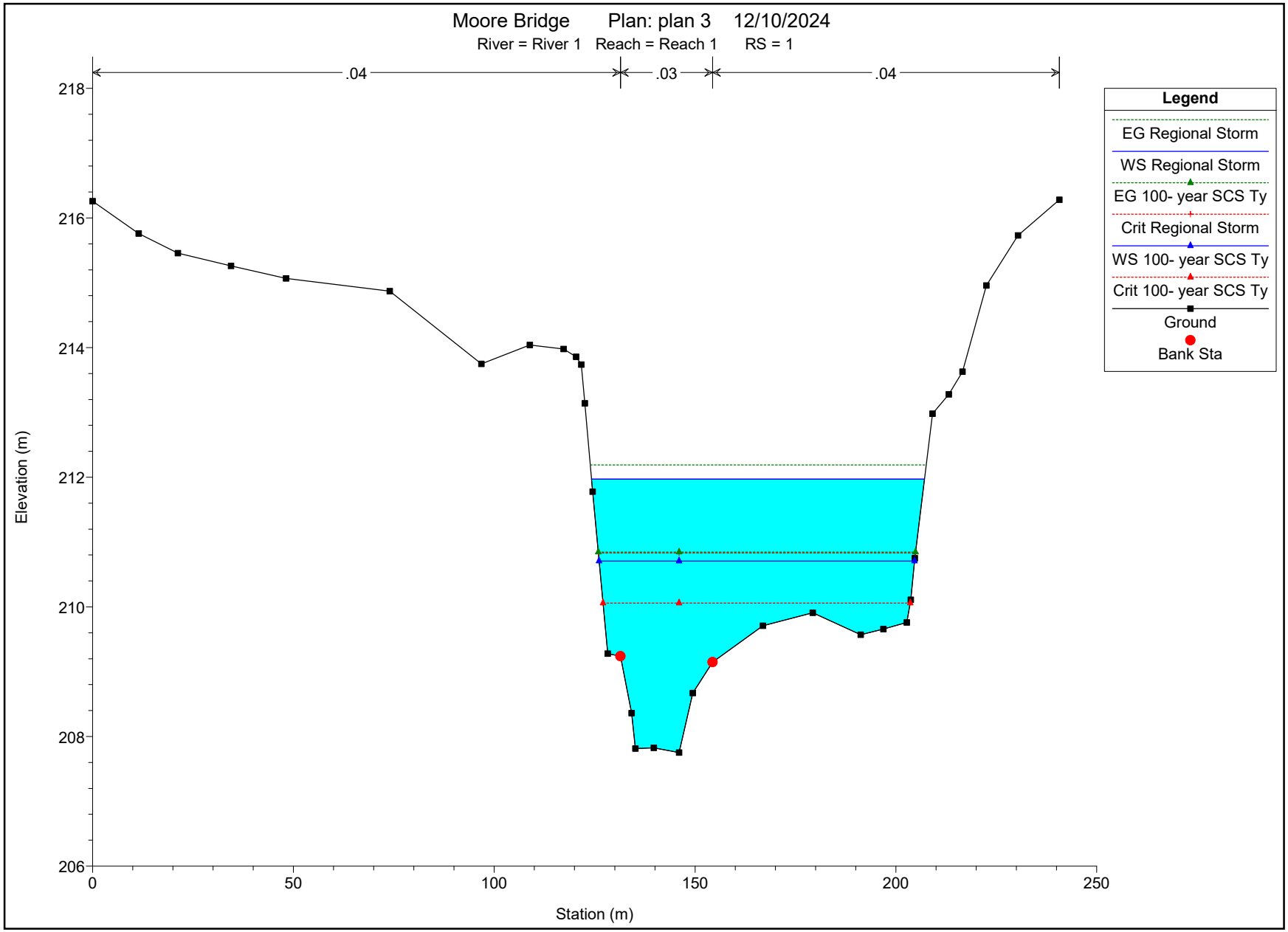

Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 5
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit Regional Storm
Crit 100- year SCS Ty
Ground
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Bank Sta
Elevation (m)
218
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214
212
210
208
206
0
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250
Station (m)


Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 4.5 BR
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Crit Regional Storm
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta
Elevation (m)
218
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214
212
210
208
206
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150
200
250
Station (m)


Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 4
.04
.03
.04
218
216
214
212
210
208
206
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
Crit Regional Storm
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Ineff
Bank Sta


Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 3
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 2
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
WS 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
218
216
214
212
210
208
206
0
50
100
150
200
250
Station (m)


Moore Bridge Plan: plan 3 12/10/2024
River = River 1 Reach = Reach 1 RS = 1
.04
.03
.04
Legend
EG Regional Storm
WS Regional Storm
EG 100- year SCS Ty
Crit Regional Storm
WS 100- year SCS Ty
Crit 100- year SCS Ty
Ground
Bank Sta
Elevation (m)
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Station (m)

Appendix E Public Consultation: Comment-Response Table

DRAFT

SUMMARY OF PUBLIC COMMENTS/FEEDBACK & TOWN/CONSULTANT RESPONSES

Town of Saugeen Shores

Comment #	Public Comments/Feedback	Town/Consultant Response
BRIDGE REMOVAL		
1. 718-1474 Dec 1, 2025	Please remove the bridge to allow better flow for storm events and restoration of the natural floodplain and environment.	Concurrence with bridge removal is noted. Basis for Support: Returning Snake Creek to a natural state.
2. 290-1476 Dec 1, 2025	Nice to do; not a need to do project. It is time for a breather on significant projects. It would be great to see a few years of less than inflation. property tax increases.	Concurrence with bridge removal is noted. Basis for Support: Impact of significant projects on the Town budget and associated impact on property taxes.
3. 79-1479 Dec 1, 2025	Removal of bridge is warranted. Currently there are big dollar grants available through FCM/Tree Canada GCCC programs to municipalities for climate change resilience; the riparian restoration of the creeksides qualifies, including slope stabilization, tree canopy enhancement, aquatic habitat and flood mitigation measures. The municipality should contact FCM for more info.	Concurrence with bridge removal is noted. Basis for Support: Returning Snake Creek to a natural state.
4. 135-1480 Dec 1, 2025	No money should be spent on replacing or maintaining a bridge that has not been used for a great length of time. Remove the structure and return the creek bank back to a natural state.	Concurrence with bridge removal is noted. Basis for Support: Returning Snake Creek to a natural state.
5. 1211-1489 Dec 2, 2025	I agree with the plan to remove the bridge, so Snake River flow is improved and the natural environment enhanced.	Concurrence with bridge removal is noted. Basis for Support: Returning Snake Creek to a natural state.
6. 1226-1494 Dec 12, 2025	Remove it. Not worth wasting the resources	Concurrence with bridge removal is noted.
MAINTAIN A RIVER CROSSING – Non-Vehicular (i.e., walking, cycling, ATVs, snowmobiles, and horse/buggy)		
7. 1203-1482 Dec 1, 2025	This bridge is part of a very popular gravel cycling route within our community. Gravel cycling is a growing tourist industry and one that Saugeen Shores is known for. This bridge keeps cyclists safe as it keeps us off major roads. Saugeen shores is a place for cycling enthusiasts and tourism. This bridge offers wonderful extensions for hiking, biking etc... I would strongly be opposed to having this bridge permanently closed.	Preference for maintaining a river crossing for active transportation is noted. Cycling Route: It is recognized that McKechnie Sideroad, including Moore Bridge, is used by the local cycling community. It helps to reduce bike travel along the busier county roads that intersect The River Road and Concession Road 8E. Specifically, the 3.7 kilometer section of Bruce Road 3 and the 650 meter section of Bruce Road 17.
8. 283-1487 Dec 2, 2025	Would it be feasible to remove the bridge or bypass it with a culvert crossing like they have up in northern Ontario?	Preference for maintaining a river crossing for active transportation, including horses and buggies used by the local Mennonite community, is noted.

Comment #	Public Comments/Feedback	Town/Consultant Response
	You could place restrictions that cars, tractors & trucks not allowed but keep it as a crossing for cyclists, walkers, ATVs, Side by sides & horse & buggies. Alot of these use the crossing on a regular basis except for the horse & buggies of course. We have lived at the McKechnie / The River Road intersection for the past 33 yrs & we miss seeing & conversing with the Amish & Mennonite families & will miss interacting with the other others.	Replacement Alternative - Culvert-Type Crossing: As noted in the Report, the maintenance of a river crossing at this location only considers replacement with a bridge type structure. Culverts, which are defined as structures that form an opening through the soil (i.e. reinforced concrete box culvert or corrugated steel pipe), may be considered for smaller waterways and shorter spans. As an alternative, for wider waterways, several culverts in series may be considered, however the hydraulic capacity would be greatly reduced. Consequently, upstream flooding and/or flooding over the road would be likely during high flows. Also, the natural riverbed would be more significantly affected by any culvert and associated fill. Therefore, for mainly technical (i.e., recommended span length of greater than 30 meters) and environmental reasons, a culvert type structure is not considered a reasonable alternative for the replacement of Moore Bridge.
9. 1209-1488 Dec 2, 2025	This bridge is an excellent connector for bike riding and hiking. Gravel biking is a growing sport and has huge potential in this area as a tourist attraction bringing people and business to the area. More time and effort should be put into our natural resources such as trails instead of destroying all the forest for housing and removing features like this.	Preference for maintaining a river crossing for active transportation is noted. Active Transportation Route: It is recognized that McKechnie Sideroad, including Moore Bridge, is used by cyclists and hikers. Potential Impacts to the Natural Environment: With the implementation of various recommended mitigation measures, it is anticipated that impacts to the natural environment related to bridge removal in the short term will be minimal. In the long term, removal of the bridge will improve the flow of Snake Creek under normal conditions and storm events by removing impediments from the floodplain and will enhance the natural environment as the original river basin will become re-established.
10. 1212-1490 Dec 2, 2025	Hello as an avid cyclist in the area this is an important route in fewer and fewer roads with gravel surfaces that connect routes in the community. Is there an avenue where the road is closed to vehicle traffic where it can be and it only be used for cycling and Hiking? The bridge would not require new approaches in that case possibly reducing the cost of the use of this crossing for cycling and walking.	Preference for maintaining a bridge for active transportation is noted. Repair or replacement with a pedestrian bridge were considered for this project.
Replacement with a Pedestrian Bridge		
11. 1204-1483 Dec 1, 2025	Just reviewed the plan for Moore Bridge. Page 14 gives an option for a pedestrian bridge, which would be very much appreciated! This is a very popular route for cyclists and it gets a lot of use! It would be sad to lose this option. One of the draws for me moving to this community is the great cycling routes and trail systems.	Preference for replacement with a pedestrian bridge is noted. Cycling Route: It is recognized that McKechnie Sideroad, including Moore Bridge, is used by the cycling community.

SUMMARY OF PUBLIC COMMENTS/FEEDBACK & TOWN/CONSULTANT RESPONSES

Town of Saugeen Shores

Comment #	Public Comments/Feedback	Town/Consultant Response
Bridge Repair		
12A. 981-1475 Dec 1, 2025	This bridge is a vital part of Saugeen Shores cycling infrastructure. It connects a very popular gravel road and completes a loop that is very popular to local cycling community. Removing the bridge completely would eliminate one of the already limited options for local cycling, and force travel on busier roadways. Maintaining this as a bike/pedestrian only bridge would be preferred.	Preference for maintaining a river crossing for active transportation is noted. Cycling Route: It is recognized that McKechnie Sideroad, including Moore Bridge, is used by the local cycling community. It helps to reduce bike travel along the busier county roads that intersect The River Road and Concession Road 8E. Specifically, the 3.7 kilometer section of Bruce Road 3 and the 650 meter section of Bruce Road 17.
12B. 981-1477 Dec 1, 2025	The alternatives discussed show that estimate of repair is 700k-1M compared to as estimate of 600-800k for removal. Repair of this bridge instead could restore this bridge to be enjoyed for several generations. Spending the money to remove something makes little sense when the alternative to repair it is in the same range. Keeping this as a pedestrian/cycling crossing is worthwhile given the large costs for removal.	Preference for repairing bridge for use by pedestrians and cyclists is noted. Capital cost only slightly higher than Bridge Removal: Although the capital cost to repair the bridge is slightly higher than removing the structure, the overall cost would be significantly greater in the long term. Once repaired, costs associated with ongoing inspection, maintenance and repairs would continue to be incurred. Further, the bridge rehabilitation alternative would ultimately delay bridge removal and associated costs. Bridge rehabilitation is not recommended due to the current extent of bridge deterioration.
13. 645-1481 Dec 1, 2025	Keep the existing bridge but have barriers which would restrict use to bikes, motorcycles, ATVs and snowmobiles. NO cars or trucks would reduce the need for a higher weight capacity.	Preference for repairing bridge for use by pedestrians, cyclists, motorcycles, ATVs and snowmobiles is noted.
14. 1205-1484 Dec 1, 2025	Could it be made a footbridge? I believe the neighbours at the corner of River Road and 8 and between the bridge and city rd 3 should have greater say than the rest of us. It is they who will be impacted most by any change.	Preference for repairing bridge for use by pedestrians and cyclists is noted. Moore Bridge is beneficial to the local community, particularly as an active transportation route/path.
15A. 1207-1486 Dec 1, 2025	Leave it as a walking bridge for the handful of local residents that currently walk it.	Preference for leaving the bridge as is (i.e., Do Nothing) or repairing the bridge for use by pedestrians, cyclists, ATVs and snowmobiles is noted. It is recognized that Moore Bridge, in its current state, is beneficial to the local community particularly as an active transportation route/path. Do Nothing Alternative: As stated in the report - ultimately, a 'Do Nothing' approach would eventually lead to a catastrophic failure (i.e., collapse) which could lead to injury, damage to the river system, and the requirement for emergency removal of the structure. The 'Do Nothing' alternative is considered inappropriate and, therefore, consideration and a decision for action will be necessary moving forward.
15B. 1207-1485 Dec 1, 2025	The cost of bridge removal is likely more than making the bridge safe for pedestrian/atv/snowbmobile crossing. I grew up on Conc. 8E and enjoyed time spent on the McKechnie Sideroad. Leave the bridge alone - for walking at the very least. A waste of money to remove.	

Comment #	Public Comments/Feedback	Town/Consultant Response
		Capital cost only slightly higher than Bridge Removal: Although the capital cost to repair the bridge is slightly higher than removing the structure, the overall cost would be significantly greater in the long term. Once repaired, costs associated with ongoing inspection, maintenance and repairs would continue to be incurred. Further, the bridge rehabilitation alternative would ultimately delay bridge removal and associated costs. Bridge rehabilitation is not recommended due to the current extent of bridge deterioration.
Do Nothing		
16. 1224-1493 Dec 6, 2025	I have lived close to the bridge for over 50 years, I agree it is unfit for vehicles in the current state However it is used on a fairly frequent basis during summer months by bike riders, hikers and walkers, alone or with their pets and often young people with their parents fishing. It is in a quiet section of the Town and provides some outdoor recreational opportunities. I would suggest the bridge be left in it's current state and not be removed much like Shank's Bridge on County Road 3.	Preference for the Do Nothing alternative to support active transportation is noted. Moore Bridge is beneficial to the local community, particularly as an active transportation route/path. Do Nothing Alternative: As stated in the report - ultimately, a 'Do Nothing' approach would eventually lead to a catastrophic failure (i.e., collapse) which could lead to injury, damage to the river system, and the requirement for emergency removal of the structure. The 'Do Nothing' alternative is considered inappropriate and, therefore, consideration and a decision for action will be necessary moving forward.
REPLACEMENT WITH A VEHICULAR BRIDGE		
17A. 285-1491 Dec 4, 2025	Please replace the bridge. Absolutely do not remove the bridge. There was a lot more use and traffic on that road than what they are saying in the report. Please find the traffic studies from before amalgamation. This road should have been properly maintained all along. Farm equipment used that road as a less dangerous route of travel to get to the different farms, also residents of the River Road used that road regularly, as well as visitors to the road and businesses. Hunters also used that road during hunting seasons every year to access properties along that road. It was a well-travelled road, moreso than the road where the bridge was replaced. Council should be asking why the 18/19 bridge was replaced and not the Maggie Moore Sideroad Bridge first!!!	Preference for replacement with a bridge that can be used by vehicular traffic and agricultural vehicles is noted. Bridge Usage: The report recognizes that prior to the closure of Moore Bridge, the structure was used by local vehicular traffic and agricultural equipment. The Annual Average Daily Traffic (AADT) in 1992 (i.e., before amalgamation) was reported to be 25 vehicles, which is considered to be low. Although the closure of the bridge did not occur until 20 years later, it is not thought that the AADT will have increased significantly. In addition, it is recognized that McKechnie Sideroad was used, and continues to be used, by pedestrians, cyclists and ATVs.
17B. 285-1492 Dec 6, 2025	Please replace the bridge. Absolutely do not remove the bridge. There was a lot more use and traffic on that road than what they are saying in the report. Please find the traffic studies from before amalgamation and find out why they have been lost. This road should have been properly maintained all along. Farm equipment used that road as a less dangerous	

Comment #	Public Comments/Feedback	Town/Consultant Response
	route of travel to get to the different farms, also residents of the River Road used that road regularly, as well as visitors to the road and businesses. Hunters also used that road during hunting seasons every year to access properties along that road. It was a well-travelled road, moreso than the road where the bridge was replaced. Council should be asking why the 18/19 bridge was replaced and not the Maggie Moore sideroad Bridge first!!!	
18. 1227-1495 Dec 14, 2025	Moore Bridge Absolutely replacing this bridge is necessary. It was the most travelled bridge (2 traffic studies done on all 3 bridges at 2 different times of the year) (the 3 temporarily closed bridges- traffic studies done prior to amalgamation) These documents were stored at the new town offices for safe keeping until bridge work could move forward.. And yet, the least travelled bridge (of the 3) was replaced first ? Not using the traffic studies to make these bridge decisions is exactly the kind of behaviours that create this kind of confusion about “need.” Where did the information come from for the report about # of vehicles over the bridge which is in the recent report ? This bridge is over Snake Creek only. It is not the same need for size of a bridge as a the combination of water flow of Snake and Burgoyne Creek combined. I read the entire report written, and the “professional “are confused about “how high” the water level of Snake Creek at this location gets. They somewhat “rule out” the use of engineered culverts based on what appears to be “assumptions” of the extreme flow, (perhaps based on the flow of the water under the bridge on The River Road ?) not based in fact. No people locally affected and waiting patiently for the replacement of the Moore Bridge were consulted when doing this recent study, or even notified that this study was taking place. We all would have been happy to be engaged in the process. In fact it was known by council and staff we wanted engagement. I was told those traffic studies were “lost”. By law, they are to be retained, and all documents related to bridges, must be saved until 8 years after a bridge is completed. They were safely stored at the new Saugeen Shores amalgamated office, and yet cannot be found? What then is the recent study referring to when the study states a #s of vehicles travelled over the Moore Bridge?	Preference for replacement with a bridge that can be used by vehicular traffic and agricultural vehicles is noted. <u>Municipal Infrastructure Projects:</u> Municipal infrastructure projects, such as decisions regarding whether to remove, repair, or replace a bridge, are based a case-specific decision making process and analysis. The decision-making process evaluates various alternatives based on several ‘environmental’ factors. The primary factors influencing the decision to rehabilitate, replace, or remove a bridge generally include, but are not limited to, the bridge condition (i.e., safety), adequacy of road approaches, traffic volumes, impacts to the local and broader communities, short-term and long-term costs, and the natural environment. One of the factors considered in the assessment was traffic (i.e., the volume of traffic). According to the information available, the Annual Average Daily Traffic (AADT) in 1992 (i.e., before amalgamation) was reported to be 25 vehicles, which is considered to be low. Although the closure of the bridge did not occur until 20 years later, it is not thought that the AADT will have increased significantly. In addition, it is recognized that McKechnie Sideroad was used, and continues to be used, by pedestrians, cyclists and ATVs. <u>SVCA Floodplain and Safe Access & Egress Requirements:</u> A review of the SVCA Floodplain and Safe Access & Egress requirements for Moore Bridge was completed and is documented in the report entitled ‘Preliminary Floodplain Assessment and Safe Access & Egress Requirements’ (December 18, 2024). Safe access and egress refers to the accessibility and capability of both vehicles and pedestrians to enter and exit a location during flooding events and during emergency situations. Bridge design must meet the requirements of the SVCA Environmental Planning and Regulations Policies Manual (Amended Oct 16, 2018). <u>Public Consultation:</u> The Town of Saugeen Shores posted a dedicated project website for the Moore Bridge project on December 1, 2025. The website provides a

Comment #	Public Comments/Feedback	Town/Consultant Response
	Bridges are needed to connect community in rural Saugeen Shores for safely travelling roads with farm machinery and passenger vehicles. It is especially a great disadvantage for the farming community to lose the use of these bridges, as the extra distance have increased costs of travel and time, but also the increased travelling dangers of the route required to travel to (owned and rented) land is a important factor. To give you an example of impact, presently, we have a very small portion of The River Road blocked off, for a "very small drainage job" that is being done at one end of The River Road during the day. (No snow plow can travel through while the work is being done during the day, but the employees are doing their best to plow at least before each closure) It is a 27 km round trip to travel from our home farm to one of our farms very near by because of the road closure and length of the drive around. It is wild that that this job is being done in December, but it is to help with one neighbours' dilemma of drainage, that affects their driveway's integrity, so we are very very thankful that it will help them. But calling this small maintenance job "The River Road Draining Project", when the majority of the drainage ditches along The River Road have not been cleaned out (some areas have full grown trees growing in these same ditches) and no other part of The River Road seems to be addressed with this small project seems misleading ? Patiently waiting and trusting The River Road and the drainage along the road will get upgraded is what most of us do. The replacement of the most travelled bridge of the 3 Rural closed bridges (The Moore Bridge) needs to be replaced. There are 17 families living on The River Road depending on travelling The River Road (16 year round-1 seasonal) but many more people travel this road to access travel on the Saugeen River. The River Road needs to be upgraded also, and replacement of the Moore Bridge is a necessary part of our infrastructure in this rural community. With the uncertainty of the County rd 3 end of the River Road (very close to the Saugeen River-below the Dunblaine Presbyterian Church) flooding, it is prudent to have another road off or on to the River Road, especially as road work on The River Road upgrade is long over due, especially to make travel safe at the curves. The number of people our family pulls out with our tractors (during winter) due to the need upgraded curves AND to make improvements of drainage in many sections near these curves. Speed is not often a factor, they often slide off the curves.	general overview of the project and includes a link to the key project documentation. Residents that have subscribed to the 'Engage Saugeen Shores' website will have received notification of the project. The project webpage also provides a link to submit comments regarding the project. Comments and feedback received, along with proponent responses, have been included in the updated report. In an effort to reach the broader public, the project was also posted on other social media platforms that the Town offers (i.e., Facebook, Instagram and linked-in). Links to the project website were also shared on the Town's social media platforms. In addition, notices were hand delivered to the two residences on McKechnie Sideroad, near its intersection with The River Road.

Comment #	Public Comments/Feedback	Town/Consultant Response
	The Moore Bridge replacement would allow traffic to have an alternative route again eight months of the year. It was a well used route while the Moore bridge was open.	
19A. 1206-1496 Dec 14, 2025	The Moore bridge needs to be replaced and the sideroad should be repaired. It is an important connecting link for the rural community; and it keeps tractor's and important farm equipment off of busy roads. It is old infrastructure that needs to be replaced in Saugeen Township. If other rural communities can afford to replace bridges on side roads, Saugeen shores should be able to with the amount of tax money that comes in.	Preference for replacement with a bridge that can be used by vehicular traffic and agricultural vehicles is noted.
OTHER COMMENTS		
19B. 1206-1497 Dec 14, 2025	I think a second opinion and another study is justified from another engineering consultant. Maybe a engineering firm that specializes in bridges and large culvert crossings	Noted
NC-193-1478 Dec 1, 2025	*Blank*	