

Prepared By:



County of Bruce & Town of Saugeen Shores Bruce County Road 33 Re-Alignment Project File (Including Addendum)

Schedule 'B' Municipal Class EA

GMBP File: 217127

April 2018 (Update: November 26, 2019)



TABLE OF CONTENTS

| | |
|--|-----------|
| 1. INTRODUCTION..... | 1 |
| 2. MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS..... | 2 |
| 3. BACKGROUND..... | 4 |
| 4. PROBLEM / OPPORTUNITY – PROJECT STATEMENT..... | 5 |
| 5. ALTERNATIVE SOLUTIONS – SCHEDULE “B” EA..... | 6 |
| 6. INVENTORY OF ENVIRONMENTS..... | 7 |
| 6.1 Social Environment..... | 7 |
| 6.2 Natural Environment..... | 8 |
| 6.3 Cultural Environment..... | 8 |
| 6.3.1 Archaeology..... | 8 |
| 6.4 Technical Environment..... | 8 |
| 6.4.1 Traffic Studies..... | 8 |
| 6.4.2 Road Design Parameters..... | 8 |
| 6.4.3 Geotechnical / Environmental Screening..... | 9 |
| 6.4.4 Surface Water Management Planning..... | 9 |
| 6.4.5 Water and Sanitary Sewer Service Planning..... | 9 |
| 6.5 Economic Environment..... | 10 |
| 7. IMPACT, ASSESSMENT AND EVALUATION OF ALTERNATIVES..... | 10 |
| 8. CONSULTATION..... | 10 |
| 8.1 Master Plan Notifications..... | 10 |
| 8.2 Notice of Project Initiation: Schedule “B” EA..... | 11 |
| 8.3 First Nations Consultation..... | 11 |
| 8.4 Public and Stakeholder Consultation..... | 11 |
| 8.5 Agency Consultation..... | 13 |
| 8.6 Summary of Consultation..... | 14 |
| 9. RECOMMENDED PREFERRED SOLUTION..... | 15 |
| 10. NOTICE OF COMPLETION..... | 15 |
| 11. NEXT STEPS..... | 15 |

FIGURES

- FIGURE 1: STUDY LOCATION MAP**
FIGURE 2: EA PROCESS CHART
FIGURE 3: PREFERRED SET OF ALTERNATIVES
FIGURE 4: BR33 ALIGNMENT OPTIONS
FIGURE 5: INTAKE PROTECTION ZONES

APPENDICES

APPENDIX A: NOTICES

APPENDIX B: BACKGROUND STUDIES

APPENDIX C: CONSULTATION

PROJECT FILE SUPPLEMENT (UPDATE)

Bruce County Road 33 Re-Alignment – Addendum:
Stormwater Management Facility
(Version 2: November 26, 2019)

(STARTS AT PAGE 334 OF PDF DOCUMENT)

SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

BRUCE COUNTY ROAD 33 RE-ALIGNMENT - PROJECT FILE

APRIL, 2018 (UPDATE: NOVEMBER 26, 2019)

GMBP FILE: 217127

1. INTRODUCTION

The County of Bruce (County), as the proponent, is the operating authority for Bruce Roads 25 and 33 (BR25 & BR33) in the central area of the Town of Saugeen Shores (Town). The County has identified that surface asphalt and drainage deficiencies exist with each road and that, prior to undertaking minor repairs and in consideration of future plans, a comprehensive review of road and drainage systems within a broader context and Study Area was in order. The Town, as a principle partner in this undertaking, has identified future developments, which would extend three streets southerly to new intersections with BR25. One of those streets, Bruce Street, is intended as a collector road, which would parallel Goderich Street (Highway 21) from BR25 in the south to Concession Road 10 in the north.

In September, 2015, the County initiated a Master Plan study, under the Municipal Class Environmental Assessment (EA) process, appropriately to plan various road and drainage undertakings within the Study Area in a comprehensive manner. The intention of the Master Plan is to establish an overall context and to assist with the planning of individual projects toward an appropriate overall development strategy within the Study Area. The **Notice of Study Completion for the Master Plan, issued May 9, 2017**, identified the re-alignment of BR33 to intersect with BR25 at the future Bruce Street alignment as a Schedule B project, which may proceed, following an EA process, using the Master Plan as a basis.

The purpose of this Project File is to document a Schedule B EA process to verify the direction envisioned in the Master Plan and to document the *Preferred Solution* for the BR33 re-alignment, as outlined on **Figure 1**.

This Project File is updated from the original Project File, dated November, 2017, to include not only the original description of the project and its purpose, existing conditions, the range of alternative solutions considered, anticipated environmental effects and proposed mitigation, the assessment and evaluation of alternative solutions, but also to include consideration of comments received through the process, and the rationale for the selection of the *Preferred Solution* by County Council.

2. MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS

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. Projects are considered approved subject to compliance with an approved Class EA process. The Municipal Class EA (Municipal Engineers Association October 2000, as amended in 2007, 2011 and 2015) applies to municipal infrastructure projects including roads, water and wastewater.

The Municipal Class EA outlines a comprehensive planning process (illustrated in **Figure 2**) that provides a rational approach to consider the environmental and technical advantages and disadvantages of alternatives and their trade-offs in order to determine a preferred alternative for addressing the problem (or opportunity), as well as consultation with agencies, directly affected stakeholders and the public throughout the process. The key principles of successful environmental assessment planning include:

- Consultation;
- Consideration of a reasonable range of alternatives;
- Consideration of effects on natural, social, cultural, and economic environments and technical components;
- Systematic evaluation;
- Clear documentation; and
- Traceable decision making.

The classification of projects and activities under the Municipal Class EA is as follows:

Schedule A: Includes normal or emergency operational and maintenance activities, which are limited in scale and have minimal adverse environmental effects. These undertakings are pre-approved and the proponent can proceed without further assessment and approval.

Schedule A+: Introduced in 2007, these minor projects are pre-approved. The public is to be advised prior to the implementation of the project.

Schedule B: Includes projects which have the potential for adverse environmental effects. This includes improvements and minor expansions of existing facilities. These projects are approved subject to a screening process which includes consulting with stakeholders who may be directly affected and relevant review agencies.

Schedule C: Includes the construction of new facilities and major expansions to existing facilities. These undertakings have the potential for significant environmental effects and must proceed under the planning and documentation procedures outlined in the Municipal Class EA document.

The Schedule ‘B’ process, is in accordance with the requirements of the Municipal Class EA process and includes Phases 1 and 2, depicted on **Figure 2**:

- Phase 1 consists of identifying the problem or opportunity, and optional (discretionary) public consultation if deemed suitable.
- Phase 2 involves identifying reasonable alternatives to the problem or opportunity, compiling an inventory of the natural, social and economic environment, evaluating each alternative and recommending a preferred alternative that will address the problem, and provide any measures necessary to mitigate potential environmental impacts. Public and agency consultation is required at this stage before the preferred solution is selected to ensure all possible impacts are identified, and assessed, as part of the evaluation process.

For Schedule B projects, the preferred solution is selected and confirmed by Council, the entire process is documented in a Project File report that is made available for public review during a 30-calendar day period. A Notice of Completion is submitted to review agencies and the public at this time.

For Schedule B projects, if concerns are raised during the 30 calendar-day review period that cannot be resolved through discussions with the Municipality, then members of the public, interested groups or technical agencies may request the Minister of the Environment and Climate Change to issue a Part II Order for the project, thereby requiring an elevated scope of study. A Part II Order request requires submission of a written request to the Minister of the Environment and Climate Change, prior to the end of the 30-calendar day review period, outlining the unresolved issue and requesting the Minister to review the matter.

Part II Order requests are submitted to:

Minister
Ministry of the Environment and Climate Change
77 Wellesley St. W., Floor 11
Toronto, ON M7A 2T5
Fax: 416-314-8452
Email: minister.moecc@ontario.ca

Copies of the request must also be sent to the Director of the Environmental Approvals Branch at the MOECC and the County of Bruce at the addresses below:

Director, Environmental Approvals Branch
Ministry of the Environment and Climate Change
135 St. Clair Avenue W, 1st Floor
Toronto, ON M4V 1L5
EAASIBgen@ontario.ca

County of Bruce
Attn: Kerri Meier – Env. Coordinator
PO Box 398, 30 Park Street,
Walkerton, ON N0G 2G0
kmeier@brucecounty.on.ca

The decision whether or not a Part II Order is appropriate or necessary rests with the Minister of the Environment and Climate Change. If no Part II Order request is outstanding by the end of the 30-calendar day review period, the project is considered to have met the requirements of the Class EA, and the Municipality may proceed to design and construct the project subject to resolving any commitments documented in this Project File during the subsequent design phases and obtaining any other outstanding environmental approvals.

For further information regarding Part II Order requests and process, please refer to:

<https://www.ontario.ca/environment-and-energy/class-environmental-assessments-part-ii-order>

3. BACKGROUND

BR25 is a two lane rural road section, which extends from a signalized intersection at Goderich Street westerly to Lake Huron. The existing BR33 (Lake Range Road) is also a two lane rural road section, which extends from a stop-controlled “tee” intersection with BR25, southerly beyond the limits of the Study Area. BR33 was previously up-loaded from the Town to the County and is used by many residents of the Town to access the neighbouring Bruce Power site. Currently, the road surfaces are in a deteriorated condition, with maintenance scheduled within the County’s 5-year plan. The “tee” intersection of Lake Range Road with BR25 is located near the top of a bluff, and sight lines do not meet current design criteria for a secondary highway, although the intersection is adequate for local road service.

The County considers that current traffic volumes would justify neither a need for additional lanes nor an urbanized cross section on either of BR25 or BR33. However, the Town’s Local Official Plan identifies future residential lands uses in the area, which would extend Stickel Street, Bruce Street, and Ridge Street southerly to intersect with BR25. The Town’s Local Official Plan further considers the future extension of Bruce Street northerly through the former Town of Port Elgin (from BR25 northerly to Concession Road 10), as a secondary major traffic route parallel to Goderich Street (Highway 21 Connecting Link). Consequently, there could be a change in traffic flow patterns and a significant impact on the traffic volume on BR25, between BR33 and Goderich Street, which may require additional lanes and/or traffic signals. Further, the Town is planning to extend water and sanitary sewer services, and to create an urban cross section along BR25. The ultimate cross section needs to be planned appropriately, in consideration of potential future lane requirements and a multi-purpose recreational path planned by the Town along the BR25 corridor.

The County as proponent, with the Town as a principle partner, completed a Master Plan for Roads and Drainage to establish appropriate direction for this infrastructure within the broader Study Area. The Master Plan process followed Phases 1 and 2 of the project planning process as outlined in the Municipal Class Environmental Assessment Manual, prepared by the Municipal Engineers Association (2015). The Master Plan process included a Phase 1 “Discretionary” public consultation, a Phase 2 “Mandatory” public consultation and a “Mandatory” **Notice of Completion (May 2017)**. Copies of these Notices are provided in **Appendix “A”**. Additional consultation information during the Master Plan process is provided in the Master Plan documentation, available on the County’s and Town’s websites, and at the Town municipal office.

The Master Plan documentation includes much of the supporting information for this BR33 re-alignment Schedule B EA process. A summary of the Preferred Set of Alternative Solutions including a preferred BR33 re-alignment is provided in **Figure 3**. Additional information in support of this Schedule B EA process is provided herein.

A Bruce County Committee Report, dated February 15, 2018, provided in **Appendix “C”**, includes a summary of the Master Plan results and an intended implementation schedule for individual projects identified within the Master Plan. The intended implementation schedule is summarized as follows:

Phase 1 – Schedule A (2019): Bruce Road 25 – Trunk storm sewer from Lake Ridge Estates to Lake Huron, including a full urbanized road section from Shipley Avenue to Saugeen Beach Road.

Phase 2 – Schedule A (2019): Two lane urbanized road section from Shipley Avenue to Bruce Street, including the local storm sewer.

Phase 3 – Schedule B (2020): Four lane urbanized cross section from Bruce Street to Goderich Street, including municipal services.

Phase 4 – Schedule B (2021): Construction of the new Bruce Road 33 realignment and rehabilitation of current Bruce Road 33 (new Lake Range Road).

A “Phase 5” may also be considered separately by the Town to include installation of a storm sewer system within the Baker Subdivision, to coincide with sanitary sewer and pumping station installation, at a yet to be determined date.

4. PROBLEM / OPPORTUNITY – PROJECT STATEMENT

The County has identified a need to advance specific project planning for the re-alignment of BR33, as identified in the Master Plan for Roads and Drainage (2017). The basic intentions of this project are outlined in the Master Plan.

The Schedule B EA planning process is project specific but follows the same process as for the more general Master Plan. Considering the significant degree of overlap between the Master Plan and this specific Schedule B EA, the following Project Statement is adapted from the Master Plan for this project specific Schedule B EA process.

The Project Statement for this Schedule B EA is as follows:

“The proponent intends to plan safe and efficient road infrastructure, and to support the Town’s transportation initiatives with regard to planned development, within the settlement area boundary, by advancing the preferred BR33 re-alignment initiative, as documented in the Master Plan for Roads and Drainage (May 2017).”

The County is, therefore, undertaking this Schedule B EA process under the Municipal Class Environmental Assessment to ensure that this project is planned appropriately, and to verify that the preferred solution identified in the more general Master Plan remains appropriate for this specific BR33 re-alignment initiative.

5. ALTERNATIVE SOLUTIONS – SCHEDULE “B” EA

The Master Plan considered the following alternative solutions for Roads:

- i) Do Nothing / Existing Conditions,
- ii) Intersection and Capacity Improvements on BR25,
- iii) Re-Align BR33 to Intersect BR25 at Future Bruce Street Intersection Location.

The BR33 re-alignment alternative was considered in the Master Plan as having the following environmental impacts:

Social

Usage of the Built Facility

- Maintenance of access to existing residences would remain. Driveway entrances and a connection of Baker Road to the new re-aligned BR33 would need to be resolved in the design phase.
- Land acquisition for additional right-of-way would be necessary for the BR33 re-alignment route.
- The design requirements and route selection for a re-aligned BR33 can accommodate preferences for the road to not cross noted properties.
- The design requirements and route selection for a re-aligned BR33 can avoid the the north westerly corner of an agricultural designation. A future review of the Town's Official Plan can re-consider this designation, as appropriate.
- Active transportation opportunities could be accommodated in this area, including an east/west multi-purpose trail along BR25, and provision for bicycles southerly along BR33.

Governance

- The County could divest the portion of BR25 from the planned BR33 intersection (at Bruce Street) westerly to Saugeen Beach Road to the Town.
- The County could divest the portion of BR33 (Lake Range Road) from BR25 southerly to the planned BR33 re-alignment location (at Baker Road) to the Town.

Cultural

- Once a BR33 route is selected, a Stage 2 archeological investigation for the subject lands should be completed to confirm there would be no effect on the Cultural environment, or if mitigation measures would be necessary.

Natural

- An EIS would be necessary to further inform the EA for the BR33 re-alignment, and to confirm there would be no effect on the natural environment, or if mitigation measures would be necessary.

Technical

- The existing intersection of BR25 and Lake Range Road would remain as a local road standard.
- Future traffic levels would be fully supported by the proposed lanes. A 4-lane urban cross section is considered preferable by both the Town and the County on BR25 between Goderich Street and Bruce Street, narrowing to a 2-lane urban cross section west of Bruce Street.
- Safety and efficiency of movement for the driving and pedestrian public would be accommodated as planned Town roads are extended from the north to BR25.

- Stop-controlled “Tee” intersections would be planned at each of the Stickel Street, Ridge Street and Lake Range Road intersections with BR25.
- A traffic signal is considered appropriate at the planned BR25 / BR33 intersection for pedestrian safety.
- Project constructability would follow conventional road construction processes.
- Generally, the design speed for a re-aligned BR33 would be 10 km/hr greater than the legal posted speed. There are several alignment options for BR33, but the minimum horizontal radius is 420 metres for a 100 km/hr design speed (80 km/hr posted speed), and 190 metres for a 70 km/hr design speed (50 km/hr posted speed); for normal cross fall. A 70 km/hr design speed would produce an alignment, which would avoid properties, the owners of which indicated a preference to not be impacted. Other alignment options are shown in **Figure No. 4**.
- The extension of Baker Road easterly to the re-aligned BR33 should be considered.
- The connection of Lake Range Road to the re-aligned BR33 should be considered.
- Maintenance issues would be typical.
- Planning and design for BR25, between Goderich Street and planned Bruce Street/ re-aligned BR33, would require a Schedule “B” EA. Construction of a new BR33 would require a Schedule “B” EA if less than \$2.4M.

Economic

- This alternative would be the most costly in terms of capital cost, but would mitigate long-term costs associated with traffic inefficiencies, which are difficult to quantify.

Upon evaluation of all Roads alternatives within the Master Plan, Alternative #3 – Re-alignment of BR33 to intersect BR25 at the future Bruce Street intersection location is the Preferred Roads Solution to the Master Plan. The Master Plan notes that additional background studies would be necessary fully to assess potential impacts on the Cultural and Natural environments. A summary of these additional studies is provided in **Section 6**.

The Master Plan also noted that a further Schedule B Environmental Assessment process would be necessary, appropriately to plan the BR33 project. Additional public and agency consultation is part of that process, which is documented in **Section 8**.

6. INVENTORY OF ENVIRONMENTS

6.1 Social Environment

The predominant Social issue related to the proposed BR33 re-alignment is impact to property. The County continues discussions with the directly affected land owners. At a Stakeholder’s meeting on October 25, 2017, all parties generally agreed with the project direction and approach to land purchase for the new right-of-way. An independent assessor will be retained by the County to establish fair market value for the proposed road allowance lands, for consideration by the land owners.

6.2 Natural Environment

A Species at Risk (SAR) study was completed by AWS Environmental Consulting Inc. (July 2017) to establish presence or absence of SAR within the proposed road allowance. The report concludes that, since the lands are currently cultivated, the potential for SAR species is low. Should the land use change from active cultivation to fallow prior to road construction, then an updated SAR review may be necessary to support the construction phase. The County is considering arrangements with land owners to continue to cultivate the road allowance lands until the road is built. A copy of the Species at Risk report is provided in **Appendix "B"**.

Recent amendments to the MEA Class EA require proponents to consider whether or not the project is located within a Source Water Protection Vulnerable Area and, if so, to document whether or not any project activities are a prescribed drinking water threat. The Source Water Protection Area for the Saugeen Shores drinking water system is provided in **Figure 5**. The area is around the water intake for the Southampton Water Treatment Plant. The Study Area is beyond the vulnerable area mapping.

The natural environment also includes potential impacts of the project on Climate Change, and of Climate Change on the project. The project intends to reduce travel time and improve traffic safety, which would result in reduced greenhouse gas emissions relative to a "Do Nothing" alternative. The proposed BR33 re-alignment is across lands, which currently are cropped. In consideration of public comments received, the proponent has committed to a landscaping plan that will introduce trees along the new alignment to provide shade and snow screening.

6.3 Cultural Environment

6.3.1 Archaeology

A Stage 1 & 2 Archeological Assessment was completed by Scarlett Janusas Archaeology Inc. (June 2017). A copy of that report is provided in **Appendix "B"**. The report generally concludes that no additional assessment is required for the subject lands. The archaeological assessment was conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism, Culture and Sport (MTCS), 2011). In a letter dated June 30, 2017, MTCS confirmed the entry of the Stage 1 Assessment Report into the Ontario Public Register of Archaeological Reports (Master Plan **Appendix "B"**).

The need for a Cultural Heritage assessment was screened out using the MTCS screening tool, as provided in **Appendix "B"**.

6.4 Technical Environment

6.4.1 Traffic Studies

Traffic studies are referenced in the Master Plan for Roads and Drainage.

6.4.2 Road Design Parameters

The following are the basic road design parameters:

- i) Minimum Travelled Lane Width = 3.5m
- ii) Minimum Shoulder Width = 1.0m
- iii) Minimum Available Horizontal Curve Radius = 310.0m
- iv) Right-of-way Width: 30 metres

Detailed road design would be prepared during the design phase of the project, using MTO and/or TAC design parameters.

6.4.3 Geotechnical / Environmental Screening

Field work for the geotechnical investigation was completed during the week of November 20th, 2017, following crop removal. Borehole data was referenced to confirm sub-surface soil and groundwater conditions. No geotechnical or environmental issues were identified that would affect the proposed construction. The geotechnical report is provided in **Appendix "B"**.

6.4.4 Surface Water Management Planning

The intended BR33 re-alignment will introduce a new impervious surface to a currently pervious area, which will increase the rate of runoff from that surface. Further, runoff from road surfaces may contain contaminants, which could adversely affect the natural environment. A preliminary stormwater management report was prepared, which describes generally how stormwater quantity and quality will be addressed with the construction of BR33. The proposed BR33 alignment would cross a drainage divide, which separates drainage northerly to BR25 and drainage southerly to Baker Road. The basis for drainage planning is to maintain surface drainage within the originating catchment area, as resolved through the Master Plan process.

Drainage northerly is proposed to be collected in the planned BR25 storm sewer system, which is intended to be constructed as Phase 1 of the Master Plan implementation schedule. The design of the BR25 storm sewer includes provisions for runoff quantity and quality from the northerly catchment area along re-aligned BR33. The BR25 storm sewer project is being advanced under a Schedule A EA process (pre-approved under the EAA). The project is currently in the design phase. The preliminary design has been reviewed by the County, Town, SVCA and MOECC. Detailed design is advancing with construction currently planned to begin in Spring 2019. Any design details which evolve from the Phase 1 design of BR25 would, therefore, be incorporated into the Phase 4 detailed design of BR33, prior to its construction, such that no additional changes would be required to BR25.

Drainage southerly along re-aligned BR33 is intended to be directed to a new SWM pond about the intersection of re-aligned BR33 and Baker Road. At this planning stage, the conceptual design considers a volume of storage required and land area requirements sufficiently to accommodate the SWM facility. Detailed design of the SWM facility would advance as the BR33 re-alignment project moves to construction as Phase 4 in the Master Plan implementation schedule. Since right-of-way lands would be acquired for the BR33 re-alignment under this Schedule B EA process, implementation of the proposed SWM Pond would proceed as a Schedule A EA activity as long as no additional property is required.

The preliminary stormwater management report is provided in **Appendix "B"**.

6.4.5 Water and Sanitary Sewer Service Planning

The Town is considering pre-servicing with watermain and sanitary sewer along the new BR33 re-alignment to support Planned Development lands along the route. Since BR33 may be constructed in advance of land development activities, the Town is considering front-ending, and later recovering those servicing costs from the developers, when the lands are developed.

The watermain could complete a loop connection from the BR25 / BR33 intersection to the BR33 / Lake Range Road intersection; tying into the existing watermain on Lake Range Road at Baker Road. Based on the Master Servicing plan, a 250 mm diameter watermain is planned.

Sanitary sewers could service two separate catchments.

- One sewer would achieve gravity drainage from about Sta. 0+260 northerly along BR33 to a planned gravity sewer on BR25, then westerly on BR25 to a planned northerly connection along Ridge Street to existing. This sewer would provide service to lands within the easterly portion of Lot 29, south of BR25.

- South and west of Sta. 0+260, the land is too low to achieve gravity drainage northerly and, therefore, a second planned sanitary sewer would drain southwesterly along re-aligned BR33 to Lake Range Road; ultimately to drain to a pumping station below the bluff. Based on the Master Servicing Plan, 200mmØ to 250 mmØ sewers are planned. Actual sewer sizing will be resolved during the detailed design phase for BR33.

6.5 Economic Environment

The Master Plan identified the re-alignment of BR33 as the most costly road alternative in terms of capital cost, but would mitigate long-term costs associated with traffic inefficiencies, which are difficult to quantify. The County and Town have considered cost sharing and budgets to address the project costs.

A preliminary project construction cost is provided in **Appendix "B"**. Meeting Minutes, dated August 11, 2017 outline intended project cost sharing between the County and the Town for various projects outlined in the Master Plan, including for the planned BR33 re-alignment.

Additional project costs for land acquisition, Ontario Land Survey, easement registration, utility relocation, HST and other professional fees are not included in the estimated construction cost.

7. IMPACT, ASSESSMENT AND EVALUATION OF ALTERNATIVES

The Master Plan process identified and evaluated alternative solutions, with the re-alignment of BR33 confirmed as the Preferred Solution. Additional background studies were completed to address project specific requirements in support of this Schedule B EA process. None of the additional background studies identifies potential impacts that would alter the assessment or evaluation of the re-alignment alternative.

8. CONSULTATION

Consultation early in and throughout the process is a key feature of environmental assessment planning. The Schedule B Municipal Class EA process has two mandatory points of contact; the Notice of Project Initiation (Consultation – Phase 2) and the Notice of Completion.

8.1 Master Plan Notifications

The Master Plan process included a Notice of Project Initiation, dated September 22, 2015, followed by a Discretionary Public Information Centre, held on October 7, 2015. A Phase 2 Public Information Centre was advertised on May 2, 2016, and was held on May 18, 2016. A Notice of Completion for the Master Plan process was issued May 9, 2017.

8.2 Notice of Project Initiation: Schedule “B” EA

A Notice of Project Initiation was prepared and first issued on January 9, 2018. The Notice was advertised in the Shoreline Beacon Newspaper on January 9, 2018 and January 16, 2018.

The Notice was also mailed to directly affected property owners within the Study Area, as well as to individuals engaged in previous project planning, on January 9, 2018. A copy of the Notice and a Figure outlining the Notification Area is provided in **Appendix “A”**.

The Notice of Project Initiation invites the Public, Agency groups and First Nation groups to review the Project File and to comment on the Recommended Solution.

Upon receipt of comments, any new information is incorporated into the review and assessment of alternatives. The Project File is updated and a Preferred Solution is presented for consideration and acceptance by Council.

The Notice of Completion is issued following acceptance by Council. The Notice of Completion initiates a 30-day review period, during which time the Minister may be requested to issue a Part II Order to the municipality to complete further study, as outlined in **Section 2**.

8.3 First Nations Consultation

First Nations groups were contacted during the Master Plan process and during this Schedule B EA process. Documentation of the correspondence provided is included in **Appendix “C”**. No response was received from any of the First Nation groups circulated with the initial Project File.

8.4 Public and Stakeholder Consultation

Public Feedback Received Prior to Commencement of the Class EA

Public feedback received prior to commencement of the Class EA process is documented in the Master Plan Report.

Public Feedback Received During this Process

With the circulation of the previous version of this Schedule B EA Project File, the public was invited to provide comments regarding the Recommended Solution for Bruce Road 33. Comments received from the public are documented in **Appendix “C”**, and are summarized below in **Table 2**. Upon receipt and review of all comments, the review of alternatives is re-visited and any new information is incorporated into the assessment of the *Recommended Preferred Solution*, for consideration and acceptance by County Council.

TABLE 2 – Summary of Public Comments Received

| | Comment / Issue | Response / Discussion | Action / Commitment |
|---|--|--|--|
| 1 | Consider the need for Baker Road to connect with the re-aligned BR33 | This connection is included in the Town's Local Official Plan. | A tee intersection is intended to be included in the design of the BR33 project, with stop-control. |
| 2 | Consider a roundabout (traffic circle) at the intersection of BR25 and re-aligned BR33 | The Master Plan considered an ultimate 4-way intersection with traffic signal control as "preferred" due to an expected high volume of both vehicular and pedestrian traffic, specifically across the north leg (Bruce Street) of that intersection. It is anticipated that the extension of Bruce Street southerly to BR25 may not occur within the foreseeable future. Therefore, the Project Team recommends that this issue be re-visited at the time the 4-way intersection is to be completed. A south bound stop-controlled tee intersection would be appropriate until that time. | Re-consider the ultimate 4-way intersection at BR25 and Bruce Street/BR33, when Bruce Street is constructed. A north bound stop-controlled tee intersection would be appropriate, on BR33 until Bruce Street is constructed. |
| 3 | Governance (Who will own the roads) | The Project File indicates that BR25 west of Bruce Street to Saugeen Beach Road, and BR33 south of BR25 to Baker Road would be divested from the County to the Town. | Project implementation |
| 4 | Consider landscaping along re-aligned BR33, including for winter safety | The County is planning to permit landowners to continue to crop through the road allowance, once established, until the road is built. Timing for tree planting will need to be resolved with the landowners but the importance of starting early to promote tree growth as a snow screen is acknowledged. | A landscape plan will be prepared in the project design phase. |
| 5 | Consider drainage and stormwater management | The direction for area drainage was resolved through the Master Plan process. Details of the drainage and stormwater management design will be resolved with the regulatory agencies through the design process. The direction of the Master Plan is to maintain flows within the originating catchment areas. | Generally, follow Master Plan and implementation Phasing. Specifically, develop details during the design phase. |
| 6 | Consider future land use planning on remnant parcels | The Town has had a long range focus that Bruce Street might be extended through the property north of BR25 and would offer a 'collector' road parallel to Highway 21. Remnant parcels might be developed in a variety of manners some of which might require planning applications to change OP's and zoning. Lots 28 and 29 are owned by the same individual. There may be an opportunity to look in the future if there is potential for an urban area expansion. The development community may have innovative ideas for land use on their lands. | Land use will be reviewed under individual Planning Act applications. |

| | Comment / Issue | Response / Discussion | Action / Commitment |
|----|--|---|---|
| | | <p>The road geometry is based on a design speed approaching 90 kph in order to thread the needle of constraints. At this time we expect the posted speed to be 60 kph. This may allow flexibility concerning the location of side roads.</p> <p>For lands north of BR25, the local official plan and current draft approved plans clearly imply the collector nature of Bruce Street.</p> | |
| 7 | Consider alternate intersection location at Ridge Street at BR25 | The Bruce Street intersection location is identified in the Town's Official Plan. Bruce Street is the intended collector road through Port Elgin and traffic planning is in keeping with development plans currently underway for lands north of BR25. | Follow direction of Master Plan |
| 8 | Reconsider Speed Limit on re-aligned BR33 | The planned BR33 alignment would accommodate a "design speed" of 90 km/hr. The County plans to provide a "posted speed" of 60 km/hr | Provide a "posted speed" of 60 km/hr. |
| 9 | Driveway re-alignments | The County will be contacting affected landowners as the design process evolves. | County to discuss with landowners. |
| 10 | Provision of bike lanes on BR33 | The County intends to provide a widened paved surface (2 x 4m lanes) on BR33, to accommodate cyclists. A formal bike lane is not intended. | Provide sufficient paved lane width to accommodate cyclists. |
| 11 | Provision of Municipal Services | Water and sanitary sewer services are identified in the Towns Master Plan for these services. The Town intends to install these services with the construction of BR33 to service Planned Development lands. | Water and sewer servicing design will be included in the BR33 project design phase. |

Stakeholder Feedback Received During this Process

A Stakeholder meeting was held on October 25, 2017. The purpose of the Stakeholder meeting was to update Stakeholders regarding project planning, land purchase considerations, and to provide opportunity to raise any questions regarding the project direction and the process moving forward.

8.5 Agency Consultation

Agencies with a regulatory role that may require future permits/approvals, or may have a direct interest in the study, were contacted during the process to invite feedback. The previous version of this Schedule B EA Project File was circulated to selected key agencies/groups on January 9th, 2018 to solicit agency comments and feedback, to be incorporated into the assessment of the *Recommended Preferred Solution* for consideration and acceptance by County Council.

A complete List of Agencies contacted is provided in **Appendix "C"**, but they include the following:

- Saugeen Valley Conservation Authority (SVCA)
- Ministry of the Environment and Climate Change
- Utilities

Comments received from the agency groups are provided in **Appendix “C”** and are summarized below in **Table 3**.

TABLE 3 – Summary of Agency Comments Received

| Agency | Comment | Discussion |
|-----------|---|---|
| SVCA | <ul style="list-style-type: none"> Review larger runoff events BR25 drainage interaction Water quality provisions Design details | <ul style="list-style-type: none"> The Project Team met with SVCA staff to discuss preliminary comments received, the Master Plan and the intended implementation Phasing. The SVCA was generally satisfied with the direction for BR25 and with the planning level of effort for BR33. Additional surface water management details will be developed through a subsequent design phase for the BR33 project. A permit application will be prepared as necessary at the design phase. |
| MOECC | <ul style="list-style-type: none"> Noted: "...the failure to comply with the Environmental Assessment Act, the provisions of the Class EA, and failure to implement the Project in the manner described in the planning documents, are contraventions of the act..." Noted: MOECC "... don't have any surface water concerns about the conceptual design of the stormwater outlet structure at the beach – a headwall/plunge pool feature." | <ul style="list-style-type: none"> The County intends to implement the direction of the Master Plan in Phases. The BR25 storm sewer is intended to be constructed as Phase 1 of the Master Plan implementation plan, and will receive runoff from the northerly end of re-aligned BR33, when it is built as Phase 4. |
| Utilities | <ul style="list-style-type: none"> No comments further to the Master Plan were received. | <ul style="list-style-type: none"> Utilities will be contacted at the design stage. |

8.6 Summary of Consultation

This Schedule B EA process intends to address the problem statement, which relates to the potential re-alignment of BR33 as envisioned and documented in the Master Plan. The process included the completion of additional background studies to better inform the process, the preparation of a Project File to document the process, and the issuing of a Notice of Project Initiation to invite comments from the public, with regard to the subject project statement.

Several comments were received through this BR33 Re-Alignment - Schedule B EA process, which relate to a drainage solution along BR25. The BR25 drainage solution is considered a separate project since it intends to address a separate problem and project statement. Comments received during this BR33 process, which relate to the BR25 project, are documented under separate cover.

Based on the comments received, and discussions provided in Tables 1, 2, and 3 above, no new information was received through the process that would suggest a change to the direction of the Master Plan.

9. RECOMMENDED PREFERRED SOLUTION

Based on the identified Project Statement, the process completed for the Master Plan for Roads and Drainage, and this Schedule B EA process, the Recommended Preferred Solution is Alternative #3; to Re-Align BR33 to Intersect BR25 at Future Bruce Street Intersection Location.

Remaining issues identified through the Schedule B EA process, which are to be addressed during the design process include the following:

- i) Provide a stop-controlled tee intersection on Baker Road at BR33
- ii) Re-consider the ultimate 4-way arrangement of the BR25 and BR33/Bruce Street intersection when Bruce Street is constructed. Including roundabout analysis.
- iii) Provide a landscaping plan at the design phase
- iv) Provide SWM details at the design phase, generally to follow the Master Plan.
- v) Provide a "posted speed" of 60 km/hr.
- vi) County to discuss driveway re-alignments with affected landowners.
- vii) Provide sufficient paved lane width to accommodate cyclists.
- viii) Incorporate municipal water and sanitary sewer services into the project design.

A Transportation and Environmental Services Committee Report, dated April 19, 2018 recommended that the Preferred Solution be approved, which was carried by the Committee (**Appendix 'C'**).

10. NOTICE OF COMPLETION

The Notice of Completion is dated May 1, 2018. It was advertised in issues of the Shoreline Beacon newspaper and sent to members of the public, First Nations groups, and Agencies.

11. NEXT STEPS

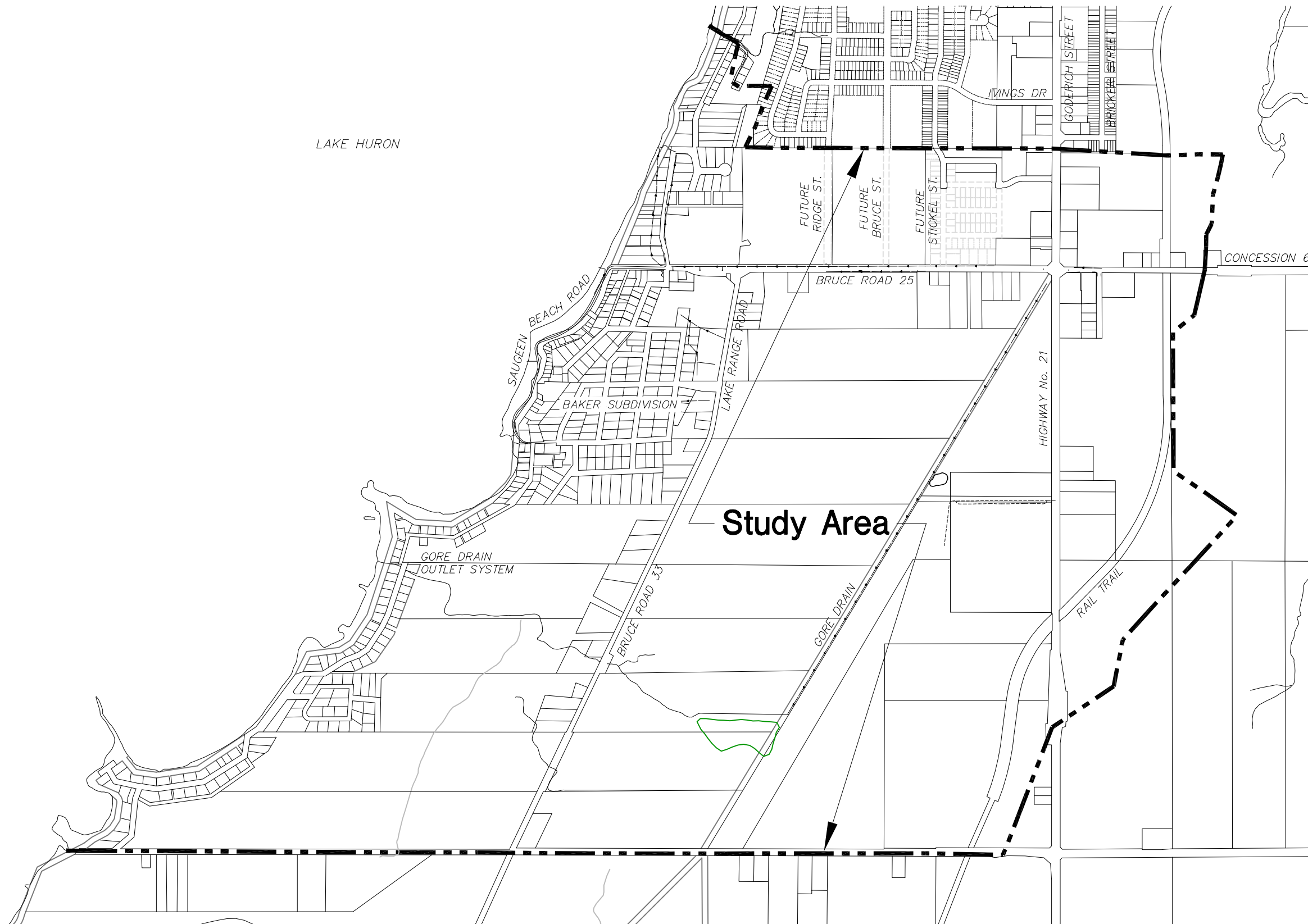
The next steps in this process are summarized as follows:

- i) Address 30-day public review period.
- ii) If a Part II Order request is not made during the 30-day public review period, the *Preferred Solution* to the Schedule B EA processes may proceed to design and construction.

All of which is respectfully submitted,
GM BLUEPLAN ENGINEERING LIMITED

FIGURES:

M-1552
Master Plan
Town of Saugeen Shores



NOT TO SCALE
JULY 2016

STUDY AREA

Figure No. 1

EXHIBIT A.2

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA

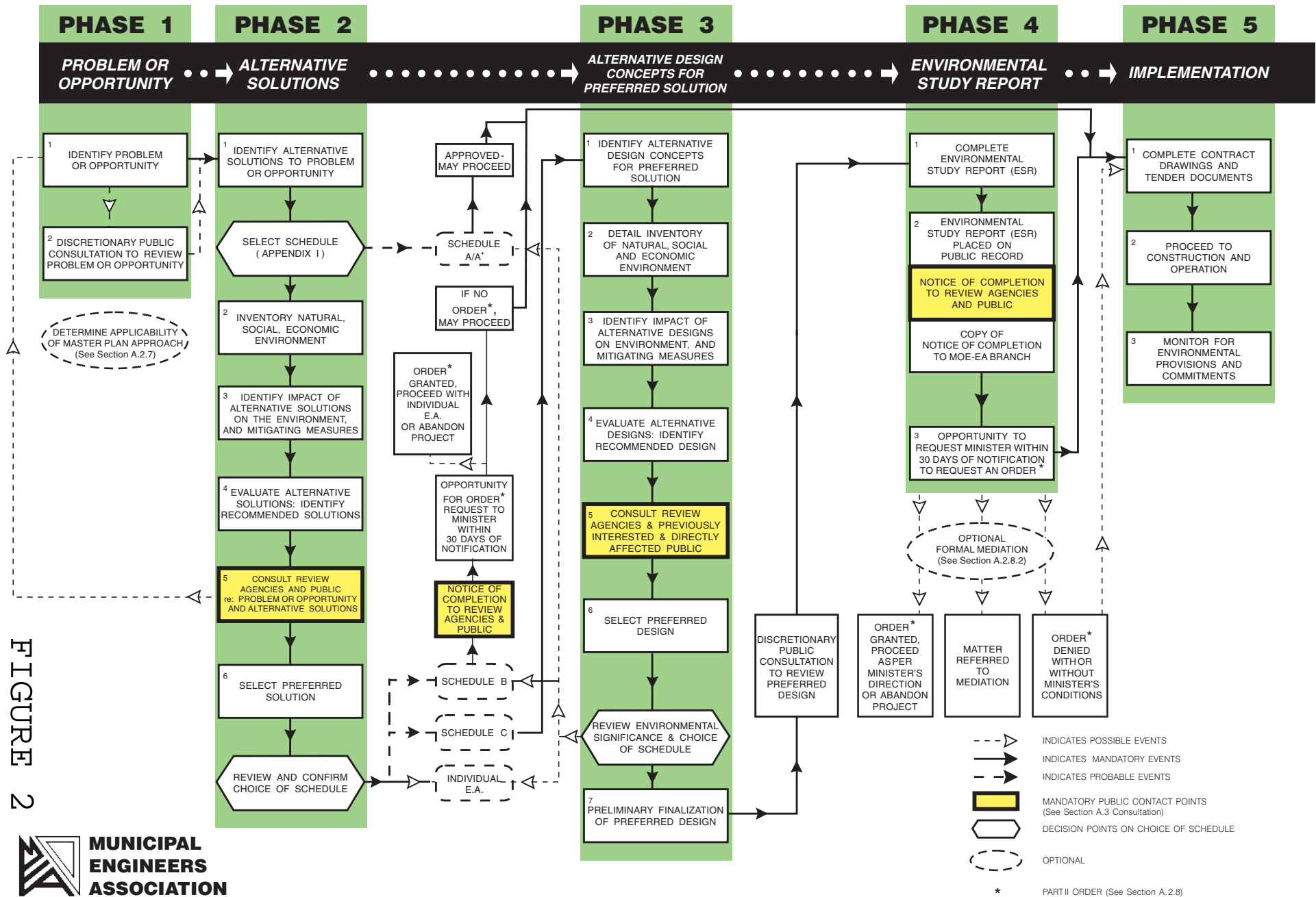
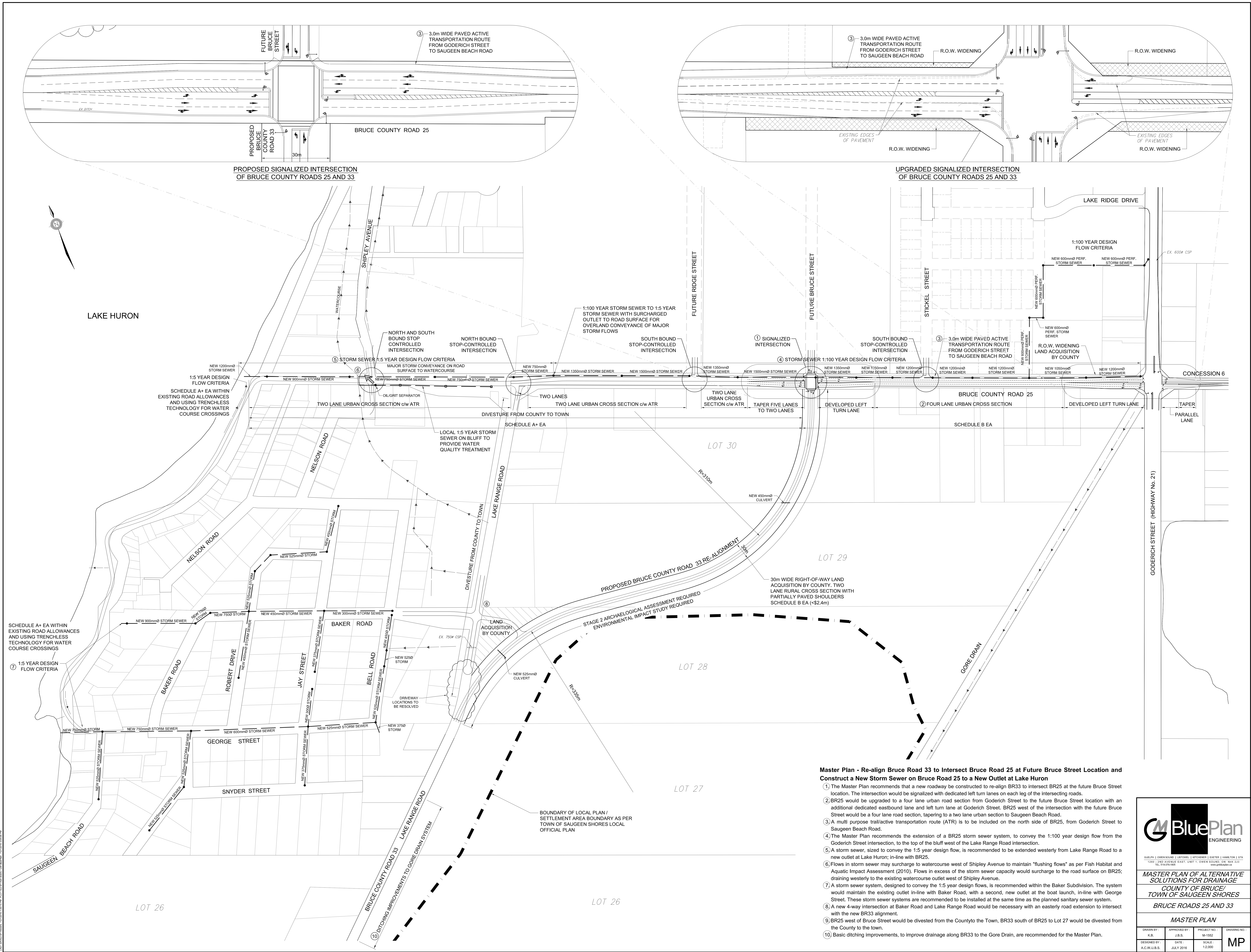
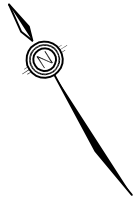


FIGURE 2



M-1552
Bruce County Road 25 Reconstruction
Town of Saugeen Shores



LEGEND

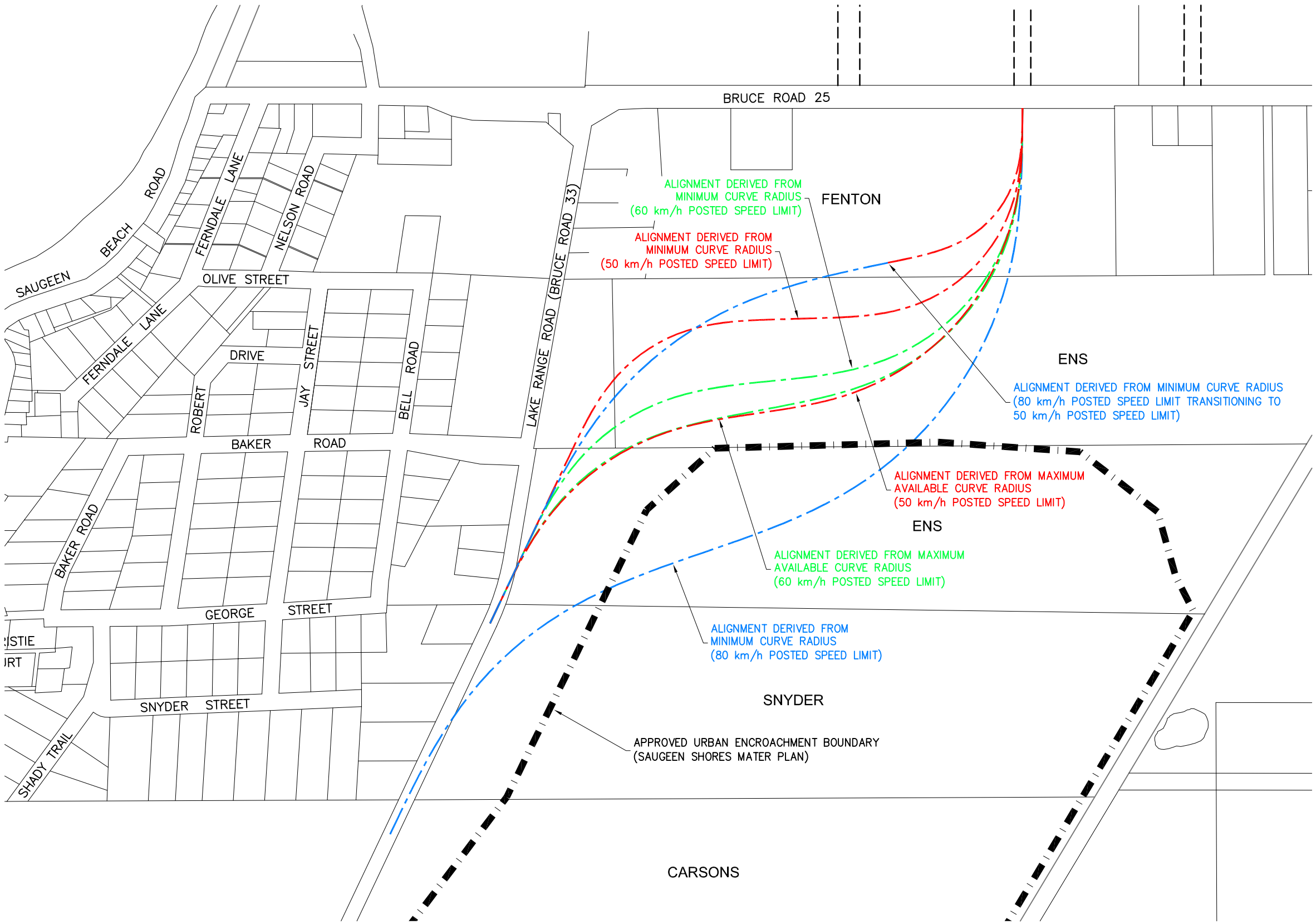
- 80 km/h POSTED SPEED LIMIT
- 60 km/h POSTED SPEED LIMIT
- 50 km/h POSTED SPEED LIMIT
- 80 km/h POSTED SPEED LIMIT
TRANSITIONING TO
50 km/h POSTED SPEED LIMIT

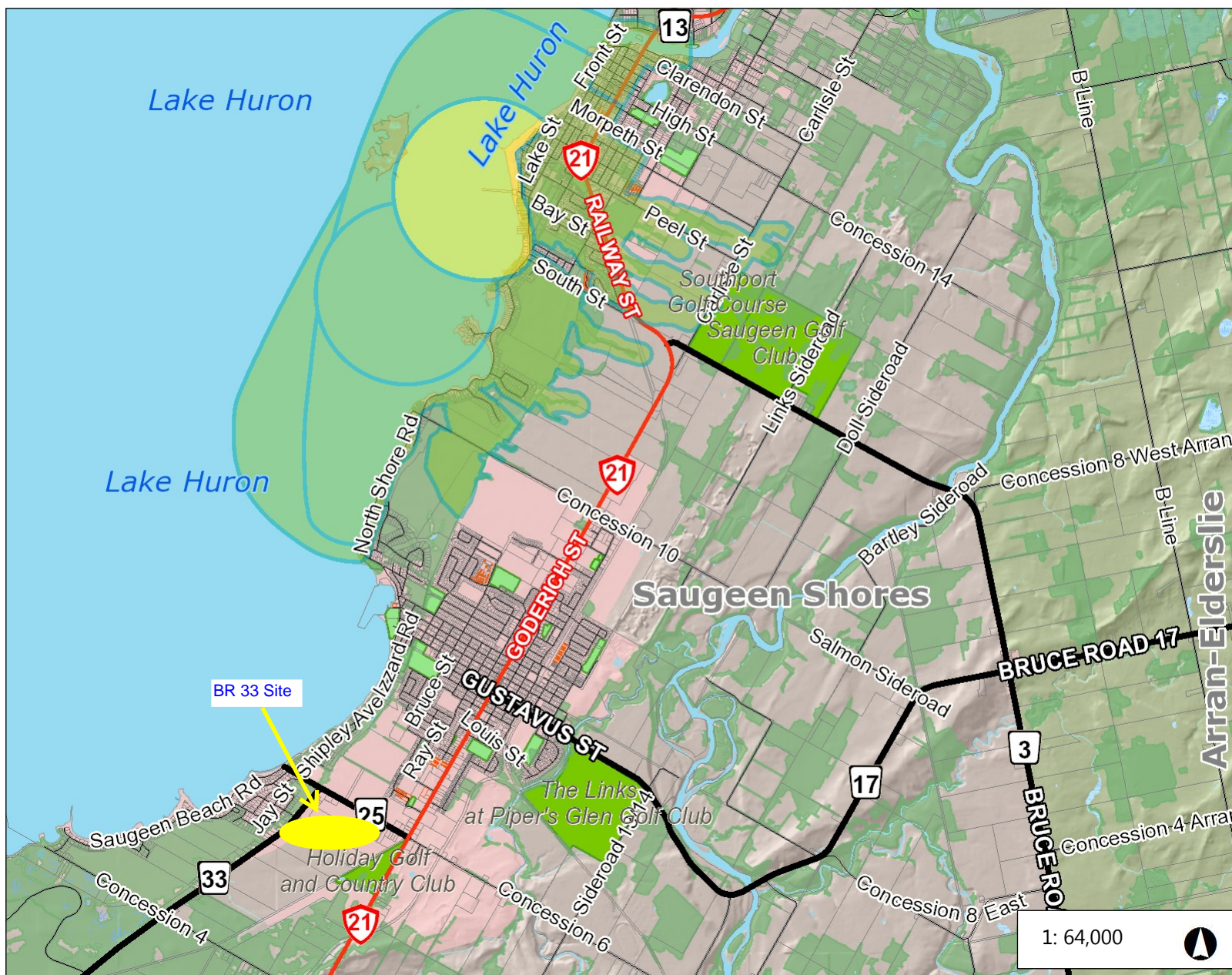
SCALE = 1:5,000
OCTOBER 2015

Bruce County Road 33
Realignment

Conceptual Alignment Layouts
for Varying Posted Speeds

Figure #1





Legend

Intake Protection Zone

- 4 - 5.9
- 6 - 7.9
- 8 - 9.9
- 10

Wellhead Protection Area Boundaries

- Zone A - 100m Buffer
- Zone B - 2 yr ToT
- Zone C - 10 yr ToT
- Zone D - 25 yr ToT

- Ferry
- Provincial Highway
- County Road
- Property Parcel
 - Assessment Parcel
 - Condominium Unit or Common Element
 - First Nation Parcel
- Body of Water
- Evaluated Wetland
- Fathom Five Boundary
- Fathom Five
- National Park Land Tenure
 - Parks Canada Owned or Managed
 - Park Unopened Road Allowance or
 - Private Land
- County Forest Boundary

1: 64,000



3.3 0 1.63 3.3 Kilometers

NAD_1983_UTM_Zone_17N
© 2018 County of Bruce

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Figure 5

APPENDIX A: NOTICES



**MASTER PLAN FOR ROADS AND DRAINAGE
BRUCE COUNTY ROADS 25 AND 33
NOTICE OF PROJECT INITIATION
DISCRETIONARY PUBLIC INFORMATION CENTRE**

The County of Bruce as Proponent, with the Town of Saugeen Shores, is studying road and drainage alternatives in the area of Bruce County Roads 25 and 33 (BR25 & BR33), located centrally in Saugeen Shores, and is inviting interested members of the public to attend an Information Centre.

The County has identified various deficiencies with its road and drainage infrastructure within the Study Area. Through initial discussions with the Town, other related issues having a broader scope have emerged which the County wishes to consider at a Master Planning level to ensure individual projects are completed in context with an appropriate overall plan. The purpose of the Discretionary Public Information Centre is to describe the identified issues within the Study Area and to receive input from the public on the issues as well as potential alternative solutions.

Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of BR25 and BR33, and planned future intersections at Stickel, Bruce and Ridge Streets. Preliminary Alternatives for Road Works include; Do Nothing but resurfacing, Re-align the BR33 intersection with the future Ridge Street intersection, or Re-align the BR33 intersection the with the future Bruce Street intersection.

Issues related to drainage include limited capacity along BR25, poor drainage through the Baker Subdivision, and inadequate drainage outlets within the Study Area. Preliminary Alternatives for Drainage works include; Do Nothing, Improve an outlet westerly on BR25 to Lake Huron, Divert flows from BR25 southerly along BR33 to a new constructed outlet westerly across Lot 26 to the existing Gore Drain outlet below Saugeen Beach Road, or Divert flows southerly along BR33 to the existing Gore Drain outlet below Lake Range Road (BR33)..

The Master Plan is being conducted under the **Municipal Class Environmental Assessment (EA)** project planning process and is intended to follow, as a minimum, Phases 1 and 2 of the EA Process, in support of Schedule B and/or Schedule C projects, which may be identified for implementation through the process.

As part of this process a Phase I – Discretionary **Public Information Centre** is planned at the Town of **Saugeen Shores Rotary Hall on October 7th, 2015 at 7:00 p.m. – 9:00 p.m.**, at which time project information will be displayed and the Project Team will be available for discussions.

The public is invited to provide written comments for incorporation into the planning considerations for this project. A future Public Information Centre, planned as part of the process, will be scheduled at a future date at which time a Problem / Opportunity Statement and Alternative Solutions will be more fully developed. Additional information is provided on the municipal web sites.

This Notice issued September 22nd, 2015.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 398, 30 Park St.
Walkerton, ON N0G 2V0
Tel: (519) 881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Mr. Dave Burnside
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
Tel: (519) 832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Consulting Professional Engineers
Mr. John Slocombe, P.Eng.
1260 2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
Tel: (519) 376-1805
www.gmbblueplan.ca



April 12, 2016
Our File: M-1552

Via Email: craig.newton@ontario.ca

Ministry of Environment and Climate Change
Southwestern Region
London Regional Office
733 Exeter Road, 2nd Floor
London, ON N6E 1L3

Attention: Mr. Craig Newton
Environmental Planner

Re: Bruce County Road 25 and 33
Master Plan for Roads and Drainage

Dear Mr. Newton,

The County of Bruce is embarking on a Master Planning process, as outlined in Approach #1 in the Municipal Class Environmental Assessment Planning Manual (MEA – Amended 2011).

Early stages of the process included the preparation of many background studies and several points of contact with potentially directly affected landowners. More recently, a Notice of Project Initiation was advertised (attached) and a Discretionary Phase 1 Public Information Centre (PIC) was held (October 7th, 2015 – Information Panels attached). A specific invitation was sent to the Saugeen Ojibway Nation (SON), offering a specific meeting to this First Nation Community, but no response was received.

Since that time, assessment tables and evaluation tables have been prepared for 3 Roads System and 7 Drainage System Alternatives.

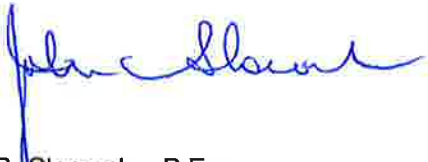
The intention is to host a Phase 2 PIC about mid-May, including an additional direct contact with SON, the Historic Saugeen Metis, and the Great Lakes Metis, after which the assessments and evaluations will be completed and the Master Plan documentation consolidated. The Master Plan will identify several individual projects, some of which will require additional detailed investigations to support Schedule 'B' or 'C' EA processes prior to project implementation. The Master Plan will be posted for a 30-day public review period prior to presentation to Council for approval.

We are forwarding this contact to the EAA Branch for early discussion purposes. We would appreciate any comments you may have.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in blue ink, appearing to read 'John B. Slocombe'.

John B. Slocombe, P.Eng.

JBS/mz

Encl.

cc: Brian Knox, P.Eng., via Email – bknox@brucecounty.on.ca
Larry Allison, via Email – allisonl@saugeenshores.ca
Len Perdue, via Email – perduel@saugeenshores.ca
File No. M-1552



**MASTER PLAN FOR ROADS AND DRAINAGE
BRUCE COUNTY ROADS 25 AND 33
NOTICE OF PHASE 2
PUBLIC INFORMATION CENTRE**

The County of Bruce as Proponent, with the Town of Saugeen Shores, is studying road and drainage alternatives in the area of Bruce County Roads 25 and 33 (BR25 & BR33), located centrally in Saugeen Shores, and is inviting interested members of the public to attend an Information Centre.

The County has identified various deficiencies with its road and drainage infrastructure within the Study Area. Through initial discussions with the Town, other related issues having a broader scope have emerged which the County wishes to consider at a Master Planning level to ensure individual projects are completed in context with an appropriate overall plan. The purpose of the Phase 2 Public Information Centre is to describe the identified issues within the Study Area and to receive input from the public on the evaluation of alternative solutions to the identified problems.

Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of BR25 and BR33, and planned future intersections at Stickel, Bruce and Ridge Streets. Alternatives for Road Systems include; Do Nothing but resurfacing, Re-align the BR33 intersection with the future Ridge Street intersection, or Re-align the BR33 intersection the with the future Bruce Street intersection.

Issues related to drainage include limited capacity along BR25, poor drainage through the Baker Subdivision, and inadequate drainage outlets within the Study Area. Alternatives for Drainage systems include; Do Nothing, Improve Existing Conditions, Construct a new outlet westerly on BR25 to Lake Huron, Divert flows northerly to the existing South End Drain Outlet, Divert flows from BR25 southerly along BR33 to a new constructed outlet westerly through the Baker Subdivision, Divert flows from BR25 southerly along BR33 to a new constructed outlet across Lot 26 to the existing Gore Drain outlet below Saugeen Beach Road, or Divert flows southerly along BR33 to the existing Gore Drain outlet below Lake Range Road (BR33).

The Master Plan is being conducted under the **Municipal Class Environmental Assessment (EA)** project planning process and is intended to follow, as a minimum, Phases 1 and 2 of the EA Process, in support of Schedule B and/or Schedule C projects, which may be identified for further study and implementation through the process.

As part of this process a Phase 2 **Public Information Centre** is planned at the Town of **Saugeen Shores Rotary Hall on Wednesday, May 18th, 2016 at 7:00 p.m. – 9:00 p.m.**, at which time project information will be displayed and a recommended solution presented. The Project Team will be available for discussions.

The public is invited to provide written comments for incorporation into the planning considerations for this project. Upon receipt of comments from the public, a Project File will consolidate the Master Planning process and a Preferred Solution will be recommended for acceptance by County and Town Councils. Additional information is provided on the municipal web sites.

This Notice issued May 2nd, 2016.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 398, 30 Park St.
Walkerton, ON N0G 2V0
Tel: (519) 881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Mr. Len Perdue
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
Tel: (519) 832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Consulting Professional Engineers
Mr. John Slocombe, P.Eng.
1260 2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
Tel: (519) 376-1805
www.gmbblueplan.ca

WELCOME

Bruce County Roads 25 & 33

**Master Plan
For
Roads and Drainage
Public Information Centre**



WELCOME

Bruce County Roads 25 & 33

**Master Plan
For
Roads and Drainage
Public Information Centre**





Master Plan - Roads and Drainage

Bruce County Roads 25 & 33

County of Bruce, Town of Saugeen Shores

PHASE 2 PUBLIC INFORMATION CENTRE – May 18th, 2016 – 7:00 PM TO 9:00 PM

SIGN-IN SHEET

| Name | Address | Postal Code | Phone | Email |
|------|---------|-------------|-------|-------|
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Please complete the above sign-in information if you wish to be included on the project notification list.



MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT NOTICE OF STUDY COMPLETION

COUNTY OF BRUCE BRUCE COUNTY ROADS 25 AND 33 MASTER PLAN FOR ROADS AND DRAINAGE

RECOMMENDED MASTER PLAN

The County of Bruce as Proponent, with the Town of Saugeen Shores, have prepared a Master Plan, following Phases 1 and 2 of the Municipal Class Environmental Assessment, for the area of Bruce County Road 25 and 33, located centrally in the Town of Saugeen Shores.

Based on the study findings and input from technical agencies and the public, the Master Plan accepted by Councils is as shown on the attached Key Plan. The Master Plan identifies the recommended infrastructure to service the future growth of the Town while minimizing environmental impacts. The recommended Master Plan incorporates the comments received from the public and agencies during the course of the study. The main components are listed below. While the Master Plan addresses need and justification at a broad level, more detailed studies for each of the projects included in the Master Plan will be done at a later date following the Municipal Class EA.

TYPE OF PROJECT

DESCRIPTION

Schedule B Projects - Roads

- Re-align Bruce Road 33 to intersect Bruce Road 25 at future Bruce Street alignment.
- Provide additional lanes on Bruce Road 25 between future Bruce Street intersection to Goderich Street (4-lane urban cross-section).
- While the Master Plan addresses Phases 1 and 2 of the Municipal Class EA, additional investigations will be carried out at a later date.

Schedule A Projects – Drainage

- Construct new storm sewer along Bruce Road 25 including outfall to Lake Huron.
- Construct local storm sewer system within Baker Subdivision to coincide with sanitary sewer installation.

The Master Plan is available for review at the following locations:

Saugeen Shores Municipal Office, Bruce County

This Notice issued Tuesday May 9, 2017.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 70, 30 Park St.
Walkerton, Ontario N0G 2V0
Tel: (519) 881-2400

The Town of Saugeen Shores
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
Tel: (519) 832-2008

GM BluePlan Engineering Limited
Mr. John Slocombe, P.Eng.
1260 2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
Tel: (519) 376-1805



**SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE COUNTY ROAD 33 RE-ALIGNMENT
NOTICE OF PROJECT INITIATION**

The County of Bruce as Proponent, with the Town of Saugeen Shores, having recently completed a Master Plan for Roads and Drainage for the general Study Area, is advancing project specific planning for the re-alignment of Bruce Road 33 (BR33), located centrally in Saugeen Shores.

The County has identified various deficiencies with road and drainage infrastructure within the Study Area. Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of B25 and BR33, and planned future intersections at Sitckel, Bruce, and Ridge Streets. The Master Plan process reviewed alternative solutions for roads including;

- i) Do nothing but resurfacing,
- ii) Intersection and Capacity Improvements on BR25, and
- iii) Re-align the BR33 intersection with the future Bruce Street intersection.

Through the Master Plan process, the re-alignment of BR33 to intersect with BR25 at a future Bruce Street alignment location was identified as the preferred solution to address the issues identified.

Project specific planning for the re-alignment of BR33 is being conducted as a Schedule B activity under the **Municipal Class Environmental Assessment (EA)**. Project planning is intended to follow, as a minimum, Phases 1 and 2 of the EA Process. The Schedule B EA process is project specific to the re-alignment of Bruce Road 33 and is intended to update and verify the direction resolved through the more general Master Plan process.

Both the Master Plan Report and the Schedule B EA Project File are available on the County and Town websites at the addresses noted below.

The public is invited to review the documentation and to provide written comments for incorporation into the planning considerations for the Bruce Road 33 re-alignment project. Comments may be directed to any one of the contacts listed below, and should be received by **February 6, 2018**.

This Notice first issued on January 9, 2018.

The County of Bruce
Mr. Brian Knox, P.Eng.
30 Park Street
Box 398
Walkerton, ON N0G 2V0
bknox@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P. Eng.
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Consulting Professional Engineers
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca



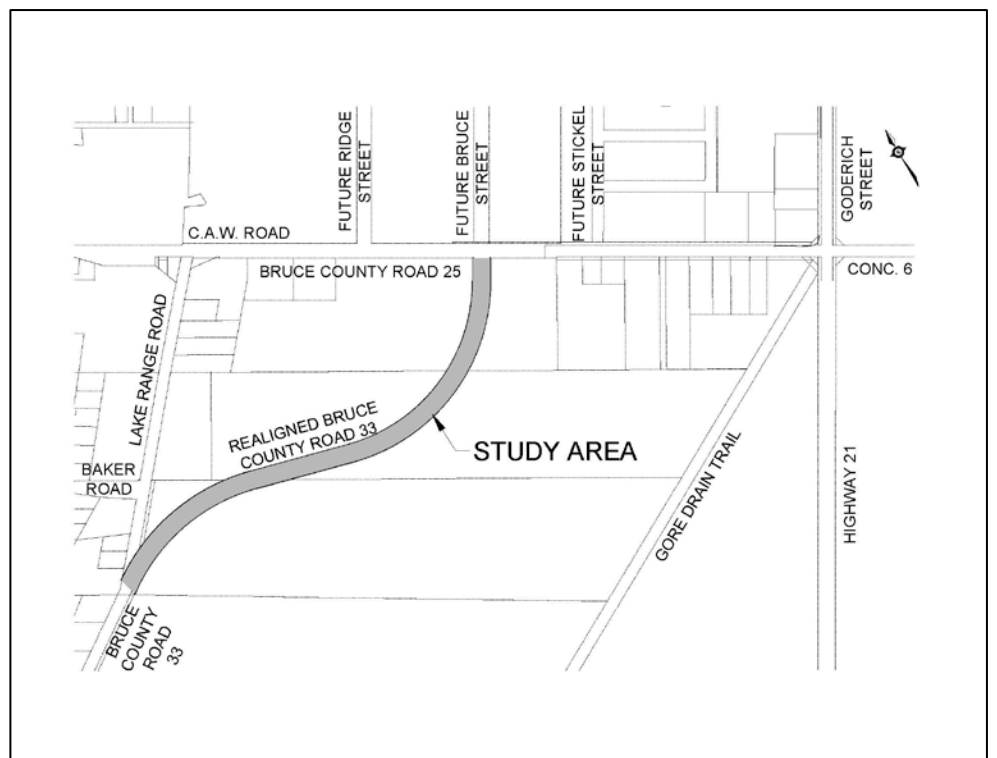
SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE COUNTY ROAD 33 RE-ALIGNMENT
NOTICE OF STUDY COMPLETION

The County of Bruce as Proponent, with the Town of Saugeen Shores, having recently completed a Master Plan for the general Study Area, is advancing project specific planning for the re-alignment of Bruce Road 33 (BR33), located where shown on the accompanying map. Issues related to roads include deteriorated travelled surfaces, poor sight lines and planned future intersections at Stickel, Bruce, and Ridge Streets. The Master Plan process reviewed alternative solutions for roads including;

- i) Do nothing but resurfacing,
- ii) Intersection and Capacity Improvements on BR25, and
- iii) Re-align the BR33 intersection with the future Bruce Street intersection.

Through the Master Plan process, the re-alignment of BR33 to intersect with BR25 at a future Bruce Street alignment location was identified as the preferred solution to address the issues identified.

Project specific planning for the re-alignment of BR33 is being conducted as a Schedule B activity under the **Municipal Class Environmental Assessment (EA)**. The Schedule B EA process is project specific to the re-alignment of Bruce Road 33 and is intended to update and verify the direction resolved through the more general Master Plan process. A Notice of Project Initiation was issued on **January 9, 2018**. Based on the study findings and comments, the BR33 re-alignment alternative, as described in the Master Plan, is adopted by Council as the Preferred Solution to this Schedule B EA process. Both the Master Plan Report and the Schedule B EA Project File are available on the County and Town websites at the addresses noted below.



Interested parties should provide written comments to the County of Bruce, at the address noted below, within 30 calendar days from the date of this Notice. If concerns arise regarding this project, which cannot be resolved in discussion with the County, a person or party may request the Minister of the Environment and Climate Change to order a change in the project status and require a higher level of assessment under an individual Environmental Assessment process (referred to as a Part II Order). Reasons must be provided for the request. Requests must be received by the Minister within 30 calendar days of this Notice.

Part II Order requests are to be submitted to:

| | |
|---|---|
| Minister Ministry of the Environment and Climate Change 77 Wellesley St. W., Floor 11 Toronto, ON M7A 2T5 Fax: 416-314-8452 | Director Environmental Assessment & Permissions Branch Ministry of the Environment and Climate Change 135 St. Clair Avenue W, 1 st Floor Toronto, ON M4V 1L5 |
|---|---|

A copy of the request should also be sent to the following:

| | | |
|---|---|--|
| The County of Bruce Ms. Kerri Meier 30 Park Street, Box 398 Walkerton, ON N0G 2V0 kmeier@brucecounty.on.ca Tel: 519-881-2400 www.brucecounty.on.ca | The Town of Saugeen Shores Ms. Amanda Froese, P. Eng. 600 Tomlinson Drive , P.O. Box 820 Port Elgin, ON N0H 2C0 amanda.froese@saugeenshores.ca Tel: 519-832-2008 www.saugeenshores.ca | GM BluePlan Engineering Limited Consulting Professional Engineers Mr. John Slocombe, P.Eng. 1260-2 nd Avenue East, Unit 1 Owen Sound, ON N4K 2J3 john.slocombe@gmblueplan.ca Tel: 519-376-1805 www.gmblueplan.ca |
|---|---|--|



Legend

- Local OP SPA labels (BR)
- Ferry
- Provincial Highway
- County Road
- Municipal or Other Road
- OBM Building Location
- OBM Building Footprint
- Building Footprint
- Body of Water
- Evaluated Wetland
- Watercourse
 - Permanent Stream
 - Intermittent Stream
- Wetland
- Built-up area

1: 16,000



0.8 0 0.41 0.8 Kilometers

NAD_1983_UTM_Zone_17N
© 2017 County of Bruce

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

APPENDIX B: BACKGROUND STUDIES

**Criteria for Evaluating Potential
for Built Heritage Resources and
Cultural Heritage Landscapes**
A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
 - is a recognized heritage property
 - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
 - the main project area
 - temporary storage
 - staging and working areas
 - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

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(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – [separate checklist](#)
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name
Bruce County Road 33 Re-Alignment

Project or Property Location (upper and lower or single tier municipality)
County of Bruce / Saugeen Shores

Proponent Name
County of Bruce

Proponent Contact Information
Kerri Meier

Screening Questions

| | | |
|--|--------------------------|-------------------------------------|
| | Yes | No |
| 1. Is there a pre-approved screening checklist, methodology or process in place? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

| | | |
|--|--------------------------|-------------------------------------|
| | Yes | No |
| 2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If Yes, do not complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

| | | |
|---|--------------------------|-------------------------------------|
| | Yes | No |
| 3. Is the property (or project area): | | |
| a. identified, designated or otherwise protected under the <i>Ontario Heritage Act</i> as being of cultural heritage value? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b. a National Historic Site (or part of)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c. designated under the <i>Heritage Railway Stations Protection Act</i> ? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d. designated under the <i>Heritage Lighthouse Protection Act</i> ? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

| | Yes | No |
|---|--------------------------|-------------------------------------|
| 4. Does the property (or project area) contain a parcel of land that: | | |
| a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b. has or is adjacent to a known burial site and/or cemetery? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c. is in a Canadian Heritage River watershed? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| d. contains buildings or structures that are 40 or more years old? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Part C: Other Considerations

| | Yes | No |
|--|--------------------------|-------------------------------------|
| 5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area): | | |
| 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? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b. has a special association with a community, person or historical event? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c. contains or is part of a cultural heritage landscape? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

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

For more information, see the Ministry of Tourism, Culture and Sport's [Ontario Heritage Toolkit](#) or [Standards and Guidelines for Conservation of Provincial Heritage Properties](#).

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's [Standards & Guidelines for Conservation of Provincial Heritage Properties](#) [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the [Standards & Guidelines for Conservation of Provincial Heritage Properties](#) has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note:** To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- [Ontario Heritage Trust](#)
- local land registry office (for a title search)

ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- [Ontario Heritage Trust](#) - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act*. **Note:** To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- [Ontario Heritage Trust](#)

v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@mtc.gov.on.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the [National Historic Sites website](#).

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the [Directory of Designated Heritage Railway Stations](#).

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the [Heritage Lighthouses of Canada website](#).

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the [Federal Heritage Buildings Review Office](#).

See a [directory of all federal heritage designations](#).

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – [World Heritage Site website](#).

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- [municipal heritage committees](#) or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's [Heritage directory](#) – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a [list of plaques](#) commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a [list of plaques](#) commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a [database of registered cemeteries](#)
- Ontario Genealogical Society (OGS) – to [locate records of Ontario cemeteries](#), both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to [locate early cemeteries](#)

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the [Canadian Heritage River System](#).

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide [Heritage Property Evaluation](#).

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- [municipal heritage committees](#) or local heritage organizations
- Ontario Historical Society's "[Heritage Directory](#)" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through [Ontario Trails](#).

Ministry of Tourism, Culture and Sport

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Programs and Services Branch
Culture Division
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Ministère du Tourisme, de la Culture et du Sport

Unité des programmes d'archéologie
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Archaeology@ontario.ca



Jun 30, 2017

Scarlett Janusas (P027)
Scarlett Janusas Archaeology Inc.
PO BOX none Tobermory ON N0H 2R0

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "STAGE 2 ARCHAEOLOGICAL ASSESSMENT REGIONAL ROAD #33 RE-ALIGNMENT PART LOTS 27, 28, 29 & 30, LAKE RANGE MUNICIPALITY OF SAUGEEN SHORES FORMER GEOGRAPHIC TOWNSHIP OF SAUGEEN BRUCE COUNTY, ONTARIO ORIGINAL REPORT ", Dated Jun 1, 2017, Filed with MTCS Toronto Office on N/A, MTCS Project Information Form Number P027-0306-2017, MTCS File Number 41RD006

Dear Ms. Janusas:

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
Kerri Meier, County of Bruce
Kerri Meier, County of Bruce

¹In 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.

**STAGE 2 ARCHAEOLOGICAL ASSESSMENT
REGIONAL ROAD #33 RE-ALIGNMENT
PART LOTS 27, 28, 29 & 30, LAKE RANGE
MUNICIPALITY OF SAUGEEN SHORES
FORMER GEOGRAPHIC TOWNSHIP OF SAUGEEN
BRUCE COUNTY, ONTARIO
SUPPLEMENTARY DOCUMENTATION
INDIGENOUS ENGAGEMENT**

Prepared for




**County of Bruce
and
Ministry of Tourism, Culture and Sport**

**SCARLETT JANUSAS ARCHAEOLOGY INC.
269 Cameron Lake Road
Tobermory, Ontario N0H 2R0
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www.actionarchaeology.ca**



**License # P027, PIF #P027-0306-2017
June 1st, 2017**

©

 Reply  Reply All  Forward




Fri 5/12/2017 9:23 AM


Scarlett Janusas <jscarlett@amtelecom.net>


Regional Road 33 Realignment - Archaeology

To 'Doran Ritchie'

 This message was sent with High importance.

 Message

 letter to Doran Ritchie requesting input from SON dated May 12 2017.pdf (548 KB)

 Archaeological Assessment Bruce Road 25 Re-Alignment.pdf (795 KB)

Good morning Doran:




I'm attaching a letter with a request for input from SON regarding the Regional Road 33 realignment. We would welcome input from SON, and if you would like a monitor to be present, please send the agreement directly to me.

If you have any questions regarding the project - happy to assist. A Stage 1 assessment has been done already by another firm. I attach it here for you as well.

Regards

Scarlett

Scarlett Janusas, BA, MA
Member CAHP, APA, SHA
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www.actionarchaeology.ca

 Reply  Reply All  Forward





Fri 5/12/2017 9:23 AM

Scarlett Janusas <jscarlett@amtelecom.net>

Regional Road 33

To 'Doran Ritchie'

 Message

 letter to Doran Ritchie requesting input from SON dated May 12 2017.pdf (725 KB)

Apologies - I am reattaching the letter, without reference to Stage 1 - we are only doing the Stage 2 assessment.

Regards

Scarlett

Scarlett Janusas, BA, MA
Member CAHP, APA, SHA
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May 12, 2017

Mr. Doran Ritchie
Environmental Office
Saugeen Ojibway Nation

Via email: d.ritchie@saugeenojibwaynation.ca

Dear Doran:

Re: **Stage 2 Archaeological Resource Assessment**
Regional Road 33 Realignment, Port Elgin
Town of Saugeen Shores

SJAI has been retained by our client to conduct the Stage 2 archaeological assessment of an area of approximately 5.3 acres in Port Elgin for the realignment of Regional Road 33. The area has been staked out in the field and we hope to have the area ploughed within the next week, and following appropriate weathering of the fields, to conduct field work.

SON's input into the project is valued. Would you please provide us (please direct all communication to myself) with of any specific concerns with regards to the project, and if you would like to have a monitor accompany SJAI on the project.

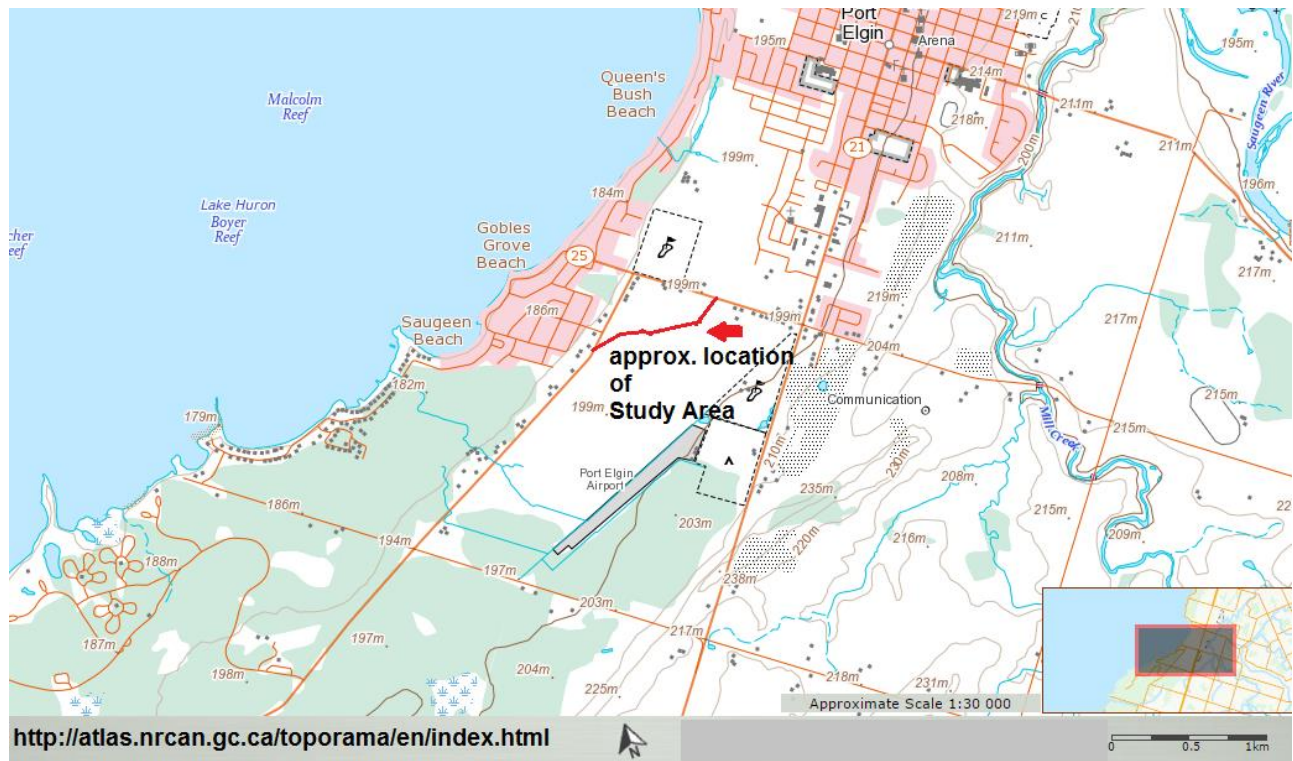
The property is located on Part Lots 27 – 30, Lake Range, in Port Elgin, Town of Saugeen Shores. I am attaching the site plan for the realignment and a google earth map which shows the location of the project.




Any concerns that SON may have with regards to the archaeology of the project would be gratefully accepted before May 20th, 2017.

Regards

A handwritten signature in blue ink that reads "Scarlett Janusas". The signature is fluid and cursive.

Scarlett E. Janusas, BA, MA, CAHP
President, SJAI
Member, APA, CNEHA, OMHC, SHA



 Reply  Reply All  Forward




Fri 5/12/2017 9:28 AM

Doran Ritchie <d.ritchie@saugeenojibwaynation.ca>

Re: Regional Road 33




To Scarlett Janusas

 You forwarded this message on 5/12/2017 11:31 AM.
We removed extra line breaks from this message.

Hello Scarlett,

Thank you for the letter, I will review the info and get back to you asap on any comments or any potential SON Involvement.

Mligwetch,
Doran

 Reply  Reply All  Forward




Wed 5/24/2017 8:37 AM

Doran Ritchie <d.ritchie@saugeenojibwaynation.ca>

Re: Regional Road 33, Port Elgin

To Scarlett Janusas

 You replied to this message on 5/24/2017 1:58 PM.
We removed extra line breaks from this message.

Hello scarlett,

Can I call you in the next hour? Can you send me your number?

Mligwetch,
Doran

Sent from my iPhone

> On May 24, 2017, at 08:23, Scarlett Janusas <jscarlett@amtelecom.net> wrote:

>

> Morning Doran - checked the weather, and it looks like rain tomorrow

> in Port Elgin. I'm now aiming for Friday. Can you send out an

> agreement and monitor for the project, or do you not feel it necessary?

>

> Regards

> Scarlett




Wed 5/24/2017 3:16 PM

Doran Ritchie <d.ritchie@saugeenojibwaynation.ca>

Re: Regional Road 33, Port Elgin

To Scarlett Janusas

Cc Pete Demarte; Adrienne Brennan; dr_dig@xplornet.com

 We removed extra line breaks from this message.

Hello Scarlett and Pete,

I just touched base with Adrienne Brennan and she's available to attend the site on Friday.

Pete, would you mind connecting with Adrienne and fill her in on a meeting place and time?

Mligwetch,
Doran

Sent from my iPhone

> On May 24, 2017, at 15:09, Scarlett Janusas <jscarlett@amtelecom.net> wrote:

>

> Hi Doran - cc'ing Pete Demarte on this one. He will be the Field Director.

> Thanks.

>

> Hope you have a pleasant evening.

>

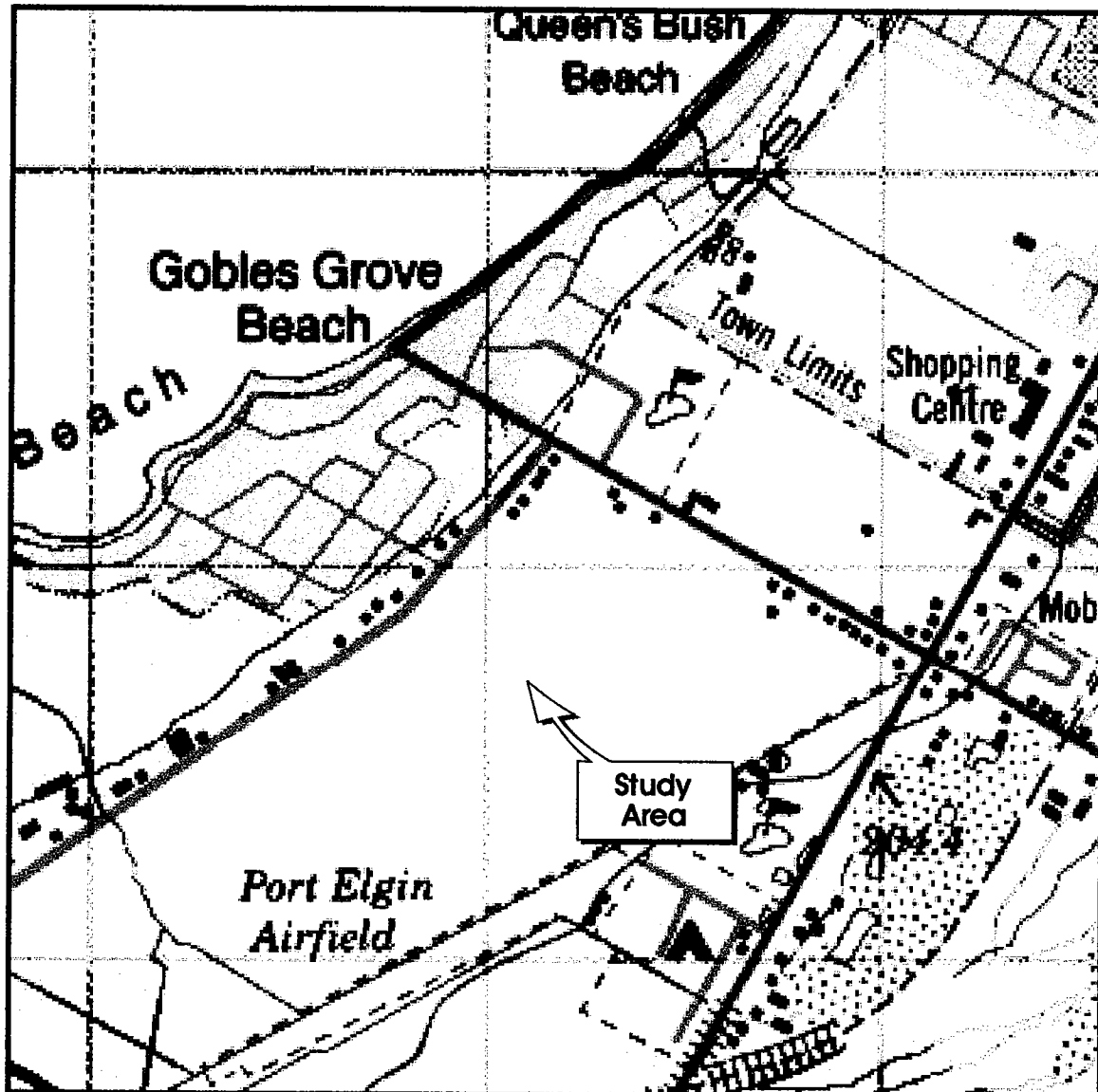
> Regards

> Scarlett

>

Adrienne Brennan attended the site with the crew for the entire project.

Archaeological Assessment (Stages 1)
Bruce County Road 25, Re-Alignment,
Port Elgin, Ontario



Mayer
Heritage
Consultants Inc.

Cultural Heritage Assessments and Archaeological Mitigative Excavations

**Archaeological Assessment (Stage 1)
Bruce County Road 25 Re-Alignment,
Port Elgin, Ontario**

Submitted to

**Gamsby and Mannerow Limited
1260 Second Avenue East, Unit 1
Owen Sound, Ontario
N4K 2J3
Fax: (519) 376-8977**

and

The Ontario Ministry of Culture

Prepared by

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**Archaeological Consulting Licence Number P040
Contract Information Form Number P040-313-2010
Corporate Project Number 10-003**

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Table of Contents

| | |
|--|--------|
| <i>Project Personnel</i> | 3 |
| <i>Acknowledgements</i> | 3 |
| Introduction | 4 |
| Stage 1 Background Research | 4 |
| Natural Environment | 6 |
| Potential for Archaeological Resources | 6 |
| RECOMMENDATIONS | 11 |
| References Cited and Consulted | 12 |
| Tables | |
| 1. General Cultural Chronology for Southern Ontario. | 6 |
| Figures | |
| 1. Location of the Study Area. | 5 |
| 2. Study Area, Facing South from Existing Road 25 | 7 |
| 3. Study Area, Facing Northeast from Lake Range Road | 7 |
| 4. Site Location on Historic Atlas | 8 |
| 5. Study Area Map | 10 |

Project Personnel

| | |
|--------------------|----------------------------------|
| Project Manager | Paul J. C. O'Neal |
| Report Preparation | Paul J. C. O'Neal Becky Jones |
| Field Director | Paul J. C. O'Neal |

Acknowledgments

Preparation of this report was facilitated by the assistance of the following individuals and their agencies:

- ***John Slocombe, Gamsby and Mannerow***
- ***Robert von Bitter***, Archaeological Data Co-ordinator, Ontario Ministry of Culture.

Archaeological Assessment (Stage 1)

Bruce County Road 25 Re-Alignment, Port Elgin, Ontario

Introduction

Among other matters, the *Planning Act R.S.O. 1990*, establishes that the protection of features of archaeological interest is a matter of provincial concern. As such, an archaeological resource assessment (Stage 1 background research) was conducted to determine whether further investigation, in the form of test-pitting or monitoring of future construction, would be required as a standard condition of approval for the proposed re-alignment of Bruce County Road 25 located in Port Elgin, Ontario (Figure 1).

This assessment was further conducted in order to determine if any direct and/or indirect impacts might occur by proposed construction activities on archaeological resources that might be present. Archaeological resources consist of artifacts (Aboriginal stone tools, pottery and subsistence remains as well as Euro-Canadian objects), subsurface settlement patterns and cultural features (post moulds, trash pits, privies, and wells), and sites (temporary camps and special purpose activity areas, plus more permanent settlements such as villages, homesteads, grist mills and industrial structures).

Stage 1 Background Research

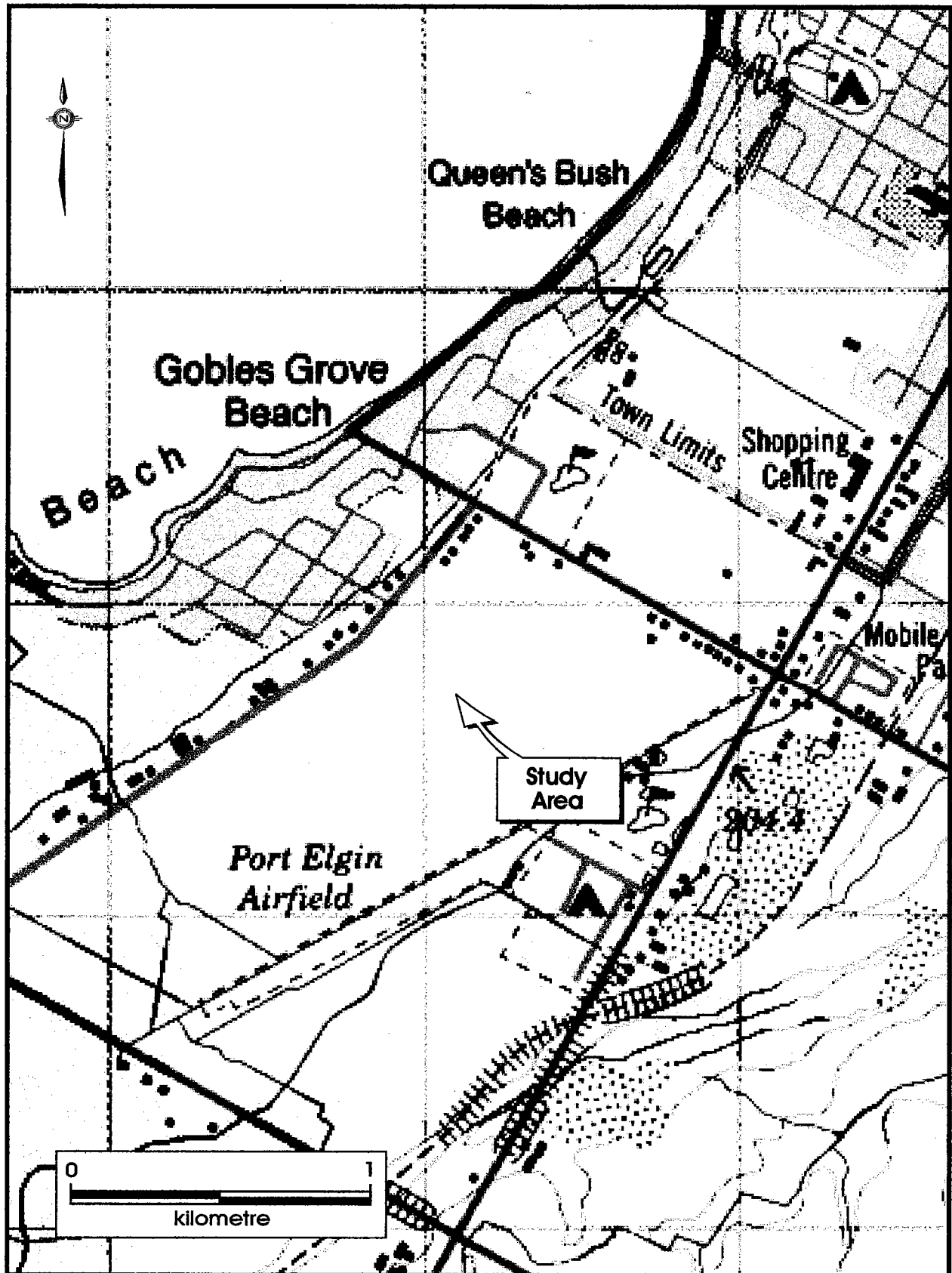
Stage 1 background research was conducted in order to complete the following tasks:

- amass all of the readily available information on any previous archaeological surveys in the area;
- determine the locations of any registered and unregistered sites; and
- develop an historical framework for assigning levels of potential significance to any new sites discovered during fieldwork.

The framework for assigning levels of potential archaeological significance is drawn from provincial guidelines (Weiler 1980). The necessary information includes the identification and evaluation of any feature that has one or more of the following attributes:

- *it has the potential through archaeological exploration, survey or fieldwork to provide answers to substantive questions (i.e. relate to particular times and places) about events and processes that occurred in the past and therefore add to our knowledge and appreciation of history;*
- *it has the potential through archaeological exploration, survey and fieldwork to contribute to testing the validity of general anthropological principles, cultural change and ecological adaptation, and therefore to the understanding and appreciation of our man-made heritage;*
or
- *it is probable that various technical, methodological, and theoretical advances are likely to occur during archaeological investigation of a feature, alone or in association with other features, and therefore contribute to the development of better scientific means of understanding and appreciating our man-made heritage (Weiler 1980:8).*

Figure 1: Location of the Study Area.



Natural Environment

The study area is within the Huron Slope (Chapman and Putnam 1984). The *Soil Survey of Bruce County* (Hoffman and Richards, 1954) indicates the dominant surface soil type to be sandy loam with imperfect drainage and a smooth, very gentle sloping topography.

Potential for Archaeological Resources

Archaeological potential is defined as the likelihood of finding archaeological sites within a study area. For planning purposes, determining archaeological potential provides a preliminary indication that significant sites might be found within the study area, and consequently, that it may be necessary to allocate time and resources for archaeological survey and mitigation. In predicting the locations of archaeological sites, the *Primer on Archaeology, Land Use Planning and Development in Ontario* (Ministry of Culture 1997:12-13) states that undisturbed lands, or those with minimal disturbance, such as cultivated fields, within 300 metres of a primary water source or 200 metres of a secondary or tertiary water source are considered to have archaeological potential. Other criteria can include location on elevated ground or near distinctive or unusual landforms, and the presence of well-drained sandy soils. These were all taken into account during the preparation of the Windsor Archaeological Master Plan (CRM Group, 2005), which indicated that the entire Riverfront of Windsor had high potential for archaeological resources.

Based upon a published synthesis of Aboriginal cultural occupations (Wright 1968), Table 1 is a general outline of the cultural history of Southwestern Ontario that is applicable to the study area. Ellis and Ferris (1990) provide greater detail of the distinctive characteristics of each time period and cultural group. The Ministry of Culture archaeological database coordinator (von Bitter 2005) indicated that there are no previously registered archaeological sites within 2,000 metres of the study area.

Table 1: General Cultural Chronology for Southwestern Ontario.

| PERIOD | GROUP | TIME RANGE | COMMENTS |
|--------------------|-------------------------|---------------------|-------------------------------------|
| Early Paleo-Indian | Fluted Projectiles | 9500 - 8500 B.C. | big game hunters |
| Late Paleo-Indian | Hi-Lo Projectiles | 8500 - 7500 B.C. | small nomadic groups |
| Early Archaic | --- | 7800 - 6000 B.C. | nomadic hunters and gatherers |
| Middle Archaic | Laurentian | 6000 - 2000 B.C. | territorial settlements |
| Late Archaic | Lamoka | 2500 - 1700 B.C. | polished ground stone tools |
| " | Broadpoint | 1800 - 1400 B.C. | --- |
| " | Crawford Knoll | 1500 - 500 B.C. | --- |
| " | Glacial Kame | circa 1000 B.C. | burial ceremonialism |
| Early Woodland | Meadowood | 1000 - 400 B.C. | introduction of pottery |
| " | Red Ochre | 1000 - 500 B.C. | --- |
| Middle Woodland | Western Basin/Saugeen | 400 B.C. - A.D. 500 | long distance trade networks |
| " | Princess Point | A.D. 500 - 800 | incipient agriculture |
| Late Woodland | Glen Meyer | A.D. 800 - 1300 | transition to village life |
| " | Uren | A.D. 1300 - 1350 | large villages with palisades |
| " | Middleport | A.D. 1300 - 1400 | wide distribution of ceramic styles |
| " | Neutral/Huron | A.D. 1400 - 1650 | tribal warfare |
| Early Contact | Mississauga plus others | A.D. 1700 - 1875 | tribal displacement |
| Late Contact | Euro-Canadian | A.D. 1800 - present | European settlement |

Figure 2: Study Area, Facing South from Existing County Road 25

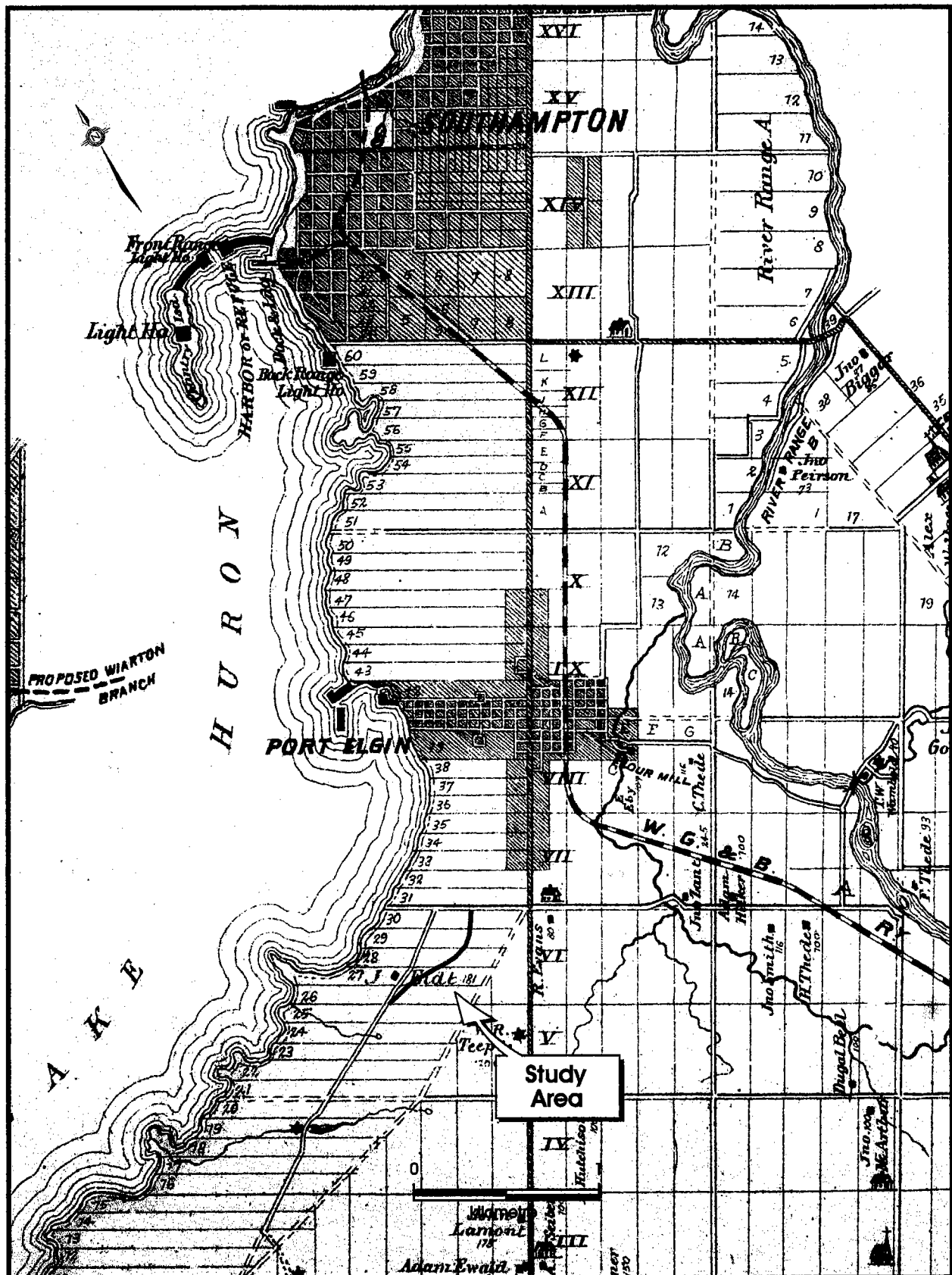
7

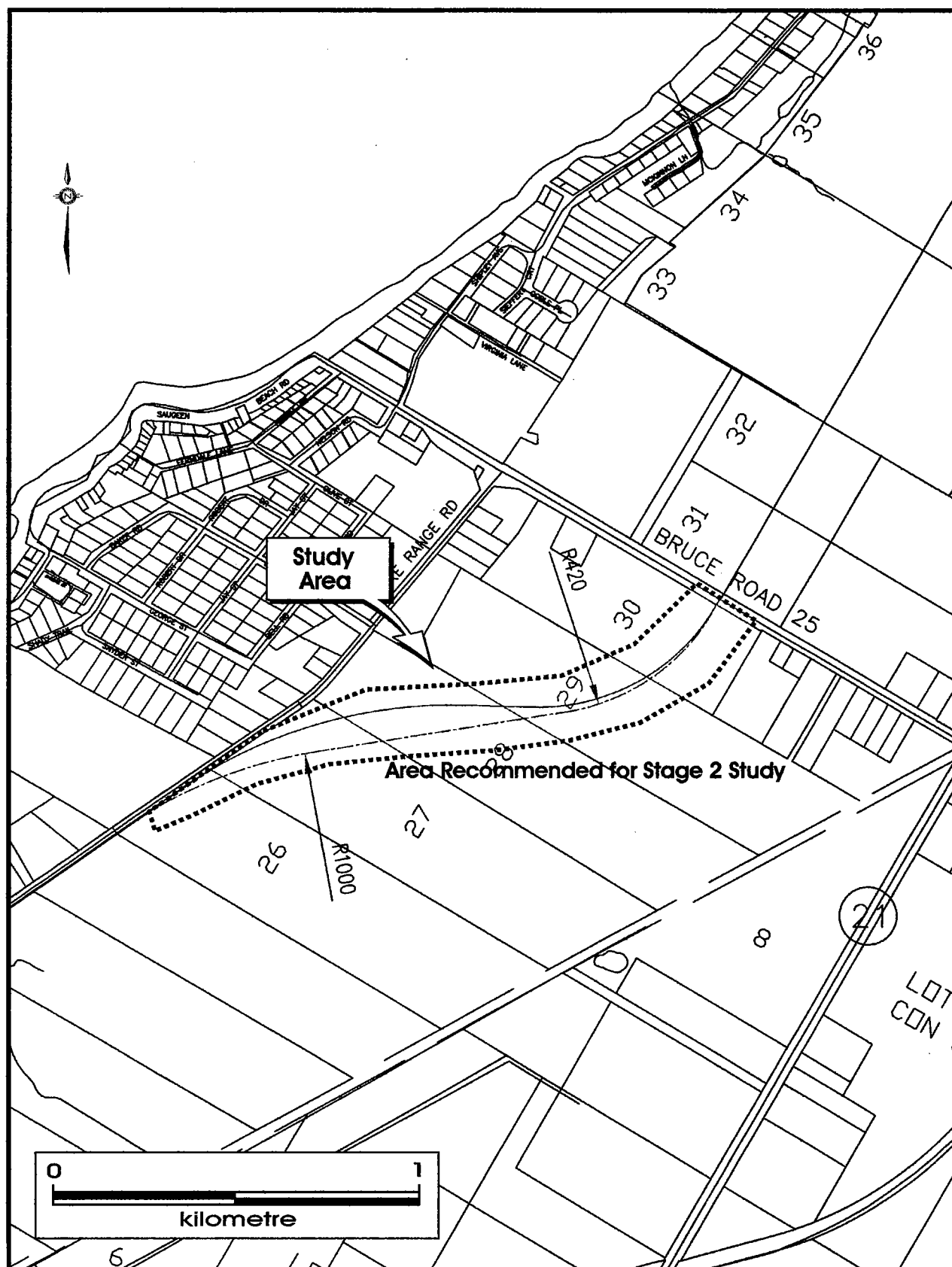


Figure 3: Study Area, Facing Northeast from Lake Range Road



Figure 4: Site Location on Historic Atlas



[illegible]

Over their thousands of years of occupation in the general region, Aboriginal people, have left behind, to a greater or lesser degree, physical evidence of their lifeway activities and settlements at many locations. The earliest possible human occupation was during the Paleo-Indian period (*circa* 9000 to 7000 B.C.) wherein small groups of nomadic peoples hunted big game along the shorelines of glacial lakes. These people were few in number and their small, temporary campsites are relatively rare.

People during the Archaic period (*circa* 7000 to 1000 B.C.) were still primarily nomadic hunters but also established territorial settlements, gathered seasonally available resources, and introduced burial ceremonialism. Late Archaic period sites are more numerous and can be quite large due to repeated annual visits.

Sites of the Woodland period (*circa* 1000 B.C. to A.D. 1650) are usually the most numerous because the population levels in Southwestern Ontario had significantly increased. The manufacture of ceramic pottery vessels for storage and cooking was introduced along with the establishment of long distance trading networks, horticulture, warfare and large palisaded villages.

Sites of the Contact period (*circa* A.D. 1650 to 1900) include Aboriginal and Euro-Canadian residences and industries. Belden's 1880 *Historic Atlas of Grey and Bruce Counties, Ontario* indicates the study area traverses a piece of property that was once owned by a "J. Eidt". No other owners for the surrounding areas are shown and no structures are shown within the study area. The absence of structures on this map however, does not necessarily mean that one or more structures were not present at that time earlier or later.

Based upon the soil and topography suitable for human habitation, the proximity to water and the historic significance of the geographic region, a Stage 1 visual assessment was done to determine the potential for the discovery of pre-contact Aboriginal and Euro-Canadian archaeological resources.

Stage 1 Visual Assessment

A visual assessment of the fields that the proposed road re-alignment will impact, was conducted on February 9, 2010 a clear and sunny day. Although snow covered the field, it appeared to have been undisturbed except by ploughing and other normal farming activities. Therefore, it is reasonable that any archaeological resources previously deposited would still be present. Therefore, we recommend a Stage 2 Archaeological Assessment, consisting of a pedestrian survey of the ploughed field, prior to any excavation or other ground disturbing construction activities take place.

RECOMMENDATIONS

The following recommendations are provided for consideration by Gamsby and Mannerow and by the Ministry of Culture:

1. Additional assessment (Stage 2) is warranted because there is moderate to good potential for archaeological resources and there is no evidence that the area has been significantly disturbed.. The Ministry of Culture is requested to issue a letter concurring with these recommendations.
2. The above recommendations are subject to concurrence by the Ministry of Culture. It is an offence to destroy or alter an archaeological site without approval from the Ministry of Culture. No landscaping, grading or other activities that may result in the destruction or disturbance of any of the archaeological sites documented in this report is permitted prior to the Ministry of Culture's approval.
3. Although every reasonable effort was made to locate all archaeological resources, it is possible that some remain to be discovered within the study area. Should deeply buried archaeological material be found during construction, the Ministry of Culture in London (519-675-7742) and Mayer Heritage Consultants Inc. in London (519-652-1818 or 800-465-9990) should be immediately notified.
4. As on virtually any property in southern Ontario, it is possible that Aboriginal or Euro-Canadian burials could be present within the study area. In the event that human remains are encountered during construction, the proponent should immediately contact both the Ministry of Culture, and the Cemeteries Regulation Unit of the Ontario Ministry of Consumer and Commercial Relations in Toronto (416-326-8392), as well as the appropriate municipal police, the local coroner, and Mayer Heritage Consultants Inc.
5. The licensee shall keep in safekeeping all artifacts and records of archaeological fieldwork carried out under this licence, except where those artifacts and records are transferred to by the licensee to Her Majesty the Queen in right of Ontario or the licensee is directed to deposit them in a public institution in accordance with subsection 66(1) of the Act.

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**STAGE 2 ARCHAEOLOGICAL ASSESSMENT
REGIONAL ROAD #33 RE-ALIGNMENT
PART LOTS 27, 28, 29 & 30, LAKE RANGE
MUNICIPALITY OF SAUGEEN SHORES
FORMER GEOGRAPHIC TOWNSHIP OF SAUGEEN
BRUCE COUNTY, ONTARIO
ORIGINAL REPORT**

Prepared for

**County of Bruce
and
Ministry of Tourism, Culture and Sport**

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**License # P027, PIF #P027-0306-2017
June 1st, 2017**

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Executive Summary

The proponent retained the services of Scarlett Janusas Archaeology Inc. (SJA) to conduct a Stage 2 archaeological resource assessment on the property affected by the realignment of Regional Road #33.

Permission to access the property and to conduct all activities associated with the Stage 2 archaeological assessment was provided by the landowner. The property is an agricultural field. The study area is located on part of lots 27, 28, 29 and 30, Lake Range, in the geographic Township of Saugeen, Municipality of Saugeen Shores, in the County of Bruce. The study property is approximately 2.75 hectares in size.

The County of Bruce required an archaeological assessment of the property. The archaeological assessment was triggered by the Environmental Assessment Act..

Background indicated that there are no registered archaeological sites within one kilometer of the study area. There are no extant buildings on the property, and the property consists ploughed and weathered agricultural fields.

Belden's *1880 Historic Atlas of Grey and Bruce Counties* shows Lot 27, of the Lake Range concession as being under the ownership of J. Eidt.

Soils are identified as sandy loam with imperfect drainage. Field observations noted that the topography of the project area was relatively level with a range in elevation from 195-198 meters.

The Stage 2 archaeological assessment of the study property was conducted under license P027 (Scarlett Janusas, PIF #P027-0306-2017) on May 26th, 2017 under good assessment weather conditions. No archaeological sites were located.

Based upon the background research of past and present conditions, and the Stage 2 archaeological assessment the following is recommended:

- No further archaeological assessment is required for this property.
- Compliance legislation must be adhered to in the event of discovery of deeply buried cultural material or features.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism, Culture and Sport, 2011).

Table of Contents

| | |
|---|-----------|
| Executive Summary | ii |
| Project Personnel | iv |
| 1.0 PROJECT CONTEXT | 1 |
| 1.1 Development Context | 1 |
| 1.2 Indigenous Community Engagement | 1 |
| 1.3 Historical Context | 1 |
| 1.3.1 Stage 1 Land Use History | 2 |
| 1.4 Archaeological Context | 2 |
| 1.4.1 Previous Archaeological Assessments within 50 m of Area | 2 |
| 1.4.3 Current Environment | 2 |
| 1.4.4 Summary of Stage 1 Archaeological Assessment | 2 |
| 2.0 FIELD METHODOLOGY AND RESULTS | 3 |
| 2.1 Stage 2 Archaeological Assessment | 3 |
| 3.0 RESULTS | 8 |
| 3.1 Stage 2 Archaeological Assessment | 8 |
| 3.2 Summary of Finds | 8 |
| 3.3 Inventory of Documentary Records Made in Field | 8 |
| 4.0 ANALYSIS AND CONCLUSIONS | 9 |
| 5.0 RECOMMENDATIONS | 10 |
| 6.0 ADVICE ON COMPLIANCE WITH LEGISLATION | 12 |
| 7.0 BIBLIOGRAPHY AND SOURCES | 13 |
| MAPS | |
| 1. Regional Location of Study Area | 14 |
| 2. Topographic Map of Study Area | 15 |
| 3. Aerial of Study Property | 16 |
| 4. Regional Road 33 Concept Plan | 17 |
| 5. Location and Direction of Photographs | 18 |
| 6. Area of Archaeological Potential | 19 |
| 7. Assessment Methodology | 20 |
| IMAGES | |
| 1. Pedestrian survey of study area (facing SE) | 21 |
| 2. Study area from northeast end (facing SW) | 21 |
| 3. Good visibility (over 80%) for soil conditions (facing SW) | 21 |
| 4. Pedestrian survey of study area (facing W) | 21 |
| 5. Study area from southwest end (facing NE) | 21 |

Project Personnel

Project Manager
Principal Archaeologist

Scarlett Janusas (P027)

Report Preparation

Scarlett Janusas (P027)
Chelsea Robert (R403)

Field Director

Pete Demarte (R1073)

Field Crew

Chelsea Robert (R403)
Pete Demarte (R1073)

Graphics

Chelsea Robert

Saugeen Ojibway Nation
Representatives

Adrienne Brennan

**STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENT
REGIONAL ROAD #33 REALIGNMENT
PART LOT 37, 38, 39 & 30, LAKE RANGE
MUNICIPALITY OF SAUGEEN SHORES
FORMER GEOGRAPHIC TOWNSHIP OF SAUGEEN
BRUCE COUNTY, ONTARIO
ORIGINAL REPORT**

1.0 PROJECT CONTEXT

1.1 Development Context

The proponent retained the services of Scarlett Janusas Archaeology Inc. (SJAI) to conduct a Stage 2 archaeological resource assessment on property where the Regional Road #33 realignment will be occurring. The project area underwent an archaeological assessment by Mayer Heritage in 2010 under Project Information Form Number (PIF #) P040-313-2010.

Permission to access the property and to conduct all activities associated with the Stage 2 archaeological assessment was provided by the landowner. The property is ploughed field. The property is located on part of lots 28, 29 and 30, Lake Range, Municipality of Saugeen Shores, in the geographic township of Saugeen, the County of Bruce. The study area is approximately 2.75 hectares in size (Maps 1 – 4).

The archaeological assessment was triggered by the Environmental Assessment Act. The County of Bruce required an archaeological assessment of the property.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism, Culture and Sport, 2011).

1.2 Indigenous Engagement

Saugeen Ojibway Nation (SON) was contacted by SJAI regarding input and/or presence of monitors for the project on behalf of the client. The client entered into an agreement with SON and monitors were present during the entirety of the project. The Supplementary Documentation provides additional details regarding engagement.

1.3 Historical Context

The historical context describes the past and present land use and the settlement history, and other relevant historical information from previous archaeological work.

1.3.1 Stage 1 Land Use History

The Stage 1 archaeological assessment licence report for the project area was produced by Mayer Heritage Consulting (MHC) in 2010 (P040-313-2010) including a visual assessment conducted in February of 2010.

O'Neal (2010:10), who authored the report, indicated that the 1880 Historic Atlas of Grey and Bruce shows part of the property in the ownership of J. Eidt. There are no structures on the map, but this does not mean there were no structures or owners, as this is a subscriber based atlas. There is no other land use history provided by O'Neal.

1.4 Archaeological Context

1.4.1 Previously Known Archaeological Resources/Assessments

The Ministry of Tourism, Culture and Sport PastPortal site (2017) indicated there are no sites located within one kilometer of the study area. The Stage 1 archaeological assessment was conducted by MHC and was entitled *Archaeological Assessment (Stage 1) Bruce County Road 25, Re-Alignment, Port Elgin, Ontario* (Mayer Heritage Consultants Inc. 2010) under PIF# P040-313- 2010.

1.4.2 Current Environment

The study area consists of a ploughed agricultural field located on Lots 27, 28, 29 and 30 Lake Range in the municipality of Saugeen Shores, county of Bruce. There are no extant structures or ruins located on the property. The study area runs on a diagonal from Regional Road #33 north-east to Bruce Road 25 and is approximately 917 m long by 50 m wide. It is approximately 4.58 ha in area. There are no water sources located directly on the property.

1.4.3. Summary of Stage 1 Archaeological Assessment

The Stage 1 archaeological assessment (MHC 2010) recommended Stage 2 archaeological assessment based on the property's soil, topography, proximity to water, and undisturbed nature.

The study area was identified as being located in the Huron Slope physiographic region, soils were identified as sandy loam with imperfect drainage and topography smooth to very gently sloping (ibid: 6). At the time of the Stage 1 assessment, the consultant reported that there were no registered sites within two kilometres of the study area.

Based on all background research and a property visit (windshield), Stage 2 archaeological assessment was recommended for the property (ibid: 11).

2.0 FIELD METHODOLOGY

2.1 Stage 2 (Archaeological Assessment)

The Stage 2 archaeological assessment was conducted on May 26th, 2017 under overcast skies and a high of 11 degrees Celsius.

As per the Ministry of Tourism, Culture and Sports' Standards and Guidelines (2011: Section 2.1, Standard 3) the fieldwork was conducted under the appropriate lighting and weather conditions.

There are no unusual physical features affecting fieldwork.

The following table identifies the standard within the Ministry of Tourism, Culture and Sports' Standards and Guidelines document (2011) and how they were met with respect to Stage 2 Field Assessment.

| Standard Section | Standard | Action |
|-------------------------|--|----------------|
| Property Survey | | |
| 2.1, Standard 1 | Survey the entire property, including lands immediately adjacent to built structures (both intact and ruins), excepting those areas identified by Section 2.1, Standard 2 | Done |
| 2.1, Standard 2a | Survey is not required where: a. lands are evaluated as having no or low potential based on the Stage 2 identification of physical features of no or low archaeological potential, including but not limited to: permanently wet areas, exposed bedrock, steep slopes (greater than 20°) except in locations likely to contain pictographs or petroglyphs b. lands are evaluated as having no or low potential based on the Stage 2 identification of extensive and deep land alteration that has severely damaged the integrity of archaeological resources c. lands have been recommended to not require Stage 2 assessment by a Stage 1 report, where the ministry has accepted the Stage 1 report into the Ontario Public Register of Archaeological Reports d) lands are designated for forest management activity without potential for impacts to archaeological sites, as determined through the Stage 1 forest management plans process (see section 1.4.3) e) lands are formally prohibited from alteration such as areas in an environmental easement, | Not Applicable |

| Standard Section | Standard | Action |
|---------------------------|---|--|
| | restrictive setback, or prohibitive zoning, where the constraint prohibits any form of soil disturbance. (Open space and other designations where allowable uses include land alterations must be surveyed.) f) it has been confirmed that the lands are being transferred to a public land-holding body, e.g., municipality, conservation authority, provincial agency. (This does not apply to lands for which a future transfer is contemplated but not yet confirmed.) | |
| 2.1, Standard 3 | Survey the property when weather and lighting conditions permit good visibility of land features | May 26 th , 2017. Overcast skies, high of 11°C |
| 2.1, Standard 4 | Using the Global Positioning System (GPS) according to the requirements set out in section 5, record the locations of the following: all diagnostic artifacts, sufficient artifacts to provide an estimate of the limits of the archaeological site, and all fixed reference landmarks | Done. Site marked with survey stakes which are based on site plan. GPS: GPSMap60Cx Accuracy: ±2m |
| 2.1, Standard 5 | Map all field activities (e.g., extent and location of survey methods, survey intervals) in reference to fixed landmarks, survey stakes and development markers. Mapping must be accurate to 5 m or to the best scale available. Use any mapping system that achieves this accuracy. | Done |
| 2.1, Standard 6 | Photo-document examples of all field conditions encountered | Done |
| 2.1, Standard 7 | Do not use heavy machinery (e.g., gas-powered augers, backhoes) to remove soil, except when removing sterile or recent fill covering areas where it has been determined that there is the potential for deeply buried or sealed archaeological sites | Done – no use of heavy machinery |
| Pedestrian Survey | | |
| 2.1.1, Standard 1 | Actively or recently cultivated agricultural land must be subject to pedestrian survey. | Done |
| 2.1.1., Standard 2 | Land to be surveyed must be recently ploughed. Use of chisel ploughs is not acceptable. In heavy clay soils ensure furrows are disked after ploughing to break them up further. | Done |
| 2.1.1, Standard 3 | Land to be surveyed must be weathered by one heavy rainfall or several light rains to improve the visibility of archaeological resources. | Done |

| Standard Section | Standard | Action |
|--------------------------|--|----------------|
| 2.1.1, Standard 4 | Provide direction to the contractor undertaking the ploughing to plough deep enough to provide total topsoil exposure, but not deeper than previous ploughing. | Done |
| 2.1.1, Standard 5 | At least 80% of the ploughed ground surface must be visible. If surface visibility is below 80% (e.g., due to crop stubble, weeds, young crop growth), ensure the land is re-ploughed and weathered before surveying. | Done |
| 2.1.1, Standard 6 | Space survey transects at maximum intervals of 5 m | Done |
| 2.1.1, Standard 7 | When archaeological resources are found, decrease survey transects to 1 m intervals over a minimum of a 20 m radius around the find to determine whether it is an isolated find or part of a larger scatter. Continue working outward at this interval until the full extent of the surface scatter has been defined. | Not applicable |
| 2.1.1, Standard 8 | Collect all formal artifact types and diagnostic categories. For 19th century archaeological sites, also collect all refined ceramic sherds (or, for larger sites collect a sufficient sample to form the basis for accurate dating). | Not applicable |
| 2.1.1, Standard 9 | Based on professional judgment, strike a balance between gathering enough artifacts to document the archaeological site and leaving enough in place to relocate the site if it is necessary to conduct further assessment | Not applicable |
| Test Pit Survey | | Not applicable |
| 2.1.2, Standard 1 | Test pit survey only on terrain where ploughing is not possible or viable, as in the following examples: wooded areas, pasture with high rock content abandoned farmland with heavy brush and weed growth, orchards and vineyards that cannot be strip ploughed (planted in rows 5 m apart or less), gardens, parkland or lawns, any of which will remain in use for several years after the survey properties where existing landscaping or infrastructure would be damaged. The presence of such obstacles must be documented in sufficient detail to demonstrate that ploughing or cultivation is not viable. | Not applicable |
| 2.1.2, Standard 2 | Test pits were spaced at maximum intervals of 5 m (400 test pits per hectare) in areas less than 300 m from any feature of archaeological potential. | Not applicable |

| Standard Section | Standard | Action |
|--------------------------|--|----------------|
| 2.1.2, Standard 3 | Space test pits at maximum intervals of 10 m (100 test pits per hectare) in areas more than 300 m from any feature of archaeological potential | Not applicable |
| 2.1.2, Standard 4 | Test pit to within 1 m of built structures (both intact and ruins), or until test pits show evidence of recent ground disturbance | Not applicable |
| 2.1.2, Standard 5 | Ensure that test pits are at least 30 cm in diameter. | Not applicable |
| 2.1.2, Standard 6 | Excavate each test pit, by hand, into the first 5 cm of subsoil and examine the pit for stratigraphy, cultural features, or evidence of fill. | Not applicable |
| 2.1.2 Standard 7 | Screen soil through mesh no greater than 6 mm. | Not applicable |
| 2.1.2 Standard 8 | Collect all artifacts according to their associated test pit | Not applicable |
| 2.1.2 Standard 9 | Backfill all test pits unless instructed not to by the landowner. | Not applicable |

Map 4 illustrates the plan of survey for the property. Map 5 illustrates the images taken of the archaeological assessment (Images 1 - 5), Map 5 illustrates the archaeological potential of the property, and, Map 7 illustrates assessment methodology.

One hundred percent of the property was subject to Stage 2 archaeological assessment using a pedestrian transect methodology. No cultural materials or features were located in the study area.

Section 2.2 of the Standards and Guidelines (MTC 2011) sets out standards to determine the need for Stage 3 archaeological assessment.

| Standard Section | Standard | Action |
|--|--|----------------|
| Section 2.2, Analysis, Determining Requirement for Stage 3 Assessment | | |
| 2.2, Standard 1 | Artifacts, groups of artifacts or archaeological sites meeting the following criteria require Stage 3 assessment | |
| 2.2, Standard 1a | Pre-contact diagnostic artifacts or a concentration of artifacts (or both) | Not applicable |
| 2.2, Standard 1a, i | Within a 10 x 10 m pedestrian survey area | |
| 2.2, Standard 1a, i, (1) | At least one diagnostic artifact or fire cracked rock in addition to two or more non-diagnostic artifacts | Not applicable |

| Standard Section | Standard | Action |
|----------------------------------|---|----------------|
| 2.2, Standard 1a, i, (2) | In areas east or north of the Niagara Escarpment, at least five non-diagnostic artifacts | Not applicable |
| 2.2, Standard 1a, i, (3) | In areas west of the Niagara Escarpment, at least 10 non-diagnostic artifacts | Not applicable |
| 2.2, Standard 1a, ii | Within a 10 x 10 m test pitting area | |
| 2.2, Standard 1a, ii, (1) | At least one diagnostic artifact from combined test pit and test unit excavations | Not applicable |
| 2.2, Standard 1a, ii, (2) | At least five non-diagnostic artifacts from combined test pit and test unit excavations. | Not applicable |
| 2.2, Standard 1b | Single examples of artifacts of special interest | Not applicable |
| 2.2, Standard 1b, i | Aboriginal ceramics | Not applicable |
| 2.2, Standard 1b, ii | Exotic or period specific cherts | Not applicable |
| 2.2, Standard 1b, iii | An isolated Paleo-Indian or Early Archaic diagnostic artifact | Not applicable |
| 2.2, Standard 1c | Post-contact archaeological sites containing at least 20 artifacts that date the period of use to before 1900. | Not applicable |
| 2.2, Standard 1d | Twentieth century archaeological sites, where background documentation or archaeological features indicate possible cultural heritage value or interest | Not applicable |
| 2.2, Standard 1e | The presence of human remains | Not applicable |

No cultural materials or features were located in the study area, hence, there is no requirement to conduct Stage 3 archaeological assessment of the study area.

3.0 RESULTS

3.1 Stage 2 Archaeological Assessment

According to Standard 7.8.2 (MTC 2011) the following is required and has been satisfied or found to be non-applicable.

| Standard | Detail | Action |
|---------------------------|--|--|
| 7.8.2 Standard 1a | A general description of the types of artifacts and features that were identified. | Not applicable |
| 7.8.2, Standard 1b | A general description of the area within which artifacts and features were identified including the spatial extent of the area and any relative variations in artifact density | Not applicable |
| 7.8.2, Standard 1c | A catalogue and description of all artifacts retained. | Not applicable |
| 7.8.2, Standard 1d | A description of the artifacts and features left in the field, nature of material, frequency, other notable traits. | Not applicable |
| 7.8.2, Standard 2 | Provide an inventory of the documentary record generated in the field. | Digital Photographs of field conditions and site. Field notes of field conditions and site. Daily Record Log of personnel, weather conditions, hours, field conditions (see Section 3.4) |
| 7.8.2, Standard 3 | Submit information detailing exact site locations on the property, separately from the project report. | Not applicable |
| 7.8.2, Standard 3a | A table of GPS readings for locations of all archaeological sites | Not applicable |
| 7.8.2, Standard 3b | Maps showing detailed site location information | Not applicable |

3.2 Summary of Finds

No cultural material or features were located during the Stage 2 archaeological assessment.

3.3 Inventory of Documentary Records Made In Field

Documents made in the field include:

- Daily record log and field notes – 2 pages
- Photograph log – 1 page
- Digital photographs – 5 photographs
- Field map showing location and orientation of photos taken.

4.0 ANALYSIS AND CONCLUSIONS

The following illustrates the standards and actions regarding analysis and conclusions.

| Standard | Description | Action |
|--|---|--------------------------|
| 7.8.3 (Analysis and Conclusions) Standard 1 | Summarize all findings from the Stage 2 survey, or state that no archaeological sites were identified. | No sites were identified |
| 7.8, Standard 2 | For each archaeological site, provide the following analysis and conclusions: | |
| 7.8, Standard 2a | A preliminary determination, to the degree possible, of the age and cultural affiliation of any archaeological sites identified | Not Applicable |
| 7.8, Standard 2b | A comparison against the criteria in 2 Stage 2: Property Assessment to determine whether further assessment is necessary. | Not Applicable |
| 7.8, Standard 2c | A preliminary determination regarding whether any archaeological sites identified in Stage 2 show evidence of a high level of cultural heritage value or interest and will thus require Stage 4 mitigation. | Not Applicable |

One hundred percent of the study area was subject to Stage 2 archaeological assessment.

No cultural material or features were located during the Stage 2 archaeological assessment.

Based on Section 2.2 of the Standards and Guidelines, no further archaeological assessment is required for this property.

5.0 RECOMENDATIONS

| Standard | Description | Compliance |
|--|--|---|
| 7.8.4 (General Recommendations) | For each archaeological site, provide a statement of the following: | |
| 7.8.4, Standard 1a | Borden No. or other identifying number | Not applicable |
| 7.8.4, Standard 1b | Whether or not it is of further cultural heritage or interest. | Not applicable |
| 7.8.4, Standard 1c | Where it is of further cultural heritage or interest, appropriate Stage 3 assessment strategies | Not applicable |
| 7.8.4, Standard 2 | Make recommendations only regarding archaeological matters. | Not applicable |
| 7.8.4, Standard 3 | If the Stage 2 survey did not identify any archaeological sites requiring further assessment or mitigation of impacts, recommend that no further archaeological assessment of the property be required. | Recommend that no further archaeological assessment of the property is required |
| 7.8.5 Recommendations for Partial Clearance | | |
| 7.8.5 Standard 1 | A recommendation for partial clearance may only be made if all of the following conditions have been met: | Not applicable |
| 7.8.5, Standard 1a | Stage 2 archaeological fieldwork has been completed within the entire project limits (Archaeological sites are present that still require Stage 3, and possibly Stage 4, archaeological fieldwork)) | Not applicable |
| 7.8.5, Standard 1b | The recommendation forms part of a final report on the Stage 2 work. | Not applicable |
| 7.8.5, Standard 1c | The recommendation includes a request for the ministry to provide a letter confirming that there are no further concerns with regard to alterations to archaeological sites for some specified part of the project area. | Not applicable |
| 7.8.5, Standard 1d | The Stage 2 report includes recommendations for further archaeological fieldwork for all sites that meet the criteria requiring Stage 3 archaeological field assessment. | Not applicable |
| 7.8.5, Standard 1e | Include the following documentation in the report package | |

| Standard | Description | Compliance |
|---------------------------------|--|----------------|
| 7.8.5, Standard 1 e, i | Development map showing the location and extent of all archaeological sites for which Stage 3 archaeological assessment is recommended, including a 20 m protective buffer zone for each site, and a 50 m monitoring zone for each site. | Not applicable |
| 7.8.5, Standard 1 e, ii | Detailed avoidance strategy, and written confirmation from the proponent regarding the proponent's commitment to implementing the strategy and confirmation that ground alterations (e.g. servicing, landscaping) will avoid archaeological sites with outstanding concerns and their buffer areas | Not applicable |
| 7.8.5, Standard 1 e, iii | Construction monitoring schedule, and written confirmation from the proponent that a licensed consultant archaeologist will monitor construction in areas within the 50 m monitoring buffer zone, and that the consultant archaeologist is empowered to stop construction if there is a concern for impact to an archaeological site | Not applicable |
| 7.8.5, Standard 1 e, iv | Timeline for completing remaining archaeological fieldwork. | Not applicable |

It is recommended that no further archaeological assessment of the property is required.

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

According to the 2011 Standards and Guidelines (Section 7.5.9) the following must be stated within this report:

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological 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 Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

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

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

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

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

7.0 BIBLIOGRAPHY AND SOURCES

Government of Ontario

1990a **The Ontario Heritage Act R.S.O. 1990.** Ontario Regulation 9/06, made under the Ontario Heritage Act. Criteria for Determining Cultural Heritage Value or Interest. Queen's Printer, Toronto.

1990b **The Planning Act. R.S.O. 1990**

Ministry of Tourism and Culture

2011 **Standards and Guidelines for Consulting Archaeologists.** Ministry of Tourism, Culture and Sport

Natural Resources Canada

n.d. Toporama – Topographic Maps. Accessed May 24 2017. On line

On Line and Other Sources

Bruce County Interactive Mapping

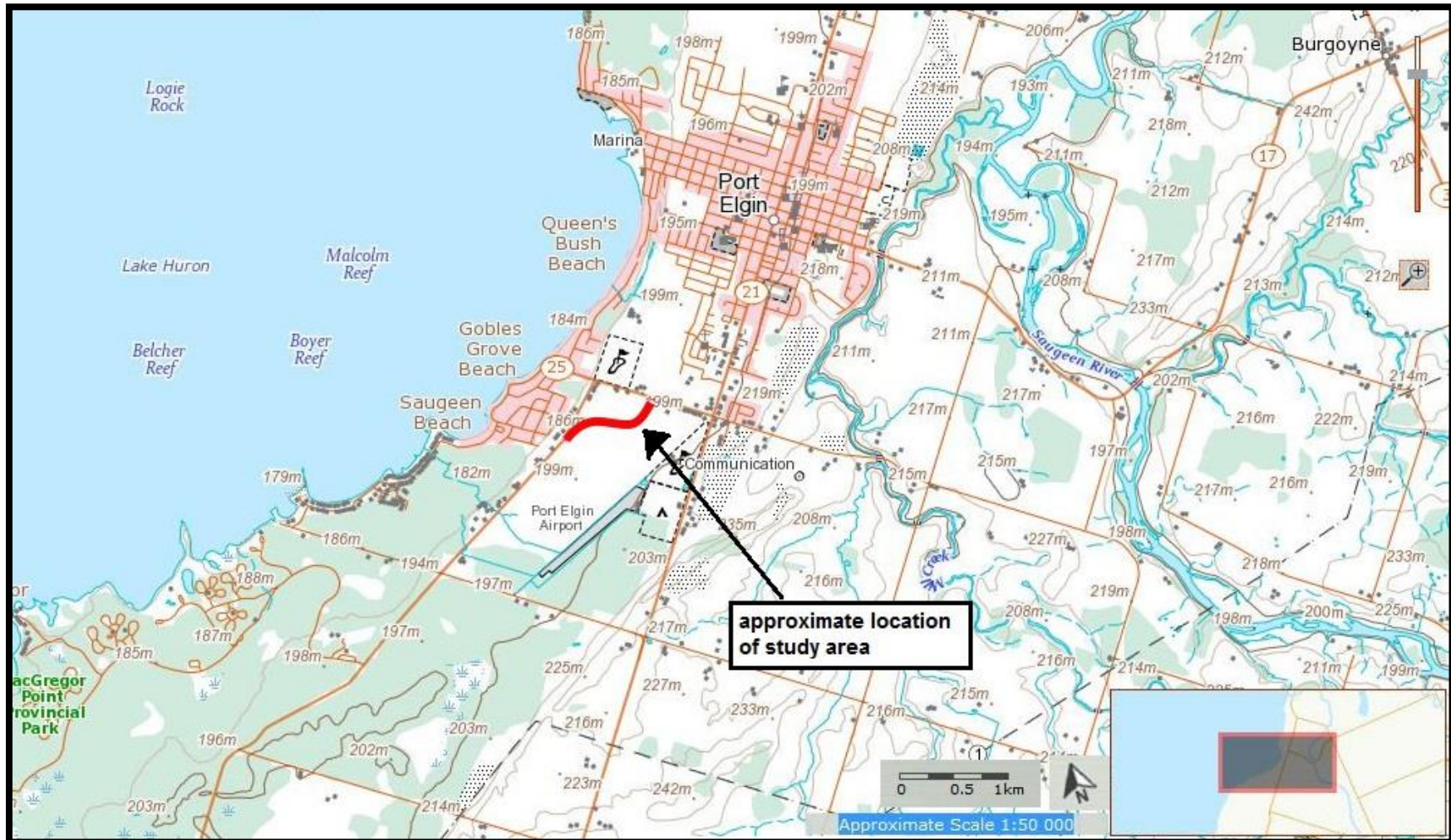
www.Brucecounty.on.ca/map

Topographic Mapping

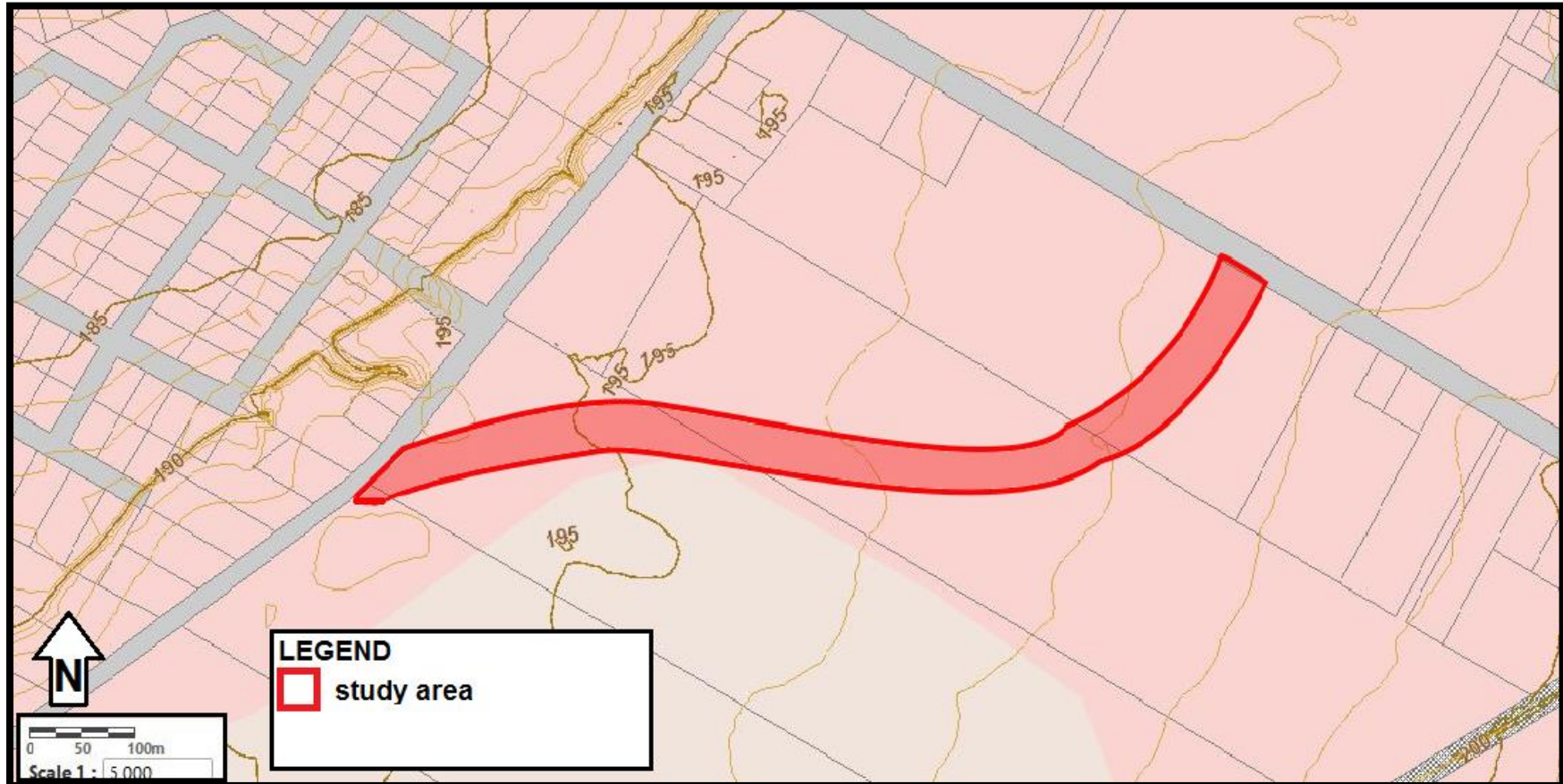
www.atlas.nrcan.gc.ca

MAPS

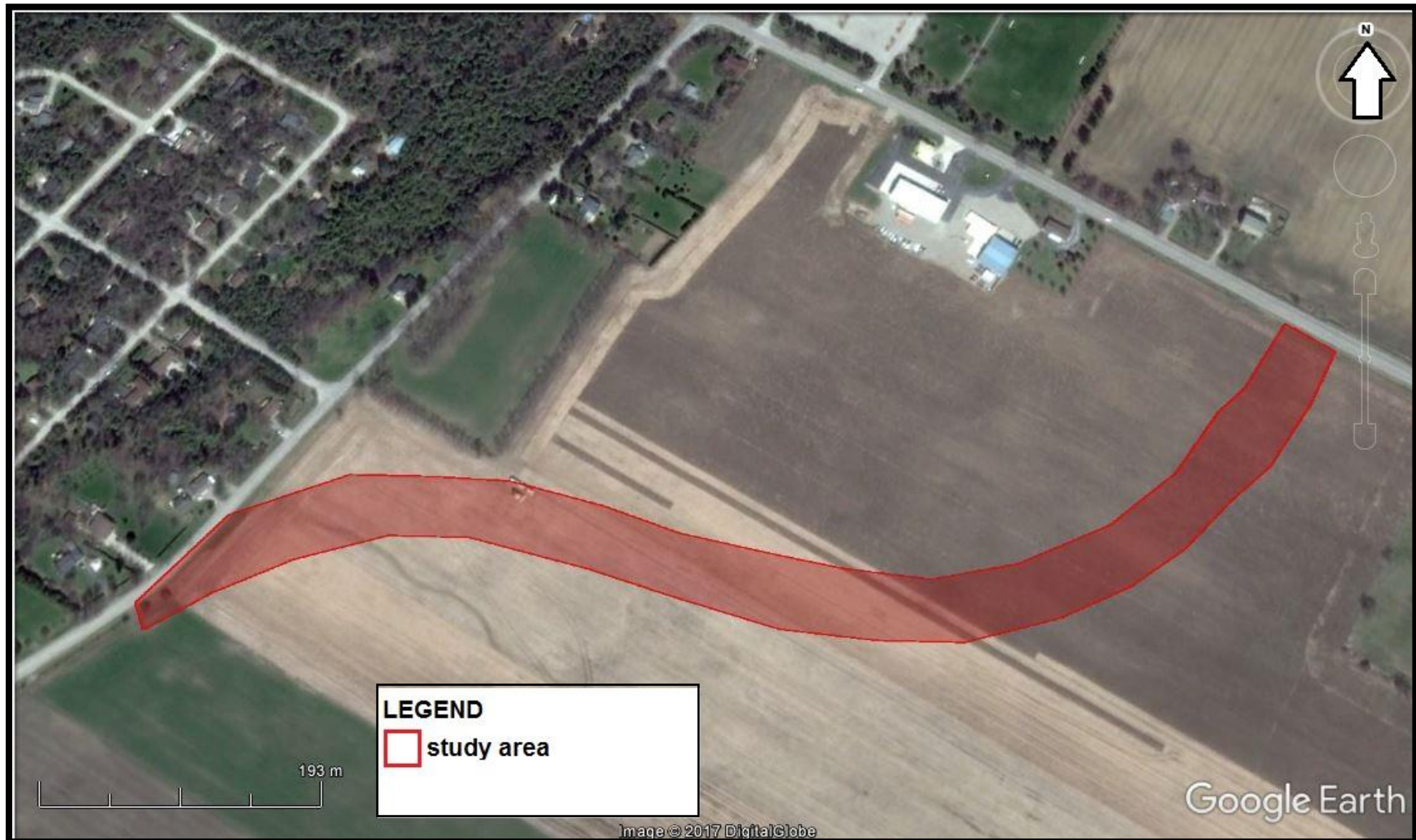
Map 1: Regional Location of Study Area (Toporama 2017)



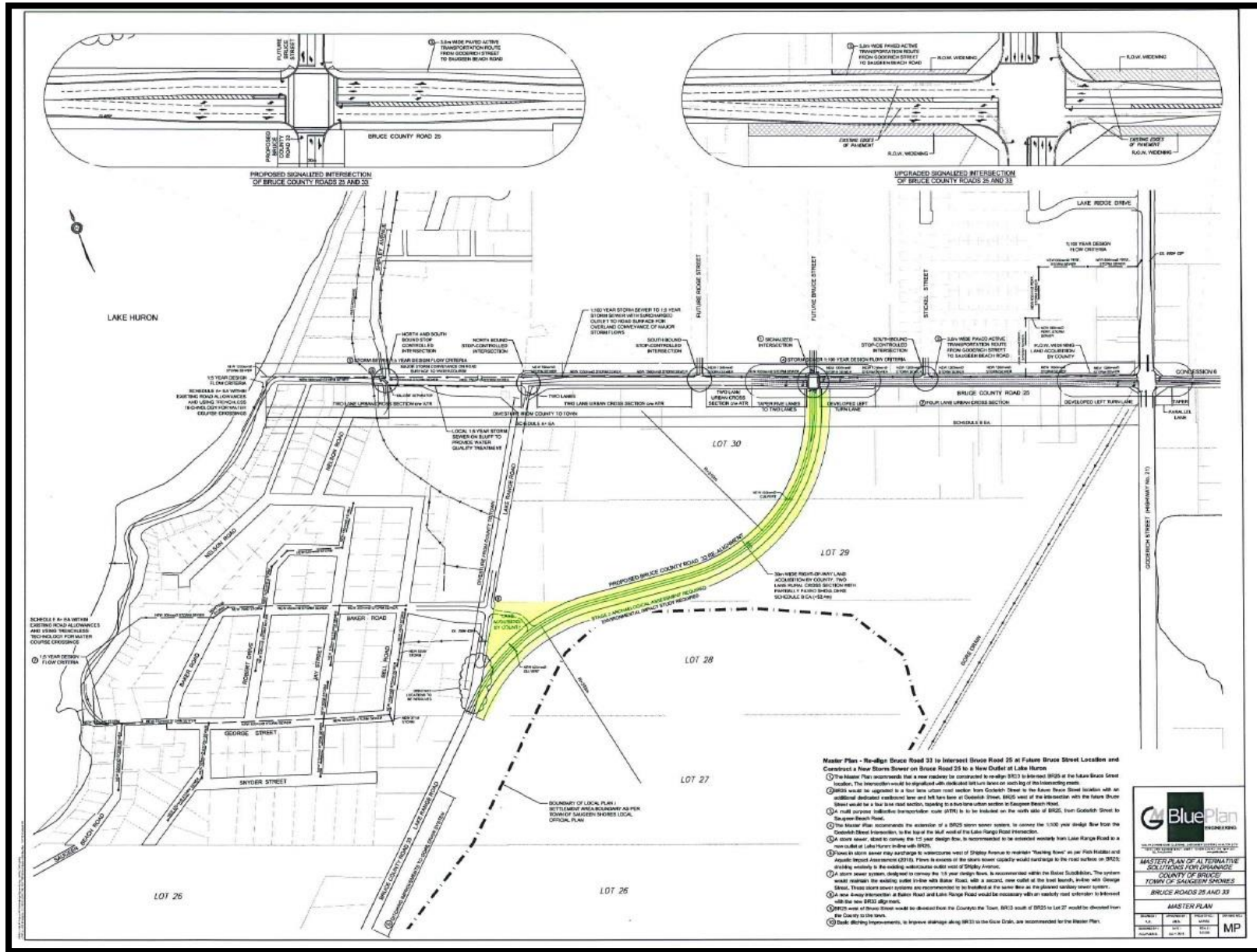
Map 2: Topographic Map of Study Area (Bruce County Mapping 2017)



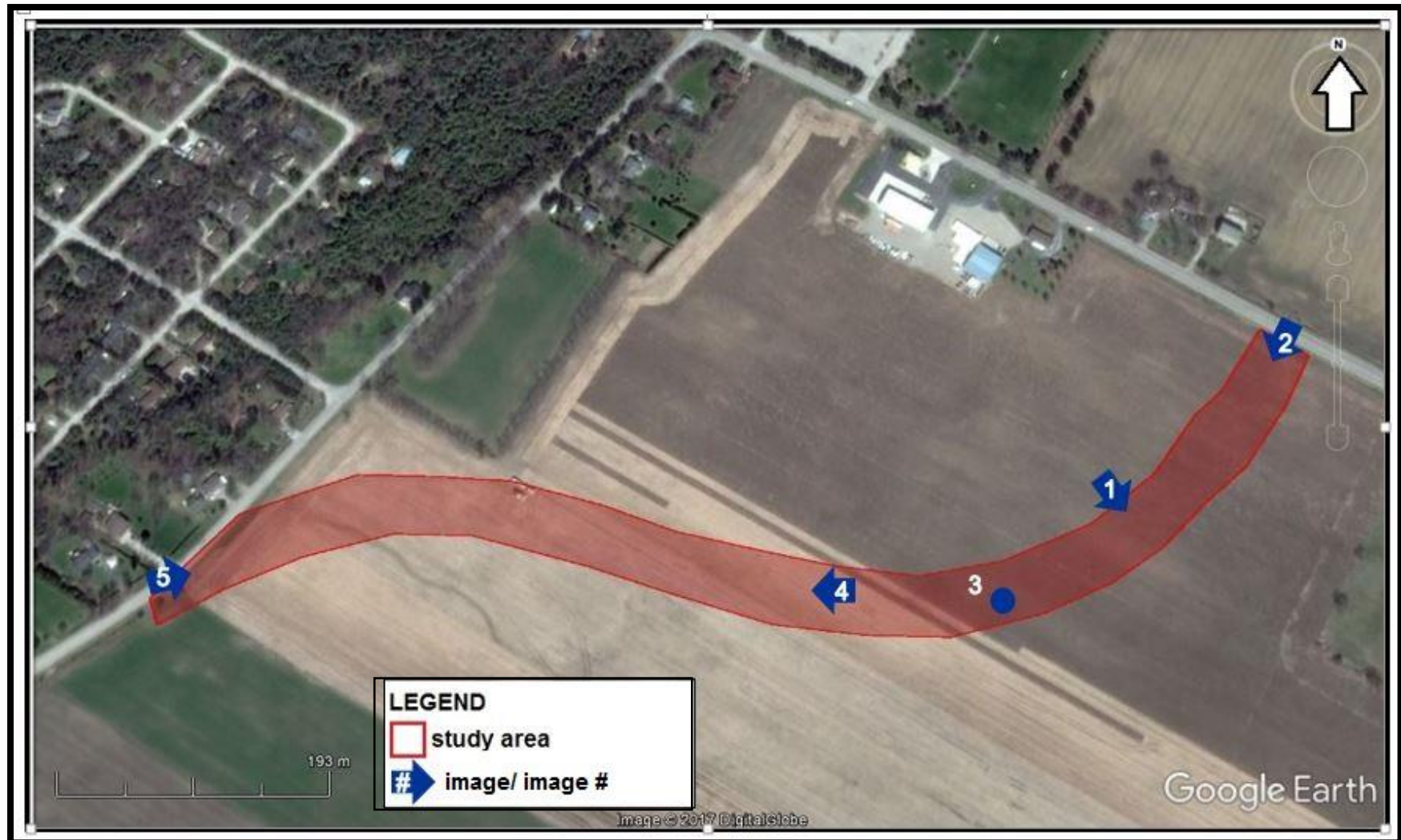
Map 3: Aerial of Study Property (Bruce County Mapping 2015)



Map 4: Regional Road 33 Concept Plan



Map 5: Location & Direction of Photographs



Map 6: Area of Archaeological Potential



Map 7: Assessment Methodology



IMAGES

Image 1: Pedestrian survey of study area (facing SE)



Image 2: Study area from northeast end (facing SW)



Image 3: Good visibility (over 80%) for soil conditions (facing SW)



Image 4: Pedestrian survey of study area (facing W)



Image 5: Study area from southwest end (facing NE)



APPENDIXES

APPENDIX A – Photo Log

| Image # | Direction | Description |
|---------|-----------|--|
| 1 | SE | Pedestrian survey |
| 2 | SW | Study area from N side of property |
| 3 | SW | Good visibility (over 80%) for soil conditions |
| 4 | W | Pedestrian survey |
| 5 | NE | Study area from W side of property |

PHASE 4
PRELIMINARY (CLASS D) CONSTRUCTION COST ESTIMATE
CONSTRUCTION OF BRUCE COUNTY ROAD 33
FROM STA. 0+000 to STA. 0+935
250m WEST OF RIDGE STREET TO HIGHWAY No. 21
OCTOBER, 2017

File No. 217127

| Item No. | Description | Qty. | Unit of Measure | Unit Price | Total Price |
|------------------------------|--|--------|-----------------|------------|-----------------|
| Road Works | | | | | |
| 1 | Clearing and grubbing | 100% | L.S. | 10,000.00 | 10,000.00 |
| 2 | Removal of bituminous surfaces | 1,200 | m ² | 5.00 | 6,000.00 |
| 3 | Earth Excavation | 2,000 | m ³ | 7.50 | 15,000.00 |
| 4 | Topsoil Stripping | 8,500 | m ³ | 3.00 | 25,500.00 |
| 5 | Granular "B" | 20,000 | tonne | 15.00 | 300,000.00 |
| 6 | Granular "A" | 6,000 | tonne | 20.00 | 120,000.00 |
| 7 | Hot mix asphalt | 2,700 | tonne | 95.00 | 256,500.00 |
| 8 | Landscaping, topsoil, seed and mulch | 10,000 | m ² | 5.00 | 50,000.00 |
| 9 | Signage | 100% | L.S. | 2,500.00 | 2,500.00 |
| 10 | Traffic control | 100% | L.S. | 10,000.00 | 10,000.00 |
| 11 | Pavement markings | 100% | L.S. | 10,000.00 | 10,000.00 |
| Subtotal for Road Works | | | | | 805,500.00 |
| Storm Sewers | | | | | |
| 12 | Removal of culverts | 30 | m | 20.00 | 600.00 |
| 13 | 525 Ø Culverts | 45 | m | 200.00 | 9,000.00 |
| 14 | 450mm Ø storm sewers | 60 | m | 155.00 | 9,300.00 |
| 15 | Headwall | 1 | each | 20,000.00 | 20,000.00 |
| 16 | SWM Pond allowance | 100% | L.S. | 150,000.00 | 150,000.00 |
| 17 | Rip-rap with filter fabric | 100 | m ² | 35.00 | 3,500.00 |
| Subtotal for Storm Sewers | | | | | 192,400.00 |
| Sanitary Sewers | | | | | |
| 18 | 1200 mm Ø sanitary manholes | 4 | each | 4,500.00 | 18,000.00 |
| 19 | 250 mm Ø sanitary sewers (incl. plugs) | 375 | m | 200.00 | 75,000.00 |
| Subtotal for Sanitary Sewers | | | | | 93,000.00 |
| Watermains | | | | | |
| 20 | 250 mm Ø watermain | 950 | m | 235.00 | 223,250.00 |
| 21 | 250 mm Ø valves | 12 | each | 2,300.00 | 27,600.00 |
| 22 | 250 mm Ø bends | 8 | each | 475.00 | 3,800.00 |
| 23 | 250 mm Ø plugs | 2 | each | 250.00 | 500.00 |
| 24 | Fire hydrants | 9 | each | 5,000.00 | 45,000.00 |
| Subtotal for Watermains | | | | | 300,150.00 |
| PROJECT SUBTOTAL | | | | | \$ 1,391,050.00 |
| Contingencies @ 15% | | | | | \$ 208,657.50 |
| Engineering @ 15% | | | | | \$ 208,657.50 |
| PROJECT TOTAL | | | | | 1,808,365.00 |



AWS Environmental Consulting Inc.
(Operating as Aquatic and Wildlife Services)

**242090 Concession Rd. 3 Keppel,
R.R. # 1, Shallow Lake, Ontario, Canada, N0H 2K0**

Office: 519-372-2303, Email: aws@gbtel.ca

Web site: www.awsenvironmental.ca

July 26, 2017

GM BluePlan Engineering Limited
1260 2nd Avenue East
Owen Sound, ON
N4K 2J3

Attention: Mr. John Slocombe, Project Manager

Re: Natural Heritage Environmental Impact Assessment
Bruce County Road 33 Realignment-Port Elgin Area
Municipal Class Environmental Assessment/Municipal Infrastructure Project

Dear Mr. Slocombe

Attached is the Environmental Impact Assessment letter report scoped to 'Species-At-Risk' , for the subject County Road 33 realignment proposed works near Port Elgin.

Respectfully Submitted

John Morton
President, AWS Environmental Consulting Inc.

cc The Town of Saugeen Shores

Attachment: EIS-SAR letter report

Bruce County Road 33 Realignment
Scoped Natural Heritage Environmental Impact Study

1. Introduction

The County of Bruce as Proponent, with the Town of Saugeen Shores has proposed a realignment to a portion of Bruce Road 33 at its intersection with Bruce Road 25, near the settlement of Port Elgin, Ontario.

To aid in addressing environmental concerns under the Municipal Class Environmental Assessment process, a Natural Heritage Feature review and 'Species-At-Risk' survey with impact assessment has been completed in support of the recommended alternative design found within the Master Plan.

2. Study and Site Lands

The Study Lands are defined as those lands assessed in the field where the road construction works to Bruce Rd 33 are to be realigned and its immediate adjacent 25m lands.

The Site Lands are defined as the road realignment lands plus the surrounding 120m lands, for natural heritage feature and historical records background review, as per the 2014 Provincial Policy Statement for Natural Heritage.

Appendix No. 1 shows the Master Plan site plan design of the Bruce Road 33 realignment by GM BluePlan Engineering Ltd.

Figure No. 1 outlines the EIS Study and Site Lands on a July 2015 air photo, based on the Master Plan design.

3. Background Review

i. Natural Heritage Features

Figure No. 2, shows no significant Natural Heritage features or environmental constraints documented within the Bruce County Official Plan (OP) to the Site Lands. Similarly Figure No. 3 shows no Provincially Significant Natural Heritage features, sourced from the Ministry of Natural Resources and Forestry (MNRF) web site mapping to the Site Lands.

ii. Historical Records

Table No. 2: MNRF Significant Flora & Fauna Records within 5km's to the Study Lands

- Excluding fauna within Lake Huron or Saugeen River waters

| Common Name | Scientific Name | Status | Last Recorded in Search Area | Habitat & Impact Concerns |
|----------------------------|-------------------------|--|------------------------------|----------------------------------|
| Butternut | Juglans Cinerea | Ranking = S2 Status = Endangered | 2008 | Potential along field edge |
| Small White Lady's-slipper | Cypripedium candidum | Ranking = S1 Status= Endangered | 1903 | No suitable habitat, no concerns |
| Bobolink | Dolichonyx oryzivorus | Ranking = S4 Status= Threatened | 2003 | Potential nesting habitat |
| Eastern Meadowlark | Stunella magna | Ranking = S4 Status = Threatened | 2003 | Potential nesting habitat |
| Northern Map Turtle | Graptemys geographica | Ranking = S3 Status = Special Concern | 1981 | No suitable habitat, no concerns |
| Snapping Turtle | Chelydra serpentina | Ranking = S3 Status = Special Concern | 2003 | No suitable habitat, no concerns |
| Dwarf Lake Iris | Iris lacustris | Ranking = S3 Status = Special Concern | 1952 | No suitable habitat, no concerns |
| Eastern Ribbonsnake | Thamnophis sauritus | Ranking = S3 Status = Special Concern | 1981 | No suitable habitat, no concerns |
| Eastern Milksnake | Lampropeltis triangulum | Ranking = S3 Status = Special Concern | 1973 | Potential along field edge |

- Through the above historical records check and the Site Lands preliminary habitat assessment through air photo interpretation, field survey works were focused on: Butternut investigations, Breeding Bird survey works and Snake activity. Though observations of any significant flora and fauna within the Study Lands investigations would be recorded.

4. Survey Dates and Weather Conditions

Table No. 1: Field Survey Dates and Conditions, to Provincial Protocol Standards

| Date | Time | Weather | Focused Survey Works |
|---------------|-----------|---|--|
| May 12, 2017 | 1000-1030 | Temp. = 11.5C Wind = 6-11 km/hour Precipitation = 0 | Hydrology, Snake hibernation emergence activity period |
| May 31, 2017 | 0700-0730 | Temp. =14.5C Wind = 12-19 km/hour Precipitation = 0 | Breeding Birds |
| June 10, 2017 | 0745-0800 | Temp. = 18C Wind = 6-11 km/hour Precipitation = 0 | Breeding Birds |
| June 28, 2017 | 0800-0830 | Temp. = 15C Wind = 6-11 km/hour Precipitation = 0 | Breeding Birds, Flora |

5. Flora Findings

No Butternut or any significant flora species were identified within the Study Lands. The field environment was in active agricultural cash crop production, with soy beans planted in 2017. The road allowance ditch - field edge were primarily grasses with patches of weeds (non- native) and scattered immature Sugar Maple and Spruce trees.

6. Fauna Findings

With no water courses or surface water features within the Study Lands it has been confirmed in the field that there is no Fish Habitat. Site investigations did not record any mammals, reptiles or amphibians within the Study Lands during the site investigations. Additionally, no critical habitat for amphibian breeding, reptile hibernation or gestation, mammal roosting or rearing was identified within the Study Lands, to provincial habitat descriptions.

No SAR snakes (Milksnake) or suitable critical habitat that could support hibernation or gestation activity was identifiable to provincial habitat criteria, within the Study Lands. No critical roosting or rearing habitat for SAR Bats was identified within the Study Lands to provincial habitat criteria.

Breeding bird survey works recorded the following species and numbers:

- Killdeer, 1
- White -throated Sparrow, 3
- Blue Jay, 1
- Brown-headed Cowbird, 2
- House Finch, 1
- American Goldfinch, 4

All of the observed bird species are considered 'common' with no significance status or regulatory requirements.

No, SAR Birds were recorded within the Study Lands investigations, nor observed within the immediate surrounding field environments to the Study Lands.

7. Impact Assessment

Site investigations of 2017 confirmed that no At Risk Species occur within the Study Lands. As such, the proposed road construction activities would be in compliance with the Provincial Endangered Species Act and the Federal Species At Risk Act.

8. Recommended Mitigation

On-site investigations confirmed that a few locally common bird species utilized the road allowance-field edge habitat for nesting, rearing activity.

As such, if no construction site preparation works are undertaken, it is recommended that no Tree cutting or vegetation removal should occur within the construction limits from May 1 to August 31 in compliance with the Federal Migratory Birds Act.

Alternatively, if construction work is proposed to be undertaken during this nesting/rearing period the following activities are recommended to discourage bird nesting activity, but the proponents should be aware that construction activity may not be in compliance with the Migratory Birds Act:

- Site preparation works for tree/shrub removal be completed outside the bird nesting/rearing period.
- The field environment should be maintained, in a non-grass environment (i.e. in cash crop soy beans, corn, canola etc.) to discourage grassland nesting birds. If this field environment supports grasses at the time of construction, additional SAR bird survey works would be required in that year and may require application/permitting under the Provincial Endangered Species Act if SAR birds are confirmed that year.
- Site preparation works along the road allowance pre-construction activity, should include road allowance grass mowing/cutting, so that ground flora does not exceed 4cm height.
- Prior to construction related site alterations commencing, the construction zone area shall be field checked by a qualified person for breeding bird activity with any identified nesting sites mapped and no disturbances to those immediate nests for non-SAR bird species.
- Respectfully Submitted

Respectfully Submitted



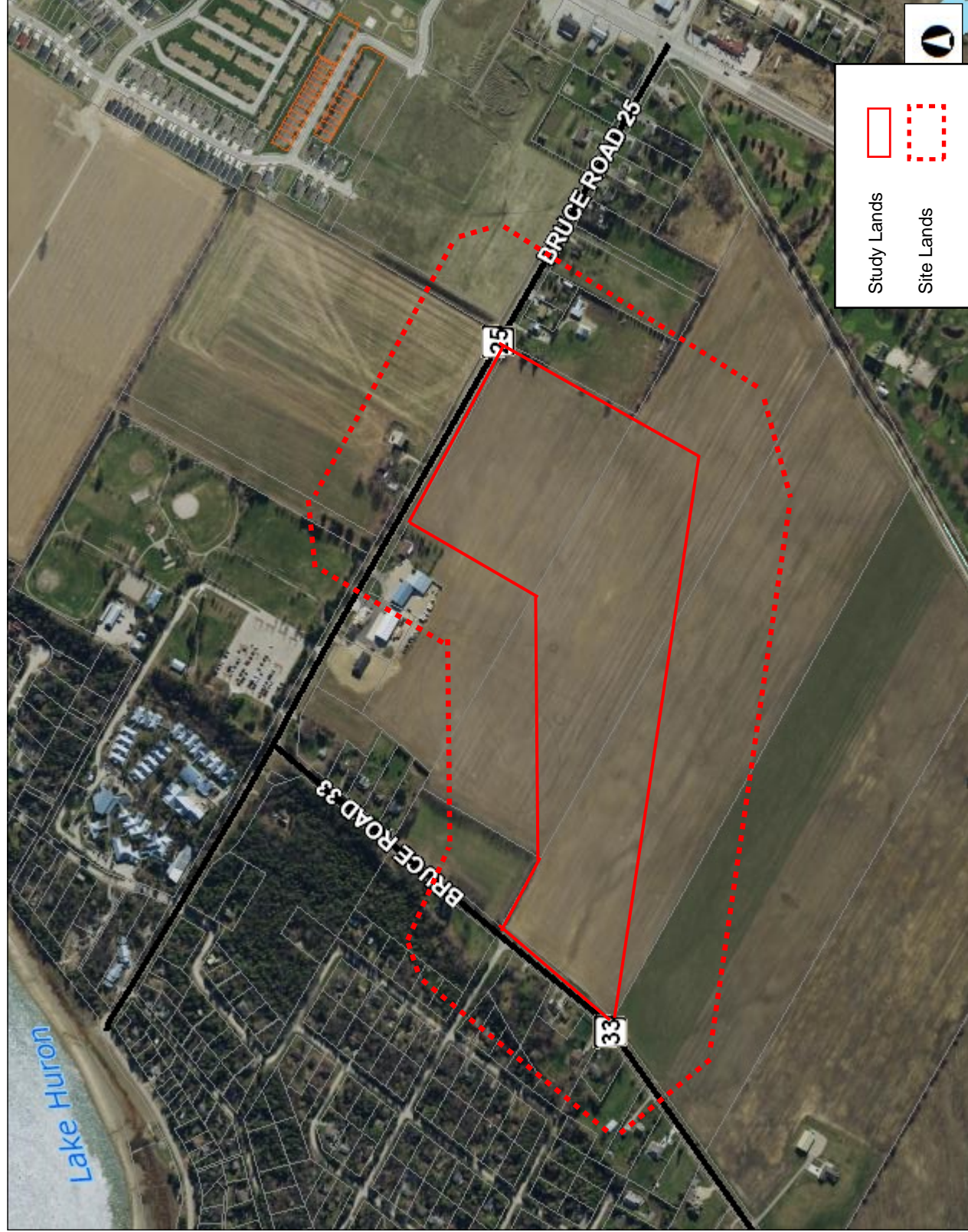
John Morton

President, AWS Environmental Consulting Inc.

cc Brian Knox, Bruce County Highway Department
Town of Saugeen Shores

Figures

- 1) Study and Site Lands shown on June 2015 air photo
- 2) Study Lands and Bruce County Official Plan- Environmental Constraint Mapping
 - No Natural Features or Environmental Constraints identified
- 3) Study Lands on Ministry of Natural Resources and Forestry- Significant Natural Features Mapping
 - No Natural Features or Environmental Constraints identified
- 4) Study Lands and 1km UTM Grid on Ministry of Natural Resources – Significant Flora and Fauna Records Search Area, 5 km's to the Study Lands.
 - See Table No. 1



0.4 0 0.20 0.4 Kilometers

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

NAD_1983_UTM_Zone_17N
© 2017 County of Bruce



Legend

- County Road
- Property Parcel
- Assessment Parcel
- Condominium Unit or Common Element
- First Nation Parcel
- Body of Water
- Watercourse
- Permanent Stream
- Intermittent Stream
- Wetland
- Body of Water
- Stream
- Built-up area
- Adjacent County

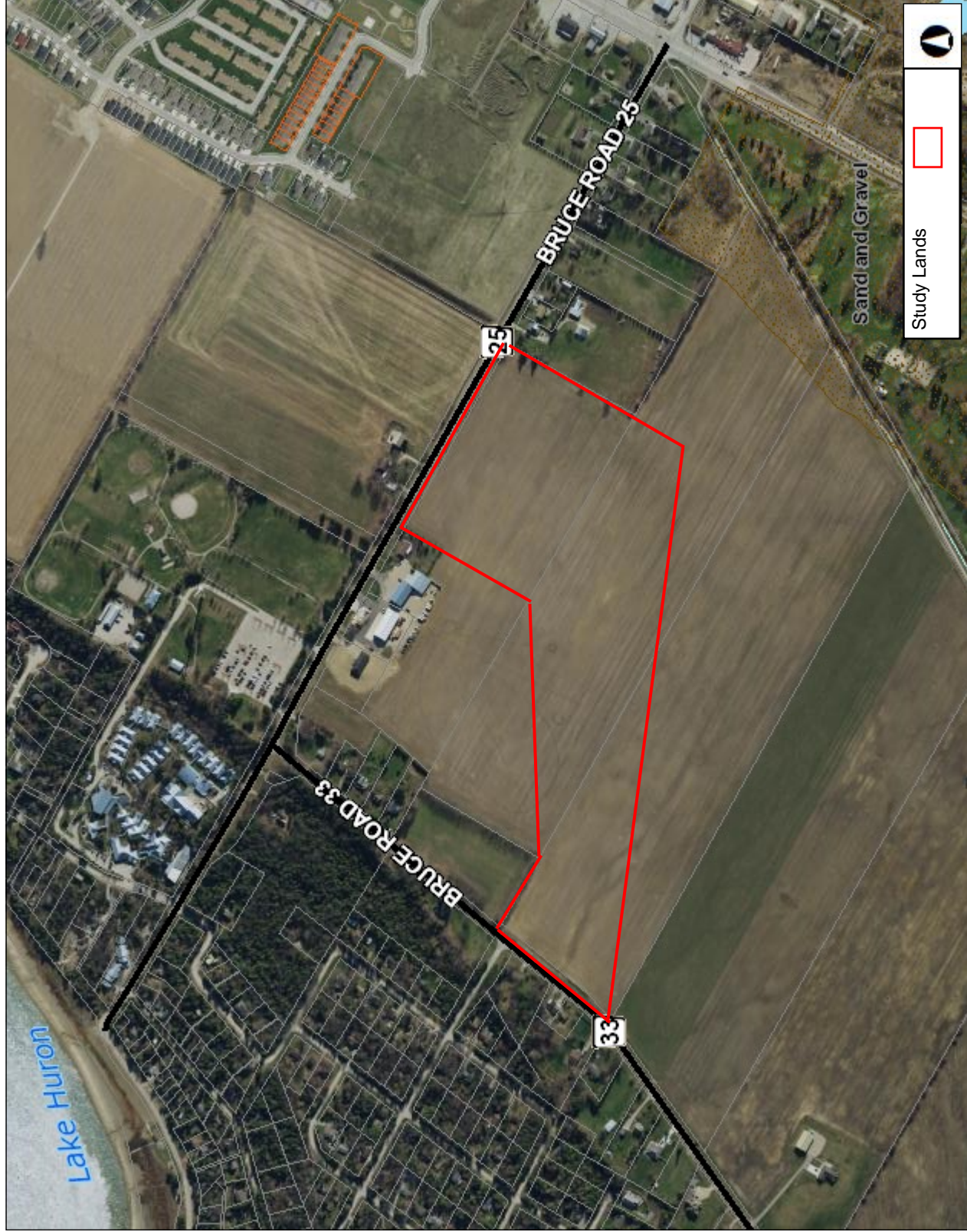
Notes

Bruce Road 33 Realignment



County of Bruce

Figure No. 2: County OP, Environmental Constraints



0.4 0 0.20 0.4 Kilometers

NAD_1983_UTM_Zone_17N
© 2017 County of Bruce

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



Legend

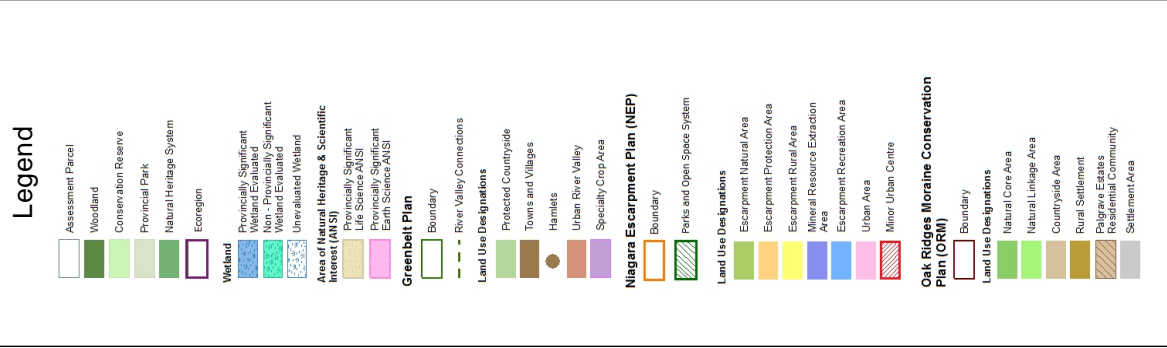
- County Road
- Property Parcel
- Assessment Parcel
- Condominium Unit or Common Element
- First Nation Parcel
- Body of Water
- Watercourse
- Permanent Stream
- Intermittent Stream
- Closed Landfill
- Active Landfill
- Karst
- Mineral Resource Area
- Significant Wetland
- Provincially Significant Wetland
- Locally Significant Wetland
- Area of Natural and Scientific Interest
- Wetland
- Body of Water
- Stream
- Built-up area
- Adjacent County

Notes

Bruce Road 33 Realignment



Figure No. 3: Provincial Natural Heritage Feature Review



0.5 0 0.23 0.5 Kilometers

Scale: 1 : 9,027



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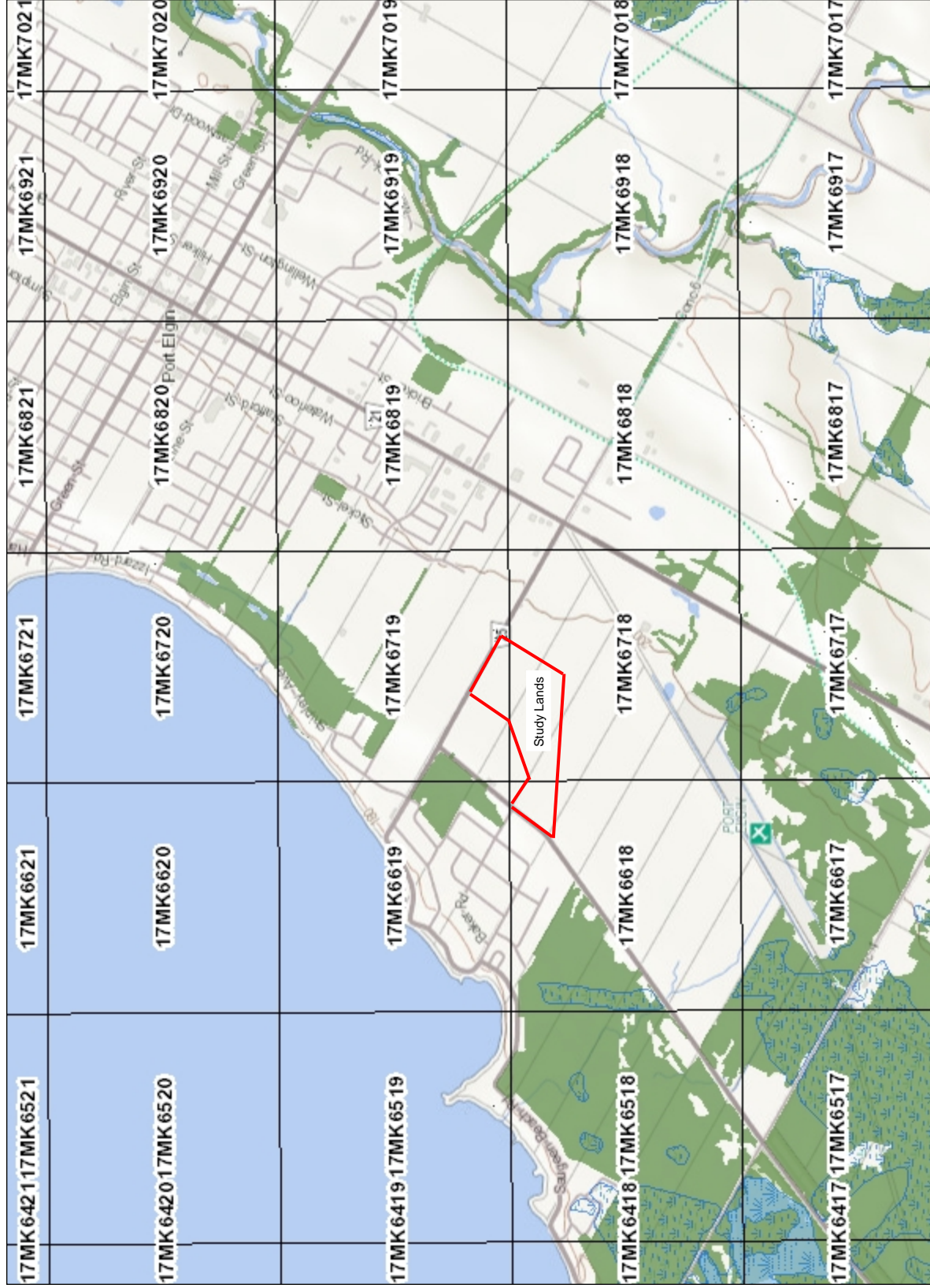
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Figure No. 4: Historical Records for
Significant Flora and Fauna



Legend

- Assessment Parcel
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System
- Ecoregion
- Wetland
 - Provincially Significant Wetland Evaluated
 - Non-Provincially Significant Wetland Evaluated
 - Unrated Wetland
- Area of Natural Heritage & Scientific Interest (ANHS)
 - Provincially Significant Life Science ANHS
 - Provincially Significant Earth Science ANHS
- Greenbelt Plan
 - Boundary
 - River Valley Connections
- Land Use Designations
 - Protected Countryside
 - Towns and Villages
 - Hamlets
 - Urban River Valley
 - Specialty Crop Area
- Niagara Escarpment Plan (NEP)
 - Boundary
 - Parks and Open Space System
- Land Use Designations
 - Escarpment Natural Area
 - Escarpment Protection Area
 - Escarpment Rural Area
 - Mineral Resource Extraction Area
 - Escarpment Recreation Area
 - Urban Area
 - Minor Urban Centre
- Oak Ridges Moraine Conservation Plan (ORM)
 - Boundary
- Land Use Designations
 - Natural Core Area
 - Natural Linkage Area
 - Countryside Area
 - Rural Settlement
 - Palgrave Estates
 - Residential Community
 - Settlement Area



Scale: 1 : 36,111

1.8 Kilometers



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Appendix

- 1) GM BluePlan Engineering, Master Plan- Site Plan Design
- 2) Site Photos, Spring of 2017

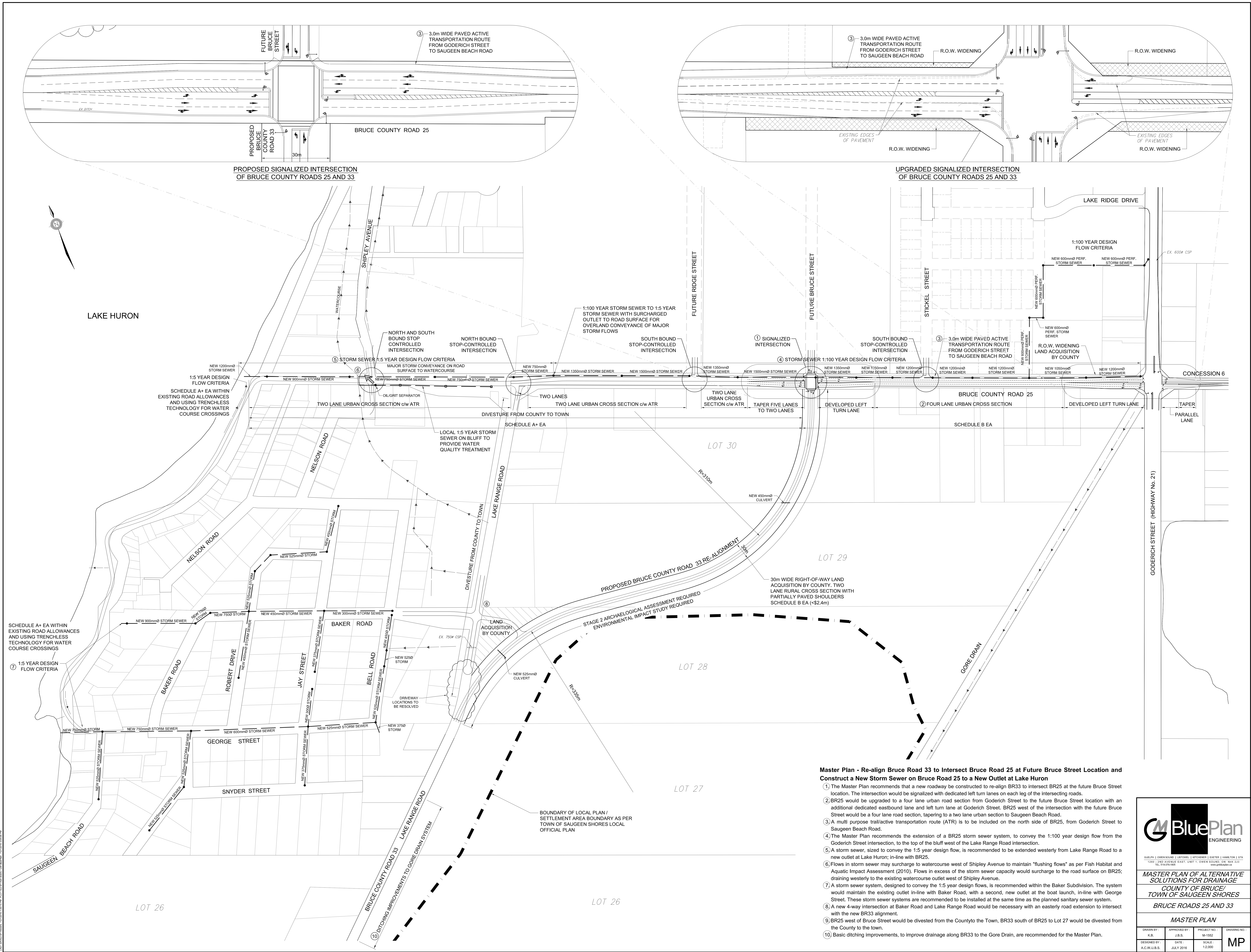




Photo No. 1: North end looking east along Bruce Rd 25

Photo No. 2: North end looking south from Bruce Road 25





Photo No. 3: South end looking north along Bruce Road 33

Photo No. 4: South end looking northeast from Bruce Road 33





CHUNG & VANDER DOELEN
ENGINEERING LTD.

**GEOTECHNICAL INVESTIGATION
ROAD RECONSTRUCTION/REALIGNMENT PROJECTS
BRUCE COUNTY ROADS 25 AND 33
SAUGEEN SHORES, ONTARIO**

Submitted to:

GM BluePlan Engineering Limited
1260 - 2nd Avenue East
Owen Sound, Ontario
N4K 2J3

Attention:

Mr. John Slocombe, P. Eng.



CHUNG & VANDER DOELEN
ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1
519-742-8979

January 30, 2018

File No.: G17496

GM BluePlan Engineering Limited
1260 - 2nd Avenue East
Owen Sound, Ontario
N4K 2J3

Attention: Mr. John Slocombe, P. Eng.

Re: GEOTECHNICAL INVESTIGATION
ROAD RECONSTRUCTION/REALIGNMENT PROJECTS
BRUCE COUNTY ROADS 25 AND 33
SAUGEEN SHORES, ONTARIO

We take pleasure in enclosing one (1) copy of our Geotechnical Investigation Report carried out at the above-mentioned location and we will be glad to discuss any questions arising from this work.

Soil samples will be retained for a period of three (3) months and will thereafter be disposed of unless we are otherwise instructed.

We thank you for giving us this opportunity to be of service to you.

Yours truly,

CHUNG & VANDER DOELEN ENGINEERING LTD.

Robert Vander Doelen, P. Eng.
Senior Engineer

TABLE OF CONTENTS

| | |
|--|-----|
| Letter of Transmittal | I |
| Table of Contents | ii |
| List of Enclosures | iii |
| 1.0 INTRODUCTION..... | 1 |
| 2.0 FIELD AND LABORATORY WORK. | 2 |
| 3.0 SITE CONDITION. | 3 |
| 4.0 SUBSURFACE CONDITION..... | 3 |
| 4.1 Pavement..... | 3 |
| 4.2 Fill. | 5 |
| 4.3 Topsoil. | 5 |
| 4.4 Native Soil Deposits..... | 5 |
| 4.5 Groundwater Condition. | 6 |
| 4.6 Soil Chemistry. | 7 |
| 5.0 DISCUSSION AND RECOMMENDATIONS..... | 8 |
| 5.1 Pavement | 8 |
| 5.1.1 Pavement Structure Consideration. | 8 |
| 5.1.2 Pavement Construction..... | 9 |
| 5.2 Underground Services Installation..... | 10 |
| 5.2.1 Groundwater Control. | 12 |
| 5.2.2 Trenching. | 13 |
| 5.2.3 Bedding..... | 13 |
| 5.2.4 Backfill..... | 14 |
| 5.2.5 Horizontal Directional Drilling..... | 15 |
| 6.0 GEO-ENVIRONMENTAL CONSIDERATIONS..... | 15 |
| 6.1 Applicable Regulatory Standards | 16 |
| 6.2 Analytical Results and Considerations | 16 |
| 7.0 CLOSURE. | 18 |



LIST OF APPENDICES AND ENCLOSURES

| | |
|---------------------|--|
| Appendix "A" | Limitations of Report |
| Appendix "B" | Soil Chemistry Results |
| Appendix "C" | Comparison of Soil Chemistry Results to the Applicable Regulatory Criteria |
| Enclosures 1 to 25 | Borehole Log Sheets |
| Enclosures 26 to 37 | Grain Size Distribution Charts |
| Enclosures 38 to 40 | Standard Proctor Test Results |
| Drawing No. 1 | Borehole Location Plan |



1.0 INTRODUCTION

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by GM BluePlan Engineering Limited (GMBP) to conduct a geotechnical investigation for the proposed reconstruction of Bruce County Road 25 and the proposed realignment of Bruce County Road 33 in the Town of Saugeen Shores, Ontario.

It is understood that Bruce County Road 25 will be reconstructed between Highway 21 and Saugeen Beach Road. Bruce County Road 33 will be realigned approximately between Baker Road and the future Bruce Street. The particulars of the project sections are as follows:

- Approximate length of the two roadway sections is $2500\pm$ m ($1600\pm$ m on Bruce County Road 25 and $900\pm$ m on Bruce County Road 33)
- Bruce County Road 25 involves the installation of underground sewer and watermain servicing (storm sewer upto 1.5 m diameter) and full reconstruction of the roadway. Servicing depths will be in the order of 4 to 5 m below grade.
- Horizontal direction drilling (HDD) is expected to be utilized at the west end of the project section where a water course crossing exists
- Bruce County Road 33 will be realigned through an existing farm field approximately between Baker Road and the future Bruce Street. The future roadway profile will be raised between 0 and $1\pm$ m above existing grades and be constructed with roadside ditching. Municipal servicing ($3\pm$ m deep) is planned along the new realignment from Bruce County Road 25 to $250\pm$ m south of Bruce County Road 25

The purpose of this investigation has been to determine the existing pavement structure and underlying soil and groundwater conditions. Geotechnical recommendations for the following aspects are to be provided:

- Replacement and construction of underground servicing including method of excavation, horizontal directional drilling, groundwater control, trench backfill, compaction requirements, suitability of reuse of existing granular base materials and insitu soils
- Recommendation for design and construction of a suitable flexible pavement structure
- Construction concerns including any required specification and provisions for materials and specialized construction activities, and recommendations for methods of overcoming anticipated construction problems, in particular, those relating to dewatering, classification of soils as per OHSA Reg. 213/91 and the stability of the excavations



- Estimates of percolation rates of the soils encountered between Sta 1+700 and Sta 2+300 on Bruce County Road 25 (approximately between the existing Bruce Road 33 intersection to the proposed Bruce Road 33 intersection)
- Handling of surplus soil materials. Specifically, any potential for encountering contamination during construction, as well as methodology for handling contaminated substances in accordance with current MOE regulations and guidelines, and the implications on the construction of the project will be addressed

2.0 FIELD AND LABORATORY WORK

The field work was conducted between November 20 and 23, 2017 and consisted of drilling and sampling twenty-five (25) boreholes extending to depths between 3.51 and 6.55 m below existing grades.

The boreholes were located in the field by CVD staff and their locations are illustrated on Drawing No. 1. The borehole locations and associated ground surface elevations at the borehole locations were surveyed and supplied to CVD by GMBP.

The field work for this project was carried out under the supervision of a member of our engineering team who logged the subsurface conditions encountered in the field, effected the subsurface sampling and testing, and monitored the groundwater conditions. Traffic control was provided during drilling operations where necessary and the underground utilities were located prior to drilling of the boreholes. A road occupancy permit was issued by the County of Bruce for the period of the field investigation program.

The boreholes were advanced to the sampling depths using a power auger drilling rig, equipped with continuous flight augers and standard soil sampling equipment. Standard penetration tests were carried out at frequent intervals of depth and the results are shown on the Borehole Log Sheets as penetration resistance or "N" values. The compactness condition or consistency of the soil strata has been inferred from these test results.

Groundwater conditions were monitored in the boreholes during and following withdrawal of the drilling augers at each borehole location. 50 mm diameter monitoring wells with flush-mount protective covers were installed at Boreholes 2, 7, 11 and 15 under the direction of the GMBP's hydrogeologist. The groundwater levels were measured on December 5, 2017 by GMBP and provided to CVD.



Samples obtained from the in situ tests were examined in the field and subsequently taken to our laboratory for detailed description and moisture content determinations.

Additional geotechnical laboratory testing included twelve (12) gradational analyses and three (3) Standard Proctor Maximum Dry Density (SPMDD) relationship tests which were conducted on representative soil samples collected during the field work program.

Six (6) soil samples were submitted to ALS Laboratory Group of Waterloo, Ontario for analysis of metals, inorganics (including electrical conductivity and sodium adsorption ratio), petroleum hydrocarbons (PHCs F1-F4), and volatile organic compounds (VOCs). Chemical testing conducted on the soil samples was to assess the environmental quality of excess soil which may potentially be removed off-site during construction.

3.0 SITE CONDITION

The two (2) project sections are generally considered as two (2) urban roadways in low density residential, commercial, and agricultural land use settings. It is understood that a former fuel station existed at the northeast corner of Highway 21 and Bruce Road 25.

4.0 SUBSURFACE CONDITION

The conditions encountered in the boreholes are detailed on the Borehole Log Sheets, Enclosures 1 to 25 of this report. The following notes are intended to amplify and comment on the subsurface data.

The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling conducted during advancement of the borehole drilling procedures and, therefore, represent transitions between soil types rather than exact planes of geologic change. The subsurface conditions will vary between and beyond the borehole locations.

4.1 Pavement

The existing pavement structure components and their associated thicknesses were measured during the advancement of Boreholes 1 to 16 along the existing Bruce County Road 25 project section. The findings are summarized in the table below:



| Borehole No. | Asphaltic Concrete (mm) | Granular Base (mm) | Underlying Subgrade Soil Type |
|--------------|-------------------------|--------------------|---|
| 1 | 110 | 590 | sand, some silt, trace gravel |
| 2 | 110 | - | silty sand fill, trace to some gravel |
| 3 | 100 | - | silty sand fill, trace gravel and clay |
| 4 | 50 | - | sand fill, trace to some silt and gravel |
| 5 | 50 | - | sand fill, trace to some silt and gravel |
| 6 | 50 | - | sand fill, some silt and gravel |
| 7 | 40 | - | sand fill, some silt, trace gravel |
| 8 | 50 | - | sand fill, some silt, some gravel |
| 9 | 50 | - | sand fill, some silt and gravel |
| 10 | 40 | - | sand fill, some silt, trace gravel |
| 11 | 50 | - | sand fill, some silt, trace gravel |
| 12 | 75 | - | sand fill, some silt and gravel |
| 13 | 50 | - | sand fill, some silt , trace to some gravel |
| 14 | 40 | - | sand fill, some silt , trace gravel |
| 15 | 100 | - | sand fill, some silt and gravel |
| 16 | 60 | 330 | sand, some silt |

A grain size distribution analysis was performed on a sample of the granular base collected from Borehole 16 beneath the surficial asphalt and the results are presented graphically on Enclosure 26 of this report. The sample failed the gradational requirements of OPSS Granular "B" Type I with 10.5% passing the #200 sieve (8% maximum is specified).



4.2 Fill

The pavement materials at Boreholes 2 to 15 were underlain by brown sand fill with varying percentages of silt and gravel which extended to depths between 0.5 and 2.1 m below existing grades. Four (4) grain size distribution analyses were conducted on representative samples of the sand fill collected from Boreholes 3, 6, 9 and 12 and the results are graphically presented on Enclosures 27 to 30.

Standard penetration testing in the fill at Boreholes 13 and 15 yielded “N”-values between 6 and 47 blows per 300 mm, indicating a variable loose to dense compactness condition. Natural moisture contents were measured between 6 and 13%, indicating a damp to moist moisture condition. Elevated moisture contents may be related to the presence of organics.

4.3 Topsoil

The ground surface at Boreholes 17 to 25 and the fill at Boreholes 2 to 11 and 13 to 15 were underlain by topsoil typically measuring between 150 and 600 mm thick.

The buried topsoil at Boreholes 2 to 11, 14 and 15 extended to depths between 0.74 and 1.8 m below existing grades. The buried topsoil (possible fill) at Borehole 13 is $1.7\pm$ m thick and extends to a depth of $3.8\pm$ m below existing grade.

Standard penetration testing in the topsoil yielded “N”-values between 6 and 25 blows per 300 mm, indicating a variable loose to compact compactness condition.

4.4 Native Soil Deposits

The above-described pavement and soil materials were underlain by native deposits of sand and gravel, sand, silty sand, sand and silt, silt and clayey silt. Occasional to frequent lenses/seams of silt and clayey silt were observed within the sand and silty sand deposits while occasional lenses/seams of sand were observed within the finer grained silt and clayey silt deposits. All twenty-five (25) boreholes were terminated within the various native deposits at depths between 3.51 and 6.55 m below existing grades.

Seven (7) grain size distribution analyses were conducted on representative samples of the native deposits collected from Boreholes 1, 2, 8, 12, 15, 18 and 23 and the results are graphically presented on Enclosures 31 to 37.



Standard penetration testing in the native deposits yielded “N”-values generally between 4 and 55 blows per 300 mm, indicating a variable loose to very dense compactness condition. Natural moisture contents were measured between 4 and 27%, indicating variable damp to saturated moisture conditions.

Three (3) laboratory Standard Proctor tests were conducted on bulk samples of the native deposits collected at Boreholes 5, 10 and 21 and the results are presented on Enclosures 38 to 40. The density-moisture relationship test derived maximum dry densities between 1925 and 2090 kg/m³ with corresponding optimum moisture contents of 8.9 and 12.2%.

4.5 Groundwater Condition

Groundwater conditions were monitored during advancement of borehole augering and immediately following withdrawal of the drilling augers at each borehole location.

Water levels were measured (and estimated) at depths between 1.8± and 4.7± m below existing grades at Boreholes 1 to 20 at the time of auger withdrawal. Dry borehole cave-in above the groundwater level occurred at Boreholes 9, 10 and 13 following withdrawal of the drilling augers. Boreholes 21 to 25 remained dry and open to their full investigation depths at withdrawal of the drilling augers.

50 mm diameter monitoring wells were installed to depths between 4.4 and 6.1 m below existing grades at Boreholes 2, 7, 11 and 15 to enable measurement of groundwater levels over the long term (if required). The following table provides the water levels measured on November 23 and December 5, 2017 at the four monitoring wells.

| Location | Ground Surface Elevation (m) | Water Depth (m) | | Water Elevation (m) | |
|-------------|------------------------------|-----------------|-------------|---------------------|-------------|
| | | Nov 23, 2017 | Dec 5, 2017 | Nov 23, 2017 | Dec 5, 2017 |
| Borehole 2 | 201.80 | 4.02 | 4.34 | 197.78 | 197.46 |
| Borehole 7 | 198.75 | 3.91 | 3.93 | 194.84 | 194.82 |
| Borehole 11 | 196.06 | 4.72 | 4.72 | 191.34 | 191.34 |
| Borehole 15 | 182.20 | 1.47 | 1.46 | 180.73 | 180.74 |

It is noted that the groundwater table will fluctuate seasonally and in response to major weather events.



4.6 Soil Chemistry

Six (6) soil samples were submitted to ALS Laboratory Group of Waterloo, Ontario for analysis of metals, inorganics (including electrical conductivity and sodium adsorption ratio), petroleum hydrocarbons (PHCs F1-F4), and volatile organic compounds (VOCs). Chemical testing conducted on the soil samples was to assess the environmental quality of excess soil which may potentially be removed off-site during construction.

The following table presents the location, depth, description and parameters analyzed for each soil sample collected and submitted.

| Sample I.D. | Sample Depth | Sample Description | Parameters Analysed |
|-------------|-------------------|--------------------------|--|
| BH1-SA2 | 0.75 to 1.22 mbeg | sand | metals, inorganics, PHCs (F1-F4), VOCs |
| BH2-SA5 | 3.05 to 3.51 mbeg | silt, some sand and clay | metals, inorganics, PHCs (F1-F4), VOCs |
| BH5-SA1 | 0.15 to 0.30 mbeg | sand fill | metals, inorganics, PHCs (F1-F4), VOCs |
| BH9-SA2 | 0.75 to 1.22 mbeg | sand | metals, inorganics, PHCs (F1-F4), VOCs |
| BH13-SA1 | 0.15 to 0.30 mbeg | sand fill | metals, inorganics, PHCs (F1-F4), VOCs |
| BH16-SA2 | 0.75 to 1.22 mbeg | sand | metals, inorganics, PHCs (F1-F4), VOCs |

The laboratory certificates of chemical analysis and results of the soil samples submitted to ALS Laboratory Group of Waterloo are enclosed in Appendix B.



5.0 DISCUSSION AND RECOMMENDATIONS

5.1 Pavement

Full roadway reconstruction will occur along the project section of Bruce County Road 25 due to underground infrastructure replacement and construction. Full roadway construction will occur along the project section of Bruce County Road 33 due to the realignment of the roadway.

5.1.1 Pavement Structure Consideration

The earth subgrade soil is expected to vary between clayey silt and sand with varying percentages of silt. Using tables in the Pavement Design and Rehabilitation Manual (1990), MTO Granular Base Equivalency (GBE) calculations and subgrade type obtained from the boreholes at the site, traffic loading and judgement and experience, the following flexible pavement structure is considered applicable for urban roadway sections.

| Pavement Component | Component Thickness |
|---|---------------------|
| HL3 Surface Asphaltic Concrete | 40 mm |
| HL8 Binder Asphaltic Concrete | 60 mm |
| Granular "A" Base Course | 150 mm |
| Granular "B" Type II Sub-base Course ² | 450 mm |
| Pavement Thickness | 700 mm |
| Granular Base Equivalency (GBE) ¹ | 650 mm |

Note:

1. GBE denotes Granular Base Equivalency which is calculated using factors of 2 for asphaltic concrete, 1 for Granular "A" base and 0.67 for Granular "B" sub-base
2. OPSS Granular "B" Type II

Longitudinal sub-drains with positive drainage outlets are recommended to be installed at the subgrade level along the edges of the roadway reconstruction to enhance the performance of the pavement. Systematic drainage of the granular base materials will promote the longevity of the pavement structure.

Elimination of the recommended sub-drains may be reviewed at the time of reconstruction and should be dependent on inspection of the exposed and underlying subgrade soil condition.



5.1.2 Pavement Construction

All topsoil/organic soil should be removed during preparation of the roadway subgrade if exposed at the prepared earth subgrade level or if it lies within 0.6 m of the prepared earth subgrade level. It is anticipated that a sufficient thickness of non-organic sand fill will remain over the thick buried topsoil layer at Borehole 13, however, further investigation of the vertical/lateral extent and stability of the topsoil layer is recommended.

The exposed inorganic earth subgrade should be recompacted from the surface with a minimum 10 tonne vibratory compactor to a density of no less than 95% Standard Proctor Maximum Dry Density (SPMDD) prior to placement of the Granular "B" (OPSS Granular "B" Type II). Any soft or otherwise incompactible areas detected should be removed and replaced with approved granular materials and should also be compacted to no less than 95% SPMDD.

The pavement design considers that road construction will be carried out during the drier time of the year and that the subgrade is stable, not heaving under construction equipment traffic. If the subgrade is wet or unstable, additional granular sub-base may be required.

The Granular "A" and Granular "B" (OPSS Granular "B" Type II) should be compacted to 100% SPMDD. Current testing of the existing granular base materials indicate non-compliance to the gradational requirements of OPSS Granular "B" and, therefore, are not suitable to be reused as Granular "B" sub-base materials. However, a more thorough review and additional sample testing of the existing granular base materials may reveal the potential for reuse of some portion of the existing granular base materials.

The asphaltic concrete should be placed and compacted in accordance with OPSS Form 310 and to at least 92% of the Marshall Density (MRD). Performance Grade Asphalt Cement (PGAC) 58-28 should be utilized in the hot mix asphalt.

The surface course of the asphaltic concrete should be placed at least one (1) year after base course is placed to allow minor settlements of the trench backfill to complete. The incomplete pavement structure may not be capable of supporting the anticipated traffic. Consequently, minor repairs of the sub-base, base and asphaltic concrete may be required prior to paving the surface course asphaltic concrete.

Frequent in situ density testing by this office should be carried out to verify that the specified degree of compaction is being achieved and maintained.



Vibration could be generated from various construction equipment, such as compactors and rollers which could be harmful to surrounding structures and buildings during construction. Peak Particle Velocity (PPV) of ground motion is widely accepted as the best descriptor of potential for vibration damage to structures. The safe vibration limit can be set to 10 to 20 mm/s PPV, depending on the sensitivity of surrounding structures to vibration.

Vibration monitoring can be carried out to measure the PPV of ground motion from vibration generated from typical compaction equipment at the beginning of the project in the potentially critical areas. This will set criteria and establish the type of equipment to be used for this project. It is also recommended that a pre-construction condition survey be conducted to document the condition of the existing structures within the possible zone of influence.

5.2 Underground Services Installation

Installation of municipal sewer and watermain servicing (storm sewer upto 1.5 m diameter) is proposed along Bruce County Road 25. Servicing depths will be in the order of 4 to 5 m below grade. Horizontal direction drilling (HDD) is expected to be utilized at the west end of the project section where a water coarse crossing exists.

Municipal servicing is also proposed along the new realignment of Bruce County Road 33 from Bruce County Road 25 to 250± m south of Bruce County Road 25. Servicing depths will be in the order of 3 m below grade.

The following table summarizes the observed groundwater elevations, the proposed deepest sewer invert elevations along Bruce County Road 25 and the 250 m northmost portion of Bruce County Road 33, and the anticipated depth of excavation below the observed groundwater table at each of the relevant boreholes drilled during the investigation.

The proposed service trench invert elevations presented in the table below assume that 300 mm of granular bedding will be provided below the future sewer service.

| Borehole | Observed Groundwater Elevation (m) | Proposed Deepest Service Trench Invert Elevation (m) | Depth of Excavation Below Observed Groundwater Table (m) |
|----------|------------------------------------|--|--|
| 2 | 197.78 | 198.30 | -0.52 |
| 3* | 198.45 | 197.00 | 1.45 |
| 4* | 197.31 | 196.40 | 0.91 |



| Borehole | Observed Groundwater Elevation (m) | Proposed Deepest Service Trench Invert Elevation (m) | Depth of Excavation Below Observed Groundwater Table (m) |
|----------|------------------------------------|--|--|
| 5* | 195.83 | 195.60 | 0.23 |
| 6* | 195.50 | 195.30 | 0.20 |
| 7 | 194.84 | 194.70 | 0.14 |
| 8* | 195.56 | 194.00 | 1.56 |
| 9* | 193.15 | 193.30 | -0.15 |
| 10* | 192.45 | 193.40 | -0.95 |
| 11 | 191.34 | 192.60 | -1.26 |
| 12* | 190.25 | 190.70 | -0.55 |
| 13* | 186.29 | 186.70 | -0.41 |
| 14* | 182.65 | 182.20 | 0.45 |
| 15 | 180.74 | 179.00 | 1.74 |
| 16* | 179.65 | 177.80 | 1.85 |
| 17* | 194.51 | 194.30 | 0.21 |
| 18* | 194.40 | 194.60 | -0.20 |
| 19* | 194.17 | 195.00 | -0.83 |

* denotes borehole without monitoring well and the groundwater elevation presented is based upon the level measured during or following completion of the borehole (i.e., measured groundwater level may not have properly stabilized and may not be accurate)



5.2.1 Groundwater Control

The groundwater table will be encountered during the underground servicing installation works. The groundwater levels drop from 198.0± m at Borehole 2 (near Highway 21) to 179.5± m at Borehole 16 (near Saugeen Beach Road) as well as from 194.5± m at Borehole 17 (near Bruce County Road 25) to 194.0± m at Borehole 19 (250 m south of Bruce County Road 25). It should be noted that the groundwater table can be expected to fluctuate seasonally and with major weather events.

CVD recommends that test pits be dug during the tendering stage of the project, so that the potential contractors can examine the groundwater and soil conditions and arrive at suitable methods of excavation, groundwater control and backfilling based on their experience and plant.

Where the exposed base subgrade and sidewall soils of the excavation are comprised of saturated granular deposits, it is recommended that groundwater be lowered and controlled to at least 0.6 m below the base of excavations to create and maintain a stable subgrade condition to facilitate pipe laying and backfilling operations, and to ensure cut slope stability.

In general, groundwater is expected to be controllable by pumping from several filtered sump pits (possibly together with intercept ditching) if the water table at the time of construction is located within 0.6 m above the required excavation level. If the water table at the time of construction is located higher than 0.6 m above the required excavation level, it is expected that pre-lowering of the groundwater table will be required prior to excavation. This may require the use of well points or other suitable means.

As the amount of groundwater to be pumped is expected to exceed 50,000 Litres/day, this pumping is considered to be a “water taking” by the Ministry of Environment and Climate Change (MOECC) and is subject to the Ministry’s “Permit To Take Water (PTTW)” requirements. In March 2016, the Ministry provided an exemption from the permitting requirements for “construction-only” water takings that do not exceed 400,000 L/day. For these modest “construction-only” water takings, the water taking must still be “registered” on the MOECC “Environmental Activity and Sector Registry (EASR)”, but nevertheless a quicker and less formal process is now available to allow pumping to proceed. In addition, the Ministry has clarified that surface water from rainfall is not included in the water quantity and there is no time limitation for these regulated water takings, although a qualified person (QP) must still evaluate the water taking for all the same environmental impact issues and then indicate this through the on-line registration procedure. For all other water takings and construction water takings exceeding 400,000 L/day, a PTTW is still required along with a 90-day review process.

A more detailed assessment by a QP is required to determine if the water taking at this site is likely to exceed 400,000 L/day (278 L/min). Thereafter, the need for either EASR registration or a PTTW can be determined.



5.2.2 Trenching

The excavations will generally penetrate loose to dense fill and competent native granular and cohesive soil deposits. The fill and native soil deposits will generally provide suitable subgrade support at the pipe founding levels. Any loose, unstable and/or organic soils encountered at the pipe invert should be sub-excavated and replaced with well compacted Granular "A" (or clean crushed gravel wrapped in non-woven geotextile) which should be placed in 150 mm thick layers and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD). The support of pipes in these areas can also be achieved with non-shrinkable fill, if poor soil is encountered at the subgrade level and fully removed.

The soil materials are generally considered to be Type 3 Soils in accordance with the latest Occupational Health and Safety Act, provided that groundwater is adequately controlled by suitable means. Trenches can be cut to 1H to 1V throughout provided groundwater is being suitably controlled. Otherwise, the side slopes should be cut to 3H : 1V or flatter. The side slopes should be suitably protected from erosion processes.

The geotechnical engineer should be retained to examine and inspect cut slopes to ensure construction safety.

It may be necessary to provide support for nearby services if they are located within the influence zone of 45 degrees to the vertical.

The use of trench liner box or timber lagging can be considered to support the trench side walls and adjacent foundations, structures or utilities.

5.2.3 Bedding

Any unstable soils exposed at the pipe subgrade should be sub-excavated and replaced with imported Granular "A", placed in thin layers and compacted to at least 95% SPMDD, or can be removed and supported on non-shrinkable fill as previously described in Section 5.2.2.

The bedding requirements for the services should be in accordance with Ontario Provincial Standard Drawings OPSD - 802 for flexible and rigid pipes provided that the groundwater table is adequately controlled and the pipe subgrade is stable. The bedding shall be a Class "B" and consist of at least 150 mm (to a maximum of 300 mm) thick Granular "A" or clean crushed gravel wrapped in geotextile compacted to 95% SPMDD.



Clear crushed stone bedding can be used to replace Granular "A" bedding if the subgrade is unstable and saturated, and compacting the Granular "A" bedding layer is not practical. The clear crushed stone will need to be suitably densified and wrapped with a non-woven filter cloth (Terrafix 270R or equivalent) to prevent migration of fine soil particles (silt) into the crushed stone mattress and prevent the loss of subgrade support for the pipes.

Granular "A" or clean crushed gravel wrapped in geotextile should be used to backfill around the pipe to at least 150 mm above the top of the pipe. This backfill should be placed in thin layers and each layer compacted to at least 95% SPMDD. Recycled asphalt will not be allowed to be used in Granular "A" bedding material.

5.2.4 Backfill

In general, the excavated soils are considered suitable for reuse as trench backfill. If the excavated materials are allowed to dry too much during summer construction, judicious addition of water may be required to facilitate compaction. Mixing drier and wetter excavated soils may be feasible to arrive at a more compactable moisture content.

The backfill should be placed in thin layers, 300 mm thick or less dependant on the demonstrated success of compaction based on in-situ density test results. Other types of materials such as organic soils, overly wet soils, boulders and frozen materials (if work is carried out in the winter months) should not be used for backfilling. All backfill should be compacted to at least 95% SPMDD.

Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time so as to minimize potential problems. This will potentially minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.

It has been our experience that excavated cohesive soils should be broken into smaller pieces (less than 150 mm diameter) before returning into the trench as backfill. This will eliminate "wedging" problems and reduce long term settlement. Particular attention must be made to backfilling the laterals where the trenches are narrow and against the manholes and catch-basins. Thinner lifts and additional compaction must be applied.

Frequent inspection by experienced geotechnical personnel should be carried out to examine and approve backfill material, to carefully inspect placement, and to verify that the specified degree of compaction has been obtained by in situ density testing.



5.2.5 Horizontal Directional Drilling

Horizontal directional drilling techniques are being considered to install 48 m of 750 mm diameter HDPE storm sewer and 45.5 m of 450 mm diameter HDPE storm sewer near the intersection of Bruce County Road 25 and Nelson Road.

The saturated deposit of fine sand encountered at Boreholes 14 and 15 is considered suitable for sewer installation using horizontal directional drilling methods. It should be noted that the Saugeen Shores area has been subjected to glaciation. Although not encountered during the drilling of the boreholes, cobbles or boulders could be present within the various deposits. Consequently, potential obstructions to the advancement of directional drilling may occur.

It is noted that the selection of directional drilling method(s) are normally the responsibility of the contractor.

Bentonite and/or polymer drilling mud slurry is used as a coolant, counteracting fluid pressure and lubricant in the drilling process. The slurry pressure should be controlled so as not to hydraulically fracture the soil which may result in release of slurry to the ground surface.

6.0 GEO-ENVIRONMENTAL CONSIDERATIONS

It is our understanding that excess soils may potentially be removed off-site during construction. CVD recommends that a soil management plan be established to manage the quantity, as well as where and how the excess soils can be disposed of off-site.

The analytical results and environmental assessment findings must be disclosed to the receiving site owner(s) and approval by the receiving site owner(s) be obtained prior to exporting/transferring the materials. It is noted that the soils condition may differ between and beyond the sampled locations. If any impacted soils are discovered during construction, CVD should be contacted for further sampling and testing to determine the limit of the impacted soils.

Transportation of excess soils from the source site to the receiving site(s) should be carried out in accordance with the MOECC document entitled "Management of Excess Soil - A Guide for Best Management Practices" dated January 2014. Additional soil sampling and analysis may be required as per the above-noted MOECC document and/or as per the requirement of the receiving site owner(s), depending on the volume of excess soil generated during construction.



Any soils identified during construction to have been environmentally impacted are to be separately stockpiled and analysed to determine the appropriate measures for handling and disposal. Waste characterization testing (TCLP) to classify the material for disposal as prescribed in Ontario Regulation 558 is required.

6.1 Applicable Regulatory Standards

The Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act established in accordance with the amended Ontario Regulation 153/04 (April 15, 2011) was consulted in the assessment of the soil at the project site. The analytical results were compared to the following “applicable regulatory standards”:

- Table 1 (Full Depth Background Site Condition Standards) for Agricultural or Other Property Use
- Table 1 (Full Depth Background Site Condition Standards) for Residential/Institutional/Parkland/Industrial/Commercial/Community Property Use
- Table 2 (Full Depth Generic Site Condition Standards in a Potable Ground Water Condition) for Residential/Parkland/Institutional Property Use for coarse textured soil
- Table 2 (Full Depth Generic Site Condition Standards in a Potable Ground Water Condition) for Industrial/Commercial/Community Property Use for coarse textured soil

The project site exists as a public transportation corridor. Neighbouring rural properties to the site rely on groundwater as a source of potable water. The site is not located within 30 m of an area of natural significance and is not a shallow soil property. The soil results were therefore compared to the Ministry of the Environment & Climate Change (MOECC) Table 2, Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community Property Use for coarse textured soil.

Table 1 for Full Depth Background Standards for Agricultural or Other Property Use and Residential/Institutional/Parkland/Industrial/Commercial/Community Use would apply for off site disposal of soil and reuse with no environmental restrictions.

6.2 Analytical Results and Considerations

Six (6) soil samples were submitted to ALS Laboratory Group of Waterloo, Ontario for analysis of metals, inorganics (including electrical conductivity and sodium adsorption ratio), petroleum hydrocarbons (PHCs F1-F4), and volatile organic compounds (VOCs). The chemical testing was



conducted to assess the environmental quality of excess soil which may potentially be removed off-site during construction. The laboratory certificates of chemical analysis and results provided by ALS Laboratory Group of Waterloo are enclosed in Appendix B. A comparison of the soil chemistry results to the applicable regulatory standards is enclosed in Appendix C.

The SAR and EC parameter values from five (5) of the six (6) samples submitted have concentrations above Table 1 standards. The SAR values from two (2) of the six (6) samples submitted exceed Table 2 standards for Industrial/Commercial/Community Property Use. Since the elevated SAR values are related to salt use for pavement de-icing purposes, it is not considered to be an exceedance to the site regulatory standard in accordance with Regulation 153/04. The excavated soil can be removed to a similar municipally owned road site where continued de-icing salt application will likely occur. Alternatively, the excess soil may be received by a holder of an appropriate certificate of approval.

The analytical results from the soil samples selected for metals analysis indicate that all analysed metals parameters were below all four applicable regulatory standards.

The analytical results from the soil samples selected for petroleum hydrocarbons analysis (PHCs, F1-F4) indicate that four (4) of six (6) samples tested have concentrations exceeding Table 1 (Full Depth Background Site Condition Standards) for Residential/Institutional/Parkland/Industrial/Commercial/Community Property Use, however, the results were below both Table 2 standards for Residential/Parkland/Institutional Property Use and Industrial/Commercial/Community Property Use.

The analytical results from the soil samples selected for VOCs analysis indicate that all analysed parameters were below all four applicable regulatory standards.

Further sampling and testing to determine the limit of impacted soil within the project work area is recommended. Impacted soil is to be separately stockpiled and analysed to determine the appropriate measures for handling and disposal.



7.0 CLOSURE

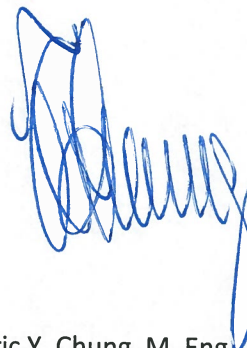
The Limitations of Report, as quoted in Appendix "A", is an integral part of this report.

We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,
CHUNG & VANDER DOELEN ENGINEERING LTD.



Robert Vander Doelen, P. Eng.
Senior Engineer



Eric Y. Chung, M. Eng., P. Eng.
Principal Engineer



APPENDIX “A”

Limitations of Report



APPENDIX “A”

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report. The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.



APPENDIX “B”

Soil Chemistry Results





CHUNG AND VANDER DOELEN
ATTN: JOE VANDERZALM
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Date Received: 01-DEC-17
Report Date: 30-JAN-18 07:48 (MT)
Version: FINAL REV. 2

Client Phone: 519-742-8979

Certificate of Analysis

Lab Work Order #: L2030089
Project P.O. #: NOT SUBMITTED
Job Reference: G17496
C of C Numbers: 14-460142
Legal Site Desc:

Mary-Lynn Pike
Client Services Supervisor

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 60 Northland Road, Unit 1, Waterloo, ON N2V 2B8 Canada | Phone: +1 519 886 6910 | Fax: +1 519 886 9047
ALS CANADA LTD Part of the ALS Group An ALS Limited Company



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-1 | BH1-SA2 | | | | | | | | | |
| Sampled By: | Client on 20-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.266 | | 0.0040 | mS/cm | 07-DEC-17 | 0.47 | 0.57 | 1.4 | 0.7 |
| % Moisture | | 16.1 | | 0.10 | % | 04-DEC-17 | | | | |
| pH | | 7.63 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 05-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 1.78 | | 0.10 | SAR | 07-DEC-17 | *1 | 2.4 | 12 | 5 |
| Calcium (Ca) | | 9.0 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | 1.5 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 21.9 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 3.1 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 16.8 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | 5.3 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | 0.25 | | 0.10 | ug/g | 08-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 16.0 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 3.3 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 6.9 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | 13.6 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | 0.0371 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 6.7 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 27.9 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 29.2 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | 0.21 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Comm Property Use

#3: T2-Soil-Ind/Com/Comm Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|------------------------------------|---------------------|--------|-----------|--------|---------|-----------|------------------|--------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-1 | BH1-SA2 | | | | | | | | | |
| Sampled By: | Client on 20-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,3-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| 1,4-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| Dichlorodifluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| 1,1-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| 1,2-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,1-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| cis-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| trans-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| Methylene Chloride | | <1.0 | RRR | 1.0 | ug/g | 06-DEC-17 | **0.05 | **0.05 | 1.6 | **0.1 |
| 1,2-Dichloropropane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| cis-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| trans-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| 1,3-Dichloropropene (cis & trans) | | <0.042 | | 0.042 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| Ethylbenzene | | <0.018 | VOCJ | 0.018 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| n-Hexane | | <0.10 | RRR | 0.10 | ug/g | 06-DEC-17 | **0.05 | **0.05 | 46 | 2.8 |
| Methyl Ethyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| Methyl Isobutyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| MTBE | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| Styrene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| 1,1,1,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| 1,1,2,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Tetrachloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| Toluene | | <0.080 | VOCJ | 0.080 | ug/g | 06-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| 1,1,1-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| 1,1,2-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Trichloroethylene | | <0.010 | VOCJ | 0.010 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| Trichlorofluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| Vinyl chloride | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| o-Xylene | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | | | | |
| m+p-Xylenes | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| Xylenes (Total) | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| Surrogate: 4-Bromofluorobenzene | | 103.4 | | 50-140 | % | 06-DEC-17 | | | | |
| Surrogate: 1,4-Difluorobenzene | | 105.4 | | 50-140 | % | 06-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| F1 (C6-C10) | | <5.0 | VOCJ | 5.0 | ug/g | 06-DEC-17 | 17 | 25 | 55 | 55 |
| F1-BTEX | | <5.0 | | 5.0 | ug/g | 11-DEC-17 | 17 | 25 | 55 | 55 |
| F2 (C10-C16) | | <10 | | 10 | ug/g | 11-DEC-17 | 10 | 10 | 230 | 98 |
| F3 (C16-C34) | | 71 | | 50 | ug/g | 11-DEC-17 | 240 | 240 | 1700 | 300 |
| F4 (C34-C50) | | 121 | | 50 | ug/g | 11-DEC-17 | *120 | *120 | 3300 | 2800 |
| Total Hydrocarbons (C6-C50) | | 192 | | 72 | ug/g | 11-DEC-17 | | | | |
| Chrom. to baseline at nC50 | | YES | | | No Unit | 11-DEC-17 | | | | |
| Surrogate: 2-Bromobenzotrifluoride | | 82.9 | | 60-140 | % | 11-DEC-17 | | | | |
| Surrogate: 3,4-Dichlorotoluene | | 76.8 | | 60-140 | % | 06-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-2 | BH2-SA5 | | | | | | | | | |
| Sampled By: | Client on 20-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.843 | | 0.0040 | mS/cm | 07-DEC-17 | *0.47 | *0.57 | 1.4 | *0.7 |
| % Moisture | | 16.9 | | 0.10 | % | 04-DEC-17 | | | | |
| pH | | 7.78 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 05-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 17.6 | SAR:M | 0.10 | SAR | 07-DEC-17 | *1 | *2.4 | *12 | *5 |
| Calcium (Ca) | | 5.4 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | <1.0 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 148 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 1.9 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 15.6 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | 8.6 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | <0.10 | | 0.10 | ug/g | 08-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 8.5 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 3.0 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 7.7 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | 2.5 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | <0.0050 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 6.2 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 12.5 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 13.3 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|------------------------------------|---------------------|--------|-----------|--------|---------|-----------|------------------|--------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-2 | BH2-SA5 | | | | | | | | | |
| Sampled By: | Client on 20-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,3-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| 1,4-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| Dichlorodifluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| 1,1-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| 1,2-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,1-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| cis-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| trans-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| Methylene Chloride | | <2.0 | RRR | 2.0 | ug/g | 06-DEC-17 | **0.05 | **0.05 | **1.6 | **0.1 |
| 1,2-Dichloropropane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| cis-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| trans-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| 1,3-Dichloropropene (cis & trans) | | <0.042 | | 0.042 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| Ethylbenzene | | <0.018 | VOCJ | 0.018 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| n-Hexane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 46 | 2.8 |
| Methyl Ethyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| Methyl Isobutyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| MTBE | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| Styrene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| 1,1,1,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| 1,1,2,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Tetrachloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| Toluene | | <0.080 | VOCJ | 0.080 | ug/g | 06-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| 1,1,1-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| 1,1,2-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Trichloroethylene | | <0.010 | VOCJ | 0.010 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| Trichlorofluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| Vinyl chloride | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| o-Xylene | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | | | | |
| m+p-Xylenes | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| Xylenes (Total) | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| Surrogate: 4-Bromofluorobenzene | | 99.6 | | 50-140 | % | 06-DEC-17 | | | | |
| Surrogate: 1,4-Difluorobenzene | | 101.2 | | 50-140 | % | 06-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| F1 (C6-C10) | | <5.0 | VOCJ | 5.0 | ug/g | 06-DEC-17 | 17 | 25 | 55 | 55 |
| F1-BTEX | | <5.0 | | 5.0 | ug/g | 08-DEC-17 | 17 | 25 | 55 | 55 |
| F2 (C10-C16) | | <10 | | 10 | ug/g | 08-DEC-17 | 10 | 10 | 230 | 98 |
| F3 (C16-C34) | | <50 | | 50 | ug/g | 08-DEC-17 | 240 | 240 | 1700 | 300 |
| F4 (C34-C50) | | <50 | | 50 | ug/g | 08-DEC-17 | 120 | 120 | 3300 | 2800 |
| Total Hydrocarbons (C6-C50) | | <72 | | 72 | ug/g | 08-DEC-17 | | | | |
| Chrom. to baseline at nC50 | | YES | | | No Unit | 08-DEC-17 | | | | |
| Surrogate: 2-Bromobenzotrifluoride | | 84.9 | | 60-140 | % | 08-DEC-17 | | | | |
| Surrogate: 3,4-Dichlorotoluene | | 69.4 | | 60-140 | % | 06-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-3 | BH5-SA1 | | | | | | | | | |
| Sampled By: | Client on 21-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.361 | | 0.0040 | mS/cm | 07-DEC-17 | 0.47 | 0.57 | 1.4 | 0.7 |
| % Moisture | | 6.52 | | 0.10 | % | 04-DEC-17 | | | | |
| pH | | 8.16 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 7.49 | | 0.10 | SAR | 07-DEC-17 | *1 | *2.4 | 12 | *5 |
| Calcium (Ca) | | 2.2 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | 1.5 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 59.2 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 1.9 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 8.0 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | 6.9 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | <0.10 | | 0.10 | ug/g | 08-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 6.2 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 2.0 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 6.3 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | 2.2 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | 0.0056 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 4.1 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 11.1 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 11.7 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Comm Property Use

#3: T2-Soil-Ind/Com/Comm Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-----------------------------------|------------------------------------|--------|-----------|--------|---------|-----------|------------------|--------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-3 | BH5-SA1 | | | | | | | | | |
| Sampled By: | Client on 21-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| | 1,3-Dichlorobenzene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| | 1,4-Dichlorobenzene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| | Dichlorodifluoromethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| | 1,1-Dichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| | 1,2-Dichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | 1,1-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| | cis-1,2-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| | trans-1,2-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| | Methylene Chloride | <0.50 | RRR | 0.50 | ug/g | 06-DEC-17 | **0.05 | **0.05 | 1.6 | **0.1 |
| | 1,2-Dichloropropane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| | cis-1,3-Dichloropropene | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| | trans-1,3-Dichloropropene | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| | 1,3-Dichloropropene (cis & trans) | <0.042 | | 0.042 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| | Ethylbenzene | <0.018 | VOCJ | 0.018 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| | n-Hexane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 46 | 2.8 |
| | Methyl Ethyl Ketone | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| | Methyl Isobutyl Ketone | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| | MTBE | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| | Styrene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| | 1,1,1,2-Tetrachloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| | 1,1,2,2-Tetrachloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | Tetrachloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| | Toluene | <0.080 | VOCJ | 0.080 | ug/g | 06-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| | 1,1,1-Trichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| | 1,1,2-Trichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | Trichloroethylene | <0.010 | VOCJ | 0.010 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| | Trichlorofluoromethane | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| | Vinyl chloride | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| | o-Xylene | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | | | | |
| | m+p-Xylenes | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| | Xylenes (Total) | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| | Surrogate: 4-Bromofluorobenzene | 103.9 | | 50-140 | % | 06-DEC-17 | | | | |
| | Surrogate: 1,4-Difluorobenzene | 106.4 | | 50-140 | % | 06-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| | F1 (C6-C10) | <5.0 | VOCJ | 5.0 | ug/g | 06-DEC-17 | 17 | 25 | 55 | 55 |
| | F1-BTEX | <5.0 | | 5.0 | ug/g | 13-DEC-17 | 17 | 25 | 55 | 55 |
| | F2 (C10-C16) | <20 | DLM | 20 | ug/g | 12-DEC-17 | **10 | **10 | 230 | 98 |
| | F3 (C16-C34) | 300 | DLM | 100 | ug/g | 12-DEC-17 | *240 | *240 | 1700 | 300 |
| | F4 (C34-C50) | 340 | DLM | 100 | ug/g | 12-DEC-17 | *120 | *120 | 3300 | 2800 |
| | F4G-SG (GHH-Silica) | 1420 | | 250 | ug/g | 08-DEC-17 | *120 | *120 | 3300 | 2800 |
| | Total Hydrocarbons (C6-C50) | 640 | | 140 | ug/g | 13-DEC-17 | | | | |
| | Chrom. to baseline at nC50 | NO | | | No Unit | 12-DEC-17 | | | | |
| | Surrogate: 2-Bromobenzotrifluoride | 90.9 | | 60-140 | % | 12-DEC-17 | | | | |
| | Surrogate: 3,4-Dichlorotoluene | 69.5 | | 60-140 | % | 06-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-4 | BH9-SA2 | | | | | | | | | |
| Sampled By: | Client on 21-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.337 | | 0.0040 | mS/cm | 07-DEC-17 | 0.47 | 0.57 | 1.4 | 0.7 |
| % Moisture | | 6.43 | | 0.10 | % | 04-DEC-17 | | | | |
| pH | | 7.66 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 8.19 | SAR:M | 0.10 | SAR | 07-DEC-17 | *1 | *2.4 | 12 | *5 |
| Calcium (Ca) | | 3.5 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | <1.0 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 55.3 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 2.1 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 14.0 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | <5.0 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | <0.10 | | 0.10 | ug/g | 11-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 12.2 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 2.9 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 5.4 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | 2.5 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | 0.0277 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 5.6 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 21.0 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 12.3 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | 0.48 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 07-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Comm Property Use

#3: T2-Soil-Ind/Com/Comm Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-----------------------------------|------------------------------------|--------|-----------|--------|---------|-----------|------------------|------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-4 | BH9-SA2 | | | | | | | | | |
| Sampled By: | Client on 21-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| | 1,3-Dichlorobenzene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| | 1,4-Dichlorobenzene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| | Dichlorodifluoromethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| | 1,1-Dichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| | 1,2-Dichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | 1,1-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| | cis-1,2-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| | trans-1,2-Dichloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| | Methylene Chloride | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.6 | 0.1 |
| | 1,2-Dichloropropane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| | cis-1,3-Dichloropropene | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| | trans-1,3-Dichloropropene | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| | 1,3-Dichloropropene (cis & trans) | <0.042 | | 0.042 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| | Ethylbenzene | <0.018 | VOCJ | 0.018 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| | n-Hexane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 46 | 2.8 |
| | Methyl Ethyl Ketone | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| | Methyl Isobutyl Ketone | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| | MTBE | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| | Styrene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| | 1,1,1,2-Tetrachloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| | 1,1,2,2-Tetrachloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | Tetrachloroethylene | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| | Toluene | <0.080 | VOCJ | 0.080 | ug/g | 07-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| | 1,1,1-Trichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| | 1,1,2-Trichloroethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| | Trichloroethylene | <0.010 | VOCJ | 0.010 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| | Trichlorofluoromethane | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| | Vinyl chloride | <0.020 | VOCJ | 0.020 | ug/g | 07-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| | o-Xylene | <0.020 | VOCJ | 0.020 | ug/g | 07-DEC-17 | | | | |
| | m+p-Xylenes | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| | Xylenes (Total) | <0.050 | | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| | Surrogate: 4-Bromofluorobenzene | 104.1 | | 50-140 | % | 07-DEC-17 | | | | |
| | Surrogate: 1,4-Difluorobenzene | 109.7 | | 50-140 | % | 07-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| | F1 (C6-C10) | <5.0 | VOCJ | 5.0 | ug/g | 07-DEC-17 | 17 | 25 | 55 | 55 |
| | F1-BTEX | <5.0 | | 5.0 | ug/g | 13-DEC-17 | 17 | 25 | 55 | 55 |
| | F2 (C10-C16) | 15 | | 10 | ug/g | 12-DEC-17 | *10 | *10 | 230 | 98 |
| | F3 (C16-C34) | 194 | | 50 | ug/g | 12-DEC-17 | 240 | 240 | 1700 | 300 |
| | F4 (C34-C50) | 53 | | 50 | ug/g | 12-DEC-17 | 120 | 120 | 3300 | 2800 |
| | F4G-SG (GHH-Silica) | 270 | | 250 | ug/g | 08-DEC-17 | *120 | *120 | 3300 | 2800 |
| | Total Hydrocarbons (C6-C50) | 263 | | 72 | ug/g | 13-DEC-17 | | | | |
| | Chrom. to baseline at nC50 | NO | | | No Unit | 12-DEC-17 | | | | |
| | Surrogate: 2-Bromobenzotrifluoride | 90.2 | | 60-140 | % | 12-DEC-17 | | | | |
| | Surrogate: 3,4-Dichlorotoluene | 93.7 | | 60-140 | % | 07-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-5 | BH13-SA1 | | | | | | | | | |
| Sampled By: | Client on 22-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.340 | | 0.0040 | mS/cm | 07-DEC-17 | 0.47 | 0.57 | 1.4 | 0.7 |
| % Moisture | | 5.00 | | 0.10 | % | 05-DEC-17 | | | | |
| pH | | 8.13 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 5.48 | | 0.10 | SAR | 07-DEC-17 | *1 | *2.4 | 12 | *5 |
| Calcium (Ca) | | 3.4 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | 2.8 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 56.4 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 1.8 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 7.8 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | 5.2 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | <0.10 | | 0.10 | ug/g | 11-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 5.8 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 1.8 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 5.8 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | 2.0 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | 0.0056 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 3.8 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 9.8 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 9.8 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|------------------------------------|---------------------|--------|-----------|--------|---------|-----------|------------------|---------------|-------|--------------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-5 | BH13-SA1 | | | | | | | | | |
| Sampled By: | Client on 22-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,3-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| 1,4-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| Dichlorodifluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| 1,1-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| 1,2-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,1-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| cis-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| trans-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| Methylene Chloride | | <0.50 | RRR | 0.50 | ug/g | 06-DEC-17 | **0.05 | **0.05 | 1.6 | **0.1 |
| 1,2-Dichloropropane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| cis-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| trans-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| 1,3-Dichloropropene (cis & trans) | | <0.042 | | 0.042 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| Ethylbenzene | | <0.018 | VOCJ | 0.018 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| n-Hexane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 46 | 2.8 |
| Methyl Ethyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| Methyl Isobutyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 06-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| MTBE | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| Styrene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| 1,1,1,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| 1,1,2,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Tetrachloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| Toluene | | <0.080 | VOCJ | 0.080 | ug/g | 06-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| 1,1,1-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| 1,1,2-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Trichloroethylene | | <0.010 | VOCJ | 0.010 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| Trichlorofluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| Vinyl chloride | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| o-Xylene | | <0.020 | VOCJ | 0.020 | ug/g | 06-DEC-17 | | | | |
| m+p-Xylenes | | <0.030 | VOCJ | 0.030 | ug/g | 06-DEC-17 | | | | |
| Xylenes (Total) | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| Surrogate: 4-Bromofluorobenzene | | 107.9 | | 50-140 | % | 06-DEC-17 | | | | |
| Surrogate: 1,4-Difluorobenzene | | 108.9 | | 50-140 | % | 06-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| F1 (C6-C10) | | <5.0 | VOCJ | 5.0 | ug/g | 06-DEC-17 | 17 | 25 | 55 | 55 |
| F1-BTEX | | <5.0 | | 5.0 | ug/g | 12-DEC-17 | 17 | 25 | 55 | 55 |
| F2 (C10-C16) | | <10 | | 10 | ug/g | 11-DEC-17 | 10 | 10 | 230 | 98 |
| F3 (C16-C34) | | 55 | | 50 | ug/g | 11-DEC-17 | 240 | 240 | 1700 | 300 |
| F4 (C34-C50) | | 82 | | 50 | ug/g | 11-DEC-17 | 120 | 120 | 3300 | 2800 |
| Total Hydrocarbons (C6-C50) | | 137 | | 72 | ug/g | 12-DEC-17 | | | | |
| Chrom. to baseline at nC50 | | YES | | | No Unit | 11-DEC-17 | | | | |
| Surrogate: 2-Bromobenzotrifluoride | | 71.5 | | 60-140 | % | 11-DEC-17 | | | | |
| Surrogate: 3,4-Dichlorotoluene | | 73.3 | | 60-140 | % | 06-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|-------------------------------------|---------------------|---------|-----------|--------|----------|-----------|------------------|-------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-7 | BH16-SA2 | | | | | | | | | |
| Sampled By: | Client on 22-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Physical Tests | | | | | | | | | | |
| Conductivity | | 0.588 | | 0.0040 | mS/cm | 07-DEC-17 | *0.47 | *0.57 | 1.4 | 0.7 |
| % Moisture | | 3.96 | | 0.10 | % | 05-DEC-17 | | | | |
| pH | | 8.27 | | 0.10 | pH units | 05-DEC-17 | | | | |
| Cyanides | | | | | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | | 0.050 | ug/g | 06-DEC-17 | 0.051 | 0.051 | 0.051 | 0.051 |
| Saturated Paste Extractables | | | | | | | | | | |
| SAR | | 13.7 | | 0.10 | SAR | 07-DEC-17 | *1 | *2.4 | *12 | *5 |
| Calcium (Ca) | | 2.6 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Magnesium (Mg) | | 1.0 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Sodium (Na) | | 103 | | 1.0 | mg/L | 07-DEC-17 | | | | |
| Metals | | | | | | | | | | |
| Antimony (Sb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1 | 1.3 | 40 | 7.5 |
| Arsenic (As) | | 1.1 | | 1.0 | ug/g | 07-DEC-17 | 11 | 18 | 18 | 18 |
| Barium (Ba) | | 4.2 | | 1.0 | ug/g | 07-DEC-17 | 210 | 220 | 670 | 390 |
| Beryllium (Be) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 2.5 | 2.5 | 8 | 4 |
| Boron (B) | | <5.0 | | 5.0 | ug/g | 07-DEC-17 | 36 | 36 | 120 | 120 |
| Boron (B), Hot Water Ext. | | <0.10 | | 0.10 | ug/g | 11-DEC-17 | 36 | 36 | 2 | 1.5 |
| Cadmium (Cd) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1.2 | 1.9 | 1.2 |
| Chromium (Cr) | | 5.1 | | 1.0 | ug/g | 07-DEC-17 | 67 | 70 | 160 | 160 |
| Cobalt (Co) | | 1.2 | | 1.0 | ug/g | 07-DEC-17 | 19 | 21 | 80 | 22 |
| Copper (Cu) | | 1.1 | | 1.0 | ug/g | 07-DEC-17 | 62 | 92 | 230 | 140 |
| Lead (Pb) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 45 | 120 | 120 | 120 |
| Mercury (Hg) | | <0.0050 | | 0.0050 | ug/g | 07-DEC-17 | 0.16 | 0.27 | 3.9 | 0.27 |
| Molybdenum (Mo) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 2 | 2 | 40 | 6.9 |
| Nickel (Ni) | | 2.5 | | 1.0 | ug/g | 07-DEC-17 | 37 | 82 | 270 | 100 |
| Selenium (Se) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.2 | 1.5 | 5.5 | 2.4 |
| Silver (Ag) | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 40 | 20 |
| Thallium (Tl) | | <0.50 | | 0.50 | ug/g | 07-DEC-17 | 1 | 1 | 3.3 | 1 |
| Uranium (U) | | <1.0 | | 1.0 | ug/g | 07-DEC-17 | 1.9 | 2.5 | 33 | 23 |
| Vanadium (V) | | 7.2 | | 1.0 | ug/g | 07-DEC-17 | 86 | 86 | 86 | 86 |
| Zinc (Zn) | | 5.3 | | 5.0 | ug/g | 07-DEC-17 | 290 | 290 | 340 | 340 |
| Speciated Metals | | | | | | | | | | |
| Chromium, Hexavalent | | <0.20 | | 0.20 | ug/g | 07-DEC-17 | 0.66 | 0.66 | 8 | 8 |
| Volatile Organic Compounds | | | | | | | | | | |
| Acetone | | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 16 | 16 |
| Benzene | | <0.0068 | VOCJ | 0.0068 | ug/g | 07-DEC-17 | 0.02 | 0.02 | 0.32 | 0.21 |
| Bromodichloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.5 | 1.5 |
| Bromoform | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.61 | 0.27 |
| Bromomethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Carbon tetrachloride | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.21 | 0.05 |
| Chlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 2.4 | 2.4 |
| Dibromochloromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 2.3 | 2.3 |
| Chloroform | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.47 | 0.05 |
| 1,2-Dibromoethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,2-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.2 | 1.2 |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)



ANALYTICAL GUIDELINE REPORT

G17496

| Sample Details | | Result | Qualifier | D.L. | Units | Analyzed | Guideline Limits | | | |
|------------------------------------|---------------------|--------|-----------|--------|---------|-----------|------------------|--------|-------|-------|
| Grouping | Analyte | | | | | | #1 | #2 | #3 | #4 |
| L2030089-7 | BH16-SA2 | | | | | | | | | |
| Sampled By: | Client on 22-NOV-17 | | | | | | | | | |
| Matrix: | SOIL | | | | | | | | | |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,3-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 9.6 | 4.8 |
| 1,4-Dichlorobenzene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.2 | 0.083 |
| Dichlorodifluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 16 | 16 |
| 1,1-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.47 | 0.47 |
| 1,2-Dichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| 1,1-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.064 | 0.05 |
| cis-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.9 | 1.9 |
| trans-1,2-Dichloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.3 | 0.084 |
| Methylene Chloride | | <0.15 | RRR | 0.15 | ug/g | 07-DEC-17 | **0.05 | **0.05 | 1.6 | **0.1 |
| 1,2-Dichloropropane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.16 | 0.05 |
| cis-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| trans-1,3-Dichloropropene | | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| 1,3-Dichloropropene (cis & trans) | | <0.042 | | 0.042 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.059 | 0.05 |
| Ethylbenzene | | <0.018 | VOCJ | 0.018 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.1 | 1.1 |
| n-Hexane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 46 | 2.8 |
| Methyl Ethyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 70 | 16 |
| Methyl Isobutyl Ketone | | <0.50 | VOCJ | 0.50 | ug/g | 07-DEC-17 | 0.5 | 0.5 | 31 | 1.7 |
| MTBE | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.6 | 0.75 |
| Styrene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 34 | 0.7 |
| 1,1,1,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.087 | 0.058 |
| 1,1,2,2-Tetrachloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Tetrachloroethylene | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 1.9 | 0.28 |
| Toluene | | <0.080 | VOCJ | 0.080 | ug/g | 07-DEC-17 | 0.2 | 0.2 | 6.4 | 2.3 |
| 1,1,1-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 6.1 | 0.38 |
| 1,1,2-Trichloroethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.05 | 0.05 |
| Trichloroethylene | | <0.010 | VOCJ | 0.010 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 0.55 | 0.061 |
| Trichlorofluoromethane | | <0.050 | VOCJ | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.25 | 4 | 4 |
| Vinyl chloride | | <0.020 | VOCJ | 0.020 | ug/g | 07-DEC-17 | 0.02 | 0.02 | 0.032 | 0.02 |
| o-Xylene | | <0.020 | VOCJ | 0.020 | ug/g | 07-DEC-17 | | | | |
| m+p-Xylenes | | <0.030 | VOCJ | 0.030 | ug/g | 07-DEC-17 | | | | |
| Xylenes (Total) | | <0.050 | | 0.050 | ug/g | 07-DEC-17 | 0.05 | 0.05 | 26 | 3.1 |
| Surrogate: 4-Bromofluorobenzene | | 104.2 | | 50-140 | % | 07-DEC-17 | | | | |
| Surrogate: 1,4-Difluorobenzene | | 106.3 | | 50-140 | % | 07-DEC-17 | | | | |
| Hydrocarbons | | | | | | | | | | |
| F1 (C6-C10) | | <5.0 | VOCJ | 5.0 | ug/g | 07-DEC-17 | 17 | 25 | 55 | 55 |
| F1-BTEX | | <5.0 | | 5.0 | ug/g | 12-DEC-17 | 17 | 25 | 55 | 55 |
| F2 (C10-C16) | | <10 | | 10 | ug/g | 12-DEC-17 | 10 | 10 | 230 | 98 |
| F3 (C16-C34) | | 56 | | 50 | ug/g | 12-DEC-17 | 240 | 240 | 1700 | 300 |
| F4 (C34-C50) | | 129 | | 50 | ug/g | 12-DEC-17 | *120 | *120 | 3300 | 2800 |
| F4G-SG (GHH-Silica) | | 510 | | 250 | ug/g | 07-DEC-17 | *120 | *120 | 3300 | 2800 |
| Total Hydrocarbons (C6-C50) | | 186 | | 72 | ug/g | 12-DEC-17 | | | | |
| Chrom. to baseline at nC50 | | NO | | | No Unit | 12-DEC-17 | | | | |
| Surrogate: 2-Bromobenzotrifluoride | | 70.7 | | 60-140 | % | 12-DEC-17 | | | | |
| Surrogate: 3,4-Dichlorotoluene | | 74.2 | | 60-140 | % | 07-DEC-17 | | | | |

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T1/T2-SOIL-AG+RPIICC/RPI-ICC-C

#1: T1-Soil-Agricultural or Other Property Use

#2: T1-Soil-Res/Park/Inst/Ind/Com/Commu Property Use

#3: T2-Soil-Ind/Com/Commu Property Use (Coarse)

#4: T2-Soil-Res/Park/Inst. Property Use (Coarse)

Reference Information

Qualifiers for Sample Submission Listed:

| Qualifier | Description |
|-----------|--|
| VOCC | Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK). |

Sample Parameter Qualifier key listed:

| Qualifier | Description |
|-----------|--|
| SAR:M | Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable. |
| G | QC result did not meet ALS DQO. Refer to narrative comments for further information. |
| VOCJ | Soil jar was submitted as VOC sample container. VOC results may be biased low, and do not meet federal (CCME) or provincial requirements (for BC, AB-Tier1, MB, ON, SK). |
| DLM | Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity). |
| RRR | Refer to Report Remarks for issues regarding this analysis |

Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Method Reference*** |
|---------------|--------|------------------------------------|---------------------|
| B-HWS-R511-WT | Soil | Boron-HWE-O.Reg 153/04 (July 2011) | HW EXTR, EPA 6010B |

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|----------------|------|--|----------------------------|
| CN-WAD-R511-WT | Soil | Cyanide (WAD)-O.Reg 153/04 (July 2011) | MOE 3015/APHA 4500CN I-WAD |
|----------------|------|--|----------------------------|

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|--------------|------|-----------------------------|------------------|
| CR-CR6-IC-WT | Soil | Hexavalent Chromium in Soil | SW846 3060A/7199 |
|--------------|------|-----------------------------|------------------|

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|-------|------|-------------------|------------|
| EC-WT | Soil | Conductivity (EC) | MOEE E3138 |
|-------|------|-------------------|------------|

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT Soil F1-F4 Hydrocarbon Calculated CCME CWS-PHC, Pub #1310, Dec 2001-S
Parameters

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Soil F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:

1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT Soil F4G SG-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

MET-200.2-CCMS-WT Soil Metals in Soil by CRC ICPMS EPA 200.2/6020A (mod)

This method uses a heated strong acid digestion with HNO3 and HCl and is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

| | | | |
|-------------|------|------------|-------------------------|
| MOISTURE-WT | Soil | % Moisture | Gravimetric: Oven Dried |
| PH-WT | Soil | pH | MOEE E3137A |

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT Soil SAR-O.Reg 153/04 (July 2011) SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|---------------------|------|------------------------------|------------------|
| VOC-1,3-DCP-CALC-WT | Soil | Regulation 153 VOCs | SW8260B/SW8270C |
| VOC-511-HS-WT | Soil | VOC-O.Reg 153/04 (July 2011) | SW846 8260 (511) |

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

| | | | |
|---------------------|------|-------------------------------------|-------------|
| XYLENES-SUM-CALC-WT | Soil | Sum of Xylene Isomer Concentrations | CALCULATION |
|---------------------|------|-------------------------------------|-------------|

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

| | | | |
|---|---|----------------------------|---------------------|
| Chain of Custody numbers: | | | |
| 14-460142 | | | |
| The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below: | | | |
| Laboratory Definition Code | Laboratory Location | Laboratory Definition Code | Laboratory Location |
| WT | ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA | | |

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg ww - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information.



Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 1 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---------------------------|-----------------|-----------------------|--------|-----------|-------|-----|--------|-----------|
| B-HWS-R511-WT | | Soil | | | | | | |
| Batch | R3907291 | | | | | | | |
| WG2680136-4 | DUP | L2029486-16 | | | | | | |
| Boron (B), Hot Water Ext. | | <0.10 | <0.10 | RPD-NA | ug/g | N/A | 30 | 08-DEC-17 |
| WG2680136-2 | IRM | HOTB-SAL_SOIL5 | | | | | | |
| Boron (B), Hot Water Ext. | | | 112.7 | | % | | 70-130 | 08-DEC-17 |
| WG2680136-3 | LCS | | | | | | | |
| Boron (B), Hot Water Ext. | | | 98.9 | | % | | 70-130 | 08-DEC-17 |
| WG2680136-1 | MB | | | | | | | |
| Boron (B), Hot Water Ext. | | | <0.10 | | ug/g | | 0.1 | 08-DEC-17 |
| Batch | R3909311 | | | | | | | |
| WG2681347-4 | DUP | L2031924-14 | | | | | | |
| Boron (B), Hot Water Ext. | | 0.27 | 0.29 | | ug/g | 5.3 | 30 | 11-DEC-17 |
| WG2681347-2 | IRM | HOTB-SAL_SOIL5 | | | | | | |
| Boron (B), Hot Water Ext. | | | 91.5 | | % | | 70-130 | 11-DEC-17 |
| WG2681347-3 | LCS | | | | | | | |
| Boron (B), Hot Water Ext. | | | 112.5 | | % | | 70-130 | 11-DEC-17 |
| WG2681347-1 | MB | | | | | | | |
| Boron (B), Hot Water Ext. | | | <0.10 | | ug/g | | 0.1 | 11-DEC-17 |
| Batch | R3909327 | | | | | | | |
| WG2681348-4 | DUP | L2027735-1 | | | | | | |
| Boron (B), Hot Water Ext. | | <0.10 | <0.10 | RPD-NA | ug/g | N/A | 30 | 11-DEC-17 |
| WG2681348-2 | IRM | HOTB-SAL_SOIL5 | | | | | | |
| Boron (B), Hot Water Ext. | | | 123.1 | | % | | 70-130 | 11-DEC-17 |
| WG2681348-3 | LCS | | | | | | | |
| Boron (B), Hot Water Ext. | | | 106.8 | | % | | 70-130 | 11-DEC-17 |
| WG2681348-1 | MB | | | | | | | |
| Boron (B), Hot Water Ext. | | | <0.10 | | ug/g | | 0.1 | 11-DEC-17 |
| CN-WAD-R511-WT | | Soil | | | | | | |
| Batch | R3905832 | | | | | | | |
| WG2677409-3 | DUP | L2030089-1 | | | | | | |
| Cyanide, Weak Acid Diss | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 35 | 05-DEC-17 |
| WG2677409-2 | LCS | | | | | | | |
| Cyanide, Weak Acid Diss | | | 97.1 | | % | | 80-120 | 05-DEC-17 |
| WG2677409-1 | MB | | | | | | | |
| Cyanide, Weak Acid Diss | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| WG2677409-4 | MS | L2030089-1 | | | | | | |
| Cyanide, Weak Acid Diss | | | 95.0 | | % | | 70-130 | 05-DEC-17 |



Environmental

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 3 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|------------------------------------|-----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| F1-HS-511-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-4 | DUP | WG2676849-3 | | | | | | |
| F1 (C6-C10) | | <5.0 | <5.0 | RPD-NA | ug/g | N/A | 30 | 06-DEC-17 |
| WG2676849-2 | LCS | | | | | | | |
| F1 (C6-C10) | | | 96.5 | | % | | 80-120 | 05-DEC-17 |
| WG2676849-1 | MB | | | | | | | |
| F1 (C6-C10) | | | <5.0 | | ug/g | | 5 | 05-DEC-17 |
| Surrogate: 3,4-Dichlorotoluene | | | 86.8 | | % | | 60-140 | 05-DEC-17 |
| WG2676849-7 | MS | WG2676849-6 | | | | | | |
| F1 (C6-C10) | | | 93.9 | | % | | 60-140 | 05-DEC-17 |
| F2-F4-511-WT | | Soil | | | | | | |
| Batch | R3907630 | | | | | | | |
| WG2677118-4 | DUP | WG2677118-3 | | | | | | |
| F2 (C10-C16) | | <10 | <10 | RPD-NA | ug/g | N/A | 30 | 08-DEC-17 |
| F3 (C16-C34) | | <50 | <50 | RPD-NA | ug/g | N/A | 30 | 08-DEC-17 |
| F4 (C34-C50) | | <50 | <50 | RPD-NA | ug/g | N/A | 30 | 08-DEC-17 |
| WG2677118-2 | LCS | | | | | | | |
| F2 (C10-C16) | | | 143.3 | LCS-H | % | | 80-120 | 08-DEC-17 |
| F3 (C16-C34) | | | 139.0 | LCS-H | % | | 80-120 | 08-DEC-17 |
| F4 (C34-C50) | | | 139.8 | LCS-H | % | | 80-120 | 08-DEC-17 |
| WG2677118-1 | MB | | | | | | | |
| F2 (C10-C16) | | | <10 | | ug/g | | 10 | 08-DEC-17 |
| F3 (C16-C34) | | | <50 | | ug/g | | 50 | 08-DEC-17 |
| F4 (C34-C50) | | | <50 | | ug/g | | 50 | 08-DEC-17 |
| Surrogate: 2-Bromobenzotrifluoride | | | 36.8 | MBS | % | | 60-140 | 08-DEC-17 |
| WG2677118-5 | MS | WG2677118-3 | | | | | | |
| F2 (C10-C16) | | | 110.7 | | % | | 60-140 | 08-DEC-17 |
| F3 (C16-C34) | | | 109.3 | | % | | 60-140 | 08-DEC-17 |
| F4 (C34-C50) | | | 110.1 | | % | | 60-140 | 08-DEC-17 |
| Batch | R3909909 | | | | | | | |
| WG2680759-4 | DUP | WG2680759-3 | | | | | | |
| F2 (C10-C16) | | <10 | <10 | RPD-NA | ug/g | N/A | 30 | 11-DEC-17 |
| F3 (C16-C34) | | 70 | 52 | J | ug/g | 19 | 100 | 11-DEC-17 |
| F4 (C34-C50) | | 67 | <50 | RPD-NA | ug/g | N/A | 30 | 11-DEC-17 |
| WG2680759-2 | LCS | | | | | | | |
| F2 (C10-C16) | | | 106.1 | | % | | 80-120 | 11-DEC-17 |
| F3 (C16-C34) | | | 102.8 | | % | | 80-120 | 11-DEC-17 |



Environmental

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 5 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|------------------------------------|-----------------|------------------------|---------|-----------|-------|-----|--------|-----------|
| F2-F4-511-WT | Soil | | | | | | | |
| Batch | R3912368 | | | | | | | |
| WG2682137-2 | LCS | | | | | | | |
| F2 (C10-C16) | | | 111.4 | | % | | 80-120 | 12-DEC-17 |
| F3 (C16-C34) | | | 101.9 | | % | | 80-120 | 12-DEC-17 |
| F4 (C34-C50) | | | 105.2 | | % | | 80-120 | 12-DEC-17 |
| WG2682137-1 | MB | | | | | | | |
| F2 (C10-C16) | | | <10 | | ug/g | | 10 | 12-DEC-17 |
| F3 (C16-C34) | | | <50 | | ug/g | | 50 | 12-DEC-17 |
| F4 (C34-C50) | | | <50 | | ug/g | | 50 | 12-DEC-17 |
| Surrogate: 2-Bromobenzotrifluoride | | | 101.9 | | % | | 60-140 | 12-DEC-17 |
| WG2682137-5 | MS | WG2682137-3 | | | | | | |
| F2 (C10-C16) | | | 101.6 | | % | | 60-140 | 12-DEC-17 |
| F3 (C16-C34) | | | 113.2 | | % | | 60-140 | 12-DEC-17 |
| F4 (C34-C50) | | | N/A | MS-B | % | | - | 12-DEC-17 |
| F4G-ADD-511-WT | Soil | | | | | | | |
| Batch | R3912041 | | | | | | | |
| WG2682950-2 | LCS | | | | | | | |
| F4G-SG (GHH-Silica) | | | 104.0 | | % | | 60-140 | 07-DEC-17 |
| WG2682950-1 | MB | | | | | | | |
| F4G-SG (GHH-Silica) | | | <250 | | ug/g | | 250 | 07-DEC-17 |
| Batch | R3912660 | | | | | | | |
| WG2683652-3 | DUP | L2030089-3 | | | | | | |
| F4G-SG (GHH-Silica) | | 1420 | 990 | | ug/g | 36 | 40 | 08-DEC-17 |
| WG2683652-2 | LCS | | | | | | | |
| F4G-SG (GHH-Silica) | | | 83.0 | | % | | 60-140 | 08-DEC-17 |
| WG2683652-1 | MB | | | | | | | |
| F4G-SG (GHH-Silica) | | | <250 | | ug/g | | 250 | 08-DEC-17 |
| HG-200.2-CVAA-WT | Soil | | | | | | | |
| Batch | R3906456 | | | | | | | |
| WG2679203-2 | CRM | WT-CANMET-TILL1 | | | | | | |
| Mercury (Hg) | | | 111.5 | | % | | 70-130 | 07-DEC-17 |
| WG2679203-6 | DUP | WG2679203-5 | | | | | | |
| Mercury (Hg) | | 0.0114 | 0.0115 | | ug/g | 1.2 | 40 | 07-DEC-17 |
| WG2679203-3 | LCS | | | | | | | |
| Mercury (Hg) | | | 113.5 | | % | | 80-120 | 07-DEC-17 |
| WG2679203-1 | MB | | | | | | | |
| Mercury (Hg) | | | <0.0050 | | mg/kg | | 0.005 | 07-DEC-17 |
| MET-200.2-CCMS-WT | Soil | | | | | | | |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 6 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|------------------------|--------|-----------|-------|-----|------------|-----------|
| MET-200.2-CCMS-WT | | Soil | | | | | | |
| Batch | R3907089 | | | | | | | |
| WG2679203-2 | CRM | WT-CANMET-TILL1 | | | | | | |
| Antimony (Sb) | | | 92.5 | | % | | 70-130 | 07-DEC-17 |
| Arsenic (As) | | | 114.6 | | % | | 70-130 | 07-DEC-17 |
| Barium (Ba) | | | 117.6 | | % | | 70-130 | 07-DEC-17 |
| Beryllium (Be) | | | 111.6 | | % | | 70-130 | 07-DEC-17 |
| Boron (B) | | | 4.0 | | mg/kg | | 0-8.2 | 07-DEC-17 |
| Cadmium (Cd) | | | 108.8 | | % | | 70-130 | 07-DEC-17 |
| Chromium (Cr) | | | 114.3 | | % | | 70-130 | 07-DEC-17 |
| Cobalt (Co) | | | 112.8 | | % | | 70-130 | 07-DEC-17 |
| Copper (Cu) | | | 114.2 | | % | | 70-130 | 07-DEC-17 |
| Lead (Pb) | | | 102.7 | | % | | 70-130 | 07-DEC-17 |
| Molybdenum (Mo) | | | 106.0 | | % | | 70-130 | 07-DEC-17 |
| Nickel (Ni) | | | 111.5 | | % | | 70-130 | 07-DEC-17 |
| Selenium (Se) | | | 0.34 | | mg/kg | | 0.11-0.51 | 07-DEC-17 |
| Silver (Ag) | | | 0.22 | | mg/kg | | 0.13-0.33 | 07-DEC-17 |
| Thallium (Tl) | | | 0.120 | | mg/kg | | 0.077-0.18 | 07-DEC-17 |
| Uranium (U) | | | 101.9 | | % | | 70-130 | 07-DEC-17 |
| Vanadium (V) | | | 112.9 | | % | | 70-130 | 07-DEC-17 |
| Zinc (Zn) | | | 111.5 | | % | | 70-130 | 07-DEC-17 |
| WG2679203-6 | DUP | WG2679203-5 | | | | | | |
| Antimony (Sb) | | <0.10 | <0.10 | RPD-NA | ug/g | N/A | 30 | 07-DEC-17 |
| Arsenic (As) | | 2.57 | 2.56 | | ug/g | 0.3 | 30 | 07-DEC-17 |
| Barium (Ba) | | 71.1 | 75.0 | | ug/g | 5.3 | 40 | 07-DEC-17 |
| Beryllium (Be) | | 0.49 | 0.51 | | ug/g | 3.0 | 30 | 07-DEC-17 |
| Boron (B) | | 12.9 | 13.6 | | ug/g | 5.6 | 30 | 07-DEC-17 |
| Cadmium (Cd) | | 0.119 | 0.115 | | ug/g | 3.4 | 30 | 07-DEC-17 |
| Chromium (Cr) | | 18.3 | 18.9 | | ug/g | 3.2 | 30 | 07-DEC-17 |
| Cobalt (Co) | | 6.68 | 6.74 | | ug/g | 0.9 | 30 | 07-DEC-17 |
| Copper (Cu) | | 17.0 | 17.0 | | ug/g | 0.3 | 30 | 07-DEC-17 |
| Lead (Pb) | | 11.4 | 11.4 | | ug/g | 0.3 | 40 | 07-DEC-17 |
| Molybdenum (Mo) | | 0.20 | 0.19 | | ug/g | 5.7 | 40 | 07-DEC-17 |
| Nickel (Ni) | | 15.1 | 15.1 | | ug/g | 0.1 | 30 | 07-DEC-17 |
| Selenium (Se) | | <0.20 | <0.20 | RPD-NA | ug/g | N/A | 30 | 07-DEC-17 |
| Silver (Ag) | | <0.10 | <0.10 | RPD-NA | ug/g | N/A | 40 | 07-DEC-17 |



Environmental

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 7 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| MET-200.2-CCMS-WT | | Soil | | | | | | |
| Batch | R3907089 | | | | | | | |
| WG2679203-6 | DUP | WG2679203-5 | | | | | | |
| Thallium (Tl) | | 0.096 | 0.094 | | ug/g | 1.7 | 30 | 07-DEC-17 |
| Uranium (U) | | 0.462 | 0.478 | | ug/g | 3.4 | 30 | 07-DEC-17 |
| Vanadium (V) | | 28.4 | 28.5 | | ug/g | 0.4 | 30 | 07-DEC-17 |
| Zinc (Zn) | | 53.9 | 53.4 | | ug/g | 1.0 | 30 | 07-DEC-17 |
| WG2679203-4 | LCS | | | | | | | |
| Antimony (Sb) | | | 99.1 | | % | | 80-120 | 07-DEC-17 |
| Arsenic (As) | | | 109.2 | | % | | 80-120 | 07-DEC-17 |
| Barium (Ba) | | | 109.4 | | % | | 80-120 | 07-DEC-17 |
| Beryllium (Be) | | | 99.9 | | % | | 80-120 | 07-DEC-17 |
| Boron (B) | | | 97.4 | | % | | 80-120 | 07-DEC-17 |
| Cadmium (Cd) | | | 100.7 | | % | | 80-120 | 07-DEC-17 |
| Chromium (Cr) | | | 107.9 | | % | | 80-120 | 07-DEC-17 |
| Cobalt (Co) | | | 105.7 | | % | | 80-120 | 07-DEC-17 |
| Copper (Cu) | | | 104.0 | | % | | 80-120 | 07-DEC-17 |
| Lead (Pb) | | | 104.4 | | % | | 80-120 | 07-DEC-17 |
| Molybdenum (Mo) | | | 101.5 | | % | | 80-120 | 07-DEC-17 |
| Nickel (Ni) | | | 105.2 | | % | | 80-120 | 07-DEC-17 |
| Selenium (Se) | | | 101.6 | | % | | 80-120 | 07-DEC-17 |
| Silver (Ag) | | | 97.1 | | % | | 80-120 | 07-DEC-17 |
| Thallium (Tl) | | | 107.8 | | % | | 80-120 | 07-DEC-17 |
| Uranium (U) | | | 98.6 | | % | | 80-120 | 07-DEC-17 |
| Vanadium (V) | | | 109.2 | | % | | 80-120 | 07-DEC-17 |
| Zinc (Zn) | | | 99.8 | | % | | 80-120 | 07-DEC-17 |
| WG2679203-1 | MB | | | | | | | |
| Antimony (Sb) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Arsenic (As) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Barium (Ba) | | | <0.50 | | mg/kg | | 0.5 | 07-DEC-17 |
| Beryllium (Be) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Boron (B) | | | <5.0 | | mg/kg | | 5 | 07-DEC-17 |
| Cadmium (Cd) | | | <0.020 | | mg/kg | | 0.02 | 07-DEC-17 |
| Chromium (Cr) | | | <0.50 | | mg/kg | | 0.5 | 07-DEC-17 |
| Cobalt (Co) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Copper (Cu) | | | <0.50 | | mg/kg | | 0.5 | 07-DEC-17 |
| Lead (Pb) | | | <0.50 | | mg/kg | | 0.5 | 07-DEC-17 |



Environmental

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 8 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-------------|-------------------|--------|-----------|-------|-----|--------|-----------|
| MET-200.2-CCMS-WT | Soil | | | | | | | |
| Batch R3907089 | | | | | | | | |
| WG2679203-1 MB | | | | | | | | |
| Molybdenum (Mo) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Nickel (Ni) | | | <0.50 | | mg/kg | | 0.5 | 07-DEC-17 |
| Selenium (Se) | | | <0.20 | | mg/kg | | 0.2 | 07-DEC-17 |
| Silver (Ag) | | | <0.10 | | mg/kg | | 0.1 | 07-DEC-17 |
| Thallium (Tl) | | | <0.050 | | mg/kg | | 0.05 | 07-DEC-17 |
| Uranium (U) | | | <0.050 | | mg/kg | | 0.05 | 07-DEC-17 |
| Vanadium (V) | | | <0.20 | | mg/kg | | 0.2 | 07-DEC-17 |
| Zinc (Zn) | | | <2.0 | | mg/kg | | 2 | 07-DEC-17 |
| MOISTURE-WT | Soil | | | | | | | |
| Batch R3903852 | | | | | | | | |
| WG2677077-3 DUP | | L2029712-1 | | | | | | |
| % Moisture | | 9.98 | 9.79 | | % | 1.9 | 20 | 04-DEC-17 |
| WG2677077-2 LCS | | | | | | | | |
| % Moisture | | | 98.6 | | % | | 90-110 | 04-DEC-17 |
| WG2677077-1 MB | | | | | | | | |
| % Moisture | | | <0.10 | | % | | 0.1 | 04-DEC-17 |
| Batch R3903853 | | | | | | | | |
| WG2677376-3 DUP | | L2029551-1 | | | | | | |
| % Moisture | | 10.7 | 11.2 | | % | 4.9 | 20 | 04-DEC-17 |
| WG2677376-2 LCS | | | | | | | | |
| % Moisture | | | 100.0 | | % | | 90-110 | 04-DEC-17 |
| WG2677376-1 MB | | | | | | | | |
| % Moisture | | | <0.10 | | % | | 0.1 | 04-DEC-17 |
| Batch R3903856 | | | | | | | | |
| WG2677306-3 DUP | | L2028950-3 | | | | | | |
| % Moisture | | 8.55 | 8.41 | | % | 1.7 | 20 | 04-DEC-17 |
| WG2677306-2 LCS | | | | | | | | |
| % Moisture | | | 100.2 | | % | | 90-110 | 04-DEC-17 |
| WG2677306-1 MB | | | | | | | | |
| % Moisture | | | <0.10 | | % | | 0.1 | 04-DEC-17 |
| Batch R3905456 | | | | | | | | |
| WG2677828-3 DUP | | L2030089-5 | | | | | | |
| % Moisture | | 5.00 | 4.99 | | % | 0.2 | 20 | 05-DEC-17 |
| WG2677828-2 LCS | | | | | | | | |
| % Moisture | | | 99.7 | | % | | 90-110 | 05-DEC-17 |
| WG2677828-1 MB | | | | | | | | |



Environmental

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 9 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---------------------------|-----------------|--------------------|--------|-----------|----------|------|---------|-----------|
| MOISTURE-WT | | | | | | | | |
| Soil | | | | | | | | |
| Batch | R3905456 | | | | | | | |
| WG2677828-1 MB | | | | | | | | |
| % Moisture | | | <0.10 | | % | | 0.1 | 05-DEC-17 |
| Batch | R3905464 | | | | | | | |
| WG2677928-3 DUP | | L2030089-7 | | | | | | |
| % Moisture | | 3.96 | 4.03 | | % | 1.7 | 20 | 05-DEC-17 |
| WG2677928-2 LCS | | | | | | | | |
| % Moisture | | | 99.6 | | % | | 90-110 | 05-DEC-17 |
| WG2677928-1 MB | | | | | | | | |
| % Moisture | | | <0.10 | | % | | 0.1 | 05-DEC-17 |
| PH-WT | | | | | | | | |
| Soil | | | | | | | | |
| Batch | R3905378 | | | | | | | |
| WG2677412-1 DUP | | L2030089-1 | | | | | | |
| pH | | 7.63 | 7.60 | J | pH units | 0.03 | 0.3 | 05-DEC-17 |
| WG2677776-1 LCS | | | | | | | | |
| pH | | | 6.98 | | pH units | | 6.9-7.1 | 05-DEC-17 |
| SAR-R511-WT | | | | | | | | |
| Soil | | | | | | | | |
| Batch | R3907103 | | | | | | | |
| WG2678814-14 DUP | | L2029656-1 | | | | | | |
| Calcium (Ca) | | 11.0 | 10.8 | | mg/L | 1.8 | 30 | 07-DEC-17 |
| Sodium (Na) | | 7.8 | 7.6 | | mg/L | 2.8 | 30 | 07-DEC-17 |
| Magnesium (Mg) | | 2.7 | 2.6 | | mg/L | 1.6 | 30 | 07-DEC-17 |
| WG2678814-15 IRM | | WT SAR1 | | | | | | |
| Calcium (Ca) | | | 98.8 | | % | | 70-130 | 07-DEC-17 |
| Sodium (Na) | | | 113.4 | | % | | 70-130 | 07-DEC-17 |
| Magnesium (Mg) | | | 101.8 | | % | | 70-130 | 07-DEC-17 |
| WG2678814-13 MB | | | | | | | | |
| Calcium (Ca) | | | <1.0 | | mg/L | | 1 | 07-DEC-17 |
| Sodium (Na) | | | <1.0 | | mg/L | | 1 | 07-DEC-17 |
| Magnesium (Mg) | | | <1.0 | | mg/L | | 1 | 07-DEC-17 |
| VOC-511-HS-WT | | | | | | | | |
| Soil | | | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-4 DUP | | WG2676849-3 | | | | | | |
| 1,1,1,2-Tetrachloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,1,2,2-Tetrachloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,1,1-Trichloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |



Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 10 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|----------------------------|-----------------|--------------------|---------|-----------|-------|-----|-------|-----------|
| VOC-511-HS-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-4 | DUP | WG2676849-3 | | | | | | |
| 1,1,2-Trichloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,1-Dichloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,1-Dichloroethylene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,2-Dibromoethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,2-Dichlorobenzene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,2-Dichloroethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,2-Dichloropropane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,3-Dichlorobenzene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| 1,4-Dichlorobenzene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Acetone | | <0.50 | <0.50 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Benzene | | <0.0068 | <0.0068 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Bromodichloromethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Bromoform | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Bromomethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Carbon tetrachloride | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Chlorobenzene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Chloroform | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| cis-1,2-Dichloroethylene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| cis-1,3-Dichloropropene | | <0.030 | <0.030 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Dibromochloromethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Dichlorodifluoromethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Ethylbenzene | | <0.018 | <0.018 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| n-Hexane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Methylene Chloride | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| MTBE | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| m+p-Xylenes | | <0.030 | <0.030 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Methyl Ethyl Ketone | | <0.50 | <0.50 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Methyl Isobutyl Ketone | | <0.50 | <0.50 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| o-Xylene | | <0.020 | <0.020 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Styrene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Tetrachloroethylene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Toluene | | <0.080 | <0.080 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| trans-1,2-Dichloroethylene | | <0.050 | <0.050 | | ug/g | | | 06-DEC-17 |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 11 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|----------------------------|-----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| VOC-511-HS-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-4 DUP | | WG2676849-3 | | | | | | |
| trans-1,2-Dichloroethylene | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| trans-1,3-Dichloropropene | | <0.030 | <0.030 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Trichloroethylene | | <0.010 | <0.010 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Trichlorofluoromethane | | <0.050 | <0.050 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| Vinyl chloride | | <0.020 | <0.020 | RPD-NA | ug/g | N/A | 40 | 06-DEC-17 |
| WG2676849-2 LCS | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | | | 101.0 | | % | | 60-130 | 05-DEC-17 |
| 1,1,2,2-Tetrachloroethane | | | 98.9 | | % | | 60-130 | 05-DEC-17 |
| 1,1,1-Trichloroethane | | | 102.2 | | % | | 60-130 | 05-DEC-17 |
| 1,1,2-Trichloroethane | | | 102.1 | | % | | 60-130 | 05-DEC-17 |
| 1,1-Dichloroethane | | | 109.7 | | % | | 60-130 | 05-DEC-17 |
| 1,1-Dichloroethylene | | | 89.0 | | % | | 60-130 | 05-DEC-17 |
| 1,2-Dibromoethane | | | 101.6 | | % | | 70-130 | 05-DEC-17 |
| 1,2-Dichlorobenzene | | | 104.2 | | % | | 70-130 | 05-DEC-17 |
| 1,2-Dichloroethane | | | 101.0 | | % | | 60-130 | 05-DEC-17 |
| 1,2-Dichloropropane | | | 101.9 | | % | | 70-130 | 05-DEC-17 |
| 1,3-Dichlorobenzene | | | 103.4 | | % | | 70-130 | 05-DEC-17 |
| 1,4-Dichlorobenzene | | | 105.4 | | % | | 70-130 | 05-DEC-17 |
| Acetone | | | 108.5 | | % | | 60-140 | 05-DEC-17 |
| Benzene | | | 103.6 | | % | | 70-130 | 05-DEC-17 |
| Bromodichloromethane | | | 99.96 | | % | | 50-140 | 05-DEC-17 |
| Bromoform | | | 93.8 | | % | | 70-130 | 05-DEC-17 |
| Bromomethane | | | 93.7 | | % | | 50-140 | 05-DEC-17 |
| Carbon tetrachloride | | | 101.5 | | % | | 70-130 | 05-DEC-17 |
| Chlorobenzene | | | 104.1 | | % | | 70-130 | 05-DEC-17 |
| Chloroform | | | 104.7 | | % | | 70-130 | 05-DEC-17 |
| cis-1,2-Dichloroethylene | | | 107.0 | | % | | 70-130 | 05-DEC-17 |
| cis-1,3-Dichloropropene | | | 101.4 | | % | | 70-130 | 05-DEC-17 |
| Dibromochloromethane | | | 101.6 | | % | | 60-130 | 05-DEC-17 |
| Dichlorodifluoromethane | | | 49.8 | MES | % | | 50-140 | 05-DEC-17 |
| Ethylbenzene | | | 98.3 | | % | | 70-130 | 05-DEC-17 |
| n-Hexane | | | 76.2 | | % | | 70-130 | 05-DEC-17 |
| Methylene Chloride | | | 110.3 | | % | | 70-130 | 05-DEC-17 |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 12 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|----------------------------|-----------------|-------------|---------|-----------|-------|-----|--------|-----------|
| VOC-511-HS-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-2 | LCS | | | | | | | |
| MTBE | | | 104.7 | | % | | 70-130 | 05-DEC-17 |
| m+p-Xylenes | | | 98.1 | | % | | 70-130 | 05-DEC-17 |
| Methyl Ethyl Ketone | | | 104.3 | | % | | 60-140 | 05-DEC-17 |
| Methyl Isobutyl Ketone | | | 94.8 | | % | | 60-140 | 05-DEC-17 |
| o-Xylene | | | 97.5 | | % | | 70-130 | 05-DEC-17 |
| Styrene | | | 97.5 | | % | | 70-130 | 05-DEC-17 |
| Tetrachloroethylene | | | 103.9 | | % | | 60-130 | 05-DEC-17 |
| Toluene | | | 100.7 | | % | | 70-130 | 05-DEC-17 |
| trans-1,2-Dichloroethylene | | | 101.9 | | % | | 60-130 | 05-DEC-17 |
| trans-1,3-Dichloropropene | | | 94.9 | | % | | 70-130 | 05-DEC-17 |
| Trichloroethylene | | | 109.7 | | % | | 60-130 | 05-DEC-17 |
| Trichlorofluoromethane | | | 95.1 | | % | | 50-140 | 05-DEC-17 |
| Vinyl chloride | | | 81.6 | | % | | 60-140 | 05-DEC-17 |
| WG2676849-1 | MB | | | | | | | |
| 1,1,1,2-Tetrachloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,1,2,2-Tetrachloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,1,1-Trichloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,1,2-Trichloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,1-Dichloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,1-Dichloroethylene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,2-Dibromoethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,2-Dichlorobenzene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,2-Dichloroethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,2-Dichloropropane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,3-Dichlorobenzene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| 1,4-Dichlorobenzene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Acetone | | | <0.50 | | ug/g | | 0.5 | 05-DEC-17 |
| Benzene | | | <0.0068 | | ug/g | | 0.0068 | 05-DEC-17 |
| Bromodichloromethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Bromoform | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Bromomethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Carbon tetrachloride | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Chlorobenzene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Chloroform | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 13 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---------------------------------|----------|-------------|--------|-----------|-------|-----|--------|-----------|
| VOC-511-HS-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-1 | MB | | | | | | | |
| cis-1,2-Dichloroethylene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| cis-1,3-Dichloropropene | | | <0.030 | | ug/g | | 0.03 | 05-DEC-17 |
| Dibromochloromethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Dichlorodifluoromethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Ethylbenzene | | | <0.018 | | ug/g | | 0.018 | 05-DEC-17 |
| n-Hexane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Methylene Chloride | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| MTBE | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| m+p-Xylenes | | | <0.030 | | ug/g | | 0.03 | 05-DEC-17 |
| Methyl Ethyl Ketone | | | <0.50 | | ug/g | | 0.5 | 05-DEC-17 |
| Methyl Isobutyl Ketone | | | <0.50 | | ug/g | | 0.5 | 05-DEC-17 |
| o-Xylene | | | <0.020 | | ug/g | | 0.02 | 05-DEC-17 |
| Styrene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Tetrachloroethylene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Toluene | | | <0.080 | | ug/g | | 0.08 | 05-DEC-17 |
| trans-1,2-Dichloroethylene | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| trans-1,3-Dichloropropene | | | <0.030 | | ug/g | | 0.03 | 05-DEC-17 |
| Trichloroethylene | | | <0.010 | | ug/g | | 0.01 | 05-DEC-17 |
| Trichlorofluoromethane | | | <0.050 | | ug/g | | 0.05 | 05-DEC-17 |
| Vinyl chloride | | | <0.020 | | ug/g | | 0.02 | 05-DEC-17 |
| Surrogate: 1,4-Difluorobenzene | | | 107.4 | | % | | 50-140 | 05-DEC-17 |
| Surrogate: 4-Bromofluorobenzene | | | 106.3 | | % | | 50-140 | 05-DEC-17 |
| WG2676849-5 | MS | WG2676849-3 | | | | | | |
| 1,1,1,2-Tetrachloroethane | | | 103.1 | | % | | 50-140 | 06-DEC-17 |
| 1,1,2,2-Tetrachloroethane | | | 99.97 | | % | | 50-140 | 06-DEC-17 |
| 1,1,1-Trichloroethane | | | 103.7 | | % | | 50-140 | 06-DEC-17 |
| 1,1,2-Trichloroethane | | | 106.3 | | % | | 50-140 | 06-DEC-17 |
| 1,1-Dichloroethane | | | 113.7 | | % | | 50-140 | 06-DEC-17 |
| 1,1-Dichloroethylene | | | 91.0 | | % | | 50-140 | 06-DEC-17 |
| 1,2-Dibromoethane | | | 106.2 | | % | | 50-140 | 06-DEC-17 |
| 1,2-Dichlorobenzene | | | 107.0 | | % | | 50-140 | 06-DEC-17 |
| 1,2-Dichloroethane | | | 105.3 | | % | | 50-140 | 06-DEC-17 |
| 1,2-Dichloropropane | | | 104.7 | | % | | 50-140 | 06-DEC-17 |
| 1,3-Dichlorobenzene | | | 104.8 | | % | | 50-140 | 06-DEC-17 |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Page 14 of 15

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1

Contact: JOE VANDERZALM

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|----------------------------|-----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| VOC-511-HS-WT | | Soil | | | | | | |
| Batch | R3905063 | | | | | | | |
| WG2676849-5 MS | | WG2676849-3 | | | | | | |
| 1,4-Dichlorobenzene | | | 106.8 | | % | | 50-140 | 06-DEC-17 |
| Acetone | | | 111.5 | | % | | 50-140 | 06-DEC-17 |
| Benzene | | | 105.5 | | % | | 50-140 | 06-DEC-17 |
| Bromodichloromethane | | | 102.1 | | % | | 50-140 | 06-DEC-17 |
| Bromoform | | | 95.8 | | % | | 50-140 | 06-DEC-17 |
| Bromomethane | | | 96.8 | | % | | 50-140 | 06-DEC-17 |
| Carbon tetrachloride | | | 103.1 | | % | | 50-140 | 06-DEC-17 |
| Chlorobenzene | | | 105.7 | | % | | 50-140 | 06-DEC-17 |
| Chloroform | | | 107.7 | | % | | 50-140 | 06-DEC-17 |
| cis-1,2-Dichloroethylene | | | 110.0 | | % | | 50-140 | 06-DEC-17 |
| cis-1,3-Dichloropropene | | | 99.7 | | % | | 50-140 | 06-DEC-17 |
| Dibromochloromethane | | | 104.4 | | % | | 50-140 | 06-DEC-17 |
| Dichlorodifluoromethane | | | 54.0 | | % | | 50-140 | 06-DEC-17 |
| Ethylbenzene | | | 99.2 | | % | | 50-140 | 06-DEC-17 |
| n-Hexane | | | 78.5 | | % | | 50-140 | 06-DEC-17 |
| Methylene Chloride | | | 114.3 | | % | | 50-140 | 06-DEC-17 |
| MTBE | | | 106.1 | | % | | 50-140 | 06-DEC-17 |
| m+p-Xylenes | | | 98.6 | | % | | 50-140 | 06-DEC-17 |
| Methyl Ethyl Ketone | | | 109.1 | | % | | 50-140 | 06-DEC-17 |
| Methyl Isobutyl Ketone | | | 93.6 | | % | | 50-140 | 06-DEC-17 |
| o-Xylene | | | 98.7 | | % | | 50-140 | 06-DEC-17 |
| Styrene | | | 98.0 | | % | | 50-140 | 06-DEC-17 |
| Tetrachloroethylene | | | 105.5 | | % | | 50-140 | 06-DEC-17 |
| Toluene | | | 102.7 | | % | | 50-140 | 06-DEC-17 |
| trans-1,2-Dichloroethylene | | | 102.2 | | % | | 50-140 | 06-DEC-17 |
| trans-1,3-Dichloropropene | | | 94.2 | | % | | 50-140 | 06-DEC-17 |
| Trichloroethylene | | | 110.7 | | % | | 50-140 | 06-DEC-17 |
| Trichlorofluoromethane | | | 98.3 | | % | | 50-140 | 06-DEC-17 |
| Vinyl chloride | | | 83.3 | | % | | 50-140 | 06-DEC-17 |

Quality Control Report

Workorder: L2030089

Report Date: 30-JAN-18

Client: CHUNG AND VANDER DOELEN
311 VICTORIA ST. N.
KITCHENER ON N2H 5E1
Contact: JOE VANDERZALM

Page 15 of 15

Legend:

| | |
|-------|---|
| Limit | ALS Control Limit (Data Quality Objectives) |
| DUP | Duplicate |
| RPD | Relative Percent Difference |
| N/A | Not Available |
| LCS | Laboratory Control Sample |
| SRM | Standard Reference Material |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| ADE | Average Desorption Efficiency |
| MB | Method Blank |
| IRM | Internal Reference Material |
| CRM | Certified Reference Material |
| CCV | Continuing Calibration Verification |
| CVS | Calibration Verification Standard |
| LCSD | Laboratory Control Sample Duplicate |

Sample Parameter Qualifier Definitions:

| Qualifier | Description |
|-----------|---|
| DLM | Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity). |
| J | Duplicate results and limits are expressed in terms of absolute difference. |
| LCS-H | Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| MBS | Surrogate recovery in Method Blank was outside ALS DQO. Moderately low-biased results in the MB do not significantly affect its purpose. |
| MES | Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME). |
| MS-B | Matrix Spike recovery could not be accurately calculated due to high analyte background in sample. |
| RPD-NA | Relative Percent Difference Not Available due to result(s) being less than detection limit. |

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

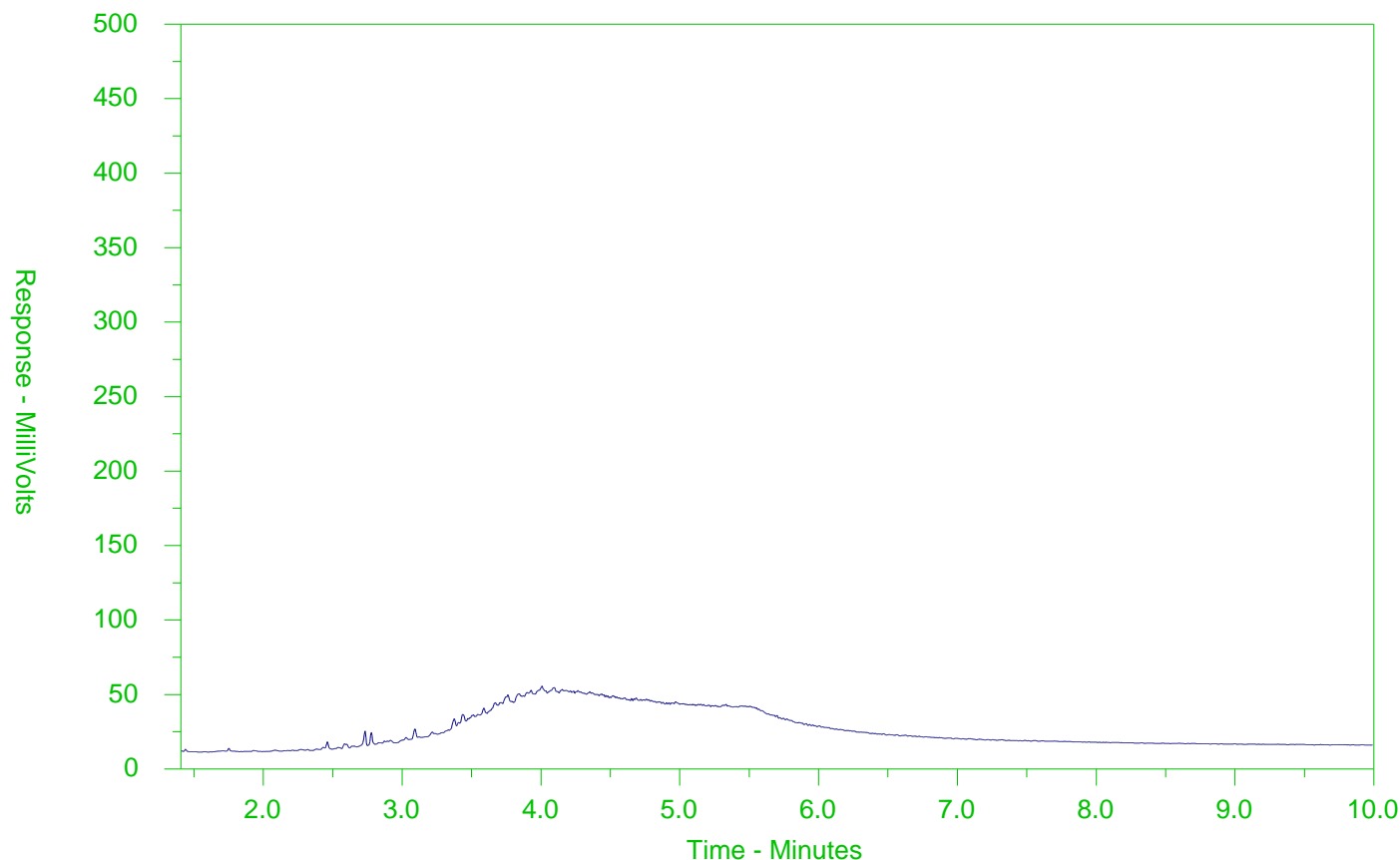
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-1
Client Sample ID: BH1-SA2



| | | | | | |
|----------------------|-------|--------|-------------------------------|--------|--------|
| ← F2 → | | ← F3 → | | ← F4 → | |
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

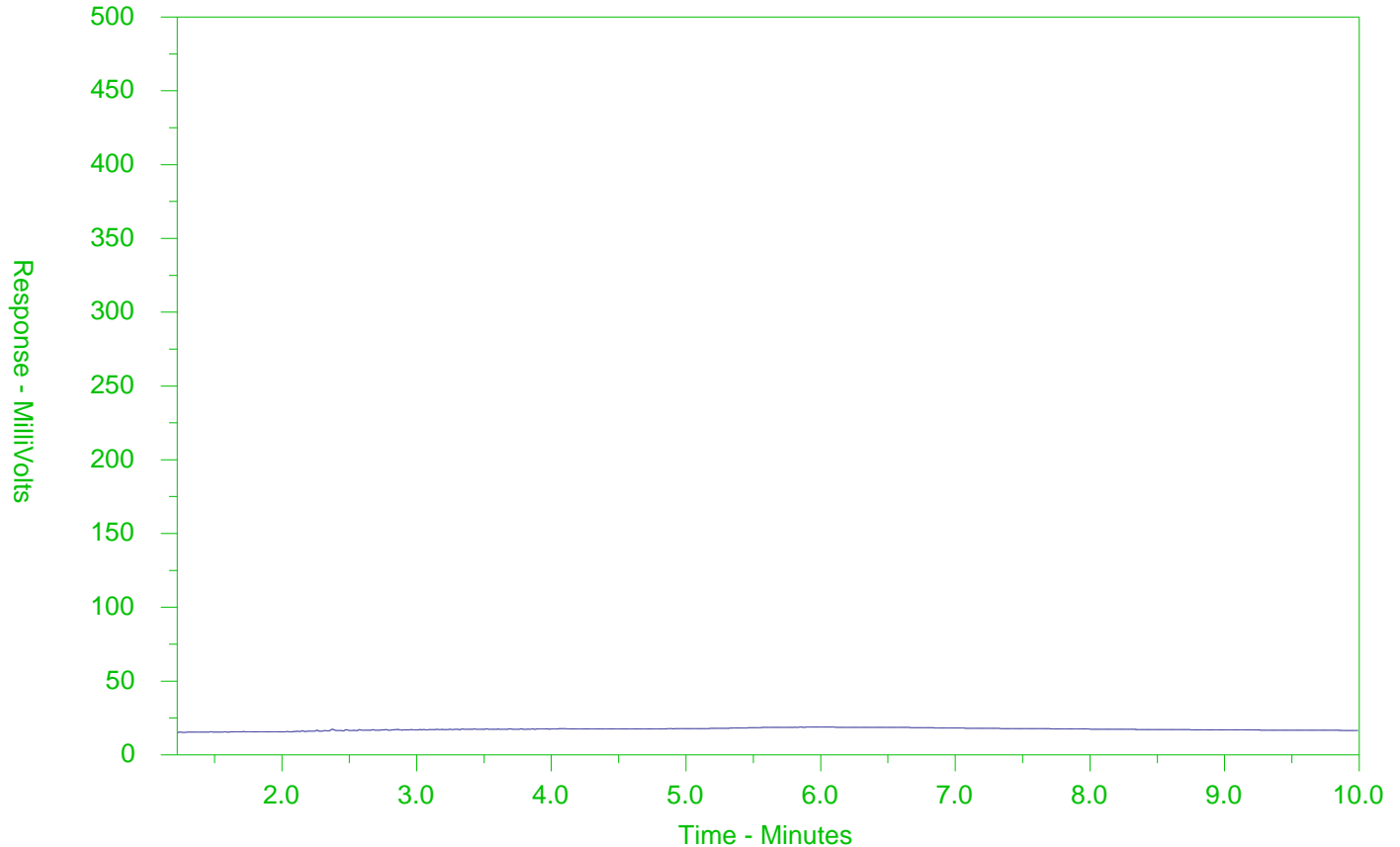
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-2
Client Sample ID: BH2-SA5



| | | | | | |
|----------------------|-------|--------|-------------------------------|--------|--------|
| ← F2 → | | ← F3 → | | ← F4 → | |
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

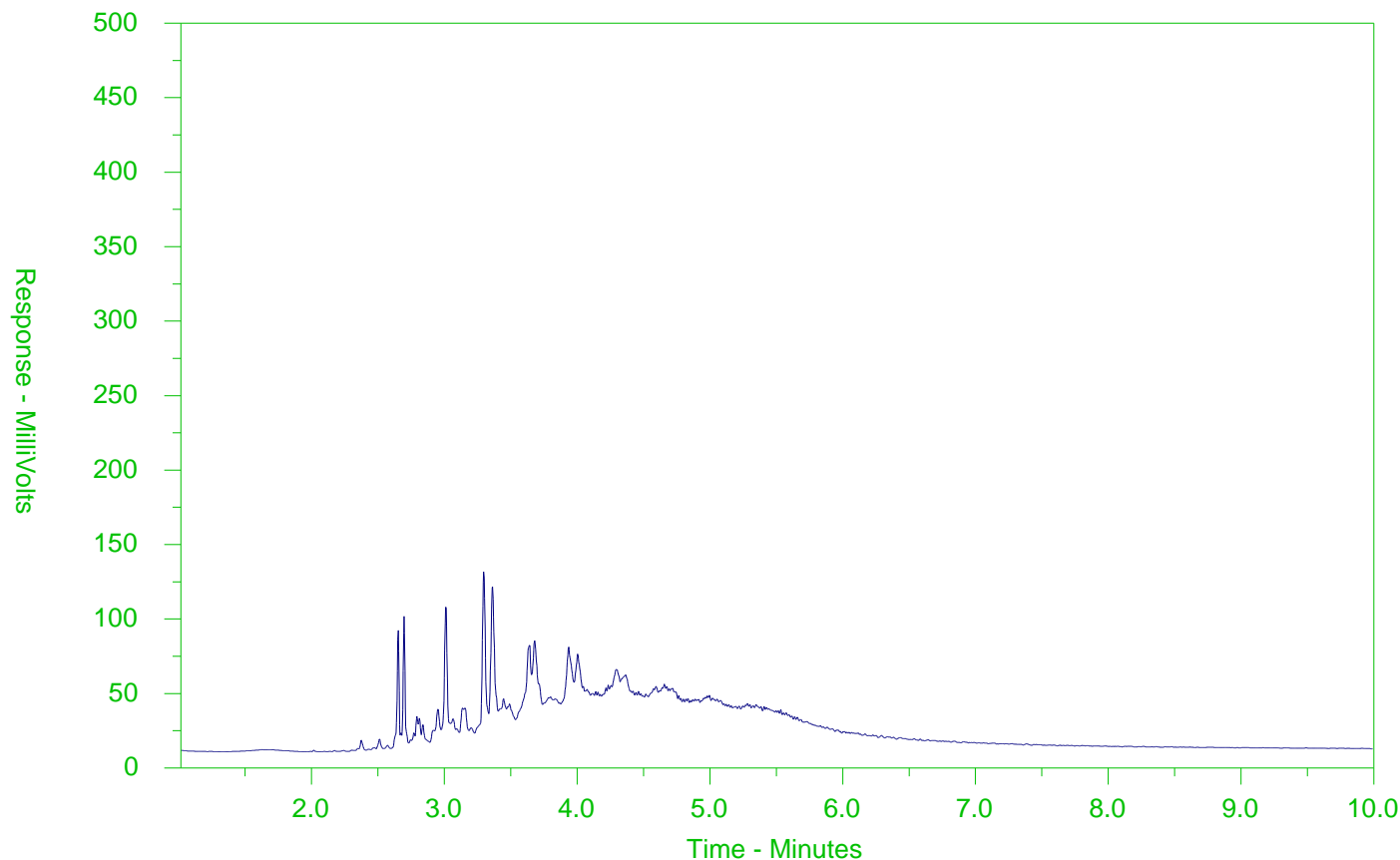
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-3
Client Sample ID: BH5-SA1



| F2 | | F3 | | F4 | |
|----------------------|-------|----|-------------------------------|----|--------|
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

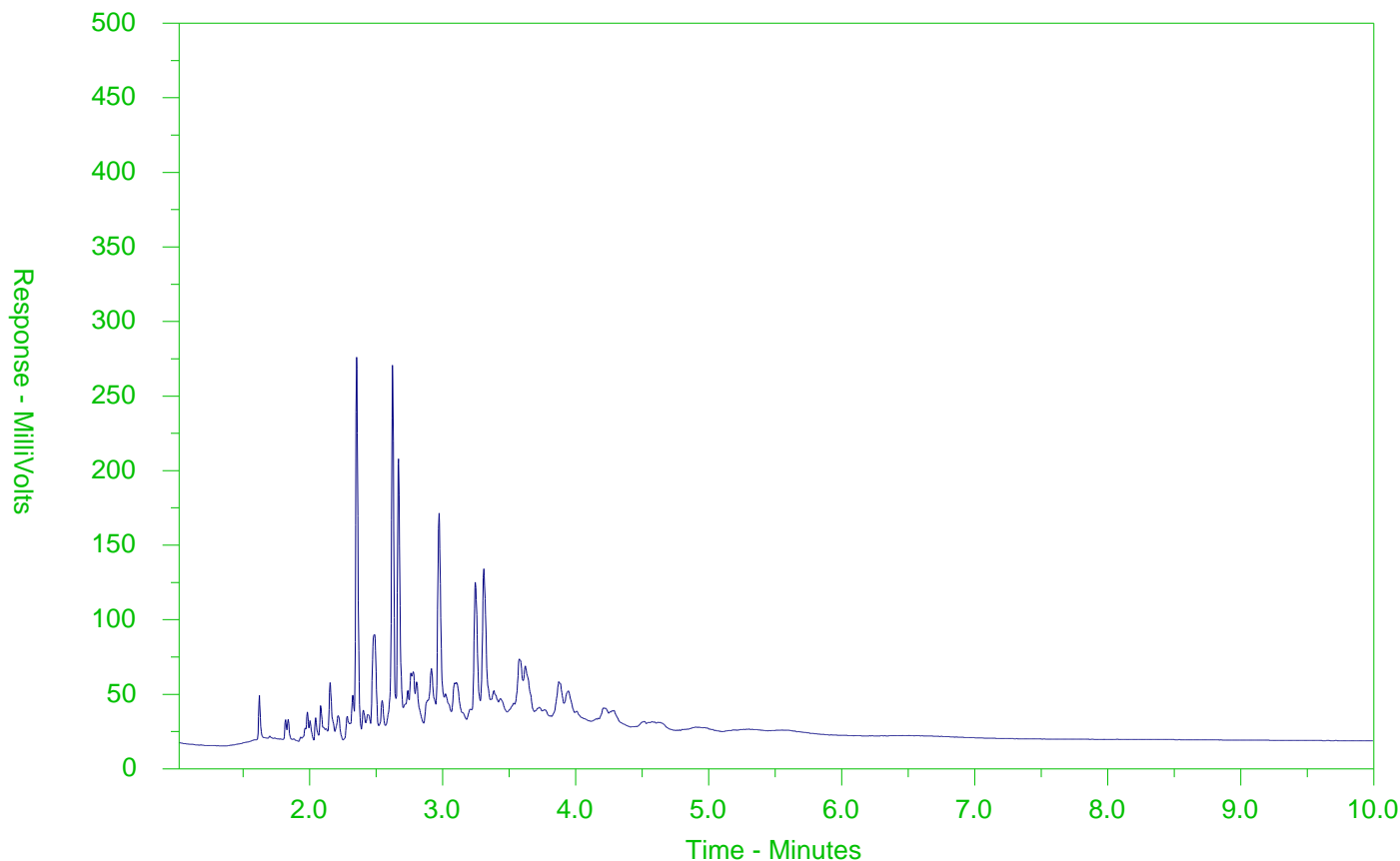
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-4
Client Sample ID: BH9-SA2



| F2 | | F3 | | F4 | |
|----------------------|-------|----|-------------------------------|----|--------|
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

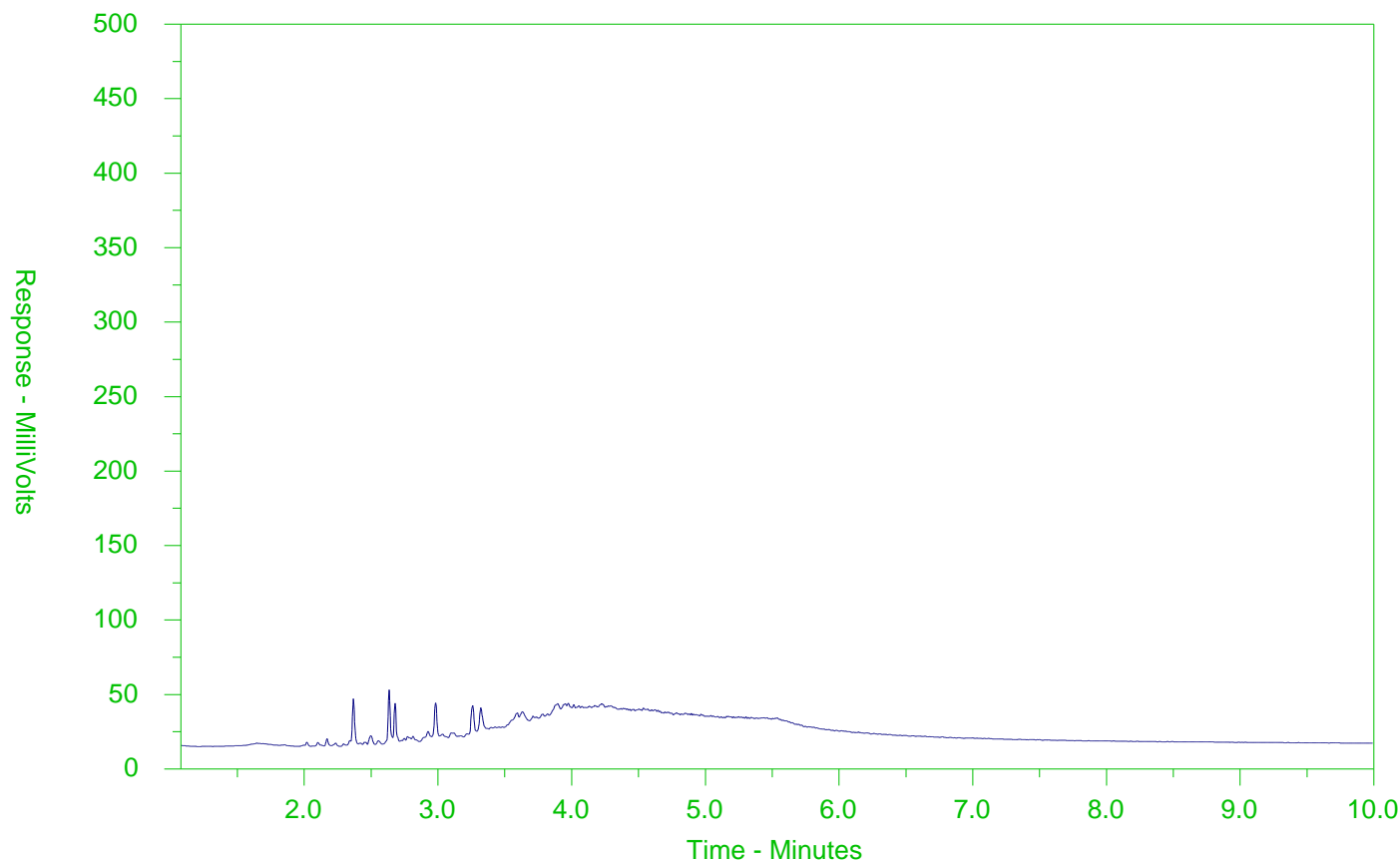
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-5
Client Sample ID: BH13-SA1



| | | | | | |
|----------------------|-------|--------|-------------------------------|--------|--------|
| ← F2 → | | ← F3 → | | ← F4 → | |
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

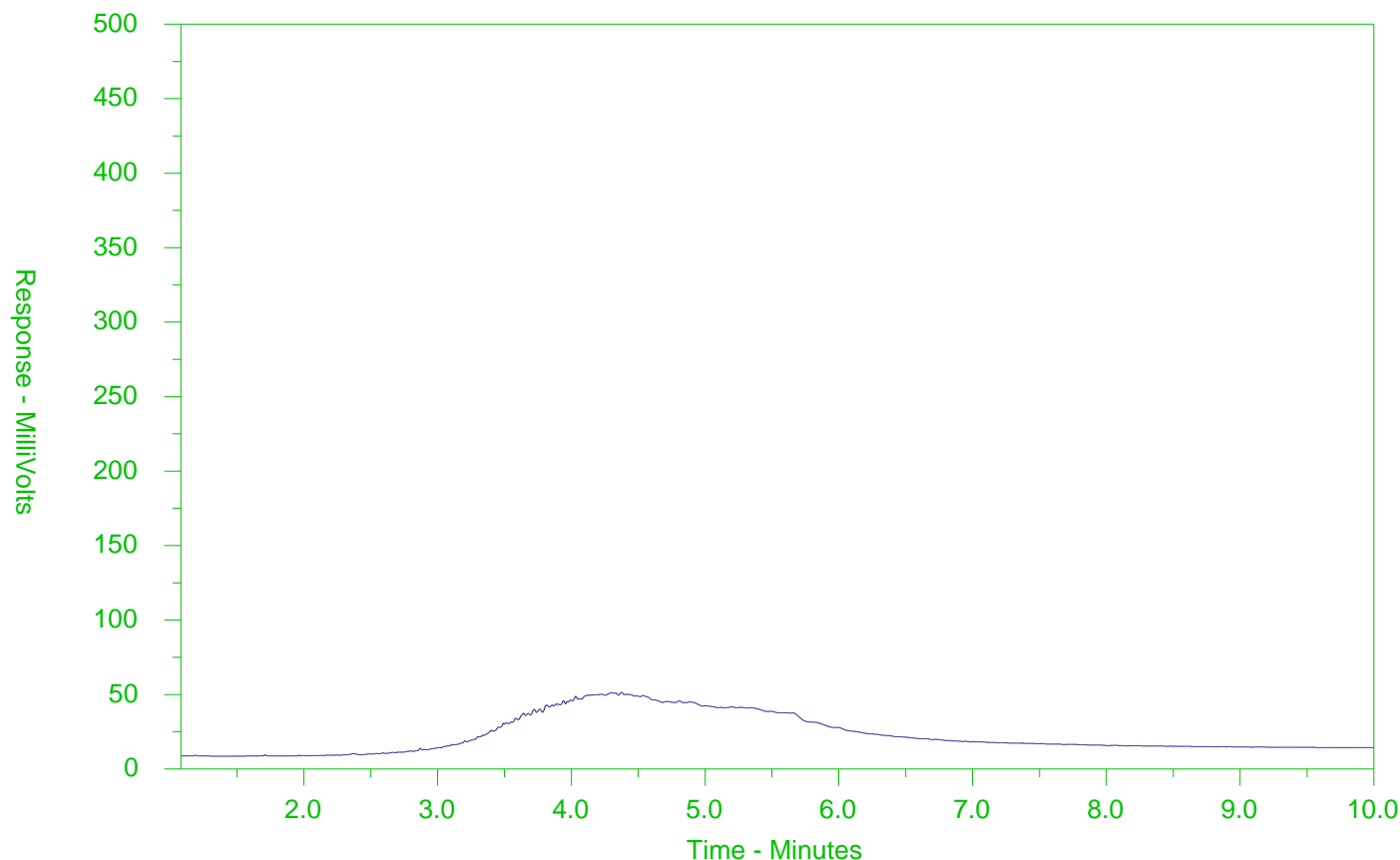
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2030089-7
Client Sample ID: BH16-SA2



| | | | | | |
|----------------------|-------|--------|-------------------------------|--------|--------|
| ← F2 → | | ← F3 → | | ← F4 → | |
| nC10 | nC16 | | nC34 | | nC50 |
| 174°C | 287°C | | 481°C | | 575°C |
| 346°F | 549°F | | 898°F | | 1067°F |
| Gasoline → | | | ← Motor Oils/Lube Oils/Grease | | |
| ← Diesel/Jet Fuels → | | | | | |

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

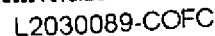
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.



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Page 4 of 4

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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215

APPENDIX “C”

Comparison of the Soil Chemistry Results to the Applicable Regulatory Criteria



ANALYTICAL RESULTS FOR SOIL
MOE Soil, Ground Water and Sediment Standards for Use Under Part XV.1
of the Environmental Protection Act, April 15, 2011

| | | <i>Table 1 Agricultural or Other Property Use Standard</i> | <i>Table 1 Residential/ Parkland/ Institutional/ Industrial/ Comercial/ Community Property Use Standard</i> | <i>Table 2 Residential/ Parkland/ Institutional Property Use Standard (Coarse)</i> | <i>Table 2 Industrial/ Commercial/ Community Property Use Standard (Coarse)</i> | BH 1 - SA 2 | BH 2 - SA 5 | BH 5 - SA 1 | BH 9 - SA 2 | BH 13 - SA 1 | BH 16 - SA 2 |
|--|-------------------------------------|--|---|--|---|-------------|-------------|-------------|-------------|--------------|--------------|
| <i>Metals & Inorganics</i> | Conductivity | 0.47 | 0.57 | 0.7 | 1.4 | 0.266 | 0.843 | 0.361 | 0.337 | 0.34 | 0.588 |
| | % Moisture | - | - | - | - | 16.1 | 16.9 | 6.52 | 6.43 | 5 | 3.96 |
| | pH | - | - | - | - | 7.63 | 7.78 | 8.16 | 7.66 | 8.13 | 8.27 |
| | SAR | 1 | 2.4 | 5 | 12 | 1.78 | 17.6 | 7.49 | 8.19 | 5.48 | 13.7 |
| | Calcium (Ca) | - | - | - | - | 9 | 5.4 | 2.2 | 3.5 | 3.4 | 2.6 |
| | Magnesium (Mg) | - | - | - | - | 1.5 | <1.0 | 1.5 | <1.0 | 2.8 | 1 |
| | Sodium (Na) | - | - | - | - | 21.9 | 148 | 59.2 | 55.3 | 56.4 | 103 |
| | Antimony (Sb) | 1 | 1.3 | 7.5 | 40 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Arsenic (As) | 11 | 18 | 18 | 18 | 3.1 | 1.9 | 1.9 | 2.1 | 1.8 | 1.1 |
| | Barium (Ba) | 210 | 220 | 390 | 670 | 16.8 | 15.6 | 8 | 14 | 7.8 | 4.2 |
| | Beryllium (Be) | 2.5 | 2.5 | 4 | 8 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Boron (B) | 36 | 36 | 120 | 120 | 5.3 | 8.6 | 6.9 | <5.0 | 5.2 | <5.0 |
| | Boron (B), Hot Water Ext. Available | 36 | 36 | 1.5 | 2 | 0.25 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| | Cadmium (Cd) | 1 | 1.2 | 1.2 | 1.9 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Chromium (Cr) | 67 | 70 | 160 | 160 | 16 | 8.5 | 6.2 | 12.2 | 5.8 | 5.1 |
| | Cobalt (Co) | 19 | 21 | 22 | 80 | 3.3 | 3 | 2 | 2.9 | 1.8 | 1.2 |
| | Copper (Cu) | 62 | 92 | 140 | 230 | 6.9 | 7.7 | 6.3 | 5.4 | 5.8 | 1.1 |
| | Lead (Pb) | 45 | 120 | 120 | 120 | 13.6 | 2.5 | 2.2 | 2.5 | 2 | <1.0 |
| | Mercury (Hg) | 0.16 | 0.27 | 0.27 | 3.9 | 0.0371 | <0.0050 | 0.0056 | 0.0277 | 0.0056 | <0.0050 |
| | Molybdenum (Mo) | 2 | 2 | 6.9 | 40 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Nickel (Ni) | 37 | 82 | 100 | 270 | 6.7 | 6.2 | 4.1 | 5.6 | 3.8 | 2.5 |
| | Selenium (Se) | 1.2 | 1.5 | 2.4 | 5.5 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Silver (Ag) | 0.5 | 0.5 | 20 | 40 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 | <0.20 |
| | Thallium (Tl) | 1 | 1 | 1 | 3.3 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Uranium (U) | 1.9 | 2.5 | 23 | 33 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| | Vanadium (V) | 86 | 86 | 86 | 86 | 27.9 | 12.5 | 11.1 | 21 | 9.8 | 7.2 |
| | Zinc (Zn) | 290 | 290 | 340 | 340 | 29.2 | 13.3 | 11.7 | 12.3 | 9.8 | 5.3 |
| | Chromium, Hexavalent | 0.66 | 0.66 | 8 | 8 | 0.21 | <0.20 | <0.20 | 0.48 | <0.20 | <0.20 |
| <i>Petroleum Hydrocarbons F2-F4</i> | F1 (C6-C10) | 17 | 25 | 55 | 55 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 |
| | F1-BTEX | 17 | 25 | 55 | 55 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 |
| | F2 (C10-C16) | 10 | 10 | 98 | 230 | <10 | <10 | <20 | 15 | <10 | <10 |
| | F3 (C16-C34) | 240 | 240 | 300 | 1700 | 71 | <50 | 300 | 194 | 55 | 56 |
| | F4 (C34-C50) | 120 | 120 | 2800 | 3300 | 121 | <50 | 340 | 53 | 82 | 129 |
| | F4G-SG (GHH-Silica) | 120 | 120 | 2800 | 3300 | - | - | 1420 | 270 | - | 510 |
| <i>Volatile Organic Compounds (VOC's)</i> | Acetone | 0.5 | 0.5 | 16 | 16 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Benzene | 0.02 | 0.02 | 0.21 | 0.32 | <0.0068 | <0.0068 | <0.0068 | <0.0068 | <0.0068 | <0.0068 |
| | Bromodichloromethane | 0.05 | 0.05 | 1.5 | 1.5 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Bromoform | 0.05 | 0.05 | 0.27 | 0.61 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Bromomethane | 0.05 | 0.05 | 0.05 | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Carbon tetrachloride | 0.05 | 0.05 | 0.05 | 0.21 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Chlorobenzene | 0.05 | 0.05 | 2.4 | 2.4 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Dibromochloromethane | 0.05 | 0.05 | 2.3 | 2.3 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Chloroform | 0.05 | 0.05 | 0.05 | 0.47 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,2-Dibromoethane | 0.05 | 0.05 | 0.05 | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,2-Dichlorobenzene | 0.05 | 0.05 | 1.2 | 1.2 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,3-Dichlorobenzene | 0.05 | 0.05 | 4.8 | 9.6 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,4-Dichlorobenzene | 0.05 | 0.05 | 0.083 | 0.2 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Dichlorodifluoromethane | 0.05 | 0.05 | 16 | 16 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,1-Dichloroethane | 0.05 | 0.05 | 0.47 | 0.47 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,2-Dichloroethane | 0.05 | 0.05 | 0.05 | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,1-Dichloroethylene | 0.05 | 0.05 | 0.05 | 0.064 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | cis-1,2-Dichloroethylene | 0.05 | 0.05 | 1.9 | 1.9 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | trans-1,2-Dichloroethylene | 0.05 | 0.05 | 0.084 | 1.3 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Methylene Chloride | 0.05 | 0.05 | 0.1 | 1.6 | <1.0 | <2.0 | <0.50 | <0.050 | <0.50 | <0.15 |
| | 1,2-Dichloropropane | 0.05 | 0.05 | 0.05 | 0.16 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,3-Dichloropropene (cis & trans) | 0.05 | 0.05 | 0.05 | 0.059 | <0.042 | <0.042 | <0.042 | <0.042 | <0.042 | <0.042 |
| | Ethylbenzene | 0.05 | 0.05 | 1.1 | 1.1 | <0.018 | <0.018 | <0.018 | <0.018 | <0.018 | <0.018 |
| | n-Hexane | 0.05 | 0.05 | 2.8 | 46 | <0.10 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Methyl Ethyl Ketone | 0.5 | 0.5 | 16 | 70 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | Methyl Isobutyl Ketone | 0.5 | 0.5 | 1.7 | 31 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | MTBE | 0.05 | 0.05 | 0.75 | 1.6 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Styrene | 0.05 | 0.05 | 0.7 | 34 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,1,1,2-Tetrachloroethane | 0.05 | 0.05 | 0.058 | 0.087 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,1,2,2-Tetrachloroethane | 0.05 | 0.05 | 0.05 | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Tetrachloroethylene | 0.05 | 0.05 | 0.28 | 1.9 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Toluene | 0.2 | 0.2 | 2.3 | 6.4 | <0.080 | <0.080 | <0.080 | <0.080 | <0.080 | <0.080 |
| | 1,1,1-Trichloroethane | 0.05 | 0.05 | 0.38 | 6.1 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | 1,1,2-Trichloroethane | 0.05 | 0.05 | 0.05 | 0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Trichloroethylene | 0.05 | 0.05 | 0.061 | 0.55 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| | Trichlorofluoromethane | 0.05 | 0.25 | 4 | 4 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| | Vinyl chloride | 0.02 | 0.02 | 0.02 | 0.032 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| | Xylenes (Total) | 0.05 | 0.05 | 3.1 | 26 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |

NOTES:

1. Units = ug/g
2. "-" - Paramater not included in chemical analysis
3. "nv" - no value

4. Test results shown in **bold and highlighted text** exceed the Table 1 Standard for Agricultural Other Property Use
5. Test results shown in **bold and highlighted text** exceed the Table 1 Standard for Residential/Parkland/Institutional/Industrial/Comercial/Community Property Use
6. Test results shown in **bold and highlighted text** exceed the Table 2 Standard for Residential/Parkland/Institutional Property Use (Coarse)
7. Test results shown in **bold and highlighted text** exceed the Table 2 Standard for Industrial/Commercial/Community Property Use (Coarse)

ENCLOSURES



FILE No: G17496

BOREHOLE No. 1



Client: **GM BluePlan Engineering Limited**

Project: **Road Reconstruction / Realignment Projects**

Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario**

EQUIPMENT DATA

Machine: **D50T**
Method: **Hollow Stem Auger**
Size: **107 mm I.D.**
Date: **Nov 20 / 17 TO Nov 20 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|-----------------------------------|---|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|---------------------------------|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | |
| Ground Elevation: 202.91 m | | | | | | | | | | | | | | | | |
| 202.80 0.11 | 110 mm ASPHALT | | ■ | | | | | | | | | | | | | |
| | Granular Base some silt | 0.5 | ▨ | 1 | AS | | | | | | | | | | | |
| 202.21 0.70 | loose to compact brown | 1.0 | ▧ | 2 | SS | 8 | ● | | | | | | ○ | | | |
| | SAND some silt trace gravel | 1.5 | ▩ | | | | | | | | | | | | | |
| | occ. to frequent silt and clayey silt lenses/seams | 2.0 | ▩ | 3 | SS | 26 | ● | | | | | | ○ | | | |
| | moist to saturated | 2.5 | ▩ | 4 | SS | 12 | ● | | | | | | ○ | | | |
| | | 3.0 | ▩ | | | | | | | | | | | | | |
| | | 3.5 | ▩ | 5 | SS | 25 | ● | | | | | | ○ | | | |
| | | 4.0 | ▩ | | | | | | | | | | | | | |
| | | 4.5 | ▩ | | | | | | | | | | | | | |
| 198.03 4.88 | compact, grey SILT | 5.0 | ▩ | 6 | SS | 16 | ● | | | | | | ○ | | | |
| | some sand trace clay occ. sand seams | 5.5 | ▩ | | | | | | | | | | | | | |
| | saturated | 6.0 | ▩ | | | | | | | | | | | | | |
| 196.36 6.55 | End of Borehole | 6.5 | ▩ | 7 | SS | 21 | ● | | | | | | ○ | | | |

water level at a depth of 1.83 m bgs upon completion of drilling
cave-in to a depth of 1.98 m bgs upon completion of drilling





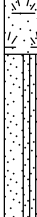


water level at a depth of 1.83 m bgs upon completion of drilling
cave-in to a depth of 1.98 m bgs upon completion of drilling

PROJECT MANAGER: **RVD**

**CHUNG & VANDER DOELEN
ENGINEERING LTD.**

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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: G17496**BOREHOLE No. 2**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 20 / 17 TO Nov 20 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|---------------------|---|-----------|---|-----------|------|----------------------|--|----|----|-------------------|----------------|----|-----------|---|---------|---|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ | | | | W _p | W | | | | W _L |
| | Ground Elevation: 201.80 m | | | | | | 20 | 40 | 60 | 80 | 10 | 20 | 30 | | | |
| 201.69 0.11 | 110 mm ASPHALT | |  | | | | | | | | | | |  | | |
| | brown silty sand FILL trace to some gravel moist | 0.5 |  | 1 | AS | | | | | | | | | | | cemented flushmount protective cover at grade |
| 200.90 0.90 | TOPSOIL | 1.0 |  | 2 | SS | 25 | | | | | | ○ | | | | |
| 200.60 1.20 | dense, brown SAND some silt damp | 1.5 |  | 3 | SS | 32 | | | | | | ○ | | | | bentonite seal |
| 199.70 2.10 | compact, brown SILT some sand and clay moist to saturated | 2.0 |  | 4 | SS | 10 | | | | | | ○ | | | | |
| | | 2.5 | | | | | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 15 | | | | | | ○ | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | occ. clayey silt and sand lenses/seams | 4.5 | | | | | | | | | | | | | | 3.05 m long, 50 mm I.D. PVC screen with sandpack |
| 196.90 4.90 | compact, brown SAND trace silt occ. clayey silt seams | 5.0 |  | 6 | SS | 16 | | | | | | ○ | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | saturated | 6.0 | | | | | | | | | | | | | | water level measured at 4.02 m depth on November 23, 2017 |
| | | 6.5 | | 7 | SS | 23 | | | | | | ○ | | | | water level measured at 4.34 m depth on December 5, 2017 |
| 195.25 6.55 | End of Borehole | | | | | | | | | | | | | | | |

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G17496**BOREHOLE No. 3**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 20 / 17 TO Nov 20 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | | | | |
|-----------------------------------|---------------------------|-----------|--------|-----------|------|---------|--|-----|-----|-----|--|----|----|-----------|-----------|---------|----|----------------|---|----------------|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ | | | | | | | | | |
| | | | | | | | 50 | 100 | 150 | 200 | 20 | 40 | 60 | | | | 80 | W _p | W | W _L |
| | | | | | | | | | | | 10 | 20 | 30 | | | | | | | |
| Ground Elevation: 200.89 m | | | | | | | | | | | | | | | | | | | | |
| 200.79 0.10 | 100 mm ASPHALT | | ■ | | | | | | | | | | | | | | | | | |
| | brown | | ▨ | 1 | AS | | | | | | | | | | | | | | | |
| | silty sand FILL | 0.5 | ▨ | | | | | | | | | | | | | | | | | |
| | trace gravel and clay | | | | | | | | | | | | | | | | | | | |
| | moist | | ▨ | | | | | | | | | | | | | | | | | |
| 200.05 0.84 | TOPSOIL | 1.0 | ▨ | 2 | SS | 19 | ● | | | | | | ○ | | | | | | | |
| 199.82 1.07 | compact | | ▨ | | | | | | | | | | | | | | | | | |
| | orangy brown to brown | | ▨ | | | | | | | | | | | | | | | | | |
| | SAND AND SILT | 1.5 | ▨ | 3 | SS | 15 | ● | | | | | | ○ | | | | | | | |
| | trace clay and organics | | ▨ | | | | | | | | | | | | | | | | | |
| | moist to wet | | ▨ | | | | | | | | | | | | | | | | | |
| 198.79 2.10 | compact, brown | 2.0 | ▨ | | | | | | | | | | | | | | | | | |
| | SAND | | ▨ | | | | | | | | | | | | | | | | | |
| | some silt | 2.5 | ▨ | 4 | SS | 16 | ● | | | | | | ○ | | | | | | | |
| | wet to saturated | | ▨ | | | | | | | | | | | | | | | | | |
| 197.99 2.90 | loose brown | 3.0 | ▨ | | | | | | | | | | | | | | | | | |
| | SILT | | ▨ | | | | | | | | | | | | | | | | | |
| | some sand | | ▨ | 5 | SS | 6 | ● | | | | | | ○ | | | | | | | |
| | occ. clayey seams | 3.5 | ▨ | | | | | | | | | | | | | | | | | |
| | saturated | | ▨ | | | | | | | | | | | | | | | | | |
| 196.89 4.00 | compact to dense | 4.0 | ▨ | 6 | SS | 19 | ● | | | | | | ○ | | | | | | | |
| | brown | | ▨ | | | | | | | | | | | | | | | | | |
| | SAND | 4.5 | ▨ | | | | | | | | | | | | | | | | | |
| | some silt | | ▨ | | | | | | | | | | | | | | | | | |
| | occ. to frequent silt and | | ▨ | 7 | SS | 21 | ● | | | | | | ○ | | | | | | | |
| | clayey silt lenses/seams | 5.0 | ▨ | | | | | | | | | | | | | | | | | |
| | saturated | | ▨ | | | | | | | | | | | | | | | | | |
| | | 5.5 | ▨ | | | | | | | | | | | | | | | | | |
| | | 6.0 | ▨ | | | | | | | | | | | | | | | | | |
| | | | ▨ | | | | | | | | | | | | | | | | | |
| | | 6.5 | ▨ | 8 | SS | 32 | ● | | | | | | ○ | | | | | | | |
| 194.34 6.55 | End of Borehole | | | | | | | | | | | | | | | | | | | |



water level at a depth of 2.44 m bgs upon completion of drilling

cave-in to a depth of 2.90 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 4**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 20 / 17 TO Nov 20 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|---------------------------------|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | ↗ — ○ — ↖ 10 20 30 | | | | | |
| Ground Elevation: 200.05 m | | | | | | | | | | | | | | | | |
| 200.09 | 50 mm ASPHALT | | | | | | | | | | | | | | | |
| | brown sand FILL trace to some silt and gravel moist | 0.5 | | 1 | AS | | | | | | | | | | | |
| 199.21 0.84 198.98 1.07 | TOPSOIL | 1.0 | | 2 | SS | 28 | | | | | | | | | | |
| | compact, brown SAND some silt occ. clayey silt/silt seams moist to wet | 1.5 | | 3 | SS | 13 | | | | | | | | | | |
| 197.95 2.10 | compact, brown SAND AND SILT trace clay moist to saturated | 2.5 | | 4 | SS | 15 | | | | | | | | | | |
| | | 3.0 | | 5 | SS | 16 | | | | | | | | | | |
| 196.05 4.00 | compact, brown SAND trace silt occ. silt seams saturated | 4.5 | | 6 | SS | 22 | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| 193.50 6.55 | End of Borehole | 6.5 | | 7 | SS | 22 | | | | | | | | | | |

water level and cave-in to a depth of 2.74 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 5**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|--------|-----------|------|---|--|--|--|-------------------|--|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↗ ○ ↖ | | | | | |
| Ground Elevation: 199.49 m | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | | |
| 199.44 0.44 | 50 mm ASPHALT | | | | | | | | | | | | | | | |
| | brown sand FILL trace to some silt and gravel moist | 0.5 | | 1 | AS | | | | | | | | | | | |
| 198.65 0.84 | TOPSOIL | 1.0 | | 2 | SS | 20 | | | | | | | | | | |
| 198.35 1.14 | loose, orangy brown SAND AND SILT | 1.5 | | | | | | | | | | | | | | |
| 197.79 1.70 | moist | | | 3 | SS | 6 | | | | | | | | | | |
| | firm, brown CLAYEY SILT | 2.0 | | | | | | | | | | | | | | bulk sample taken |
| | moist | | | | | | | | | | | | | | | |
| 196.99 2.50 | | 2.5 | | 4 | SS | 4 | | | | | | | | | | |
| | loose to compact brown | 3.0 | | | | | | | | | | | | | | |
| | SAND | | | | | | | | | | | | | | | |
| | trace to some silt | 3.5 | | 5 | SS | 7 | | | | | | | | | | |
| | occ. clayey silt seams | | | | | | | | | | | | | | | |
| | moist to saturated | 4.0 | | 6 | SS | 17 | | | | | | | | | | water level and cave-in to a depth of 3.66 m bgs upon completion of drilling |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | 7 | SS | 17 | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| 192.94 6.55 | End of Borehole | 6.5 | | 8 | SS | 15 | | | | | | | | | | |

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FILE No: G17496**BOREHOLE No. 6**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|--|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↗ ○ ↖ | | | | | |
| Ground Elevation: 199.16 m | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | |
| 199.05 | 50 mm ASPHALT | | | | | | | | | | | | | | | |
| | brown sand FILL some silt and gravel moist | 0.5 | | 1 | AS | | | | | | | | | | | |
| 198.26 0.90 | TOPSOIL | 1.0 | | 2 | SS | 18 | | | | | | | | | | |
| | | 1.5 | | | | | | | | | | | | | | |
| 197.36 1.80 | loose, orangy brown SAND AND SILT trace clay moist | 2.0 | | 3 | SS | 8 | | | | | | | | | | |
| | | 2.5 | | 4 | SS | 4 | | | | | | | | | | |
| 196.26 2.90 | compact, brown SAND trace to some silt occ. to frequent silt and clayey silt lenses/seams moist to saturated | 3.0 | | 5 | SS | 19 | | | | | | | | | | |
| | | 3.5 | | | | | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | 6 | SS | 15 | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| 192.61 6.55 | End of Borehole | 6.5 | | 7 | SS | 20 | | | | | | | | | | |

▽

water level and cave-in to a depth of 3.66 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 7**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|---------------------|---|-----------|--------|-----------|------|---------|--|--|--|--|---------------------------------|--|---|-----------|-----------|---|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | ↗ — ○ — ↖ | | | | | |
| | | | | | | | | | | | 10 20 30 | | | | | |
| 198.04 0.04 | 40 mm ASPHALT | | | | | | | | | | | | | | | |
| | brown sand FILL some silt, trace gravel moist | 0.5 | | 1 | AS | | | | | | | | | | | cemented flushmount protective cover at grade |
| 197.99 0.76 | TOPSOIL | 1.0 | | 2 | SS | 16 | ● | | | | | | ○ | | | |
| 197.37 1.38 | compact, brown SAND AND SILT trace clay moist | 1.5 | | 3 | SS | 21 | ● | | | | | | ○ | | | bentonite seal |
| 196.25 2.50 | compact, brown SAND trace to some silt occ. silt seams moist to saturated | 2.5 | | 4 | SS | 13 | ● | | | | | | ○ | | | |
| | | 3.0 | | 5 | SS | 23 | ● | | | | | | ○ | | | |
| | | 3.5 | | | | | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | 6 | SS | 19 | ● | | | | | | ○ | | | 3.05 m long, 50 mm I.D. PVC screen with sandpack |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | water level measured at 3.91 m depth on November 23, 2017 |
| 192.20 6.55 | End of Borehole | 6.5 | | 7 | SS | 16 | ● | | | | | | ○ | | | water level measured at 3.93 m depth on December 5, 2017 |

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FILE No: G17496**BOREHOLE No. 8**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|---------------------|---|-----------|--------|-----------|----------------------|---------|--|---|---------------------------------|----------|--|-----------|-----------|---------|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | W _p W W _L | 10 20 30 | | | | |
| 198.05 | Ground Elevation: 198.00 m | | | | | | | | | | | | | |
| 197.85 | 50 mm ASPHALT | | | | | | | | | | | | | |
| 197.50 | brown sand FILL some gravel, some silt moist | 0.5 | | 1 | AS | | | | | | | | | |
| 196.93 | TOPSOIL | 1.0 | | 2 | SS | 8 | | | | | | | | |
| 195.90 | loose, orangy brown SILTY SAND damp | 1.5 | | 3 | SS | 9 | | | | | | | | |
| 2.10 | | 2.0 | | | | | | | | | | | | |
| | loose to compact brown SAND some silt to silty trace gravel occ. silt seams moist to saturated | 2.5 | | 4 | SS | 16 | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 17 | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | |
| | | 5.0 | | 6 | SS | 15 | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | |
| | trace to some gravel | 6.0 | | | | | | | | | | | | |
| | | 6.5 | | 7 | SS | 20 | | | | | | | | |
| 191.45 | End of Borehole | 6.55 | | | | | | | | | | | | |








water level at a depth of
2.44 m bgs upon
completion of drilling
cave-in to a depth of 2.74
m bgs upon completion of
drilling

PROJECT MANAGER: **RVD**
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FILE No: G17496**BOREHOLE No. 9**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|---|-----------|------|----------------------|--|--|--|-------------------|---|--|-----------|-----------|---------|---|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | W _p W W _L 10 20 30 |
| Ground Elevation: 197.42 m | | | | | | | | | | | | | | | | |
| 197.83 0.03 | 50 mm ASPHALT | |  | | | | | | | | | | | | | |
| | brown sand FILL | |  | 1 | AS | | | | | | | | | | | |
| 196.96 0.46 | some silt and gravel | 0.5 |  | | | | | | | | | | | | | |
| 196.68 0.74 | TOPSOIL | |  | | | | | | | | | | | | | |
| | compact, brown SAND | 1.0 |  | 2 | SS | 13 | | | | | | | | | | |
| | trace to some silt | | | | | | | | | | | | | | | |
| | trace gravel | 1.5 | | | | | | | | | | | | | | |
| | occ. to frequent silt and clayey silt lenses/seams | 2.0 | | 3 | SS | 18 | | | | | | | | | | |
| | damp to saturated | 2.5 | | | | | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 22 | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | 6 | SS | 15 | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | 7 | SS | 22 | | | | | | | | | | |
| 190.87 6.55 | End of Borehole | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

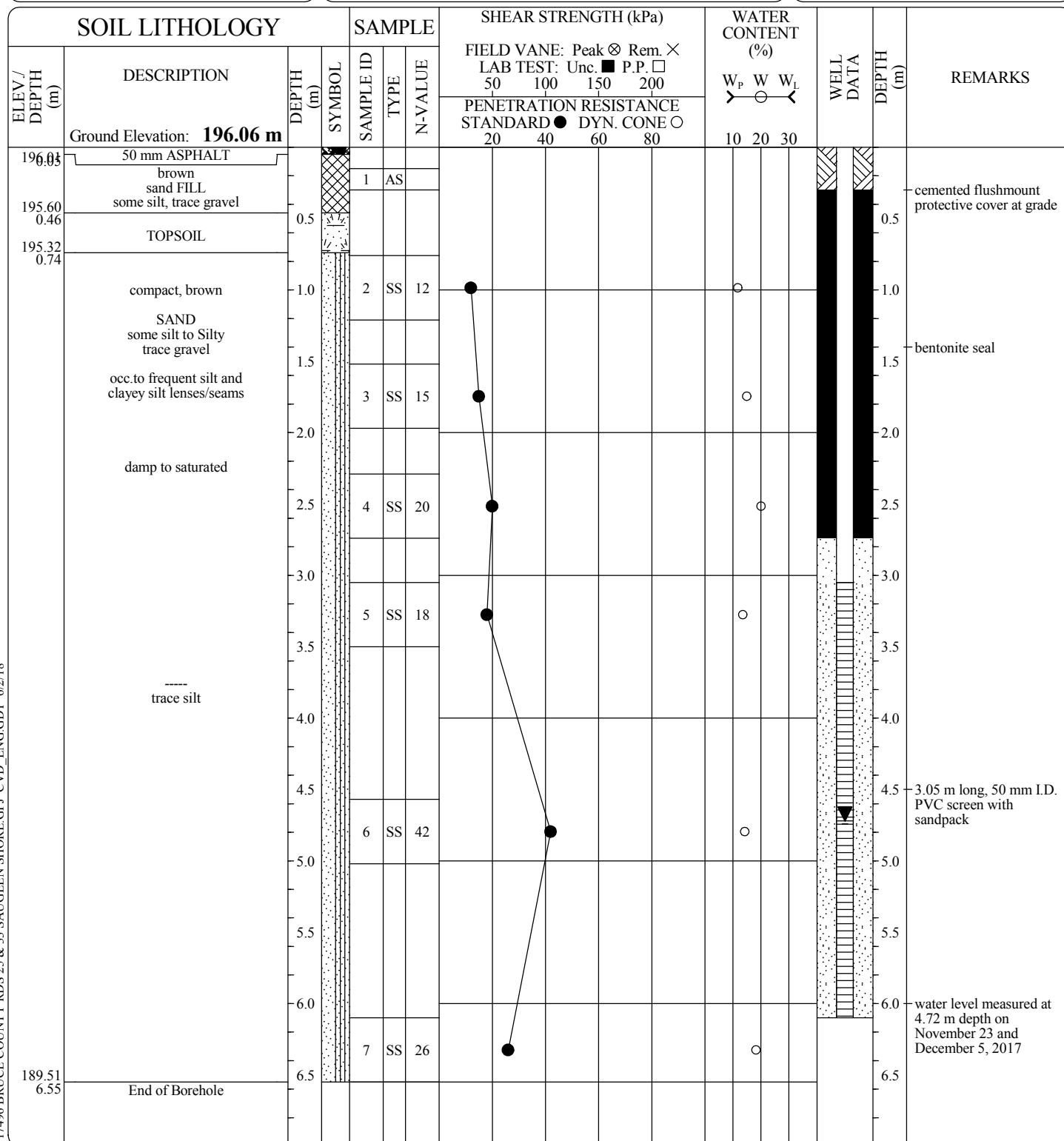
cave-in and dry to a depth of 4.27 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 10**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 21 / 17 TO Nov 21 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|----------------------------|-----------------------------|-----------|--------|-----------|------|---------|--|--|--|--|---|--|--|-----------|-----------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | |
| Ground Elevation: 196.72 m | | | | | | | | | | | | | | | | |
| 196.68 | 40 mm ASPHALT | | ⊗ | | | | | | | | | | | | | |
| | brown sand FILL | | ⊗ | 1 | AS | | | | | | | | | | | |
| 196.26 0.46 | some silt, trace gravel | 0.5 | ⊗ | | | | | | | | | | | | 0.5 | |
| 195.98 0.74 | TOPSOIL | | ⊗ | | | | | | | | | | | | | |
| | compact to very dense brown | 1.0 | ⊗ | 2 | SS | 13 | | | | | | | | | 1.0 | |
| | SAND | | ⊗ | | | | | | | | | | | | | |
| | trace to some silt | 1.5 | ⊗ | | | | | | | | | | | | 1.5 | |
| | trace gravel | | ⊗ | | | | | | | | | | | | | |
| | occ. silt seams | 2.0 | ⊗ | 3 | SS | 26 | | | | | | | | | 2.0 | bulk sample taken |
| | moist to saturated | 2.5 | ⊗ | | | | | | | | | | | | | |
| | | 3.0 | ⊗ | 4 | SS | 20 | | | | | | | | | 2.5 | |
| | | | ⊗ | | | | | | | | | | | | 3.0 | |
| | -sand and gravel layer | 3.5 | ⊗ | 5 | SS | 55 | | | | | | | | | 3.5 | |
| | | 4.0 | ⊗ | | | | | | | | | | | | 4.0 | |
| | | 4.5 | ⊗ | | | | | | | | | | | | 4.5 | cave-in and dry to a depth of 4.27 m bgs upon completion of drilling |
| | | 5.0 | ⊗ | 6 | SS | 20 | | | | | | | | | 5.0 | |
| | | 5.5 | ⊗ | | | | | | | | | | | | 5.5 | |
| | | 6.0 | ⊗ | | | | | | | | | | | | 6.0 | |
| | | | ⊗ | | | | | | | | | | | | | |
| | | 6.5 | ⊗ | 7 | SS | 19 | | | | | | | | | 6.5 | |
| 190.17 6.55 | End of Borehole | | | | | | | | | | | | | | | |

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FILE No: G17496**BOREHOLE No. 11**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G17496**BOREHOLE No. 12**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|---------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|--|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↗ ○ ↖ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | |
| 194.74 0.08 | Ground Elevation: 194.82 m 75 mm ASPHALT | | | | | | | | | | | | | | | |
| | brown sand FILL some silt and gravel moist | 0.5 | | 1 | AS | | | | | | | | | | | |
| 193.92 0.90 | stiff, brown CLAYEY SILT occ. sand lenses/seams moist | 1.0 | | 2 | SS | 10 | | | | | | | | | | |
| | | 1.5 | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 13 | | | | | | | | | | |
| 192.72 2.10 | compact to dense brown SAND some silt trace gravel damp to saturated | 2.5 | | 4 | SS | 32 | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 32 | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | 6 | SS | 18 | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| 188.27 6.55 | End of Borehole | 6.5 | | 7 | SS | 25 | | | | | | | | | | |

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water level and cave-in to a depth of 4.57 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 13**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|---------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|---|--|-----------|-----------|--|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | |
| | | | | | | | W _p W W _L | | | | | | | | | |
| 188.69 | Ground Elevation: 188.69 m | | | | | | | | | | | | | | | |
| | 50 mm ASPHALT | | | | | | | | | | | | | | | |
| | compact to dense brown | 0.5 | | 1 | AS | | | | | | | | | | | |
| | sand FILL some silt trace to some gravel | 1.0 | | 2 | SS | 47 | | | | | | | | | | |
| | damp to moist | 1.5 | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 26 | | | | | | | | | | |
| 186.59 2.10 | loose TOPSOIL (possible Fill) | 2.5 | | 4 | SS | 6 | | | | | | | | | cave-in and wet to a depth of 2.44 m bgs upon completion of drilling | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 6 | | | | | | | | | | |
| | | 4.0 | | 6 | SS | 5 | | | | | | | | | | |
| 184.84 3.85 | loose, orangy brown SILTY SAND | 4.5 | | | | | | | | | | | | | | |
| 184.19 4.50 | moist | 5.0 | | 7 | SS | 12 | | | | | | | | | | |
| | SAND trace to some silt | 5.5 | | | | | | | | | | | | | | |
| | saturated | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | 8 | SS | 29 | | | | | | | | | | |
| 182.14 6.55 | End of Borehole | | | | | | | | | | | | | | | |

cave-in and wet to a depth of 2.44 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 14**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**

























| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|---------------------|--|-----------|--------|-----------|------|-----------|--|--|--|--|---|--|--|-----------|-----------|---------|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | WATER CONTENT (%) W _p W W _L ↗ — ○ ↖ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | | | | | |
| | | | | | | | | | | | 10 20 30 | | | | | |
| 184.78 0.04 | 40 mm ASPHALT | | | | | | | | | | | | | | | |
| 184.32 0.46 | brown sand FILL some silt, trace gravel | 0.5 | | 1 | AS | | | | | | | | | | | |
| 184.02 0.76 | TOPSOIL | | | | | | | | | | | | | | | |
| | compact, brown SAND trace silt | 1.0 | | 2 | SS | 26 | | | | | | | | | | |
| | damp to saturated | 1.5 | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 16 | | | | | | | | | | |
| | | 2.5 | | 4 | SS | 14 | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 21 | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| 180.48 4.30 | very dense, brown SAND and GRAVEL saturated | 4.5 | | 6 | SS | 50/100 mm | | | | | | | | | | |
| 179.96 4.82 | Auger Refusal on suspect boulder | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |

water level and cave-in to a depth of 2.13 m bgs upon completion of drilling

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FILE No: G17496**BOREHOLE No. 15**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|-----------------------------------|--|-----------|---|-----------|------|---------|---|--|--|--|--|---|--|---|-----------|---|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↗ ○ ↖ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | |
| Ground Elevation: 182.20 m | | | | | | | | | | | | | | | | |
| 182.10 0.10 | 100 mm ASPHALT | |  | | | | | | | | | | |  | | |
| | loose brown to dark brown sand FILL some silt and gravel | 0.5 |  | 1 | AS | | | | | | | | |  | | cemented flushmount protective cover at grade |
| | moist to wet | 1.0 |  | 2 | SS | 6 | ● | | | | | ○ | |  | | bentonite seal |
| 180.83 1.37 | TOPSOIL | 1.5 |  | | | | | | | | | | |  | | |
| 180.40 1.80 | | |  | 3 | SS | 13 | ● | | | | | ○ | |  | | |
| | loose to dense brown SAND trace silt | 2.0 |  | | | | | | | | | | |  | | |
| | | 2.5 |  | 4 | SS | 17 | ● | | | | | ○ | |  | | |
| | saturated | 3.0 |  | | | | | | | | | | |  | | |
| | | 3.5 |  | 5 | SS | 8 | ● | | | | | ○ | |  | | |
| | | 4.0 |  | 6 | SS | 18 | ● | | | | | ○ | |  | | |
| | | 4.5 |  | | | | | | | | | | |  | | |
| | | 5.0 |  | 7 | SS | 42 | ● | | | | | ○ | |  | | |
| 177.17 5.03 | End of Borehole | | | | | | | | | | | | | | | water level measured at 1.47 m depth on November 23, 2017 |
| | | 5.5 | | | | | | | | | | | | | | water level measured at 1.46 m depth on December 5, 2017 |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |

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FILE No: G17496**BOREHOLE No. 16**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Hollow Stem Auger**Size: **107 mm I.D.**Date: **Nov 22 / 17 TO Nov 22 / 17**





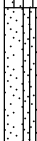
| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|---------------------|----------------------------|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|--|---|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↗ — ○ ↖ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | 10 20 30 | | | | | |
| 181.72 0.06 | 60 mm ASPHALT | | ■ | | | | | | | | | | | | | |
| 181.39 0.39 | Granular Base some silt | | ▨ | 1 | AS | | | | | | | | | | | |
| | compact to dense brown | 0.5 | ▧ | | | | | | | | | | | | | |
| | SAND trace silt | 1.0 | | 2 | SS | 15 | ● | | | | ○ | | | | | |
| | damp to saturated | 1.5 | | | | | | | | | | | | | | |
| | | 2.0 | | | | | | | | | | | | | | |
| | | 2.5 | | 4 | SS | 14 | ● | | | | | ○ | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 30 | ● | | | | | ○ | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | 6 | SS | 44 | ● | | | | | ○ | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| 175.23 6.55 | End of Borehole | 6.5 | | 7 | SS | 45 | ● | | | | | ○ | | | | |

water level and cave-in to a depth of 2.13 m bgs upon completion of drilling

PROJECT MANAGER: **RVD**
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FILE No: G17496**BOREHOLE No. 17**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|---|-----------|--|-----------|------|----------------------|--|-----|-----|-------------------|--|----|-----------|-----------|---------|----|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ | | | | | |
| | | | | | | | 50 | 100 | 150 | 200 | 20 | 40 | | | | 60 |
| Ground Elevation: 197.71 m | | | | | | | | | | | W _p W W _L | | | | | |
| | | | | | | | | | | | | | | | | |
| 197.38 0.33 | 330 mm TOPSOIL | |  | 1 | SS | 5 | ● | | | | | | ○ | | | |
| | loose, brown SAND AND SILT trace clay | 0.5 |  | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 1.0 | | 2 | SS | 8 | ● | | | | | | ○ | | | |
| | moist to wet | 1.5 |  | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 5 | ● | | | | | | ○ | | | |
| 195.61 2.10 | compact, brown SAND trace to some silt | 2.5 |  | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 2.5 | | 4 | SS | 13 | ● | | | | | | ○ | | | |
| | occ. to frequent silt and clayey silt lenses/seams | 3.0 |  | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | moist to saturated | 3.5 | | 5 | SS | 18 | ● | | | | | | ○ | | | |
| 194.20 3.51 | End of Borehole | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |



water level and cave-in to
a depth of 3.20 m bgs
upon completion of
drilling

PROJECT MANAGER: **RVD**
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FILE No: G17496**BOREHOLE No. 18**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|---------------------|---|-----------|--------|-----------|------|---------|--|--|--|--|---------------------------------|--|---|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _P W W _L | | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | ↗ ○ ↖ | | | | | | |
| | | | | | | | | | | | 10 20 30 | | | | | | |
| 197.12 0.18 | 180 mm TOPSOIL | | | | | | | | | | | | | | | | |
| | compact orangy brown to brown SAND some silt to Silty occ. to frequent silt and clayey silt lenses/seams moist to saturated | 0.5 | | 1 | SS | 4 | ● | | | | | | ○ | | | | |
| | | 1.0 | | 2 | SS | 12 | ● | | | | | | | ○ | | | |
| | | 1.5 | | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 16 | ● | | | | | | ○ | | | | |
| | | 2.5 | | 4 | SS | 18 | ● | | | | | | | ○ | | | |
| | | 3.0 | | | | | | | | | | | | | | | |
| 193.79 3.51 | End of Borehole | 3.5 | | 5 | SS | 19 | ● | | | | | | ○ | | | | |
| | | 4.0 | | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | | |

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water level and cave-in to
a depth of 2.90 m bgs
upon completion of
drillingPROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G17496**BOREHOLE No. 19**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | | |
|----------------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|--|--|-----------|-----------|---------|-----|-----|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | WATER CONTENT (%) W _p W W _L | | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | ↔ — — — ↔ | | | | | | |
| Ground Elevation: 196.91 m | | | | | | | | | | | | | | | | | |
| 196.76 0.15 | 150 mm TOPSOIL | | | | | | | | | | | | | | | | |
| | loose to compact brown SAND some silt to Silty occ. to frequent silt and clayey silt lenses/seams moist to saturated | 0.5 | | 1 | SS | 5 | ● | | | | | | ○ | | | 0.5 | |
| | | 1.0 | | 2 | SS | 7 | ● | | | | | | | ○ | | | 1.0 |
| | | 1.5 | | | | | | | | | | | | | | | 1.5 |
| | | 2.0 | | 3 | SS | 8 | ● | | | | | | | | ○ | | 2.0 |
| | | 2.5 | | | | | | | | | | | | | | | 2.5 |
| | | 3.0 | | 4 | SS | 14 | ● | | | | | | | | ○ | | 3.0 |
| | | 3.5 | | | | | | | | | | | | | | | 3.5 |
| 3.51 | End of Borehole | | | | | | | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | 4.0 | |
| | | 4.5 | | | | | | | | | | | | | | 4.5 | |
| | | 5.0 | | | | | | | | | | | | | | 5.0 | |
| | | 5.5 | | | | | | | | | | | | | | 5.5 | |
| | | 6.0 | | | | | | | | | | | | | | 6.0 | |
| | | 6.5 | | | | | | | | | | | | | | 6.5 | |

water level at a depth of 2.74 m bgs upon completion of drilling
cave-in to a depth of 3.05 m bgs upon completion of drilling

▽

water level at a depth of 2.74 m bgs upon completion of drilling
cave-in to a depth of 3.05 m bgs upon completion of drilling

PROJECT MANAGER: **RVD**
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FILE No: G17496**BOREHOLE No. 20**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|--------|-----------|------|---------|--|--|--|--|--|--|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | WATER CONTENT (%) W _p W W _L | | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Ground Elevation: 196.53 m | | | | | | | | | | | | | | | | | |
| 200 mm TOPSOIL | | | | | | | | | | | | | | | | | |
| 196.33 0.20 | loose to compact brown SAND some silt to Silty occ. to frequent silt and clayey silt lenses/seams moist to saturated | 0.5 | | 1 | SS | 7 | ● | | | | | | | | | | |
| | | 1.0 | | 2 | SS | 16 | ● | | | | | | | | | | |
| | | 1.5 | | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 20 | ● | | | | | | | | | | |
| | | 2.5 | | | | | | | | | | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | | |
| 193.02 3.51 | End of Borehole | 3.5 | | 5 | SS | 17 | ● | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | | |
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water level at a depth of 2.90 m bgs upon completion of drilling

open to a depth of 3.51 m bgs upon completion of drilling

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
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ph. (519) 742-8979, fx. (519) 742-7739

FILE No: G17496**BOREHOLE No. 21**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|--------|-----------|------|----------------------|--|--|--|-------------------|--|--|-----------|-----------|---|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _P W W _L ↔ ○ ↔ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | | | | | |
| Ground Elevation: 196.40 m | | | | | | | | | | | | | | | | |
| 196.20 0.20 | 200 mm TOPSOIL | | | | | | | | | | | | | | | |
| | loose to compact brown SAND some silt to Silty occ. to frequent silt and clayey silt lenses/seams moist to saturated | 0.5 | | 1 | SS | 4 | ● | | | | | | ○ | | | |
| | | 1.0 | | 2 | SS | 7 | ● | | | | | | ○ | | | |
| | | 1.5 | | 3 | SS | 10 | ● | | | | | | ○ | | | |
| | | 2.0 | | 4 | SS | 14 | ● | | | | | | ○ | | | |
| | | 2.5 | | 5 | SS | 15 | ● | | | | | | ○ | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | | | | | | | | | | | | | |
| 192.89 3.51 | End of Borehole | | | | | | | | | | | | | | open and dry to a depth of 3.51 m bgs upon completion of drilling | |

bulk sample taken

open and dry to a depth of 3.51 m bgs upon completion of drilling

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
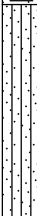
FILE No: G17496**BOREHOLE No. 22**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | | |
|-----------------------------------|---|-----------|--------|-----------|------|----------------------|---|---|--|-------------------|--|----|-----------|-----------|---------|--|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _p W W _L ↔ — ○ —↔ | | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | | | | | | |
| Ground Elevation: 196.08 m | | | | | | | | | | | 10 | 20 | 30 | | | | |
| 195.83 0.25 | 250 mm TOPSOIL | | | | | | | | | | | | | | | | |
| | loose to dense brown SILT some sand to Sandy occ. clayey silt and sand lenses/seams moist | 0.5 | | 1 | SS | 7 | ● | | | | | | ○ | | | | |
| | | 1.0 | | 2 | SS | 35 | | ● | | | | | | ○ | | | |
| | | 1.5 | | | | | | | | | | | | | | | |
| | | 2.0 | | 3 | SS | 15 | | ● | | | | | | ○ | | | |
| 193.18 2.90 | End of Borehole | 2.5 | | 4 | SS | 13 | | ● | | | | | | ○ | | | |
| | | 3.0 | | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 18 | | ● | | | | | | ○ | | | |
| | | 4.0 | | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | | |

open and dry to a depth of 3.51 m bgs upon completion of drilling

PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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FILE No: G17496**BOREHOLE No. 23**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|---|-----------|------|----------------------|--|--|--|-------------------|---|--|-----------|-----------|---------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | WATER CONTENT (%) W _p W W _L |
| Ground Elevation: 195.52 m | | | | | | | | | | | | | | | | |
| 195.06 0.46 | 460 mm TOPSOIL | 0.5 |  | 1 | SS | 4 | ● | | | | | | | | | |
| | loose to compact brown | | | | | | | | | | | | | | | |
| | SAND AND SILT some silt to silty | 1.0 |  | 2 | SS | 8 | ● | | | | | | | | | |
| | occ. silt and clayey silt seams | | | | | | | | | | | | | | | |
| | moist to wet | 1.5 | | | | | | | | | | | | | | |
| 192.62 2.90 | ----- sand and silt | 2.0 | | | | | | | | | | | | | | |
| | | 2.5 | | 4 | SS | 28 | ● | | | | | | | | | |
| | compact, brown SILT some sand, trace clay moist to wet | 3.0 | | | | | | | | | | | | | | |
| 192.01 3.51 | End of Borehole | 3.5 | | 5 | SS | 21 | ● | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |

borehole open and dry to a depth of 3.51 m bgs upon completion of drilling

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


FILE No: G17496**BOREHOLE No. 24**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS | |
|----------------------------|--|-----------|--------|-----------|------|----------------------|---|--|--|-------------------|--|--|-----------|-----------|---------|---|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | W _p W W _L ↔ — ○ — ↔ 10 20 30 |
| Ground Elevation: 195.02 m | | | | | | | | | | | | | | | | |
| 194.69 0.33 | 330 mm TOPSOIL | | | 1 | SS | 4 | ● | | | | | | | | ○ | |
| | loose to compact brown SAND AND SILT occ. clayey silt seams moist to wet | 0.5 | | | | | | | | | | | | | | |
| | | 1.0 | | 2 | SS | 7 | ● | | | | | | | ○ | | |
| | | 1.5 | | | | | | | | | | | | | | |
| | 2.0 | | | | | | | | | | | | | | | |
| 2.5 | 4 | SS | | 18 | ● | | | | | | | | ○ | | | |
| 192.12 2.90 | compact, brown SAND trace silt moist | 3.0 | | 5 | SS | 25 | ● | | | | | | | | ○ | |
| 191.51 3.51 | End of Borehole | 3.5 | | | | | | | | | | | | | | |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |

open and dry to a depth of 3.51 m bgs upon completion of drilling

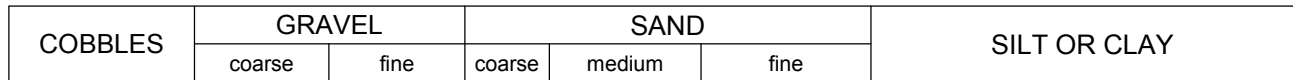
PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN
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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

FILE No: G17496**BOREHOLE No. 25**Client: **GM BluePlan Engineering Limited**Project: **Road Reconstruction / Realignment Projects**Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario****EQUIPMENT DATA**Machine: **D50T**Method: **Solid Stem Auger**Size: **150 mm O.D.**Date: **Nov 23 / 17 TO Nov 23 / 17**

| SOIL LITHOLOGY | | | | SAMPLE | | | SHEAR STRENGTH (kPa) | | | | WATER CONTENT (%) | | | WELL DATA | DEPTH (m) | REMARKS |
|-----------------------------------|--|-----------|--|-----------|------|---------|---|--|--|---|---|--|--|-----------|-----------|--|
| ELEV./ DEPTH (m) | DESCRIPTION | DEPTH (m) | SYMBOL | SAMPLE ID | TYPE | N-VALUE | FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200 | | | | W _P W W _L ↔ — ○ —↔ | | | | | |
| | | | | | | | PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80 | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Ground Elevation: 194.46 m | | | | | | | | | | | | | | | | |
| 194.16 0.30 | 300 mm TOPSOIL | |  | 1 | SS | 7 | ● | | | | | | | | | |
| | loose to compact brown SILT trace to some sand occ. clayey silt seams moist | 0.5 |  | | | | | | | | | | | ○ | | |
| | | 1.0 | | 2 | SS | 6 | ● | | | | | | | | ○ | |
| | | 1.5 | | | | | | | | | | | | | | |
| | 192.36 2.10 | | | 3 | SS | 12 | ● | | | | | | | | ○ | |
| | dense, brown SAND trace silt damp | 2.5 |  | 4 | SS | 33 | | | | ● | | | | | | |
| | | 3.0 | | | | | | | | | | | | | | |
| | | 3.5 | | 5 | SS | 34 | | | | | | | | ○ | | |
| 190.95 3.51 | End of Borehole | | | | | | | | | | | | | | | borehole open and dry to a depth of 3.51 m bgs upon completion of drilling |
| | | 4.0 | | | | | | | | | | | | | | |
| | | 4.5 | | | | | | | | | | | | | | |
| | | 5.0 | | | | | | | | | | | | | | |
| | | 5.5 | | | | | | | | | | | | | | |
| | | 6.0 | | | | | | | | | | | | | | |
| | | 6.5 | | | | | | | | | | | | | | |

borehole open and dry to a depth of 3.51 m bgs upon completion of drilling

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| LL | PL | PI | Cc | Cu | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|----|----|----|------|-------|------|-------|-------|-----|---------|-------|-------|-------|
| | | | 0.72 | 77.01 | 19 | 5.296 | 0.512 | | 43.0 | 46.5 | 10.5 | |

| | | | | |
|--------------------------|---------------------------------|------------------------|------------------------|--------------------------------------|
| Date: | Dec. 21 / 2017 | Sieve Size (mm) | Percent Passing | OPSS 1010 Granular 'B' Type I |
| Client: | GM BluePlan Engineering Limited | | | |
| Contractor: | | 150 | | 100 |
| Source: | | 26.5 | | 50 - 100 |
| Sampled From: | BH 16, 0.15 to 0.30 m depth | 4.75 | 57.0 | 20 - 100 |
| Sample No.: | 16-1 | 1.18 | 40.6 | 10 - 100 |
| Date Sampled: | Nov. 22 / 2017 | 0.300 | 22.3 | 2 - 65 |
| Sampled By: | JV | 0.075 | 10.5 | 0 - 8 |
| Lab No.: | 2562 | | | |
| Date Tested: | Dec. 04 / 2017 | | | |
| Type of Material: | Granular Base, some silt | | | |



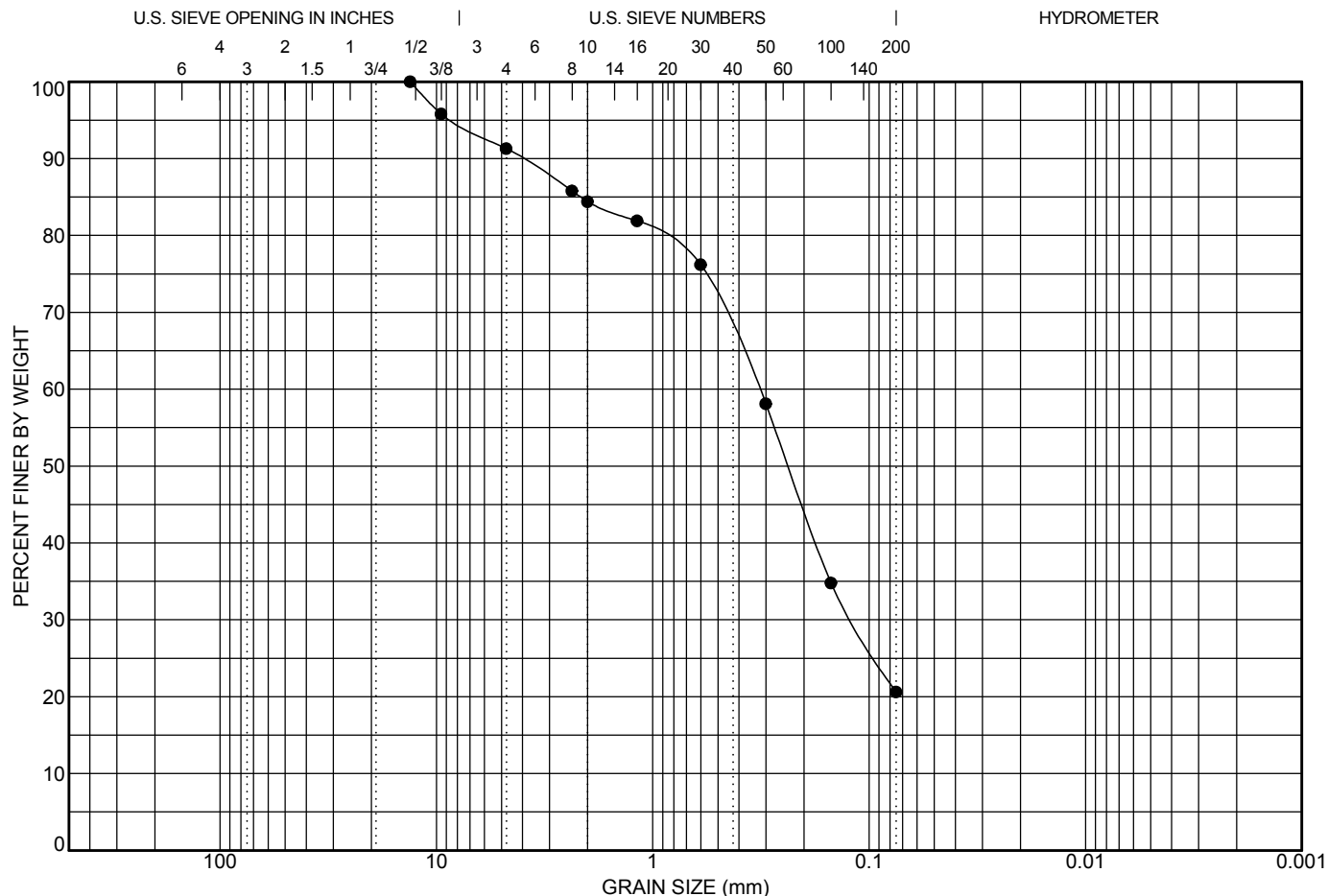
**CHUNG & VANDER DOELEN
ENGINEERING LTD.**
311 Victoria Street North
Kitchener, Ontario N2H 5E1
Telephone: 519-742-8979
Fax: 519-742-7739
e-mail: info@cvdengineering.com

Project: Road Reconstruction / Realignment Projects

Location: Bruce County Roads 25 and 33, Saugeen Shores,
Ontario

File No.: G17496

Enclosure No.: 26



| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
| | coarse | fine | coarse | medium | fine | |

| LL | PL | PI | Cc | Cu | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|----|----|----|----|----|------|-------|-------|-----|---------|-------|-------|-------|
| | | | | | 13.2 | 0.323 | 0.119 | | 8.7 | 70.7 | 20.6 | |

Date: Dec. 21 / 2017
Client: GM BluePlan Engineering Limited
Contractor:
Source:
Sampled From: BH 3, 0.15 to 0.30 m depth
Sample No.: 3-1
Date Sampled: Nov. 20 / 2017
Sampled By: JV
Lab No.: 255
Date Tested: Dec. 04 / 2017
Type of Material: Silty Sand Fill, trace gravel

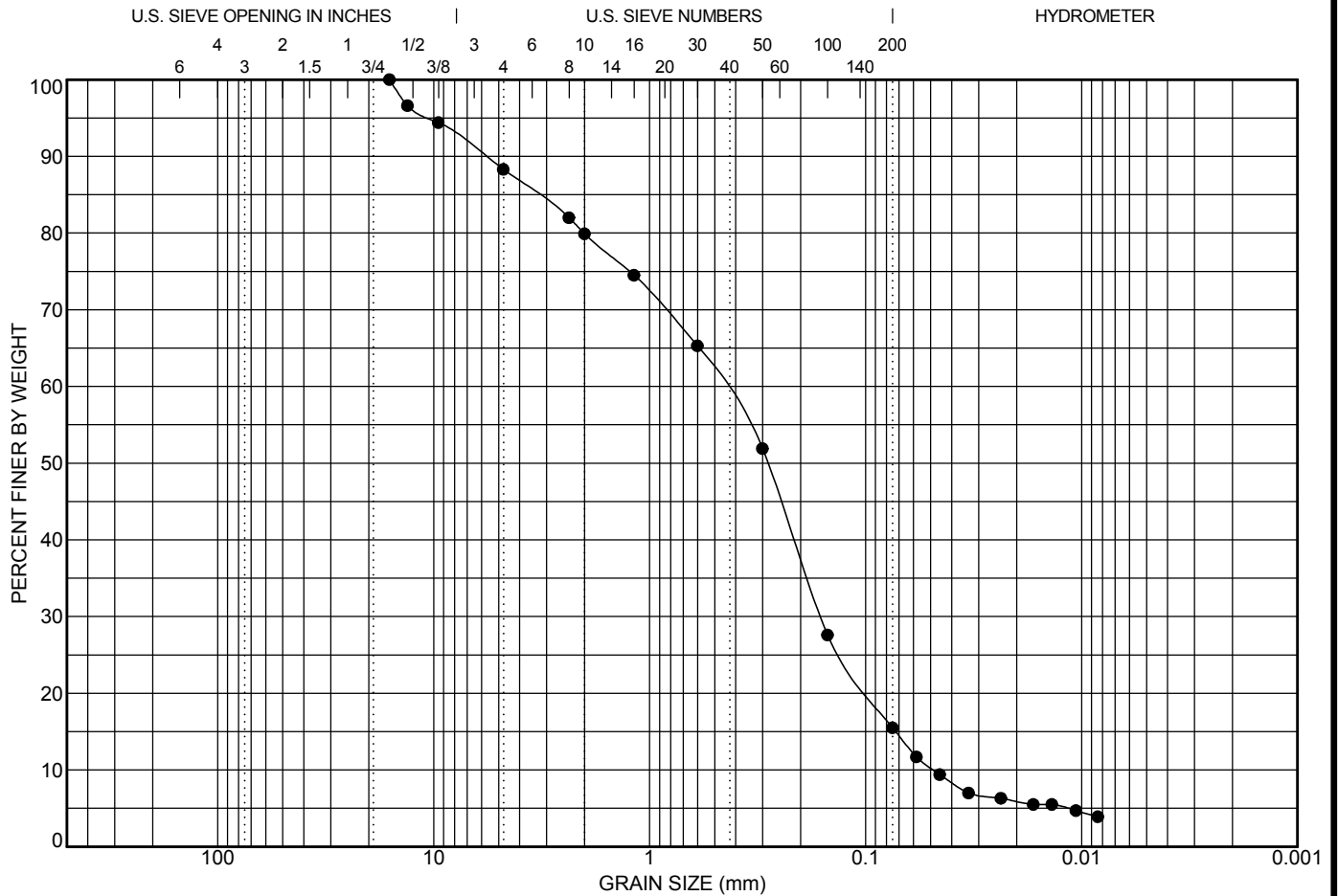
| Sieve Size (mm) | Percent Passing | No Specifications |
|-----------------|-----------------|-------------------|
| | | |



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 Fax: 519-742-7739
 e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects
Location: Bruce County Roads 25 and 33, Saugeen Shores, Ontario
File No.: G17496
Enclosure No.: 27



| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
| | coarse | fine | coarse | medium | fine | |

| LL | PL | PI | Cc | Cu | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|----|----|----|------|------|------|-------|-------|-------|---------|-------|-------|-------|
| | | | 1.17 | 9.44 | 16 | 0.456 | 0.161 | 0.048 | 11.7 | 72.8 | 15.5 | |

Date: Dec. 21 / 2017
Client: GM BluePlan Engineering Limited
Contractor:
Source:
Sampled From: BH 6, 0.15 to 0.30 m depth
Sample No.: 6-1
Date Sampled: Nov. 21 / 2017
Sampled By: JV
Lab No.: 2556
Date Tested: Dec. 04 / 2017
Type of Material: Sand Fill, some silt and gravel

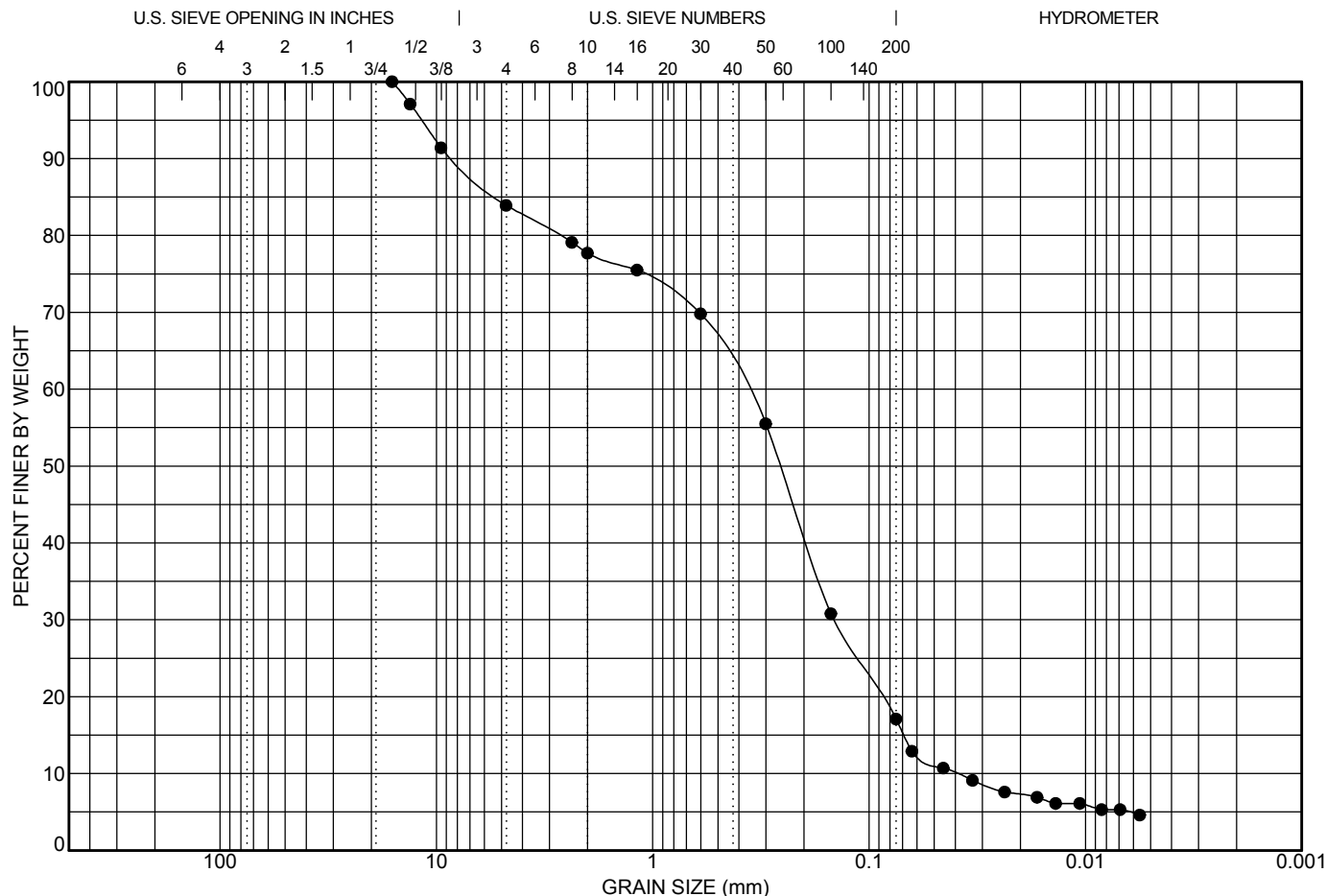
| Sieve Size (mm) | Percent Passing | No Specifications |
|-----------------|-----------------|-------------------|
| | | |



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 e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects
Location: Bruce County Roads 25 and 33, Saugeen Shores, Ontario
File No.: G17496
Enclosure No.: 28



| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---------|--------|------|--------|--------|------|--------------|
| | coarse | fine | coarse | medium | fine | |

| LL | PL | PI | Cc | Cu | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|----|----|----|------|------|------|-------|-------|------|---------|-------|-------|-------|
| | | | 1.41 | 9.44 | 16 | 0.373 | 0.144 | 0.04 | 16.1 | 66.8 | 17.1 | |

Date: Dec. 21 / 2017
Client: GM BluePlan Engineering Limited
Contractor:
Source:
Sampled From: BH 9, 0.15 to 0.30 m depth
Sample No.: 9-1
Date Sampled: Nov. 21 / 2017
Sampled By: JV
Lab No.: 2558
Date Tested: Dec. 04 / 2017
Type of Material: Sand Fill, some silt and gravel

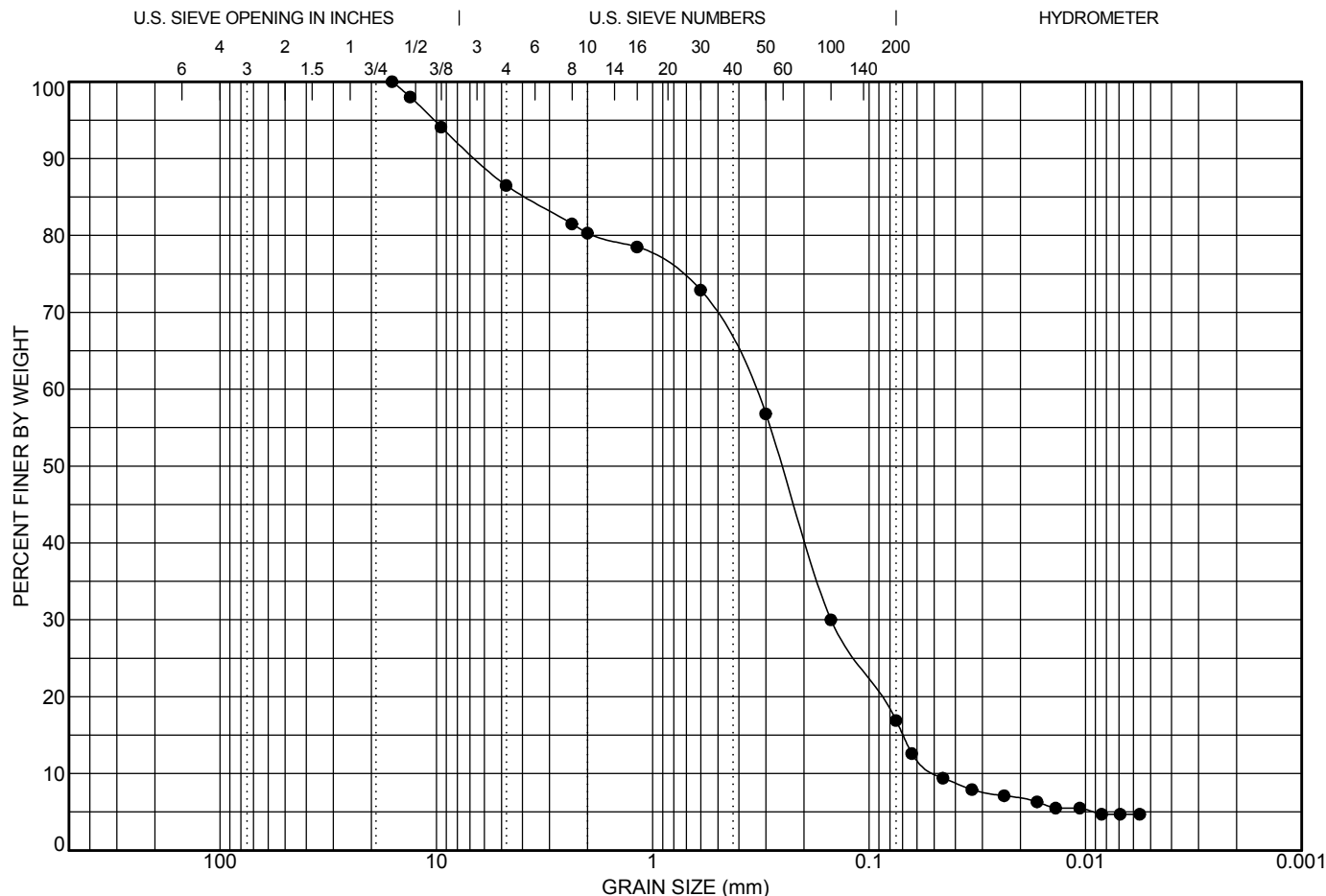
| Sieve Size (mm) | Percent Passing | No Specifications |
|-----------------|-----------------|-------------------|
| | | |

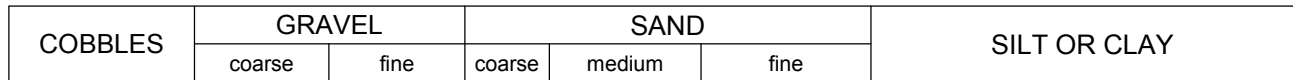


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 Fax: 519-742-7739
 e-mail: info@cvdengineering.com

GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects
Location: Bruce County Roads 25 and 33, Saugeen Shores, Ontario
File No.: G17496
Enclosure No.: 29





| | | | | |
|--------------------------|---------------------------------|------------------------|------------------------|--------------------------|
| Date: | Dec. 21 / 2017 | Sieve Size (mm) | Percent Passing | No Specifications |
| Client: | GM BluePlan Engineering Limited | | | |
| Contractor: | | | | |
| Source: | | | | |
| Sampled From: | BH 1, 1.52 to 1.98 m depth | | | |
| Sample No.: | 1-3 | | | |
| Date Sampled: | Nov. 20 / 2017 | | | |
| Sampled By: | JV | | | |
| Lab No.: | 2553 | | | |
| Date Tested: | Dec. 04 / 2017 | | | |
| Type of Material: | Sand, some silt, trace gravel | | | |



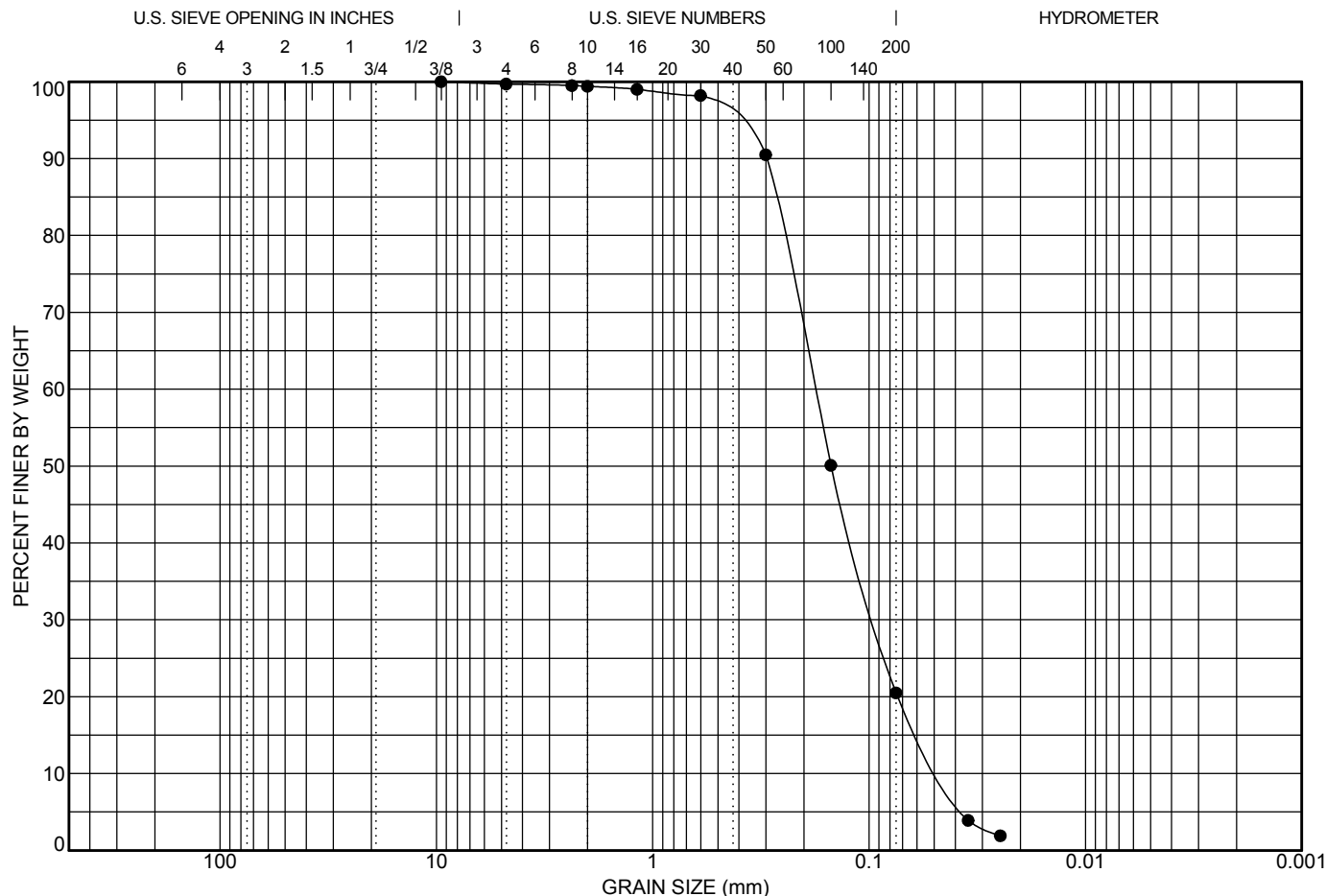
GRAIN SIZE DISTRIBUTION

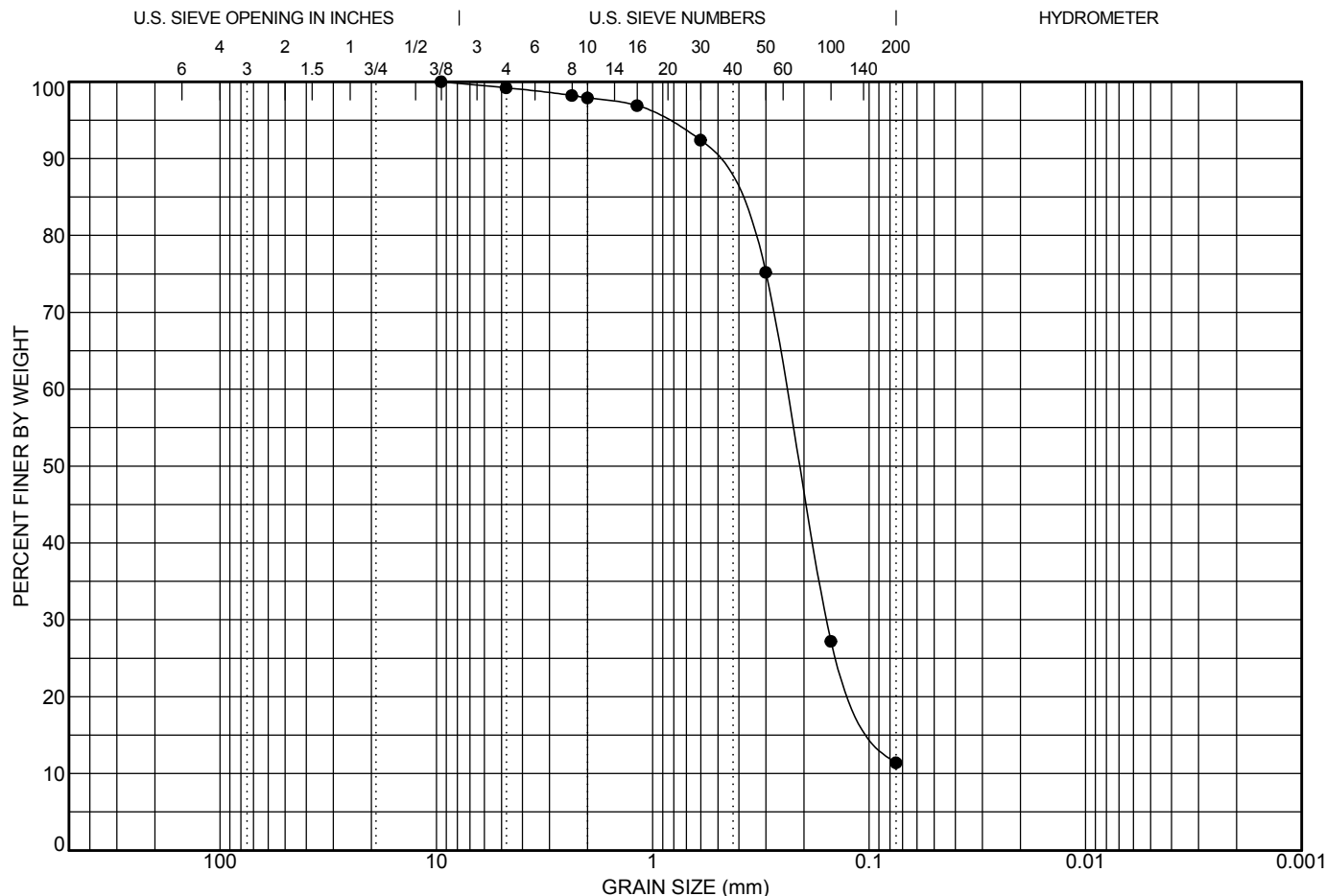
Project: Road Reconstruction / Realignment Projects

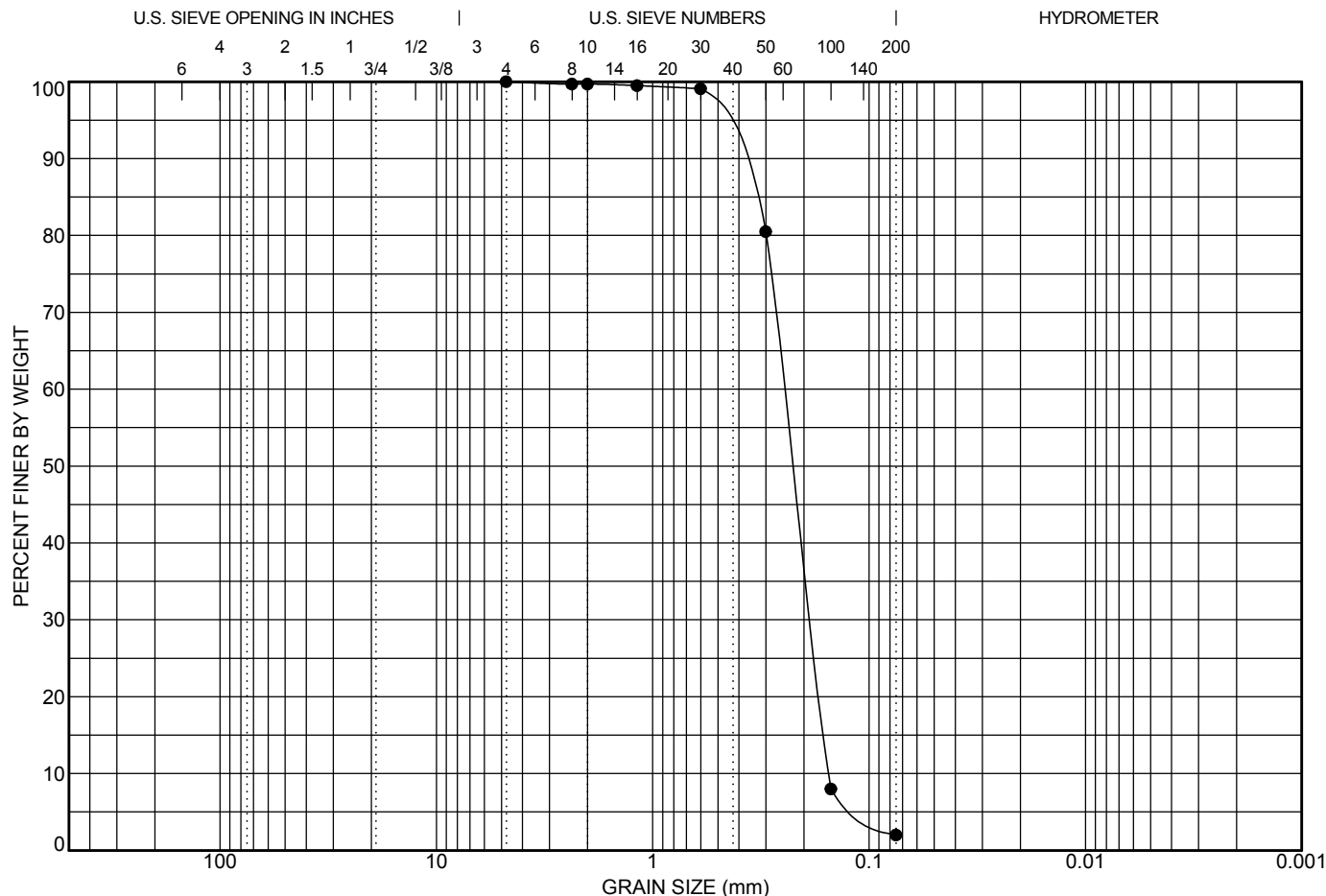
Location: Bruce County Roads 25 and 33, Saugeen Shores,
Ontario

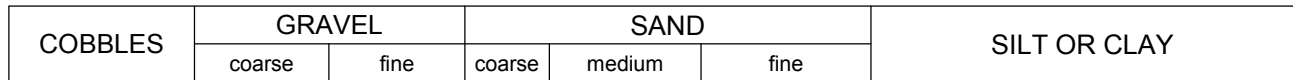
File No.: G17496

Enclosure No.: 31









| | | | | |
|--------------------------|---------------------------------|------------------------|------------------------|--------------------------|
| Date: | Dec. 21 / 2017 | Sieve Size (mm) | Percent Passing | No Specifications |
| Client: | GM BluePlan Engineering Limited | | | |
| Contractor: | | | | |
| Source: | | | | |
| Sampled From: | BH 18, 2.29 to 2.74 m depth | | | |
| Sample No.: | 18-4 | | | |
| Date Sampled: | Dec. 23 / 2017 | | | |
| Sampled By: | JV | | | |
| Lab No.: | 2563 | | | |
| Date Tested: | Dec. 04 / 2017 | | | |
| Type of Material: | Silty Sand, trace clay | | | |



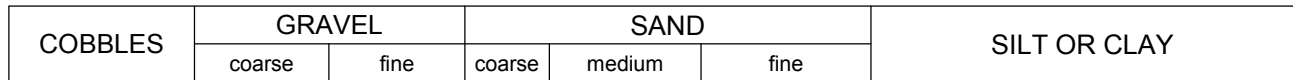
GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects

Location: Bruce County Roads 25 and 33, Saugeen Shores,
Ontario

File No.: G17496

Enclosure No.: 35



| | | | | |
|--------------------------|---------------------------------|------------------------|------------------------|--------------------------|
| Date: | Dec. 21 / 2017 | Sieve Size (mm) | Percent Passing | No Specifications |
| Client: | GM BluePlan Engineering Limited | | | |
| Contractor: | | | | |
| Source: | | | | |
| Sampled From: | BH 23, 2.29 to 2.74 m depth | | | |
| Sample No.: | 23-4 | | | |
| Date Sampled: | Nov. 23 / 2017 | | | |
| Sampled By: | JV | | | |
| Lab No.: | 2564 | | | |
| Date Tested: | Dec. 05 / 2017 | | | |
| Type of Material: | Sand and Silt | | | |



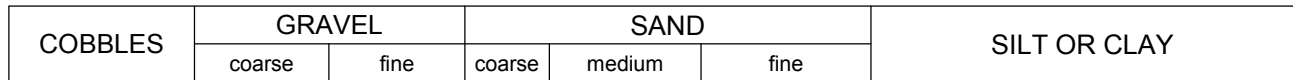
GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects

Location: Bruce County Roads 25 and 33, Saugeen Shores,
Ontario

File No.: G17496

Enclosure No.: 36



| | | | | |
|--------------------------|---------------------------------|------------------------|------------------------|--------------------------|
| Date: | Dec. 21 / 2017 | Sieve Size (mm) | Percent Passing | No Specifications |
| Client: | GM BluePlan Engineering Limited | | | |
| Contractor: | | | | |
| Source: | | | | |
| Sampled From: | BH 2, 2.29 to 2.74 m depth | | | |
| Sample No.: | 2-4 | | | |
| Date Sampled: | Nov. 20 / 2017 | | | |
| Sampled By: | JV | | | |
| Lab No.: | 2554 | | | |
| Date Tested: | Dec. 04 / 2017 | | | |
| Type of Material: | Silt, some sand and clay | | | |



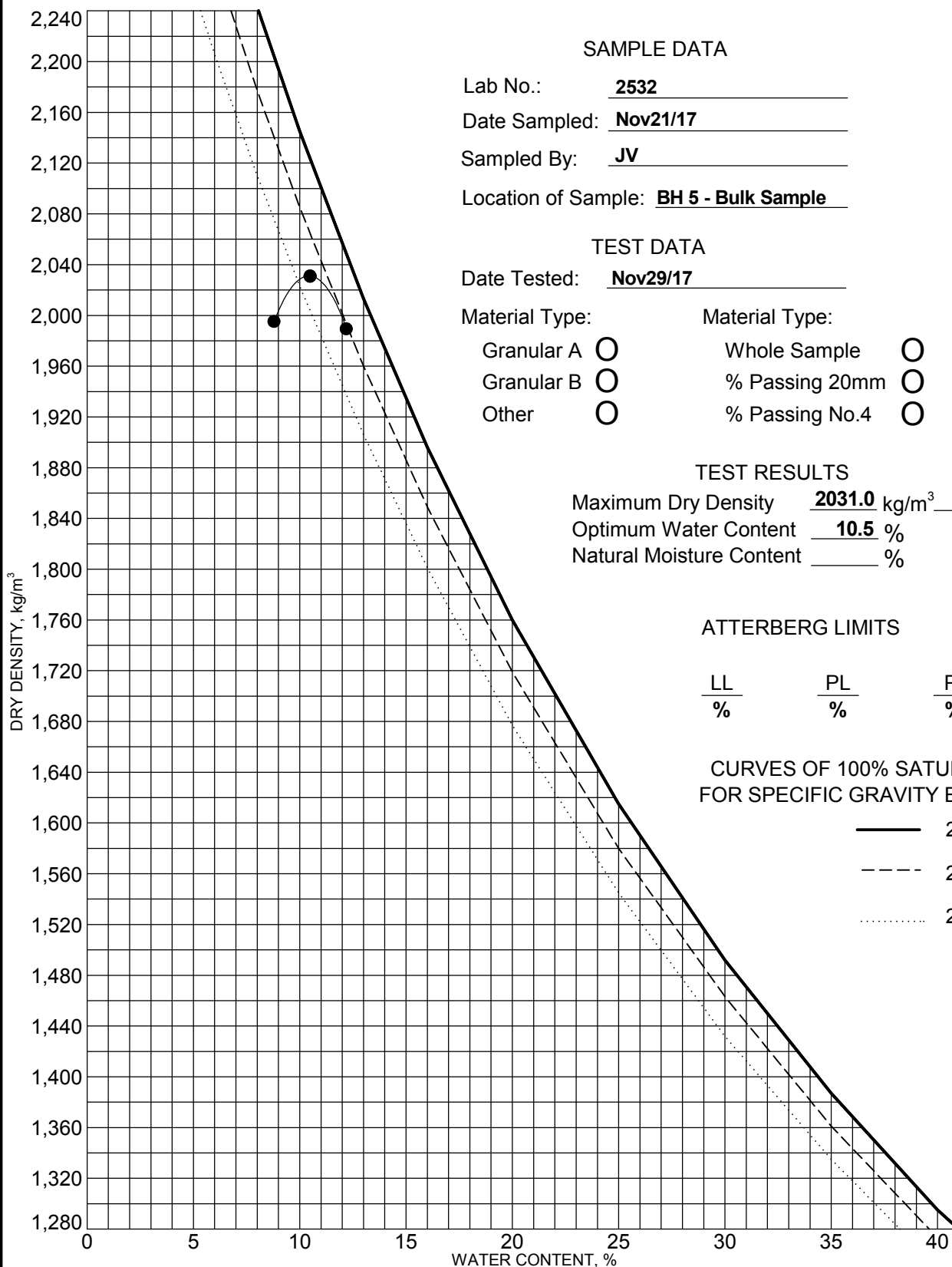
GRAIN SIZE DISTRIBUTION

Project: Road Reconstruction / Realignment Projects

Location: Bruce County Roads 25 and 33, Saugeen Shores,
Ontario

File No.: G17496

Enclosure No.: 37



SAMPLE DATA

Lab No.: 2532

Date Sampled: Nov21/17

Sampled By: JV

Location of Sample: BH 5 - Bulk Sample

TEST DATA

Date Tested: Nov29/17

Material Type:

Granular A ☐

Granular B ☐

Other ☐

Material Type:

Whole Sample ☐

% Passing 20mm ☐

% Passing No.4 ☐

TEST RESULTS

Maximum Dry Density 2031.0 kg/m³ 126.8 PCF

Optimum Water Content 10.5 %

Natural Moisture Content _____ %

ATTERBERG LIMITS

| LL | PL | PI |
|----|----|----|
| % | % | % |

CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY EQUAL TO:

— 2.80

- - - 2.70

..... 2.60



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e-mail: info@cvdengineering.com

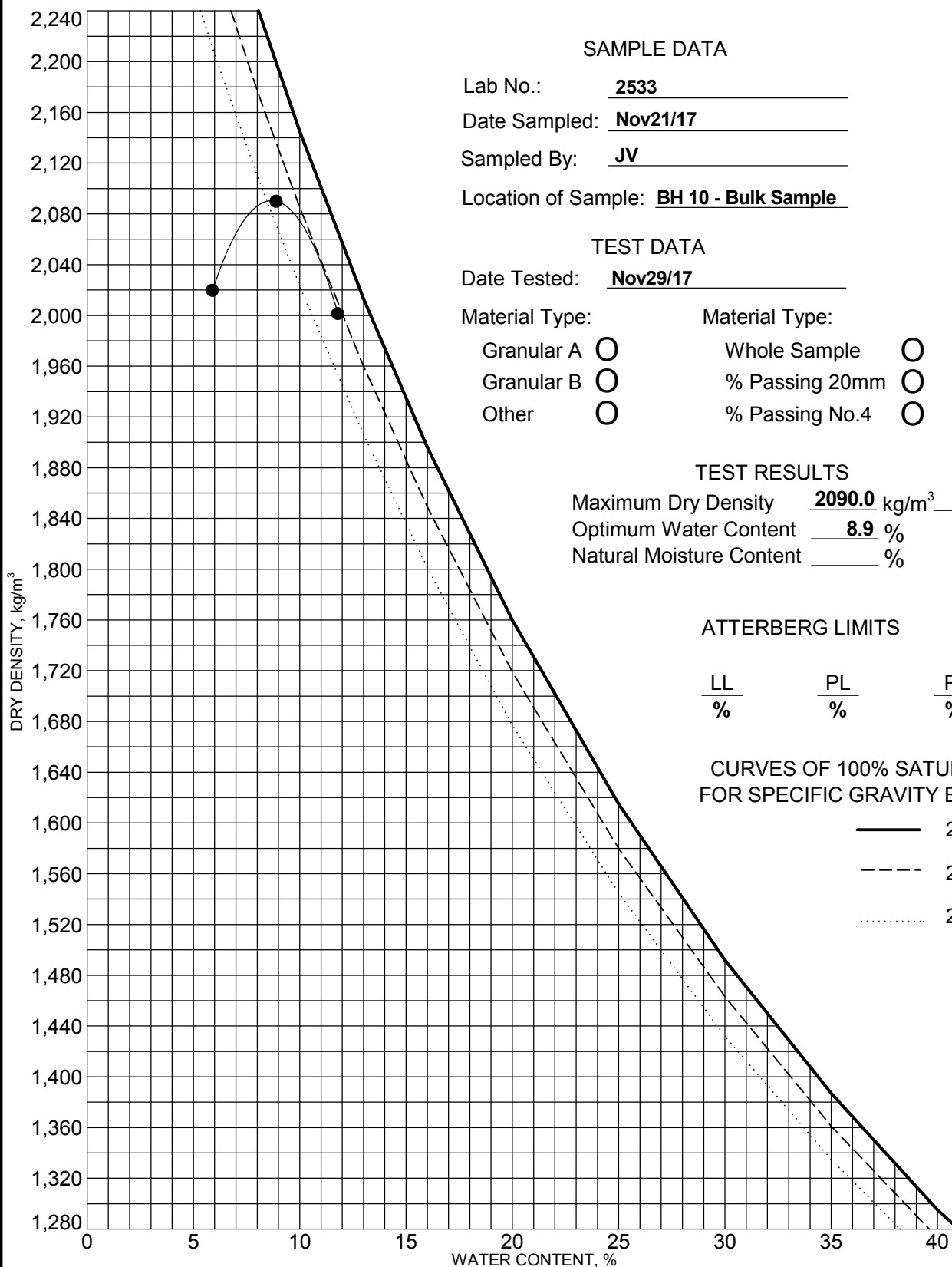
STANDARD PROCTOR TEST RESULTS

Project: **Road Reconstruction / Realignment Projects**

Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario**

File No.: **G17496**

Enclosure No.: 38



SAMPLE DATA

Lab No.: 2533

Date Sampled: Nov21/17

Sampled By: JV

Location of Sample: BH 10 - Bulk Sample

TEST DATA

Date Tested: Nov29/17

Material Type:

Granular A ☐

Granular B ☐

Other ☐

Material Type:

Whole Sample ☐

% Passing 20mm ☐

% Passing No.4 ☐

TEST RESULTS

Maximum Dry Density 2090.0 kg/m³ 130.5 PCF

Optimum Water Content 8.9 %

Natural Moisture Content _____ %

ATTERBERG LIMITS

| LL | PL | PI |
|----|----|----|
| % | % | % |

CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY EQUAL TO:

— 2.80

- - - 2.70

..... 2.60



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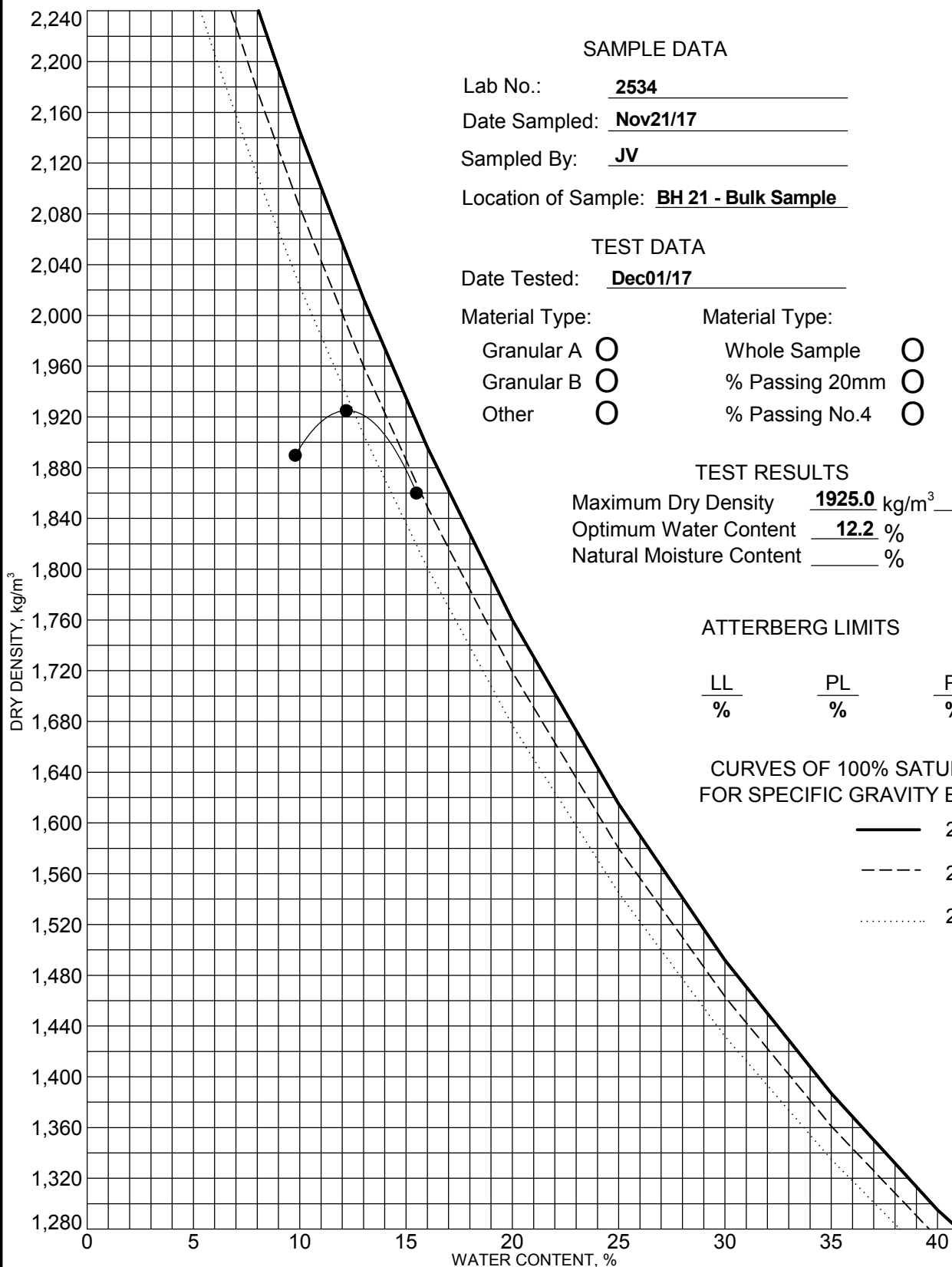
STANDARD PROCTOR TEST RESULTS

Project: **Road Reconstruction / Realignment Projects**

Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario**

File No.: **G17496**

Enclosure No.: 39



SAMPLE DATA

Lab No.: 2534

Date Sampled: Nov21/17

Sampled By: JV

Location of Sample: BH 21 - Bulk Sample

TEST DATA

Date Tested: Dec01/17

Material Type:

Granular A ☐

Granular B ☐

Other ☐

Material Type:

Whole Sample ☐

% Passing 20mm ☐

% Passing No.4 ☐

TEST RESULTS

Maximum Dry Density 1925.0 kg/m³ 120.2 PCF

Optimum Water Content 12.2 %

Natural Moisture Content _____ %

ATTERBERG LIMITS

| LL | PL | PI |
|----|----|----|
| % | % | % |

CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY EQUAL TO:

— 2.80

- - - 2.70

..... 2.60



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e-mail: info@cvdengineering.com

STANDARD PROCTOR TEST RESULTS

Project: **Road Reconstruction / Realignment Projects**

Location: **Bruce County Roads 25 and 33, Saugeen Shores, Ontario**

File No.: **G17496**

Enclosure No.: 40

Prepared By:



Bruce County Road 33 Re-Alignment

Conceptual Stormwater Management Design Brief Saugeen Shores, ON

GMBP File: 217127

April, 2018



Be an explorer.



TABLE OF CONTENTS

| | |
|--|----------|
| 1. INTRODUCTION AND BACKGROUND | 1 |
| 2. EXISTING CONDITIONS AND DRAINAGE..... | 2 |
| 2.1 Stormwater Management Design Criteria..... | 2 |
| 3. POST-DEVELOPMENT CONDITIONS AND DRAINAGE..... | 3 |
| 4. QUANTITY CONTROL CRITERIA, PARAMETERS AND MODELLING..... | 4 |
| 4.1 Design Rainfall Events..... | 4 |
| 4.2 Site Soil Conditions..... | 4 |
| 4.3 Pre-Development Catchment Areas | 4 |
| 4.4 Post-Development Catchment Areas | 5 |
| 4.5 MIDUSS Quantity Control Modelling Results | 5 |
| 5. STORMWATER QUALITY TREATMENT..... | 6 |
| 6. SUMMARY..... | 7 |

LIST OF FIGURES

FIGURE 1: SITE LOCATION MAP

FIGURE 2: PRE-DEVELOPMENT CATCHMENT AREAS

FIGURE 3: POST-DEVELOPMENT CATCHMENT AREAS

APPENDICES

APPENDIX A: MIDUSS MODELLING – PRE-DEVELOPMENT CONDITIONS

APPENDIX B: MIDUSS MODELLING – POST-DEVELOPMENT CONDITIONS

APPENDIX C: ENHANCED GRASS SWALES – MIDUSS MODELLING

CONCEPTUAL STORMWATER MANAGEMENT DESIGN BRIEF

BRUCE COUNTY ROAD 33 RE-ALIGNMENT

APRIL, 2018

GMBP FILE: 217127

1. INTRODUCTION AND BACKGROUND

The County of Bruce (County), as the operating authority for Bruce Road 25 and Bruce Road 33 (BR25 & BR33), proposes to reconstruct the existing BR25 roadway between Saugeen Beach Road and Goderich Street (Provincial Highway 21), as well as to construct a new roadway to re-align BR33 to intersect BR25 at a location approximately 535m to the east of its current intersection with BR25 as shown on Figure 1. The Town of Saugeen Shores (Town) has identified future development in the area which would extend Bruce Street southerly, to intersect with BR25 at the location of the proposed BR25/BR33 intersection.

The proposed reconstruction of BR25 and re-alignment of BR33 are supported by the recommendations of the recently completed Master Plan for Roads and Drainage (Master Plan) study completed about May, 2017 that addressed Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process.

Subsequent to the Notice of Completion for the Master Plan, the County and Town prepared the following implementation plan:

Phase 1 – Trunk Storm Sewer on BR25 from Lake Ridge Estates to Lake Huron, including full urbanized road section from Shipley Avenue to Saugeen Beach Road. (Schedule A+ Activity)

Phase 2 – 2-Lane urbanized road section from Shipley Avenue to Bruce Street, including local storm sewer down the bluff. (Schedule A+ Activity)

Phase 3 – 4-Lane urbanized road section from Bruce Street to Goderich Street, including municipal services (subject to a future Schedule B EA process)

Phase 4 – New Construction of BR 33 (Subject to current EA process)

GM BluePlan Engineering Limited (GMBP) was retained to prepare a Stormwater Management (SWM) Design Brief to address the drainage interests of the Town and County in relation to the proposed development of BR33, as Phase 4 of the implementation plan.

Based on the recommendations of the Master Plan, the reconstruction of BR25 will include the design and installation of a trunk storm sewer to drain runoff from the roadway and upstream lands, to an outlet at Lake Huron, as Phase 1 of the implementation plan. The design of the proposed BR25 storm sewer will be addressed in a separate design brief, although capacity would be provided within that storm sewer to accommodate quantity and quality related issues for runoff from the north end of the re-aligned BR33, under Phase 4 of the implementation plan.

Therefore, the SWM requirements of the BR25 reconstruction are outside the scope of this Preliminary SWM Design Brief for BR33.

The Master Plan identifies that the residential lands in the Baker Road area to the west of the existing BR33, occasionally suffer from seasonal flooding issues, and currently lack a storm sewer system. As a result, drainage conditions within the Baker Subdivision should not be worsened by runoff associated with development within upstream lands, and be improved if possible.

This Preliminary SWM Design Brief addresses, in general terms, the drainage interests associated with the portions of the proposed BR33 construction, which would drain to Baker Road. Additional details would be prepared, as necessary, during the project design phase.

2. EXISTING CONDITIONS AND DRAINAGE

In general, lands to the south of BR25, west of the Gore Drain Trail and east of the Baker Road Subdivision area, drain downward from east to west. Lands associated with the BR33 re-alignment and draining to the Baker Subdivision are zoned as Planned Development. Current land use is for agricultural purposes.

Runoff from lands east of the Baker Subdivision currently drain across the existing BR33 (Lake Range Road) at two locations; a 750mm Ø culvert approximately 155m to the south of BR25, or a 750mm Ø approximately 50m to the south of Baker Road.

Runoff draining to the northerly culvert is conveyed through the area to the north of the Baker Street Subdivision towards BR25, and is not considered to contribute to the identified drainage issues within the Baker Subdivision.

Runoff draining to the southerly culvert drains in an open watercourse across private properties to a system of roadside ditches within the Baker Subdivision, and ultimately is conveyed to Lake Huron.

2.1 Stormwater Management Design Criteria

Based on pre-development drainage conditions, and correspondence with the Town and County, the SWM criteria used to develop the appropriate SWM approach for the proposed development is as follows:

1. Post-development peak flow rates discharging from the proposed BR33 development and upstream lands to the Baker Subdivision are to be attenuated to less than, or equal to, pre-development conditions.
2. Future development within the lands zoned as Planned Development will be responsible to manage its own stormwater, beyond the existing condition.
3. Enhanced water quality treatment (80% TSS Removal) is to be provided for runoff draining from the proposed development and its upstream lands prior to draining to the Baker Subdivision.

3. POST-DEVELOPMENT CONDITIONS AND DRAINAGE

The re-aligned BR33 section is proposed to be constructed from the existing BR33 at a location approximately 190m to the south of the existing intersection with Baker Road, to BR25 at a location approximately 535m to the east of its existing intersection with BR25. The new, proposed BR25/BR33 intersection is in line with a planned extension of Bruce Street, as illustrated on Figure 1.

The approximately 990m re-aligned BR33 section is generally proposed to be constructed with a two-lane rural cross-section, transitioning to a two-lane plus a left-turn lane urban cross-section at the intersection of BR25. The northerly 200m of the BR33 re-alignment will drain northerly to the planned BR25 trunk storm sewer, intended to be constructed as Phase 1 of the implementation plan.

The section of the existing BR33 immediately to the south of Baker Road is proposed to be reconstructed as a cul-de-sac to maintain access to the private properties, although the design phase may alter the final configuration.

An approximately 90m long road with a two-lane rural cross-section is proposed to be constructed between the existing BR33 / Baker Road intersection and the proposed re-aligned BR33 to maintain access. All proposed roadworks include the construction of roadside ditches to convey the runoff from the roadways and their upstream lands.

At this time, no reconstruction is proposed for Baker Road west of its intersection with the existing BR33. The existing BR33, north of its intersection with Baker Road, is planned to be re-surfaced only.

The proposed re-aligned BR33 will intercept runoff from a portion of the lands upstream. The proposed grading of the roadway and roadside ditches generally will maintain the pre-development drainage tributary areas to each of the existing culverts on Lake Range Road (existing BR33).

The outlet provided by the existing BR33 culvert to the south of Baker Road is proposed to be replaced, ultimately by a planned storm sewer system through the Baker Subdivision that drains to Lake Huron. The planned storm sewer system, as a recommendation of the Master Plan, will be designed to convey the 5 year design flows associated with the Baker Subdivision area and its upstream lands. The currently proposed project includes the installation of the inlet section of the planned storm sewer. Therefore, the runoff draining to the inlet section of the storm sewer system is to be controlled to consider seasonal flooding issues within the Baker Subdivision.

Under proposed conditions, runoff from the proposed BR33 roadworks will drain to a proposed SWM facility.

The SWM facility is designed as a dry pond to provide temporary runoff storage to attenuate peak runoff rates. The outlet to the SWM facility constitutes the inlet section of the planned Baker Subdivision storm sewer system. Ultimately, attenuated outflows from the proposed SWM facility will drain via the planned storm sewer system to Lake Huron. In the interim, attenuated outflows will be conveyed by the existing ditch systems within the Baker Subdivision to Lake Huron.

4. QUANTITY CONTROL CRITERIA, PARAMETERS AND MODELLING

4.1 Design Rainfall Events

Rainfall data collected by Environment Canada for the Goderich area over the years from 1970 to 1980, and 1997 to 2007 were used to prepare IDF statistical rainfall data. The data was entered in the MIDUSS computer modeling software to generate coefficients for the Chicago type rainfall distribution patterns. The Chicago storm input parameters used to model the various design rainfall events for the subject property are summarized in the following Table 1.

Table 1 – Design Rainfall Events (Generated from Environment Canada IDF Data for Goderich)

| COEFFICIENT | 2-Year | 5-Year | 10-Year | 25-Year | 50-Year | 100-Year |
|-------------------|---------|---------|---------|---------|---------|----------|
| A | 1264.60 | 2258.60 | 3043.26 | 4026.22 | 4882.60 | 5607.28 |
| B | 10.288 | 14.090 | 16.180 | 17.817 | 19.202 | 19.798 |
| C | 0.8891 | 0.9265 | 0.9456 | 0.9604 | 0.9719 | 0.9772 |
| R | 0.375 | 0.375 | 0.375 | 0.375 | 0.375 | 0.375 |
| Duration (min) | 360 | 360 | 360 | 360 | 360 | 360 |
| Depth (mm) | 39.5 | 56.0 | 67.0 | 80.9 | 91.3 | 200.5 |
| Intensity (mm/hr) | 85.7 | 116.7 | 136.8 | 162.7 | 181.2 | 101.4 |

4.2 Site Soil Conditions

The soil type within the site is generally characterized as Berrien sandy loam, as per the Bruce County Soils Map (Ontario Soil Survey Report No. 16) published by the Department of Agriculture. Berrien sandy loam is known to be of the Hydrological Soil Group AB.

With consideration of the pre-development and post-development pervious ground cover of the roadway and its upstream lands, which could be defined as “crop and other improved land”, a Group AB soil is represented with an SCS Curve Number of 70 as per the MTO Drainage Manual’s Design Chart 1.09.

The impervious areas within all catchments are associated with an SCS Curve Number of 98.

4.3 Pre-Development Catchment Areas

For pre-development conditions analysis purposes, the approximately 48.45 ha area associated with the proposed roadworks and their upstream lands that drain to the Baker Subdivision are modelled as one (1) drainage catchment, described in Table 2 below, and as shown on Figure 2. The pre-development conditions MIDUSS computer modelling is attached in Appendix ‘A’.

Table 2 – Pre-Development Conditions Catchment

| Catchment | Description | Area (ha) | Impervious Level (%) |
|-----------|---|-----------|----------------------|
| 10 | Lands Draining to the Baker Subdivision | 48.45 | 0 |

The results of the existing conditions routing analysis are summarized in Section 4.5.

4.4 Post-Development Catchment Areas

For post-development conditions analysis purposes, the approximately 48.45 ha area associated with the proposed roadworks and their upstream lands that drain to the Baker Subdivision are modelled as two (2) drainage catchments, described in Table 3 below, and as shown on Figure 3. The post-development conditions MIDUSS computer modelling is attached in Appendix 'B'.

Table 3 – Post-Development Conditions Catchments

| Catchment | Description | Area (ha) | Impervious Level (%) |
|-----------|--|-----------|----------------------|
| 100 | Lands to the east of the re-aligned BR33 draining to the Baker Subdivision | 42.65 | 2 |
| 200 | Lands to the west of the re-aligned BR33 draining to the Baker Subdivision | 5.80 | 10 |

The results of the post-development conditions routing analysis are summarized in Section 4.5.

4.5 MIDUSS Quantity Control Modelling Results

MIDUSS modelling software was used to model the expected pre-development conditions and post-development conditions stormwater runoff draining to the Baker Subdivision under the various design storms. Results from the models are summarized in the following Tables 4 and 5, and the modelling is provided for reference in Appendix 'A' and 'B'.

Table 4 below provides the total peak flow rates discharging from the modelled catchments to the Baker Subdivision under pre-development conditions and the total post-development peak flow rates discharging to SWM facility prior discharging to the Baker Subdivision.

Table 4 – Summary of Peak Runoff Flow Results

| Catchments | Return Storm Frequency (yr) | | | | | |
|--|-----------------------------|--------------|--------------|--------------|--------------|--------------|
| | 2 | 5 | 10 | 25 | 50 | 100 |
| Pre-Development Conditions | | | | | | |
| Lands draining to the Baker Subdivision – Catch.10 (m ³ /s) | 0.096 | 0.318 | 0.543 | 0.909 | 1.243 | 1.604 |
| Post-Development Conditions | | | | | | |
| Lands to the east of the re-aligned BR33, draining to the Baker Subdivision – Catch. 100 (m ³ /s) | 0.095 | 0.305 | 0.518 | 0.864 | 1.183 | 1.516 |
| Lands to the west of the re-aligned BR33, draining to the Baker Subdivision – Catch. 200 (m ³ /s) | 0.091 | 0.144 | 0.184 | 0.242 | 0.309 | 0.398 |
| Total Uncontrolled Runoff Draining to SWM Facility (m³/s) | 0.172 | 0.349 | 0.591 | 0.984 | 1.325 | 1.729 |

From the total post-development peak flow rates draining to the SWM facility shown in Table 4, a conceptual SWM facility was designed within the MIDUSS modelling to estimate the active storage volume required to provide the required attenuation of peak flow rates discharging to the Baker Subdivision.

From the results of the modelling, an active storage volume of approximately 2500m³ is required to be provided within the SWM facility to achieve adequate attenuation of post-development peak flow rates to less than, or equal to, pre-development peak flow rates for all design storm events up to, and including, the 100 year return period.

With the assumption that the mean depth of the active storage volume is 1.25m, the footprint area of the SWM facility is expected to be approximately 2000m². Based on preliminary designs, it is believed that about 2400m² of area is available for the construction of the SWM facility.

5. STORMWATER QUALITY TREATMENT

Stormwater quality treatment for runoff draining to the Baker Subdivision is addressed via a treatment train approach. Runoff is conveyed and treated by Enhanced Grass Swales and further polished by the SWM facility which has been designed as a "dry pond".

The roadside ditches along the proposed roadworks have been generally designed to meet the criteria of an Enhanced Grass Swale as per the Low Impact Development Stormwater Management Planning and Design Guide¹ (LIDSWMP Design Guide) published by the Credit Valley Conservation Authority (CVCA) and the Toronto and Regional Conservation Authority (TRCA).

In general, the roadside ditches are designed with the maximum side slopes of 3:1 (H:V), a minimum of 0.85m wide bottom, and a longitudinal slope of about 0.5%. Table 6 below compares the characteristics of the maximum peak flow rate expected to be conveyed by the Enhanced Grass Swales (the peak flow rates from Catchment 100) during a 4 hour, 25mm Chicago storm even in comparison with the requirements set by the LIDSWMP Design Guide; MIDUSS modelling for the results are attached as Appendix 'C'.

Table 6 – Enhanced Grass Swale Design in Comparison to Requirements

| Characteristics | During 4 hour, 25mm Chicago Storm Event | |
|--|---|-------------|
| | As Designed* | As Required |
| Maximum depth of flow through Enhanced Grass Swale | 0.098 m | 0.100 m |
| Maximum flow velocity through Enhanced Grass Swale | 0.36 m/s | 0.50 m/s |

**Conservatively considers the flow through Catchment 100; the relatively lesser flows through Catchment 200 are expected to yield a more desirable treatment performance.*

¹ Publicly available online at: <http://www.creditvalleyca.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/low-impact-development-stormwater-management-planning-and-design-guide/>

As shown in Table 6, the design depth and velocity of flow through the Enhanced Grass Swale during a 4 hour, 25mm Chicago storm event meets the requirements of the LIDSWMP Design Guide. According to the CVCA and TRCA's LIDSWMP Design Guide, an Enhanced Grass Swale provides a median TSS removal rate of 76%.

The Enhanced Grass Swales convey runoff to the SWM facility where it is further polished. The SWM facility provides volume temporarily to store runoff. The attenuation provided by the outlet of the SWM facility reduces the velocity of flows through the SWM facility and encourages further settling out of suspended solids.

Overall, given the initial stormwater quality treatment provided by conveying runoff along the roadside ditches designed as Enhanced Grass Swales, and the further polishing provided by the SWM facility's temporary storage volume, it is expected that the runoff from the proposed roadworks will receive an enhanced water quality treatment level (80% TSS removal) prior to discharging to the Baker Subdivision.

6. SUMMARY

The County of Bruce proposes to reconstruct the existing BR25 roadway between Saugeen Beach Road and Goderich Street, as well as to construct a new roadway to re-align BR33 to intersect BR25 at a location approximately 535m to the east of its current intersection with BR25.

Seasonal flooding issues have been identified previously within the Baker Subdivision area. The drainage conditions of lands upstream of the Baker Subdivision, and consequently the Baker Subdivision, are expected to be maintained or improved by the construction of a proposed SWM facility as conceptualized within this SWM Design Brief.

Upon completion of the proposed development;

1. The construction of a SWM facility that provides a minimum active storage volume of 2000m³, and is generally designed as a dry pond, is expected to attenuate post-development peak flow rates discharging from the proposed BR33 re-alignment and upstream lands to less than, or equal to, pre-development conditions.
2. It is expected that sufficient area within the proposed development lands exists to construct the SWM facility.
3. Enhanced water quality treatment (80% TSS removal) is expected to be provided for runoff draining from the proposed development and its upstream lands prior to draining to the Baker Subdivision.

All of which is respectfully submitted,

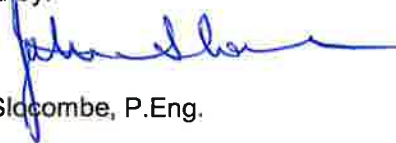
GM BLUEPLAN ENGINEERING LIMITED

Per:



Alexander C. Wilkinson, E.I.T.

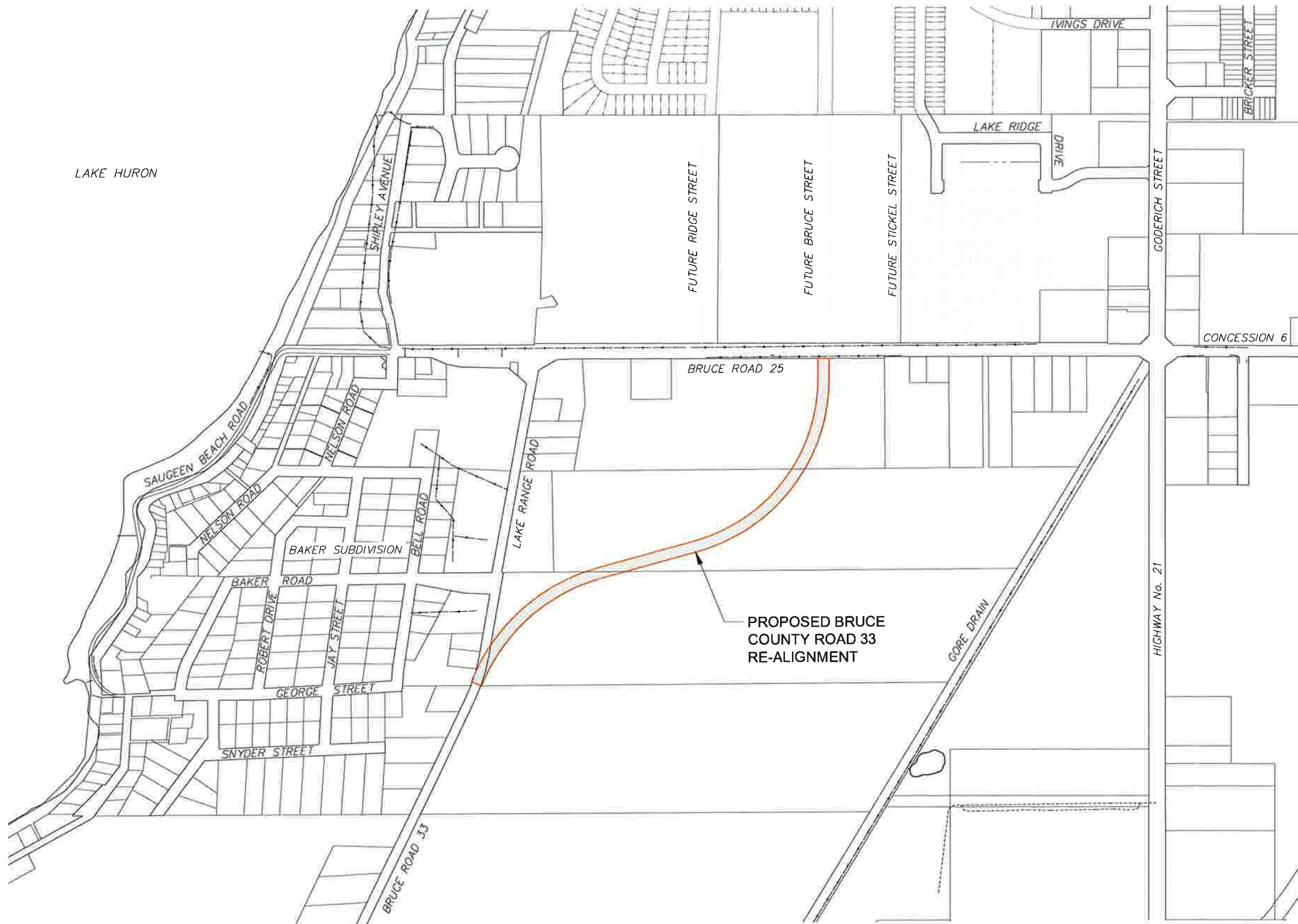
Reviewed by:



John B. Slodcombe, P.Eng.

FIGURES:

217127
Bruce County Road 33
Town of Saugeen Shores

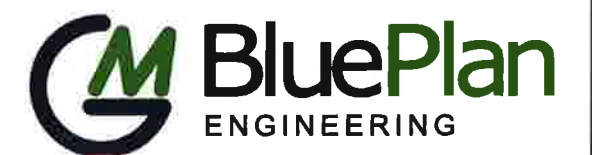


NOT TO SCALE
APRIL 2018

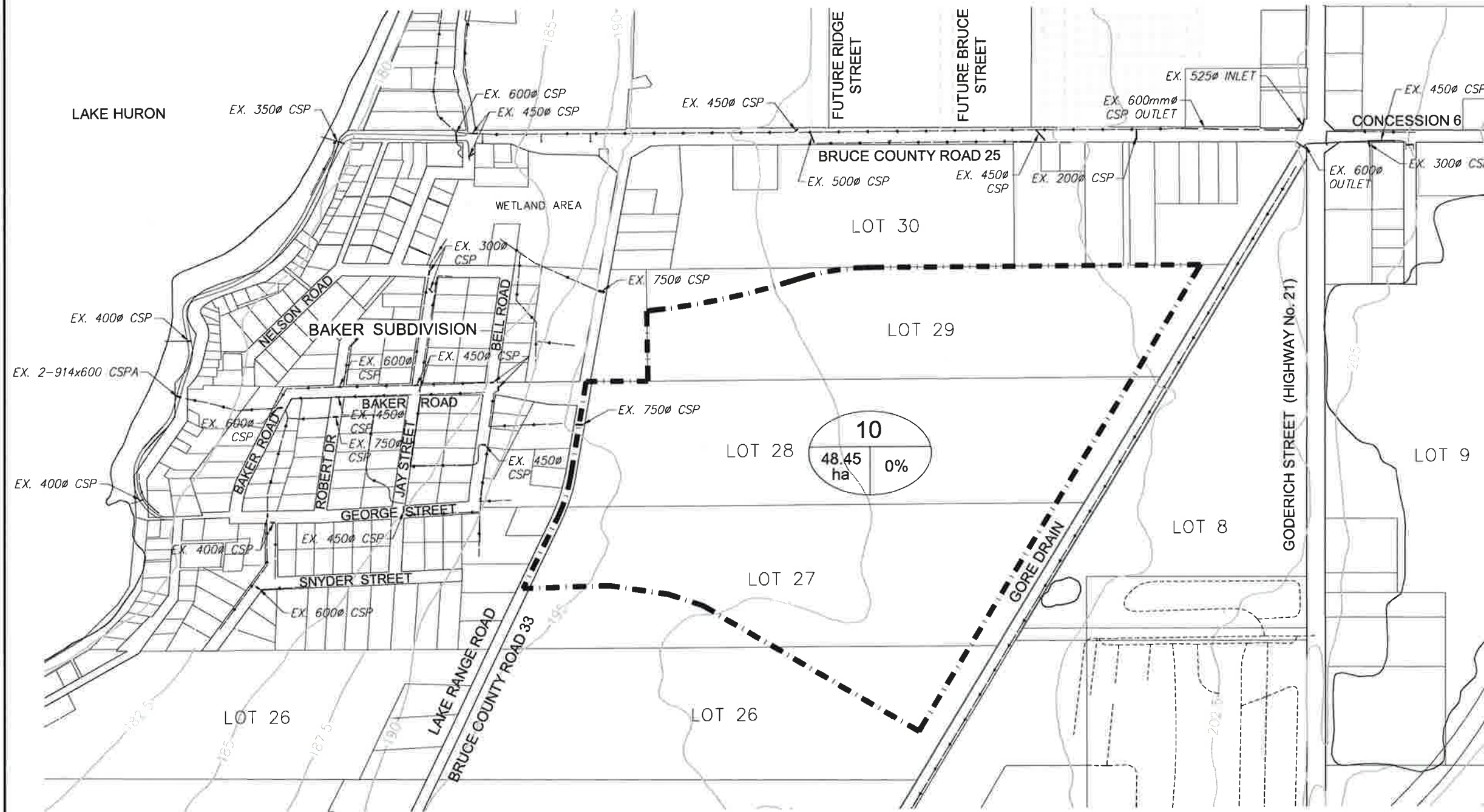
SITE LOCATION PLAN

BRUCE COUNTY
ROAD 33 RE-ALIGNMENT

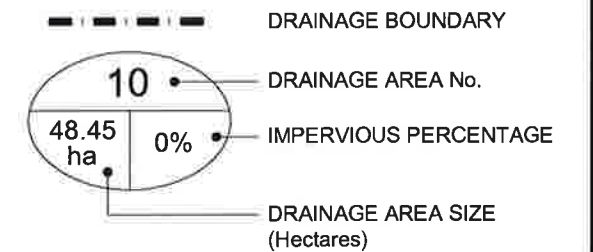
Figure No. 1



217127
Bruce County Road 33
Town of Saugeen Shores



LEGEND



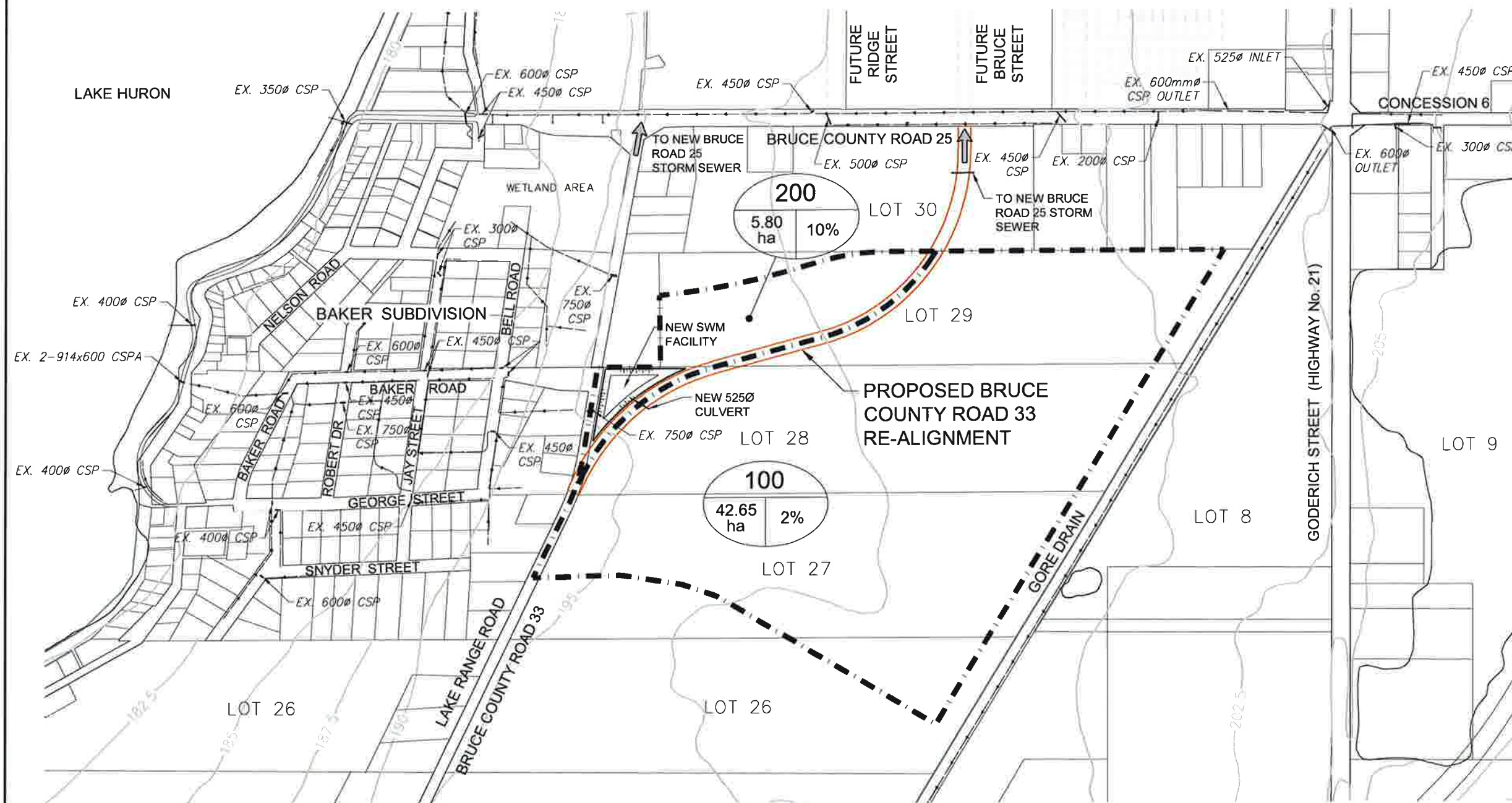
SCALE 1:7,500
APRIL 2018

**PRE-DEVELOPMENT
DRAINAGE AREAS**

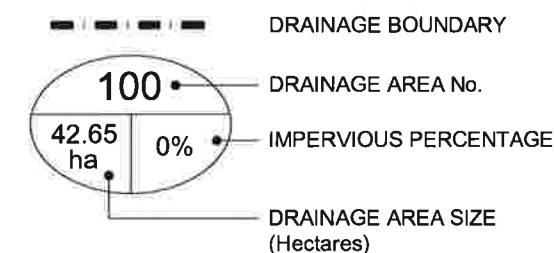
**BRUCE COUNTY
ROAD 33 RE-ALIGNMENT**

Figure No. 2

217127
Bruce County Road 33
Town of Saugeen Shores



LEGEND



SCALE 1:7,500
APRIL 2018

**POST-DEVELOPMENT
DRAINAGE AREAS**

**BRUCE COUNTY
ROAD 33 RE-ALIGNMENT**

Figure No. 3

APPENDIX A:
MIDUSS MODELLING – PRE-DEVELOPMENT CONDITIONS


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217127 - Pre 2 year - AW - Nov17
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MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8\users_private\aw\kinson\documents\
MIDUSS\217127
Output filename: 217127 - Pre 2 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Date & Time last used: 11/24/2017 at 5:43:19 PM
TIME PARAMETERS
Time Step 11/24/2017 at 5:43:19 PM
360,000 Max. Storm length"
2400,000 Max. Hydrograph"
STORM Chicago storm"
1 Chicago storm"
1264,600 Coefficient A"
10,288 Constant B"
0,889 Exponent C"
0,375 Fraction R"
360,000 Duration"
1,000 Time step multiplier"
Maximum intensity 85.761 mm/hr"
Total depth 39.507 mm"
6 CATCHMENT 10" Hydrograph extension used in this file"
1 Triangular SCS"
1 Equal length"
1 SCS method"
Lands Draining to the Baker Subdivision"
10
0,000 % Impervious"
48,450 Total Area"
700,000 Flow length"
0,500 Overland Slope"
48,450 Pervious Area"
700,000 Pervious length"
0,500 Pervious slope"
0,000 Impervious Area"
700,000 Impervious length"
0,500 Impervious slope"
0,250 Pervious Manning "n"
70,000 Pervious SCS Curve No.
0,151 Pervious Runoff coefficient"
0,100 Pervious Ia/s coefficient"
10,886 Pervious initial abstraction"
0,015 Impervious Manning "n"
98,000 Impervious SCS Curve No.
0,000 Impervious Runoff coefficient"
0,100 Impervious Ia/s coefficient"
0,518 Impervious initial abstraction"
0,096 0,000 0,000
Catchment 10 Pervious 0,000 c.m/sec"
Surface Area 48,450 Total Area "
Time of concentration 336,643 24,410 336,641 hectare"
Rainfall depth 595,796 199,271 595,794 minutes"
Rainfall volume 39,507 39,507 39,507 mm"
Rainfall losses 1,9141 0,0000 1,9141 ha-m"
Runoff depth 33,548 5,152 33,548 mm"
Runoff volume 2886,88 34,355 2886,89 c.m"
Runoff coefficient 0,151 0,000 0,151 c.m/sec"
Maximum flow 0,096 0,000 0,096
4 HYDROGRAPH Add Runoff "
HYDROGRAPH Add Runoff " 0,096 0,000 0,000"
HYDROGRAPH Copy to outflow"
8 Copy to outflow" 0,096 0,000 0,000"
HYDROGRAPH Combine 1"
6 Combine "
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0,096 c.m/sec"

```

```

217127 - Pre 2 year - AW - Nov17
-----
Hydrograph volume 0.096 0.096 0.096"
START/RE-START TOTALS 10"
Runoff totals on EXIT"
Total Catchment area 48,450 hectare"
Total Impervious area 0,000 hectare"
Total % Impervious 0,000"
EXIT"

```



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31 MIDUSS Output ----- 217127 - Pre 5 year - AW - Nov17
32 MIDUSS version Version 2.25 rev. 473
33 MIDUSS created Sunday, February 07, 2010
34 Units used: \\\os-2k8\users\private\awilkinson\Documents\
35 Job folder: MIDUSS\217127
36 Output filename: 217127 - Pre 5 year - AW - Nov17.out
37 Licensee name: gmbp
38 Company Hewlett-Packard Company
39 Date & Time last used: 11/24/2017 at 5:45:26 PM
40
41 TIME PARAMETERS
42 10.000 Time step
43 360.000 Max. Storm length"
44 2400.000 Max. Hydrograph"
45
46 1 STORM Chicago storm"
47 1 Chicago storm"
48 2258.600 Coefficient A"
49 14.090 Constant B"
50 0.927 Exponent C"
51 0.375 Fraction R"
52 360.000 Duration"
53 1.000 Time step multiplier"
54
55 Maximum intensity 116.710 mm/hr"
56 Total depth 55.992 mm"
57
58 6 005hyd Hydrograph extension used in this file"
59 CATCHMENT 10"
60 1 Triangular SCS"
61 1 Equal length"
62 1 SCS method"
63 10 Lands Draining to the Baker Subdivision"
64
65 0.000 % Impervious"
66 48.450 Total Area"
67 700.000 Flow length"
68 0.500 Overland Slope"
69 48.450 Pervious Area"
70 700.000 Pervious length"
71 0.500 Pervious slope"
72 0.000 Impervious Area"
73 700.000 Impervious length"
74 0.500 Impervious slope"
75 0.250 Pervious Manning "n""
76 70.000 Pervious SCS Curve No."
77 0.236 Pervious Runoff coefficient"
78 0.100 Pervious Ia/S coefficient"
79 10.886 Pervious Initial abstraction"
80 0.015 Impervious Manning "n""
81 98.000 Impervious SCS Curve No."
82 0.000 Impervious Runoff coefficient"
83 0.100 Impervious Ia/S coefficient"
84 0.518 Impervious Initial abstraction"
85
86 0.318 0.000 0.000 0.000 c.m/sec"
87
88 Catchment 10 pervious Total Area
89 Surface Area 48.450 0.000 48.450 hectare"
90 Time of concentration 229.455 21.299 229.454 minutes"
91 Time to centroid 463.816 191.063 463.815 minutes"
92 Rainfall depth 55.992 55.992 mm"
93 Rainfall volume 2.7128 0.0000 2.7128 ha-m"
94 Rainfall losses 42.779 5.391 42.779 mm"
95 Runoff depth 13.213 50.602 13.213 mm"
96 Runoff volume 6401.59 0.02 6401.62 c.m"
97 Runoff coefficient 0.236 0.000 0.236 c.m/sec"
98 Maximum flow 0.318 0.000 0.318 c.m/sec"
99
100 4 Add Runoff " 0.318 0.000 0.000"
101 HYDROGRAPH Add Runoff "
102 4 0.318
103 HYDROGRAPH Copy to Outflow"
104 8 Copy to Outflow" 0.318 0.000"
105
106 HYDROGRAPH combine 1"
107 6 Combine "
108 1 Node #
109 Total Runoff Draining to Baker Subdivision"
110 Maximum flow 0.318 c.m/sec"

```

```

38 Hydrograph volume 0.318
39 START/RE-START TOTALS 10"
40 3 Runoff Totals on EXIT"
41 Total Catchment area 48.450 hectare"
42 Total Impervious area 0.000 hectare"
43 Total % impervious 0.000"
44 EXIT"

```


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|-----------------------------|---------------------------|------------------|
| Hydrograph volume | 217127 - Pre 10 year - AW | Nov17 |
| | 0.543 | 9251.898 |
| | 0.543 | c.m ³ |
| 3 START/RE-START TOTALS 10" | 0.543 | 0.543" |
| Runoff Totals on EXIT" | | |
| Total Catchment area | | 48.450 |
| Total Impervious area | | 0.000 |
| Total % impervious | | 0.000" |
| EXIT" | | |
| hectare" | | hectare" |
| hectare" | | hectare" |


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217127 - Pre 25 year - AW - Nov17
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8\users_private\aw\kinson\Documents\
MIDUSS\217127
Output filename: 217127 - Pre 25 year - AW - Nov17.out
Licensee name: gmbp
Company Hewlett-Packard Company
Date & Time last used: 11/24/2017 at 5:48:47 PM
TIME PARAMETERS
31 10.000 Time Step
360.000 Max. Storm length
2400.000 Max. Hydrograph
32 STORM Chicago storm
1 Chicago storm
Coefficient A
17.817 Constant B
0.360 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 162.743 mm/hr
Total depth 80.877 mm
6 02Shyd Hydrograph extension used in this file"
33 CATCHMENT 10
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands draining to the Baker Subdivision"
0.000 % Impervious
48.450 Total Area
700.000 Flow length
0.500 Overland Slope
48.450 Pervious Area
700.000 Pervious length
0.500 Pervious slope
0.000 Impervious Area
700.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.339 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction"
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction"
0.909 0.000 0.000 c.m/sec"
Catchment 10 Pervious Impervious Total Area
Surface Area 48.450 0.000 48.450 hectare"
Time of concentration 163.504 18.494 163.503 minutes"
Time to centroid 380.942 184.158 380.942 minutes"
Rainfall depth 80.877 80.877 80.877 mm"
Rainfall volume 3.9185 0.0000 3.9185 ha-m"
Rainfall losses 53.491 5.695 53.491 mm"
Runoff depth 27.387 75.182 27.387 mm"
Runoff volume 1.3269 0.0000 1.3269 ha-m"
Runoff coefficient 0.339 0.000 0.339 c.m/sec"
Maximum flow
4 HYDROGRAPH Add Runoff "
4 Add Runoff " 0.909 0.000 0.000"
HYDROGRAPH Copy to Outflow"
8 Copy to Outflow" 0.909 0.909 0.000"
HYDROGRAPH Combine 1"
6 Combine "
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0.909 c.m/sec"

```

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217127 - Pre 25 year - AW - Nov17
Hydrograph volume 0.909 0.909 c.m"
START/RE-START TOTALS 10"
3 Runoff Totals on EXIT" 48.450 hectare"
Total Catchment area 0.000 hectare"
Total Impervious area 0.000"
Total % impervious EXIT"

```


217127 - Pre 50 year - AW - Nov17
Hydrograph volume 1.243 16546.217 c.m.
START/RE-START TOTALS 10" 1.243
3 Runoff Totals on EXIT" 48,450
Total Catchment area 0.000
Total Impervious area 0.000
Total % impervious
EXIT"

217127 - Pre 50 year - AW - Nov17
MIDUSS Output Version 2.25 rev. 473
MIDUSS version Sunday, February 07, 2010
Units created 1e METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\MIDUSS\217127
Output filename: 217127 - Pre 50 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Date & Time last used: 11/24/2017 at 5:52:36 PM
TIME PARAMETERS
Time Step 10.000
Max. Storm length 360.000
Max. Hydrograph 2400.000
1 STORM Chicago storm
4882.600
Coefficient A 19.202
Constant B 0.973
Exponent C 0.373
Fraction R 360.000
Duration 1.000
Time step multiplier 181.226 mm/hr
Maximum intensity 91.285
Total depth
6 050hyd Hydrograph extension used in this file"

33
CATCHMENT 10"
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands Draining to the Baker Subdivision
0.000
% Impervious
48.450 Total Area
700.000 Flow length
0.500 Overland Slope
48.450 Pervious Area
700.000 Pervious length
0.500 Pervious Slope
0.000 Impervious Area
700.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.374 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
1.243 0.000 0.000 0.000 c.m/sec
Catchment 10 Pervious 48.450 0.000 48.450
Surface Area 48.450 0.000 48.450 hectare
Time of concentration 148.469 17.683 148.469 minutes
Time to Centroid 360.253 182.112 360.253 minutes
Rainfall depth 91.285 91.285 mm
Rainfall volume 4.4227 0.000 4.4227 ha-m
Rainfall losses 57.134 5.396 57.134 mm
Runoff depth 34.131 85.889 34.131 mm
Runoff volume 1.6546 0.000 1.6546 ha-m
Runoff coefficient 0.374 0.000 0.374
Maximum flow 1.243 0.000 1.243 c.m/sec
4 Add Runoff "

40
HYDROGRAPH Copy to Outflow"
8 Copy to Outflow" 1.243 1.243 0.000"
HYDROGRAPH Combine 1"
6 Combine "
1 Node #"
Total Runoff Draining to Baker Subdivision" 1.243 c.m/sec
Maximum flow

217127 - Pre 100 year - AW - Nov17
Hydrograph Volume 1.604 19916.957 c.m
1.604 1.604
START/RE-START TOTALS 10"
3 Runoff Totals on EXIT"
Total Catchment area 48,450 hectare"
Total Impervious area 0.000 hectare"
Total % impervious 0.000"
EXIT"

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APPENDIX B:
MIDUSS MODELLING – POST-DEVELOPMENT CONDITIONS


```

217127 - Post 2 year - AW - Nov17
-----
MIDUSS output
MIDUSS version      Version 2.25 rev. 473
MIDUSS created      Sunday, February 07, 2010
Job folder:         \\os-2k8\users_private\awilkinson\Documents\
                    MIDUSS\217127
Output filename:     217127 - Post 2 year - AW - Nov17.out
Licensee name:       Hewlett-Packard Company
Date & Time last used: 11/24/2017 at 6:30:28 PM
TIME PARAMETERS
Time Step           10.000
Max. Storm length   360.000
Max. Hydrograph     2400.000
STORM Chicago storm
Coefficient A        1264.600
Constant B          10.288
Exponent C          0.889
Fraction R          0.375
Duration            360.000
Time step multiplier 1.000
Maximum intensity   85.735 mm/hr
Total depth         39.484 mm
6 002Hyd Hydrograph extension used in this file"
33 1 Triangular SCS
1 Equal length"
1 SCS method"
100 Lands to the East of the Re-Aligned BR33 Draining to the Baker
Subdivision"
% Impervious"
2.000
Total Area"
42.650
Flow length"
600.000
Overland Slope"
0.500
Pervious Area"
41.797
Pervious length"
600.000
Pervious slope"
0.500
Impervious Area"
0.853
Impervious length"
600.000
Impervious slope"
0.500
Pervious Manning "n"
0.250
Pervious SCS Curve No.
0.151
Pervious Runoff coefficient"
0.100
Pervious Ia/S coefficient"
10.886
Pervious Initial abstraction"
0.015
Impervious Manning "n"
98.000
Impervious SCS Curve No.
0.864
Impervious Runoff coefficient"
0.100
Impervious Ia/S coefficient"
0.518
Impervious Initial abstraction"
0.095
Catchment 100
Surface Area
41.797
Time of concentration
307.043
Time to Centroid
559.964
Rainfall depth
39.484
Rainfall volume
1.6303
Rainfall losses
5.960
Runoff depth
2486.75
Runoff volume
292.90
Runoff coefficient
0.151
Maximum flow
0.870
HYDROGRAPH Add, Runoff "
0.095
4 Add Runoff "
0.095
0.000
0.000
0.000
CATCHMENT 200"
1 Triangular SCS"
1 Equal length"
1 SCS method"
200 Lands to the west of the Re-Aligned BR33 Draining to the Baker
Subdivision"
10.000
% Impervious"

```

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217127 - Post 2 year - AW - Nov17
-----
Total Area"
150.000
Flow length"
0.500
Overland Slope"
5.220
Pervious Area"
150.000
Pervious length"
0.500
Pervious slope"
150.000
Impervious Area"
0.500
Impervious length"
0.500
Impervious slope"
0.250
Pervious Manning "n"
70.000
Pervious SCS Curve No.
0.151
Pervious Runoff coefficient"
0.100
Pervious Ia/S coefficient"
10.886
Pervious Initial abstraction"
0.015
Impervious Manning "n"
98.000
Impervious SCS Curve No.
0.864
Impervious Runoff coefficient"
0.100
Impervious Ia/S coefficient"
0.518
Impervious Initial abstraction"
0.095
Catchment 200
Surface Area
5220
Time of concentration
135.848
Time to Centroid
349.893
Rainfall depth
39.484
Rainfall volume
2061.04
Rainfall losses
33.535
Runoff depth
5.948
Runoff volume
310.50
Runoff coefficient
0.151
Maximum flow
0.864
HYDROGRAPH Add, Runoff "
0.023
4 Add Runoff "
0.172
0.000
0.000
POND DESIGN"
0.172
Current peak flow c.m/sec"
1.604
Target outflow c.m/sec"
3288.1
Hydrograph volume c.m"
0.000
Number of stages"
1.000
Minimum water level metre"
1.000
Maximum water level metre"
0.000
Starting water level metre"
Keep design data: 1 = True; 0 = False"
Level Discharge Volume"
0.000
0.6250
0.09600
470.000"
1.250
1.604
2500.000"
Peak outflow 0.096 c.m/sec"
Maximum level 0.624 metre"
Maximum storage 469.025 c.m"
Centroidal lag 9.437 hours"
0.091
0.172
0.096
0.000 c.m/sec"
40 HYDROGRAPH 1"
6 Combine "
1 Node #"
Total Runoff Draining to Baker Subdivision"
Hydrograph volume 3288.095 c.m"
START/RE-START TOTALS 200"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare"
Total Impervious area 1.433 hectare"
Total % Impervious 2.958"
EXIT"

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217127 - Post 5 year - AW - Nov17
-----
MIDUSS Output
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: \\os-2k8\users\private\awilkinson\Documents\ie METRIC
Job folder: MIDUSS\217127
Output filename: 217127 - Post 5 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Date & Time last used: 11/24/2017 at 6:32:45 PM

TIME PARAMETERS
Time step 10.000
Max. storm length 360.000
Max. Hydrograph 2400.000
STORM Chicago storm
Coefficient A 2258.600
Constant B 14.090
Exponent C 0.927
Fraction R 0.375
Duration 360.000
Time step multiplier 1.000
Maximum intensity 116.710 mm/hr
Total depth 55.992 mm
6.00SHyd Hydrograph extension used in this file"
CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method
100 Lands to the East of the Re-Aligned BR33 Draining to the Baker
Subdivision"
2.000 % Impervious
42.650 Total Area
600.000 Flow length
0.500 Overland Slope
41.797 Pervious Area
600.000 Pervious length
0.500 Pervious slope
0.853 Impervious Area
600.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.236 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning 'n'
98.000 Impervious SCS Curve No.
0.899 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.305 Pervious
0.000 Impervious
Catchment 100 Pervious
Surface Area 41.797
Time of concentration 209.184
Time to Centroid 438.814
Rainfall depth 55.992
Rainfall volume 2.3403
Rainfall losses 2.3403
Runoff depth 15.213
Runoff volume 532.44
Runoff coefficient 0.236
Maximum flow 0.299
HYDROGRAPH Add, Runoff " 0.299
4 Add Runoff " 0.305 0.000 0.000"
CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
200 Lands to the west of the Re-Aligned BR33 Draining to the Baker
Subdivision"
10.000 % Impervious

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217127 - Post 5 year - AW - Nov17
-----
Total Area 5.800
Flow length 150.000
Overland Slope 0.500
Pervious Area 41.797
Pervious length 600.000
Pervious slope 0.500
Impervious Area 0.586
Impervious length 150.000
Impervious slope 0.500
Pervious Manning 'n' 0.250
Pervious SCS Curve No. 70.000
Pervious Runoff coefficient 0.236
Pervious Ia/S coefficient 0.100
Pervious Initial abstraction 10.886
Impervious Manning 'n' 0.015
Impervious SCS Curve No. 98.000
Impervious Runoff coefficient 0.896
Impervious Ia/S coefficient 0.100
Impervious Initial abstraction 0.518
Catchment 200 Pervious
Surface Area 52.200
Time of concentration 212.453
Time to Centroid 438.814
Rainfall depth 55.992
Rainfall volume 2.3403
Rainfall losses 2.3403
Runoff depth 15.213
Runoff volume 532.44
Runoff coefficient 0.236
Maximum flow 0.299
HYDROGRAPH Add, Runoff " 0.299
4 Add Runoff " 0.305 0.000 0.000"
POND DESIGN"
0.144 0.349 0.000 0.000"
54 Current peak flow c.m/sec
1.604 Target outflow c.m/sec
6932.3 Hydrograph volume c.m
0.000 Number of stages metre
1.000 Minimum water level metre
0.000 Maximum water level metre
0.000 Starting water level metre
Keep Design Data: 1 = True; 0 = False
Level Discharge Volume
0.6250 0.09600 470.000"
1.250 1.604 2500.000"
Peak outflow 0.334 c.m/sec
Maximum level 0.724 metre
Maximum storage 790.348 c.m
Centroidal lag 7.566 hours
0.144 0.349 0.334 0.000 c.m/sec"
40 HYDROGRAPH " Combine 1"
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0.334 c.m/sec
Hydrograph volume 6933.469 c.m
0.144 0.334 0.334"
38 START/RE-START TOTALS 200"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare
Total Impervious area 1.433 hectare
Total % Impervious 2.958"
EXIT"

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217127 - Post 10 year - AW - Nov17
-----
MIDUSS Output:
MIDUSS version: Version 2.25 rev. 473
MIDUSS created: Sunday, February 07, 2010
Units used: \\os-2k8\users_private\awilkinson\Documents\
MIDUSS\217127
Job folder:
Output filename: 217127 - Post 10 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Company: gmbp
Date & Time last used: 11/24/2017 at 6:34:46 PM
TIME PARAMETERS:
31 10.000 Time Step 136.818 mm/hr
360.000 Max. Storm length
2400.000 Max. Hydrograph
32 STORM Chicago storm
1 Chicago storm
3043.260 Coefficient A
16.180 Constant B
0.946 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 136.818 mm/hr
Total depth 67.019 mm
6 CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method
1 Lands to the East of the Re-Aligned BR33 Draining to the Baker
Subdivision 100
% Impervious
2.000 Total Area
42.650 Flow length
600.000 Overland Slope
0.500 Pervious Area
41.797 Pervious length
600.000 Pervious slope
0.500 Impervious Area
0.853 Impervious length
600.000 Impervious Manning "n"
0.500 Pervious Manning "n"
0.230 Pervious SCS Curve No.
0.285 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.918 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.518 Catchment 100
Surface Area 41.797 Pervious
Time of concentration 175.825
Rainfall depth 397.300
Rainfall volume 67.019
Rainfall losses 2.8012
Runoff depth 19.094
Runoff volume 7980.69
Runoff coefficient 0.285
Maximum flow 524.58
HYDROGRAPH Add Runoff " 0.518 0.000 0.000 0.000"
4 Add Runoff " 0.518 0.518 0.000 0.000"
CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
200 Lands to the west of the Re-Aligned BR33 Draining to the Baker
Subdivision 10.000 % Impervious

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217127 - Post 10 year - AW - Nov17
-----
Total Area 5.800
Flow length 150.000
Overland Slope 0.500
Pervious Area 5.220
Pervious length 150.000
Pervious slope 0.500
Impervious Area 0.580
Impervious length 150.000
Impervious Manning "n" 0.500
Pervious SCS Curve No. 0.230
Pervious Runoff coefficient 0.285
Pervious Ia/S coefficient 0.100
Pervious Initial abstraction 10.886
Impervious Manning "n" 0.015
Impervious SCS Curve No. 98.000
Impervious Runoff coefficient 0.903
Impervious Ia/S coefficient 0.100
Impervious Initial abstraction 0.518
Catchment 200
Surface Area 5.220
Time of concentration 76.532
Rainfall depth 272.413
Rainfall volume 3498.38
Rainfall losses 47.938
Runoff depth 19.080
Runoff volume 996.00
Runoff coefficient 0.285
Maximum flow 0.128
HYDROGRAPH Add Runoff " 0.184 0.518 0.000 0.000"
4 Add Runoff " 0.184 0.591 0.000 0.000"
POND DESIGN
0.591 Current peak flow c.m/sec
1.604 Target outflow c.m/sec
9852.1 Hydrograph volume c.m
3 Number of stages metre
0.000 Minimum water level metre
1.000 Maximum water level metre
0.000 Starting water level metre
Keep Design Data: I = True; O = False
Level discharge volume 0.000
0.6250 0.09600 470.000
1.250 1.604 2500.000
Peak outflow 0.560 c.m/sec
Maximum level 0.818 metre
Maximum storage 1095.426 c.m
Centroidal lag 6.881 hours
0.184 0.591 0.560 0.000 c.m/sec
HYDROGRAPH Combine 1
6 Combine " Node #
Total Runoff Draining to Baker Subdivision
Maximum flow 0.560 c.m/sec
Hydrograph volume 9850.785 c.m
0.184 0.591 0.560 0.560"
3 START/RE-START TOTALS 200
Runoff totals on EXIT
Total Catchment area 48.450 hectare
Total Impervious area 1.433 hectare
Total % impervious 2.958
EXIT

```


217127 - Post 25 year - AW - Nov17

MIDUSS Output
MIDUSS version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: 1e METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\217127\MIDUSS\217127
Output filename: 217127 - Post 25 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Company: gmbp
Date & Time last used: 11/24/2017 at 6:36:32 PM

TIME PARAMETERS

31 10.000 Time step
360.000 Max. Storm length
2400.000 Max. Hydrograph
1 STORM Chicago storm
4026.220 Coefficient A
17.817 Constant B
0.960 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 162.743 mm/hr
Total depth 80.877 mm

CATCHMENT 100 Hydrograph extension used in this file

33 1 Triangular SCS
1 Equal length
1 SCS method
100 Lands to the East of the Re-Aligned BR33 Draining to the Baker Subdivision

2.000 % Impervious
42.650 Total Area
600.000 Flow length
0.500 Overland Slope
41.797 Pervious Area
600.000 Pervious length
0.500 Pervious Slope
0.853 Impervious Area
600.000 Impervious length
0.500 Impervious Slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.339 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.933 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction

40 CATCHMENT 100 Pervious
Surface Area 41.797
Time of concentration 149.060
Time to Centroid 362.600
Rainfall depth 80.877
Rainfall volume 33804
Rainfall losses 23380
Runoff depth 27387
Runoff volume 1.1447
Runoff coefficient 0.339
Maximum flow 0.933
HYDROGRAPH Add Runoff " 0.852
Add Runoff " 0.864
0.864 0.000 0.852 0.000 0.000 0.000 0.000 c.m/sec"

33 CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
200 Lands to the West of the Re-Aligned BR33 Draining to the Baker Subdivision
10.000 % Impervious

217127 - Post 25 year - AW - Nov17

5.800 Total Area
150.000 Flow length
0.500 Overland Slope
5.220 Pervious Area
150.000 Pervious length
0.500 Pervious Slope
0.580 Impervious Area
150.000 Impervious length
0.500 Impervious Slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.339 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.909 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.242 0.864 0.000 0.000 0.000 c.m/sec"

40 CATCHMENT 200 Pervious
Surface Area 5.220
Time of concentration 64.882
Time to Centroid 255.738
Rainfall depth 80.877
Rainfall volume 4221.80
Rainfall losses 53.500
Runoff depth 27.377
Runoff volume 1429.09
Runoff coefficient 0.339
Maximum flow 0.909
HYDROGRAPH Add Runoff " 0.208
Add Runoff " 0.242 0.984 0.000 0.000 0.000 c.m/sec"

POND DESIGN

54 0.984 Current peak flow c.m/sec
1.604 Target outflow c.m/sec
13945.7 Hydrograph volume c.m
3 Number of stages
0.000 Minimum water level metre
1.000 Maximum water level metre
0.000 Starting water level metre
0 Keep Design Data: 1 = True; 0 = False
Level Discharge Volume
0.6250 0.09600 470.000
1.250 1.604 2500.000
Peak outflow 0.922 c.m/sec
Maximum level 0.967 metre
Maximum storage 1582.424 c.m
Centroidal lag 6.301 hours
0.242 0.984 0.922 0.000 c.m/sec"

40 HYDROGRAPH Combine
1 Node #
Total Runoff Draining to Baker Subdivision
Maximum flow 0.922 c.m/sec
Hydrograph volume 13949.215 c.m
START/RE-START TOTALS 200
3 Runoff Totals on EXIT
Total Catchment area
Total Impervious area
Total % Impervious
EXIT
48.450 hectare
1.433 hectare
2.958


```

31 MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: 1e METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\
MIDUSS\217127
Output filename: 217127 - Post 50 year - AW - Nov17.out
Licensee name: Hewlett-Packard Company
Company gmop
Date & Time last used: 11/24/2017 at 6:37:59 PM
TIME PARAMETERS
31 10.000 Time Step
360.000 Max. Storm length"
2400.000 Max. Hydrograph"
32 STORM Chicago storm"
1 Chicago storm"
4882.600 Coefficient A"
19.202 Constant B"
0.972 Exponent C"
0.375 Fraction R"
360.000 Duration"
1.000 Time step multiplier"
Maximum intensity 181.226 mm/hr"
Total depth 91.285 mm"
6 CATCHMENT 100"
1 Triangular SCS"
1 Equal length"
1 SCS method"
33 Lands to the East of the Re-Aligned BR33 Draining to the Baker
100 % Impervious"
2.000 Total Area"
42.650 Flow length"
600.000 Overland Slope"
0.500 Pervious Area"
41.797 Pervious length"
600.000 Pervious slope"
0.500 Impervious Area"
0.853 Impervious length"
600.000 Impervious slope"
0.500 Pervious Manning "n"
0.250 Pervious SCS Curve No.
0.374 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
10.886 Pervious Initial abstraction"
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.938 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
0.000 c.m./sec"
Subdivision"
CATCHMENT 100 Pervious 0.000 c.m./sec"
Surface Area 41.797 Impervious Total Area
Time of concentration 135.353 42.650
Rainfall depth 343.590 16.120
Rainfall volume 91.285 180.126
Rainfall losses 3.815 335.632
Runoff depth 37.135 91.285
Runoff volume 34.132 5.649
Runoff coefficient 1.4275 56.103
Maximum flow 0.374 85.635
HYDROGRAPH Add Runoff " 1.167 0.0730
4 Add Runoff " 1.183 0.295 1.5005
1.183 0.000 0.000 c.m./sec"
CATCHMENT 200"
1 Triangular SCS"
1 Equal length"
1 SCS method"
200 Lands to the west of the Re-Aligned BR33 Draining to the Baker
10.000 % Impervious"

```

```

5.800 Total Area"
150.000 Flow length"
0.500 Overland Slope"
5.220 Pervious Area"
150.000 Pervious length"
0.500 Pervious slope"
0.580 Impervious Area"
150.000 Impervious length"
0.500 Impervious slope"
0.500 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.374 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
10.886 Pervious Initial abstraction"
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.938 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
0.000 c.m./sec"
CATCHMENT 200 Pervious 0.000 c.m./sec"
Surface Area 5.220 Impervious Total Area
Time of concentration 58.916 0.380
Rainfall depth 246.510 7.017
Rainfall volume 91.285 166.943
Rainfall losses 4765.06 229.443
Runoff depth 34.134 91.285
Runoff volume 1781.79 529.45
Runoff coefficient 0.374 7.392
Maximum flow 0.284 52.175
HYDROGRAPH Add Runoff " 0.216 83.892
4 Add Runoff " 1.325 486.58
1.325 0.000 0.000 c.m./sec"
POND DESIGN"
1.325 Current peak flow c.m./sec"
1.604 Target outflow c.m./sec"
172733 Hydrograph volume c.m"
3. Number of stages" metre"
0.000 Minimum water level metre"
1.000 Maximum water level metre"
0.000 Starting water level metre"
0 Keep Design Data: 1 = True; 0 = False"
Level Discharge Volume"
0.6250 0.09600 470.000"
1.250 1.604 2500.000"
Peak outflow 1.247 c.m./sec"
Maximum level 1.102 metre"
Maximum storage 2019.060 c.m"
Centroidal lag 5.985 hours"
0.309 1.325 1.247 0.000 c.m./sec"
6 HYDROGRAPH Combine 1"
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 1.247 c.m./sec"
Hydrograph volume 17268.881 c.m"
1.247 1.247"
3 START/RE-START TOTALS 200"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare"
Total Impervious area 1.433 hectare"
Total % Impervious 2.958"
EXIT"

```


MIDUSS Output
 MIDUSS version Version 2.25 rev. 473
 MIDUSS created Sunday, February 07, 2010
 Units used: \\os-2k8\users_private\aw\lkinson\Documents\ MIDUSS\217127.out
 Job folder:
 Output filename: 217127 - Post 100 year - AW - NOV17.out
 Licensee name: Hewlett-Packard Company
 Date & Time last used: 11/24/2017 at 6:16:16 PM

10

TIME PARAMETERS

31 10,000 Time step
 360,000 Max. storm length
 2400,000 Max. Hydrograph
 1 STORM Chicago storm
 5607,280 Coefficient A
 19,798 Constant B
 0.977 Exponent C
 0.375 Fraction R
 360,000 Duration
 1,000 Time step multiplier
 Maximum intensity 200.453 mm/hr
 Total depth 101.430 mm

33 6 100hyd Hydrograph extension used in this file
 1 Triangular SCS
 1 Equal length
 1 SCS method

Subdivision
 100 Lands to the East of the Re-Aligned BR33 Draining to the Baker

2,000 % Impervious
 42,650 Total Area
 600,000 Flow length
 0,500 Overland Slope
 41,797 Pervious Area
 600,000 Pervious length
 0,500 Pervious slope
 0,853 Impervious Area
 600,000 Impervious length
 0,500 Impervious slope
 0,250 Pervious Manning 'n'
 70,000 Pervious SCS Curve No.
 0,405 Pervious Runoff coefficient
 0,100 Pervious Ia/S coefficient
 10,886 Pervious Initial abstraction
 0,015 Impervious Manning 'n'
 98,000 Impervious SCS Curve No.
 0,941 Impervious Runoff coefficient
 0,100 Impervious Ia/S coefficient
 0,518 Impervious Initial abstraction

Catchment 100 Pervious 0.000 c.m/sec
 Surface Area 41,797 Impervious 42,650 Total Area
 Time of concentration 124,593 15,463 139,655
 Rainfall depth 329,625 322,841 652,466
 Rainfall volume 4,239 4,320 8,559
 Rainfall losses 60,324 59,239 119,563
 Runoff depth 41,105 95,466 136,571
 Runoff volume 1,718 4,119 5,837
 Runoff coefficient 0.405 0.881 0.643
 Maximum flow 1,495 0.941 0.334
 HYDROGRAPH Add Runoff 1,495 0.334 0.000 c.m/sec

4 Add Runoff 1,516 0.000 0.000
 CATCHMENT 200

33 1 Triangular SCS
 1 Equal length
 1 SCS method
 200 Lands to the West of the Re-Aligned BR33 Draining to the Baker
 Subdivision
 10,000 % Impervious

5,800 Total Area
 150,000 Flow length
 0,500 Overland Slope
 5,220 Pervious Area
 150,000 Pervious length
 0,500 Pervious slope
 0,580 Impervious Area
 150,000 Impervious length
 0,250 Impervious slope
 70,000 Pervious Manning 'n'
 0,405 Pervious SCS Curve No.
 0,100 Pervious Runoff coefficient
 10,886 Pervious Ia/S coefficient
 0,015 Impervious Manning 'n'
 98,000 Impervious SCS Curve No.
 0,927 Impervious Runoff coefficient
 0,100 Impervious Ia/S coefficient
 0,518 Impervious Initial abstraction

40

HYDROGRAPH Add Runoff

Catchment 200 Pervious 0.000 c.m/sec
 Surface Area 5,220 Impervious 5,800 Total Area
 Time of concentration 239,795 166,061 405,856
 Rainfall depth 101,430 101,430 202,860
 Rainfall volume 5294,63 588,29 5882,92
 Rainfall losses 60,323 7,437 67,760
 Runoff depth 41,107 93,993 135,100
 Runoff volume 2145,76 545,16 2690,92
 Runoff coefficient 0.405 0.927 0.457
 Maximum flow 0.356 0.239 0.398
 HYDROGRAPH Add Runoff 0.356 0.239 0.398 c.m/sec

4 Add Runoff

54 POND DESIGN
 1,729 Current peak flow c.m/sec
 1,604 Target outflow c.m/sec
 20686.0 Hydrograph volume c.m
 0,000 Number of stages
 0,000 Minimum water level metre
 1,000 Starting water level metre
 0,000 Keep Design Data: 1 = True; 0 = False

Level Discharge Volume
 0.6250 0.09600 470.000
 1,250 1,604 2500.000
 Peak outflow 1,595 c.m/sec
 Maximum level 1,248 metre
 Maximum storage 2494,451 c.m
 Centroidal lag 5,752 hours
 0,398 1,729 1,595 0.000 c.m/sec
 HYDROGRAPH Combine 1

40

HYDROGRAPH

6 Node #
 1 Total Runoff Draining to Baker Subdivision
 Maximum flow 1,595 c.m/sec
 Hydrograph volume 20681,271 c.m
 3 START/RE-START TOTALS 200
 3 Runoff Totals on EXIT
 Total Catchment area 48,450 hectare
 Total Impervious area 1,433 hectare
 Total % Impervious 2.958

38

APPENDIX C:
ENHANCED GRASS SWALES – MIDUSS MODELLING


```

217127 - Post 4 hr 25 mm - AW - NOV17
-----
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: \\os-2k8\users_private\awilkinson\documents\1e METRIC
Job folder: MIDUSS\217127
Output filename: 217127 - Post 4 hr 25 mm - AW - NOV17.out
Licensee name: Hewlett-Packard Company
Company: gmrb
Date & Time last used: 11/24/2017 at 5:55:23 PM

TIME PARAMETERS
10.000 Time step
240.000 Max. storm length"
2400.000 Max. Hydrograph"
2400.000 Max. Canada AES"
32 4 Canada AES"
25.000 Rainfall depth"
240.000 Duration" depth"
84.000 Time to peak"
7.000 Decay factor"
Maximum intensity 21.392 mm/hr"
Total depth 25.000 mm"
6 001hyd Hydrograph extension used in this file"
33 CATCHMENT 100"
1 Triangular SCS"
1 Equal length"
1 SCS method"
100 Lands to the East of the Re-Aligned BR33 Draining to the Baker
Subdivision"
2.000 % Impervious"
42.650 Total Area"
600.000 Flow length"
0.500 Overland Slope"
41.797 Pervious Area"
600.000 Pervious length"
0.500 Pervious slope"
0.853 Impervious Area"
600.000 Impervious length"
0.500 Impervious slope"
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.064 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
10.886 Pervious Initial abstraction"
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.806 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
0.041 0.000 0.000 0.000 c.m/sec"
Catchment 100 Pervious Impervious Total Area "
Surface Area 41.797 42.650 hecta-e"
Time of concentration 516.931 38.538 419.462 minutes"
Rainfall depth 606.885 125.117 508.728 mm"
Rainfall volume 25.000 25.000 25.000 ha-m"
Rainfall losses 1.0449 0.0213 1.0662 mm"
Runoff depth 23.393 4.849 23.022 mm"
Runoff volume 1.607 20.151 1.978 mm"
Runoff coefficient 671.77 171.89 843.67 c.m"
Maximum Flow 0.064 0.806 0.079 c.m/sec"
HYDROGRAPH Add Runoff "
4 Add Runoff" 0.041 0.000 0.000 0.000"
CHANNEL DESIGN"
0.041 Current peak flow c.m/sec"
0.035 Manning "n"
0. Cross-section type: 0=trapezoidal; 1=general"
0.850 Basewidth metre"
3.000 Left bank slope"
3.000 Right bank slope"
0.100 Channel depth metre"
0.500 Gradient %"

```

```

217127 - Post 4 hr 25 mm - AW - NOV17
-----
Depth of flow 0.098 metre"
Velocity 0.364 m/sec"
Channel capacity 0.042 c.m/sec"
Critical depth 0.058 metre"
ROUTE Zero Route"
0.00 Zero Route Reach length (metre)"
0.041 0.000 c.m/sec"
HYDROGRAPH " Combine 1"
6 Combine " Node #1"
Maximum Flow through EGS"
Hydrograph volume 0.041 843.665 c.m/sec"
0.041 0.041 c.m"
3 START/RE-START TOTALS 100"
3 Runoff Totals on EXIT"
Total Catchment area 42.650 hectare"
Total Impervious area 0.853 hectare"
Total % Impervious 2.000%
EXIT"

```


APPENDIX C: CONSULTATION

**SCHEDULE "B" MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE ROAD 33 RE-ALIGNMENT
TOWN OF SAUGEEN SHORES
PUBLIC AGENCY CIRCULATION LIST
FILE NO. 217127
APRIL 2018**

| AGENCIES | CONTACT |
|--|--|
| UTILITIES | |
| Eastlink 77 Main Street Lions Head, ON N0H 1W0 | Dan Oswald Tel: (519) 793-3111 Email: dan.oswald@corp.eastlink.ca |
| MUNICIPAL AGENCIES | |
| County of Bruce Planning and Development 1243 MacKenzie Road Port Elgin, ON N0H2C6 | Tessa Fortier Tel: 226-909-1601 ext.2 Email: TFortier@brucecounty.on.ca |
| County of Bruce Highways Department 30 Park Street, PO Box 848 Walkerton, ON N0G 2V0 | Brian Knox Tel: (519) 881-1782 ext. 263 Fax: (519) 507-3030 Email: bknox@brucecounty.on.ca |
| Grey Bruce Health Unit 101-17 th Street East Owen Sound, ON N4K 0A5 | Bev Middleton Tel: (519) 376-9420 Fax: (519) 376-5043 Email: publichealth@publichealthgreybruce.on.ca |
| Saugeen Valley Conservation Authority 1078 Bruce Road 12, Box 150 Formosa, ON N0G 1W0 | Erik Downing Tel: (519) 367-3040 Fax: (519) 367-3041 Email: e.downing@svca.on.ca |
| Town of Saugeen Shores PO Box 820 600 Tomlinson Drive Port Elgin, ON N0H 2C0 | Amanda Froese Tel: (519) 832-2008 Fax: (519) 832-2140 Email: amanda.froese@saugeenshores.ca |
| Ministry of the Environment Owen Sound Area Office 101-17 th Street East, 3 rd Floor Owen Sound, ON N4K 0A5 | Ian Mitchell Tel: (519) 371-2901 Fax: (519) 371-2905 Email: ian.mitchell@ontario.ca |
| Ministry of the Environment Southwestern Region London Regional Office 733 Exeter Road, 2 nd Floor London, ON N6E 1L3 | Tammie Ryall Tel: (519) 873-5014 Fax: (519) 873-5020 Email: tammy.ryall@ontario.ca |
| Ministry of the Environment Environmental Assessment & Approvals Branch 135 St. Clair Avenue West, 1 st Floor Toronto, ON M4V 1P5 • Notices of Completion Only | Email: mea.notices.eaab@ontario.ca |

**SCHEDULE "B" MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE ROAD 33 RE-ALIGNMENT
TOWN OF SAUGEEN SHORES
PUBLIC AGENCY CIRCULATION LIST
FILE NO. 217127
APRIL 2018**

CIRCULATED BY COUNTY

| AGENCIES | CONTACT |
|--|---|
| FIRST NATION / MÉTIS | |
| Saugeen Ojibway Nation SON Environmental Office 25 Maadookii Subdivision R.R. #5 Wiarton, ON N0H 2T0 | Doran Ritchie Tel: (519) 534-5507 ext. 226 Fax: (519) 534-5525 Email: d.ritchie@saugeenojibwaynation.ca |
| Saugeen First Nation Chippewas of Saugeen First Nation No. 29 6493 Highway 21, RR#1 Southampton, ON N0H 2L0 | Cheree Urscheler Tel: (519) 797-2781 Fax: (519) 797-2978 Email: sfn@saugeenfirstnation.ca |
| Historic Saugeen Metis 204 High Street, Box 1492 Southampton, ON N0H 2L0 | George Govier Tel: (519) 483-4000 Fax: (519) 783-4002 Email: saugeenmetisadmin@bmts.com |
| Chippewas of Nawash Unceded Nation 135 Lakeshore Boulevard Neyaashinigmiing, ON N0H 2T0 | Rose Lameman Tel: (519) 534-1689 Fax: (519) 534-2130 Email: cnadministrator@nawash.ca |
| MNO Great Lakes Metis Council 380-9 th Street East Owen Sound, ON N4K 1P1 | Pete Couture Tel: (519) 370-0435 Fax: (519) 370-0436 Email: consultations@metisnation.org |
| PRIVATE GROUPS | |
| Lake Ridge Estates P.O. Box 614, R.R. #3 Port Elgin, ON N0H 2C0 | Andy Kuperus Tel: (519) 832-2058 Fax: (519) 389-4547 Email: l.kuperus@bmts.com |
| Port Elgin & Saugeen Township Beacher's Organization Box 377 Port Elgin, ON N0H 2C0 | David Shemilt Tel: (519) 386-0934 Email: manager@beachers.org |
| CAW Family Education Centre R.R. #1, Bruce County Road 25 115 Shipley Avenue Port Elgin, ON N0H 2C5 | Tel: (519) 389-3200 Email: confcentre@unifor.org |
| Canadian Tire Real Estate | Victor Simone Email: victor.simone@cantire.com |
| Unifor (CAW) 205 Placer Court North York, ON M2H 3H9 | Graeme Brown Tel: (416) 495-3799 Fax: (416) 495-6559 Email: Graeme.Brown@unifor.org |
| Unifor (CAW) 10 Collard Way PO Box 1725 Port Elgin, ON N0H 2C0 | Brad R. Pryde, P.Eng. Tel: (519) 832-5950 Email: bpryde@bmts.com |
| Cuesta Planning Consultants 978 First Avenue West Owen Sound ON N4K 4K5 | David Ellingwood Tel 519-372-9790 Email: cuesta@cuestaplanning.com |



BRUCE ROAD 25 AND BRUCE ROAD 33 REALIGNMENT
Town of Saugeen Shores - Port Elgin
August 11, 2017 -10am



MEETING MINUTES

Attendees: Amanda Froese, Town of Saugeen Shores
Adam Stanley, Town of Saugeen Shores
Len Perdue, Town of Saugeen Shores
John Slocombe, GM BluePlan
Brian Knox, Bruce County Highways
Kerri Meier, Bruce County Highways

Master Plan - Bruce Road 25 & Bruce Road 33 Realignment

Background on the outcome of the Master Plan for Roads and Drainage was provided:

Drainage:

- Construct a new 1:100 year capacity storm sewer on Bruce Road 25 from Goderich St. to Lake Range Road
- Construct a new 1:5 year capacity storm sewer on Bruce Road 25 from Lake Range Road to Lake Huron
- Provide a 1:100 year overland flow route within an urban road cross section on Bruce Road 25 from Lake Range Road westerly to spill to the watercourse west of Shipley Ave
- Provide a secondary local storm sewer system on Bruce Road 25 west of Lake Range Road to collect and treat road runoff prior to discharging to the watercourse outlet west of Shipley Ave
- Construct a local area storm sewer system within Baker Subdivision at the time of the sanitary sewer installation

Road:

- Re-align Bruce Road 33 to intersect Bruce Road 25 at the planned Bruce Street Location
- A 4-lane urban cross section on Bruce Road 25 from Goderich Street (Highway 21) to the planned Bruce Street intersection
- A dedicated left turn lane on eastbound Bruce Road 25 at Goderich Street
- A stop-controlled "Tee" intersection on the planned Stickel Street at Bruce Road 25
- Traffic signals at the planned Bruce Street/Bruce Road 25 intersection
- A 2-lane urban cross section on Bruce Road 25 from the planned Bruce Street intersection to Saugeen Beach Road
- A stop-controlled "Tee" intersection on the planned Ridge Street at Bruce Road 25
- A Multi-Use Trail from Goderich Street to Saugeen Beach Road on the north side of Bruce Road 25
- Transfer of Bruce Road 33 from Bruce Road 25 southerly to about Baker Road from the County to the Town
- Transfer of Bruce Road 25 from the planned Bruce Street intersection westerly to Saugeen Beach Road from the County to the Town

Development charges

- Town inquired into whether the County has considered incorporating development charges
- Brian noted that this has not been a past practice of the County.

Land Purchases

- The County has been in discussion with Tom Fenton and Peter Ens about land purchases. Both landowners are interested in moving forward and have questions regarding severances and servicing of properties.
- Brian asked John to prepare a plan of the County Road 33 realignment and include the remaining parcels of land owned by Tom Fenton and Peter Ens.
- Amanda suggested that the Town and County planners set up a meeting with the two landowners to review the project and implications on their properties.
- There are four properties at the intersection of Bruce Road 25 and Goderich St that require land purchases to accommodate the five lanes. Two properties are within County jurisdiction and two are within the Towns.

Proposed 2017 Work

- Geotechnical work for the entire project will be facilitated by GMBLuePlan
- GMBLuePlan to undertake engineering for the project and specifically 2018 work including a rough estimate of the work scheduled for each year.
- GMBLuePlan to investigate whether undertaking the installing the 2018 storm sewer would be best coordinated with the required road work between Saugeen Beach Road and the planned Bruce Street
- County and Saugeen Shores to develop cost-sharing agreement.
- GMBLuePlan to prepare a plan identifying tree removal to accommodate the project in order that adjacent landowners can be approached.
- It was agreed that the Master Plan facilitates the land purchase for the CR 33 realignment. The County would pursue the re-alignment land purchases.
- The County will complete the Schedule B project and provide notice to landowners (via mail out) and public (via newspaper).
- Town to review the Master Servicing Study to confirm requirements for services along the new Bruce Road 33.

Proposed 2018 Work

- Schedule A+
- Construct a new 1:100 year capacity storm sewer on Bruce Road 25 from the Kaparus SWM pond to Lake Range Road
- Construct a new 1:5 year capacity storm sewer on Bruce Road 25 from Lake Range Road to Lake Huron
- Provide a 1:100 year overland flow route within an urban road cross section on Bruce Road 25 from Lake Range Road westerly to spill to the watercourse west of Shipley Ave, it was thought that storm work would be shared on a 50-50 basis between County and Town. Town and County to review timing and costs.
- Provide a secondary local storm sewer system on Bruce Road 25 west of Lake Range Road to collect and treat road runoff prior to discharging to the watercourse outlet west of Shipley Ave. Town to review timing and costs.
- Implement the findings of the GMBLuePlan investigation of storm sewer and potentially construct the 2-lane urban cross section work between Saugeen Beach Road and the planned Bruce Street, including a 3 meter wide multiuse trail in the north boulevard

and water and sanitary services where required. There were ongoing discussions on the cost-sharing of this work.

- Consider whether the project or the developer would construct the apron for a stop-controlled "Tee" intersection on the planned Ridge Street at Bruce Road 25.
- Road work will be contracted out by the County
- Bruce Road 25 from planned Bruce Street to the Saugeen Beach Road will be transfer to Saugeen Shores once Bruce Road 33 realignment is completed.

Proposed 2019 Work

- Schedule B - Notice in papers and mail outs to direct landowners (County)
- Construct a 4-lane urban cross section on Bruce Road 25 from Goderich Street (Highway 21) to the planned Bruce Street intersection with a dedicated left turn lane on eastbound Bruce Road 25 intersection and including a stop-controlled "Tee" intersection on the planned Stickel Street at Bruce Road 25. Include a 3 m wide multi-use trail on north boulevard and including water and sanitary services where required.
- GMBLuePlan to provide the Town with CAD files to prepare PHM125 drawings for the traffic signals at the Goderich St. intersection. These signals will be the responsibility of the Town of Saugeen Shores
- GMBLuePlan to provide the County with CAD files to prepare the PHM125 drawings for the traffic signals at the Bruce Road 25 and Bruce Road 33 alignment (Bruce Street). These signals will be the responsibility of the County.
- Road work will be contracted out by the County
- Potential to start Storm water management pond at the Bruce Road 33 realignment

Proposed 2020 Work

- Schedule B - Notice in papers and mail outs to direct landowners (County)
- Construct the realignment of Bruce Road 33 to intersect Bruce Road 25 at the planned Bruce Street Location
- County is of the opinion that BR 33 would be constructed as a rural road
- Discussions regarding the urban planning limit as well as potential for sideroad locations were held, these details will be further reviewed with planning departments and current landowners.
- It was noted that the road will require an elevated road platform for storm drainage purposes.
- The potential to provide servicing of BR 33 to the urban planning limit is being considered.
- There was discussion on the rehabilitation of the section of Lake Range Road, currently Bruce Road 33, from Bruce Road 25 to the beginning of the realignment. It appeared clear that the County would be involved in the apron from the realigned Bruce Road 33 onto Lake Range Road.
- Traffic signals at the Bruce Road 25 and Bruce Road 33 alignment (Bruce Street) will be the responsibility of the County.
- Transfer of Bruce Road 33 from Bruce Road 25 southerly to about Baker Road from the County to the Town.
- Transfer of Bruce Road 25 from the planned Bruce Street intersection westerly to Saugeen Beach Road from the County to the Town.

Preliminary Cost Sharing

2017

- Engineering - County

2018

- Geotechnical Investigation - County
- Land purchases/Legal - County and Saugeen Shores based on property
- Storm Sewer Servicing - 50/50 County/Town
- Potential roadwork from planned Bruce Street to Saugeen Beach Road to be further discussed.

2019

- Traffic Lanes - County
- Curb and Gutter - County
- Storm Service - 50/50 split
- Servicing - Saugeen Shores
- Multi-Use Trail - Saugeen Shores
- Traffic Signals - County (Bruce St.), Saugeen Shores (Goderich St)

2020

- Traffic Lanes - County
- Servicing - Saugeen Shores

Proposed Tender dates for Annual Projects

- February / March tender
- April / May construction

Action Items

County

- Initiate meeting with Town, County Planning, Fenton and Ens
- Land purchases

GMBluePlan

- Undertake engineering for the project and specifically 2018 work including a rough estimate of the work scheduled for each year.
- Prepare a plan identifying tree removal to accommodate the project in order that adjacent landowners can be approached.
- Geotechnical Investigation

Saugeen Shores

- Land purchases
- Extent of servicing on BR 25 and BR 33 realignment



Committee Report

To: Warden Paul Eagleson
Members of the Transportation and Environmental Services
Committee

From: Brian Knox
Engineer

Date: February 15, 2018

Re: Bruce Road 33 Environmental Assessment

Recommendation:

The report Bruce Road 33 Environmental Assessment is for information.

Background:

In January the Department submitted an information report to support the 'Notice of Project Initiation' for the potential realignment of Bruce Road 33. The notice was published in the Shoreline Beacon, posted on the County and Town website and circulated to landowners, agencies and Indigenous communities on January 9, 2018. The Department has received comments, with a large number referring to components of the Master Plan that are outside of the Bruce Road 33 EA Schedule B project. At this time, the Engineer believes it to be beneficial to review the process of the Master Plan for Bruce Road 25 and Bruce Road 33 for Roads and Drainage that was initiated in September 2015, the various projects derived from the Master Plan and the specific Bruce Road 33 Schedule B project.

Bruce Road 25 & 33 - Master Plan

At the April 20, 2017 meeting, Committee approved the preferred solution for the Bruce County Road 25 and 33 Municipal Class Environmental Assessment Master Plan for roads and drainage. The Department and Town of Saugeen Shores completed the Master Plan by issuing the Notice of Completion on May 9, 2017. The outcome of the Master Plan included a number of projects as follows:

Schedule A Projects - Drainage

- Construct new storm sewer along Bruce Road 25 including outfall to Lake Huron.
- Construct local storm sewer system within Baker subdivision to coincide with sanitary sewer installation.



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Schedule B Projects - Roads

- Re-align Bruce Road 33 to intersect Bruce Road 25 at future Bruce Street alignment.
- Provide additional lanes on Bruce Road 25 between future Bruce Street intersection and Goderich Street (4-lane urban cross-section)

The Master Plan addressed Phase 1 and 2 of the Municipal Class EA process that supports the Schedule A projects while the Schedule B projects require additional technical studies, documentation and review period. The following is an overview of the proposed work over a four-year period (2018-2021). A drawing identifying the work is attached.

Phase 1 - Schedule A (2018): Bruce Road 25 - trunk storm sewer from Lake Ridge Estates to Lake Huron, including a full urbanized road section from Shipley Avenue to Saugeen Beach Road.

Phase 2 - Schedule A (2019): Two lane urbanized road section from Shipley Avenue to Bruce Street, including the local storm sewer.

Phase 3 - Schedule B (2020): Four lane urbanized cross section from Bruce Street to Goderich Street, including municipal services.

Phase 4 - Schedule B (2021): Construction of the new Bruce Road 33 realignment and rehabilitation of current Bruce Road 33 (new Lake Range Road).

Bruce Road 33 Realignment - Schedule B - Environmental Assessment

The County of Bruce, Town of Saugeen Shores and GM BluePlan initiated the Bruce Road 33 Realignment Environmental Assessment as an outcome of the Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33.

Bruce Road 33 Realignment is being undertaken in accordance with the Municipal Class Environmental Assessment (EA) Planning Process as a Schedule B Project. The Notice of Project initiation was issued on January 9, 2018 outlining three alternative solutions:

- i) Do nothing but resurfacing,
- ii) Intersection and capacity improvements on BR 25, and
- iii) Re-align the BR33 intersection with the future Bruce Street intersection.

The Master Plan and Schedule B EA project file relating to the Bruce Road 33 Realignment was available for viewing by agencies, public, landowners and Indigenous Communities with comments due on February 6, 2018.



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The Department and Town of Saugeen Shores received a number of comments regarding the Bruce Road 33 Realignment as well as questions regarding the future work on Bruce Road 25, which was reviewed under the Master Plan process. A summary of the comments regarding Bruce Road 33 Realignment are as follows:

- General acceptance of the realignment of Bruce Road 33 with the future Bruce Street which would assist in traffic flow and safety concerns.
- Tree planting on the new realignment which would be beneficial during winter.
- Review of placing a roundabout at the intersection of future Bruce Street and future Bruce Road 33; a signalized intersection was considered as the preferred solution for pedestrian safety reasons and the planned Active Transportation Route.
- Drainage was considered under the Master Plan process and will be further advanced as the Bruce Road 25 design is developed.
- There was interest in the alignment of Baker Street and the location of the connection to the proposed Bruce Road 33 new alignment.

The Schedule B project will be reviewed further taking into consideration the comments received during the comment period. A preferred solution for the Bruce Road 33 Schedule B EA will be recommended at the March Committee for approval, prior to the Notice of Completion being issued.

Bruce Road 25 - Drainage

The Department, Town and GM BluePlan are reviewing the feedback pertaining to the Bruce Road 25 Schedule "A" projects, specifically the drainage outlet and will be providing further information to agencies, public, landowners and Indigenous Communities.

Response to Comments

In order to manage the comments and to move forward on this undertaking Saugeen Shores and the Department have agreed that the project team composed of the Town Saugeen Shores, consultant GM Blue Plan and the Department will continue to work together on discussing the comments received, however the Town of Saugeen Shores will respond to comments on the Schedule A projects as outlined in Phases 1 and 2 above and the Department will respond to Schedule B projects as outlined in Phases 3 and 4 above.

Financial/Staffing/Legal/IT Considerations:

There are no financial, staffing, legal or IT considerations associated with this report.



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Interdepartmental Consultation:

Not applicable.

Link to Strategic Goals and Elements:

Goal #6 - Explore alternative options to improve efficiency, service
Element #D - Coordinate working with other agencies

Approved by:

Kelley Coulter
Chief Administrative Officer

Schedule B - Environmental Assessment - Bruce Road 33 Realignment Project Schedule

| Date | Activity | Responsibility |
|-------------------|---|---------------------|
| November 2017 | Geotechnical Investigation (includes BR25) | County / GMBLuePlan |
| December 1 2017 | Landowner information package circulated | County |
| Ongoing 2017-2018 | Land purchases/OLS survey | County |
| December 18 2018 | Correspondence to First Nation/Metis | County |
| January 9 2018 | Schedule B EA - Notice of Project Initiation <ul style="list-style-type: none"> Shoreline Beacon - County Landowner Mail-out - County Agency Contact - GMBLuePlan | County / GMBLuePlan |
| February 6 2018 | Response deadline | GMBLuePlan |
| February 15 2018 | Report to Highways Committee with information report/comments received | County |
| March 22, 2018 | Report to Highways Committee with recommended preferred solution | County |
| March 30 2018 | Schedule B EA - Notice of Completion <ul style="list-style-type: none"> Shoreline Beacon - County Landowner Mail-out - County Agency Contact - GMBLuePlan First Nation/Metis - County | County / GMBLuePlan |
| April 30 2018 | Schedule B EA - 30 day review period ends | GMBLuePlan |
| May 7 2018 | Reports due to Highways Committee | County |
| May 17 2018 | Highways Committee | County |
| | | |



Committee Report

To: Warden Paul Eagleson
Members of the Transportation and Environmental Services
Committee

From: Kerri Meier
Environmental Coordinator

Date: April 19, 2018

Re: Bruce Road 33 Environmental Assessment

Recommendation:

That the preferred solution for the Bruce Road 33 Schedule B Environmental Assessment be option iii) re-align the Bruce Road 33 intersection with the future Bruce Street Intersection be approved.

Background:

At the February Committee, the Department submitted an information report to provide a status update on the Bruce Road 33 Schedule B Environmental Assessment.

The Bruce Road 33 Realignment is being undertaken in accordance with the Municipal Class Environmental Assessment (EA) Planning Process as a Schedule B Project. The Notice of Project initiation was issued on January 9, 2018 outlining three alternative solutions:

- i) Do nothing but resurfacing,
- ii) Intersection and capacity improvements on Bruce Road 25, and
- iii) Re-align the Bruce Road 33 intersection with the future Bruce Street Intersection.

The Master Plan and Schedule B EA project file relating to the Bruce Road 33 Realignment was available for viewing by agencies, public and landowners and Indigenous Communities with comments due on February 6, 2018.

A summary of the comments regarding Bruce Road 33 realignment are as follows:

- General acceptance of the realignment of Bruce Road 33 with the future Bruce Street which would assist in traffic flow and safety concerns.
- Tree planting on the new realignment would be beneficial during winter.
- Review option of a roundabout at the intersection of future Bruce Street and future Bruce Road 33, a signalized intersection was considered as the preferred solution for pedestrian safety and the planned Active Transportation Route. A north-bound stop control on the proposed re-aligned Bruce Road 33 would be the interim solution until the extension of Bruce Street southerly to Bruce Road 25 occurs.



- Interest in the alignment of Baker Street and the location of the connection to the proposed Bruce Road 33 new alignment.
- The storm water management along future Bruce Road 33 will be incorporated into the design and approvals phase.
- Drainage comments are being considered as the Bruce Road 25 design is developed.

The County, Town and Consultant reviewed all comments received regarding the Schedule B project and acknowledge the preferred solution of the realignment of the Bruce Road 33 intersection with the future Bruce Street Intersection.

A Notice of Completion, including the updated project file will be issued in the near future. The Department will provide a status report on the project after the 30-day review period is complete.

Financial/Staffing/Legal/IT Considerations:

There are no financial, staffing, legal or IT considerations associated with this report.

Interdepartmental Consultation:

Not Applicable.

Link to Strategic Goals and Elements:

Goal #6 - Explore alternative options to improve efficiency, service
Element #D - Coordinate working with other agencies

Approved by:

Kelley Coulter
Chief Administrative Officer

Moved by Councillor Mitch Twolan
Seconded by Councillor Milt McIver

That the preferred solution for the Bruce Road 33 Schedule B Environmental Assessment be option iii) re-align the Bruce Road 33 intersection with the future Bruce Street Intersection be approved.

Carried



1078 Bruce Road 12, P.O. Box 150, Formosa ON Canada N0G 1W0
Tel 519-367-3040, Fax 519-367-3041, publicinfo@svca.on.ca, www.svca.on.ca

February 8, 2018

The County of Bruce
Brian Know, P.Eng.
30 Park St., Box 398
Walkerton, ON
N0G 2V0

Town of Saugeen Shores
Amanda Froese, P.Eng.
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON
N0H 2C0

GM BluePlan Engineering Limited
Consulting Professional Engineers
John Slocombe, P.Eng.
1260-2nd Ave. East, Unit 1
Owen Sound, ON
N4K 2J3

Dear Mr. Knox, Ms. Froese, and Mr. Slocombe:

RE: Notice of Project Initiation – Schedule B Municipal Class Environmental Assessment Bruce Rd. 33 Re-Alignment
Detailed Design, Bruce Rd. 25 Drainage Works, November 2017
Part Lot 27-30, Lake Range
Geographic Township of Saugeen
Town of Saugeen Shores

The Saugeen Valley Conservation Authority (SVCA) has reviewed this proposal in accordance with the SVCA's mandate and the Environmental Planning and Regulations Policies Manual, approved May 16, 2017. The proposed Bruce Rd. 33 Re-Alignment, and Bruce Road 25 Project would facilitate a new roadway pattern, drainage route, and potential outlet modification and drainage route of stormwater to the Lake Huron Shoreline in an area of drainage problems.

Details to the proposed have been provided to the SVCA January 16, 2018 and November 20, 2017. The SVCA has reviewed the Preliminary Stormwater Management Design Brief – Saugeen Shores, ON and Bruce Road 33 Re-Alignment and Schedule B Class Environmental Assessment – Brief. The SVCA has also reviewed some related plans associated with Bruce Rd. 25 proposed works and the related drainage proposal. The SVCA offers the following comments.



Watershed Member Municipalities

Municipality of Arran-Elderslie, Municipality of Brockton, Township of Chatsworth, Municipality of Grey Highlands,
Town of Hanover, Township of Howick, Municipality of Morris-Turnberry, Municipality of South Bruce,
Township of Huron-Kinloss, Municipality of Kincardine, Town of Minto, Township of Wellington North,
Town of Saugeen Shores, Township of Southgate, Municipality of West Grey

General Comment

Please clarify the phasing of the proposed Bruce Rd. 25/33 works. The SVCA has some concerns around 'proposed conditions', modelling and forecasting as currently both plans are fluid, and requiring integration and reliance on the other being completed initially. Perhaps there is a need to combine these two, linked proposals, as one project for design and review purposes with phasing plans. Detailed design is underway for Bruce Road 25 while 33 is undergoing EA still. Master plan process has reviewed multiple options for the area, but perhaps a larger scale plan should proceed given the interdependence.

Bruce Road 25 Works:

Bruce Road 25 on the Glacial Lake Bluff, over the watercourse north and west of Shipley Ave. and within its floodplain, where the roadway intersects the shoreline of Lake Huron and within an offset of these features is located within the SVCA's Regulated Area. This proposal will require permission from the SVCA in the form of an SVCA permit to Alter a Regulated Area and likely and Alteration to a Watercourse permit.

- 1) Alterations to the slope will require SVCA approval in the form of a permit. SVCA staff request additional details as to grading on and around the proposed roadway ensuring the stability of the slope is maintained on and surrounding the project area. A Geotechnical slope stability analysis may be necessary given proposed grading and additional material placement. Groundwater conditions management would need to be addressed in this report.
- 2) Alterations to the watercourse and/or floodplain of a watercourse will require SVCA permission in the form of a permit. A cut/fill analysis, floodplain report, and an indication of flow maintenance of the watercourse are required by SVCA staff in order to insure no negative impacts on the watercourse or the control of flooding. Please refer to previous comments regarding DFO involvement associated with fisheries.
- 3) Alterations within a Dynamic Beach area for the proposed outlet will require SVCA permission in the form of a permit. A coastal report appears to be prudent as increased flows, to an enlarged outlet, could negatively impact erosion and dynamic beaches in the area. Water quality impacts should be investigated at this outlet as well.

Bruce Rd. 33 Environmental Assessment

- 1) The SVCA would recommend larger runoff events be considered then 100 yr. event given sensitive receptors in area, the intent of this work to resolve drainage issues, and given climate change considerations as indicated to be an intent of EA process. Ultimately the intend of this proposal is not to maintain current problems, but it is to resolve problems SVCA staff understand.
- 2) BR 25 is not factored into this proposal, with limited/no opportunities for stormwater management in that project. Potentially this project could 'over manage' drainage to make up for lost perviousness associated with BR25.
- 3) Water quality improvements are sought associated with the Lake Huron Shoreline. While 'Enhanced' water quality treatment is proposed associated with the Bruce Rd. 33 component of this project, what about BR25 and can increased water quality be achieved to represent a net gain at shoreline?
- 4) The SVCA's Regulation may be applicable to the proposed Bruce Road 33 western/southern realignment. Road widening or works at the top of the slope, or within 15 metres of the slope and related 'rills' would require SVCA permission. Design details are not yet known at this location for SVCA review.

Notice of Project Initiation – Schedule B Municipal Class Environmental Assessment
Bruce Rd. 33 Re-Alignment, Bruce Rd. 25 Drainage Works
February 8, 2018
Page 3 of 3

The SVCA will continue our review upon clarifications and/or revisions being provided to the SVCA.

If you have any questions on the above, please do not hesitate to contact this office.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Erik Downing', with a stylized flourish at the end.

Erik Downing
Manager, Environmental Planning & Regulations
Saugeen Conservation

ED/

cc: Luke Charbonneau, Authority Member, SVCA, via email
Mike Smith, Authority Member, SVCA, via email.

733 Exeter Road
London ON N6E 1L3
Tel: 519 873-5000
Fax: 519 873-5020

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

February 9, 2018

The County of Bruce
Brian Knox
30 Park Street
Box 398
Walkerton ON
N0G 2V0

Attention: Brian Knox

Re: Class EA for the Realignment of Bruce Road 33

Dear Brian Knox:

This letter acknowledges this ministry's receipt of the Notice of Commencement for the above noted project.

It is this ministry's understanding that the County of Bruce is initiating a Class EA process to re-align Bruce Road 33 as identified in the Town of Saugeen Shores' Master Plan for Roads and Drainage.

As you know, the Class Environmental Assessment (Class EA) planning process includes consultation with interested stakeholders, evaluation of alternatives, assessment of the effects of the proposed works and identification of measures to mitigate any adverse impacts. In addition to consultation with public agencies and the general public, consultation with Aboriginal communities is required.

Aboriginal Consultation

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to your proposed project, **the MOECC is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown's preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project:

| Nation | Contact Information | |
|--|--|--|
| Saugeen First Nation | <p>Saugeen Ojibway Nation Environment Office 25 Maadookii Road Neyaashiinigmiing, ON N0H 2T0 519-534-5507 Doran Ritchie Land Use Planning Coordinator d.ritchie@saugeenojibwaynation.ca (Please send hard copy to Doran Ritchie)</p> | <p>Saugeen First Nation 6493 Highway 21 R.R.#1 Southampton, ON N0H 2L0 519-797-2781 Chief Lester Anoquot lanoquot@saugeenfirstnation.ca (Email copy to Chief Anoquot)</p> |
| Chippewas of Nawash Unceded First Nation | | <p>Chippewas of Nawash Unceded First Nation R.R.#5 Wiarton, ON N0H 2T0 519-534-1689 Chief Gregory Nadjiwon chiefsdesk@nawash.ca (Email copy to Chief Nadjiwon)</p> |
| Historic Saugeen Metis | <p>Historic Saugeen Metis 204 High Street, Box 1492 Southampton, ON N0H 2L0 President, Archie Indoe <u>Other Contact:</u> George Govier Consultation Coordinator 519-483-4000 saugeenmetisadmin@bmts.com</p> | |
| Great Lakes Metis Council | <p>Great Lakes Metis Council 380 9th Street East Owen Sound, ON N4K 1P1 519-370-0435 Other Contact: James Wagar, Consultation Assessment Coordinator jamesw@metisnation.org and consultations@metisnation.org (Please send email copies to email addresses listed above)</p> | |

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link:

<https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process>

Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

You must contact the Director of Environmental Approvals Branch under the following circumstances subsequent to initial discussions with the communities identified by MOECC:

- aboriginal or treaty rights impacts are identified to you by the communities;
- you have reason to believe that your proposed project may adversely affect an aboriginal or treaty right;
- consultation has reached an impasse;

- a Part II Order request or elevation request is expected.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line "Potential Duty to Consult" to EAASIBgen@ontario.ca or by mail or fax at the address provided below:

| | |
|-----------------|--|
| Email: | EAASIBGen@ontario.ca Subject: Potential Duty to Consult |
| Fax: | 416-314-8452 |
| Address: | Environmental Approvals Branch 135 St. Clair Avenue West, 1 st Floor Toronto, ON, M4V 1P5 |

The MOECC will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

Source Water Protection

As per the recent amendments to the Municipal Engineers Association (MEA) Class Environmental Assessment parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be addressed (requirements under the Clean Water Act). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the report on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. As a note, even if the project activities in a vulnerable area are deemed not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important.

Climate Change

The Municipality is strongly encouraged to include climate change in this EA. Climate change should be considered in the context of mitigation and the context of adaptation. The Ministry has recently released a guidance document to support proponents in including climate change in environmental assessments. The guide can be found online: <https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process> . It should be noted that Climatic Features is identified in Appendix 2 of the Municipal Class EA page 2-7 (2015).

Information on Notice of Commencement and Timing

The noticed received by the Ministry of Environment and Climate Change did not include a map showing the project area. Appendix 6 of the Municipal Class EA identifies the information that must be part of a notice, including a map of the study area or location (where applicable). Given that this project is for the realignment of a specific section of existing transportation infrastructure, it would seem that providing mapping of the area would be fitting. MOECC encourages the County to consider including mapping in future notices, as appropriate, and to review the requirements of notices prior to issuance to ensure all items are met, as applicable.

Also identified in Appendix 6 (page 6-2) is a circulation to ministry list that includes sending all notices to the applicable MOECC Regional Offices. The regional office address can be found in the header. Alternatively, electronic submissions may be made directly the Environmental Assessment Coordinator. Please ensure all notices are sent to the appropriate offices. This expedites ministry response when necessary.

Conclusion

Thank you for the opportunity to comment on this project. Please keep this office fully informed of the status of this project as it proceeds through the Class EA process.

Please send all future correspondence with respect to this project to my attention, as I am this ministry's one window contact for this project: Anneleis Eckert, Regional Environmental Planner / Regional EA Coordinator at the address below; email address: anneleis.eckert@ontario.ca ; telephone number: 519-873-5115.

Yours truly,



Anneleis Eckert
Regional Environmental Planner / Regional EA Coordinator
Ministry of Environment and Climate Change
733 Exeter Road
London ON, N6E 1L3
519 873-5115

Copy:

Amanda Froese, Town of Saugeen Shores
John Slocombe, GM BluePlan Engineering
Ian Mitchell, MOECC
John Ritchie, MOECC
Scott Abernethy, MOECC

Ministry of the Environment
and Climate Change

Environmental Assessment and
Permissions Branch
135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement et de
l'Action en matière de changement
climatique

Direction des évaluations et des
permissions environnementales
135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Télec. : 416 314-8452



ENV1283MC-2018-266

March 13, 2018

Brian Knox and Kerri Meier
The County of Bruce
Box 70, 30 Park St.
Walkerton ON N0G 2V0

Dear Mr. Brian Knox and Ms. Kerri Meier:


On February 5, 2018, the Ministry of the Environment and Climate Change (ministry) received one Part II Order request asking that the County of Bruce (County) be required to prepare an individual environmental assessment for Bruce County Roads 25 and 33 Master Plan for Roads and Drainage (Project). The Project was planned under the Master Plan procedures of the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA).

On March 9, 2018, the ministry received correspondence from the requester indicating that the requester wished to withdraw the Part II Order request. I understand that this withdrawal was a result of negotiating a mutual agreement, and I appreciate the County's efforts to reach a successful resolution of the requester's concerns. With no outstanding Part II Order requests before the ministry, the County can continue planning the Project.

I would like to ensure that the County understands that failure to comply with the *Environmental Assessment Act*, the provisions of the Class EA, and failure to implement the Project in the manner described in the planning documents, are contraventions of the act and may result in prosecution under section 38 of the act.

I am confident that the County recognizes the importance and value of the act and will ensure that its requirements and those of the Class EA are satisfied.

Yours sincerely,

 Annamaria Cross
Manager, Environmental Assessment Services Section
Environmental Assessment and Permissions Branch

April 5, 2018

Via E-Mail

Good Morning Kim, John and Kerri:

Please be advised that staff of the Ministry of Environment and Climate Change Southwestern Region (MOECC SWR) don't have any surface water concerns about the conceptual design of the storm water outlet structure at the beach – a headwall/plunge pool feature. The outlet structure is discussed in the preliminary storm sewer design brief (page 13 of 14). Consideration was given to minor and major storm events, water infiltration, storage and flow velocity reduction (erosion control). Water quality control is provided in upstream drainage areas. Alternate designs for the outlet were considered and rejected for acceptable reasons. The design brief says that a landscaping plan may be included with the detailed design for the headwall/plunge pool structure to beautify it. MOECC SWR would suggest that a landscaping plan is a good idea in this case.

Thank you for providing this ministry's Southwestern Region this pre-submission review opportunity. Please feel free to submit a formal application for an Environmental Compliance Approval to staff of this ministry's Approvals Branch in Toronto.

Yours truly,

Craig Newton
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment and Climate Change
Southwestern Region
(519) 873-5014

E-MAILED
May 1/18

Melissa Zammit - GM BluePlan

To: Utility / Municipal Agencies
Cc: John Slocombe - GM BluePlan (John.Slocombe@gmblueplan.ca); Amanda Froese (amanda.froese@saugeenshores.ca); Kerri Meier
Subject: 217127 - BR33 Re-Alginment Sch. B EA - Notice of Study Completion
Attachments: 217127 - Notice of Study Completion BR33 Re-alignment - May 1, 2018.pdf

Good Morning,

Please find attached Notice of Study Completion for the Schedule B Environmental Assessment for the Bruce County Road 33 Re-alignment project.

The Schedule B Project File has been completed and can be viewed/saved by clicking on the link below. This link will be valid for 14 days:

[https://sendafile.gmblueplan.ca/uploads/04-30-18_135217_217127 - Sch B EA Project File - BR 33 Realignment - April 2018\(FINAL\).pdf](https://sendafile.gmblueplan.ca/uploads/04-30-18_135217_217127_-_Sch_B_EA_Project_File_-_BR_33_Realignment_-_April_2018(FINAL).pdf)

The Notice of Study Completion and the Project File have also been posted on the County and Town websites for viewing.

Please contact Kerri Meier (Bruce County), Amanda Froese (Town of Saugeen Shores), and John Slocombe (GM BluePlan Engineering) at the addresses listed on the Notice of Study Completion with any questions or comments regarding this project.

Regards,

Melissa Zammit
Administrative Assistant

GM BluePlan Engineering Limited
1260-2nd Avenue East | Owen Sound ON N4K 2J3
t: 519.376.1805 ext. 2238
melissa.zammit@gmblueplan.ca | www.gmblueplan.ca





COUNTY OF BRUCE

HIGHWAYS DEPARTMENT

Box 398, 30 Park Street, Walkerton, Ontario N0G 2V0
(519) 881-2400 1-877-681-1291 Ext 4 Fax: (519) 507-3030
Brian R. Knox, County Engineer

September 9, 2015

Our File: M-1552

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
R.R. #5, Wiarton, ON N0H 2T0

Attention: Mr. Doran Ritchie
Landuse Planning Coordinator

Re: Master Plan for Roads and Drainage
Bruce County Roads 25 and 33
Saugeen Shores
Preliminary Information

Dear Mr. Ritchie,

The County of Bruce is embarking on a Master Plan process to address issues with roads and drainage in the southerly area of the Former Town of Port Elgin (Saugeen Shores), about the intersection of Bruce Roads 25 and 33.

The process will follow the outline of a Municipal Class Environmental Assessment. We are providing Saugeen Ojibway Nation (SON) with this preliminary information package identifying the issues currently under consideration and the plan to host a "Discretionary" Public Information Centre (PIC) under the process as outlined in the enclosed information. We would welcome the opportunity of meeting with you prior to the PIC and look forward to working with you on this initiative.

We will provide you with updates as this initiative progresses, but please contact me or our consultant John Slocombe, P.Eng of GM BluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox, P.Eng
County Engineer

Encls.

cc: Dave Burnside – Saugeen Shores: burnsided@saugeenshores.ca
Stuart Doyle – Saugeen Shores: doyles@saugeenshores.ca
John Slocombe – GM BluePlan: john.slocombe@gmblueplan.ca



**MASTER PLAN FOR ROADS AND DRAINAGE
BRUCE COUNTY ROADS 25 AND 33
NOTICE OF PROJECT INITIATION
DISCRETIONARY PUBLIC INFORMATION CENTRE**

The County of Bruce as Proponent, with the Town of Saugeen Shores, is studying road and drainage alternatives in the area of Bruce County Roads 25 and 33 (BR25 & BR33), located centrally in Saugeen Shores, and is inviting interested members of the public to attend an Information Centre.

The County has identified various deficiencies with its road and drainage infrastructure within the Study Area. Through initial discussions with the Town, other related issues having a broader scope have emerged which the County wishes to consider at a Master Planning level to ensure individual projects are completed in context with an appropriate overall plan. The purpose of the Discretionary Public Information Centre is to describe the identified issues within the Study Area and to receive input from the public on the issues as well as potential alternative solutions.

Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of BR25 and BR33, and planned future intersections at Stickel, Bruce and Ridge Streets. Preliminary Alternatives for Road Works include; Do Nothing but resurfacing, Re-align the BR33 intersection with the future Ridge Street intersection, or Re-align the BR33 intersection the with the future Bruce Street intersection.

Issues related to drainage include limited capacity along BR25, poor drainage through the Baker Subdivision, and inadequate drainage outlets within the Study Area. Preliminary Alternatives for Drainage works include; Do Nothing, Improve an outlet westerly on BR25 to Lake Huron, Divert flows from BR25 southerly along BR33 to a new constructed outlet westerly across Lot 26 to the existing Gore Drain outlet below Saugeen Beach Road, or Divert flows southerly along BR33 to the existing Gore Drain outlet below Lake Range Road (BR33)..

The Master Plan is being conducted under the **Municipal Class Environmental Assessment (EA)** project planning process and is intended to follow, as a minimum, Phases 1 and 2 of the EA Process, in support of Schedule B and/or Schedule C projects, which may be identified for implementation through the process.

As part of this process a Phase I – Discretionary **Public Information Centre** is planned at the Town of **Saugeen Shores Rotary Hall on October 7th, 2015 at 7:00 p.m. – 9:00 p.m.**, at which time project information will be displayed and the Project Team will be available for discussions.

The public is invited to provide written comments for incorporation into the planning considerations for this project. A future Public Information Centre, planned as part of the process, will be scheduled at a future date at which time a Problem / Opportunity Statement and Alternative Solutions will be more fully developed. Additional information is provided on the municipal web sites.

This Notice issued September 22nd, 2015.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 398, 30 Park St.
Walkerton, ON N0G 2V0
Tel: (519) 881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Mr. Dave Burnside
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
Tel: (519) 832-2008
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Master Plan - Roads and Drainage

Bruce County Roads 25 & 33

County of Bruce

Town of Saugeen Shores





Welcome

Public Information Centre

Bruce County Roads 25 & 33

Master Plan – Roads and Drainage

County of Bruce
Town of Saugeen Shores

October 7th, 2015
7:00 pm to 9:00 pm

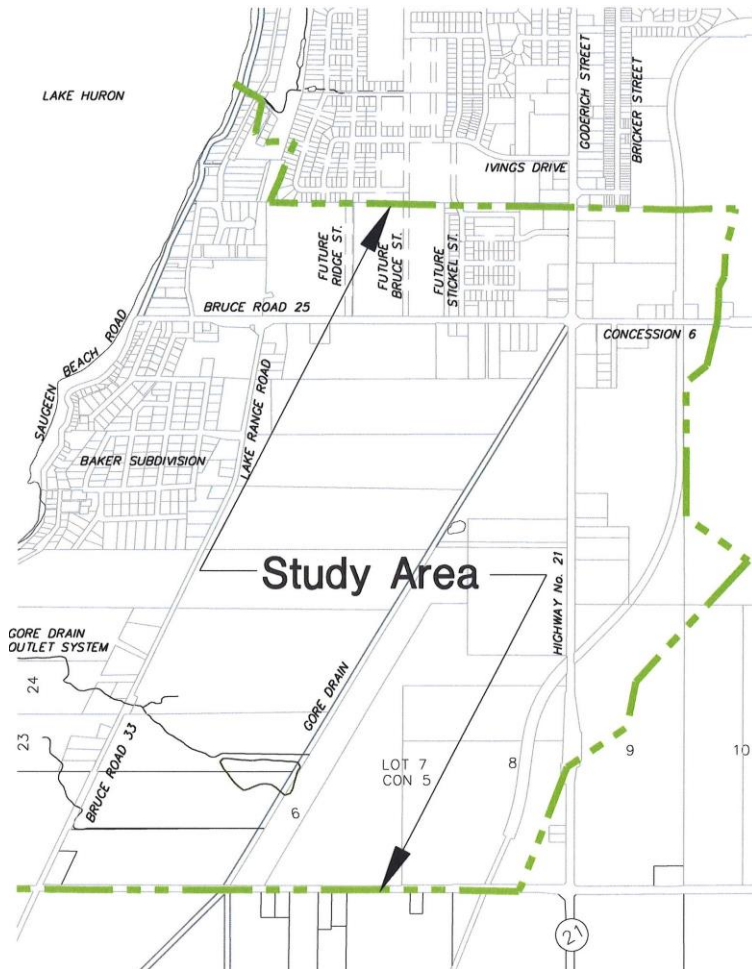
Please sign in so that we can keep you updated on the study.



Intentions of the “Discretionary” Public Information Centre

- Identify the Study Area;
- Identify the Problems/Opportunities within the Study Area;
- Present the Process Framework (Municipal Class Environmental Assessment – Master Plan Process);
- Consider Preliminary Alternatives for Roads;
- Consider Preliminary Alternatives for Drainage;
- Public Involvement in the Process; and
- Identify the Next Steps.

Study Area Location Map



Basic Issues

Roads:

The Proponent is considering to:

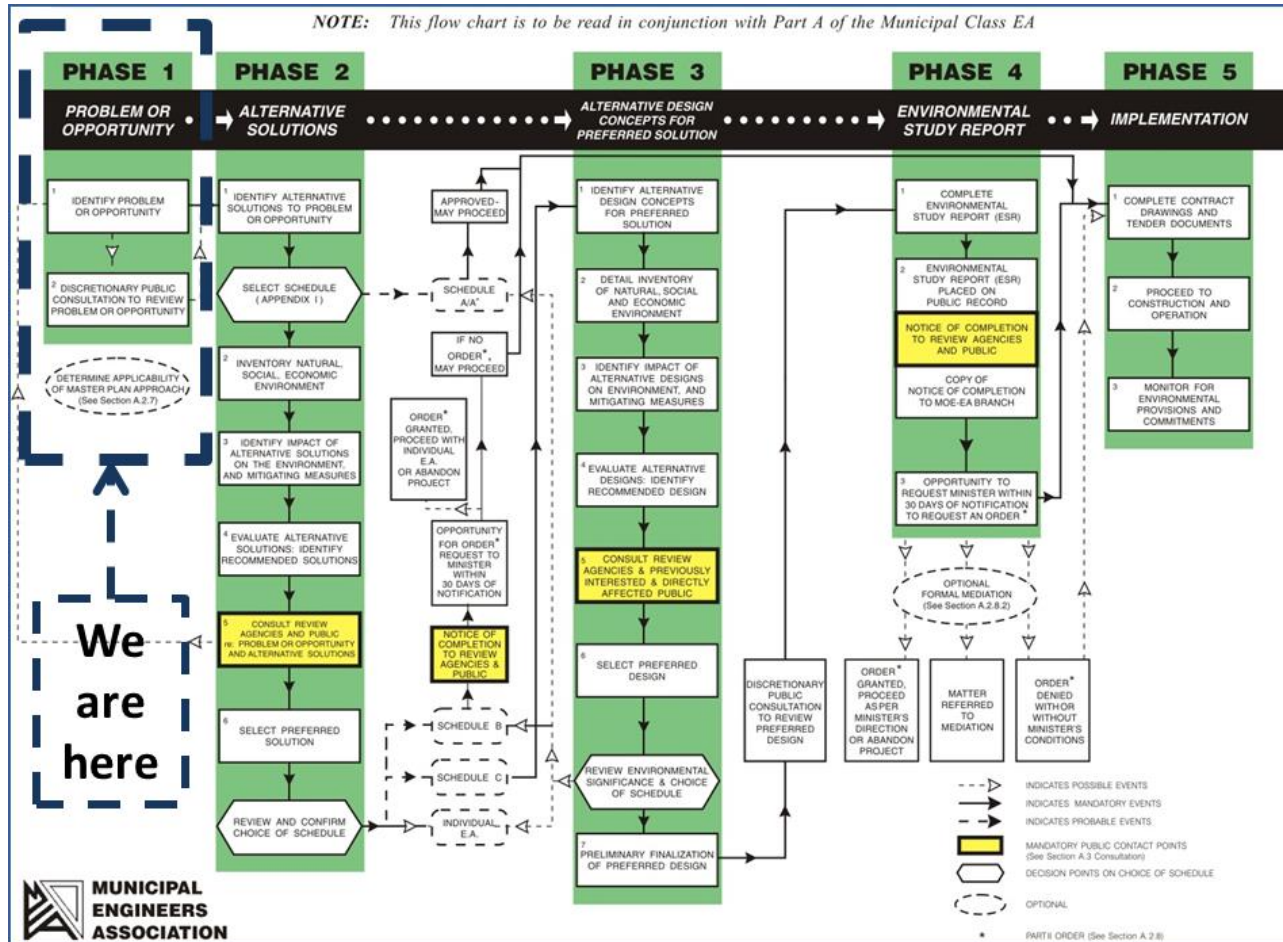
- Improve road surfaces on Bruce Road 25 (BR25) and Bruce Road 33 (BR33)
- Optimize the traffic flow patterns, and
- Address future requirements for number of lanes and traffic control at planned intersections along BR25.

Drainage:

The Proponent is considering to:

- Address drainage deficiencies along BR25
- Address flooding issues within the Baker Subdivision west of BR33, and
- Consider an appropriate outlet (s) supportive of area interests.

Municipal Class EA Process



Planning and implementation of municipal infrastructure projects are undertaken in accordance with an approved procedure, giving due regard to the need to protect the environment and minimize negative effects.

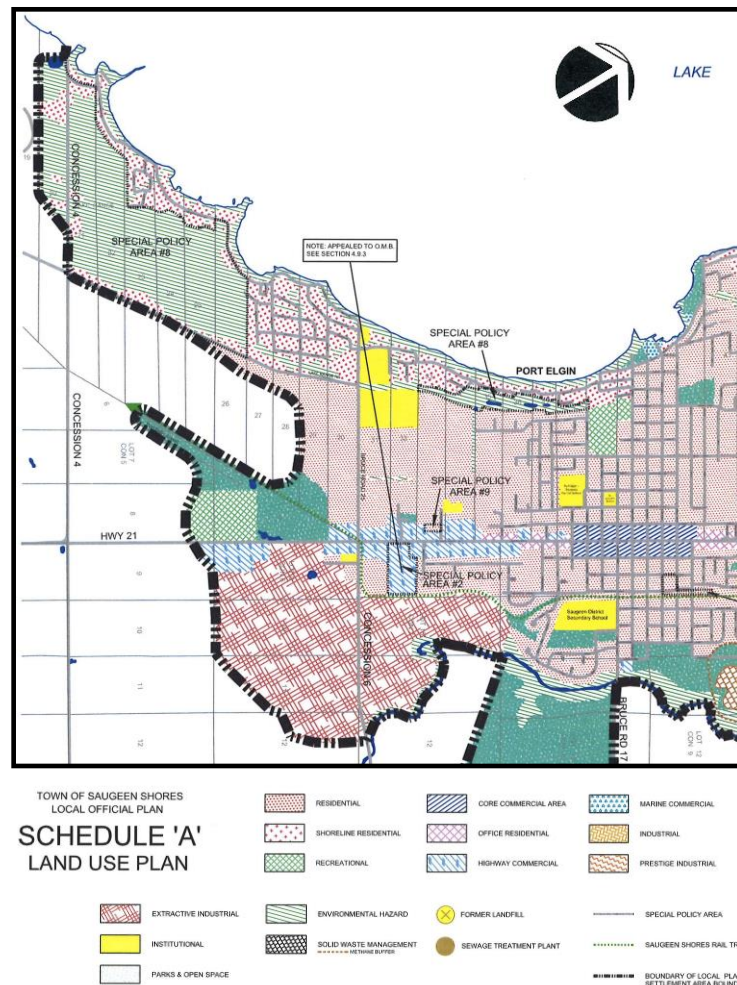
Key message: we are in the very early stages of a 'multi-phased' study



Phase 1

Local Official Plan: Schedule 'A'

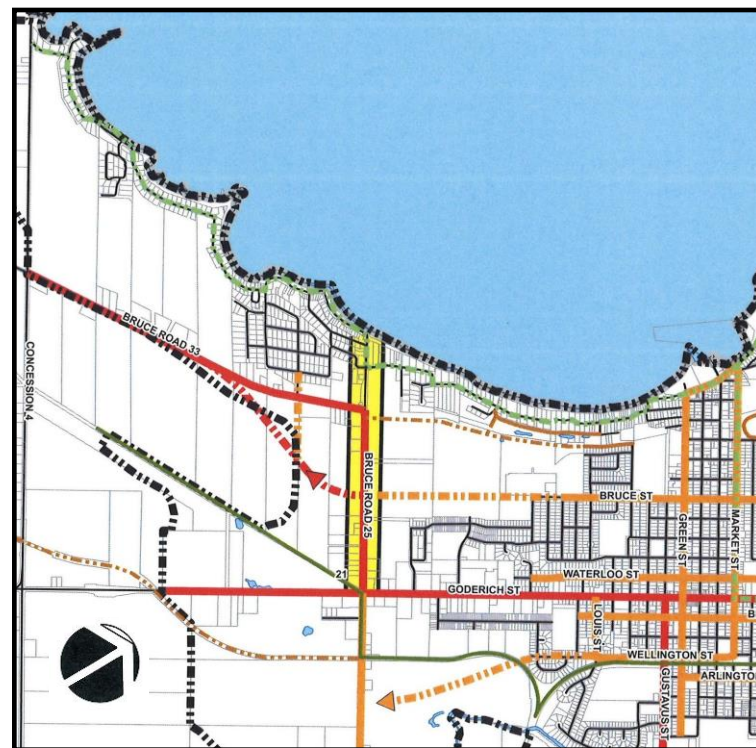
- Solutions for Roads and Drainage should consider planned future land uses;
- Future land uses adjacent to BR25 (north and south) and BR33 (east) are planned residential;
- Draft Plans of Subdivision are in place north of BR25;
- No current Secondary Plan or Draft Plan of Subdivision South of BR25.



Phase 1

Problems & Opportunities - Roads

- BR25 is currently a 2-lane rural cross-section with a tee intersection at BR33;
- Existing asphalt surfaces are in need of repair or replacement; and
- Intersection of BR25 and BR33 has poor sight lines that do not meet current design criteria.
- Previous plans have identified requirements for water and sewer services, additional lanes, an urban cross-section, active transportation and improved intersection control along BR25 from the Bruce Street alignment to Goderich Street.
- Planned extensions of Stickel Street, Bruce Street and Ridge Street to BR25 from the north, along with the existing BR33 intersection would create four off-set intersections (2 major) within a short length along BR25.



Town of Saugeen Shores
Local Official Plan
Schedule 'B'
Transportation Plan with Trails

- | | | |
|---------------------|---|--|
| — Arterial Road | — Proposed Collector | — Existing Trail |
| — Collector Road | — Local Road | — Proposed Trail |
| — Proposed Arterial | — Boundary of Local Plan/Settlement Area Boundary | — Saugeen Shores Rail Trail |
| | | — Proposed Active Transportation Route |
| | | — Active Transportation Route |



Phase 2 – Step 1

Alternative Solutions - Roads

At this early stage, the project team has identified 3 alternatives, representing a range of possible approaches/solutions.

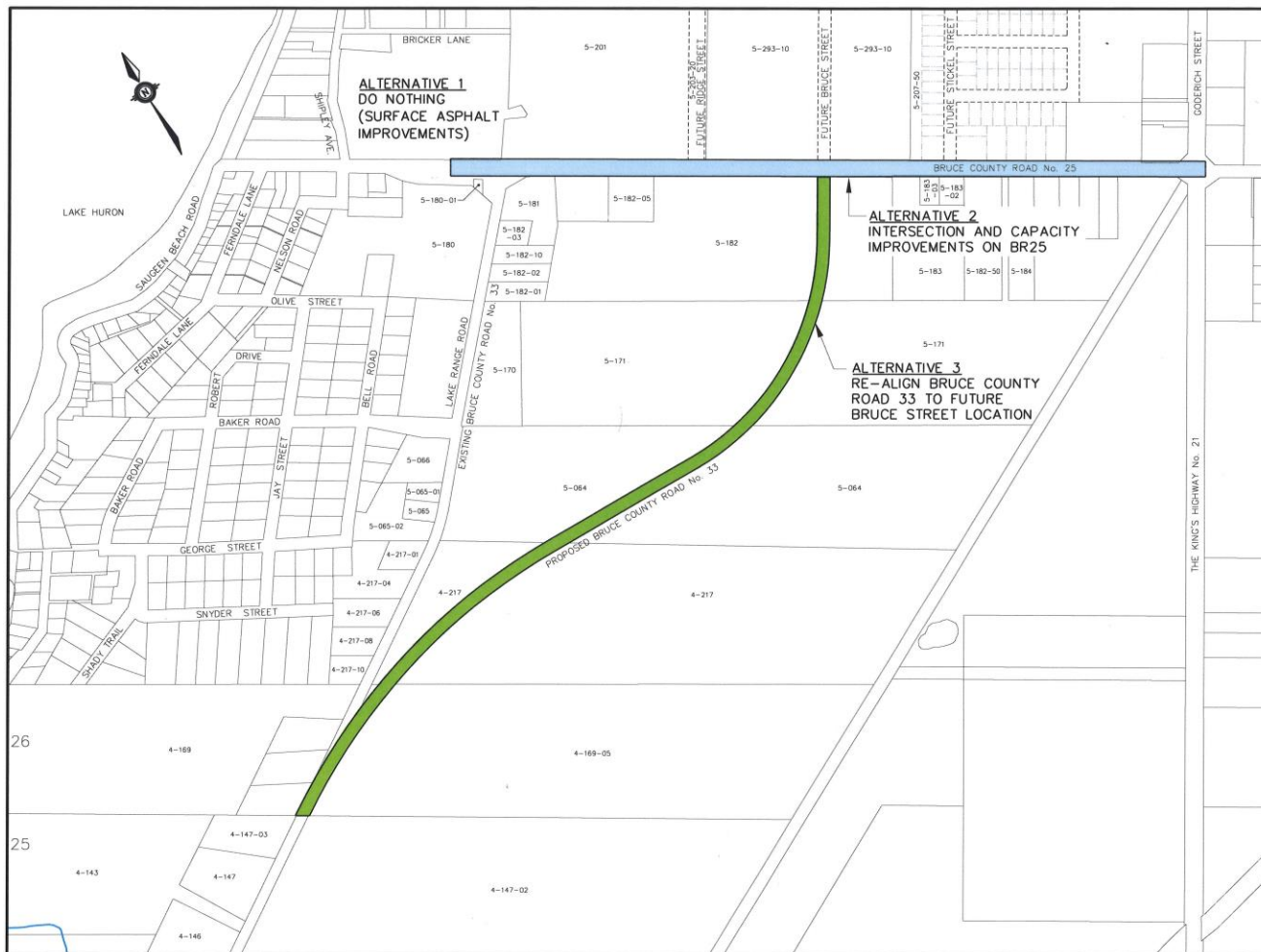
Variations of these may be developed as the study progresses.

- Alternative 1 – Do Nothing (Surface Asphalt Improvements Only)
- Alternative 2 – Intersection and Capacity Improvements on BR25
- Alternative 3 – Re-align BR33 to intersect BR25 future Bruce Street location.



Phase 2 – Step 1

Alternative Solutions - Roads





Phase 2 – Step 2

Inventory Natural, Social and Economic “Environments”- Roads

Natural

- Water Courses / Drainage Routes
- Bluff Feature
- Habitats (Flora and Fauna)

Social

- Land Requirements
- Archaeological Resources / Cultural Heritage
- Future Development / Community Needs
- Public Safety / Liability

Economic

- Capital and Maintenance Costs
- Life Cycle Costs (Asset Management)
- Potential Funding Partners



Phase 2 – Step 3

Screening and Mitigating Measures - Roads

- Identify issues and/or constraints with respect to each alternative and each “environment”;
- Consider the relative magnitude of each net positive and net negative effect;
- Explore mitigating measures and relative impacts.



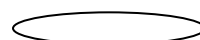
Phase 2 – Step 4

Sample Evaluation of Alternatives - Roads

| Category | Assessment Factor | Alt 1 Do Nothing | Alt 2 Intersection & Capacity Improvements BR25 | Alt 3 Realignment of BR33 to Bruce Street |
|----------------------------|--|---------------------|---|--|
| Natural Environment | Water Courses / Drainage Routes | | | |
| | Bluff Feature | | | |
| | Habitats (Flora and Fauna) | | | |
| Social Environment | Land Requirements | | | |
| | Archaeological Resources / Cultural Heritage | | | |
| | Future Development / Community Needs | | | |
| | Public Safety / Liability | | | |
| Economic | Capital and Maintenance Costs | | | |
| | Life Cycle Costs (Asset Management) | | | |
| | Potential Funding Partners | | | |
| Regulatory | Permits/Approvals | | | |



Negative



Neutral

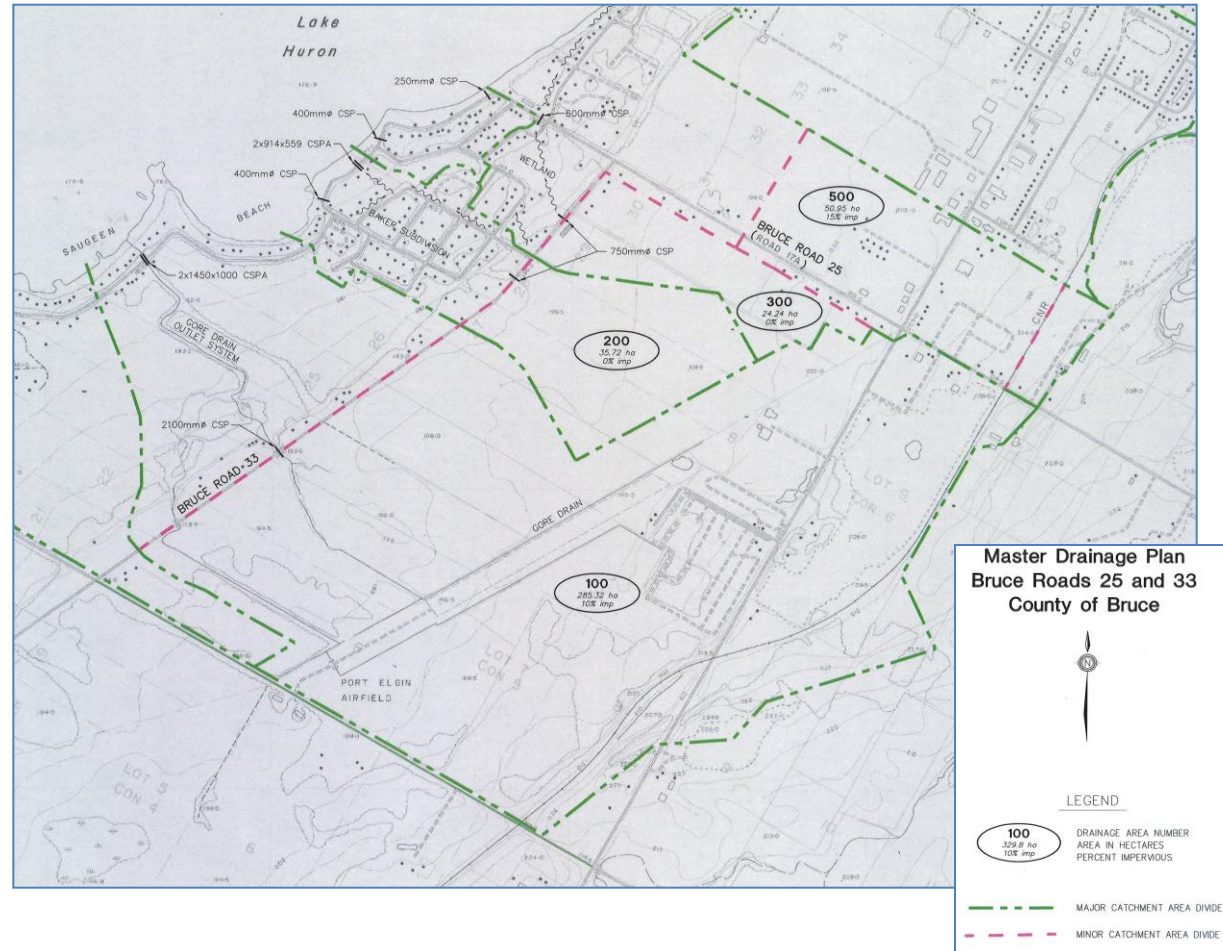


Positive

Phase 1

Problems & Opportunities - Drainage

- Existing outlet on BR25 is at capacity and crosses private properties.
- The drainage system on BR25 is inadequate to support existing conditions.
- Baker Subdivision experiences seasonal flooding.
- Planned development is on hold pending resolution to drainage issues.
- Existing outlet across public beach at the end of BR25 is relatively minor and there is a preference for not enlarging.





Phase 2 – Step 1

Alternative Solutions - Drainage

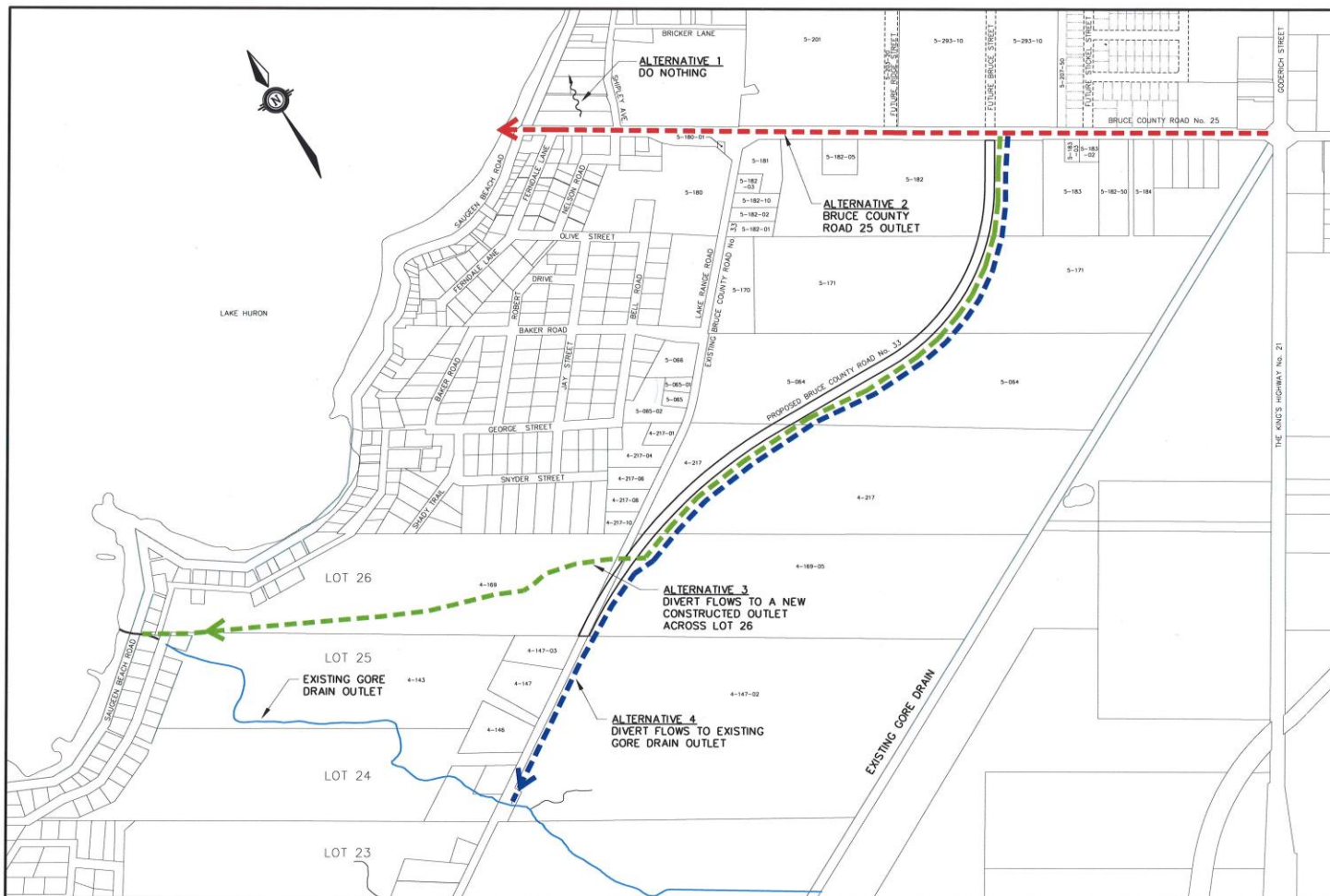
At this early stage, the project team has identified 4 alternatives, representing a range of possible approaches/solutions.

Variations of these may be developed as the study progresses.

- Alternative 1 – Do Nothing
- Alternative 2 – Improve BR25 Outlet to Lake Huron
- Alternative 3 – Divert flows from BR25 to a new constructed outlet across Lot 26 to existing Gore Drain Outlet west of Saugeen Beach Road
- Alternative 4 – Divert flows from BR25 to existing Gore Drain Outlet west of BR33.



Phase 2 – Step 1 Alternative Solutions - Drainage





Phase 2 – Step 2

Inventory Natural, Social and Economic “Environments”- Drainage

Natural

- Water courses / Drainage Routes (Quantity and Quality)
- Bluff Feature
- Wetlands
- Shoreline / Beaches
- Habitats (Flora and Fauna / Terrestrial and Aquatic)

Social

- Land Requirements
- Flooding Issues
- Archaeological Resources / Cultural Heritage
- Future Development / Community Needs
- Shoreline, Beaches, Recreational Opportunities
- Public Safety / Liability

Economic

- Capital and Maintenance Costs
- Life Cycle Costs (Asset Management)
- Potential Funding Partners



Phase 2 – Step 3

Screening and Mitigating Measures - Drainage

- Identify issues and constraints with respect to each alternative and each “environment”;
- Consider the relative magnitude of each net positive and net negative effect;
- Explore mitigating measures.



Phase 2 – Step 4: Sample Evaluation of Alternatives - Drainage

| Category | Assessment Factor | Alt 1 Do Nothing | Alt 2 BR25 Outlet | Alt 3 Lot 26 Outlet | Alt 4 Gore Drain Outlet |
|----------------------------|--|---------------------|----------------------|------------------------|-------------------------------|
| Natural Environment | Water Courses / Drainage Routes (Quantity and Quality) | | | | |
| | Bluff Feature | | | | |
| | Wetlands | | | | |
| | Shoreline / Beaches | | | | |
| | Habitats (Flora and Fauna / Terrestrial and Aquatic) | | | | |
| Social Environment | Land Requirements | | | | |
| | Flooding Issues | | | | |
| | Archaeological Resources / Cultural Heritage | | | | |
| | Future Development / Community Needs | | | | |
| | Shoreline, Beaches, Recreational Opportunities | | | | |
| | Public Safety / Liability | | | | |
| Economic | Capital and Maintenance Costs | | | | |
| | Life Cycle Costs (Asset Management) | | | | |
| | Potential Funding Partners | | | | |
| Regulatory | Permits/Approvals | | | | |



Negative



Neutral



Positive



Phase 2 – Step 5

Agency and Public Involvement

Agency Involvement

Agencies include: Federal Departments, Provincial Ministries, Local Governments, First Nation Groups, Conservation Authorities, Utility Companies, etc. The Project Team will engage relevant agencies throughout the process.

Public Involvement

Public input is an essential part of the planning and decision-making process.

Opportunities to provide your input are not limited to formal consultation events.

Our Public Consultation program includes inviting feedback from:

- Directly affected private landowners;
- Other interested stakeholders;
- General Public.

* The Phase 2 – Step 5 Public Information Centre will be scheduled at a later date. A recommended solution may be provided at that time.

* Phase 2 – Step 6 confirms the preferred solution(s).



Next Steps

The next steps in this project planning are expected as follows:

- ❖ Receive initial feedback from the public (Discretionary PIC),
- ❖ Update Project File (Alternatives/Inventories/Screening/Evaluation),
- ❖ Receive Agency Comments,
- ❖ Update Project File based on comments received,
- ❖ Hold Mandatory Public Information Centre #1 and receive public comments,
- ❖ Update Project File and recommend a Preferred (set of) Alternative(s),
- ❖ Review choice of project schedule (as appropriate),
- ❖ Issue "Notice of Completion".



Please Provide Your Feedback

Thank you for attending this Phase 1 Public Information Centre

Would you like to be included on the study mailing list?

Do you have any questions or comments about the study?

Please let us know your thoughts by completing a Comment Sheet.

Completed sheets can either be deposited in the envelope on the way out or submitted by **October 21st, 2015.**

Opportunities to provide input are not limited to formal meetings or events. You can provide input to the study team at any point through the study.

*Information collected will be used in accordance with the
Freedom of Information and Protection of Privacy Act.*

With the exception of personal information, all comments will become part of the public record.



COUNTY OF BRUCE

HIGHWAYS DEPARTMENT

Box 398, 30 Park Street, Walkerton, Ontario N0G 2V0
(519) 881-2400 1-877-681-1291 Fax: (519) 507-3030
Brian R. Knox, County Engineer

April 22, 2016
Our File: M-1552

Great Lakes Métis
380 – 9th Street East
Owen Sound, ON N4K 1P1

Attention: Mr. Peter Couture
President

Re: Master Plan for Roads and Drainage
Bruce County Roads 25 and 33
Saugeen Shores
Phase 2 Public Information Centre

Dear Mr. Peter Couture,

The County of Bruce and Town of Saugeen Shores are undertaking a Master Plan process, as outlined in Approach 1 of the Municipal Class Environmental Assessment Planning Manual, to address issues with roads and drainage in the southerly area of the Former Town of Port Elgin (Saugeen Shores), about the intersection of Bruce Roads 25 and 33.

A Discretionary Public Information Centre was held on October 7, 2015 and since this time this initiative has progressed into Phase 2 of the Municipal Class Environmental Assessment Planning and Design Process. Assessment and evaluation tables have been prepared for three road systems and seven drainage system alternatives and will be available for viewing on the County's website on May 2, 2016.

We are providing Great Lakes Métis with this information package identifying the issues currently under consideration and the plan to host a Public Information Centre (PIC) on May 18, 2016. We would welcome the opportunity of meeting with you prior to the PIC and look forward to working with you on this initiative.

We will provide you with updates as this initiative progresses, please contact me or our consultant John Slocombe, P.Eng of GM BluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox, P.Eng
County Engineer

Encl.

c: Len Perdue – Saugeen Shores: perduel@saugeenshores.ca
John Slocombe – GM BluePlan: john.slocombe@gmblueplan.ca



**MASTER PLAN FOR ROADS AND DRAINAGE
BRUCE COUNTY ROADS 25 AND 33
NOTICE OF PHASE 2
PUBLIC INFORMATION CENTRE**

The County of Bruce as Proponent, with the Town of Saugeen Shores, is studying road and drainage alternatives in the area of Bruce County Roads 25 and 33 (BR25 & BR33), located centrally in Saugeen Shores, and is inviting interested members of the public to attend an Information Centre.

The County has identified various deficiencies with its road and drainage infrastructure within the Study Area. Through initial discussions with the Town, other related issues having a broader scope have emerged which the County wishes to consider at a Master Planning level to ensure individual projects are completed in context with an appropriate overall plan. The purpose of the Phase 2 Public Information Centre is to describe the identified issues within the Study Area and to receive input from the public on the evaluation of alternative solutions to the identified problems.

Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of BR25 and BR33, and planned future intersections at Stickel, Bruce and Ridge Streets. Alternatives for Road Systems include; Do Nothing but resurfacing, Re-align the BR33 intersection with the future Ridge Street intersection, or Re-align the BR33 intersection the with the future Bruce Street intersection.

Issues related to drainage include limited capacity along BR25, poor drainage through the Baker Subdivision, and inadequate drainage outlets within the Study Area. Alternatives for Drainage systems include; Do Nothing, Improve Existing Conditions, Construct a new outlet westerly on BR25 to Lake Huron, Divert flows northerly to the existing South End Drain Outlet, Divert flows from BR25 southerly along BR33 to a new constructed outlet westerly through the Baker Subdivision, Divert flows from BR25 southerly along BR33 to a new constructed outlet across Lot 26 to the existing Gore Drain outlet below Saugeen Beach Road, or Divert flows southerly along BR33 to the existing Gore Drain outlet below Lake Range Road (BR33).

The Master Plan is being conducted under the **Municipal Class Environmental Assessment (EA)** project planning process and is intended to follow, as a minimum, Phases 1 and 2 of the EA Process, in support of Schedule B and/or Schedule C projects, which may be identified for further study and implementation through the process.

As part of this process a Phase 2 **Public Information Centre** is planned at the Town of **Saugeen Shores Rotary Hall on Wednesday, May 18th, 2016 at 7:00 p.m. – 9:00 p.m.**, at which time project information will be displayed and a recommended solution presented. The Project Team will be available for discussions.

The public is invited to provide written comments for incorporation into the planning considerations for this project. Upon receipt of comments from the public, a Project File will consolidate the Master Planning process and a Preferred Solution will be recommended for acceptance by County and Town Councils. Additional information is provided on the municipal web sites.

This Notice issued May 2nd, 2016.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 398, 30 Park St.
Walkerton, ON N0G 2V0
Tel: (519) 881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Mr. Len Perdue
600 Tomlinson Drive
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COUNTY OF BRUCE

HIGHWAYS DEPARTMENT

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(519) 881-2400 1-877-681-1291 Fax: (519) 507-3030
Brian R. Knox, County Engineer

April 22, 2016

Our File: M-1552

Historic Saugeen Métis
P.O. Box 1492
204 High Street
Southampton, ON N0H 2L0

Attention: Mr. George Govier
Lands and Resources Coordinator

Re: Master Plan for Roads and Drainage
Bruce County Roads 25 and 33
Saugeen Shores
Phase 2 Public Information Centre

Dear Mr. Govier,

The County of Bruce and Town of Saugeen Shores are undertaking a Master Plan process, as outlined in Approach 1 of the Municipal Class Environmental Assessment Planning Manual, to address issues with roads and drainage in the southerly area of the Former Town of Port Elgin (Saugeen Shores), about the intersection of Bruce Roads 25 and 33.

A Discretionary Public Information Centre was held on October 7, 2015 and since this time this initiative has progressed into Phase 2 of the Municipal Class Environmental Assessment Planning and Design Process. Assessment and evaluation tables have been prepared for three road systems and seven drainage system alternatives and will be available for viewing on the County's website on May 2, 2016.

We are providing Historic Saugeen Métis (HSM) with this information package identifying the issues currently under consideration and the plan to host a Public Information Centre (PIC) on May 18, 2016. We would welcome the opportunity of meeting with you prior to the PIC and look forward to working with you on this initiative.

We will provide you with updates as this initiative progresses, please contact me or our consultant John Slocombe, P.Eng of GM BluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox, P.Eng
County Engineer

Encl.

c: Len Perdue – Saugeen Shores: perduel@saugeenshores.ca
John Slocombe – GM BluePlan: john.slocombe@gmblueplan.ca



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BRUCE COUNTY ROADS 25 AND 33
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This Notice issued May 2nd, 2016.

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April 22, 2016
Our File: M-1552

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
R.R. #5, Wiarton, ON N0H 2T0

Attention: Mr. Doran Ritchie
Landuse Planning Coordinator

Re: Master Plan for Roads and Drainage
Bruce County Roads 25 and 33
Saugeen Shores
Phase 2 Public Information Centre

Dear Mr. Ritchie,

The County of Bruce and Town of Saugeen Shores are undertaking a Master Plan process, as outlined in Approach 1 of the Municipal Class Environmental Assessment Planning Manual, to address issues with roads and drainage in the southerly area of the Former Town of Port Elgin (Saugeen Shores), about the intersection of Bruce Roads 25 and 33.

A Discretionary Public Information Centre was held on October 7, 2015 and since this time this initiative has progressed into Phase 2 of the Municipal Class Environmental Assessment Planning and Design Process. Assessment and evaluation tables have been prepared for three road systems and seven drainage system alternatives and will be available for viewing on the County's website on May 2, 2016.

We are providing Saugeen Ojibway Nation (SON) with this information package identifying the issues currently under consideration and the plan to host a Public Information Centre (PIC) on May 18, 2016. We would welcome the opportunity of meeting with you prior to the PIC and look forward to working with you on this initiative.

We will provide you with updates as this initiative progresses, please contact me or our consultant John Slocombe, P.Eng of GM BluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox, P.Eng
County Engineer

Encl.

c: Len Perdue – Saugeen Shores: perduel@saugeenshores.ca
John Slocombe – GM BluePlan: john.slocombe@gmblueplan.ca



**MASTER PLAN FOR ROADS AND DRAINAGE
BRUCE COUNTY ROADS 25 AND 33
NOTICE OF PHASE 2
PUBLIC INFORMATION CENTRE**

The County of Bruce as Proponent, with the Town of Saugeen Shores, is studying road and drainage alternatives in the area of Bruce County Roads 25 and 33 (BR25 & BR33), located centrally in Saugeen Shores, and is inviting interested members of the public to attend an Information Centre.

The County has identified various deficiencies with its road and drainage infrastructure within the Study Area. Through initial discussions with the Town, other related issues having a broader scope have emerged which the County wishes to consider at a Master Planning level to ensure individual projects are completed in context with an appropriate overall plan. The purpose of the Phase 2 Public Information Centre is to describe the identified issues within the Study Area and to receive input from the public on the evaluation of alternative solutions to the identified problems.

Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of BR25 and BR33, and planned future intersections at Stickel, Bruce and Ridge Streets. Alternatives for Road Systems include; Do Nothing but resurfacing, Re-align the BR33 intersection with the future Ridge Street intersection, or Re-align the BR33 intersection the with the future Bruce Street intersection.

Issues related to drainage include limited capacity along BR25, poor drainage through the Baker Subdivision, and inadequate drainage outlets within the Study Area. Alternatives for Drainage systems include; Do Nothing, Improve Existing Conditions, Construct a new outlet westerly on BR25 to Lake Huron, Divert flows northerly to the existing South End Drain Outlet, Divert flows from BR25 southerly along BR33 to a new constructed outlet westerly through the Baker Subdivision, Divert flows from BR25 southerly along BR33 to a new constructed outlet across Lot 26 to the existing Gore Drain outlet below Saugeen Beach Road, or Divert flows southerly along BR33 to the existing Gore Drain outlet below Lake Range Road (BR33).

The Master Plan is being conducted under the **Municipal Class Environmental Assessment (EA)** project planning process and is intended to follow, as a minimum, Phases 1 and 2 of the EA Process, in support of Schedule B and/or Schedule C projects, which may be identified for further study and implementation through the process.

As part of this process a Phase 2 **Public Information Centre** is planned at the Town of **Saugeen Shores Rotary Hall on Wednesday, May 18th, 2016 at 7:00 p.m. – 9:00 p.m.**, at which time project information will be displayed and a recommended solution presented. The Project Team will be available for discussions.

The public is invited to provide written comments for incorporation into the planning considerations for this project. Upon receipt of comments from the public, a Project File will consolidate the Master Planning process and a Preferred Solution will be recommended for acceptance by County and Town Councils. Additional information is provided on the municipal web sites.

This Notice issued May 2nd, 2016.

The County of Bruce
Mr. Brian Knox, P.Eng.
Box 398, 30 Park St.
Walkerton, ON N0G 2V0
Tel: (519) 881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Mr. Len Perdue
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
Tel: (519) 832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Consulting Professional Engineers
Mr. John Slocombe, P.Eng.
1260 2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
Tel: (519) 376-1805
www.gmbblueplan.ca



December 18, 2017

Chippewas of Nawash Unceded Nation
135 Lakeshore Boulevard
Neyaashinigmiing, ON N0H 2T0

Attention: Rose Lameman

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

We are providing Saugeen First Nation with the attached Notice of Project Initiation for the Schedule B Environmental Assessment (EA) for the Bruce County Road 33 Re-Alignment that will be issued on January 9, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in June 2017, Saugeen Ojibway Nation monitors were present during the assessment.

The Master Plan and the Schedule B EA Project File, which includes all background technical reports, will be available on the County of Bruce and Town of Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shore Municipal Office for viewing on January 9, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant John Slocombe, P.Eng of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox
County Engineer

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores

County of Bruce Highways Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030
Brian R. Knox, County Engineer

brucecounty.on.ca



December 18, 2017

MNO Great Lakes Metis Council
380-9th Street East
Owen Sound, ON N4K 1P1

Attention: Peter Couture

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

We are providing Saugeen First Nation with the attached Notice of Project Initiation for the Schedule B Environmental Assessment (EA) for the Bruce County Road 33 Re-Alignment that will be issued on January 9, 2018. The Master Plan and the Schedule B EA Project File, which includes all background technical reports, will be available on the County of Bruce and Town of Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shore Municipal Office for viewing on January 9, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant John Slocombe, P.Eng of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

A handwritten signature in dark ink, appearing to be 'B. Knox', written over a horizontal line.

Brian Knox
County Engineer

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



December 18, 2017

Historic Saugeen Metis
204 High Street, PO Box 1492
Southampton, ON N0H2L0

Attention: George Govier

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

We are providing Saugeen First Nation with the attached Notice of Project Initiation for the Schedule B Environmental Assessment (EA) for the Bruce County Road 33 Re-Alignment that will be issued on January 9, 2018. The Master Plan and the Schedule B EA Project File, which includes all background technical reports, will be available on the County of Bruce and Town of Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shore Municipal Office for viewing on January 9, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant John Slocombe, P.Eng of GMBluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox
County Engineer

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



December 18, 2017

Saugeen First Nation
Chippewas of Saugeen First Nation No.29
6493 Highway 21, RR#1
Southampton, ON N0H2L0

Attention: Allen Deleary

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

We are providing Saugeen First Nation with the attached Notice of Project Initiation for the Schedule B Environmental Assessment (EA) for the Bruce County Road 33 Re-Alignment that will be issued on January 9, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in June 2017, Saugeen Ojibway Nation monitors were present during the assessment.

The Master Plan and the Schedule B EA Project File, which includes all background technical reports, will be available on the County of Bruce and Town of Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shore Municipal Office for viewing on January 9, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant John Slocombe, P.Eng of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox
County Engineer

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



December 18, 2017

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
RR#5, Wiarton ON N0H 2T0

Attention: Doran Ritchie

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

We are providing Saugeen Ojibway Nation (SON) with the attached Notice of Project Initiation for the Schedule B Environmental Assessment (EA) for the Bruce County Road 33 Re-Alignment that will be issued on January 9, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in June 2017, SON monitors were present during the assessment.

The Master Plan and the Schedule B EA Project File, which includes all background technical reports, will be available on the County of Bruce and Town of Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shore Municipal Office for viewing on January 9, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant John Slocombe, P.Eng of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Brian Knox
County Engineer

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



**SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE COUNTY ROAD 33 RE-ALIGNMENT
NOTICE OF PROJECT INITIATION**

The County of Bruce as Proponent, with the Town of Saugeen Shores, having recently completed a Master Plan for Roads and Drainage for the general Study Area, is advancing project specific planning for the re-alignment of Bruce Road 33 (BR33), located centrally in Saugeen Shores.

The County has identified various deficiencies with road and drainage infrastructure within the Study Area. Issues related to roads include deteriorated travelled surfaces, poor sight lines at the intersection of B25 and BR33, and planned future intersections at Sitckel, Bruce, and Ridge Streets. The Master Plan process reviewed alternative solutions for roads including;

- i) Do nothing but resurfacing,
- ii) Intersection and Capacity Improvements on BR25, and
- iii) Re-align the BR33 intersection with the future Bruce Street intersection.

Through the Master Plan process, the re-alignment of BR33 to intersect with BR25 at a future Bruce Street alignment location was identified as the preferred solution to address the issues identified.

Project specific planning for the re-alignment of BR33 is being conducted as a Schedule B activity under the **Municipal Class Environmental Assessment (EA)**. Project planning is intended to follow, as a minimum, Phases 1 and 2 of the EA Process. The Schedule B EA process is project specific to the re-alignment of Bruce Road 33 and is intended to update and verify the direction resolved through the more general Master Plan process.

Both the Master Plan Report and the Schedule B EA Project File are available on the County and Town websites at the addresses noted below.

The public is invited to review the documentation and to provide written comments for incorporation into the planning considerations for the Bruce Road 33 re-alignment project. Comments may be directed to any one of the contacts listed below, and should be received by **February 6, 2018**.

This Notice first issued on January 9, 2018.

The County of Bruce
Mr. Brian Knox, P.Eng.
30 Park Street
Box 398
Walkerton, ON N0G 2V0
bknox@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P. Eng.
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Consulting Professional Engineers
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030

brucecounty.on.ca

April 25, 2018

Chippewas of Nawash Unceded Nation
135 Lakeshore Boulevard
Neyaashinigmiing, ON N0H 2T0

Attention: Rose Lameman

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. Correspondence was provided to Chippewas of Nawash Unceded Nation on December 18, 2017 regarding the Schedule B EA for Bruce Road 33 and the Notice of Project Initiation dated January 9, 2018.

The Department is moving forward with the Schedule B EA for Bruce Road 33 and is issuing the Notice of Study Completion on May 1, 2018. The notice identifies the preferred solution to be the re-alignment of Bruce Road 33 intersection with the future Bruce Street Intersection. A copy of the notice is enclosed for your review.

The Schedule B EA Project File will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on May 1, 2018.

We will continue to provide correspondence as the project progresses. Please contact our office or our consultant John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Kerri Meier
Environmental Coordinator

Encl.

c: Kelley Coulter, CAO Bruce County
John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030

brucecounty.on.ca

April 25, 2018

MNO Great Lakes Metis Council
380-9th Street East
Owen Sound, ON N4K 1P1

Attention: Peter Couture

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. Correspondence was provided to MNO Great Lakes Metis Council on December 18, 2017 regarding the Schedule B EA for Bruce Road 33 and the Notice of Project Initiation dated January 9, 2018.

The Department is moving forward with the Schedule B EA for Bruce Road 33 and is issuing the Notice of Study Completion on May 1, 2018. The notice identifies the preferred solution to be the re-alignment of Bruce Road 33 intersection with the future Bruce Street Intersection. A copy of the notice is enclosed for your review.

The Schedule B EA Project File will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on May 1, 2018.

We will continue to provide correspondence as the project progresses. Please contact our office or our consultant John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Kerri Meier
Environmental Coordinator

Encl.

c: Kelley Coulter, CAO Bruce County
John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030

brucecounty.on.ca

April 25, 2018

Historic Saugeen Metis
P.O. Box 1492, 204 High Street
Southampton, ON N0H 2L0

Attention: George Govier

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. Correspondence was provided to Historic Saugeen Metis on December 18, 2017 regarding the Schedule B EA for Bruce Road 33 and the Notice of Project Initiation dated January 9, 2018.

The Department is moving forward with the Schedule B EA for Bruce Road 33 and is issuing the Notice of Study Completion on May 1, 2018. The notice identifies the preferred solution to be the re-alignment of Bruce Road 33 intersection with the future Bruce Street Intersection. A copy of the notice is enclosed for your review.

The Schedule B EA Project File will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on May 1, 2018.

We will continue to provide correspondence as the project progresses. Please contact our office or our consultant John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Kerri Meier
Environmental Coordinator

Encl.

c: Kelley Coulter, CAO Bruce County
John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030

brucecounty.on.ca

April 25, 2018

Saugeen First Nation
Chippewas of Saugeen First Nation No.29
6493 Highway 21, RR#1
Southampton, ON N0H2L0

Attention: Cheree Urscheler

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. Correspondence was provided to Saugeen First Nation on December 18, 2017 regarding the Schedule B EA for Bruce Road 33 and the Notice of Project Initiation dated January 9, 2018.

The Department is moving forward with the Schedule B EA for Bruce Road 33 and is issuing the Notice of Study Completion on May 1, 2018. The notice identifies the preferred solution to be the re-alignment of Bruce Road 33 intersection with the future Bruce Street Intersection. A copy of the notice is enclosed for your review.

The Schedule B EA Project File will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on May 1, 2018.

We will continue to provide correspondence as the project progresses. Please contact our office or our consultant John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Kerri Meier
Environmental Coordinator

Encl.

c: Kelley Coulter, CAO Bruce County
John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400 1-877-681-1291 Fax (519)507-3030

brucecounty.on.ca

April 25, 2018

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
RR#5, Wiarton ON N0H 2T0

Attention: Doran Ritchie

Re: Schedule B Environmental Assessment - Bruce Road 33 Re-Alignment

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Notice of Study Completion for the Master Plan was issued on May 9, 2017 and identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. Correspondence was provided to Saugeen Ojibway Nation (SON) on December 18, 2017 regarding the Schedule B EA for Bruce Road 33 and the Notice of Project Initiation dated January 9, 2018.

The Department is moving forward with the Schedule B EA for Bruce Road 33 and is issuing the Notice of Study Completion on May 1, 2018. The notice identifies the preferred solution to be the re-alignment of Bruce Road 33 intersection with the future Bruce Street Intersection. A copy of the notice is enclosed for your review.

The Schedule B EA Project File will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on May 1, 2018.

We will continue to provide correspondence as the project progresses. Please contact our office or our consultant John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Kerri Meier
Environmental Coordinator

Encl.

c: Kelley Coulter, CAO Bruce County
John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores

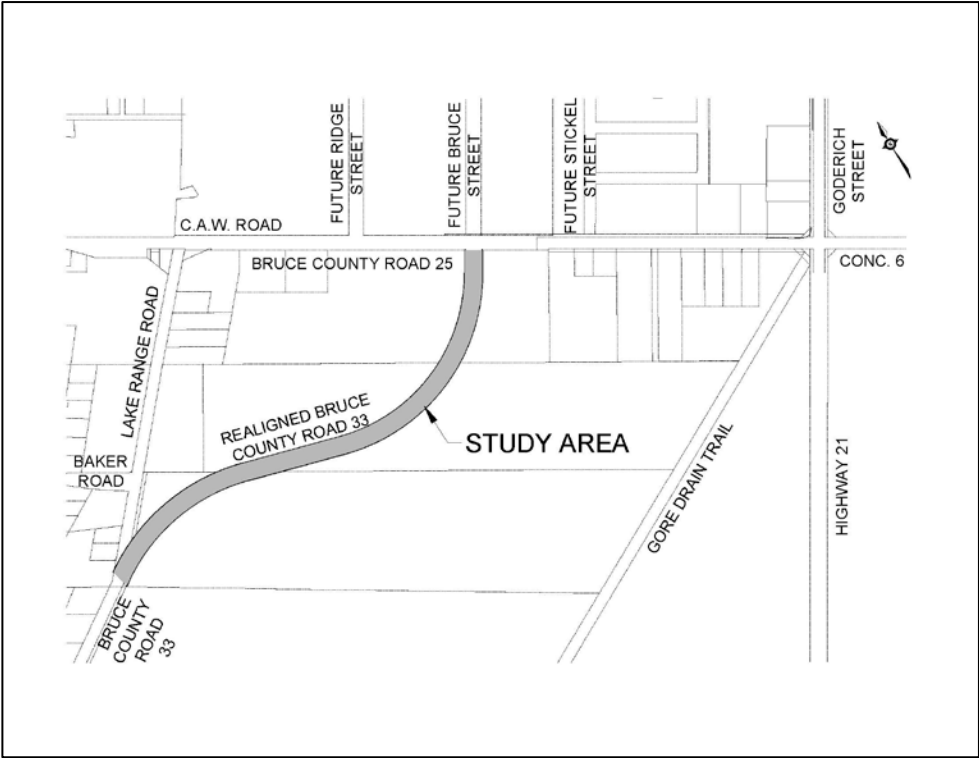
SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
BRUCE COUNTY ROAD 33 RE-ALIGNMENT
NOTICE OF STUDY COMPLETION

The County of Bruce as Proponent, with the Town of Saugeen Shores, having recently completed a Master Plan for the general Study Area, is advancing project specific planning for the re-alignment of Bruce Road 33 (BR33), located where shown on the accompanying map. Issues related to roads include deteriorated travelled surfaces, poor sight lines and planned future intersections at Stickel, Bruce, and Ridge Streets. The Master Plan process reviewed alternative solutions for roads including;

- i) Do nothing but resurfacing,
- ii) Intersection and Capacity Improvements on BR25, and
- iii) Re-align the BR33 intersection with the future Bruce Street intersection.

Through the Master Plan process, the re-alignment of BR33 to intersect with BR25 at a future Bruce Street alignment location was identified as the preferred solution to address the issues identified.

Project specific planning for the re-alignment of BR33 is being conducted as a Schedule B activity under the **Municipal Class Environmental Assessment (EA)**. The Schedule B EA process is project specific to the re-alignment of Bruce Road 33 and is intended to update and verify the direction resolved through the more general Master Plan process. A Notice of Project Initiation was issued on **January 9, 2018**. Based on the study findings and comments, the BR33 re-alignment alternative, as described in the Master Plan, is adopted by Council as the Preferred Solution to this Schedule B EA process. Both the Master Plan Report and the Schedule B EA Project File are available on the County and Town websites at the addresses noted below.




Interested parties should provide written comments to the County of Bruce, at the address noted below, within 30 calendar days from the date of this Notice. If concerns arise regarding this project, which cannot be resolved in discussion with the County, a person or party may request the Minister of the Environment and Climate Change to order a change in the project status and require a higher level of assessment under an individual Environmental Assessment process (referred to as a Part II Order). Reasons must be provided for the request. Requests must be received by the Minister within 30 calendar days of this Notice.

Part II Order requests are to be submitted to:

| | |
|---|---|
| Minister Ministry of the Environment and Climate Change 77 Wellesley St. W., Floor 11 Toronto, ON M7A 2T5 Fax: 416-314-8452 | Director Environmental Assessment & Permissions Branch Ministry of the Environment and Climate Change 135 St. Clair Avenue W, 1 st Floor Toronto, ON M4V 1L5 |
|---|---|

A copy of the request should also be sent to the following:

| | | |
|---|---|--|
| The County of Bruce Ms. Kerri Meier 30 Park Street, Box 398 Walkerton, ON N0G 2V0 kmeier@brucecounty.on.ca Tel: 519-881-2400 www.brucecounty.on.ca | The Town of Saugeen Shores Ms. Amanda Froese, P. Eng. 600 Tomlinson Drive , P.O. Box 820 Port Elgin, ON N0H 2C0 amanda.froese@saugeenshores.ca Tel: 519-832-2008 www.saugeenshores.ca | GM BluePlan Engineering Limited Consulting Professional Engineers Mr. John Slocombe, P.Eng. 1260-2 nd Avenue East, Unit 1 Owen Sound, ON N4K 2J3 john.slocombe@gmblueplan.ca Tel: 519-376-1805 www.gmblueplan.ca |
|---|---|--|



Feb.5, 2018

Minister of the Environment and Climate Change
77 Wellesley St. W, Floor 11
Toronto ON M7A 2T5

Dear Minister Chris Ballard

**Part II Order Request
Bruce County Road 33 Re-alignment**

I have reviewed the project file Bruce County Road 33 Re-alignment and feel that there has not been adequate consultation of the cottagers who are major stakeholders and therefore I am submitting this Part II Order Request. It is necessary for proper engagement that the cottagers in the area be consulted because we are major users of CR 25 and CR 33 and the surrounding area which are being affected by the project.

Both the Notice of Phase 2 and the Project Initiation Notice do not refer to the roads by their commonly known names. CR 25 has commonly been known as the CAW Road and Con. 6. CR33 is commonly known as Lake Range Road. These names are referenced in the report but not in the Notices. The notices state that the project is located centrally in Saugeen Shores when in fact it is in the south end of Saugeen Shores and there was not a map included in the notices to show the project location. When I received the notice, I did not realize that I frequently travel these roads and the stormwater outflow would potentially affect the shoreline.

The Notice of Phase 2 Public Information Centre was sent May 2 for a meeting Wednesday May 18 from 7:00 to 9:00 pm. It is difficult for most cottagers to attend a mid-week meeting on such short notice in May (prior to many cottage openings Victoria Day Weekend). A Stakeholder meeting was held Oct. 25, 2017, which again was mid week, shortly after Thanksgiving.

Having been a cottager for more than 50 years, I feel that I should have been engaged in the planning process. I feel that the recreation, safety, environment and tourism aspects of the project have not adequately been addressed in the study and I would like more information.

From a recreational point of view and safety, I feel that the proposed multi-use path proposed on the north side of CR25 must be built at the same time that the road is upgraded. Recently I have heard from the Beachers' Association that the multi-use path will not be built for at least 4 years. This would be a missed opportunity and we all know any delay means it may never happen. In the summer people walk and ride bikes along CR25 between Town and the lake and I have felt for a long time that there should be a bike path on CR 25. It is not safe to walk or ride along CR 25 because of the site lines and therefore from a safety perspective this should be built without a 4 year delay.

I would not like to see the addition of a traffic light at CR33 and CR25 and the addition of more stop signs until the traffic warrants it. I prefer the option of a round about if it can be done safely taking into account pedestrians and cyclists.

From a tourism standpoint, I believe biking should be encouraged and thus the plans must take this into account, not just motor vehicles. CR 33 should also have bike lanes because it is a well travelled bike route. Although they are discussed briefly, they are not described in detail.

Stormwater management and sewers are big issues in this area of Saugeen Shores. The sewers have never been continued south of CR 25 and many of the septic systems are extremely old. Before further development takes place in this area, the sewers must be extended. Although it is mentioned in the report, stormwater management is an issue, with increased run-off according to the plan. There are not sufficient details discussing water quality. This is significant because the outflow will be into the lake. The water quality is extremely important for tourism, for the residents/cottagers and the natural environment, therefore consideration must be given to how the water quality will be preserved.

I am not trying to stop the project, but I am submitting this Part II Order Request to ensure proper consultation with the hope that Bruce County and Saugeen Shores will notify the stakeholders properly and incorporate the feedback into the plan, which are the fundamental principles of the EA process.

Sincerely,



cc.

Kathleen O'Neill, Director EA Brand

Brian Knox, County of Bruce

From: Brian Knox

Sent: Thursday, March 1, 2018 4:14 PM

To: [REDACTED]

Cc: Kerri Meier <kmeier@brucecounty.on.ca>; Amanda Froese (amanda.froese@saugeenshores.ca)
<amanda.froese@saugeenshores.ca>; John Slocombe (John.Slocombe@gmblueplan.ca)
<John.Slocombe@gmblueplan.ca>

Subject: Bruce County Road 33 Re-alignment

[REDACTED]

The County received your letter dated February 5, 2018 to the Minister of Environment and Climate Change regarding the Part II Order Request - Bruce County Road 33 Re-alignment. We called earlier today and it seemed best to email and to comment on a number of items you had included in your letter.

The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Master Plan process included two public information sessions and comment periods. We noted that the meetings were very well attended. The Notice of Study Completion for the Master Plan was issued on May 9, 2017. We note that various projects are derived from the Master Plan and we have identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.

The Bruce Road 33 re-alignment will be undertaken in accordance with the Municipal Class Environmental Assessment (EA) Planning Process as a Schedule B project. The Notice of Project Initiation was issued on January 9, 2018 with comments due on February 6, 2018. The County is now considering all the comments received and will review the project and will update the project file prior to the Notice of Completion being issued and the 30 day review period commencing. We expect to take the recommendation for the preferred solution to the March 22 meeting of the Transportation and Environmental Services Committee. The Committee's decision on the recommendation would form the basis of the Notice of Completion.

An active transportation route is proposed on the north side of Bruce Road 25 and will be constructed throughout the four years that the Bruce Road 25 and Bruce Road 33 projects will be undertaken. The County is also working with the Great Lakes Waterfront Trail project which identifies a mapping route for cyclist throughout Bruce County. The proposed route encourages cyclist to travel on Bruce Road 33 to Conc 4, then along Saugeen Beach Road and consequently to Bruce Road 25 or to continue along Shipley Ave. We are of the opinion that the active transportation route on Bruce Road 25 will assist with the cyclist safety.

Concerning your comment on the Bruce Road 33 realignment, we did consider a traffic circle at the proposed Bruce Road 25/33 intersection in the Master Plan but a signalized intersection was considered as "preferred" for pedestrian safety reasons, this decision is being reviewed by the Town, County and Consultants.

The Bruce County Road 33 Re-alignment does have regard for storm water management and water quality will be considered and incorporated in the design.

Many thanks for your comments and feel free to give us a call.

Many thanks,

Brian

Brian Knox

Engineer

Transportation & Environmental Services
Corporation of the County of Bruce

519-881-2400 ext 263

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From: Kerri Meier [<mailto:kmeier@brucecounty.on.ca>]

Sent: March-06-18 4:47 PM

To: [REDACTED]

Cc: Amanda Froese (amanda.froese@saugeenshores.ca); John Slocombe (John.Slocombe@gmblueplan.ca); Brian Knox; Robinson, Callee (MOECC)

Subject: RE: Bruce County Road 33 Re-alignment

[REDACTED]

Thank you for the phone conversation this morning to review and discuss the email below.

We acknowledge your concerns regarding stakeholder engagement for projects which include seasonal residences. We noted the public consultation was undertaken during the Master Plan process and the County and Town of Saugeen Shores will continue to correspond with landowners, agencies, organizations as the various projects proceed.

We provided a general overview of the status of the Schedule A - drainage project and the Schedule B – Bruce Road 33 project.

The Schedule A – drainage project is in the design phase and an application to the MOECC and Saugeen Valley Conservation Authority will be submitted prior to construction approval. We note that the Town, Consultant and County will review further means to ensure public input is included. We did note that the Town has met with the Beacher's Association and has corresponded with the Lake Huron Coastal Centre regarding this project. It is proposed that in the near future, Town Council will be updated on the project and pre-consultation with the MOECC will take place. Following that the Town will host an Open House to share information with the Public.

The Schedule B – Bruce Road 33 road project will proceed with the EA process. It was noted that the construction of the Active Transportation Route is included under each phase of the project, having regarding for cyclist safety. It was also confirmed that the proposed Bruce Road 33 re-alignment will include water and sanitary services and a stormwater management pond.

We thank you for your comments and welcome any further questions/comments as the we move forward with the Bruce Road 25 and Bruce Road 33 projects.

Kerri

Kerri Meier
Environmental Coordinator
Transportation & Environmental Services
Corporation of the County of Bruce

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and Climate Change

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ENV1283MC-2018-266

March 13, 2018

[Redacted address block]

Dear [Redacted name]


Thank you for your February 5, 2018, correspondence to the Minister of the Environment and Climate Change in regards to the Bruce County Roads 25 and 33 Master Plan for Roads and Drainage (Project) proposed by the County of Bruce (County). I am pleased to respond on behalf of the Minister.

By way of this letter, I am acknowledging that you are withdrawing your Part II Order request following discussions with the County. I understand that you and the County have been engaged in discussions regarding the Project, and have come to an agreement that resolves your concerns to your satisfaction.

As there are no outstanding Part II Order requests before the ministry, the County may continue planning the Project.

Thank you for participating in the Class EA process and for bringing your concerns to the attention of the ministry.

Yours sincerely,

 Annamaria Cross
Manager, Environmental Assessment Services Section
Environmental Assessment and Permissions Branch

c: Brian Knox
County of Bruce

EA File No. 18021
Bruce County Roads 25 and 33 Master Plan for Roads and Drainage

| Comment Received | | Response Provided | Additional Discussion |
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| Resident #1 | | | |
| Res. #1 – Comment #1 | <p>The intersection to Baker Road should be removed. Preferably, all legs of an intersection should be on a tangent section. Where a minor road intersects a major road on a horizontal curve, the geometric design of the intersection becomes significantly more complicated, particularly for sight distance, turning movements, channelization, and superelevation. This will be a short cut for the NW properties.</p> <p>Based in the intermittent and traffic flow patterns a traffic circle would be a better design option for Rte 33/Rte 25 intersection.</p> <p>Tree planting should start immediately for the portion of Rte 33 in the open field. That portion will be a safety issue especially during winter condition and when HWY21 is closed.</p> | <p>Thank you for your comments in response to the notice of project initiation.</p> <p>You provided three comments to which we wish to respond as follows:</p> <ol style="list-style-type: none"> 1. The Baker subdivision residents noted the connection to the realigned road and were in favor. The horizontal alignment of the proposed realigned Bruce road 33 is a radius of 335m which reflects a design speed of 90 kph and subsequently a posted speed of 80kph. is very close to a 90kph. The proposed Bruce Road 33 is an elevated rural platform and easier to manage than a curbed urban cross-section. We acknowledge your comment on the potential of Lake Range Road being a short cut and shall be aware of this potential when we prepare the signage plan, ie stop signs at the Baker Road/ Lake Range Road intersection. 2. A traffic circle at the proposed Bruce Road 25/33 intersection was considered in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons. Please note the planned “Active Transportation Route” (path) along the north side of Bruce Road 25. 3. Timing will need to be sorted out with landowners, but the importance of starting early is understood. We wish to note that in our discussions with the landowners on the potential CR 33 realignment we had mentioned a thought that if the County acquired the road allowance we may wish the landowner to continue to crop through the road allowance until we undertake the CR 33 construction. <p>We will continue our review of comments received. This review will culminate in a preferred solution that we anticipate presenting to the Highways Committee in March.</p> | <p>The connection of Baker Road to BR33 is planned in the Town's Local Official Plan.</p> <p>Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed.</p> |

| Comment Received | | Response Provided | Additional Discussion |
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| Resident #2 | | | |
| Res. #2 – Comment #1 | <p>The overall plan is excellent and it will be nice to have a second access into the South edge of the Port Elgin built up area via future Bruce Street from both a convenience and emergency perspective. Re-aligning the roadway will also improve traffic flow and safety in the area.</p> <p>Was the installation of a round-about considered at the Intersection of re-aligned Road 33 and Road 25? A round-about would provide the required traffic control without the expense of signalization and extensive use of dedicated turning lanes.</p> <p>It is noted that the abandoned portion of Road 33 will be transferred to Saugeen Shores after the re-alignment. Will Road 25 West of the new Road 33 Intersection be transferred as well? The need for this remnant portion of road to be a County responsibility seems minimal.</p> <p>The proposed SWM facility in the severed triangle between Road 33 and Baker Road makes perfect sense from a design perspective. I do note though that there seems to be a conflict on the presented drawings as to whether this triangular piece of land will be used for a detention facility or for Baker Road extension.</p> <ul style="list-style-type: none"> • The preferred would obviously be to provide both in this area if space allows. • If not, the proposed cul-de-sac at the South end of the old Road 33 could be replaced with a short radius connection to new Road 33. • Without the proposed direct link to new Road 33, Baker Road traffic would continue to use the abandoned portion of Road 33. I can see this not being desirable but the traffic volume at the present Road 25 intersection would be significantly reduced with only Baker Road contributing. <p>It is noted that SWM considerations on Road 25 are beyond the scope of this review. I suggest a preliminary review of the opportunities and constraints be investigated now to ensure we are not pushing a problem into the future that will be difficult and possibly even impossible to solve. This leads to Item 6.</p> <p>In addition to post-development areas 100 and 200, the report should investigate routing runoff from Road 25 ditches East of the proposed Road 25/33 intersection and surface discharge from Lot 30 East of the proposed alignment onto Road 33 for routing to the Baker Road Detention Facility. This would appear to offer the following benefits to Road 25 West of the proposed Road 33 Intersection:</p> | <ol style="list-style-type: none"> 1. Thank you 2. A round-about at the proposed Bruce Road 25/33 intersection was considered in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons. Please note the planned “Active Transportation Route” (path) along the north side of Bruce Road 25. 3. Yes, Saugeen Shores and the County are working together and we expect the section of Bruce Road 25 west of the proposed Bruce Street intersection to be transferred to Saugeen Shores. 4. We shall consider your thoughts as move toward final design. 5. We have asked Project Consultant John to have specific regard to your comments 5 through 7. <p>The Concept drawings provided indicate both a SWM pond and a road connection from Baker Road. In consideration of comments received through the process, the concept will be refined to provide direction to the design process.</p> <p>The Master Plan for Roads and Drainage reviewed drainage alternatives for BR25, at a systems-wide planning level.</p> <p>Flow diversion southerly, from BR25 at the planned BR25/BR33 intersection, was reviewed as Alternatives 5, 6, and 7 in the Master Plan for Roads and Drainage.</p> <p>Comments received from Baker Subdivision residents during the Master Plan process did not support diversion of flow through the Baker Subdivision (Alternative 5)</p> <p>We will continue our review of comments received. This review will culminate in a preferred solution that we anticipate presenting to the Highways Committee in March.</p> | <p>Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed.</p> <p>The details of the BR33/Baker Road intersection and SWM Pond will be resolved during the design phase.</p> <p>Alternatives 5, 6 and 7 considered in the Master Plan had even greater challenges and were screened out earlier in the process.</p> <p>An expansion of the currently proposed SWM Pond could be considered with future adjacent land development. No proposal currently is being considered.</p> |

| Comment Received | Response Provided | Additional Discussion |
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| <ul style="list-style-type: none"> • The contributing drainage area would be significantly reduced. • SWM facilities may not be required on Road 25 as a result thereby solving the need for a detention facility where little opportunity exists. • Upgrading of this portion of Road 25 would be limited to resurfacing and minor ditch cleaning. • The existing storm sewer system would remain largely as-is. • The present discharge to the cold water stream at Nelson Road, although not entirely desirable, would be maintained. However, with a smaller contributing area the present impact would be reduced. • The need for a storm outfall across the beach would be eliminated. • Ownership of this portion of the roadway could be transferred from the County to Saugeen Shores. <p>With revised contributing areas, it is acknowledged that the SWM facility adjacent to Baker Road would require additional storage volume to maintain the predevelopment discharge levels into the Baker subdivision, however:</p> <ul style="list-style-type: none"> • A single SWM facility would simplify long term maintenance obligations. • Increased area requirements could be provided through minor proposed road re-alignment and an increased roadway curve radius in this area. • An enlarged facility would provide the opportunity for a permanent pool with a wetland fringe. • This would improve the aesthetics of the facility; provide both dilution and biological filtering of runoff for improved discharge quality; and provide wildlife habitat. <p>(SWM facilities don't have to be holes in the ground, they can be landscape features. With shallow side slopes and appropriate vegetation, they do not need to be fenced exclusion compounds.)</p> <ul style="list-style-type: none"> • The impact of modelling future development lands as uncontrolled discharge could be determined and used to assess whether future on-site controls are desirable. A communal system would ensure the long term SWM functionality of these contributing areas with the benefit of not having to deal with individual land owners. • Additional costs for an enlarged facility could be offset by savings realized from: the previously mentioned reconstruction cost savings on Road 25; the removal of signalization and turning lanes at the Road 25/33 intersection, and; possible Lot Levies on adjacent future development lands imposed as a SWM contribution. | | |

| Comment Received | | Response Provided | Additional Discussion |
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| Resident #3 | | | |
| Res. #3 – Comment #1 | Does Baker Road need to be extended to the new Rd 33, can it just terminate at the old Rd 33? | In consideration of comments received through the process, the concept will be refined to provide direction to the design process. | The connection of Baker Road to BR33 is planned in the Town's Local Official Plan. |
| Res. #3 – Comment #2 | Can the design incorporate a round about at 25/33 instead of lights? When the highway is closed, and the Bruce Power trucks come through there is little to no chance of others getting into the flow of traffic. A round about go alleviate this by allowing all to flow easier. | A traffic circle at the proposed BR25 / BR33 intersection was considered in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons; associated with the planned “Active Transportation Route” (path) along the north side of BR25. | Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed. |
| | | <p>Good afternoon,</p> <p>Thank you for your comments in response to the notice of project initiation.</p> <p>I understand that Amanda has responded to you concerning your comments on Bruce Road 33. I believe there were two comments:</p> <ol style="list-style-type: none"> 1. It was our opinion that the proposed intersection of Baker Street at the realigned Bruce Road 33 offered Baker Street residents the option of travelling south as they do today. The design team will review the specific details of this intersection. 2. Concerning your comment on a round about, we did consider one at the proposed Bruce Road 25/33 intersection in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons. Please note the planned “Active Transportation Route” (path) along the north side of Bruce Road 25. <p>We will continue our review of comments received. This review will culminate in a preferred solution that we anticipate presenting to the Highways Committee in March.</p> | |

| Res. #3 – Comment #3 | Comment Received | Response Provided | Additional Discussion |
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| | <p>Brian, Thanks for your response to my comments.</p> <p>We do have a difference of opinions regarding the signaled intersection and a roundabout at Bruce Rd 33 and Bruce Rd 25. Let me first say that I am neither an engineer or planner designing roads, My comments are only the opinion of this layman.</p> <p>Before moving to Saugeen Shores, we lived in Kitchener within the Region of Waterloo.</p> <p>Like them or hate them, there are approximately 32 roundabouts within the City of Kitchener with 9 under the City jurisdiction. Since 2004, roundabouts have been an important part of the roadway landscape in the Region of Waterloo. The roundabouts are deemed to improve road safety, manage increased traffic demand and help improve air quality by eliminating stops and idling.</p> <p>Roundabouts have helped to promote traffic safety, reducing the frequency and severity of vehicle crashes. To your point, they have been less successful at safeguarding people on foot. More on that later in more detail..</p> <p>So let us look at Pros and Cons from recent readings, not my words:</p> <p>Benefits:</p> <p>Are effective traffic calmers.</p> <p>Are far safer than conventional, signal-controlled intersections. Crashes are far less likely at roundabouts, but when they do happen, they occur at lower speeds and at slighter angles. This greatly reduces the resulting property damage, injury and loss of life from wrecks.</p> <p>Roundabouts reduce delays and congestion, since vehicles do not have to come to a full stop before proceeding (except in cases where they must yield).</p> <p>Traffic flows more naturally at roundabouts than at signal-controlled intersections. Drivers are not controlled by an artificial traffic signal.</p> <p>Issues with Pedestrian Use of Roundabouts:</p> <p>One of the key limitations of roundabouts is that they have had insufficient safeguards and/or pedestrian crossing signs to protect local foot traffic. This is due to the vehicle-centric approach that spurred their intervention. This issue can be dealt with by routing foot and bicycle traffic away from the roundabout with crosswalks (Crossovers) marked by traffic safety systems, such as signage and caution lights. These measures prevent foot traffic from crossing at unauthorized locations, while also making drivers more alert to the presence of walkers or cyclists.</p> | | <p>Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed.</p> <p>The connection of Baker Road to BR33 is planned in the Town's Local Official Plan.</p> |

| Comment Received | Response Provided | Additional Discussion |
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| <p>Installing marked crosswalks at roundabouts is imperative to the safety of drivers, bicyclists and pedestrians. With due caution and planning, all local citizens.and vacationers can use that route safely.</p> <p>To that, I would like to refer you to the Ministry of Transport, Ontario regulation (402/15) under the Highway Traffic Act which establishes a new traffic control device – Level 2 Pedestrian Crossover. This is contained in a City of Kitchener staff report dated November 3, 2016. as attached.</p> <p>I would also like you to refer to one of the most horrendous and ill conceived and planned roundabout intersections within the City of Kitchener at Homer Watson Blvd and Blockline Rd, which was close to where I lived. Homer Watson Blvd had 38080 vehicles in the 2015 average annual daily traffic and Blockline and Kingswood (block away) had 15053 average daily vehicle traffic.Three corners of that intersection are residential subdivisions.The fourth corner had a Tim Hortons, a gas bar and two additional eating establishments. A block away on Blockline Rd is St Mary's High Scholl with an enrollment of 2100 students, one of the largest schools in Ontario.</p> <p>So why do I even bring that up? This roundabout was not well planned with the amount of vehicular traffic combined with the amount of pedestrian traffic to the shops and high school.The speed limit on Homer Watson was 70 km with a four lane divided roadway with up to 3 lanes entering the roundabout.There were many accidents within this roundabout both pedestrians and vehicles.So eventually with a redesign and reconstruction, lower speed limit and Pedestrian Crossover this safety issue has been significantly reduced.</p> <p>See Goggle maps link for reference to Crossovers: https://www.google.ca/maps/place/Tim+Hortons/@43.4189262,-80.4726327,552m/data=!3m2!1e3!4b1!4m5!3m4!1s0x882bf53c22feb11:0xdaba14275eb66ae9!8m2!3d43.4189223!4d-80.470444</p> <p>So in reference to the planned "Active Transportation Route" (path) along the north side of Bruce Rd 25, in my view the safety concerns with a roundabout can be significantly reduced or eliminated, through proper planning design and construction of the roundabout and Crossovers. Having lived in the Baker subdivision the last number of years I have observed issues which give me doubts of the safe use of a signalized intersection at Bruce Rd 33 and 25.One only has to observe the vehicle traffic on the present Bruce 33 while highway 21 is closed due to weather conditions. With the amount of traffic from the power plant, one can not turn left onto 33 from Baker Rd (Drivers will not let you in).You are forced to take Saugeen Beach Road to .Bruce Rd 25 to go up town. Drivers do not stop at the stop sign at on Bruce Rd 33 and Bruce Rd 25,it become a race</p> | | |

| Comment Received | | Response Provided | Additional Discussion |
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| | <p>coming up 25. So my point is, what makes us believe drivers will stop for a red light while turning right at the new signalized intersection? Will drivers use the signalized intersection like a roundabout, does this make it safer? That goes back to the point of roundabouts being safer, properly planned, designed and constructed.</p> <p>For the same reasons expressed above is why I question Baker Rd extended to the new 33. In times of highway 21 closures and high traffic volumes on 33, local traffic will have to use the old 33 (Lake Range) to Bruce 25. The only benefit will be those turning right on Bruce Rd 33 to go south.</p> <p>Thanks for giving me the opportunity to input my views.</p> | | |
| Resident #4 | | | |
| Res. #4 – Comment #1 | <p>I am concerned about the recommendation for a signalized intersection at BR33 and BR25. I think that, in the interest of promoting optimum traffic flow in this area, the County and Town should consider a traffic circle at this intersection instead of signals. The future will likely see larger amounts of traffic coming up BR25 from the East (especially if and when sewers are installed below the ridge allowing for more intensive development). This traffic will need to mix with very heavy north/south traffic on BR33. To avoid congestion both north/south and east/west in the future we should install a traffic circle at this stage, while it is still possible to do so. I understand that the plan to have 4 lanes of traffic between the new BR33 and Goderich St complicates this but I remain confident that a safe and functional traffic circle could be engineered for this location.</p> | <p>A traffic circle at the proposed BR25 / BR33 intersection was considered in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons; associated with the planned “Active Transportation Route” (path) along the north side of BR25.</p> <p>Thank you for your comments in response to the notice of project initiation.</p> <p>I understand that Amanda has responded to you concerning your comments on Bruce Road 25.</p> <p>Concerning your comment on the Bruce Road 33 realignment, we did consider a traffic circle at the proposed Bruce Road 25/33 intersection in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety reasons. Please note the planned “Active Transportation Route” (path) along the north side of Bruce Road 25.</p> <p>We will continue our review of comments received with Amanda. This review will culminate in a preferred solution that we anticipate presenting to the Highways Committee in March. We are hopeful that Saugeen Shores will also have an opportunity to share the preferred solution at the same time.</p> <p>Many thanks, Brian</p> | <p>Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed.</p> |

| Comment Received | | Response Provided | Additional Discussion |
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| Resident #5 | | | |
| Res. #5 – Comment #1 | Living on Bruce road for 33years I have seen many changes in traffic patterns. I believe the only logical direction is to change the point of connection with Bruce rd 25 and realine Bruce rd 33 . The present connection on a hill has been a bottle neck for years and a dangerous point on slippery roads in the winter . | Thank you for your comments in response to the notice of project initiation. | |
| Res. #5 – Comment #2 | The area from Baker road to the 25 narrowing and a deep culvert with no guard rail must be addressed. | We shall include the width and need for guardrail issues in our design of the section of the future Lake Range Road from the proposed realignment to Bruce Road 25. We will continue our review of comments received. This review will culminate in a preferred solution that we anticipate presenting to the Highways Committee in March. | This project is currently considered for Phase 4 of the implementation plan. |
| Resident #6 | | | |
| Res #6 – Comment #1 | The drawing from GMBP in the CR33 Schedule B Project File shows that the section of CR25 from Bruce St to HWY 21 will be done under a Schedule B EA. Are you saying that this section will be done under a different Schedule B EA? | The Master Plan for Roads and Drainage identified a section of BR25 between the future Bruce Street / BR33 intersection and Goderich Street as being planned for four traffic lanes. That specific project has a separate “trigger” for a Schedule B EA process related to the planned increase in road capacity. | |
| Res #6 – Comment #2 | Also, the report shows that the most northern part of CR33 would drain to Shipley Watercourse under present conditions. As for my the current Schedule B EA for CR33. I am not satisfied with your response to my concern regarding the boundary of the CR33 study area. The CR33 drainage drawing in the CR33 Project File shows that some of the stormwater will travel north along CR33 to the “new CR25 storm sewer”. This means that the CR33 EA is relying on a successful EA for the CR25 drainage project. Since the CR25 drainage is still in the design phase, it’s not possible to assess the impact from the CR33 stormwater. Also, what happens if the CR25 drainage sewer isn’t installed for another 5 years? Then the runoff and contaminates from the north section of CR33 will get directed to the Shipley watercourse. It’s my opinion that the Study Area for the CR33 EA needs to include where the stormwater from CR33 will be diverted to. | The Master Plan for Roads and Drainage concluded with a “Preferred” set of solutions for road and drainage at a systems-wide planning level. The Current Schedule B EA planning process is “triggered” by the new road in a new location and the need to acquire land. Drainage design and implementation are considered under subsequent processes. | Interim measures can be provided to bridge between individual project implementation phases, if necessary. The BR25 trunk storm sewer is intended as Phase 1 of the implementation plan as outlined in the Bruce County Committee Report – Feb. 15, 2018. |

| Comment Received | Response Provided | Additional Discussion |
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| <p>Res #6 – Comment #3</p> | <p>This appears to contradict the "Public Information Centre - May 18, 2016 - Presentation Package" page 17. The presentation acknowledges that the George Street Storm Sewer and Outlet would require a Schedule "C" EA because it is "construction of a new sewage system including outfall to a receiving water body."</p> <p>Can you explain why the proposed outlet at Gobles Grove is not considered a new outfall to a receiving water body?</p> <p>Provided below is the text from the presentation. Note that section 4 clearly states that it is Goderich to Bruce, not Goderich to Saugeen Beach Rd.</p> <p>Drainage</p> <ol style="list-style-type: none"> 1. New George Street Storm Sewer System and Outlet <ul style="list-style-type: none"> • Construction of new sewage system including outfall to receiving water body = Schedule "C" EA. • EA to be determined. 2. Baker Street storm sewer system to existing outlet <ul style="list-style-type: none"> • Establish a sewage collection system to an existing outlet; within existing road allowance = Schedule "A"+ • Town may proceed with design/approvals subject to public notification. 3. BR33 Flow Diversion from BR25 <ul style="list-style-type: none"> • Complimentary to George Street storm sewer system Schedule "C" EA. • EA to be determined. • Could proceed concurrently with Re-Align BR33 Schedule "B" EA. 4. BR25 Storm Sewer – Goderich to Bruce <ul style="list-style-type: none"> • Establish a sewage collection system to an existing sewage or natural drainage outlet, within an existing road allowance = Schedule "A"+ EA. • May proceed with design/approvals subject to public notification. • Would be coincident with Schedule "B" EA to Add Lanes to BR25, Goderich to Bruce. | <p>The proposed outlet on Bruce Road 25 is at an existing outlet, a culvert currently exists in this location and it is within municipally owned property. Acquisition of land is not required for this solution.</p> <p>Whereas, the George Street Storm System contemplated at that time included consideration of a flow diversion from BR25 east of the Bruce Street alignment, southerly along the proposed BR33 to a new outlet at George Street.</p> <p>The Schedule C Definition is as follows:</p> <ol style="list-style-type: none"> 1. Construct new sewage system, including outfall to receiving water body and/or a constructed wetland for treatment. <p>"New Sewage or Water System" is defined in the MEA Manual as:</p> <p>"Means a new sewage or water facility, or series of facilities, having no physical connection with an existing sewage or water facility through property or process link."</p> <p>Therefore, the contemplated George Street Storm Sewer system would meet this description since there currently is no property connection along which the system necessarily would drain between BR25 and Baker Road; ultimately to the George Street outlet.</p> <p>The currently planned storm sewer on BR25 meets the description of a Schedule A+ project under Municipal Water and Wastewater Projects, as follows:</p> <ol style="list-style-type: none"> 1. Establish, extend, or enlarge a sewage collection system and all necessary works to connect the system to an existing sewage or natural drainage outlet, provided all such facilities are in either an existing road allowance or an existing utility corridor, including the use of Trenchless Technology for water crossings. <p>The reason that the descriptions are only Goderich to Bruce Street was because of the manner in which the options were compared, with appropriate planning of a storm sewer outlet westerly from Bruce Street, the balance of the system east of Bruce Street would connect to that outlet as a Schedule A+ activity. This is because of how you select the process to follow. You need to focus on the problem that you are trying to solve, and for the drainage portion there is no monetary limit in the MEA Schedules. However, the addition of lanes proposed on Bruce Road 25 from Bruce Street to Goderich Street would be triggered as a Schedule B activity. Simple addition of Bike</p> |

| Comment Received | | Response Provided | Additional Discussion |
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| | | <p>Lanes does not have a limit for cost.</p> <p>Municipal Road Projects</p> <p>20. Reconstruction or widening where the reconstructed road or linear paved facilities (e.g. HOV lanes) will not be for the same purpose, use, capacity or at the same location" <\$2.4M</p> | |
| Res #6 – Comment #4 | <p>I object to the proponent's strategic decision to piecemeal this project into smaller sections in order to limit the extent of the environmental assessments. There appears to be a deliberate attempt to keep costs below \$2.4 million for road work by doing it in two stages (therefore avoiding a Schedule "C" EA), and strategically classifying portions of the master plan as "separate projects" even though design and construction will be concurrent. The Municipal Class EA procedure states that projects should be assessed as a whole and not in "piecemeal"</p> <p>Here is some evidence to support that this project has been systematically piecemeal-ed to limit the extent of the environmental assessment:</p> <ol style="list-style-type: none"> 1. The intersection with CR-25 has not been included in the project boundary. Although work will be done at the intersection as part of this project, it has been excluded from the study area. This component is essential to the project, and yet the County is relying on the "separate" CR-25 project to assess the environmental impact. 2. There were no individual CR-33 Re-alignment public consultation sessions. The only sessions that occurred were part of the Master Plan development. If this is a separate project, then the proponent should have held separate public information sessions to address this project getting completed without any improvements to CR-25 or storm water management. 3. Land acquisition costs and legal fees have been excluded from the Project Costs estimate, to keep costs below the \$2.4 million threshold for roadwork. 4. Only a portion of the newly aligned CR-33 is within the drainage boundary as indicated by the CR-33 Re-alignment Project File Figure 3. The portion excluded currently drains to a natural watercourse. If this section were included it would have met the | <p>As an Introduction to our answers the MEA Manual includes the following definition of "Master Plan" and "Cost":</p> <p>"Master Plan: Means a long range plan which integrates infrastructure requirements for existing and future land use with environmental assessment principles. At a minimum, a Master Plan addresses Phases 1 and 2 of the Municipal Class EA process."</p> <p>"Cost: Means the most up-to-date estimate prepared by the proponent of the cost of a project, and which has been accepted by the proponent as the basis on which the project is to proceed. The estimate shall not include costs for:</p> <ol style="list-style-type: none"> i) Acquisition of land. ii) Feasibility of studies and engineering design for the project. iii) Operation of the project. <p>The estimate shall include the capital costs of all components of a project required to solve the problem. If separate components of a project are independent of each other (i.e. are solving separate problems) but are being constructed together as a single project for purposes of cost effectiveness or efficiency (e.g. a defective watermain replaced while a road is being reconstructed), then the costs shall be considered to be separate."</p> <ol style="list-style-type: none"> 1. The Master Plan included review of the re-alignment for BR33; following Phases 1 and 2 of the MEA EA process. An intersection configuration was considered in the Master Plan. The Schedule B EA process for the re-alignment logically extends southerly from the existing BR25 road allowance to a re-connection point on Lake Range Road. 2. The current Schedule B EA process for the re-alignment of BR33 is on-going. We are currently in Phase 2, Part 5 of that EA process. The public communication plan does not include an "open house" event. As per the manual, a Schedule B does not require to have an open house, it requires specified points of contact, which the proponent is carrying out through the notification you are commenting on. | |

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| | <p>conditions for a schedule "C" EA.</p> <p>5. The northern section of CR-33, and intersection with CR-25 as indicated in the Master Plan will eventually have a new storm water discharge to Lake Huron. This project is being designed, developed and constructed concurrent to the CR-33 project by the same proponent, however strategically claimed they are separate projects so that a Schedule A+ EA could be used.</p> | <p>3. See definition of "Cost" above.</p> <p>4. See definition of Schedule A+ versus Schedule C projects provided previously. The drainage system envisioned in the Master Plan maintains flows within existing catchment areas. As such, one project can proceed independently from the other. Interim measures can be taken at the juncture of separate individual projects until the vision of the Master Plan is achieved.</p> <p>5. See definition of Schedule A+ versus Schedule C projects provided previously.</p> | |
| Res #6 – Comment #5 | <p>One more point that I wish to clarify:</p> <p>Does your response imply that the new outlet at George St has been downgraded to a Schedule A+? If so, could you please provide the justification for this? The reason stated in the public consultation was due to the new sewage system and outfall to a receiving water body (not due to flow diversion). There is no existing outfall at this location, and it's flowing to a receiving water body.</p> <p>New George Street Storm Sewer System and Outlet</p> <ul style="list-style-type: none"> • Construction of new sewage system including outfall to receiving water body = Schedule "C" EA | <p>I would like to reiterate that the "Preferred Master Plan for Roads and Drainage" identifies the planned drainage solution within the Baker Road area as a Schedule A+ activity as long as the system remains within an existing road allowance or utility corridor to a natural drainage outlet for George Street, if a new system is to include an outfall to accept diverted flows to an outlet along Baker Road it would be a Schedule C.</p> <p>I would like to also reiterate that at this time the Town and County are working towards a detailed design for the selected drainage solution, which is to outlet at the end of Bruce Road 25. This design will be brought forward for public information prior to construction. During the design phase, the professionals hired to complete the job are working with approval agencies and other experts to determine the best configuration. We have met with the Beachers Association for input already and will be meeting with the Waterfront Advisory Committee as well.</p> | |
| | | <p>This link will be of interest to you, it helps explain the process and residents' responsibilities in this process. It was prepared by the Group that works with the Province on the MEA Processes.</p> <p>http://www.municipalclassea.ca/files/Companion%20Guide%20to%20MCEA%20Manual%20rev1.pdf</p> <p>It is important to for us to understand your technical concern, can you please confirm to me that your concern is that more water will be conveyed to the beach AND to the watercourse after the project is completed than in the existing condition? I do recognize that you have concerns about the process as well, and I believe the document in the link above can answer those questions, however below are our responses to your questions.</p> | |

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| Res. #6 – Comment #6 | <p>My concern is that the drainage assessment only covered a portion of the project. The boundaries for the drainage study only included approximately 2/3rds of the new road. In the section that was included, it was determined that the conversion from agricultural land to impervious asphalt would cause an increase in flow to the Baker subdivision (which was one of the defined problems in the Master Plan). To accommodate this problem, a storm water management pond was included. So my question is what impact does the new road have on the drainage of the northern 1/3rd? And is there a reason why it wasn't included in the report?</p> <p>The other technical concern that I have with the piecemeal-ed approach (identified in #2 below) is that there hasn't been consultation or assessment of only performing a portion of the Master Plan. So when the public was asked to comment, they were looking at the project as a whole. By only performing a portion of it, new problems can emerge because the supporting infrastructure hasn't been developed yet. For example, the road studies are based on present traffic levels. By completing CR33 as a stand alone project, this shortens the commute and makes this route to Bruce Power more appealing, which means more people will choose to drive this route, which causes increased traffic on in the residential section of CR25 between Goderich St and CR33. This increase in traffic on CR25 may create new safety hazards for residents in this area, however there was no place for these concerns to be identified.</p> <p>Similarly if we look at the drainage problems identified in the Master Plan, by choosing a piecemeal-ed approach of performing CR33 in isolation, you are assuming that all of the drainage projects will be successful. What happens if while performing the EA on the Baker subdivision outlets or CR25 outlet, it's discovered that the impact is too severe. An alternative strategy or option is no longer practical because the drainage project from the CR33 portion has already been completed. That's why the problems identified in the Master Plan are supposed to be looked at on a whole. By completing the CR33 project separately, you are committing to Alternative 3 for the drainage problems identified in the Master Plan without actually assessing the Environmental Impacts of Alternative 3.</p> | <p>The County and Town have established a 5 Phase implementation plan. Phase 1 is the installation of the storm sewer outlet on BR25 as a Schedule A+ activity. Phase 2 involves the continued urbanization of BR25 between Shipley and Bruce Street. Phase 3 involves urbanization of BR25 between Bruce Street and Goderich Street, subject to a future Schedule B EA process. Phase 4 would involve construction of the BR33 re-alignment, subject to the current Schedule B EA process. Phase 5 involves upgrades to Lake Range Road between BR25 and the new connection to the re-aligned BR33. Therefore, the outlet system on BR25 is intended to be constructed to service the north end of the BR33 re-alignment. Even if it is not, then temporary SWM measures could be taken to mitigate quantity and quality issues related to the north end of re-aligned BR33.</p> <p>The Master Plan approach was taken to plan road and drainage on a systems-wide level to avoid piece-mealing independent solutions. It would be impractical to construct all projects considered in the Master Plan at on time. The planned increase to road capacity on BR25 between Goderich Street and re-aligned BR33 is intended to be planned as a Schedule B process. The overall direction is established through the Master Plan with additional details to be resolved / verified through that process, once it is initiated. The results of that process will be independent of the current Schedule B EA process. As noted above, the re-alignment of BR33 is intended to be constructed after the widening to BR25 between Goderich Street and the future BR33 intersection.</p> <p>Master Plan addresses this direction, the water flows to the lake from this area and the construction of the project must be done in phases to be affordable and constructable. There are many what if scenarios that could come into play and it is not practical at any time to try to forecast that. If a development proposal came in for the Baker Subdivision, or the Town decided to urbanize these impacts would need to be addressed then. Similar to if a storm sewer outlet and piped networks were to be constructed in the Baker Subdivision, mitigation would be required regardless of the Bruce Road 25 and Bruce Road 33 projects. This design project would accommodate what was done upstream. The intent at this time is to construct a legal outlet for lands draining to Bruce Road 25 and outlet to the lake.</p> | |
| Res. #6 – Comment #7 | <p>Regarding your comment:</p> <p>"Therefore, the outlet system on BR25 is intended to be constructed to service the north end of the BR33 re-alignment. Even if it is not, then temporary SWM measures could be taken to mitigate quantity and quality issues related to the north end of re-aligned BR33."</p> | | MOECC has reviewed and accepted the preliminary design for the BR25 storm sewer. |

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| | <p>I think the intent of the EA is to demonstrate that the impacts from the project have been considered and can be mitigated. I don't think it's enough to just say we will handle it when the time comes.</p> <p>I would request that this information be formally presented in the Environmental Assessment. ie. that the north section will have an increased flow rate and the project to install a new outlet on BR25 will accommodate it.</p> | | |
| Resident #7 | | | |
| Res. #7 – Comment #1 | For the most part we view this project favourably. We consider such changes as the diversion of Bruce Road 33, the additional lanes on BR25 between Goderich intersection and the proposed Bruce Street, the proposed trail beside BR25, the enhanced quality treatment (80% TSS removal) of the drainage water and the SWM facility as examples of positive proposals in this plan. | Noted | |
| Resident #8 | | | |
| Res. #8 – Comment #1 | I would support realignment of BR33 Intersection with the future bruce street, would this be more of a by-pass so no future housing development on that road? I don't understand the need 4 lane urban crossing, wouldn't roundabout work in this case? With the addition of bike/pedestrian pathway that would connect with the Gore Drain, Rail Trail System and the Gobles Grove beaches to provide safer recreation options . I understand these "are planned future intersections" but why is there need to have 3 T-stop intersections to connect onto the CAW Rd? I understand Bruce being the prime intersection and to some degree Stickle St. due to the future housing development in that area. But sure adding a 3rd will make things move easier. | <p>As noted in the Master Plan, the lands through which BR33 re-alignment would pass considered are identified as "Planned Development" in the Town's Official Plan.</p> <p>A traffic circle at the proposed BR25 / BR33 intersection was considered in the Master Plan but a signalized intersection was considered as "preferred" for pedestrian safety reasons; associated with the planned "Active Transportation Route" (path) along the north side of BR25.</p> <p>The 3 planned intersections with BR25 from the north are considered in the Town's Official Plan.</p> | Since the construction of Bruce Street north from BR25 is not expected in the foreseeable future, a stop-controlled tee intersection may be appropriate in the interim. A full intersection design may be revisited when Bruce Street is constructed. |
| | | <p>Good afternoon,</p> <p>Thank you for your comments in your email of February 1st to John Slocombe in response to the notice of project initiation. I understand that Amanda has responded to you concerning your comments on Bruce Road 25.</p> <p>Concerning your comment on the Bruce Road 33 realignment involving a roundabout, we did consider one at the proposed Bruce Road 25/33 intersection in the Master Plan but a signalized intersection was considered as "preferred" for</p> | |

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| | | <p>pedestrian safety reasons. Please note the planned "Active Transportation Route" (path) along the north side of Bruce Road 25. You also inquired about the three intersections onto Bruce Road 25. Stickle Street is part of a proposed plan of subdivision while the extension of Bruce Street has been an opportunity identified in a number of planning documents. I am a little uncertain on the future Ridge Street yet will inquire of my colleagues.</p> <p>We will continue our review of comments received. This review will culminate in a preferred solution on the Bruce Road 33 Re-alignment that we anticipate presenting to the Highways Committee in March.</p> | |
| Cuesta Planning | | | |
| | <p>Cuesta Planning Consultants wish to submit the following comments in response to the Notice of Project Initiation for the Schedule B Municipal Class Environmental Assessment for the Bruce County Road 33 Re-alignment.</p> <p>After reviewing the mapping of the road re-alignment, one primary concern that arises from a planning perspective is the future utilization of the surrounding lands. Both the lands to the north of the proposed intersection and the lots that would be crossed by the proposed Bruce Rd 33 re-alignment are zoned PD Future Development in the Saugeen Shores zoning schedules. While the exact use of this area may be undetermined at this time, it could be supposed that residential use would be a strong consideration for this section of the Town. The northern segment of the alignment through Lot 30 would partition this land parcel into approximately a 2 ha easterly block and a larger 6 ha westerly block. The parcel in Lot 29 would be divided roughly in half.</p> <p>Strong consideration needs to be given to how subdivisions could be laid out in the odd shaped parcels that would be generated by the re-alignment project.</p> <ol style="list-style-type: none"> 1. Are the resulting parcels sufficient in size to support subdivisions for example, small block on east side of alignment in Lot 30 2. Do the curves in the Bruce Rd 33 proposed alignment create unusable portions of the lots for example, long point on east side of alignment near south edge of Lot 29 | <p>Thank you for our phone conversation with Brian Knox on February 12, 2018 regarding the Bruce Road 33 Re-Alignment. We provide the following comments:</p> <p>The Town has had a long range focus that Bruce Street may be extended through the property north of Bruce Road 25 (as shown on the Town's Official Plan schedules) and would offer a 'collector' road parallel to Highway 21.</p> <p>Item 1 - there is no secondary plan for this area, landowners are aware of the lot fabric that would result following the establishment of the new road allowance. We offer that this might be developed in a variety of manners some may require planning applications to change OP designations and zoning. The land required for the road is sufficiently small enough to allow the resulting parcels to accommodate a reasonably efficient development design. Further consideration of other alternatives via the Bruce Street connection do not offer any improvement in land use without negative impacts to efficient road design and/or other good transportation planning considerations. Town Staff have reviewed how these lands could be developed as subdivisions and are satisfied that it can be done and serviced.</p> <p>Item 2 – Please note our response to Item 1, we offer that Lot 28 and 29 are owned by one landowner and there may be a future opportunity to review potential for an urban area expansion, dependent on the Official Plan.</p> | <ol style="list-style-type: none"> 1. A secondary plan has not been prepared for the PD – Planned Development lands. 2. The curves planned for BR33 meet geometric designs for roads. 3. A secondary plan has not been prepared for the PD Lands. 4. The conceptual design includes for one sideroad access to BR33 from each side. 5. The planned BR33 alignment is consistent with the Town's Local Official Plan. |

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| | <p>3. How would neighbourhood roads be configured within these new lots for example, can roads be efficiently laid out to minimize land consumption, be serviced in a cost-effective manner, and not have odd-shaped lots that are undesirable for development</p> <p>4. Does the road geometry allow for local roads to outlet onto the new Bruce Rd 33 corridor safely for example, there may be up to five local roads outletting onto the corridor; how close can local road intersections from Lot 30 be from the new Bruce Rd 33 / Bruce Rd 25 intersection; can local road outlets from Lot 29 be positioned along the s- bend</p> <p>It is not clear from the November 2017 GM Blue Plan report whether other intersections were considered. The area to the north of Bruce Rd 25 is undeveloped at this point and it is noted that two other north-south roads are planned, namely Ridge St and Stickel St. Has any consideration been given to connecting Bruce Rd 33 to Ridge St instead? Shifting the potential re-alignment of Bruce Rd 33 one "block" west may necessitate less dramatic s-curves in the alignment and create remnant parcels that may have more desirable layouts for future developments.</p> <p>Thank you for the opportunity to provide comments on this project. By way of this submission, please add Cuesta Planning Consultants to the mailing list for future correspondence and notices regarding this project.</p> | <p>Item 3 – Please note our response to Item 1, we note that depending how the land is develop, it may require a plan of subdivision to determine the neighbourhood road configuration.</p> <p>Item 4 – The road geometry is based on a design speed of 90km/h in order to accommodate constraints, however we expect the posted speed of the new Bruce Road 33 to be 60km/h. Two accesses are currently being considered from the new Bruce Road 33, additional review is required to determine these locations.</p> <p>We note that a Ridge Street intersection was considered during the Master Plan process, however Bruce Street alignment was considered more appropriate since it is recognized in the Town's Local Official Plan. Bruce Street is a planned collector road, which would provide a continuous route parallel to Goderich Street between Bruce Road 25 and Concession 10.</p> <p>As requested we have added Cuesta to the list for future correspondence on this project. Please note Brian Knox has retired with the County of Bruce, please send any correspondence to myself and the project team as cc'd on this email.</p> | |
| Resident #9 | | | |
| Res. #9 – Comment #1 | <p>As a resident of County Road 25, I was sent a letter inviting comments to be taken into consideration for the Bruce County Road 33 Re-Alignment Project. It is my understanding that Option #3 (realign BR33 with Bruce Street) is the option that was chosen to move ahead. I would prefer that option #1 was chosen, but either way, I have reviewed the planning information, and would like these three suggestions to be considered.</p> <ol style="list-style-type: none"> 1) That a tree line or "living fence" be installed along the new section of BR 33 as the wind in this area is quite severe especially in the winter. Without it, the road may become impassable in the winter or have very poor visibility. As this will be a major alternative route to Bruce Power when hwy 21 is closed in the winter, we need to be able to keep it open. 2) The plans show several trees to be removed from BR25 during construction. There needs to be a replanting plan to replace trees that are removed during construction. 3) I did not see any immediate plans written that include sidewalks along BR25. I feel that this is an important requirement to having the road redone. There is a lot of | <p>Thank you for comments, We have received several similar comments and I have distributed your comments to members of the design team.</p> | <ol style="list-style-type: none"> 1) A tree screen along the re-aligned BR33 will be considered in the detailed design phase. 2) A landscape plan will be considered with the detailed design of the separate BR25 project. 3) An Active Transportation Route along the north side of BR25 (3.0m wide paved path) is included in the Master Plan for Roads and Drainage. |

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| | walking and biking traffic along this road especially in the summer. People use this as a main connection to get to the beach from town, as well as walking from cottages and Unifor into town. | | |
| Resident #10 | | | |
| Res. #10 – Comment #1 | <p>Good morning Amanda, this email is in response to the notice of project initiation issued Jan 9th, 2018. My husband and I reside at [REDACTED] which appears to be the converging point of many of the possible alignment layouts for Bruce Rd 33. Naturally we are concerned about this fact. On one of the maps, our driveway is circled with a statement saying “driveway locations to be resolved. “ It seems strange to us that no one has ever approached us personally as to what sort of measures will need to be taken re our driveway.</p> <p>We have been unable to attend any of the town sessions but that should not matter.</p> <p>Also, on map M-1552 some of the layouts that converge on us are suggesting a speed limit of 80Km/h which is insane. Even with the small curve on the edge of our property and speed limit of 50 Km/h, cars are often in the ditch.</p> <p>Our choice would be to have the new road converge further down Bruce Rd 33 and not at our driveway. Thankyou,</p> | <p>Thank you for your comments regarding the Bruce Road 33 Re-Alignment Environmental Assessment. The County and Town will be considering next steps through the EA process and note the concerns you have identified in your comments. The County will be contacting you to review the layouts and the potential effect they have to your driveway as the design process evolves.</p> | |

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| Resident #11 | | | |
| Res. #11 – Comment #1 | <p>I have reviewed the project file Bruce County Road 33 Re-alignment and feel that there has not been adequate consultation of the cottagers who are major stakeholders and therefore I am submitting this Part II Order Request. It is necessary for proper engagement that the cottagers in the area be consulted because we are major users of CR25 and CR33 and the surrounding area which are being affected by the project.</p> <p>Both the Notice of Phase 2 and the Project Initiation Notice do not refer to the roads by their commonly known names. CR25 has commonly been known as the CAW Road and Con. 6. CR 33 is commonly known as Lake Range Road. These names are referenced in the report but not in the Notices. The notices state that the project is located centrally in Saugeen Shores when in fact it is in the south end of Saugeen Shores and there was not a map included in the notices to show the project location. When I received the notice, I did not realize that I frequently travel these roads and the stormwater outflow would potentially affect the shoreline.</p> <p>The Notice of Phase 2 Public Information Centre was sent May 2 for a meeting Wednesday May 18 from 7:00 to 9:00 pm. It is difficult for most cottagers to attend a mid-week meeting on such short notice in May (prior to many cottage openings Victoria Day Weekend). A Stakeholder meeting was held Oc. 25, 2017, which again was mid week, shortly after Thanksgiving.</p> <p>Having been a cottager for more than 50 years, I feel that I should have been engaged in the planning process. I feel that the recreation, safety, environment and tourism aspects of the project have not adequately been addressed in the study and I would like more information.</p> <p>From a recreational point of view and safety, I feel that the proposed multi-use path proposed on the north side of CR 25 must be built at the same time that the road is upgraded. Recently I have heard from the Beachers' Association that the multi-use path will not be built for at least 4 years. This would be a missed opportunity and we all know any delay means it may never happen. In the summer people walk and ride bikes along CR 25 between Town and the lake and I have felt for a long time that there should be a bike path on CR 25. It is not safe to walk or ride along CR 25 because of the site lines and therefore from a safety perspective this should be built without a 4 year delay.</p> <p>I would not like to see the addition of a traffic light at CR 33 and</p> | <p>The County received your letter dated February 5, 2018 to the Minister of Environment and Climate Change regarding the Part II Order Request – Bruce County Road 33 Re-alignment. We called earlier today and it seemed best to email and to comment on a number of items you had included in your letter.</p> <p>The County of Bruce and Town of Saugeen Shores initiated a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in September 2015. The Master Plan process included two public information sessions and comment periods. We noted tha the meetings were very well attended. The Notice of Study Completion for the Master Plan was issued on May 9, 2017. We note that various projects are derived from the Master Plan and we have identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project.</p> <p>The Bruce Road 33 re-alignment will be undertaken in accordance with the Municipal Class Environmental Assessment (EA) Planning Process as a Schedule B project. The Notice of Project Initiation was issued on January 9, 2018 with comments due on February 6, 2018. The County is now considering all the comments received and will review the project and will update the project file prior to the Notice of Completion being issued and the 30 day review period commencing. We expect to take the recommendation for the preferred solution to the March 22 meeting of the Transportation and Environmental Services Committee. The Committees decision on the recommendation would form the basis of the Notice of Completion.</p> <p>An active transportation route is proposed on the north side of Bruce Road 25 and will be constructed throughout the four years that the Bruce Road 25 and Bruce Road 33 projects will be undertaken. The County is also working with the Great Lakes Waterfront Trail project which identifies a mapping route for cyclist throughout Bruce County. The proposed route encourages cyclist to travel on Bruce Road 33 to Conc 4, then along Saugeen Beach Road and consequently to Bruce Road 25 or to continue along Shipley Ave. We are of the opinion that the active transportation route on Bruce Road 25 will assist with the cyclist safety.</p> <p>Concerning your comment on the Bruce Road 33 realignment, we did consider a traffic circle at the proposed Bruce Road 25/33 intersection in the Master Plan but a signalized intersection was considered as “preferred” for pedestrian safety</p> | |

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| <p>CR 25 and the addition of more stop signs until the traffic warrants it. I prefer the option of a round about if it can be done safely taking into account pedestrians and cyclists.</p> <p>From a tourism standpoint, I believe biking should be encouraged and thus the plans must take this into account, not just motor vehicles. CR 33 should also have bike lanes because it is a well travelled bike route. Although they are discussed briefly, they are not described in detail.</p> <p>Stormwater management and sewers are big issues in this area of Saugeen Shores. The sewers have never been continued south of CR 25 and many of the septic systems are extremely old. Before further development takes place in this area, the sewers must be extended. Although it is mentioned in the report, stormwater management is an issue, with increased run-off according to the plan. There are not sufficient details discussing water quality. This is significant because the outflow will be into the lake. The water quality is extremely important for tourism, for the residents/cottagers and the natural environment, therefore consideration must be given to how the water quality will be preserved.</p> <p>I am not trying to stop the project, but I am submitting this Part II Order Request to ensure proper consultation with the hope that Bruce County and Saugeen Shores will notify the stakeholders properly and incorporate the feedback into the plan, which are the fundamental principles of the EA process.</p> | <p>reasons, this decision is being reviewed by the Town, County and Consultants.</p> <p>The Bruce County Road 33 Re-alignment does have regard for storm water management and water quality will be considered and incorporated in the design.</p> <p>Thank you for the phone conversation this morning to review and discuss the email below.</p> <p>We acknowledge your concerns regarding stakeholder engagement for projects which include seasonal residences.</p> <p>We noted the public consultation was undertaken during the Master Plan process and the County and Town of Saugeen Shores will continue to correspond with landowners, agencies, organizations as the various projects proceed.</p> <p>We provided a general overview of the status of the Schedule A - drainage project and the Schedule B – Bruce Road 33 project.</p> <p>The Schedule A – drainage project is in the design phase and an application to the MOECC and Saugeen Valley Conservation Authority will be submitted prior to construction approval. We note that the Town, Consultant and County will review further means to ensure public input is included. We did note that the Town has met with the Beachers Association and has corresponded with the Lake Huron Coastal Centre regarding this project. It is proposed that in the near future, Town Council will be updated on the project and pre-consultation with the MOECC will take place. Following that the Town will host an Open House to share information with the Public.</p> | |
| | <p>The Schedule B – Bruce Road 33 road project will proceed with the EA process. It was noted that the construction of the Active Transportation Route is included under each phase of the project, having regard for cyclist safety. It was also confirmed that the proposed Bruce Road 33 re-alignment will include water and sanitary services and a stormwater management pond.</p> <p>We thank you for your comments and welcome any further questions/comments as we move forward with the Bruce Road 25 and Bruce Road 33 projects.</p> | |

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| Res. #11 – Comment #2 | <p>I would like to confirm my conversation with Kerri Meier and Brian Knox. I expressed my concern that cottage owners were not engaged although the affected people were primarily cottagers. Methods of engagement of cottagers should be considered in future projects. The description of the project and its location (including a map) would assist the audience in a better understanding of the project.</p> <p>I appreciate that Brian and Kerri will solicit community involvement for their Schedule A drainage project because it is a concern to people living/cottaging in the area, although it is not required under the Environmental Assessment Act.</p> <p>After my conversation with Brian and Kerri, I feel that they have listened to my concerns and will take them into account in future planning. Therefore I will withdraw my Part II Order request.</p> <p>Thank you for contacting me about my concerns.</p> | | |
| Resident #12 | | | |
| Res #12 – Comment #1 * Interpreted from hand written comment. | <p>In answer to your letter Bruce Street was purchased by the Saugeen Twp. to put the road in. Fenton raised (hell) about putting the road across by his house. The reeve of Saugeen Twp. thought he might lose some votes if he forced it so he decided to put the road by me. In my opinion the road should have gone through Bruce then there would not have a building there which has nothing in it. He built it to stop the road. I would say if you can put the road on Bruce Street as its needed to get the drainage right.</p> | | The proposed BR33 alignment intersects BR25 at the future Bruce Street location. |
| Resident #13 | | | |
| Res. #13 – Comment #1 | <p>We do have concerns, however, on the discharge of storm sewers to Lake Huron at both the George Street and BR25 shorelines given the design of the proposed outflows are to be addressed in a separate design brief. We understand this design brief is still to be completed and presented to the public. We look forward to reading and commenting on it.</p> <p>As per our address below, we own a property on Shipley Ave and also maintain a family cottage nearby in the unserved sewer area (for full disclosure we recently engaged GM BluePlan to provide engineering work on our Shipley property). Given our knowledge of septic systems in the area, we suggest that the storm sewer issue along BR25 and George St be arranged to coincide with installation of municipal sewers in the unserved area.</p> | <p>The team had a conference call today with the intention of providing a map for the future work on Bruce Road 25. As you are aware, this project is separate from the Realignment of Bruce Road 33, and as such this email is only in response to the Bruce Road 25 works, being carried out under a Class EA Schedule A+. The County will respond separately to your comments on the realignment.</p> <p>During the Master Plan process a preferred alternative was determined through communication with agencies as well as the public. This preferred alternative is now being designed. The solution is to be vetted through the Master Plan document and is required to be in accordance to those recommendations. This means that the consultant team is reviewing the preliminary works to confirm it meets the intent, including the stormwater management plan and the environmental plan that</p> | |

| Comment Received | | Response Provided | Additional Discussion |
|------------------|--|--|-----------------------|
| | | <p>were prepared with the Master Plan. We have also circulated to the Conservation Authority for input into the Preliminary design. We are now going to reach out to Huron Costal Conservation to look for input on the outlet configuration and technologies that may be appropriate in this environment.</p> <p>Once the Team has the design far enough along to be able to present a configuration, the Town will prepare some form of public consultation.</p> | |

NOTE: Additional comments received related to BR25 drainage are documented separately

ADDENDUM

**Stormwater Management Facility
(Version 2: November 26, 2019)**

Prepared By:



County of Bruce & Town of Saugeen Shores Bruce County Road 33 Re-Alignment - Addendum: Stormwater Management Facility

Schedule 'B' Environmental Assessment - Project File Addendum

GMBP File: 217127

Version 2: November 26, 2019



TABLE OF CONTENTS

| | |
|---|-----------|
| 1. INTRODUCTION | 1 |
| 1.1 Background | 1 |
| 1.2 Addendum: Project File 'Supplement' | 1 |
| 2. MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS | 2 |
| 3. BACKGROUND | 4 |
| 3.1 Master Plan | 4 |
| 3.2 Project Status | 5 |
| 4. PROJECT STATEMENT..... | 5 |
| 5. OFFICIAL PLANS AND GOVERNANCE | 6 |
| 5.1 Planning Considerations and Zoning | 6 |
| 5.2 Road Jurisdiction | 6 |
| 5.3 Governance of Lands | 7 |
| 6. STORMWATER MANAGEMENT CONSIDERATIONS | 7 |
| 6.1 Drainage Area: Base Conditions | 7 |
| 6.2 Existing Conditions and Drainage | 8 |
| 6.3 Post Development Conditions | 8 |
| 7. ALTERNATIVE SOLUTIONS: STORMWATER MANAGEMENT | 9 |
| 7.1 Stormwater Management Design Criteria | 9 |
| 7.2 Stormwater Management Alternatives | 9 |
| 7.2.1 Alternative 1: Do Nothing | 9 |
| 7.2.2 Alternative 2: Construct a SWM Facility to Manage Runoff Related Only to BR33 Re-Alignment..... | 9 |
| 7.2.3 Alternative 3: Construct a SWM Facility to Manage Runoff from BR33 & Future Development..... | 10 |
| 7.2.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron | 10 |
| 7.3 Summary and Comparison of Alternative Solutions..... | 10 |
| 8. BACKGROUND STUDIES..... | 11 |
| 9. INVENTORY OF ENVIRONMENTS | 11 |
| 9.1 Cultural Environment..... | 11 |
| 9.1.1 Archaeological Study | 11 |
| 9.1.2 Cultural Heritage Landscape Evaluation | 12 |
| 9.2 Social Environment | 12 |
| 9.2.1 Impacts to Private Property..... | 12 |
| 9.2.2 Baker Subdivision | 13 |
| 9.2.3 Governance | 13 |
| 9.3 Natural Environment..... | 13 |
| 9.3.1 Natural Heritage Environmental Impact Study..... | 13 |
| 9.3.2 Saugeen Valley Conservation Authority | 14 |

| | | |
|------------|--|-----------|
| 9.3.3 | Storm Water Quality Treatment | 14 |
| 9.3.4 | Source Water Protection and Climate Change | 15 |
| 9.4 | Technical Environment | 16 |
| 9.4.1 | Geotechnical Investigation | 16 |
| 9.4.2 | Technical Considerations | 16 |
| 9.4.3 | Efficacy of System Design | 17 |
| 9.5 | Economic Environment | 18 |
| 10. | ASSESSMENT OF ALTERNATIVES | 19 |
| 11. | PRELIMINARY RECOMMENDED SOLUTION | 21 |
| 12. | CONSULTATION | 21 |
| 12.1 | Notice of Project Change | 22 |
| 12.2 | Consultations | 22 |
| 12.2.1 | Public Consultation | 22 |
| 12.2.2 | Agency Consultation | 23 |
| 13. | RECOMMENDED PREFERRED SOLUTION | 25 |
| 14. | COUNCIL RESOLUTION | 26 |
| 15. | NEXT STEPS | 26 |

FIGURES

FIGURE 1: SITE LOCATION PLAN

FIGURE 2: EA PROCESS CHART

FIGURE 3: TRANSPORTATION PLANNING

FIGURE 4: PRE-DEVELOPMENT DRAINAGE AREA

FIGURE 5: POST DEVELOPMENT DRAINAGE AREAS

TABLES

TABLE 1: SUMMARY OF STORMWATER MANAGEMENT ALTERNATIVES

TABLE 2: TECHNICAL REVIEW AND COMPARISON OF ALTERNATIVES

TABLE 3: SUMMARY OF CONCEPTUAL CONSTRUCTION COSTS FOR EACH ALTERNATIVE

TABLE 4: ASSESSMENT OF STORMWATER MANAGEMENT ALTERNATIVES

TABLE 5: GENERAL SUMMARY OF AGENCY, UTILITY AND INDIGENOUS COMMUNITY COMMENTS RECEIVED

ENCLOSURES

ENCLOSURE A: BR33 RE-ALIGNMENT: RELEVANT CORRESPONDENCE

ENCLOSURE B: ADDENDUM NOTICES AND CONSULTATION

ENCLOSURE C: STORMWATER MANAGEMENT DESIGN BRIEF

ENCLOSURE D: TRANSPORTATION PLANNING MAPS

ENCLOSURE E: PUBLIC, AGENCY, UTILITY AND INDIGENOUS COMMUNITY COMMENTS

ENCLOSURE F: COMMITTEE REPORT

SCHEDULE 'B' ENVIRONMENTAL ASSESSMENT - PROJECT FILE ADDENDUM

BRUCE COUNTY ROAD 33 RE-ALIGNMENT - ADDENDUM: STORMWATER MANAGEMENT FACILITY COUNTY OF BRUCE & TOWN OF SAUGEEN SHORES

VERSION 2: NOVEMBER 26, 2019

GMBP FILE: 217127

1. INTRODUCTION

1.1 Background

In September 2015, the County of Bruce (County), as the proponent, with the Town of Saugeen Shores (Town), as a principle partner, initiated a Master Plan to plan various road and drainage undertakings within a broad area central to Saugeen Shores along Bruce Roads 25 and 33 (BR25 and BR33) in a comprehensive manner. The intention of the Master Plan was to establish an overall context and to assist with the planning of individual projects toward an appropriate overall development strategy. The *Preferred Master Plan* identified several projects for implementation to address the identified problems and opportunities. One of the projects included the re-alignment of BR33 to intersect BR25 from the south at the same location as the Town's planned alignment of Bruce Street from the north. The Master Plan is available on the County and Town websites for reference.

In January 2018, the County initiated a process under Schedule 'B' of the Municipal Class Environmental Assessment (EA), appropriately to plan the Bruce Road 33 re-alignment as considered in the Master Plan. A *Notice of Study Completion* to the process was advertised on May 1, 2018; however, on May 27, 2018 a Part II Order (PIIO) was requested by a member of the public, requesting that the Ministry of the Environment, Conservation and Parks (MECP) review the planning process. By letter dated January 8, 2019, the MECP indicated that the PIIO request would not be considered, citing that additional review of alternatives to the proposed stormwater management (SWM) facility was necessary. As such, the MECP concluded that the initial *Notice of Study Completion* was no longer valid. This correspondence is included in **Enclosure A**.

As part of the assessment outlined in the original Project File (April 2018) for the re-alignment of BR33 it was considered that land acquisition necessary for the planned road re-alignment would also be sufficient to accommodate a SWM facility associated with the road and, therefore, implementation of the planned SWM facility ancillary to the road could proceed as a Schedule 'A' EA activity. In its review, the MECP considered that any land acquisition which would support a SWM facility should be planned as a Schedule 'B' EA activity, including a review of various alternative stormwater management solutions. Further, since the proposed stormwater management facility is a component of the BR33 re-alignment, it was considered appropriate to assess the projects together under one process.

1.2 Addendum: Project File 'Supplement'

The County subsequently advanced the additional requirements for the conceptual stormwater management facility. This Addendum to the *'Bruce County Road 33 Re-Alignment - Project File' (April 2018)* is provided as a supplement to the original Project File to meet the Schedule 'B' requirements for the conceptual stormwater management (SWM) facility. The purpose of this Addendum is to document the additional review of alternatives for SWM associated with the BR33 re-alignment planned in the parent Project File (i.e. *'Bruce County Road 33 Re-Alignment - Project File'*; dated April 2018) and is included as a supplement to the document. The Project File, which outlines the *Preferred Solutions* to the road and the associated stormwater

management, dated April 2018 (Addendum: November 2019), is available on the County and Town websites for reference.

It is noted that the use of the term 'Addendum' for this additional documentation required to support the EA Process for the BR33 re-alignment is only intended to reflect the inclusion of additional material (i.e. a report supplement) to the Project File originally circulated. Accordingly, a new *Notice of Project Completion* has been issued so that all items in the Project File will be subject to Part II Order requests.

This Project File Addendum is intended to facilitate the assessment of the stormwater management facility alternatives and the road re-alignment project under one process and is considered a "living document". The *Notice of Project Change*, included in **Enclosure B**, which outlined the additional work completed for the project, was first issued on October 8th, 2019. The Notice included an invitation to the public, various government agencies and indigenous communities to review and provide comments on the Addendum to the Project File for the Bruce Road 33 Stormwater Management Facility. The purposes of this addendum are to:

- i. Outline the Project Statement;
- ii. Identify the range of Alternative Solutions considered to address the problem or opportunity;
- iii. Evaluate the anticipated 'environmental' effects and proposed mitigation;
- iv. Provide an assessment and evaluation of the alternative solutions considered; and
- v. Discuss the rationale for the consideration of a *Recommended Solution*.

This version of the Addendum to the Project File (Version 2) updates the previous Version 1 (October 8, 2019) and is completed as part of Phase 2 of the EA Process. It includes a summary of the key comments and feedback received during the consultation period completed in November 2019, commitments to mitigate any remaining negative impacts of the project, and a re-assessment of the *Preliminary Recommended Solution* to stormwater management. The documentation provided herein continues to support the *Recommended Solution*.

During the Committee meeting on November 21st, 2019, the Transportation and Environmental Services Committee accepted the *Recommended Preferred Solution*, thus directing the completion of Phase 2 of the EA Process, finalization of the Project File and issuance of the *Notice of Project Completion*. The *Notice of Project Completion* was issued on November 26th, 2019.

2. MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS

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. Projects are considered approved subject to compliance with an approved Class EA process. The Municipal Class EA (Municipal Engineers Association October 2000, as amended in 2007, 2011 and 2015) applies to municipal infrastructure projects including roads, water and wastewater.

The Municipal Class EA outlines a comprehensive planning process (illustrated in **Figure 2**) that provides a rational approach to consider the environmental and technical advantages and disadvantages of alternatives and their trade-offs in order to determine a *Preferred Solution* to address an identified problem (or opportunity), as well as consultation with agencies, indigenous communities, directly affected stakeholders and the public throughout the process. The key principles of successful environmental assessment planning include:

- Consultation;
- Consideration of a reasonable range of alternatives;
- Consideration of effects on natural, social, cultural, and economic environments and technical components;
- Clear documentation and systematic evaluation;
- Traceable decision making.

The classification of projects and activities under the Municipal Class EA is as follows:

Schedule A: Includes normal or emergency operational and maintenance activities, which are limited in scale and have minimal adverse environmental effects. These undertakings are pre-approved, and the proponent can proceed without further assessment and approval.

Schedule A+: Introduced in 2007, these minor projects are pre-approved. The public is to be advised prior to the implementation of the project.

Schedule B: Includes projects which have the potential for adverse environmental effects. This includes improvements to, and minor expansions of, existing facilities. These projects are approved subject to a screening process which includes consulting with stakeholders who may be directly affected and relevant review agencies.

Schedule C: Includes the construction of new facilities and major expansions to existing facilities. These undertakings have the potential for significant environmental effects and must proceed under the planning and documentation procedures outlined in the Municipal Class EA document.

This Schedule 'B' Project File Addendum, which addresses the Schedule 'B' assessment process for the stormwater management facility associated with the Bruce Road 33 road re-alignment (i.e. the parent project), includes documentation of the Schedule 'B' EA process specific to the stormwater management facility, which is in accordance with the requirements of the Municipal Class EA process and includes Phases 1 and 2, depicted on **Figure 2**:

- Phase 1 consists of identifying the problem or opportunity, and optional (discretionary) public consultation if deemed suitable.
- Phase 2 involves identifying reasonable alternatives to the problem or opportunity, compiling an inventory of the natural, cultural, social, technical and economic environments, evaluating each alternative and recommending a preferred alternative that will address the problem, and provide any measures necessary to mitigate potential environmental impacts. As part of the Phase 2 process, public and agency consultation is required before the preferred solution is selected to ensure all possible impacts are identified, and assessed, as part of the evaluation process. A summary of the key comments/feedback obtained during the Phase 2 consultation period is provided.

For Schedule 'B' or 'C' projects, a *Notice of Project Initiation* (or *Notice of Project Change*) is advertised and the *Preferred Solution* (and for Schedule 'C' projects, the *Preferred Design*) is developed through the process; to be confirmed by Council. The entire process is documented in a Schedule 'B' Project File, or Schedule 'C' Environmental Study Report, which is made available for public and agency review during a 30 calendar day period following the issuance of the *Notice of Completion*. Project Notices specific to this Project File Addendum are provided in **Enclosure B**.

For Schedule 'B' or 'C' projects, if concerns are raised during the minimum 30 calendar day review period, following advertisement of the *Notice of Completion*, that cannot be resolved through discussions with the County and the Town, then members of the public, interested groups or technical agencies may request the Minister of the Ministry of the Environment, Conservation and Parks (MECP) to issue a '*Part II Order*' for the project. Within the Part II Order request, the Minister may be requested to refer the matter to mediation, impose additional project conditions, and/or request an elevated scope of study. A Part II Order request requires the completion of a 'Part II Order Request' Form (i.e. form ID No.012-2206E). The form can be found online on Service Ontario's Central Forms Repository website (<http://www.forms.ssb.gov.on.ca/>) by searching 'Part II Order' or '012-2206E' (i.e. the form number). It is noted that the Part II Order process outlined herein supersedes that outlined in Section 2 of the Parent Project File.

The completed form and any supporting information must be submitted to the MECP (formerly the MOECC), prior to the end of the review period (minimum of 30 days is required), outlining the unresolved issue and requesting the Minister to review the matter.

Part II Order requests are submitted to:

Minister, Ministry of the Environment, Conservation and Parks
Ferguson Block, 77 Wellesley Street West, 11th Floor
Toronto, ON M7A 2T5
Fax: 416-314-8452
Minister.MECP@ontario.ca

Copies of the request must also be sent to the Director of the Environmental Approvals Branch at the MECP and to the County of Bruce at the addresses below:

Director, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
enviropemissions@ontario.ca

County of Bruce
Attn: Kerri Meier, Environmental Coordinator
30 Park Street
P.O. Box 398, Walkerton, ON N0G 2V0
kmeier@brucecounty.ca

The decision whether or not a Part II Order is appropriate or necessary rests with the Minister of the Ministry of the Environment, Conservation and Parks. If no Part II Order request is outstanding by the end of the minimum 30 calendar day review period, the project is considered to have met the requirements of the Class EA, and the County may proceed to design and construct the project subject to resolving any commitments documented in this Project File during the subsequent design phases and obtaining any other outstanding environmental approvals. For further information regarding Part II Order requests and process, please refer to:

<https://www.ontario.ca/environment-and-energy/class-environmental-assessments-part-ii-order>

3. BACKGROUND

3.1 Master Plan

The County of Bruce proposes to reconstruct the existing BR25 roadway, between Saugeen Beach Road and Goderich Street, as well as to construct a new roadway to re-align BR33 to intersect BR25 at the planned extension of Bruce Street, as illustrated on **Figure 1**. More specifically, as outlined in the parent Project File, the re-aligned BR33 section is proposed to be constructed from the existing BR33 at a location approximately 190 meters to the south of the existing intersection with Baker Road, to BR25 at a location approximately 535 meters to the east of its current intersection with BR25. Proposed BR33 roadworks include the construction of roadside ditches to convey the runoff from the roadways and their upstream lands. The remaining section of the existing BR33, immediately to the south of Baker Road, is proposed to be reconstructed as a cul-de-sac to maintain access to the private properties, although the final configuration may be altered during the design phase.

The approximately 990m re-aligned BR33 section is generally proposed to be constructed with a two-lane rural cross-section, transitioning to either a two-lane plus a left-turn lane urban cross-section at the intersection of BR25 or a roundabout. The configuration of the intersection of BR25 and BR33 will be addressed as part of the Schedule 'B' Project File for the BR25 urbanized cross-section between Bruce Street and Goderich Street, as identified in the Master Plan.

3.2 Project Status

GM BluePlan Engineering Limited (GMBP) was retained to undertake the planning process required to advance the re-alignment of BR33, as identified in the Master Plan for Roads and Drainage (2017). A *Notice of Study Completion* for this project was issued on May 1, 2018. The Parent Project File considered that land acquisition necessary for the planned road re-alignment would also be sufficient to accommodate a SWM facility associated with the road and, therefore, implementation of the planned SWM facility ancillary to the road could proceed as a Schedule 'A' EA activity. In its review, the MECP considered that any land acquisition which would support a SWM facility should be planned as a Schedule 'B' EA activity, including a review of various alternative stormwater management solutions and recommended the following:

- i. A *Notice of Project Change* be issued explaining that additional work would be completed.
- ii. The completion of the Schedule 'B' requirements for the proposed stormwater management facility including, but not limited to:
 - Consultation with the public and review agencies;
 - Assessment of alternative solutions specific to stormwater management;
 - Identification of potential impacts and provisions for mitigation measures;
 - Documentation of the planning process through an amended Project File report; and
 - Re-issuance of the *Notice of Completion*, including a 30-calendar day consultation period.

This Project File Addendum, although prepared as a 'stand-alone document', forms part of the Project File for the Bruce Road 33 Re-Alignment.

Background studies that have been completed in support of this Schedule 'B' EA process for the stormwater management facility include a Conceptual Stormwater Management Design Brief, which includes a review of alternatives, to identify the impacts of the various stormwater management alternatives (outlined in **Section 7**) and mitigation measures required to address identified impacts. The *'Revised Conceptual Stormwater Management Design Brief'* (September 2019) is included in **Enclosure C**.

4. PROJECT STATEMENT

As previously discussed, the need to advance specific project planning for the re-alignment of BR33 was identified in the Master Plan for Roads and Drainage (May 2017). The basic intentions of the Bruce Road 33 re-alignment and drainage improvements were outlined in the Master Plan.

A component of the proposed road re-alignment project included stormwater management, which had initially been addressed in **Section 6.4.4** of the Parent Project File. A conceptual design, which considered the volume of storage required and the land area requirement sufficiently to accommodate the stormwater management planning, was outlined. However, as it was considered that *'right-of-way lands would be acquired for the BR33 re-alignment under the Schedule 'B' process, implementation of the proposed SWM Pond would proceed as a Schedule 'A' activity as long as no additional property was required'*, it was thought that the detailed design of the SWM facility could be advanced as part of the design process. In contrast, the Ministry considered that any land acquisition that would support a SWM facility should be planned as a Schedule 'B' EA activity.

Consequently, a related, but project specific, intention of the process is to develop a preferred stormwater management strategy. Stormwater management alternatives under consideration have project specific triggers for a Schedule 'B' EA process (i.e. property acquisition). As part of the Schedule 'B' process specific to stormwater management, a Project Statement is required and is outlined below.

The Schedule 'B' EA planning process is project specific but follows the same process as for the more general Master Plan. Therefore, in consideration of the significant degree of overlap between the Master Plan and the

Schedule 'B' EA for the Bruce Road 33 re-alignment and drainage improvements, the Project Statement outlined below is consistent with that presented in the Parent Project File and was adapted from the Master Plan. It is considered appropriately to address the intentions of the Schedule 'B' processes.

'The proponent intends to plan safe and efficient road infrastructure, and to support the Town's transportation initiatives with regard to planned development, within the settlement area boundary, by advancing the preferred BR33 re-alignment initiative, including consideration for drainage improvements along BR33, as documented in the Master Plan for Roads and Drainage (May 2017).'

The County is, therefore, completing this Schedule 'B' EA process under the Municipal Class Environmental Assessment to ensure that this project is appropriately planned.

5. OFFICIAL PLANS AND GOVERNANCE

5.1 Planning Considerations and Zoning

As an upper tier government, the County establishes land use planning policies within the Bruce County Official Plan (BCOP June 21, 2010 – office consolidation June 2013). The BCOP identifies land uses with a broad area perspective, including such designations as 'primary urban community', 'agricultural areas' and 'hazard land areas', as illustrated in the Schedule A Land Use Plan. The BCOP also identifies a County-wide transportation plan as illustrated in the Schedule B Transportation Plan. Schedules A and B of the BCOP are provided in **Enclosure D**. BR33 is identified as a 'collector rural road', connecting the 'primary urban community' of Port Elgin with the 'secondary urban community' of the Bruce Nuclear Power Development.

As a lower tier government, the Town establishes more local land use planning policies within the Town of Saugeen Shores Local Official Plan (SSLOP, September 2014). The Schedule A Land Use Plan identifies predominantly residential land uses adjacent to BR25 and BR33. The SSLOP Schedule B Transportation Plan identifies Bruce Street as a proposed collector road to align with a southerly connection to BR33 at the Lot 25/26 boundary. SSLOP Schedule A and B are included in **Enclosure D**.

Both the BCOP and SSLOP identify a southerly limit of the 'planned settlement area' generally at the Lot 28/29 boundary but extending southerly along both the Gore Drain and BR33, where shown on **Figure 1**. The balance of the lands south of the Lot 28/29 boundary are designated as agricultural.

5.2 Road Jurisdiction

Currently, the County is responsible for BR25 from the signalized intersection at Goderich Street (i.e. Highway 21) westerly to the intersection of Saugeen Beach Road at Lake Huron, where shown on **Figure 3**. As per the recommendations of the Master Plan, the County intends to divest the portion of BR25 from the planned Bruce Street intersection westerly to Saugeen Beach Road since more local issues are expected to predominate with planned development within the urban designation. In addition, divestiture of BR33 from BR25 to the confluence between the re-aligned BR33 and remnant Lake Range Road, is considered as part of the re-alignment of Bruce Road 33. Bruce Road 33, as aligned, will remain part of the County road network.

Therefore, upon completion of the Schedule 'B' processes for BR25 and BR33, it is likely that the County (i.e. the proponent) will maintain jurisdiction over BR25 between Highway 21 and the planned Bruce Street/BR33 re-alignment. The portion of BR25 between the planned Bruce Street west to Saugeen Beach Road and the cut-off section of Lake Range Road will be divested to the Town. Further, the Town will maintain jurisdiction over the road network associated with the Baker Subdivision.

5.3 Governance of Lands

While the County will maintain jurisdiction over the BR33 right-of-way, as aligned, the Town will maintain jurisdiction over the surrounding lands. Future development will be governed by the Town and, as per the SSLOP, the availability of adequate municipal services to accommodate increased demand on services including storm drainage, will need to be considered. Further, drainage issues within the 'Planned Development' lands will need to be addressed as part of detailed design for future development. The SSLOP states the following:

'Stormwater management studies shall be required for any new residential development consisting of more than five lots or for commercial or industrial developments with large amounts of impervious area. Such plans may be required for other developments, as determined by the Town, if the area has existing drainage problems or if runoff could significantly affect adjacent lands or water quality. Priority areas for future study include Bruce Road 25. Significant findings and recommendations from these studies will be considered when reviewing new development proposals.'

6. STORMWATER MANAGEMENT CONSIDERATIONS

6.1 Drainage Area: Base Conditions

Elements considered within the *Preliminary Preferred Master Plan* related to drainage improvements generally addressed three separate drainage areas, and included the following:

1. BR25 Stormwater Management System:

Based on the recommendations of the Master Plan, the reconstruction of BR25 included a recommendation to install a trunk storm sewer to drain runoff from the roadway and upstream lands, to an outlet at Lake Huron, as follows:

- Construction of a storm sewer, sized to convey the 1:100-year design flow, extending westerly on BR25 from Goderich Street to Lake Range Road.
- Construction of a storm sewer in line with BR25, sized to convey the 1:5-year design flow, extending westerly from the Lake Range Road intersection to a new outlet at Lake Huron.
- Provision for a secondary local storm sewer system on BR25 west of Lake Range Road to collect and treat road runoff prior to discharging to the watercourse outlet west of Shipley Ave.
- For flows in excess of the storm sewer capacity, provision for a 1:100-year overland flow route within an urban road cross section on BR25 from Lake Range Road westerly to spill to the watercourse west of Shipley Avenue.

The construction of the trunk storm sewer, west of Ridge Street to an outlet at Lake Huron was substantially completed in the Fall 2019. The works associated with constructing the urban road section and associated storm sewers from Lake Range Road to the future Ridge Street is expected to be completed in 2020. It is anticipated that the remainder of the storm sewer (i.e. extension to Goderich Street/Highway 21) will be constructed at a later date; planned for 2021.

2. Baker Subdivision System:

The Baker Subdivision is located below the bluff west of BR33 and south of BR25. The Master Plan identified that residential lands in the Baker Road area, to the west of the existing BR33 alignment, occasionally suffer from seasonal flooding issues and currently lack a storm sewer system. Therefore, construction of a local area storm sewer system within the Baker Subdivision was recommended as part of the Master Plan, but to be installed concurrently with a planned sanitary sewer collection system.

3. BR33 Storm Water Management System:

The Master Plan recommended the completion of drainage improvements along BR33. This Addendum to the Project File is prepared specifically to consider stormwater management

alternatives for the BR33 system. Further, stormwater management specifically within the Baker Subdivision may be addressed separately from, or in addition to, the BR33 system. However, the drainage conditions through Baker Subdivision should be maintained or improved by the construction of the proposed SWM works associated with the construction of BR33.

6.2 Existing Conditions and Drainage

In general, lands to the south of BR25, west of the Gore Drain Trail and east of Lake Range Road (i.e. the existing BR33), drain downward from east to west. The lands associated with the BR33 re-alignment are zoned as 'Planned Development' and 'Agricultural', as shown on **Figure 1**. Current land use is primarily agricultural.

Runoff from lands east of the Baker Subdivision currently drains across the existing BR33 (Lake Range Road) at two locations; via a 750mm Ø culvert approximately 155m to the south of BR25 and via a 750mm Ø culvert approximately 50m to the south of Baker Road, where shown on **Figure 4**. Runoff draining to the northerly culvert is conveyed through the area to the north of the Baker Street Subdivision towards BR25 and is not considered to contribute to the identified drainage issues within the Baker Subdivision. Runoff draining to the southerly culvert drains in an open watercourse across private properties to a system of roadside ditches within the Baker Subdivision, and ultimately is conveyed to Lake Huron. Under pre-development conditions it is estimated that approximately 48.45 hectares of upstream lands drain to the Baker Subdivision.

6.3 Post Development Conditions

The proposed re-aligned BR33 will intercept runoff from the lands upstream of the Baker Subdivision (i.e. runoff currently draining to the southerly culvert), as a well as a portion of the lands upstream of the existing northerly 750mm Ø culvert crossing Lake Range Road which, under pre-development conditions, do not drain to the Baker Subdivision. Currently, the developed portions of these lands generally drain to BR25 with only several accessory buildings draining westerly towards the location of the proposed re-aligned BR33. The existing accessory buildings are considered to have negligible imperviousness.

The runoff to be intercepted under post-development conditions from the existing northerly 750mm Ø culvert includes approximately 8.07 hectares of land zoned as 'Residential', 'Planned Development', and 'Highway Commercial'. In consideration of the additional 8.07 ha from within Lot 30, it is estimated that under post-development conditions approximately 56.52 hectares of upstream lands will drain to the Baker Subdivision. The post-development catchment area is outlined on **Figure 5**.

Stormwater management alternatives reviewed within the '*Revised Conceptual Stormwater Management Design Brief*' conservatively include these additional lands to ensure that drainage conditions within the Baker Subdivision are not worsened by runoff associated with development within upstream lands and are improved, if possible. At the design development phase, consideration should be given to overland flow routes to address the 'greater than 100-year' runoff condition, as recommended by the SVCA.

7. ALTERNATIVE SOLUTIONS: STORMWATER MANAGEMENT

The BR33 re-alignment considered in the Master Plan, and further planned within the Parent Project File, would introduce a new impervious surface to a currently pervious area, which would increase the rate of runoff. An increased rate of runoff could result in adverse effects downstream. The Master Plan identified that, under existing conditions, residential lands in the Baker Road area to the west of the existing BR33 alignment occasionally suffer from seasonal flooding issues and currently lack a storm sewer system. Further, runoff from road surfaces may contain contaminants, which could adversely affect the natural environment.

7.1 Stormwater Management Design Criteria

Based on pre-development drainage conditions and correspondence with the SVCA, the Town and the County, the stormwater management criteria used to develop appropriate stormwater management strategies for the BR33 re-alignment included the following:

1. Post-development peak flow rates discharging from the proposed BR33 re-alignment and upstream lands to the Baker Subdivision are to be attenuated to less than, or equal to, pre-development conditions.
2. Stormwater management associated with future development, within the lands zoned as 'Planned Development', may be considered in either the current or future developed state.
3. Enhanced water quality treatment (i.e. 80% total suspended solids removal) is to be provided for runoff draining from the proposed development and its upstream lands prior to draining to the Baker Subdivision.

These criteria were considered within the stormwater management alternatives outlined herein.

7.2 Stormwater Management Alternatives

Alternative solutions considered to address the Project Statement are summarized as follows:

1. Do Nothing
2. Construct a stormwater management facility to manage runoff related only to the BR33 re-alignment.
3. Construct a stormwater management facility to manage runoff from BR33 and future development.
4. Construct a new storm sewer system through the Baker Subdivision to Lake Huron.

7.2.1 Alternative 1: Do Nothing

This alternative represents the construction of the proposed roadworks with no stormwater management controls provided for the attenuation and treatment of runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision. The 'Do Nothing' alternative would, at minimum, maintain existing conditions. However, the existing deficiencies could be exacerbated due to the potential for increased peak flows and/or impacts to water quality. While the 'Do Nothing' alternative would not address the stormwater management criteria (outlined in **Section 7.1**), it is considered as a base-line against which to compare other alternative stormwater management solutions and may be implemented at any time during the planning process prior to implementation of the *Preferred Solution*.

7.2.2 Alternative 2: Construct a SWM Facility to Manage Runoff Related Only to BR33 Re-Alignment

This alternative considers the construction of a stormwater management facility (SWM) to provide attenuation of post-development flows from the 56.52 ha catchment area to less than, or equal to, the pre-development peak flow rates. The SWM is envisioned to be a dry pond-type facility that would include water quality treatment provisions such as a "treatment train" consisting of roadside ditches generally designed to the requirements of an enhanced grass swale. This alternative considers that future development lands located

upstream of the Baker Subdivision (post-development) would be responsible for lot-specific stormwater management.

This type of SWM facility was considered in the Parent Project File. A Conceptual Stormwater Management Design Brief describing the SWM facility was prepared and provided in **Appendix B** of the Parent Project File.

7.2.3 Alternative 3: Construct a SWM Facility to Manage Runoff from BR33 & Future Development

This alternative considers the construction of a 'centralized' stormwater management facility to provide for the attenuation of post-development flows for runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision to less than, or equal to, the pre-development peak flow rates. This alternative would include the construction of a stormwater management facility that would be sized to receive runoff from the re-aligned BR33 and contributing lands in a developed state (limited to lands zoned as 'Planned Development') and designed to meet the water quality treatment requirements.

The SWM is envisioned as a dry pond-type facility with an infiltration feature to address both peak flow attenuation and water quality treatment requirements. Water quality treatment for the entire post-development catchment area would be provided by a single facility, which would be developed in conjunction with the re-alignment of BR33.

7.2.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron

This alternative considers the construction of a storm sewer system through the Baker Subdivision to convey all post-development runoff from the re-aligned BR33 and upstream lands to a new outlet at Lake Huron. The storm sewer would be designed (i.e. sized) sufficiently to prevent an increase in downstream flows and would include the provision for runoff water quality treatment prior to discharging to the Lake (i.e. Oil-Grit Separator). More specifically, the storm sewer would be designed to provide sufficient capacity to convey the upstream runoff associated with a 100-year design storm event. Options include the following:

- Option A: The storm sewer would be designed to support post-development peak flow rates to less than, or equal to, pre-development flow rates. Stormwater management associated with future development of lands located upstream of the Baker Subdivision (post-development) would become the responsibility of the developer(s).
- Option B: The storm sewer would be designed to support both the BR33 re-alignment and future development within the post-development catchment area located to the east of the Baker Subdivision. In other words, future development would be permitted to drain uncontrolled to a proposed storm sewer system.

7.3 Summary and Comparison of Alternative Solutions

A summary and comparison of the alternative solutions being considered is provided in the following **Table 1**.

TABLE 1: SUMMARY OF STORMWATER MANAGEMENT ALTERNATIVES

| ALTERNATIVE | TYPE OF FACILITY | DESCRIPTION OF DRAINAGE AREA CONSIDERED | | WATER TREATMENT (TSS Removal) |
|---------------|------------------|---|-------------------------------|-------------------------------|
| | | Re-Aligned BR33 | Planned Dev. Lands | |
| Alternative 1 | None | Increased runoff to Baker Sub. | Existing condition maintained | None |
| Alternative 2 | SWM Pond | Diverted to SWM Pond | Existing condition maintained | Yes |
| Alternative 3 | SWM Pond | Diverted to SWM Pond | Diverted to SWM Pond | Yes |
| Alternative 4 | Storm Sewer | Diverted to Storm Sewer | Inclusion is optional | Yes |

8. BACKGROUND STUDIES

The following background studies were prepared to aid in the evaluation and assessment of the BR33 alternatives and are considered herein to inform the impacts of alternative stormwater management solutions. Copies of these background study reports are provided in **Appendix B** of the Parent Project File.

- i) Archaeological Assessment (Stage 1) – Bruce County Road 25 Re-Alignment, Port Elgin, Ontario. Prepared by Mayer Heritage Consultants Inc. (February 2010).
- ii) Stage 2 Archaeological Assessment – Regional Road #33 Re-Alignment: Part Lots 27, 28, 29 & 30 Lake Range, Municipality of Saugeen Shores, Former Geographic Township of Saugeen, Bruce County, Ontario. Original Report. Prepared by Scarlett Janusas Archaeology Inc. (June 1, 2017).
- iii) Stage 2 Archaeological Assessment – Regional Road #33 Re-Alignment: Part Lots 27, 28, 29 & 30 Lake Range, Municipality of Saugeen Shores, Former Geographic Township of Saugeen, Bruce County, Ontario. Supplementary Documentation: Indigenous Engagement. Prepared by Scarlett Janusas Archaeology Inc. (June 1, 2017).
- iv) Scoped Natural Heritage Environmental Impact Study: Bruce County Road 33 Re-Alignment. AWS Environmental Consulting Inc. (July 26, 2017)
- v) Geotechnical Investigation: Road Reconstruction/Re-Alignment Projects – Bruce County Roads 25 and 33. Saugeen Shores, Ontario. Prepared by Chung & Vander Doelen Engineering Limited (January 30, 2018).
- vi) Bruce County Road 33 Re-Alignment: Conceptual Stormwater Management Design Brief, Saugeen Shores. Prepared by GM BluePlan Engineering (April 2018).

One additional background study was completed specifically to support this Addendum to the Schedule 'B' Project File. The *'Revised Conceptual Stormwater Design Brief, Saugeen Shores'* (August 2019) includes a review of the stormwater management alternatives and identifies the impacts and mitigation measures required to address the identified impacts. The Revised Conceptual Stormwater Design Brief is included in **Enclosure C**.

A summary and discussion of background information is provided in the following sections.

9. INVENTORY OF ENVIRONMENTS

9.1 Cultural Environment

9.1.1 Archaeological Study

Based on the recommendations outlined in the Stage 1 Archaeological Assessment (Mayer, 2010), Scarlett Janusas Archaeology Inc. was retained to complete a Stage 2 Archeological Assessment for the BR33 re-alignment. The assessment was conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (S&G) administered by the Ministry of Tourism, Culture and Sport (MTCS).

The Stage 2 archaeological assessment of the study area was conducted on May 26th, 2017. The study area included an area of 50 meters in width along the proposed BR33 right-of-way. No cultural material or features were identified during the Stage 2 assessment. The report generally concludes that no additional assessment is required for the subject lands. In a letter dated June 30, 2017, the MTCS confirmed the entry of the Stage 2 Assessment Report into the Ontario Public Register of Archaeological Reports. This is included in **Appendix B** of the Parent Project File.

9.1.2 Cultural Heritage Landscape Evaluation

The need for a Cultural Heritage assessment was screened out using the MTCS screening tool, as provided in **Appendix B** of the Parent Project File.

9.2 Social Environment

9.2.1 Impacts to Private Property

As outlined in the Parent Project File, the predominant issue related to the proposed BR33 re-alignment is impacts to property. While land acquisition will be required to support the roadworks associated with the re-alignment of BR33, additional land acquisition may be required depending on the stormwater management alternative selected. The acquisition of privately-owned lands specifically required to support the roadworks, previously identified in the Parent Project File, includes the following:

- A 30-meter wide right-of-way along the proposed re-alignment of BR33.
- The remnant portion of Lot 28, to the northwest of the proposed BR33 alignment and east of Lake Range Road, is planned to be acquired for the proposed construction of ancillary works. Ancillary works may include, but not be limited to, a cul-de-sac along Lake Range Road to the south of Baker Road to maintain access to private properties and an extension of Baker Road to the east.

The County initiated discussions with the directly affected landowners in conjunction with the Schedule 'B' process for the Bruce Road 33 re-alignment. At that time all parties generally agreed with the project direction and approach to land purchase for the new right-of-way. Upon confirmation of the *Preferred Solutions* to this Schedule 'B' EA process for both the BR33 re-alignment and stormwater management, the County will continue (or initiate) discussions with the directly affected landowners and an independent assessor will be retained by the County to establish fair market value for the required lands. The impacts to surrounding properties related to each stormwater management alternative are discussed below.

Alternative 1:

The 'Do Nothing' approach would avoid the requirement for land acquisition.

Alternative 2:

The conceptual design for the management of stormwater, limited to the post-development flows associated with the BR33 re-alignment, considers that the area of land required sufficiently to accommodate stormwater management planning is available within the lands required for the BR33 roadworks, including the remnant land situated in the northwest corner of Lot 28 Lake Range, where shown on **Figure 5**. Therefore, in consideration of the area of lands required to accommodate the BR33 re-alignment, including the proposed construction of ancillary roadworks, no additional land acquisition would be required for the development of a SWM facility with sufficient capacity to address water quantity and quality issues limited to the proposed BR33 re-alignment.

Alternative 3:

This alternative would include the construction of a stormwater management facility that would be sized to receive and treat runoff from the re-aligned BR33 and the post-development contributing lands in a developed state. Under this scenario, the larger developed land area would further increase the rate of runoff, resulting in a need for a larger SWM facility and, as a result, additional property acquisition beyond the minimum necessary to permit the construction of the proposed roadworks (where shown on **Figure 5**). In other words, the area proposed to be acquired for ancillary works associated with the Bruce Road 33 re-alignment, would not sufficiently accommodate a stormwater management facility that simultaneously addresses drainage from the post development catchment area in a developed state. Consequently, additional land acquisition would

need to be negotiated by the County to accommodate the additional flows from the private development(s) within the Town of Saugeen Shores.

Alternative 4:

This Alternative considers that the increase in runoff due to the proposed BR33 re-alignment could be managed in a new storm sewer system, with provision for water quality treatment prior to discharging to Lake Huron. The storm sewer alternative considers that the system could be designed to either include for flows from the BR33 re-alignment alone or the combined flows from BR33 and future development within the post-development catchment area located to the east of the Baker Subdivision. As both flows and treatment could be achieved via a variety of options, the system could be designed in such a way that, if preferred, the acquisition of additional lands could be avoided.

9.2.2 Baker Subdivision

The Master Plan identified that residential lands in the Baker Road area, to the west of the existing BR33 alignment, occasionally suffer from seasonal flooding issues and currently lack a storm sewer system. Therefore, construction of a local area storm sewer system within the Baker Subdivision was recommended as part of the Master Plan, but to be installed concurrently with a planned sanitary sewer collection system. The installation of a local area storm and sanitary sewer system within the Baker Subdivision was previously pursued by the Town, however Provincial funding for the project was not approved. The Town has indicated a preference to pursue future opportunities for Provincial funding to make the project economically viable. The management of drainage from the area upstream of the Baker Subdivision will result in no negative impacts and potential improvements to the existing drainage conditions through the Baker Subdivision.

9.2.3 Governance

As previously discussed, the proposed BR33 right-of-way and stormwater management specific to the BR33 re-alignment, will be owned and maintained by the County. However, the surrounding lands fall within the jurisdiction of the Town of Saugeen Shores and will be developed privately, subject to the Town's planning policies.

Alternatives 3 and 4B consider stormwater management for the post-development catchment area (i.e. including lands in the Town's Planned Development Area), in a developed state. The Town lands that fall outside of the County parcel required for the BR33 re-alignment are considered to be of little direct interest to the County. Further, the pre-purchase of the development lands would need to be arranged and administered by the Town; a process that would add complexity (i.e. governance issues), time and cost to the project. Consequently, at this time the Town has indicated no interest in pursuing alternatives that simultaneously address future stormwater management within the Town's area of Planned Development, as the degree or structure of future development in the area is currently unknown.

Therefore, alternatives that permit the implementation of a system solely operated and maintained by the County, allowing for the County to complete the required works on its own initiative, are preferred. The management of stormwater within the Town's planned development lands may proceed at a later date.

9.3 Natural Environment

9.3.1 Natural Heritage Environmental Impact Study

A "Scoped Natural Heritage Environmental Impact Study" (EIS) was completed by AWS to further inform the Environmental Assessment for the re-alignment of Bruce Road 33. This study was completed to characterize and document natural heritage features and species at risk (SAR) within the study area and to assess impacts. The report concluded that, since the lands are currently cultivated, the potential for SAR species is low.

However, should the land use change from active cultivation to fallow prior to road construction, then an updated SAR review may be necessary to support the construction phase.

Further, the study area considered within the EIS did not address the potential for additional land acquisition required for a larger scale SWM facility. Therefore, a SWM alternative that includes the acquisition of additional lands beyond the area proposed for the BR33 re-alignment, including the lands required for ancillary works, would require that the EIS be updated to confirm the natural heritage features. However, based on the similar land use and site features, it is anticipated that the findings and recommendations would be similar.

9.3.2 Saugeen Valley Conservation Authority

The Study Area is located within the jurisdiction and Screening Limits of the Saugeen Valley Conservation Authority (SVCA). Following the *Notice of Project Initiation* (January 2018), the SVCA completed a review in accordance with the Environmental Planning and Regulations Policies Manual (May 2017). The main comment specific to the approach to stormwater management within the study area generally indicated that runoff events, larger than the '100-year event', be considered given the sensitive receptors in the area. Ultimately, at the design development phase, the project should consider addressing these issues.

SVCA correspondence issued in relation to the Part-II Order request echoed the above comment. Correspondence received following the initial issuance of the *Notice of Study Completion* (May 2018) for the re-alignment of BR33 is provided in **Enclosure A**.

Comments from the SVCA on October 29, 2019 re-iterated feedback previously provided. In general, the SVCA continued to suggest that '*given the sensitive receptors in the area, the intent of this work to resolve drainage issues, and given climate change considerations*', run-off events, greater than the 100-year event, and '*higher targets*', to increase water quality and effect a net gain at the shoreline, be considered. As previously noted, the requirements of the SVCA and MECP will be addressed during the subsequent design development phase which will be advanced following the completion of the Environmental Assessment Process. The SVCA and MECP will be issued a copy of the design drawings for review and approval in conjunction with the required permit applications.

9.3.3 Storm Water Quality Treatment

Water quality treatment is required to an enhanced level for, at minimum, runoff draining from the re-aligned BR33 and post-development lands upstream of the Baker Subdivision. However, some alternative solutions presented herein also consider the management of stormwater quantity and quality for runoff from post-development contributing lands in a developed state. The water quality control measures considered by each alternative were evaluated in the '*Revised Conceptual Stormwater Management Design Brief*' as follows:

Alternative 1:

As part of the 'Do Nothing' approach no stormwater management controls would be provided for the attenuation and treatment of runoff. Therefore, the water quality associated with runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision would be expected to be adversely affected as contaminants from the proposed roadworks would be conveyed downstream without treatment.

Alternative 2:

Water quality treatment for drainage specific to the re-alignment of BR33 and post-development lands upstream of the Baker Subdivision (in an undeveloped state) was considered to be addressed via a treatment train approach. In other words, sufficient treatment capacity would be provided by flow through enhanced grass swales which would convey runoff to the stormwater management facility where it would be further polished. The SWM facility would be designed as a dry pond-type facility and would provide temporary volume to store runoff. The control provided by the outlet of the SWM facility would serve to reduce the velocity of

flows discharging to the Baker Subdivision and encourage further settling out of suspended solids. Using this approach, it is expected that the runoff from the proposed roadworks would receive an enhanced level (i.e. 80% TSS removal) of water quality treatment prior to discharging to the Baker Subdivision drainage system.

Alternative 3:

This alternative requires consideration for water quality treatment for runoff from the BR33 re-alignment and the post-development lands upstream of the Baker Subdivision in a developed state. As the volume of runoff (peak flow) draining to the proposed roadworks would be expected to be greater than the capacity that could be treated via a conveyance control (i.e. grass swale), enhanced grass swales were not considered to be a feasible SWM control under this alternative. Therefore, water quality treatment provided via an "end of pipe" approach, such as within a stormwater management pond was proposed. The minimum required area (i.e. footprint) for such a facility is generally governed by the storage volume required for the attenuation of peak flows. Following a review of various types of SWM facilities, a dry-pond with a sub-surface infiltration feature for water quality treatment was considered as it requires the smallest area. However, as previously discussed, the minimum footprint area of approximately 9,430 m² for the dry-pond is still greater than that available in the area proposed to be acquired for the ancillary works, therefore additional land acquisition would need to be negotiated.

Alternatives 4A/4B:

Water quality treatment is considered to be addressed via an oil-grit separator (OGS) unit installed in-line with a storm sewer system designed to direct flows from the re-aligned BR33 and post-development lands upstream of the Baker Subdivision, either in an undeveloped state (i.e. Option A) or developed state (i.e. Option B), through the subdivision and discharging to Lake Huron. Based on the assessment provided in the Conceptual SWM Plan (August 2019), it is not expected that a standard OGS unit (i.e. pre-designed) could provide sufficient water quality treatment for runoff from the subject area. While custom Stormceptor MAX units can be designed to meet site-specific needs, the potential application of this technology remains unknown and could be further evaluated should the County decide to further pursue this alternative. Alternatively, multiple water quality treatment provisions would be required to address the design criteria.

9.3.4 Source Water Protection and Climate Change

Recent amendments to the EA Process require proponents to consider whether the project is located within a Source Water Protection Area and, if so, to document whether any project activities are a prescribed drinking water threat. As part of the EA process, this project was reviewed with respect to the requirements under the Clean Water Act, 2006. The study area is located within the Saugeen Valley Source Protection Area and falls under the Saugeen-Grey Sauble-Northern Bruce Peninsula Source Protection Plan. Based on the Saugeen, Grey Sauble and Northern Bruce Peninsula Source Protection Vulnerable Areas Mapping Application, the Study Area is situated within a Significant Groundwater Recharge Area (SGRA) and a Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6. The SVCA Risk Management Office was consulted via the *Notice of Project Change*. The SVCA Risk Management Office provided comments specific to Source Water Protection on October 9, 2019, included in **Enclosure E**, which confirmed that the project does not fall within a highly vulnerable source protection area (i.e. wellhead protection area or intake protection zone) where Source Protection Plan policies apply.

The natural environment also includes potential impacts of the project on Climate Change, and of Climate Change on the project. As outlined in the Parent Project File, the project intends to reduce travel time and improve travel safety, which would result in reduced greenhouse gas emissions. Further, considering that the project is intended simultaneously to resolve drainage issues, runoff events greater than the 100-year event may be considered in the design of the stormwater management facility in order to factor in the potential effects of climate change on the project. The proposed BR33 re-alignment is across lands, which are currently cropped. In consideration of public comments received, the proponent has committed to a landscaping plan that will include trees along the new alignment to provide shade and snow screening.

9.4 Technical Environment

9.4.1 Geotechnical Investigation

A geotechnical investigation was completed by Chung & Vander Doelen Engineering to inform the proposed reconstruction of Bruce Road 25 and the proposed re-alignment of BR33. As part of the investigation, recommendations regarding the replacement and construction of underground servicing along BR25 and the southern extent of BR33 to depths in the order of 3 to 5 meters were requested. Borehole data was referenced to confirm sub-surface soil and groundwater conditions. No geotechnical or environmental issues were identified that would affect the construction of a stormwater management facility. However, CVD recommended that groundwater and soil conditions be further examined prior to construction. The report is included in **Appendix B** of the Parent Project File.

9.4.2 Technical Considerations

The proposed BR33 re-alignment will intercept runoff from a portion of the lands upstream of the Baker Subdivision as well about 8.07 hectares of land that are currently situated upstream of the northerly culvert crossing Lake Range Road, which under pre-development conditions, do not drain to the Baker Subdivision. Therefore, under post-development conditions, approximately 56.52 ha of upstream land is expected to drain to the Baker Subdivision.

From a technical perspective, alternatives that best address the stormwater management design criteria for the post-development catchment area, outlined in **Section 7.1**, are considered preferable. The criteria considered generally include the following:

- i. Water Quantity Management: Post-development peak flow rates are to be attenuated to less than, or equal to, pre-development conditions.
- ii. Area Serviced: Stormwater management for lands zoned as 'Planned Development' may be considered in either the current or future developed state.
- iii. Water Quality Treatment: Enhanced water quality treatment (i.e. 80% total suspended solids [TSS] removal) is to be provided.

An evaluation of the alternatives being considered compared to the stormwater management criteria is provided in the following **Table 2**.

TABLE 2: TECHNICAL REVIEW AND COMPARISON OF ALTERNATIVES

| CRITERIA | | i: Water Quantity Management | | | ii: Area Serviced | | iii: Water Quality Treatment | | Applicability of Alternative: SWM Criteria Addressed |
|---|---|---|--------------------|------------------|-------------------|--------------------|---|--------------------------------------|--|
| ALTERNATIVE | | SWM Facility Storage Volume (m ³) | Storm Sewer System | Road Restoration | BR33 Re-Alignment | Future Development | Treatment | Type of Treatment | |
| 1 | Do Nothing | None | None | No | No | No | No | None | None |
| Stormwater Management Facility | | | | | | | | | |
| 2 | Limited to BR33 Re-alignment. | ±8,500 | Not Applicable | No | Yes | No | Yes | Pre-treatment: Enhanced Grass Swales | All |
| 3 | Considers future development in Planned Dev. Lands. | ±19,000 | Not Applicable | No | Yes | Yes | Yes | Infiltration within SWM facility | All |
| Storm Sewer System through the Baker Subdivision to Lake Huron | | | | | | | | | |
| 4A | Limited to BR33 Re-alignment. | Not Applicable | ±685 meters | Yes | No | TBD | OGS unit not commercially available. Requires further assessment. | | i and ii Only; iii = TBD |
| 4B | Considers future development in Planned Dev. Lands. | Not Applicable | ±685 meters | Yes | Yes | TBD | | | |

Based on the assessment provided in **Table 2**, Alternatives 2 and 3 fully satisfy the design criteria and, as such, are considered preferable from a technical perspective.

With respect to consideration for the Town's Planned Development lands, while the future development plans are considered by the stormwater management alternatives developed to address the water quantity and quality issues associated with the County's proposed BR33 re-alignment, the potential benefits that may be achieved by factoring in the added size and complexity associated with a system that could potentially accommodate the Town's future development plans are further evaluated in **Table 4**.

9.4.3 Efficacy of System Design

While conceptual designs of SWM systems that include for drainage from within the Town's planned development lands are considered, the efficacy of such a system to sufficiently accommodate future flows is uncertain due to the lack of details regarding the future development plans. Therefore, stormwater management within any future development would still need to be evaluated, and additional stormwater management provisions may still be required.

9.5 Economic Environment

The economic environment considers relative construction costs. The conceptual construction costs were considered in the *'Revised Conceptual Stormwater Management Design Brief'* and are summarized herein. The conceptual construction costs presented in this Addendum to the Project File only consider the required stormwater management features associated with each alternative solution and do not include costs associated with land acquisition. Further, the cost associated with the roadworks for the re-alignment of BR33 are not included as they are considered to be relatively constant among the alternative solutions. It is noted that the 'Do Nothing' option would likely lead to future costs.

The conceptual construction costs of the alternative solutions considered the excavation and construction of the SWM facility, storm sewer installation, manholes, road restoration and OGS unit installation, as applicable. However, while the costs associated with land acquisition, beyond that already required for the proposed BR33 re-alignment including the remnant portion of Lot 28, are not included, additional land acquisition requirements are noted in the following **Table 3**.

TABLE 3: SUMMARY OF CONCEPTUAL CONSTRUCTION COSTS FOR EACH ALTERNATIVE

| SWM Design | Description of Alternative | Conceptual Cost | Land Acquisition* |
|----------------|--|------------------------|-------------------|
| Alternative 1 | Do Nothing | \$0 | No |
| Alternative 2 | SWM facility limited to the management stormwater from the re-alignment of BR33. | \$200,000 to \$250,000 | No |
| Alternative 3 | SWM facility that includes for stormwater management from the post-development catchment area, in a developed state. | \$600,000 to \$800,000 | Yes |
| Alternative 4A | Construction of a storm sewer system through the Baker Subdivision to Lake Huron limited to the management of stormwater from the BR33 re-alignment. | \$4.5M to \$5.0M | No |
| Alternative 4B | Construction of a storm sewer system through the Baker Subdivision to Lake Huron that includes for stormwater management from the post-development catchment area, in a developed state. | \$5.0M to \$5.5M | No |

Notes:

- *Land acquisition is only noted for lands that are additional to that required for the BR33 re-alignment.
- Alternatives that consider the management of stormwater from both the County Road BR33 and the Town's Planned Development Lands, in a developed state, would require an agreement between the County and the Town. Cost-sharing would need to be negotiated.

It is noted that cost estimates were prepared with limited design details and are based on probable conditions affecting the project. Therefore, cost estimates are intended to reflect the approximate magnitude of the project costs. A more detailed assessment of overall project costs will be completed as part of the design development phase.

As shown in **Table 3**, with the exception of Alternative 1, which is considered to be technically inadequate as it would not address the identified drainage issues within the Baker Subdivision, the least costly alternative solution is Alternative 2. Further, the final costs associated with Alternative 3 are expected to be greater than that presented due to the additional land acquisition requirements associated with the larger footprint area required to manage the stormwater from the Town's planned development lands in a developed state.

10. ASSESSMENT OF ALTERNATIVES

The Municipal Class EA outlines a comprehensive planning process (illustrated in **Figure 2**) that provides a rational approach to consider the advantages and disadvantages of various alternatives and their trade-offs in order to determine a *Preferred Solution* to address an identified problem (or opportunity), as well as consultation with agencies, directly affected stakeholders and the public throughout the process.

The EA Addendum for Bruce Road 33 is being completed to assess the alternatives for the management of stormwater from the proposed BR33 re-alignment. More specifically the management of runoff intercepted from the lands upstream of the Baker Subdivision, under post-development conditions, an area of approximately 56.52 ha. Since a 'Do Nothing' approach is considered technically inadequate as it does not address the identified drainage issues within the Baker Subdivision, which is considered inappropriate, consideration and a decision for action will be necessary moving forward.

The background studies were prepared help to inform the impacts each alternative would have on each of the environments. The process toward the selection of a *Preliminary Recommended Solution* involved the following:

- i. Identification of the impacts and mitigating measures of an alternative solution on each environment,
- ii. An assessment of the degree of impact each alternative would have on each environment, and
- iii. An evaluation based on comparative analysis of the alternative which best addresses the Project Statement.

The following summarizes the impacts and assessment of each of the alternative solutions on each of the environments by providing a relative ranking of the 4 alternatives (not including the Do Nothing alternative); numbered between 1 and 4, with 1 being the least favoured and 4 being the most favoured in each case. Ultimately, the alternative with the highest total ranking would be considered as the *Recommended Solution*.

The following **Table 4** presents a summary of the assessment of alternative solutions.

**TABLE 4: ASSESSMENT OF STORMWATER MANAGEMENT ALTERNATIVES:
BRUCE ROAD 33 RE-ALIGNMENT**

| Environment | Alternative 2 SWM Facility BR33 Re-Alignment | Alternative 3 SWM Facility BR33 + Future Development | Alternative 4A Storm Sewer System BR33 Re-Alignment | Alternative 4B Storm Sewer System BR33 + Future Development |
|---|---|---|--|--|
| SOCIAL | | | | |
| 1. Impacts to Private Property | The area of land required sufficiently to accommodate a SWM facility is available within the lands required for the BR33 roadworks, including the remnant land situated in the northwest corner of Lot 28 Lake Range. Therefore, no additional land aquisition would be required. | The footprint area required to sufficiently address stormwater management would require additional land acquisition beyond that identified for the re-alignment of BR33. This may not be supported by the subject land-owner. | A storm sewer system could be designed in such a way that, if preferred, the acquisition of additional lands could be avoided. | |
| 2. Baker Subdivision | The management of drainage from the area upstream of the Baker Subdivision will result in improvements to the existing drainage conditions through Baker Subdivision. | | | |
| 3. Governance | COUNTY. Stormwater management provisions would not require long-term agreements between the County and the Town. | COUNTY and TOWN. Stormwater management provisions would not require long-term agreements and cooperation between the County and the Town. | COUNTY. Stormwater management provisions would not require long-term agreements between the County and the Town. | COUNTY and TOWN. Stormwater management provisions would not require long-term agreements and cooperation between the County and the Town. |
| Ranking | 3.5 | 1 | 3.5 | 2 |
| NATURAL | | | | |
| 1. Natural Heritage Features & Species at Risk | Since lands are currently cultivated, the potential for species at risk is low. | Since lands are currently cultivated, the potential for species at risk is low. Land aquisition would require additional assessment. | The potential for species at risk is low. No additional investigations are required in existing roadway. | |
| 2. Ability to resolve existing drainage issues in Baker Subdivision. | A SWM facility designed to intercept and control flows from the re-aligned BR33 and upstream lands within the post-development catchment area would serve to improve drainage conditions in the Baker Subdivision. | A SWM facility designed to, at minimum, intercept and control flows from the re-aligned BR33 and upstream lands within the post-development catchment area would serve to improve drainage conditions in the Baker Subdivision. | A storm sewer system designed to intercept and divert flows from the re-aligned BR33 and upstream lands within the post-development catchment area would serve to improve drainage conditions in the Baker Subdivision. | A SWM facility designed to, at minimum, intercept and divert flows from the re-aligned BR33 and upstream lands within the post-development catchment area would serve to improve drainage conditions in the Baker Subdivision. |
| 3. Storm Water Treatment | Would be addressed via a treatment train approach. SWM Pond could be designed as a pond type facility to store and control flows discharging to the Baker Subdivision. | Water quality treatment could be addressed within a stormwater management pond. SWM facility could be designed as a dry pond with a subsurface infiltration feature. | Water quality is considered to be potentially addressed via an oil grit separator unit installed in-line with a storm sewer system. However, based on preliminary assessments a pre-designed OGS unit would not be available. The potential for the application of a custom OGS unit remains unknown. Alternatively, multiple water quality treatment provisions could be considered to address the design criteria. | |
| Ranking | 4 | 3 | 1.5 | 1.5 |
| CULTURAL | | | | |
| 1. Archaeological | The Stage 2 Archaeological Assessment concluded there are no archaeological resources in the vicinity of the Bruce Road 33 re-alignment. | | | |
| 2. Cultural Heritage | The need for a Cultural Heritage Assessment was screened out using the MTCS screening tool. | | | |
| Ranking | Net neutral for all alternatives considered. | | | |
| TECHNICAL | | | | |
| 1. Technical Considerations (i.e. Ability to Satisfy Design Criteria) | Can be designed to sufficiently address the post-development water quantity and quality issues identified. | Can be designed to sufficiently address the post-development water quantity and quality issues identified. | Storm sewer system may be designed to sufficiently address the water quantity issues identified. However, a 'custom' OGS unit would be required for water quality treatment. Potential application of this technology remains unknown. | Storm sewer system may be designed to sufficiently address the water quantity issues identified. However, a 'custom' OGS unit would be required for water quality treatment. Potential application of this technology remains unknown. |
| 2. Efficacy of Design | Based on the post-development conditions identified, a stormwater management facility could be designed to sufficiently accommodate runoff associated with the re-alignment of BR33. | Due to the lack of details regarding the Town's future development, stormwater management within any future development would still need to be evaluated and additional stormwater management provisions may still be required. | Based on the post-development conditions identified, a storm sewer system could be designed to sufficiently accommodate runoff associated with the re-alignment of BR33. | Due to the lack of details regarding the Town's future development, stormwater management within any future development would still need to be evaluated and additional stormwater management provisions may still be required. |
| 3. Timing | Would not have an impact on the schedule developed as part of the Master Plan. | Pre-purchase of lands associated with development within the Town would need to be arranged and administered by the Town, adding time and costs to the project. | Timing would be tied to the construction of the sanitary sewer system which would cause project delays and would be dependent on Provincial funding. | |
| Ranking | 4 | 2.5 | 2.5 | 1 |
| ECONOMIC | | | | |
| 1. Relative Construction Costs | \$200,000 to \$250,000 | \$600,000 to \$800,000 | Approximately \$4.5M to \$5.0M | Approximately \$5.0M to \$5.5M |
| 2. Contributors (Budget) | County | Agreement would be required between the County and the Town. Additional land is of little direct interest to the County. | County | Agreement would be required between the County and the Town. |
| 3. Land Acquisition | SWM facility could be accommodated within the area idenfied in the Parent Project File for the re-alignment of BR33. | SWM Facility would require additional land acquisition due to the larger footprint area required to manage the greater volume of flows. | Stormwater management system could be accommodated within the existing (i.e. Baker Subdivision) and proposed (i.e. BR33) right-of-ways. | Stormwater management system could be accommodated within the existing (i.e. Baker Subdivision) and proposed (i.e. BR33) right-of-ways. |
| Ranking | 4 | 1 | 3 | 2 |
| OVERALL RANKING | 15.5 | 7.5 | 10.5 | 6.5 |
| Relative Ranking of Environments: | | | | |
| | Favoured and/or Positive Impact | Net Neutral | Least Favoured / Negative Impact | |

11. PRELIMINARY RECOMMENDED SOLUTION

Based on the results of the relative ranking presented in **Table 4**, Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, was identified as the *Preliminary Recommended Solution*. Conceptually, Alternative 2 proposes the following SWM elements:

- Future development within lands upstream of the Baker Subdivision will be responsible for managing its own stormwater, beyond a pre-development condition.
- Construction of roadside ditches generally designed to the requirements of an enhanced grass swale to convey and treat runoff prior to discharging to a proposed SWM facility.
- The proposed construction of a dry pond-type SWM facility to further polish runoff and attenuate peak flow rates to less than, or equal to, pre-development conditions prior to discharging to the Baker Subdivision.

The *Preliminary Recommended Solution* was circulated with Version 1 of the Project File Addendum (dated October 8, 2019) to the public, agencies, and indigenous communities for review and comment.

12. CONSULTATION

Consultation early in and throughout the process is a key feature of environmental assessment planning. The Schedule 'B' Municipal Class EA process has two mandatory points of contact; the *Notice of Project Initiation* (Consultation - Phase 2) and the *Notice of Completion*.

In conjunction with project planning limited to the re-alignment of BR33 (i.e. the Parent Project File), a *Notice of Project Initiation* was issued on January 9, 2018. Several comments from the public and agencies were received through the consultation process, as outlined in Section 8 of the Parent Project File. These were incorporated into the assessment of alternatives considered for the BR33 re-alignment. The *Notice of Study Completion* was subsequently issued on May 1, 2018 outlining the *Preferred Solution*: to re-align BR33 to intersect BR25 at the location of the future Bruce Street.

On May 27, 2018, the Minister of the MECP received one Part-II Order request. However, as the Ministry interpreted that the proposed stormwater management works required to service the re-aligned Bruce Road 33 would require property acquisition, the Ministry ascertained that an assessment of the stormwater management alternatives should also be completed in accordance with the Schedule 'B' procedures of the MCEA. As the review of stormwater management alternatives is considered to form a component of the BR33 re-alignment, the Ministry recommended that a *Notice of Project Change* be issued. This Notice was issued on October 8th, 2019.

As the initial *Notice of Study Completion* (May 1, 2018) was withdrawn, a new *Notice of Project Completion* was required. The *Notice of Project Completion*, issued on November 26th, 2019, provides an opportunity for members of the public, agencies and Indigenous Communities to submit a Part II Order request on both the *Preferred Solution* to re-align BR33 to intersect BR25 at the future Bruce Street intersection, previously accepted by Council (i.e. the Transportation and Environmental Services [T&ES] Committee) in April 2018, and the subsequent *Preferred Solution* to stormwater management, to construct a SWM facility to manage runoff related only to the BR33 re-alignment.

12.1 Notice of Project Change

A *Notice of Project Change* was first issued on October 8th, 2019. A copy of the Notice is provided in **Enclosure B**. This Notice outlined that additional work was required for the completion of the Schedule 'B' EA process for the re-alignment of BR33 and provided the *Preliminary Recommended Solution* for stormwater management.

Consistent with the consultation processes previously completed, the Notice was advertised in the Shoreline Beacon Newspaper on October 8th and October 15th, 2019 and was circulated to utility companies, agencies, and Indigenous Communities via email. The Notice was also mailed to Indigenous Communities, directly affected property owners within the Study Area, as well as to individuals engaged in previous project planning on October 8th, 2019. A Figure outlining the Notification Area is provided in **Enclosure B**.

The *Notice of Project Change* invited the public, agencies and Indigenous Communities to review the Project File Addendum (i.e. Version 1) and to comment on the *Preliminary Recommended Solution* for stormwater management.

The comments received, and feedback provided, are included in **Enclosure E**. Upon receipt of comments, new information was incorporated into the review and assessment of a *Recommended Preferred Solution* for stormwater management, presented to Council (i.e. the T&ES Committee) for acceptance (or otherwise) on November 21, 2019.

12.2 Consultations

12.2.1 Public Consultation

With the circulation of the Schedule 'B' EA Project File Addendum (Version 1: October 8, 2019), the public were invited to provide comments regarding the *Preliminary Recommended Solution* to the stormwater management requirements for the proposed BR33 re-alignment. In addition to the Beachers Organization, which requested that a brief introduction to the report be provided, a total of six (6) comments were received from the public. The comments received can generally be summarized as follows:

1. One comment requested clarification on how the various project alternatives may impact the properties and creek system to the west of Lake Range Road (i.e. within Baker Subdivision), citing concern for potential impacts to property value. Potential impacts of concern included changes to flow volume (particularly the potential for increased flows), impacts directly to the residential properties via erosion to land surrounding the creek or alteration to the creek's path, and additional structures that may need to be installed within the Baker Subdivision to support the stormwater management system for Bruce Road 33.

An assessment of how the various project alternatives might affect properties in the Baker Subdivision is provided herein. Each stormwater management alternative considered 'no net' increase in peak flow through the Baker Subdivision as a basic requirement.

2. Support for Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of Bruce Road 33 as the *Preliminary Recommended Solution*, was provided. The basis for this support was that, under Alternative 2, drainage from the upper fields to the Baker Subdivision, which is currently diverted to the Subdivision, may be '*rectified as a result of development along Bruce Road 33*'.
3. Comments were provided with the intention to ensure that impacts of the development will be minimized and to potentially 'enhance the drainage design proposed'. In general, a preference for an alternative that considered stormwater management for future development within Town lands upstream of the Baker Subdivision, in addition to the management of runoff specific to the re-alignment

of County Road 33, was corresponded. In addition, feedback specific to the analysis (i.e. modelling) and general design features, which may be further considered during the subsequent design phase, were also outlined in detail.

It is noted that the intention of the analysis and preliminary design completed to support the selection of a preferred stormwater management alternative was to confirm that sufficient land area may be available including the proposed construction of ancillary works (as identified in the Parent Project File). These preliminary assessments were also completed to ensure no net increase in peak flow downstream through the Baker Subdivision, as a result of the construction of Bruce Road 33.

4. Clarification of the EA Process and consultations was requested.
5. Comments were provided re-iterating the preference for the County to consider the Town's future land use and identifying the 'need for sanitary sewers in the Baker Subdivision'. As discussed herein, although alternatives considering stormwater management for future development within the Town lands upstream of the Baker Subdivision were evaluated, the recommended stormwater management solution addresses increase in runoff from the re-alignment of the County Road (i.e. Bruce Road 33) itself.

Future development within Town lands may expand on this facility at the time of a Planning Act application, at the cost of the developer as an alternative to constructing a facility elsewhere within the development lands. It would be pre-mature to anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes. Some of the future lands are not within the Settlement Boundary for the Town and therefore would not likely be developed in the near future.

A summary of the Public Comments received (recorded sic erat scriptum), including a general response, is included in **Enclosure E**. A review of the alternatives, based on comments/feedback provided, was incorporated into the re-assessment of the *Recommended Preferred Solution* presented to Council on November 21, 2019.

12.2.2 Agency Consultation

Agencies with a regulatory role that may require future permits/approvals, or may have a direct interest in the study, are to be contacted at each 'mandatory point of contact' required as part of the EA process to invite feedback. The Addendum to the Schedule 'B' Project File (Version 1: October 8, 2019) was circulated to key agencies, utilities and Indigenous Communities on October 8th, 2019 to solicit comments and feedback. A complete list of those contacted, including documentation of contact attempts and communications, is included in **Enclosure B**.

Comments received during the consultation period from agency groups, utility companies and Indigenous Communities are summarized in the following **Table 5**.

**TABLE 5: GENERAL SUMMARY OF AGENCY, UTILITY & INDIGENOUS
COMMUNITY COMMENTS RECEIVED**

| Agency (Issue Date) | Overview of Comments | General Response and/or Follow-up Requirements |
|--|--|---|
| SVCA: Risk Management Office (Oct 9, 2019) | Confirmed that the project does not fall within a high vulnerable source protection area (wellhead protection area or intake protection zone) where Source Protection Policies apply. Further, the project activities are not a prescribed drinking water threat, therefore activities associated with the project will not change or create new vulnerable source protection areas. | Noted. |
| Historic Saugeen Métis (Oct 11, 2019) | HSM provided confirmation of their review of the information provided and indicated that the HSM has no objection or opposition to the proposed Bruce County Road 33 Re-Alignment Project, as presented. | Noted. |
| SVCA: Environmental Planning and Regulations (Oct 29, 2019) | <p>The SVCA re-iterated feedback previously provided, including the following:</p> <ol style="list-style-type: none"> 1. The SVCA would recommend larger runoff events be considered then the 100-yr event given sensitive receptors in the area, the intent of this work to resolve drainage issues, and given climate change considerations as indicated to be an intent of EA process. 2. Water quality improvements are sought associated with the Lake Huron Shoreline. While 'Enhanced' water quality treatment is associated with the proposal, higher targets could be set to increased water quality to represent a net gain at shoreline. 3. The SVCA's Regulation may be applicable to the proposed Bruce Road 33 western/southern realignment. Road widening or works at the top of the slope, or within 15 metres of the slope and related 'rills' would require SVCA permission. Design details are not yet known at this location for SVCA review. | As noted in the Project File, the design development phase will address requirements of the SVCA and MECP and will be advanced following the completion of the Environmental Assessment Process. The SVCA and MECP will be issued a copy of the design drawings for review and approval in conjunction with the required permit applications. |
| MECP (Nov 7, 2019) | <ol style="list-style-type: none"> 1. MECP comments emphasized that, since the original Notice of Completion was withdrawn, the new Notice of Completion should <i>'provide an opportunity for members of the public, agencies and Indigenous Communities to submit Part II Order request(s) should they choose to do so on both the road re-alignment and the stormwater management approach'</i>. | <ol style="list-style-type: none"> 1. Consistent with this requirement, the <i>Notice of Project Completion</i> identifies the opportunity for the public to comment on both aspects of the project. |

| Agency (Issue Date) | Overview of Comments | General Response and/or Follow-up Requirements |
|------------------------|--|---|
| | <p>2. The Ministry outlines its concerns regarding the use of the term 'Addendum'.</p> <p>3. Provided Source Water Protection (SWP) clarification that the study area is located within the Saugeen Valley Source Protection Area.</p> <p>4. Indigenous Consultation Requirements identified for the Project.</p> <p>5. Species at Risk (SAR): The MECP re-iterated that, since the project encompasses intensive agricultural lands, it is unlikely that the proponent would contravene the Endangered Species Act and indicated that the potential for SAR habitat on the subject lands should be confirmed.</p> | <p>2. Clarification has been included in Section 1 of this Project File Addendum (Version 2).</p> <p>3. SWP concerns are addressed in Section 9.3.4 of the supplement (or Addendum) to the Project File. Further, the SVCA Risk Management Office was consulted via the Notice of Project Change. Correspondence provided from the SVCA Risk Management Office on October 9, 2019 confirmed that, based on the location of the project and the proposed works, project activities are not considered a prescribed drinking water threat, and that any activities associated with the project will not change or create new vulnerable source protection areas.</p> <p>4. It is noted that correspondence was provided via email and lettermail to Indigenous Communities on October 8th, 2019. Comments were provided from the Historic Saugeen Métis. Consistent with the requirements of the EA Process, continued notification and consultation will be provided through the remainder of the EA Process.</p> <p>5. Consistent with SAR requirements, the findings of the Natural Heritage Environmental Impact Assessment (July 2017) included in Appendix B of the Parent Project File confirmed that no SAR occur within the study lands.</p> |
| Indigenous Communities | <i>With the exception of the HSM, no comments were received.</i> | |

Note: Notification correspondence is included in **Enclosure B** and Comments & Feedback are provided in **Enclosure E**.

13. RECOMMENDED PREFERRED SOLUTION

The *Preliminary Recommended Solution* for stormwater management was circulated on October 8, 2019, via a *Notice of Project Change*, along with the Project File Addendum (Version 1: October 8, 2019) to the public, agencies and Indigenous Communities for review and comment. Based on the identified project statement, the information received through the consultation process and the additional review and assessment of alternatives, the *Recommended Preferred Solution* for consideration and acceptance (or otherwise) by Council remained the same; to construct a stormwater management facility to manage run-off from the re-alignment of Bruce Road 33.

14. COUNCIL RESOLUTION

In consideration of the County of Bruce Committee Report presented to the members of the Transportation and Environmental Services Committee on November 21th, 2019, respecting the BR33 Environmental Assessment, specifically the associated stormwater management facility, Council approved the *Recommended Preferred Solution*, Alternative 2: to construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment. The Committee Report is provided in **Enclosure F**.

A *Notice of Project Completion* was first issued on November 26, 2019. A copy of the Notice is included in **Enclosure B**. The Notice was advertised in the Shoreline Beacon on November 26th and December 3rd, 2019. The Notice was circulated to agencies, Indigenous Communities and utility companies via email. The Notice was also mailed to Indigenous Communities, directly affected property owners within the Study Area, as well as to individuals engaged in previous project planning.

The Notice initiates the minimum 30 calendar day review period during which time the Minister of the MECP may be requested to issue a Part II Order to the County to complete further study on the Schedule 'B' project, as outlined in **Section 2**. In consideration of the holiday season, an extended public review period has been considered. Therefore, if there is no request received by January 3rd, 2020, the project will proceed to design development and construction.

15. NEXT STEPS

The *Notice of Project Completion* is dated November 26th, 2019. The next steps in the process are summarized as follows:



- i. Address the review period required to permit the opportunity for any participant to request the Minister to enact Part II of the Act (i.e. a Part II Order), which would require additional study to verify the project direction. It is noted that in consideration of the holiday season, an extended public review period has been considered (i.e. extension to January 3, 2020).
- ii. If a Part II Order request is not made during the review period, the *Preferred Solutions* to the Schedule 'B' EA process may proceed to design development and construction.

FIGURES:

217127
Bruce County Road 33
Re-Alignment
SWM Addendum
Town of Saugeen Shores
County of Bruce



LEGEND

-  PLANNED DEVELOPMENT
-  AGRICULTURAL

NOT TO SCALE
SEPTEMBER 2019

SITE LOCATION PLAN

Figure No. 1

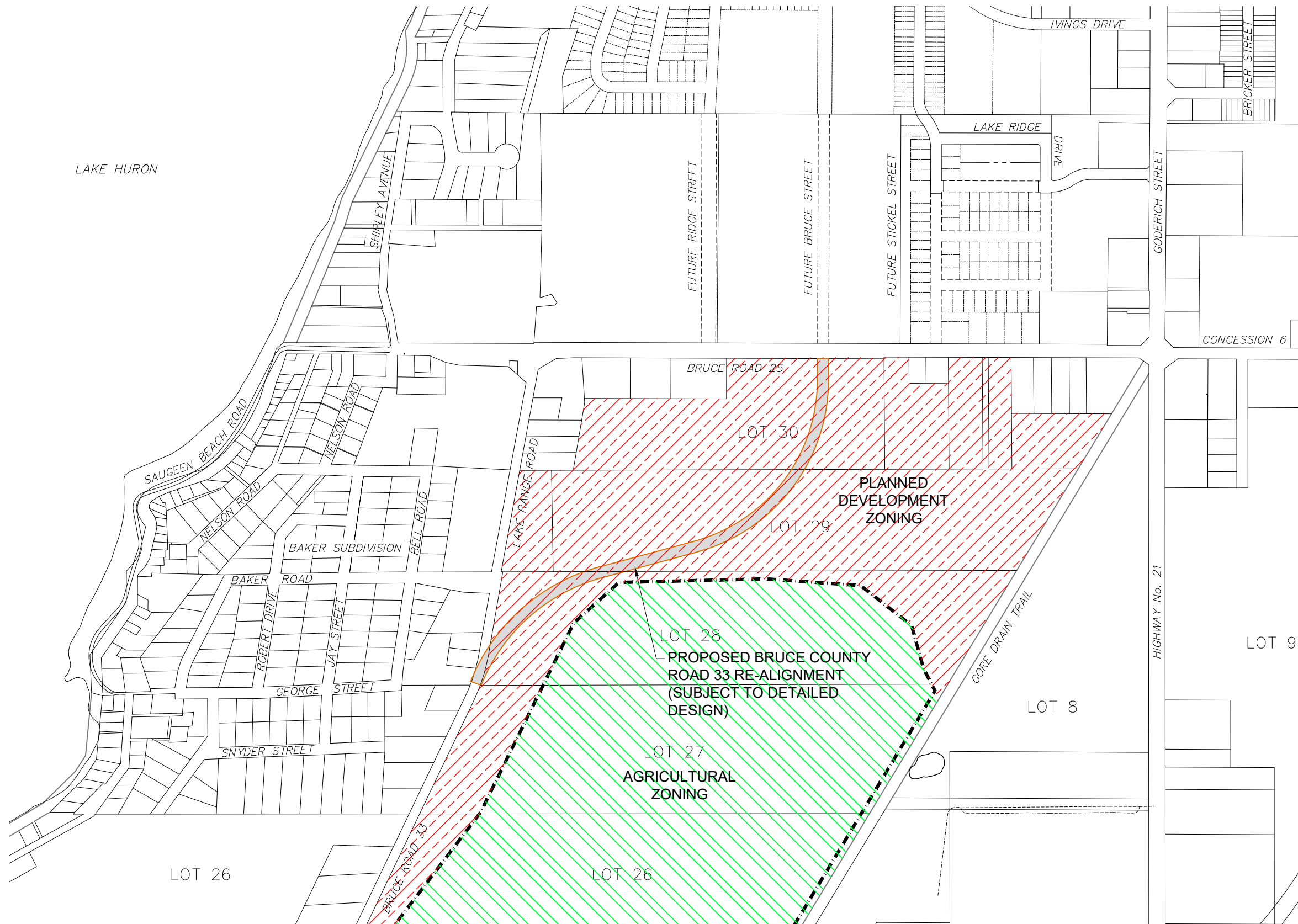
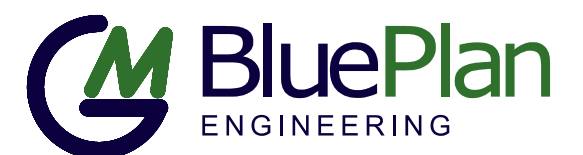
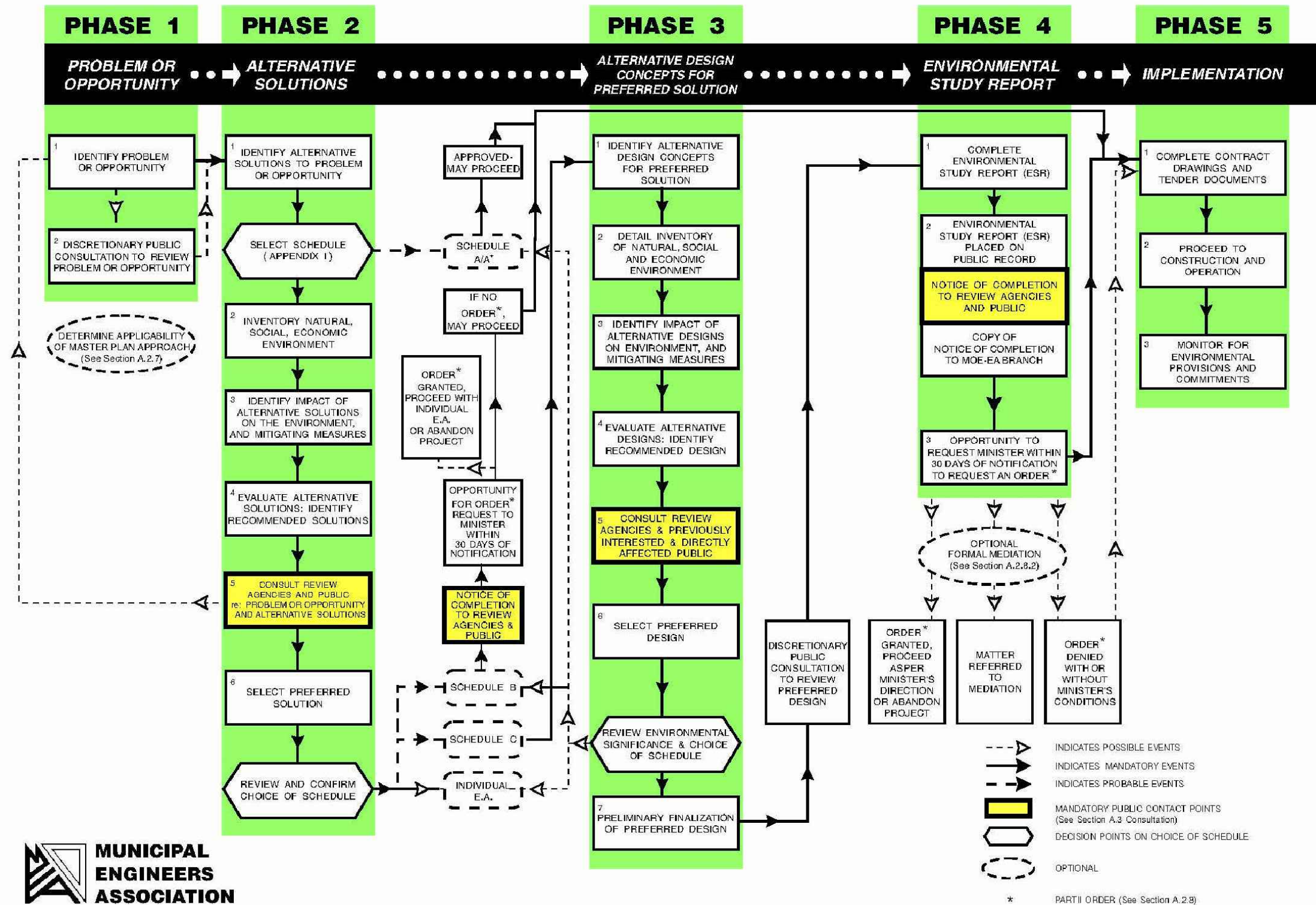


EXHIBIT A.2

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



NOT TO SCALE
SEPTEMBER 2019

MASTER PLAN
EA PROCESS

Figure No. 2

217127
Bruce County Road 33
Re-Alignment
SWM Addendum
Town of Saugeen Shores
County of Bruce



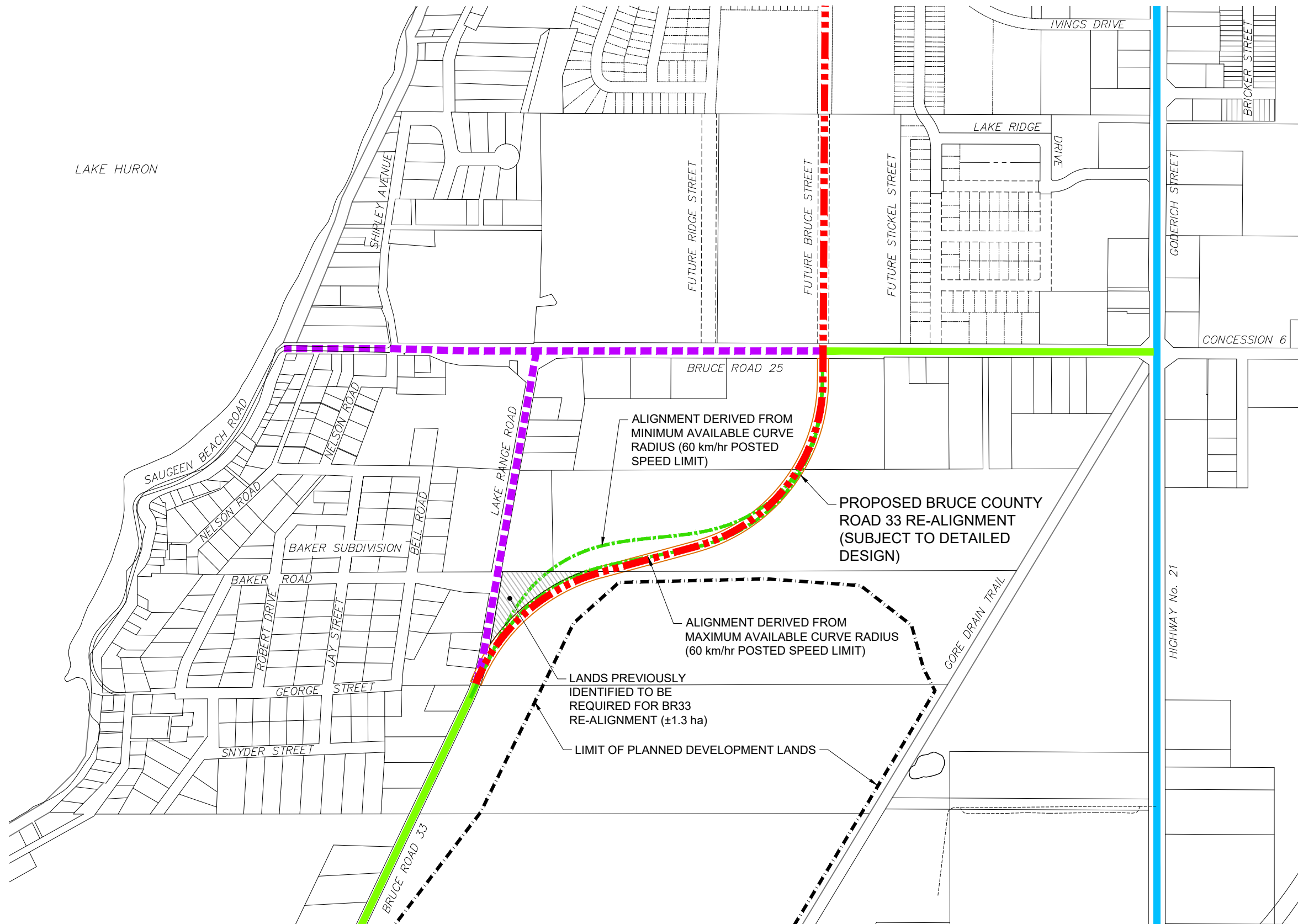
LEGEND

- PROVINCIAL HIGHWAY
- BRUCE COUNTY ROAD
- PROPOSED DIVESTURE FROM COUNTY TO TOWN (AS PER MASTER PLAN)
- PROPOSED COLLECTOR ROAD
- RECOMMENDED PREFERRED SOLUTION TO BR33 RE-ALIGNMENT (SCH. B PROJECT FILE) ULTIMATE ALIGNMENT SUBJECT TO DETAILED DESIGN

NOT TO SCALE
SEPTEMBER 2019

TRANSPORTATION
PLANNING

Figure No. 3



217127
Bruce County Road 33
Re-Alignment
SWM Addendum
Town of Saugeen Shores
County of Bruce



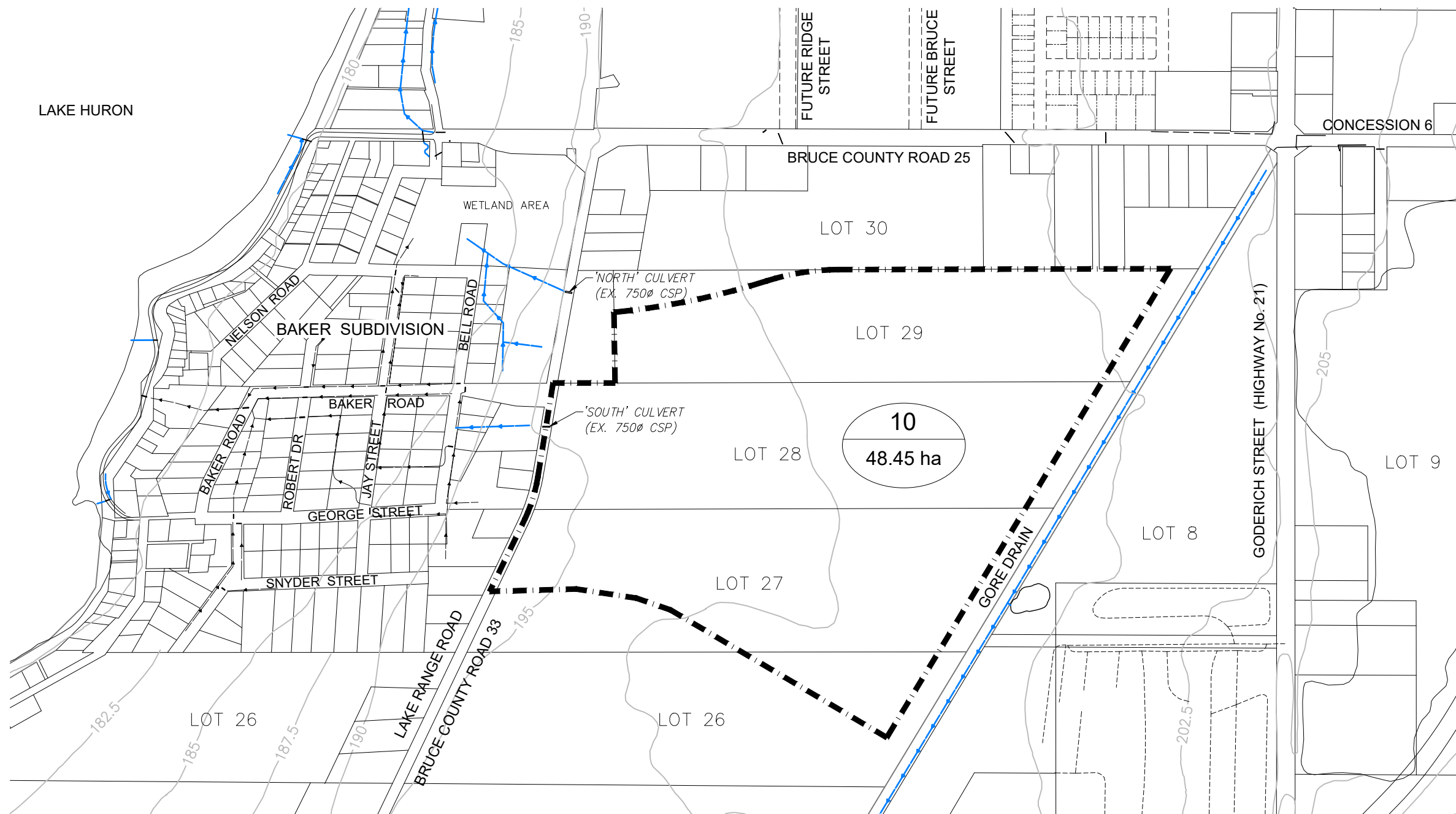
LEGEND

- DRAINAGE BOUNDARY
- 10 DRAINAGE AREA No.
- 48.45 ha DRAINAGE AREA SIZE (Hectares)

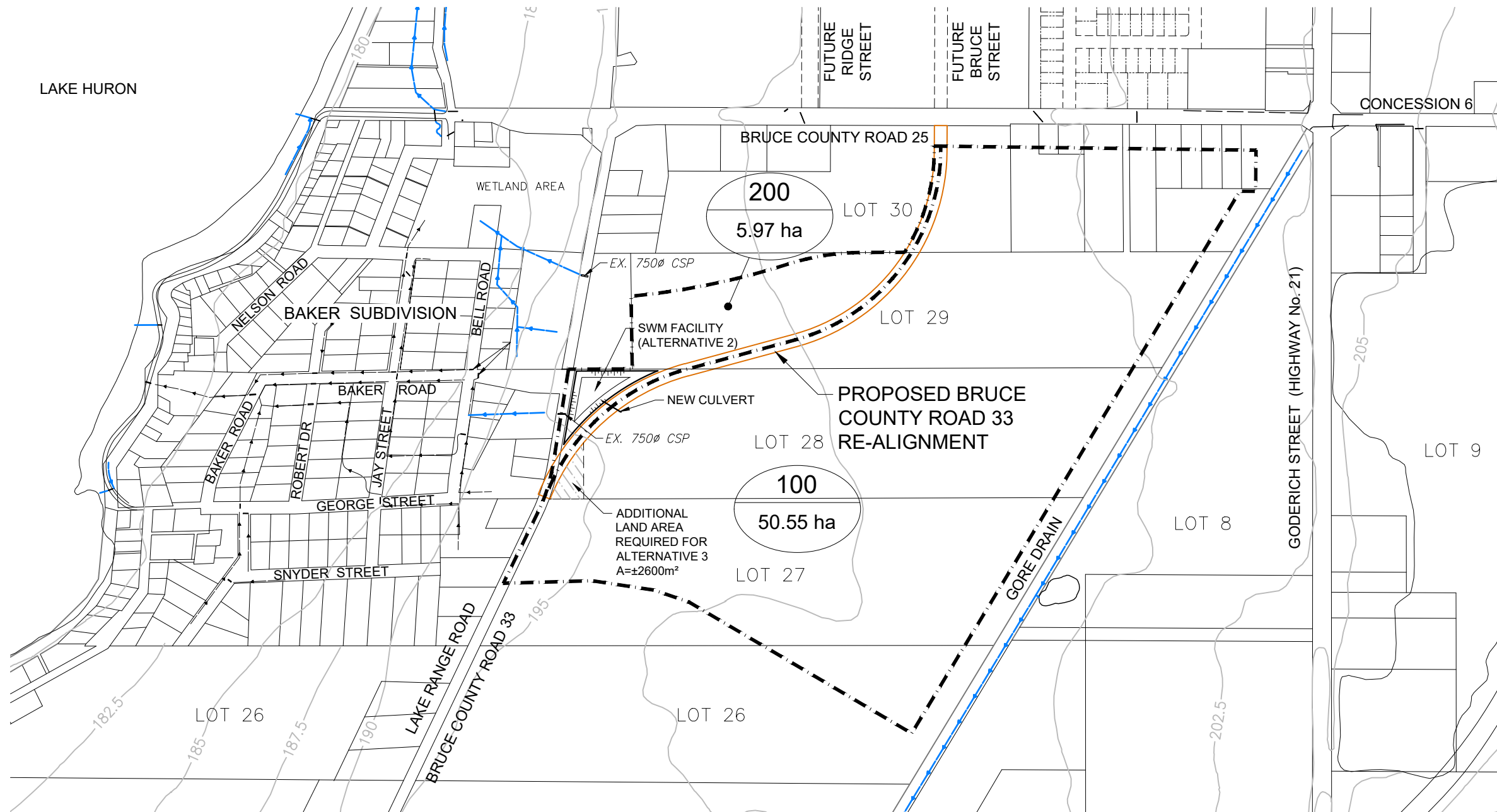
SCALE 1:7,500
SEPTEMBER 2019

PRE-DEVELOPMENT
DRAINAGE AREAS

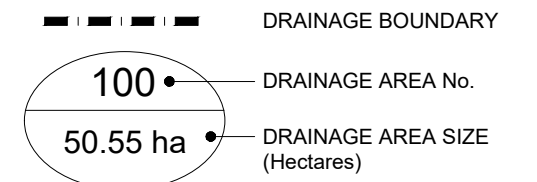
Figure No. 4



217127
Bruce County Road 33
Re-Alignment
SWM Addendum
Town of Saugeen Shores
County of Bruce



LEGEND



SCALE 1:7,500
SEPTEMBER 2019

POST-DEVELOPMENT
DRAINAGE AREAS

Figure No. 5

ENCLOSURE A:
BR33 RE-ALIGNMENT: RELEVANT CORRESPONDENCE

Ministry of the Environment,
Conservation and Parks

Ministère de l'Environnement, de
la Protection de la nature et des
Parcs



Environmental Assessment and
Permissions Branch

Direction des évaluations et des
permissions environnementales

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Télééc. : 416 314-8452

357-2018-1916

January 8, 2019

Kerri Meier
Environmental Planner
County of Bruce
30 Park Street
Walkerton, ON N0G 2V0

Dear Ms. Meier:

On May 27, 2018, the Minister of the Environment, Conservation and Parks received one Part II order request asking that the County of Bruce be required to prepare an individual environmental assessment for the Bruce County Road 33 Re-Alignment.

As outlined in the Project File Report, the preferred solution includes the following components:

- Re-alignment of Bruce Road 33 at the future Bruce Street;
- Stop-controlled tee intersection on Baker Road at Bruce Road 33;
- Landscaping;
- Stormwater management (details to be determined in design phase);
- Driveway re-alignments;
- Paved lane widths to accommodate cyclists; and
- Municipal water and sanitary sewer services.

The ministry understands that the proposed stormwater management works include the construction of a stormwater management facility with a minimum active storage volume of 2000 cubic metres to service the new alignment of Bruce Road 33. If property acquisition is required, the project must be planned in accordance with the Schedule B procedures of the Municipal Class Environmental Assessment.

Staff at the ministry reviewed the project documentation and determined that the project was not planned in accordance with the requirements of the Municipal Class Environmental Assessment. As the class environmental assessment process is a streamlined, self-assessment process, the ministry expects proponents to ensure that the appropriate planning process is followed for their undertaking.

The proposed re-alignment was planned in accordance with the Schedule B procedures of the Municipal Class Environmental Assessment. However, the stormwater management facility was not planned in accordance with the Municipal Class Environmental Assessment. As property acquisition is required for the stormwater management facility, the County should have followed

the Schedule B procedures for the stormwater management facility. You indicated that the proposed stormwater management facility is a component of the proposed realignment project. As such, the projects should be assessed together under one process to avoid a piecemealed approach.

Under Section 13 of the Environmental Assessment Act, a proponent of an undertaking subject to a Class Environmental Assessment shall not proceed with the undertaking unless the proponent does so in accordance with the Class Environmental Assessment. Based on the ministry's review of the project, the County has failed to meet the requirements of the Municipal Class Environmental Assessment. The following actions are recommended to address the ministry's outstanding concerns related to compliance with the Environmental Assessment Act:

- The Notice of Completion for the project is no longer valid. Issue a Notice of Project Change, explaining to the public and any interested persons that additional work will be conducted for the project.
- Complete the Schedule B requirements for the proposed stormwater management facility, which includes, but is not limited to:
 - Consultation with the public and review agencies;
 - Assessing alternative solutions;
 - Identifying the potential impacts of the undertaking and providing mitigation measures;
 - Documenting the planning process for the project through an amended project file report;
 - Issuing a notice of completion for the project. The Project File Report must be made available for a 30-day public consultation period. Copies of the Notice of Completion should be sent directly to the ministry and to the requester.

For consultation purposes, it is important that the recommended solution not be presented as a decision, but as a preliminary preference based on a rational evaluation of available information. Public input is necessary and important to ensure that the best solution is selected for the undertaking. The Project File Report should include information on how public feedback was considered for the project design. Concerns were raised with respect to the environmental assessment process being easily traceable and understandable by the public. As we do with all proponents, we encourage the County to continue to ensure that Class Environmental Assessment documentation and consultation requirements are met to help assist the public's understanding of these important infrastructure projects.

As the class environmental assessment process is not complete for this project, the ministry will not be considering the Part II order request at this time. The Part II order requester will be notified in writing that their request will not be considered at this time, and that the County will be conducting further work for the project. Once the Notice of Completion is issued, the County must notify the requester and advise them that a Part II order can be requested.

If you have additional questions about this matter, please contact Ms. Callee Robinson, Project Evaluator directly at 416-314-0286 or at Callee.Robinson@ontario.ca.

Ms. Kerri Meier
Page 3.

Sincerely,

A handwritten signature in cursive script that reads "Kristina Rudzki". The signature is written in black ink and is positioned above the printed name and title.

Kristina Rudzki
Supervisor, Project Review Unit
Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks

c: EA File No. 18057
Anneleis Eckert, Regional EA Coordinator / Planner, Southwestern Region
Requester

Drea Nelson - GM BluePlan

Subject: FW: Bruce County Rd. 33 Re-Alignment
Attachments: 2018_02_08_SAUG_EA_33_25_II.pdf

From: Erik Downing <e.downing@svca.on.ca>
Sent: Monday, July 16, 2018 1:46 PM
To: Dubber, Hannah (MOECC) <hannah.dubber@ontario.ca>
Cc: Amanda Froese <amanda.froese@saugeenshores.ca>; John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>
Subject: Re: Bruce County Rd. 33 Re-Alignment

Greetings Hannah,
SVCA staff comments from earlier this year are attached regarding BR33 and BR25. My comments indicate BR33 proposal is much closer to being satisfactory to SVCA staff, but the connection to BR25 had me noting/warning that BR33 as proposed may make BR25 proposal more complex and limit design options to resolve if synergy not achieved between projects. Up to the designer ultimately on this item though. The Town's design consultant, John Slocombe has stressed informally to me the distinction between the two projects, which I have not disputed. So beyond 'greater than 100yr' being incorporated into the proposed 33 recommendation, and/or further drainage improvements to ensure the proposal achieves as much as possible for local drainage issues, SVCA staff are generally satisfied with the proposed 33 works.

An SVCA permit will likely be required for the most western works at an eroding gully.

Regards,

Erik Downing
Manager, Environmental Planning and Regulations
Saugeen Conservation
1078 Bruce Road 12, P.O. Box 150
Formosa, ON
N0G 1W0

From: Dubber, Hannah (MOECC) <Hannah.Dubber@ontario.ca>
Sent: Thursday, July 12, 2018 10:58 AM
To: Erik Downing
Cc: Robinson, Callee (MOECC)
Subject: Bruce County Rd. 33 Re-Alignment

Good morning Mr. Downing,

The Ministry of Environment, Conservation and Parks is currently reviewing a Part II Order request for the [Bruce County Rd. 33 Re-Alignment](#) (Project), which was planned under the Municipal Class Environmental Assessment (EA) process. I have attached the Notice of Completion for your reference. This Project was first planned under the [Bruce Road 25 and 33 Master Plan](#), which also includes drainage projects.

The Part II Order request submitted to the ministry specifically outlines concerns related to the drainage study area. As such, we are inquiring as to whether you have reviewed the Project documentation and if so, does the Saugeen Valley Conservation Authority have any concerns regarding either the Project, the drainage works or the Master Plan document, which has informed this Class Environmental Assessment?

Also, will this Project (Bruce County Road 33) or any of the other Projects require a permit from the Saugeen Valley Conservation Authority?

If it's easier, please feel free to reach out directly to myself or Callee Robinson (416-314-0286) to discuss the Project.

Thank you,

Hannah Dubber

Assistant Project Officer, Project Review Unit
Environmental Assessment and Permissions Branch, Ministry of Environment, Conservation and Parks
135 St. Clair Avenue West, 7th Floor, Toronto ON, M4V 1M2
Hannah.Dubber@ontario.ca || (416)-212-3696

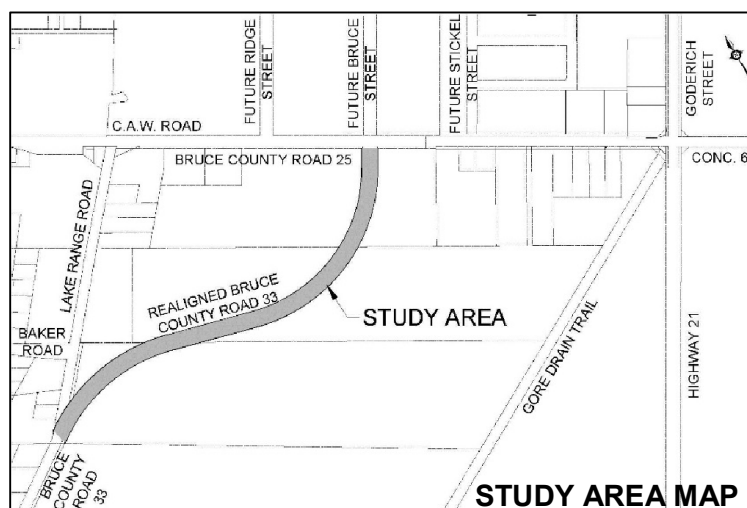
ENCLOSURE B:
ADDENDUM NOTICES AND CONSULTATION

**BRUCE COUNTY ROAD 33 RE-ALIGNMENT
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA): SCHEDULE 'B'**

NOTICE OF PROJECT CHANGE

In May 2017, the County of Bruce (County), as the proponent, with the Town of Saugeen Shores (Town), as a principle partner, completed a Master Plan to plan various road and drainage undertakings within a broad area central to Saugeen Shores along Bruce Roads 25 and 33 (BR25 & BR33). The Master Plan identified several projects including the re-alignment of BR33 to intersect BR25 from the south at the same location as the Town's future Bruce Street alignment, where shown on the Study Area Map provided.

In January 2018, the County initiated a Schedule 'B' EA process, appropriately to plan the BR 33 re-alignment as considered in the Master Plan. A *Notice of Study Completion* to the process, identifying the re-alignment of the BR33 intersection with the future Bruce Street intersection as the *Preferred Solution*, was advertised on May 1, 2018. However, during the 30-day public review period, the Ministry of the Environment, Conservation and Parks (MECP) received a Part-II Order Request. In its review of the Project File, the MECP determined that additional study was required appropriately to plan the associated stormwater management (SWM) facility. As such, the MECP concluded that the *Notice of Completion* was no longer valid, citing that additional review of SWM alternatives was necessary. The County is advancing this additional study and is providing additional information via this *Notice of Project Change*.



An Addendum to the 'Bruce County Road 33 Re-Alignment - Project File' (dated April 2018) has been prepared to meet the Schedule 'B' requirements for the conceptual SWM facility and to document the additional review of alternatives for stormwater management associated with the re-alignment of BR33. SWM alternatives reviewed include the following:

- Alternative 1: Do Nothing
- Alternative 2: Construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment
- Alternative 3: Construct a SWM facility to manage runoff from Bruce Road 33 & future development
- Alternative 4: Construct a new storm sewer system through the Baker Subdivision to Lake Huron

Through the work completed to date, the Study Team has identified Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, as the *Preliminary Recommended Solution*.

The Master Plan (July 2016), the Bruce County Road 33 Re-Alignment Project File (April 2018) and the Schedule 'B' Project File Addendum (October 2019), which provides a review and assessment of the stormwater management alternatives considered, are available on the County and Town websites and at their offices for viewing purposes.

With the circulation of this *Notice of Project Change* and the Project File Addendum, public, stakeholder, agency and aboriginal community comments are invited for incorporation into the planning of this project. Comments will be received by GM BluePlan Engineering and/or the County until November 1st, 2019. Contact information is provided below. Upon receipt of comments, the Study Team will re-evaluate the *Recommended Solution* and present the findings in an updated Project File Addendum.

This *Notice of Project Change* is advertised in the Shoreline Beacon and is also posted on the County and Town websites, where additional information is provided.

This Notice first issued on October 8th, 2019.

The County of Bruce
Mr. Jim Donohoe
30 Park Street, Box 398
Walkerton, ON N0G 2V0
jdonohoe@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P.Eng.
600 Tomlinson Drive, Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

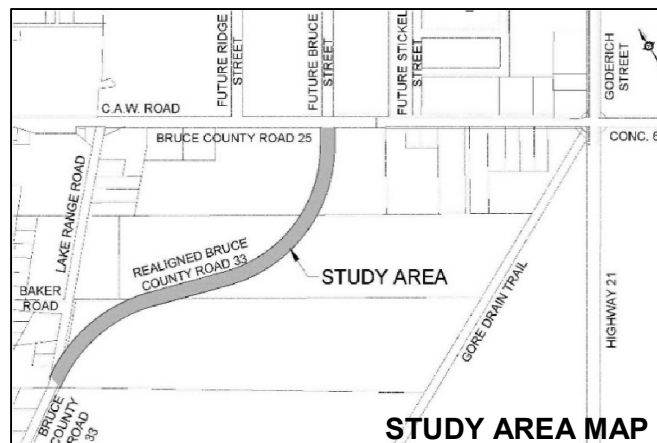
GM BluePlan Engineering Limited
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca

**BRUCE COUNTY ROAD 33 RE-ALIGNMENT
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA): SCHEDULE 'B'**

NOTICE OF PROJECT COMPLETION

In May 2017, the County of Bruce (County), as the proponent, with the Town of Saugeen Shores (Town), as a principle partner, completed a Master Plan to plan various road and drainage undertakings within a broad area central to Saugeen Shores along Bruce Roads 25 and 33 (BR25 & BR33). The Master Plan identified several projects including the re-alignment of BR33 to intersect BR25 from the south at the same location as the Town's future Bruce Street alignment, where shown on the Study Area Map provided.

In January 2018, the County initiated a Schedule 'B' EA process, appropriately to plan the BR33 re-alignment as considered in the Master Plan. A *Notice of Study Completion* to the process, identifying the re-alignment of the BR33 intersection with the future Bruce Street intersection as the *Preferred Solution*, was advertised on May 1, 2018. However, during the 30-day public review period, the Ministry of the Environment, Conservation and Parks (MECP) received a Part-II Order Request. In its review of the Project File, the MECP determined that additional study was required appropriately to plan the associated stormwater management (SWM) facility. As such, the MECP concluded that the *Notice of Study Completion* was no longer valid, citing that additional review of SWM alternatives was necessary. The County advanced this additional study and is providing the findings via this *Notice of Project Completion*.



The '*Bruce County Road 33 Re-Alignment - Project File*', dated April 2018, now has an Addendum dated November 2019. The Addendum was prepared to meet the Schedule 'B' requirements for the conceptual SWM facility and to document the additional review of alternatives for stormwater management associated with the re-alignment of BR33. SWM alternatives reviewed include the following:

- Alternative 1: Do Nothing
- Alternative 2: Construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment
- Alternative 3: Construct a SWM facility to manage runoff from Bruce Road 33 & future development
- Alternative 4: Construct a new storm sewer system through the Baker Subdivision to Lake Huron

Based on the *Preferred Solution*, to re-align BR33 to intersect BR25 at the future Bruce Street intersection, previously accepted by Council (the Transportation and Environmental Services [T&ES] Committee) in April 2018, and the subsequent *Preferred Solution* to stormwater management, to construct a SWM facility to manage runoff related only to the BR33 re-alignment (Alternative 2), accepted by the T&ES Committee on November 21st, 2019, the County intends to proceed with the construction of the proposed BR33 re-alignment and associated stormwater management facility. Documentation of the development and review of alternatives considered, including a summary of the planning and consultation process, a detailed evaluation and assessment of the alternatives and the rationale for the selection of the *Preferred Solutions*, is provided in the '*Bruce County Road 33 Re-Alignment Project File (including Addendum) - Schedule 'B' Municipal Class EA*', dated April 2018 (Addendum: November 2019). The Master Plan (July 2016) and the Bruce County Road 33 Re-Alignment Project File, including the stormwater management Addendum to the Project File, are available on the County and Town websites and at their offices for viewing purposes.

This Notice initiates the minimum 30 calendar day review period. In consideration of the holiday season, an extended review period has been considered. Interested persons are requested to provide written comment to the County of Bruce and/or GM BluePlan Engineering by January 3rd, 2020.

The County of Bruce
Mr. Jim Donohoe
30 Park Street, Box 398
Walkerton, ON N0G 2V0
jdonohoe@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P.Eng.
600 Tomlinson Drive, Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca

If concerns arise regarding this project, that cannot be resolved through discussions with the County, then members of the public, interested groups or technical agencies may request the Minister of the MECP to issue a 'Part II Order' for the project. Within the Part II Order request, the Minister may be requested to refer the matter to mediation, impose additional project conditions, and/or request an elevated scope of study (i.e. an individual environmental assessment). A Part II Order request requires the completion of a 'Part II Order Request' Form (Form ID No.012-2206E), which can be found on Service Ontario's website (<http://www.forms.ssb.gov.on.ca/>).

Requests may be received by the Minister at the address below until January 3rd, 2020. If there is no request received by January 3rd, 2020, the project will proceed to design and construction. A copy of the request must also be sent to the Director of the Environmental Assessment and Permissions Branch (MECP) and the County of Bruce.

Minister
Ministry of the Environment, Conservation and Parks
Ferguson Block, 77 Wellesley Street West, 11th Floor
Toronto, ON M7A 2T5
Fax: (416)314-8452
Minister.MECP@ontario.ca

Director, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
enviropemissions@ontario.ca

This *Notice of Project Completion* is advertised in the Shoreline Beacon and is also posted on the County and Town websites, where additional information is provided.

This Notice first issued on November 26th, 2019.



Legend

- Rural Community point, labelled
- Ferry
- Provincial Highway
- County Road
- Municipal or Other Road (small scale)
- Propane Facility Buffer
- Wetland
- Body of Water
- Built-up area
- Adjacent Counties
- Lake Huron and Georgian Bay

Notes

landowner mail out circulation area

1.3 0 0.64 1.3 Kilometers

NAD_1983_UTM_Zone_17N
© 2019 County of Bruce

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

CIRCULATION LIST: AGENCIES
BRUCE ROAD 33 RE-ALIGNMENT
SCHEDULE B EA
PROJECT FILE ADDENDUM

| AGENCY | CONTACT INFORMATION | | ADDRESS | INFORMATION SENT | | | | | | | | | | COMMENTS/RESPONSE RECEIVED (DESCRIPTION) |
|--|---------------------|--|--|--------------------------|--------|------|-------|-----------------------------|--|--|------------------------------------|-------|-------------|--|
| | | | | DATE SENT or RECEIVED | VIA | | | DOCUMENT | | | | | DESCRIPTION | |
| | | | | | E-mail | Mail | Phone | Notice of Project Change | Project File Addendum (Oct 2019) | Project File (April 2018), including Addendum (Nov 2019) | Notice of Project Completion | Other | | |
| MUNICIPAL AGENCIES | | | | | | | | | | | | | | |
| County of Bruce | Contact | Tessa Fortier | County of Bruce | 8-Oct-19 | S | | | X | X | | | | | |
| | | Planning and Development | Planning and Development | 26-Nov-19 | S | | | | | X | X | | | |
| | Telephone | (226) 909-1601 (Ext. 2) | 1243 McKenzie Road | | | | | | | | | | | |
| | E-mail | tfortier@brucecounty.on.ca | Port Elgin, ON N0H 2C6 | | | | | | | | | | | |
| | Contact | Kerri Meier | | | | | | | | | | | | |
| | | Environmental Coordinator | | | | | | | | | | | | |
| | Telephone | (519) 881-2400 (Ext. 307) | | | | | | | | | | | | |
| | E-mail | kmeier@brucecounty.on.ca | | | | | | | | | | | | |
| | Contact | Miguel Pelletier | | | | | | | | | | | | |
| | | Director of Transportation | | | | | | | | | | | | |
| | Telephone | (519) 881-2400 (Ext. 307) | | | | | | | | | | | | |
| | E-mail | mpelletier@brucecounty.on.ca | | | | | | | | | | | | |
| Town of Saugeen Shores | Contact | Amanda Froese, Director | Town of Saugeen Shores | 8-Oct-19 | S | | | X | X | | | | | |
| | | Infrastructure and Development Services | P.O. Box 820 | 26-Nov-19 | S | | | | | X | X | | | |
| | Telephone | (519) 832-2008 (Ext. 119) | 600 Tomlinson Drive | | | | | | | | | | | |
| | Fax | (519) 832-2140 | Port Elgin, ON N0H 2C0 | | | | | | | | | | | |
| | E-mail | amanda.froese@saugeenshores.ca | | | | | | | | | | | | |
| Saugeen Valley Conservation Authority (SVCA) | Contact | Erik Downing | Saugeen Conservation | 8-Oct-19 | S | | | X | X | | | | | |
| | | Manager, Environmental Planning & Reg. | 1078 Bruce Road 12 | 29-Oct-19 | R | | | | | | | X | | Re-iteration of previous comments, as presented in the |
| | Telephone | (519) 367-3040 (Ext. 241) | P.O. Box 150 | 26-Nov-19 | S | | | | | X | X | | | Project File Addendum. |
| | Fax | (519) 367-3041 | Formosa, ON N0G 1W0 | | | | | | | | | | | |
| | E-mail | e.downing@svca.on.ca | | | | | | | | | | | | |
| Source Water Protection | Contact | Carl Seider, Project Manager | Drinking Water source Protection | 8-Oct-19 | S | | | X | X | | | | | Including consultation correspondence |
| | Telephone | (519) 470-3000 (ext.201) | c/o Grey Sauble Conservation Authority | 9-Oct-19 | R | | | | | | | X | | SWP clarification and confirmation |
| | Fax | (519) 470-3005 | R.R.#4; 237897 Inglis Falls Road | 26-Nov-19 | S | | | | | X | X | | | |
| | E-mail | c.seider@waterprotection.ca | Owen Sound, ON N4K 5N6 | | | | | | | | | | | |
| | E-mail | mail@waterprotection.ca | | | | | | | | | | | | |
| Grey-Bruce Health Unit | Contact | Public Health Inspector | Grey Bruce Health Unit | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (519) 376-9420 | 101 17th Street East | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (519) 376-5043 | Owen Sound, ON N4K 0A5 | | | | | | | | | | | |
| | E-mail | publichealth@publichealthgreybruce.on.ca | | | | | | | | | | | | |

CIRCULATION LIST: AGENCIES
BRUCE ROAD 33 RE-ALIGNMENT
SCHEDULE B EA
PROJECT FILE ADDENDUM

| AGENCY | | CONTACT INFORMATION | ADDRESS | INFORMATION SENT | | | | | | | | | | DESCRIPTION | COMMENTS/RESPONSE RECEIVED (DESCRIPTION) |
|--|-----------|--|---|--------------------------|--------|------|-------|-----------------------------|--|--|------------------------------------|-------|--|-------------|--|
| | | | | DATE SENT or RECEIVED | VIA | | | DOCUMENT | | | | | | | |
| | | | | | E-mail | Mail | Phone | Notice of Project Change | Project File Addendum (Oct 2019) | Project File (April 2018), including Addendum (Nov 2019) | Notice of Project Completion | Other | | | |
| PROVINCIAL AGENCIES | | | | | | | | | | | | | | | |
| Ministry of the Environment, Conservation and Parks Owen Sound Area Office | Contact | Ian Mitchell, P.Eng. | MECP | 8-Oct-19 | S | | | X | X | | | | | | |
| | | District Engineer | Owen Sound Area Office | 26-Nov-19 | S | | | | | X | X | | | | |
| | Telephone | (519) 371-6191 | 101 17th Street East, 3rd Floor | | | | | | | | | | | | |
| | Fax | (519) 371-2905 | Owen Sound, ON N4K 0A5 | | | | | | | | | | | | |
| | E-mail | ian.mitchell@ontario.ca | | | | | | | | | | | | | |
| Ministry of the Environment, Conservation and Parks Southwestern Region | Contact | Craig Newton | MECP - Southwest Region | 8-Oct-19 | S | | | X | X | | | | | | |
| | | Environmental Planner | Technical Support Section | 21-Oct-19 | | | X | | | | | X | | | Conference call to clarify Project File approach |
| | | Southwest Region | 733 Exeter Road | 7-Nov-19 | R | | | | | | | X | | | (In general) - Summary of conference call discussions, |
| | Telephone | (519) 873-5014 | London, ON N6E 1L3 | 26-Nov-19 | S | | | | | X | X | | | | SWP requirements and Indigenous Community |
| | Fax | | | | | | | | | | | | | | consultation requirements. |
| | Email | craig.newton@ontario.ca | | | | | | | | | | | | | |
| Ministry of the Environment, Conservation and Parks Southwestern Region | Contact | Anneleis Eckert | MECP | 8-Oct-19 | S | | | X | X | | | | | | Project Information Form included. |
| | | Regional Environmental Planner | Regional EA Coordinator | 8-Oct-19 | R | | | | | | | X | | | Confirmation of Receipt |
| | | Streamlined EA Notice Submission | 733 Exeter Road | 9-Oct-19 | R | | | | | | | X | | | Anneleis no longer with MECP. Consult with Craig |
| | | Southwest Region | London, ON N6E 1L3 | | | | | | | | | | | | Newton, MECP SWR |
| | Telephone | (519) 873-5115 | | | | | | | | | | | | | |
| | Fax | (519) 873-5020 | | | | | | | | | | | | | |
| | E-mail | anneleis.eckert@ontario.ca | | | | | | | | | | | | | |
| | E-mail | eanotification.swregion@ontario.ca | | | | | | | | | | | | | |
| Ministry of the Environment, Conservation and Parks Environmental Assessment and Approvals Branch | Contact | Callee Robinson | MECP | 8-Oct-19 | S | | | X | X | | | | | | |
| | | Project Officer | Environmental Approvals Branch | 21-Oct-19 | | | X | | | | | X | | | Conference call to clarify Project File approach |
| | | Environmental Assessment Services | 135 St.Clair Ave W, 1st Floor | 26-Nov-19 | S | | | | | X | X | | | | |
| | Telephone | (416) 314-0286 | Toronto, ON M4V 1P5 | | | | | | | | | | | | |
| | Fax | | | | | | | | | | | | | | |
| | Email | callee.robinson@ontario.ca | | | | | | | | | | | | | |
| Ministry of the Environment, Conservation and Parks Environmental Assessment and Approvals Branch | Contact | Director | MECP | 8-Oct-19 | S | | | X | X | | | | | | Project Information Form included. |
| | Telephone | (416) 314-7288 | Environmental Approvals Branch | 26-Nov-19 | S | | | | | X | X | | | | |
| | Fax | (416) 314-8452 | 135 St.Clair Ave W, 1st Floor | | | | | | | | | | | | |
| | E-mail | EAASIBgen@ontario.ca | Toronto, ON M4V 1P5 | | | | | | | | | | | | |
| | | mea.notices.eaab@ontario.ca | | | | | | | | | | | | | Notice of Completion only |
| Ministry of Natural Resources and Forestry | Contact | Jodi Benvenuti | Ministry on Natural Resources and Forestry | 8-Oct-19 | S | | | X | X | | | | | | |
| | Telephone | (519) 371-8471 | Owen Sound Area Office | 26-Nov-19 | S | | | | | X | X | | | | |
| | Fax | (519) 372-3305 | 1450 7th Avenue East | | | | | | | | | | | | |
| | E-mail | jodi.benvenuti@ontario.ca | Owen Sound, ON N4K 2Z1 | | | | | | | | | | | | |
| Ministry of Natural Resources and Forestry | Contact | Ken Mott, District Planner | Ministry on Natural Resources and Forestry | 8-Oct-19 | S | | | X | X | | | | | | Services Grey, Bruce, Simcoe and Dufferin |
| | Telephone | (705) 725-7546 | Midhurst District | 26-Nov-19 | S | | | | | X | X | | | | |
| | Fax | (705) 725-7584 | 2284 Nursery Road | | | | | | | | | | | | |
| | E-mail | ken.mott@ontario.ca | Midhurst, ON L9X 1N8 | | | | | | | | | | | | |
| Ministry of Agriculture, Food and Rural Affairs | Contact | Carolyn Hamilton | Ministry of Agriculture, Food and Rural Affairs | 8-Oct-19 | S | | | X | X | | | | | | |
| | | Director, Rural Programs Branch | Rural Programs Branch | 26-Nov-19 | S | | | | | X | X | | | | |
| | Telephone | (519) 826-3419 | Ontario Government Building | | | | | | | | | | | | |
| | Fax | | 1 Stone Road West, 4th Floor NW | | | | | | | | | | | | |
| | E-mail | carolyn.hamilton@ontario.ca | Guelph, Ontario N1G 4Y2 | | | | | | | | | | | | |
| Ministry of Transportation | Contact | Steve Hood | Ministry of Transportation | 8-Oct-19 | S | | | X | X | | | | | | |
| | | Technical Services Supervisor | 1450 7th Ave E | 26-Nov-19 | S | | | | | X | X | | | | |
| | Telephone | (519) 372-4036 | Owen Sound, ON N4K 2Z1 | | | | | | | | | | | | |
| | E-mail | steve.hood@ontario.ca | | | | | | | | | | | | | |
| Ministry of Tourism, Culture and Sport Culture Division Heritage Program Unit | Contact | Karla Barboza, Team Lead - Heritage (Acting) | MTCS | 8-Oct-19 | S | | | X | X | | | | | | |
| | Telephone | (416) 314-7120 | 401 Bay Street | 26-Nov-19 | S | | | | | X | X | | | | |
| | Fax | | Toronto, ON M7A 0A7 | | | | | | | | | | | | |
| | E-mail | karla.barboza@ontario.ca | | | | | | | | | | | | | |

CIRCULATION LIST: AGENCIES
BRUCE ROAD 33 RE-ALIGNMENT
SCHEDULE B EA
PROJECT FILE ADDENDUM

| AGENCY | CONTACT INFORMATION | | ADDRESS | INFORMATION SENT | | | | | | | | | | COMMENTS/RESPONSE RECEIVED (DESCRIPTION) |
|---|---------------------|--|---------------------------------------|--------------------------|--------|------|-------|-----------------------------|--|--|------------------------------------|-------|-------------|--|
| | | | | DATE SENT or RECEIVED | VIA | | | DOCUMENT | | | | | DESCRIPTION | |
| | | | | | E-mail | Mail | Phone | Notice of Project Change | Project File Addendum (Oct 2019) | Project File (April 2018), including Addendum (Nov 2019) | Notice of Project Completion | Other | | |
| FEDERAL AGENCIES | | | | | | | | | | | | | | |
| Environment and Climate Change Canada | Contact | Environmental Assessment Coordinator | Environment and Climate Change Canada | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (416) 739-4734 | Ontario Region | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (416) 739-4776 | 4905 Dufferin Street | | | | | | | | | | | |
| | E-mail | ec.ecoactionon.ec@canada.ca | Toronto, Ontario M3H 5T4 | | | | | | | | | | | |
| Indigenous and Northern Affairs Canada | Contact | Environmental Assessment Coordinator | Indigenous and Northern Affairs | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (416) 973-4004 | Ontario Region | 8-Oct-19 | R | | | | | | | X | | Confirmation of Receipt |
| | Fax | (416) 954-6201 | 25 St Clair Ave East, 8th Floor | 26-Nov-19 | S | | | | | X | X | | | |
| | E-mail | InfoPubs@aadnc-aandc.gc.ca | Toronto, Ontario M4T 1M2 | | | | | | | | | | | |
| UTILITIES | | | | | | | | | | | | | | |
| Bell Access Network | Contact | Nicolas Kellar | Bell Access Network | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (519) 371-5450 | 870-4th Avenue East | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (519) 376-3563 | Owen Sound, ON | | | | | | | | | | | |
| | E-mail | nicholas.kellar@bell.ca | N4K 2N7 | | | | | | | | | | | |
| Hydro One Networks Inc. | Contact | Kevin Brackley | Hydro One Networks Inc. | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (888) 664-9376 | 45 Sargeant Drive, Box 6700 | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (905) 944-3251 | Barrie, ON | | | | | | | | | | | |
| | E-mail | Zone5PlanningDept@HydroOne.com | L4N 4V9 | | | | | | | | | | | |
| | cc. | kevin.brackley@hydroone.com | | | | | | | | | | | | |
| | cc. | tammy.scott@hydroone.com | | | | | | | | | | | | |
| Eastlink | Contact | Dan Oswald | Eastlink | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (519) 793-3111 | 77 Main Street | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | | Lion's Head, ON N0H 1W0 | | | | | | | | | | | |
| | E-mail | dan.oswald@corp.eastlink.ca | | | | | | | | | | | | |
| Bruce Telecom (BMTS) | Contact | Head Office | BMTS - Tiverton - Head Office | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (519) 368-2000 | 3145 Highway 21 | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | | P.O. Box 80 | | | | | | | | | | | |
| | E-mail | admin@brucetelecom.com | Tiverton, ON N0G 2T0 | | | | | | | | | | | |
| Union Gas Limited | Contact | Kevin Schimus | Union Gas | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (519) 377-0214 | 603 Krumpf Drive | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (519) 376-2591 | P.O. Box 340 | | | | | | | | | | | |
| | E-mail | kschimus@uniongas.com | Waterloo, ON N2J 4A4 | | | | | | | | | | | |
| Rogers Cable | Contact | Tony Dominguez | Rogers Cable | 8-Oct-19 | S | | | X | X | | | | | |
| | Telephone | (705) 737-4660 ext. 6923 | 1 Sperling Drive | 26-Nov-19 | S | | | | | X | X | | | |
| | Fax | (705) 737-3840 | Barrie, ON L4M 6B8 | | | | | | | | | | | |
| | E-mail | Tony.Dominguez@rci.rogers.com | | | | | | | | | | | | |

CIRCULATION LIST: AGENCIES
BRUCE ROAD 33 RE-ALIGNMENT
SCHEDULE B EA
PROJECT FILE ADDENDUM

| AGENCY | CONTACT INFORMATION | | ADDRESS | INFORMATION SENT | | | | | | | | | | COMMENTS/RESPONSE RECEIVED (DESCRIPTION) |
|--|---------------------|--|--------------------------------|--------------------------|--------|------|-------|-----------------------------|--|--|------------------------------------|-------|-------------|---|
| | | | | DATE SENT or RECEIVED | VIA | | | DOCUMENT | | | | | DESCRIPTION | |
| | | | | | E-mail | Mail | Phone | Notice of Project Change | Project File Addendum (Oct 2019) | Project File (April 2018), including Addendum (Nov 2019) | Notice of Project Completion | Other | | |
| INDIGENOUS COMMUNITIES - Consultations Completed by the County of Bruce (and GMBP) | | | | | | | | | | | | | | |
| Historic Saugeen Metis | Contact | Archie Indoe (President) | Historic Saugeen Metis | 8-Oct-19 | S | S | | X | X | | | | | Confirmation that there is no objection or opposition to the project. |
| | | George Govier (Consultation Coordinator) | 204 High Street | 11-Oct-19 | R | | | | | | | X | | |
| | Telephone | (519) 483-4000 | Box 1492 | | | | | | | | | | | |
| | Contact | Chris Hatchey | Southampton, ON N0H 2L0 | 26-Nov-19 | S | S | | | | X | X | | | |
| | | hsmasstrcc@bmts.com | | | | | | | | | | | | |
| | E-mail | saugeenmetisadmin@bmts.com | | | | | | | | | | | | |
| Saugeen First Nation | Contact | Lester Anoquot (Chief) | Saugeen First Nation | 8-Oct-19 | S | S | | X | X | | | | | |
| | | Cheree Urscheler (Band Administrator) | Saugeen Band Office | 26-Nov-19 | S | S | | | | X | X | | | |
| | Telephone | (519) 797-2781 | 6493 Highway 21, R.R.#1 | | | | | | | | | | | |
| | Fax | (519) 797-2978 | Southampton, ON N0H 2L0 | | | | | | | | | | | |
| | E-mail | lester.anoquot@saugeen.org | | | | | | | | | | | | |
| Metis Nation of Ontario (MNO) Great Lakes Metis Council Owen Sound Office | Contact | James Wagar | Metis Nation of Ontario | 8-Oct-19 | S | S | | X | X | | | | | |
| | | Consultation Assessment Coordinator | Owen Sound Office | 26-Nov-19 | S | S | | | | X | X | | | |
| | Telephone | (519) 370-0435 | 380-9th Street East | | | | | | | | | | | |
| | E-mail | jamesw@metisnation.org | Owen Sound, ON N4K 1P1 | | | | | | | | | | | |
| | | joannem@metisnation.org | | | | | | | | | | | | |
| | E-mail | consultations@metisnation.org | | | | | | | | | | | | |
| Saugeen Ojibway Nation Environmental Office | Contact | Doran Ritchie | Saugeen Ojibway Nation | 8-Oct-19 | S | S | | X | X | | | | | |
| | | Infrastructure Planning Coordinator | Environment Office | 26-Nov-19 | S | S | | | | X | X | | | |
| | Telephone | (519) 534-5507 (ext. 226) | 25 Maadookii Road | | | | | | | | | | | |
| | Fax | (519) 534-5525 | Neyaashiinigmiing, Ont. | | | | | | | | | | | |
| | E-mail | d.ritchie@saugeenojibwaynation.ca | N0H 2T0 | | | | | | | | | | | |
| Chippewas of Nawash Unceded First Nation | Contact | Chief Gregory Nadjiwon | Chippewas of Nawash Unceded FN | 8-Oct-19 | S | S | | X | X | | | | | |
| | Telephone | (519) 534-1689 | #135 Lakeshore Blvd. | 26-Nov-19 | S | S | | | | X | X | | | |
| | Fax | (519) 534-2130 | Neyaashiinigmiing, Ont. | | | | | | | | | | | |
| | E-mail | chiefsdesk@nawash.ca | R.R#5 Wiarton, ON N0H 2T0 | | | | | | | | | | | |
| | E-mail | cnadministrator@nawash.ca | | | | | | | | | | | | |

CIRCULATION LIST: AGENCIES
BRUCE ROAD 33 RE-ALIGNMENT
SCHEDULE B EA
PROJECT FILE ADDENDUM

| AGENCY | CONTACT INFORMATION | | | ADDRESS | INFORMATION SENT | | | | | | | | | | DESCRIPTION | COMMENTS/RESPONSE RECEIVED (DESCRIPTION) | |
|---|---------------------|--|--|-----------|--------------------------|--------|------|-------|-----------------------------|--|--|------------------------------------|-------|--|-------------|--|---|
| | | | | | DATE SENT or RECEIVED | VIA | | | DOCUMENT | | | | | | | | |
| | | | | | | E-mail | Mail | Phone | Notice of Project Change | Project File Addendum (Oct 2019) | Project File (April 2018), including Addendum (Nov 2019) | Notice of Project Completion | Other | | | | |
| Private Groups: Circulated by the County (mail) and GMBP (email) | | | | | | | | | | | | | | | | | |
| Lake Ridge Estates | Contact | Andy Kuperus | Lake Ridge Estates | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Telephone | (519) 832-2058 | P.O. Box 614 | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| | Fax | (519) 389-4547 | R.R.#3 | | | | | | | | | | | | | | |
| | E-mail | l.kuperus@bmts.com | Port Elgin, ON N0H 2C0 | | | | | | | | | | | | | | |
| Port Elgin & Saugeen Township Beacher's Organization | Contact | David Shemilt | Port Elgin & Saugeen Township | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Contact | Dave Reynolds, Director | Beacher's Organization | 8-Oct-19 | R | | | | | | | | | | | | Request for clarification |
| | Contact | Greg Schmaltz, President | P.O. Box 377 | 15-Oct-19 | S | | | | | | | | | | | | Brief update that request is being considered and will be |
| | Telephone | (519) 386-0934 | Port Elgin, ON N0H 2C0 | 16-Oct-19 | S | | | | | | | | | | | | addressed the following week. |
| | E-mail | davereynolds5959@gmail.com | | 21-Oct-19 | S | | | | | | | | | | | | General project summary provided |
| | E-mail | manager@beachers.org | | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| CAW Family Education Centre | Contact | | CAW Family Education Centre | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Telephone | (519) 389-3200 | R.R.#1 Bruce County Road 25 | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| | Fax | | 115 Shipley Avenue | | | | | | | | | | | | | | |
| | E-mail | confcentre@unifor.org | Port Elgin, ON N0H 2C5 | | | | | | | | | | | | | | |
| Unifor (CAW) | Contact | Graeme Brown | Unifor (CAW) | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Telephone | (416) 495-3799 | 205 Placer Court | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| | Fax | (416) 495-6559 | North York, ON M2H 3H9 | | | | | | | | | | | | | | |
| | E-mail | Graeme.Brown@unifor.org | | | | | | | | | | | | | | | |
| Cuesta Planning Consultants | Contact | David Ellingwood | Cuesta Planning Consultants | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Telephone | (519) 372-9790 | 978 First Avenue West | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| | Fax | | Owen Sound, ON N4K 4K5 | | | | | | | | | | | | | | |
| | E-mail | cuesta@cuestaplanning.com | | | | | | | | | | | | | | | |
| Barry's Construction and Insulation Ltd. | Contact | Barry's Construction and Insulation Ltd. | Barry's Construction and Insulation Ltd. | 8-Oct-19 | S | S | | X | X | | | | | | | | |
| | Telephone | (519) 934-3374 | 7839 Highway 21 | 26-Nov-19 | S | S | | | | X | X | | | | | | |
| | Fax | | P.O. Box 30 | | | | | | | | | | | | | | |
| | E-mail | stu@barrysconstruction.ca | Allenford, ON N0H 1A0 | | | | | | | | | | | | | | |
| Interested Public: Members of the community that previously engaged in the planning process for the re-alignment of Bruce Road 33 were issued Notices via mail or email depending on the contact information previously provided. | | | | | | | | | | | | | | | | | |



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

October 8, 2019

Historic Saugeen Metis
P.O. Box 1492, 204 High Street
Southampton, ON N0H 2L0

Attention: George Govier

Re: Schedule B Environmental Assessment - Bruce Road 33

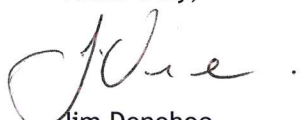
The County of Bruce and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in May 2017. The Master Plan identified several projects including the realignment of Bruce Road 33 to intersect Bruce Road 25 from the south at the same location as the Town's future Bruce Street alignment. The enclosed map provides an overview of the phases resulting from the Master Plan.

The Department is continuing with the Schedule B Environmental Assessment for Bruce Road 33 as identified in the enclosed Notice of Project Change.

The Master Plan (July 2016), Bruce County Road 33 Re-Alignment Project File (April 2018) and the Schedule B Project File Addendum (October 2019) will be available on the County of Bruce and Saugeen Shores websites and at the County of Bruce Administration Building and Town of Saugeen Shores Municipal Office for viewing on October 8, 2019. We ask that comments regarding this file be provided by November 1, 2019.

We will continue to provide correspondence as the project progresses. Please contact our office or John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,



Jim Donohoe
Engineering Manager

Encls.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

October 8, 2019

Metis Nation of Ontario
Great Lakes Metis Council
380-9th Street East
Owen Sound, ON N4K 1P1

Attention: James Wagar

Re: Schedule B Environmental Assessment - Bruce Road 33

The County of Bruce and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in May 2017. The Master Plan identified several projects including the realignment of Bruce Road 33 to intersect Bruce Road 25 from the south at the same location as the Town's future Bruce Street alignment. The enclosed map provides an overview of the phases resulting from the Master Plan.

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We will continue to provide correspondence as the project progresses. Please contact our office or John Slocombe of GMBluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Jim Donohoe
Engineering Manager

Encls.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

October 8, 2019

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
RR#5, Wiarton ON N0H 2T0

Attention: Doran Ritchie

Re: Schedule B Environmental Assessment - Bruce Road 33

The County of Bruce and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in May 2017. The Master Plan identified several projects including the realignment of Bruce Road 33 to intersect Bruce Road 25 from the south at the same location as the Town's future Bruce Street alignment. The enclosed map provides an overview of the phases resulting from the Master Plan.

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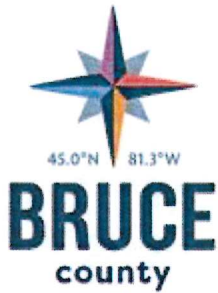
We will continue to provide correspondence as the project progresses. Please contact our office or John Slocombe of GMBluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Jim Donohoe
Engineering Manager

Encls.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

October 8, 2019

Chippewas of Nawash Unceded First Nation
135 Lakeshore Boulevard
Neyaashiinigmiing
RR# 5
Wiarton ON N0H 2T0

Attention: Chief Gregory Nadjiwon

Re: Schedule B Environmental Assessment - Bruce Road 33

The County of Bruce and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in May 2017. The Master Plan identified several projects including the realignment of Bruce Road 33 to intersect Bruce Road 25 from the south at the same location as the Town's future Bruce Street alignment. The enclosed map provides an overview of the phases resulting from the Master Plan.

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We will continue to provide correspondence as the project progresses. Please contact our office or John Slocombe of GMBLuePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Jim Donohoe
Engineering Manager

Encls.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

October 8, 2019

Saugeen First Nation
Chippewas of Saugeen First Nation No.29
6493 Highway 21, RR#1
Southampton, ON N0H2L0

Attention: Cheree Urscheler

Re: Schedule B Environmental Assessment - Bruce Road 33

The County of Bruce and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 25 and Bruce Road 33 in May 2017. The Master Plan identified several projects including the realignment of Bruce Road 33 to intersect Bruce Road 25 from the south at the same location as the Town's future Bruce Street alignment. The enclosed map provides an overview of the phases resulting from the Master Plan.

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We will continue to provide correspondence as the project progresses. Please contact our office or John Slocombe of GMBluePlan Engineering Limited if you have any questions, comments or require additional information.

Yours truly,

Jim Donohoe
Engineering Manager

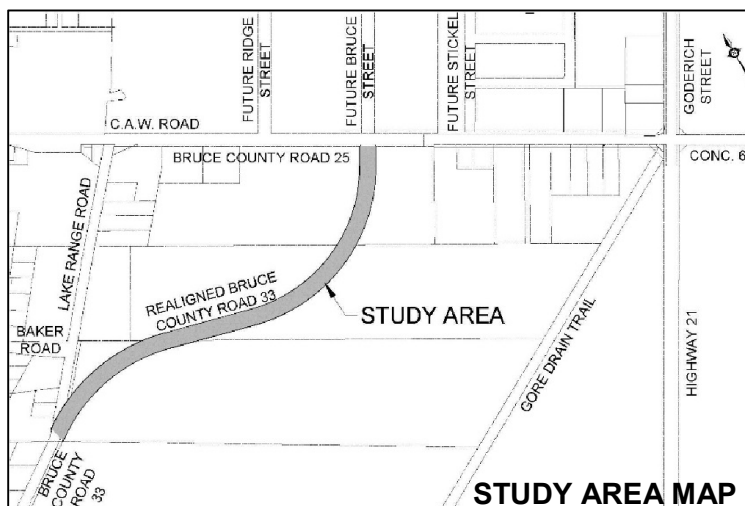
Encls.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce

**BRUCE COUNTY ROAD 33 RE-ALIGNMENT
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA): SCHEDULE 'B'
NOTICE OF PROJECT CHANGE**

In May 2017, the County of Bruce (County), as the proponent, with the Town of Saugeen Shores (Town), as a principle partner, completed a Master Plan to plan various road and drainage undertakings within a broad area central to Saugeen Shores along Bruce Roads 25 and 33 (BR25 & BR33). The Master Plan identified several projects including the re-alignment of BR33 to intersect BR25 from the south at the same location as the Town's future Bruce Street alignment, where shown on the Study Area Map provided.

In January 2018, the County initiated a Schedule 'B' EA process, appropriately to plan the BR 33 re-alignment as considered in the Master Plan. A *Notice of Study Completion* to the process, identifying the re-alignment of the BR33 intersection with the future Bruce Street intersection as the *Preferred Solution*, was advertised on May 1, 2018. However, during the 30-day public review period, the Ministry of the Environment, Conservation and Parks (MECP) received a Part-II Order Request. In its review of the Project File, the MECP determined that additional study was required appropriately to plan the associated stormwater management (SWM) facility. As such, the MECP concluded that the *Notice of Completion* was no longer valid, citing that additional review of SWM alternatives was necessary. The County is advancing this additional study and is providing additional information via this *Notice of Project Change*.



An Addendum to the 'Bruce County Road 33 Re-Alignment - Project File' (dated April 2018) has been prepared to meet the Schedule 'B' requirements for the conceptual SWM facility and to document the additional review of alternatives for stormwater management associated with the re-alignment of BR33. SWM alternatives reviewed include the following:

- Alternative 1: Do Nothing
- Alternative 2: Construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment
- Alternative 3: Construct a SWM facility to manage runoff from Bruce Road 33 & future development
- Alternative 4: Construct a new storm sewer system through the Baker Subdivision to Lake Huron

Through the work completed to date, the Study Team has identified Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, as the *Preliminary Recommended Solution*.

The Master Plan (July 2016), the Bruce County Road 33 Re-Alignment Project File (April 2018) and the Schedule 'B' Project File Addendum (October 2019), which provides a review and assessment of the stormwater management alternatives considered, are available on the County and Town websites and at their offices for viewing purposes.

With the circulation of this *Notice of Project Change* and the Project File Addendum, public, stakeholder, agency and First Nation comments are invited for incorporation into the planning of this project. Comments will be received by GM BluePlan Engineering and/or the County until November 1st, 2019. Contact information is provided below. Upon receipt of comments, the Study Team will re-evaluate the *Recommended Solution* and present the findings in an updated Project File Addendum.

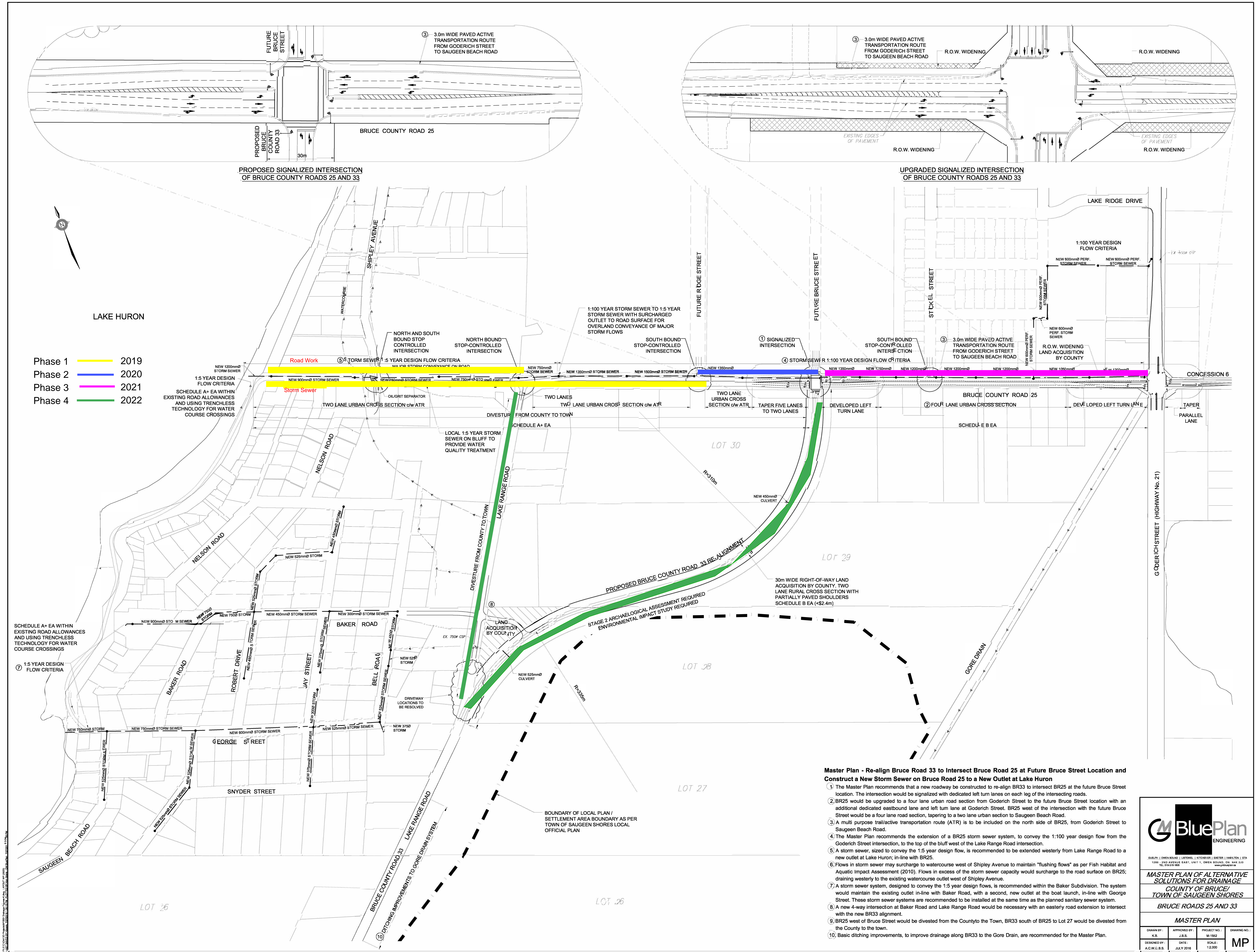
This *Notice of Project Change* is advertised in the Shoreline Beacon and is also posted on the County and Town websites, where additional information is provided.

This Notice first issued on October 8th, 2019.

The County of Bruce
Mr. Jim Donohoe
30 Park Street, Box 398
Walkerton, ON N0G 2V0
jdonohoe@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P.Eng.
600 Tomlinson Drive, Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca



- Master Plan - Re-align Bruce Road 33 to Intersect Bruce Road 25 at Future Bruce Street Location and Construct a New Storm Sewer on Bruce Road 25 to a New Outlet at Lake Huron**
- The Master Plan recommends that a new roadway be constructed to re-align BR33 to intersect BR25 at the future Bruce Street location. The intersection would be signalized with dedicated left turn lanes on each leg of the intersecting roads.
 - BR25 would be upgraded to a four lane urban road section from Goderich Street to the future Bruce Street location, with an additional dedicated eastbound lane and left turn lane at Goderich Street. BR25 west of the intersection with the future Bruce Street would be a four lane road section, tapering to a two lane urban section to Sauguen Beach Road.
 - A multi purpose trail/active transportation route (ATR) is to be included on the north side of BR25, from Goderich Street to Sauguen Beach Road.
 - The Master Plan recommends the extension of a BR25 storm sewer system, to convey the 1:100 year design flow from the Goderich Street intersection, to the top of the bluff west of the Lake Range Road intersection.
 - A storm sewer, sized to convey the 1:5 year design flow, is recommended to be extended westerly from Lake Range Road to a new outlet at Lake Huron, in-line with BR25.
 - Flows in storm sewer may surge to watercourse west of Shipley Avenue to maintain "flushing flows" as per Fish Habitat and Aquatic Impact Assessment (2010). Flows in excess of the storm sewer capacity would surge to the road surface on BR25, draining westerly to the existing watercourse outlet west of Shipley Avenue.
 - A storm sewer system, designed to convey the 1:5 year design flows, is recommended within the Baker Subdivision. The system would maintain the existing outlet in-line with Baker Road, with a second, new outlet at the boat launch, in-line with George Street. These storm sewer systems are recommended to be installed at the same time as the planned sanitary sewer system.
 - A new 4-way intersection at Baker Road and Lake Range Road would be necessary with an easterly road extension to intersect with the new BR33 alignment.
 - BR25 west of Bruce Street would be divested from the County to the Town, BR33 south of BR25 to Lot 27 would be divested from the County to the town.
 - Basic ditching improvements, to improve drainage along BR33 to the Gore Drain, are recommended for the Master Plan.



BluePlan
ENGINEERING

1200 - 2ND AVENUE EAST, UNIT 1, GORE BOUND, ON, N4K 2A5
TEL: 709-995-9600

MASTER PLAN OF ALTERNATIVE SOLUTIONS FOR DRAINAGE
COUNTY OF BRUCE
TOWN OF SAUGUEN SHORES
BRUCE ROADS 25 AND 33

MASTER PLAN

| | | | |
|----------------------------|------------------------|------------------------|--------------------|
| DESIGNED BY: R.B. | APPROVED BY: J.B.S. | PROJECT NO.: M-1992 | DRAWING NO.: MP |
| DRAWN BY: A.C.W./J.B.S. | DATE: JULY 2019 | SCALE: 1:2,000 | |

October 8, 2019

Our File: 217127

Via Email: c.seider@waterprotection.ca

Drinking Water Source Protection
c/o Grey Sauble Conservation Authority
Risk Management Office
237897 Inglis Falls Road, RR#4
Owen Sound, ON N4K 5N6

Attention: Mr. Carl Seider

Re: Source Water Protection Consultation
Bruce Road 33 Re-Alignment
Town of Saugeen Shores
County of Bruce

Dear Carl,

GM BluePlan Engineering has been retained by the County of Bruce, as the proponent, with the Town of Saugeen Shores, as principle partner, to undertake a Schedule 'B' Municipal Class Environmental Assessment (EA) planning process appropriately to plan the Bruce Road 33 re-alignment. A Project File (April 2018) was previously prepared to address the EA process (Municipal Engineers Association, 2015) and is available on the County's and Town's website. An addendum to the 'Bruce County Road 33 Re-Alignment – Project File' has subsequently been prepared to meet the Schedule 'B' requirements specific to the additional review of alternatives for stormwater management associated with the road re-alignment. The Project File, including the Addendum, discusses the findings, to date, of Phase 1 and, in part, Phase 2 of the Environmental Assessment.

As a simplified summary, the project proposes the re-alignment of Bruce Road 33 to intersect Bruce Road 25 at the Future Bruce Street intersection location, where shown on the attached *Notice of Project Change*, and the construction of a stormwater management facility to manage runoff from the re-aligned Bruce Road 33. This will result in road works outside of the existing rights-of-way and the construction of a stormwater management facility, and will include the following:

- Road works including grading and paving;
- Landscaping of adjacent areas;
- The construction of roadside ditches designed to meet the requirements of an enhanced grass swale; and
- The proposed construction of a dry pond-type stormwater management facility.

The creation of lands that would include chemical or fuel storage are not included as part of this plan.

Based on our preliminary review, the Study Area is situated within the Saugeen Valley Source Protection Area. According to the Saugeen-Grey Sauble-Northern Bruce Peninsula Source Protection Plan, the Study Area is not situated within a wellhead protection area (WHPA) or intake protection zone (IPZ) and therefore cannot be considered a significant drinking water threat. Although it does not alter the evaluation of drinking water threats, it is recognized that the site is situated within a significant groundwater recharge area (SGRA) and a highly vulnerable aquifer (HVA), with a vulnerability score of 6.



We have reviewed the recommended re-alignment of Bruce Road 33 and associated activities in relation to the *Tables for Drinking Water Threats*. Based on the potential scope of the project, it not anticipated that:

- i. Any project activities will be considered a prescribed drinking water threat; or
- ii. Any activities will change or create new vulnerable areas.

As part of the EA process, we are reviewing the project with respect to requirements under the Clean Water Act. At this time, we are requesting confirmation of the above, as well as whether you are aware of any other potential considerations and policies in the Source Protection Plan that may apply to the project.

Should you have any questions, please feel free to contact our office.

Yours truly,

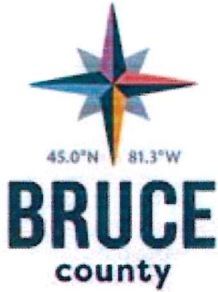
GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in black ink, appearing to be 'Matthew Nelson', written over a horizontal line.

Matthew Nelson, P.Eng., P.Geo.
AN/kd

cc: County of Bruce: Jim Donohoe, via Email – jdonohoe@brucecounty.on.ca
File No. 217127



County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

November 26, 2019

Chippewas of Nawash Unceded First Nation
135 Lakeshore Boulevard
Neyaashiinigiing
RR# 5
Wiarton ON N0H 2T0

Attention: Chief Gregory Nadjiwon

Re: Schedule B Environmental Assessment - Bruce Road 33

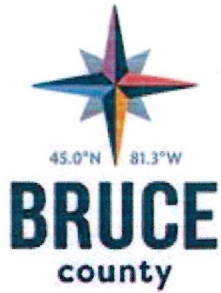
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County of Bruce Transportation &
Environmental Services Department
30 Park Street, P.O. Box 398, Walkerton, ON N0G 2V0
(519) 881-2400

brucecounty.on.ca

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Yours truly,

Jim Donohoe
Engineering Manager

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



County of Bruce Transportation &
Environmental Services Department
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November 26, 2019

Metis Nation of Ontario
Great Lakes Metis Council
380-9th Street East
Owen Sound, ON N4K 1P1

Attention: James Wagar

Re: Schedule B Environmental Assessment - Bruce Road 33

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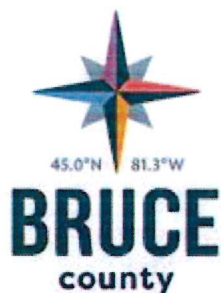
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Jim Donohoe
Engineering Manager

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Amanda Froese, Town of Saugeen Shores
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(519) 881-2400

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November 26, 2019

Historic Saugeen Metis
P.O. Box 1492, 204 High Street
Southampton, ON N0H 2L0

Attention: George Govier

Re: Schedule B Environmental Assessment - Bruce Road 33

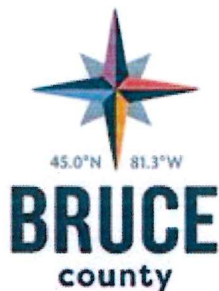
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Jim Donohoe
Engineering Manager

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce



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Environmental Services Department
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(519) 881-2400

brucecounty.on.ca

November 26, 2019

Saugeen First Nation
Chippewas of Saugeen First Nation No.29
6493 Highway 21, RR#1
Southampton, ON N0H2L0

Attention: Cheree Urscheler

Re: Schedule B Environmental Assessment - Bruce Road 33

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November 26, 2019

Saugeen Ojibway Nation
SON Environmental Office
25 Maadookii Subdivision
RR#5, Wiarton ON N0H 2T0

Attention: Doran Ritchie

Re: Schedule B Environmental Assessment - Bruce Road 33

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Jim Donohoe
Engineering Manager

Encl.

c: John Slocombe, GM BluePlan Engineering Ltd.
Amanda Froese, Town of Saugeen Shores
Kerri Meier, County of Bruce

ENCLOSURE C:
STORMWATER MANAGEMENT DESIGN BRIEF

Prepared By:



Bruce County Road 33 Re-Alignment

Revised Conceptual Stormwater Management Design Brief Saugeen Shores, ON

GMBP File: 217127

September 2019



Be an explorer.



TABLE OF CONTENTS

| | |
|--|-----------|
| 1. INTRODUCTION AND BACKGROUND | 1 |
| 2. EXISTING CONDITIONS (PRE-DEVELOPMENT) | 2 |
| 3. EVALUATION OF POST-DEVELOPMENT CONDITIONS | 2 |
| 3.1 Post-Development Drainage | 2 |
| 3.2 Stormwater Management Design Criteria | 3 |
| 4. ALTERNATIVE SOLUTIONS: STORMWATER MANAGEMENT | 3 |
| 4.1 Alternative 1: Do Nothing | 3 |
| 4.2 Alternative 2: Construct a SWM Facility to Manage Runoff Related only to BR33 Re-Alignment | 3 |
| 4.3 Alternative 3: Construct a SWM Facility to Manage Runoff from BR33 & Future Development | 3 |
| 4.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron | 4 |
| 5. QUANTITY CONTROL CRITERIA PARAMETERS AND MODELLING | 4 |
| 5.1 Design Rainfall Events | 4 |
| 5.2 Site Soil Conditions | 4 |
| 5.3 Pre-Development Catchment Areas | 5 |
| 5.4 Post-Development Catchment Areas | 5 |
| 5.5 MIDUSS Quantity Control Modelling Results | 6 |
| 6. STORMWATER QUALITY TREATMENT | 8 |
| 6.1 Alternative 1: Do Nothing | 8 |
| 6.2 Alternative 2: Construct a SWM Facility to Manage Road Runoff Only | 8 |
| 6.3 Alternative 3: Construct a SWM Facility to Manage Runoff from Road and Future Development | 9 |
| 6.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron | 10 |
| 7. CONCEPTUAL CONSTRUCTION COSTS OF ALTERNATIVE SOLUTIONS | 11 |
| 8. DISCUSSION AND COMPARISON OF SWM ALTERNATIVE SOLUTIONS | 12 |
| 8.1 Alternative 1: Do Nothing | 12 |
| 8.2 Alternative 2: Construct a SWM Facility to Manage Road Runoff Only | 12 |
| 8.3 Alternative 3: Construct a SWM Facility to Manage Runoff from Road and Future Development | 12 |
| 8.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron | 13 |
| 9. SUMMARY | 13 |

LIST OF TABLES

TABLE 1: DESIGN RAINFALL EVENTS (GENERATED FROM IDF DATA FOR GODERICH)
TABLE 2: PRE-DEVELOPMENT CONDITIONS CATCHMENT
TABLE 3: POST-DEVELOPMENT CONDITIONS CATCHMENTS
TABLE 4: SUMMARY OF UNCONTROLLED PEAK FLOW RATE RESULTS
TABLE 5: ENHANCED GRASS SWALE DESIGN IN COMPARISON TO REQUIREMENTS
TABLE 6: MIN. STORAGE VOLUME AND CORRESPONDING MIN. FOOTPRINT AREA BY SWM FACILITY TYPE
TABLE 7: SUMMARY OF CONCEPTUAL CONSTRUCTION COSTS FOR EACH ALTERNATIVE SOLUTION

LIST OF FIGURES

FIGURE 1: SITE LOCATION MAP
FIGURE 2: PRE-DEVELOPMENT DRAINAGE AREAS
FIGURE 3: POST-DEVELOPMENT DRAINAGE AREAS

APPENDICES

APPENDIX A: MIDUSS MODELLING – PRE-DEVELOPMENT CONDITIONS
APPENDIX B: MIDUSS MODELLING – POST-DEVELOPMENT CONDITIONS
APPENDIX C: MIDUSS MODELLING – ENHANCED GRASS SWALES
APPENDIX D: MIN. WQT VOLUME AND FOOTPRINT AREA CALCULATIONS
APPENDIX E: PCSWMM FOR STORMCEPTOR SIZING TOOL

REVISED CONCEPTUAL STORMWATER MANAGEMENT DESIGN BRIEF

BRUCE COUNTY ROAD 33 RE-ALIGNMENT

SEPTEMBER 2019

GMBP FILE: 217127

1. INTRODUCTION AND BACKGROUND

The County of Bruce (County), as the operating authority for Bruce Road 25 and Bruce Road 33 (BR25 & BR33), proposes to reconstruct the existing BR25 roadway between Saugeen Beach Road and Goderich Street (Provincial Highway 21), as well as to construct a new roadway to re-align BR33 to intersect BR25 at the same location as the Town of Saugeen Shores' (Town) planned alignment of Bruce Street from the north, as shown on Figure 1.

The proposed reconstruction of BR25 and re-alignment of BR33 are supported by the recommendations of the Master Plan for Roads and Drainage (Master Plan: May 2017). The Master Plan identifies that the residential lands in the Baker Road area to the west of the existing BR33 (Lake Range Road), herein referred to as the Baker Subdivision, occasionally suffer from seasonal flooding issues, and currently lack a storm sewer system. As a result, drainage conditions within the Baker Subdivision should not be worsened by runoff associated with development within upstream lands and be improved, if possible.

A Conceptual Stormwater Management (SWM) Design Brief (April 2018) was completed to address, in general terms, the drainage interests associated with the increase in impervious surface area related to the proposed BR33 re-alignment, which would drain through the Baker Subdivision to Lake Huron. The previous SWM Design Brief considered a SWM pond only ancillary to the re-aligned BR33. The proposed SWM pond was conceptually designed to attenuate upstream post-development peak flow rates to less than, or equal to, pre-development conditions prior to draining to the Baker Subdivision; assuming that future development would be responsible to manage its own stormwater, beyond the existing condition. Water quality treatment (WQT) to an enhanced level (80% TSS removal), would be provided to runoff primarily by roadside ditches designed generally to the requirements of Enhanced Grassed (EG) swales. In addition, since the previous SWM Design Brief, the area of upstream lands expected to drain to the proposed BR33 re-alignment under post-development conditions has increased slightly as a result of more detailed roadway design considerations.

The previous Conceptual SWM Design Brief was prepared to support the Schedule 'B' Municipal Class Environmental Assessment (EA) process associated with the proposed BR33 re-alignment project. Since then, the Ministry of the Environment, Conservation and Parks (MECP) has indicated that a review of additional alternatives to the proposed SWM facility is necessary prior to a *Notice of Completion* being valid.

This Revised Conceptual SWM Design Brief identifies, conceptually, several alternative solutions for SWM in support of an Addendum to the *'Bruce County Road 33 Re-alignment – Project File'* that is being prepared to satisfy the requirements of the Environmental Assessment process.

2. EXISTING CONDITIONS (PRE-DEVELOPMENT)

In general, lands to the south of BR25, west of the Gore Drain Trail and east of the Baker Subdivision area, drain downward from east to west. The lands associated with the BR33 re-alignment, and draining to the Baker Subdivision, are zoned as 'Planned Development' and 'Agricultural'. Current land use is for agricultural purposes.

Runoff from lands east of the Baker Subdivision currently drains across Lake Range Road at two locations; via a 750mm Ø culvert approximately 155m to the south of BR25, and via a 750mm Ø culvert approximately 50m to the south of Baker Road, where shown on Figure 2. Runoff draining to the northerly culvert is conveyed through the area to the north of the Baker Subdivision towards BR25 and is not considered to contribute to the identified drainage issues within the Baker Subdivision. Runoff draining to the southerly culvert drains in an open watercourse across private properties to a system of roadside ditches within the Baker Subdivision and is ultimately conveyed to Lake Huron. Under pre-development conditions, approximately 48.45 ha of upstream land is expected to drain to the Baker Subdivision.

3. EVALUATION OF POST-DEVELOPMENT CONDITIONS

3.1 Post-Development Drainage

The re-aligned BR33 section is proposed to be constructed from Lake Range Road at a location approximately 190m to the south of the existing intersection with Baker Road, to BR25 at a location approximately 535m to the east of its existing intersection with BR25. The new, proposed BR25/BR33 intersection is in line with a future extension of Bruce Street, planned by the Town of Saugeen Shores.

The approximately 990m re-aligned BR33 section is generally proposed to be constructed with a two-lane rural cross-section, transitioning to a two-lane plus a left-turn lane urban cross-section at its intersection with BR25, although additional planning study for that intersection is anticipated through a separate planning process.

The proposed re-aligned BR33 will intercept runoff from the lands upstream of the Baker Subdivision, as a well as a portion of the lands currently upstream of the existing northerly 750mm Ø culvert crossing Lake Range Road, which do not drain to the Baker Subdivision under pre-development conditions. The runoff intercepted from the existing northerly 750mm Ø culvert includes lands zoned as 'Residential', 'Planned Development', and 'Highway Commercial'. Currently, the developed portions of these lands generally drain to BR25 with only several accessory buildings draining westerly towards the location of the proposed re-aligned BR33; the existing accessory buildings are considered to have negligible imperviousness within the overall area. Therefore, under post-development conditions, approximately 56.52ha of upstream land is expected to drain to the Baker Subdivision.

In consideration of the BR33 re-alignment, the acquisition of privately owned land is planned to permit, at minimum, a 30m-wide right-of-way along the proposed re-alignment of BR33. In addition, the remnant portion of Lot 28 located to the east of Lake Range Road and west of the re-aligned BR33 is planned to be acquired for the proposed construction of ancillary roadworks, where shown on Figure 1.

The section of Lake Range Road, immediately south of Baker Road, is proposed to be reconstructed as a cul-de-sac to maintain access to private properties, although the design phase may alter the final configuration. An approximately 90m long road with a two-lane rural cross-section is proposed to be constructed between the Lake Range Road / Baker Road intersection and the proposed re-aligned BR33 to maintain access. All proposed roadworks may include the construction of roadside ditches to convey the runoff from the roadways and their upstream lands.

3.2 Stormwater Management Design Criteria

Based on pre-development drainage conditions, and correspondence with the SVCA, Town and County, the SWM criteria used to develop the alternative solutions considered for the proposed project are as follows:

1. Post-development peak flow rates discharging from the proposed BR33 re-alignment and upstream lands to the Baker Subdivision are to be attenuated to less than, or equal to, pre-development conditions.
2. Stormwater management associated with future development, within the lands zoned as 'Planned Development', may be considered in either the current or future developed state.
3. Enhanced WQT (80% total suspended solids [TSS] removal) is to be provided for runoff draining from the proposed development and its upstream lands prior to draining to the Baker Subdivision.

4. ALTERNATIVE SOLUTIONS: STORMWATER MANAGEMENT

The following four (4) alternative solutions are considered to address the previously defined SWM Design Criteria:

1. Do Nothing
2. Construct a SWM facility to manage runoff related only to the BR33 re-alignment
3. Construct a SWM facility to manage runoff from BR33 re-alignment and future development
4. Construct a new storm sewer system through the Baker Subdivision to Lake Huron

4.1 Alternative 1: Do Nothing

The 'Do Nothing' alternative represents the construction of the proposed roadworks with no SWM controls provided for the attenuation or WQT of runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision. This alternative does not address the increase in peak flows, the existing drainage deficiencies identified within the Baker Subdivision, or the additional potential impacts to water quality. It is considered as a base-line against which to compare other alternative solutions.

4.2 Alternative 2: Construct a SWM Facility to Manage Runoff Related only to BR33 Re-Alignment

Alternative 2 considers the construction of a SWM facility to provide attenuation of post-development peak flow rates to less than, or equal to, pre-development peak flow rates for runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision. Future development within lands upstream of the Baker Subdivision are considered, by this alternative solution, to be responsible for managing their own stormwater beyond the pre-development condition. WQT is expected to be provided via a "treatment train" approach consisting of roadside ditches, generally designed to the requirements of an enhanced grass swale and a dry pond-type facility.

4.3 Alternative 3: Construct a SWM Facility to Manage Runoff from BR33 & Future Development

Alternative 3 considers the construction of a "centralized" SWM facility to provide the attenuation of post-development peak flow rates to less than, or equal to, pre-development peak flow rates for runoff draining from the re-aligned BR33 and lands upstream prior to draining to the Baker Subdivision. Future development within lands upstream of the Baker Subdivision is considered, by this alternative solution, to drain uncontrolled to a central, or common, SWM facility. The SWM facility considered for Alternative 3 is envisioned as a dry pond-type with an infiltration feature to address both peak flow attenuation and WQT requirements. WQT for the catchment areas (i.e. the 56.52 ha area) is considered to be provided by a single SWM facility.

4.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron

Alternative 4 considers the construction of a storm sewer system through the Baker Subdivision to convey all post-development runoff from upstream lands to a new outlet at Lake Huron. In order not to worsen the identified drainage issues within the Baker Subdivision, the storm sewer system would be designed to provide sufficient capacity to convey the upstream runoff associated with a 100-year design storm event. The design of Alternative 4 could consider two options:

- Option A: Future development would be responsible to manage its own stormwater, beyond the pre-development conditions.
- Option B: Future development would be permitted to drain uncontrolled to the proposed storm sewer system.

It is expected that WQT would be provided for runoff conveyed by the storm sewer system by an Oil-Grit Separator (OGS) unit prior to discharging to Lake Huron.

5. QUANTITY CONTROL CRITERIA PARAMETERS AND MODELLING

5.1 Design Rainfall Events

Rainfall data, collected by Environment Canada for the Goderich area between 1970 and 2007, were used to prepare intensity duration frequency (IDF) statistical rainfall data. The data was entered in the MIDUSS computer modeling software to generate coefficients for the Chicago type rainfall distribution patterns. The Chicago storm input parameters used to model the various design rainfall events for the subject property are summarized in the following Table 1.

Table 1 – Design Rainfall Events (Generated from Environment Canada IDF Data for Goderich)

| COEFFICIENT | 2-Year | 5-Year | 10-Year | 25-Year | 50-Year | 100-Year |
|-------------------|---------|---------|---------|---------|---------|----------|
| A | 1264.60 | 2258.60 | 3043.26 | 4026.22 | 4882.60 | 5607.28 |
| B | 10.288 | 14.090 | 16.180 | 17.817 | 19.202 | 19.798 |
| C | 0.8891 | 0.9265 | 0.9456 | 0.9604 | 0.9719 | 0.9772 |
| R | 0.375 | 0.375 | 0.375 | 0.375 | 0.375 | 0.375 |
| Duration (min) | 360 | 360 | 360 | 360 | 360 | 360 |
| Depth (mm) | 39.5 | 56.0 | 67.0 | 80.9 | 91.3 | 101.4 |
| Intensity (mm/hr) | 85.7 | 116.7 | 136.8 | 162.7 | 181.2 | 200.5 |

5.2 Site Soil Conditions

The soil types within the lands upstream of the Baker Subdivision are generally characterized as Berrien sandy loam and Brady sandy loam, as per the Bruce County Soils Map (Ontario Soil Survey Report No. 16) published by the Department of Agriculture. Berrien sandy loam and Brady sandy loam are known to be of the Hydrological Soil Group AB.

With consideration of the pre-development and post-development pervious ground cover of the proposed roadworks and lands upstream of the Baker Subdivision, which could be defined as “crop and other improved

land”, a Group AB soil is represented with an SCS Curve Number of 70 as per the Ministry of Transportation (MTO) Drainage Manual’s Design Chart 1.09.

The impervious areas within all catchments are associated with an SCS Curve Number of 98.

5.3 Pre-Development Catchment Areas

For pre-development conditions analysis purposes, the approximately 48.45ha area associated with the proposed roadworks and lands upstream of the Baker Subdivision, are modelled as one (1) drainage catchment, described in Table 2 below, and as shown on Figure 2. The pre-development conditions MIDUSS computer modelling is attached in Appendix ‘A’.

Table 2 – Pre-Development Conditions Catchment

| Catchment | Description | Area (ha) | Impervious Level (%) |
|-----------|---|-----------|----------------------|
| 10 | Lands Draining to the Baker Subdivision | 48.45 | 0 |

The results of the pre-development conditions routing analysis are summarized in Section 5.5.

5.4 Post-Development Catchment Areas

For post-development conditions analysis purposes, the approximately 56.52ha area associated with the proposed roadworks and the land upstream of the Baker Subdivision is modelled as two (2) drainage catchments, described in Table 3, and as shown on Figure 3.

Catchment 100 includes about 8.07 hectares within Lot 30 east of the BR33 re-alignment. This area is included conservatively within the SWM facility calculations to ensure no net increase in outflow from the planned SWM facility. At the design development phase, consideration should be given to overland flow routes to address the ‘greater than 100-year’ runoff condition as recommended by the SVCA.

The imperviousness associated with the post-development drainage catchments is considered to be one of the following two conditions, depending on the alternative solution:

Scenario A:

Future development will be responsible for managing its own stormwater, to pre-development flow conditions. The imperviousness of the catchment lands is based solely on the impervious area of the proposed BR33 re-alignment; negligible imperviousness is considered to currently exist within the upstream lands. (*Applies to Alternatives 1, 2 and 4 Opt. A*)

Scenario B:

Future development will drain uncontrolled to the proposed BR33 re-alignment. The imperviousness is based on the current Town of Saugeen Shores Zoning By-Law 75-2006. The approximately 28.60ha portion of catchment lands zoned as ‘Planned Development’ and ‘Residential’ are associated with an imperviousness described as a Rational Method runoff coefficient of 0.50. A runoff coefficient of 0.50 is considered appropriate for most residential uses (single family, semi-detached, townhouse and institutional) as per Table 5-1 of the Design Guidelines for Sewage Works (DGSW) published by the MECP. The approximately 0.14 ha portion of catchments lands zoned as ‘Highway Commercial’ are associated with an imperviousness described as a

Rational Method runoff coefficient of 0.80; an acceptable value as per Table 5-1 of the DSGW. Considering that, from the same Table, impervious surfaces and grassed areas can be associated with a runoff coefficient of 0.90 and 0.25, respectively, runoff coefficients of 0.50 and 0.80 correspond to imperviousness values of approximately 40% and 85%, respectively. The approximately 27.78ha portion of the catchment lands zoned as 'Agricultural' is considered to be completely pervious. (*Applies to Alternatives 3 and 4 Opt. B*).

The post-development conditions MIDUSS computer modelling is attached in Appendix 'B'.

Table 3 – Post-Development Conditions Catchments

| Catchment | Description | Area (ha) | Impervious Level (%) | |
|-----------|---|-----------|----------------------|------------|
| | | | Scenario A | Scenario B |
| 100 | Lands easterly of the re-aligned BR33 draining to the Baker Subdivision: ±27.78ha zoned as 'Agricultural'; ±0.14ha zoned as 'Highway Commercial'; ±22.63ha zoned as 'Highway Commercial' | 50.55 | 2 | 19 |
| 200 | Lands westerly of the re-aligned BR33 draining to the Baker Subdivision. (Entirely zoned as 'Planned Development') | 5.97 | 13 | 40 |

The results of the post-development conditions routing analysis are summarized in Section 5.5.

5.5 MIDUSS Quantity Control Modelling Results

MIDUSS modelling software was used to model the expected peak flow rates draining to the Baker Subdivision under pre-development conditions and the post-development conditions of each alternative solution during the various design storm events. Results from the models are summarized in the following Table 4, and the modelling is provided for reference in Appendix 'A' and Appendix 'B'.

Table 4 below provides the total peak flow rates discharging from the modelled catchments to the Baker Subdivision under pre-development conditions as well as the uncontrolled post-development peak flow rates associated with both imperviousness scenarios. The total post-development runoff volume expected to drain to the Baker Subdivision during a 100-year design storm event are also shown in Table 4.

Table 4 – Summary of Uncontrolled Peak Flow Rate Results

| Development Conditions | Return Storm Frequency (yr) | | | | | |
|---|-----------------------------|-------|-------|-------|-------|----------------------|
| | 2 | 5 | 10 | 25 | 50 | 100 |
| Pre-Development Conditions – Peak Flow Rate (m³/s) | | | | | | |
| Existing Level | 0.087 | 0.287 | 0.493 | 0.820 | 1.120 | 1.448 |
| Post-Development Conditions – Peak Flow Rate (m³/s) (Total Volume of Runoff) | | | | | | |
| Scenario A (Alt. 1, 2 & 4 Opt. A) | 0.232 | 0.451 | 0.764 | 1.261 | 1.717 | 2.218 (24,189 m³) |
| Scenario B (Alt. 3 & 4 Opt. B) | 2.053 | 3.133 | 3.916 | 5.404 | 6.787 | 8.289 (29,397 m³) |

Alternative 1 is represented by the post-development peak flow rates associated with Scenario A in Table 4, as no SWM controls are proposed as part of the alternative solution. Thus, an increase in peak flow rates is associated with Alternative 1, confirming that a “Do Nothing” approach would worsen the existing drainage issues identified within the Baker Subdivision.

From the uncontrolled post-development peak flow rates shown in Table 4, a conceptual SWM facility was designed within the MIDUSS modelling for both Alternatives 2 and 3 to estimate the active storage volume required to provide attenuation of peak flow rates to pre-development levels prior to discharging to the Baker Subdivision. For both Alternatives 2 and 3, an infiltration basin-type facility is not considered to be feasible in addressing peak flow control requirements considering that a runoff volume of approximately 24,189 m³ and 29,397 m³, respectively, would be expected to drain to the proposed SWM facility during the 100-year design storm event. From the Stormwater Management Planning and Design (SWMPD) Manual published by the MECP, the maximum storage depth within an infiltration basin-type is 0.6m to prevent the compaction of underlying soils and resulting decrease in their infiltration potential. Therefore, the minimum infiltration basin footprint area for Alternatives 2 and 3 would be expected to be approximately 40,315m² and 48,995m², respectively, to infiltrate the entirety of the post-development runoff volume. Considering that approximately 6,850m² of area is available for the construction of a SWM facility within the remnant portion of Lot 28, it is believed that alternative SWM facility types may be more appropriate given the land requirements of an infiltration basin.

From the results of the modelling, an active storage volume of approximately 8,500m³ would be necessary within the SWM facility related to Alternative 2 to attenuate post-development runoff to a pre-development peak flow rate for all design storm events up to, and including, the 100-year return period. Considering that approximately 6,850m² of area is available for the construction of a SWM facility, this active storage volume would correspond to a depth of approximately 1.24m. From the SWMPD Manual published by the MECP, a maximum active storage depth of 2m is permitted for a wet or dry pond-type facility. For Alternative 2, a dry pond-type facility is envisioned as these are typically associated with lower construction, maintenance and design costs than a wet pond-type facility and offer opportunity for infiltration considering the sandy nature of local soils.

For Alternative 3, an active storage volume of approximately 20,100m³ would be necessary within the SWM facility to attenuate post-development runoff to a pre-development peak flow rate for all design storm events up to, and including, the 100-year return period. Assuming that a maximum 2m mean active storage depth could be achieved by a dry or wet pond-type facility with favourable site conditions (the greatest maximum mean active storage depths defined for SWM facilities within the SWMPD Manual), the minimum footprint area of the facility would be approximately 10,050m², or approximately 150% greater than the area considered to be available within the remnant portion of Lot 28 for the construction of a SWM facility. Therefore, lands additional to the minimum required for the proposed roadworks would be necessary to construct the SWM facility associated with Alternative 3. To limit the level of land acquisition, a dry or wet pond-type facility would be proposed as part of Alternative 3 to achieve peak flow attenuation objectives. Land acquisition of this nature would need to be negotiated with adjacent land owners.

The 100-year, post-development peak flow rates shown in Table 4 for Scenarios A and B, represent the peak design flow to be conveyed by the envisioned storm sewer system through the Baker Subdivision as considered by Alternative 4, Options A and B, respectively. Possible additional flows from potential, future lateral sewers within the Baker Subdivision are not considered at this time by these peak flow rate values. The storm sewer system would be expected to be installed from Lake Range Road, along Baker Road, Bell Road and George Street, to a new outlet at Lake Huron. The expected length of the proposed storm sewer system would be approximately 685m and, based on the modelling of the Master Plan, the average pipe grade within the system (weighted for section length) would be expected to be approximately 0.80%. To provide sufficient capacity to convey the entirety of the upstream 100-year peak flow rates associated with Options A (2.218m³/s) and B (8.289m³/s) of Alternative 4, minimum pipe diameters of 1050mm (Q_{CAP} = 2.442m³/s) and

1800mm ($Q_{CAP} = 10.281\text{m}^3/\text{s}$) would be required, respectively (assuming a Manning's $n = 0.013$). Based on the Master Plan, the total length of storm sewer proposed through the Baker Subdivision is expected to be approximately 685m. These minimum pipe diameters would be expected to be larger once future lateral sewers, from within the Baker Subdivision, are considered.

6. STORMWATER QUALITY TREATMENT

Water quality treatment is required to be provided to an Enhanced level for runoff draining from the re-aligned BR33 and lands upstream of the Baker Subdivision prior to draining to the Baker Subdivision. For alternative solutions that consider future development to be responsible for managing its own stormwater beyond the pre-development condition, such as Alternatives 1, 2 and 4 Option A, runoff is considered to be treated to an Enhanced level prior to draining to the proposed roadworks. However, the runoff draining from these lands must still be considered in the design and sizing of downstream SWM controls intended to treat runoff from the proposed roadworks, as appropriate, since they would confluence prior to draining to the Baker Subdivision.

For alternative solutions that consider runoff from future development to drain uncontrolled to the proposed roadworks, such as Alternatives 3 and 4 Option B, water quality treatment must be provided to an Enhanced level by their proposed SWM facilities for all lands upstream of the Baker Subdivision.

The water quality control measures considered by each of the alternative solutions are outlined and evaluated within the following sub-sections.

6.1 Alternative 1: Do Nothing

As part of the "Do Nothing" approach of Alternative 1, no SWM controls are proposed to provide WQT to runoff prior to draining to the Baker Subdivision. As a result, the water quality of runoff draining to the Baker Subdivision would be expected to be adversely affected as contaminants from the proposed roadworks would be conveyed downstream without treatment.

6.2 Alternative 2: Construct a SWM Facility to Manage Road Runoff Only

WQT for Alternative 2 is considered to be addressed via a treatment train approach. Runoff would be conveyed and treated by EG Swales and further polished by the SWM facility, designed as a dry pond-type facility.

Under Alternative 2, the roadside ditches along the proposed roadworks are generally considered to meet the criteria of an EG Swale as per the Low Impact Development Stormwater Management Planning and Design (LIDSWMPD) Guide published by the Credit Valley Conservation Authority and the Toronto and Regional Conservation Authority TRCA. In general, the roadside ditches are considered with maximum side slopes of 3:1 (Horizontal : Vertical), a minimum 1.05m-wide bottom, and a longitudinal slope of about 0.5%. Table 5 below compares the characteristics of the maximum peak flow rate expected to be conveyed by the EG Swales (the peak flow rate from Catchment 100) during a 4 hour, 25mm Chicago storm event for Alternative 2 in comparison with the requirements set by the LIDSWMPD Guide; MIDUSS modelling for the results are attached as Appendix 'C'.

Table 5 – Enhanced Grass Swale Design in Comparison to Requirements

| Characteristics | During 4 hour, 25mm Chicago Storm Event | |
|--|---|-------------|
| | As Designed* | As Required |
| Maximum depth of flow through EG Swale | 0.10m | 0.10m |
| Maximum flow velocity through EG Swale | 0.48m/s | 0.50m/s |

* Conservatively considers the peak flow rate draining from Catchment 100; the relatively lesser flows through Catchment 200 are expected to yield a more desirable WQT performance.

As shown in Table 5, the design depth and velocity of flow through the EG Swale during a 4 hour, 25mm Chicago storm event meets the requirements of the LIDSWMPD Guide. According to the CVCA and TRCA's LIDSWMPD Guide, an EG Swale provides a median TSS removal rate of 76%.

The EG Swales would convey runoff to the SWM facility where it further would be polished. The SWM facility would provide temporary volume to store runoff. Infiltration of low flows within the SWM facility may also be considered in the detailed design phased. The attenuation provided by the outlet of the SWM facility reduces the velocity of flows through the SWM facility and encourages further settling out of suspended solids.

Overall, given the initial WQT provided by conveying runoff along the roadside ditches designed as EG Swales, and the further polishing provided by the SWM facility's temporary storage volume, it is expected that the runoff from the proposed roadworks will receive an Enhanced level (80% TSS removal) of WQT prior to discharging to the Baker Subdivision drainage system.

6.3 Alternative 3: Construct a SWM Facility to Manage Runoff from Road and Future Development

The peak flow rate of runoff considered by Alternative 3 to be draining to the proposed roadworks is expected to be too great to be treated first via a conveyance control such as an EG Swale. The maximum peak flow rate that would be expected to be conveyed by roadside EG Swales (the peak flow rate draining from Catchment 100) during a 4 hour, 25mm Chicago storm event for Alternative 3 is approximately 1.017m³/s; MIDUSS modelling for the results are attached as Appendix 'C'. Considering the maximum bottom width of 3m permitted by the LIDSWMPD Guide for EG Swales, and the 3:1 (H:V) side slopes and longitudinal slope of about 0.5% of the proposed roadside ditches, an approximately 0.28m of flow depth is required to convey the approximately 1.017m³/s peak flow rate. Since this depth of flow is considerably greater than the 0.10m maximum required for the design of an EG Swale, EG Swales are not considered to be a feasible SWM control for WQT under the proposed conditions of Alternative 3.

Therefore, WQT must be provided for the runoff via an "end-of-pipe" approach such as within a SWM facility, which is already considered for peak flow attenuation, prior to discharging to the Baker Subdivision. Considering the land constraints, the SWM facility type proposed by Alternative 3 would be one that can provide the required level of WQT with the smallest footprint area while also considering the active storage volume necessary to achieve peak flow attenuation requirements. The minimum footprint area of several SWM facility types were calculated based on the storage volumes requirements of the SWMPD Manual for an Enhanced level of WQT and are summarized in Table 6; supporting calculations are attached as Appendix 'D'.

Table 6 – Min. Storage Volumes and Corresponding Min. Footprint Area by SWM Facility Type

| SWM Facility Type | Req. Water Quality Treatment (WQT) Volumes (m ³) | | Req. Peak Flow Attenuation (PFA) Active Volume ** (m ³) | Governing Storage Volume Component | Corresponding Minimum SWM Facility Footprint Area (m ²) |
|-----------------------|--|-----------|---|------------------------------------|---|
| | Active | Permanent | | | |
| Infiltration * | 1,245 | | 20,100 | PFA - Active | 33,500 |
| Wetland | 2,265 | 1,360 | 20,100 | PFA - Active | 20,100 |
| Wet Pond | 2,265 | 3,845 | 20,100 | PFA - Active | 10,050 |

Notes:

Enhanced WQT storage requirements for Dry Pond-type facility not provided within SWMPD Manual.

** Considers an Infiltration Basin-type facility; sub-surface infiltration facilities are discussed below.*

*** Volume for peak flow attenuation requirements determined in Section 5.5.*

For all SWM facilities types shown in Table 6, the minimum required footprint area is governed by the storage volume required for peak flow attenuation objectives. Thus, of these SWM facility types, that which has the deepest permitted active pool depth, the wet pond-type, results in the smallest footprint area. However, given the typically sandy soils within the Port Elgin area, the provision of the required infiltration volume through a sub-surface feature of the SWM facility is possible. For the same footprint area as a wet pond-type facility, a dry pond with a sub-surface infiltration feature could be considered as they both have the same permitted active storage depth. A sub-surface infiltration feature with a wet pond-type facility is not considered to be suitable since the wet pond area would need to be lined with an impervious layer.

Furthermore, the storage volume provided by a sub-surface infiltration feature for WQT could also be considered to reduce the active storage requirements of the dry pond portion of the SWM facility and, consequently, the land area requirements of the proposed SWM facility as a whole. If the required 1,245m³ infiltration volume for WQT was provided by the sub-surface feature, the dry pond portion would be required to provide approximately 18,855m³ of active storage volume to satisfy peak flow attenuation objectives. Considering a maximum mean active storage depth of 2m, the minimum footprint area of the SWM facility would be approximately 9,430m². Considering a porosity of 0.4 for clear stone, the sub-surface feature would be proposed to have a volume of approximately 3,115m³ to provide approximately 1,245m³ of storage volume within the voids of the clear stone. For the reduced footprint area of the proposed SWM facility, this clear stone volume would correspond to an approximately 0.33m-deep layer which is generally considered to be achievable assuming favourable groundwater conditions.

Therefore, the envisioned SWM facility proposed by Alternative 3 is a dry pond with a sub-surface infiltration feature for WQT since it has the smallest land acquisition requirements.

6.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron

WQT for Alternative 4 is considered to be addressed via an OGS unit installed in-line with the storm sewer system proposed to be constructed through the Baker Subdivision. Installed either at the inlet or outlet section of the storm sewer system, the OGS unit would provide an Enhanced level of WQT to runoff draining from the proposed roadworks and lands upstream of the Baker Subdivision prior to discharging to Lake Huron. If future lateral storm sewers were planned to drain Baker Subdivision lands to the proposed storm sewer system, the size of the OGS unit considered by Alternative 4 may need to be increased to accommodate the additional runoff or installed at the inlet of the storm sewer system with additional SWM controls considered for runoff received by the storm sewer system from downstream lands.

The PCSWMM for Stormceptor tool provided by Imbrium Solutions Inc. for the sizing of Stormceptor STC OGS units was used to determine the appropriate size of OGS unit considered by Alternative 4 as the STC line of units typically provides a broader range of options for relatively larger tributary areas such as the subject one. Given the limitations of available OGS unit sizing tools, both Options A and B of Alternative 4 are represented by the same design parameters with an approximately 56.52ha tributary area having a “developed” imperviousness of approximately 22%. The scenario of development lands managing their own stormwater beyond the existing condition cannot be properly represented within the simulation of the sizing tool. Considering the aforementioned tributary area characteristics, the sizing tool was used to determine an appropriate unit to provide an Enhanced level of WQT to 90% of the annual runoff volume for a fine particle distribution. The results of the sizing tool calculations are included as Appendix ‘E’.

From the results of the sizing tool, it is determined that no pre-designed Stormceptor STC unit is readily available to satisfy the proposed project’s WQT requirements. A Stormceptor MAX unit, which involves custom, detailed design by the manufacturer on a site-specific basis, would have to be considered and it is not known whether a Stormceptor MAX unit could be designed to achieve the WQT requirements.

Therefore, Alternative 4 is not expected to provide sufficient water quality treatment to runoff draining to the Baker Subdivision from upstream lands including the proposed roadworks. Multiple water quality treatment provisions would be required to address the design criteria.

7. CONCEPTUAL CONSTRUCTION COSTS OF ALTERNATIVE SOLUTIONS

To facilitate a more comprehensive comparison of the alternative solutions, construction costs estimates for each alternative have been estimated at a conceptual level. The conceptual construction costs consider only the SWM features associated with each alternative solution and do not include the construction costs associated with the proposed roadworks which are considered to be generally constant among the alternative solutions. Similarly, the costs do not consider those associated with land acquisition required by the proposed roadworks, which is considered to include the remnant portion of Lot 28. Alternately, a note is made of any alternative solution that would require lands additional to those required for the proposed roadworks.

Conceptual construction costing of the alternative solutions is based on the following components:

- **Storage Volume of the SWM Facility:** Considered to be earth excavation including removal from site.
- **Volume of Clear Stone:** Supplied and installed.
- **Storm Sewer:** This excludes costs associated with the outlet systems of the SWM facilities as they are expected to be relatively minor and generally similar between the alternative solutions considered.
- **Manholes / Headwall:** Assumes one (1) headwall structure and several 3600mmØ pipes; supplied and installed.
- **OGS Unit:** Supplied and installed.
- **Road Restoration:** Any restoration of roadways associated with the installation of SWM components.

The conceptual costing of the alternative solutions is summarized in the following Table 7 below.

Table 7 – Summary of Conceptual Construction Costs of Each Alternative Solution

| Alternative | Description of Alternative Solution | Conceptual Cost of SWM Components | Req. Additional Land Acquisition |
|-------------|--|-----------------------------------|----------------------------------|
| 1 | Do Nothing | \$0 | No |
| 2 | Construct a SWM Facility to Manage Road Runoff Only | \$200,000 to \$250,000 | No |
| 3 | Construct a SWM Facility to Manage Runoff from Road and Future Development | \$600,000 to \$800,000 | Yes |
| 4: Opt. A | Construct a New Storm Sewer System through the Baker Subdivision to Lake Huron | \$4.5M to \$5.0M | No |
| 4: Opt. B | | \$5.0M to \$5.5M | No |

As shown in Table 7, omitting Alternative 1 – Do Nothing, which is not expected to address the identified drainage issues within Baker Subdivision, the least costly alternative solution is Alternative 2. In addition, the final construction cost associated with Alternative 3 is expected to be greater than shown in Table 7 due to the required land acquisition as a result of the relatively larger footprint area associated with its proposed SWM facility.

8. DISCUSSION AND COMPARISON OF SWM ALTERNATIVE SOLUTIONS

In evaluating the alternative solutions, the impact to social, cultural, natural, technical and economic environments should be considered. While mention may be made to other “environments”, this technical document focuses on the technical and related economic (in terms of construction cost) environments.

8.1 Alternative 1: Do Nothing

Alternative 1, which proposes a ‘Do Nothing’ approach, is the most economical approach but is technically inadequate since it does not address the identified drainage issues within Baker Subdivision. Therefore, Alternative 1 is not considered appropriate.

8.2 Alternative 2: Construct a SWM Facility to Manage Road Runoff Only

Alternative 2 satisfies the SWM Design Criteria defined within Section 3.2 in terms of both water quality and quantity requirements. Alternative 2 is associated with the lowest conceptual construction cost. In addition, the land requirements of Alternative 2 coincide with that of the proposed roadworks and additional land acquisition would not be required.

8.3 Alternative 3: Construct a SWM Facility to Manage Runoff from Road and Future Development

Alternative 3 also satisfies the SWM Design Criteria defined within Section 3.2 in terms of both water quality and quantity requirements. The increase in conceptual construction costs from Alternative 2 to Alternative 3 could be justified on the basis that the proposed “centralized” SWM facility may encourage development within lands upstream of the Baker Subdivision and/or a cost sharing program could be implemented to recoup the construction costs from future developers. However, development interest within the upstream lands is

impeded by the absence of municipal sanitary and water servicing infrastructure within the lands upstream of the Baker Subdivision. This may result in a long period of time before the economic objective of a cost sharing program is fully realized.

In addition, the relatively large footprint area of the SWM facility proposed by Alternative 3 would require additional land acquisition greater than the minimum necessary to permit the construction of the proposed roadworks. Additional costs would be incurred as a result of the purchase of these lands.

8.4 Alternative 4: Construct a New Storm Sewer System through Baker Subdivision to Lake Huron

Alternative 4 does not conclusively satisfy the SWM Design Criteria defined within Section 3.2 in terms of water quality. It is not expected that a single OGS unit of sufficient size to provide WQT to an enhanced level is commercially available and, if it were, the costs associated with such a unit, or multiple units, are expected to be considerable. Although Alternative 4 is expected to mitigate the identified drainage issues within Baker Subdivision by conveying upstream runoff through it as piped flow, the discharge location to Lake Huron would require additional studies to assess the impact and possible mitigations for the outlet. In relation to the other alternative solutions considered, the conceptual construction costs associated with both Options A and B of Alternative 4 are significant.

To their benefit, the opportunity exists for the Town to construct planned storm and sanitary sewers within the Baker Subdivision concurrently with the Alternative 4 storm sewer system. Assuming that the Town would choose to exploit this opportunity, significant delays to the project would be anticipated as the Town does not currently have approvals or the funding for such an undertaking. Based on the review of the technical and economic considerations, Alternative 4, including both Option A and Option B, is considered to be not as favourable in comparison to Alternative 2.

Therefore, from the comparative discussion above, Alternative 2 is concluded to be the recommended alternative solution from a construction cost and technical environment perspective.

9. SUMMARY

This Revised Conceptual SWM Design Brief was been prepared to identify, conceptually design, and assess possible SWM alternative solutions in support of an Addendum to the *'Bruce County Road 33 Re-alignment – Project File'* that is being prepared to satisfy the planning requirements of the MECP. The following SWM design alternatives were considered:

1. Do Nothing
2. Construct a SWM facility to manage runoff related only to the BR33 re-alignment
3. Construct a SWM facility to manage runoff from BR33 re-alignment and future development
4. Construct a new storm sewer system through the Baker Subdivision to Lake Huron

From the conceptual-level evaluation and comparison of primarily technical and economic impacts, Alternative 2, to construct a stormwater management facility to manage runoff related to the BR33 re-alignment is concluded to be the Recommended Alternative Solution for stormwater management. Alternative 2 proposes the following SWM elements:

- Future development within lands upstream of the Baker Subdivision will be responsible for managing its own stormwater, beyond a pre-development condition.

- Construction of roadside ditches generally designed to the requirements of an enhanced grass swale to convey and treat runoff prior to discharging to a proposed SWM facility.
- The proposed construction of a dry pond-type SWM facility to further polish runoff and attenuate peak flow rates to less than, or equal to, pre-development conditions prior to discharging to the Baker Subdivision.

Additional design details of Alternative 2 would be prepared, as necessary, during the project design phase.

All of which is respectfully submitted,

GM BLUEPLAN ENGINEERING LIMITED

Per:

Alex Wilkinson
for
Alex Wilkinson, E.I.T.

Reviewed by:

John Slocombe
John Slocombe, P.Eng.

FIGURES:

217127
Bruce County Road 33
Town of Saugeen Shores

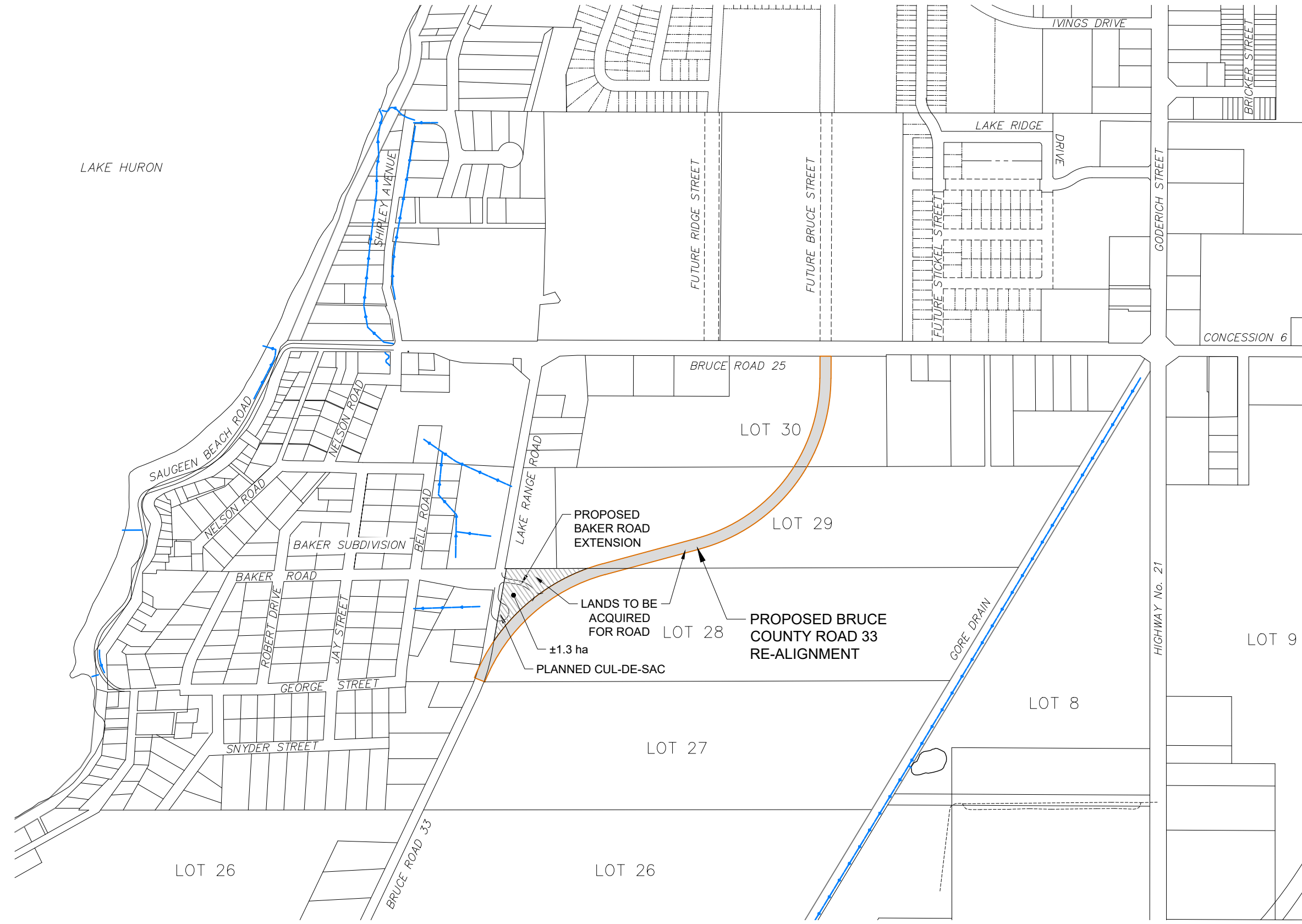
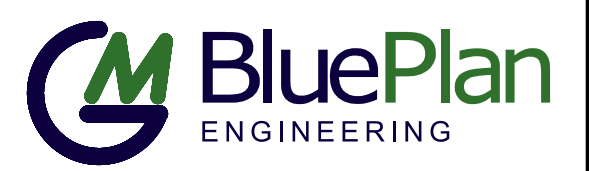


SCALE 1:7,500
SEPTEMBER 2019

SITE LOCATION PLAN

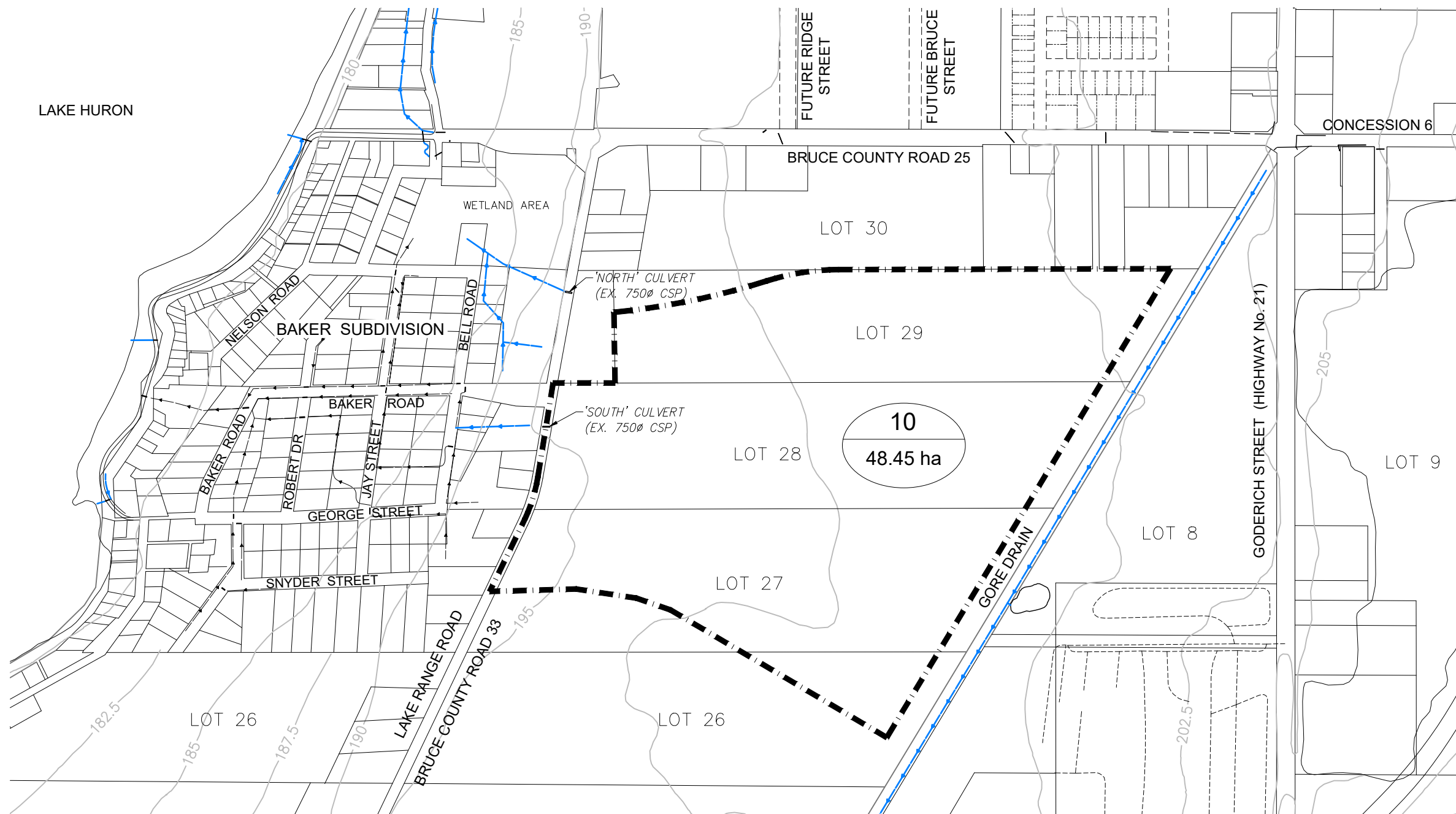
BRUCE COUNTY ROAD 33 RE-ALIGNMENT

Figure No. 1

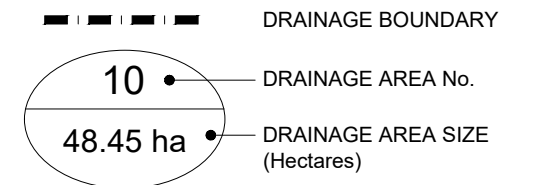


FILE C:\Civil 3D Projects\217127 Drainage Figures-K.dwg LAYOUT: Site Location
LAST SAVED BY: Kboers, 9/30/2019 2:34:00 PM PLOTTED BY: Ken Boers - GM BluePlan 9/30/2019 2:59:56 PM

217127
Bruce County Road 33
Town of Saugeen Shores



LEGEND



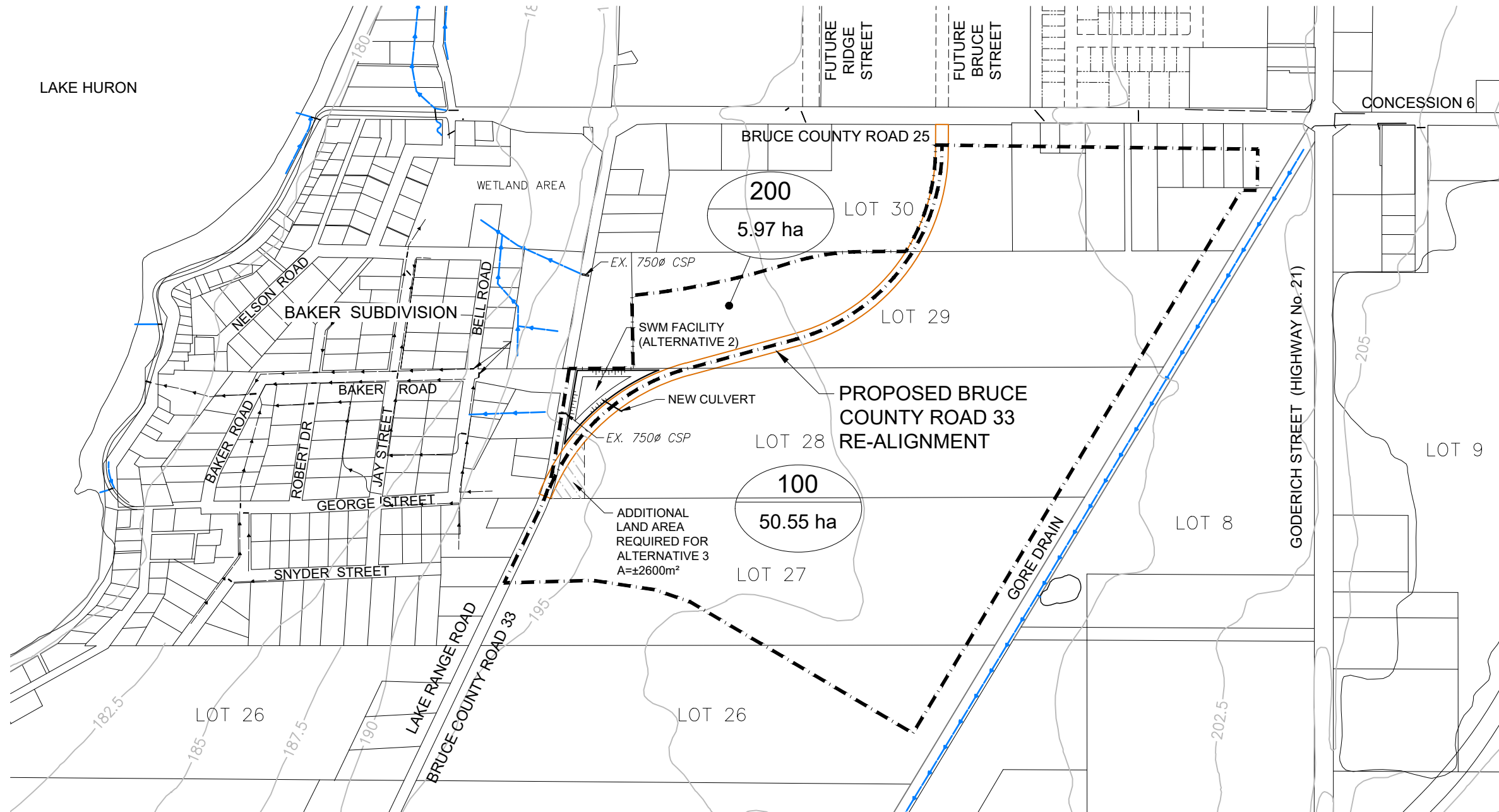
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SEPTEMBER 2019

PRE-DEVELOPMENT
DRAINAGE AREAS

BRUCE COUNTY
ROAD 33 RE-ALIGNMENT

Figure No. 2

217127
Bruce County Road 33
Town of Saugeen Shores



LEGEND

- DRAINAGE BOUNDARY
- 100 DRAINAGE AREA No.
- 50.55 ha DRAINAGE AREA SIZE (Hectares)

SCALE 1:7,500
SEPTEMBER 2019

POST-DEVELOPMENT
DRAINAGE AREAS

BRUCE COUNTY
ROAD 33 RE-ALIGNMENT

Figure No. 3

APPENDIX A:
MIDUSS MODELLING – PRE-DEVELOPMENT CONDITIONS


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217127 - Pre 2 yr - Aug19
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MIDUSS Output
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Output filename: 217127 - Pre 2 yr - Aug19.out
Licensee name: gmbp
Company: Hewlett-Packard Company
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TIME PARAMETERS
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360.000 Max. Storm Length
2400.000 Max. Hydrograph
1 STORM Chicago storm
1264.600 Coefficient A
10.288 Constant B
0.889 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 85.761 mm/hr
Total depth 39.507 mm
6 002hyd Hydrograph extension used in this file"
CATCHMENT 10
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands Draining to the Baker Subdivision
0.000 % Impervious
48.450 Total Area
850.000 Flow length
0.500 Overland Slope
48.450 pervious Area
850.000 pervious length
0.500 pervious slope
0.000 Impervious Area
850.000 Impervious length
0.500 Impervious slope
0.250 Impervious Manning "n"
70.000 Pervious SCS Curve No.
0.151 Pervious Runoff coefficient
0.100 Pervious Ia/s coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/s coefficient
0.518 Impervious Initial abstraction
0.087 0.000 0.000 0.000 c.m/sec"
Catchment 10 Pervious Total Area
Surface Area 48.450 0.000 48.450 hectare"
Time of concentration 378.226 27.426 378.234 minutes"
Time to Centroid 646.132 203.881 646.149 minutes"
Rainfall depth 39.507 39.507 mm
Rainfall volume 1.9141 0.0000 1.9141 ha-m"
Rainfall losses 33.549 5.184 33.548 mm"
Runoff depth 5.958 34.323 5.958 mm"
Runoff volume 2886.83 0.02 2886.85 c.m"
Runoff coefficient 0.151 0.000 0.151 c.m/sec"
Maximum flow 0.087 0.000 0.087 c.m/sec"
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HYDROGRAPH " Combine 1"
6 Combine "
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0.087 c.m/sec"

```

```

217127 - Pre 2 yr - Aug19
-----
Hydrograph volume 0.087 2886.848 0.087 c.m"
START/RE-START TOTALS 10"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare"
Total Impervious area 0.000 hectare"
Total % impervious 0.000
EXIT"

```



```

217127 - Pre 5 yr - Aug19
MIDUSS output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\MIDUSS\217127
Output filename: 217127 - Pre 5 yr - Aug19.out
Licensee name: gmbp
Company: Hewlett-Packard Company
Date & Time last used: 8/5/2019 at 6:59:31 PM

TIME PARAMETERS
31 10.000 Time Step 116.710 mm/hr
360.000 Max. Storm length 55.992 mm
2400.000 Max. Hydrograph

32 STORM Chicago storm
1 Chicago storm
2258.600 Coefficient A
14.090 Constant B
0.927 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier

Maximum intensity 116.710 mm/hr
Total depth Hydrograph extension used in this file
6 005hyd 10"
CATCHMENT 10"
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands Draining to the Baker subdivision
0.000 Total Area
48.450 Flow length
850.000 Overland Slope
0.500 Pervious Area
48.450 Pervious length
850.000 Pervious slope
0.500 Impervious Area
0.000 Impervious length
850.000 Impervious slope
0.500 Pervious Manning 'n'
0.250 Pervious SCS Curve No.
0.236 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning 'n'
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.287 0.000 0.000
0.000 C.m/sec"
Catchment 10" Pervious Impervious Total Area
Surface Area 48.450 0.000 48.450 hectare
Time of concentration 257.804 23.930 257.803 minutes
Rainfall depth 498.738 194.961 498.737 mm
Rainfall volume 55.992 55.992 55.992 m3
Rainfall losses 2.7128 0.0000 2.7128 m3
Runoff depth 42.781 5.379 42.781 mm
Runoff volume 13.211 30.613 13.211 m3
Runoff coefficient 6400.68 0.02 6400.70 c.m"
Maximum flow 0.236 0.000 0.236 c.m/sec"
HYDROGRAPH Add Runoff "
4 Add Runoff 0.287 0.000 0.000
HYDROGRAPH Copy to Outflow"
8 Copy to Outflow 0.287 0.287 0.000
HYDROGRAPH Combine 1"
6 Combine "
1 Node #
Total Runoff Draining to Baker Subdivision"
0.287 c.m/sec"
Maximum flow

```

```

217127 - Pre 5 yr - Aug19
Hydrograph volume 0.287 6400.704 0.287 c.m"
START/REF START TOTALS 10"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare
Total Impervious area 0.000 hectare
Total % Impervious 0.000
EXIT"

```


217127 - Pre 10 yr - Aug19

MIDUSS Output
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\MIDUSS\217127
Output filename: 217127 - Pre 10 yr - Aug19.out
Licensee name: gmpb
Company: Hewlett-Packard Company
Date & Time last used: 8/5/2019 at 7:00:47 PM

TIME PARAMETERS

31 10.000 Time Step
360.000 Max. Storm Length
2400.000 Max. Hydrograph
32 1 CHICAGO STORM
3043.260 Coefficient A
16.180 Constant B
0.946 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier

Maximum intensity 136.818 mm/hr
Total depth 67.019 mm
6 Q10hyd Hydrograph extension used in this file

CATCHMENT 10

33 1 Triangular SCS
1 Equal length
1 SCS method
10 Lands draining to the Baker subdivision
0.000 % Impervious
48.450 Total Area
850.000 Flow length
0.500 Overland Slope
48.450 Pervious Area
850.000 Pervious length
0.500 Pervious slope
0.000 Impervious Area
850.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.285 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction

0.493 0.000 0.000 0.000 c.m/sec
CATCHMENT 10 Pervious Total Area
Surface Area 48.450 0.000 48.450 hectare
Time of concentration 216.691 22.353 216.690 minutes
Time to Centroid 448.709 191.014 448.708 minutes
Rainfall depth 67.019 67.019 67.019 mm
Rainfall volume 3.247 0.000 3.247 ha-m
Rainfall losses 47.921 5.401 47.921 mm
Runoff depth 19.092 61.617 19.092 mm
Runoff volume 9232.29 0.03 9232.32 c.m
Runoff coefficient 0.285 0.000 0.285 c.m/sec
Maximum flow 0.493 0.000 0.493 c.m/sec
4 HYDROGRAPH Add Runoff " Add Runoff " 0.493 0.000 0.000

HYDROGRAPH Copy to Outflow

8 Copy to Outflow 0.493 0.493 0.000

HYDROGRAPH Combine 1

6 Combine " Node #"

1 Total Runoff Draining to Baker Subdivision

Maximum flow 0.493 c.m/sec

217127 - Pre 10 yr - Aug19
Hydrograph volume 9232.323 c.m
0.493 0.493
3 START/RE-START TOTALS 10"
Runoff Totals on EXIT
Total Catchment area 48.450 hectare
Total Impervious area 0.000 hectare
Total % impervious 0.000
EXIT

217127 - Pre 25 yr - Aug19

MIDUSS Output
MIDUSS version
MIDUSS created
Job folder:
Output filename:
Licensee name:
Company
Date & Time last used:
TIME PARAMETERS
Time Step
Max. Storm length
Max. Hydrograph
STORM Chicago storm
Chicago storm
Coefficient A
Constant B
Exponent C
Fraction R
Duration
Time step multiplier
Maximum intensity
Total depth
6 025hyd Hydrograph extension used in this file
CATCHMENT 10
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands Draining to the Baker Subdivision
0.000 % Impervious
48.450 Total Area
850.000 Flow length
0.500 Overland Slope
48.450 Pervious Area
850.000 Pervious length
0.500 Pervious slope
0.000 Impervious Area
850.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.339 Pervious Runoff coefficient
0.100 Pervious Ia/s coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/s coefficient
0.518 Impervious Initial abstraction
0.820 Pervious
0.000 Impervious
0.000 c.m/sec
Catchment 10 Pervious Total Area
Surface Area 48.450 0.000 48.450
Time of concentration 183.705 20.779 183.704
Time to Centroid 406.582 187.462 406.582
Rainfall depth 80.877 80.877 80.877
Rainfall volume 3.9165 0.0000 3.9165
Rainfall losses 53.490 53.490 53.490
Runoff depth 27.388 0.0000 27.388
Runoff volume 1.3269 0.0000 1.3269
Runoff coefficient 0.339 0.000 0.339
Maximum flow 0.820 0.000 0.820
4 Add Runoff " HYDROGRAPH Add Runoff " 0.820 0.000 0.000
HYDROGRAPH Copy to Outflow" 0.820 0.000 0.000
8 Copy to Outflow" 0.820 0.820 0.000
HYDROGRAPH " Combine 1" 0.820 0.000 0.000
6 Combine " 1" 0.820 0.000 0.000
1 Node #
Total Runoff Draining to Baker Subdivision" 0.820 c.m/sec
Maximum flow

10

31

32

33

40

40

40

217127 - Pre 25 yr - Aug19
Hydrograph volume 0.820 0.820 0.820
START/RE-START TOTALS 10"
3 Runoff Totals on EXIT"
Total Catchment area
Total Impervious area
Total % Impervious
EXIT"
48.450
0.000
0.000"

38

19


```

217127 - Pre 50 yr - Aug19
-----
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: \\os-2k8\users_private\awilkinson\Documents\
Job folder: MIDUSS\217127
Output filename: 217127 - Pre 50 yr - Aug19.out
Licensee name: gmbp
Company Hewlett-Packard Company
Date & Time last used: 8/5/2019 at 7:04:28 PM

TIME PARAMETERS
Time Step 10.000
Max. Storm length 360.000
Max. Hydrograph 2400.000
STORM Chicago storm
1 Chicago storm
Coefficient A 4882.600
Constant B 19.202
Exponent C 0.972
Fraction R 0.375
Duration 360.000
Time step multiplier 1.000
Maximum intensity 181.326 mm/hr
Total depth 31.285 mm
6 050hyd Hydrograph extension used in this file"
CATCHMENT 10
1 Triangular SCS
1 Equal length
1 SCS method
10 Lands Draining to the Baker Subdivision
0.000 % Impervious
48.450 Total Area
850.000 Flow length
0.500 Overland Slope
48.450 Pervious Area
850.000 Pervious length
0.500 Pervious slope
0.000 Impervious Area
850.000 Impervious length
0.500 Impervious slope
0.350 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.374 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning 'n'
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
1.120 0.000 0.000
Catchment 10 Pervious Impervious Total Area
Surface Area 48.450 0.000 48.450 hectare"
Time of Concentration 166.813 19.867 166.812 minutes"
Rainfall depth 383.546 185.293 383.546 mm"
Rainfall volume 4.4227 0.0000 4.4227 ha-m"
Rainfall losses 57.131 6.266 57.131 mm"
Runoff depth 34.133 85.019 34.133 mm"
Runoff volume 1.6347 0.0000 1.6347 ha-m"
Maximum Flow 0.374 0.000 0.374 c.m/sec"
HYDROGRAPH Add, Runoff "
4 Add Runoff " 1.120 0.000 1.120
HYDROGRAPH Copy to Outflow"
8 Copy to Outflow" 1.120 0.000 0.000"
HYDROGRAPH Combine 1"
6 Combine " 1.120 1.120 0.000"
1 Node #
1 Total Runoff Draining to Baker Subdivision"
Maximum flow 1.120 c.m/sec"

```

```

217127 - Pre 50 yr - Aug19
-----
Hydrograph volume 1.120 1.120 1.120 c.m"
START/RE-START TOTALS 10"
3 Runoff Totals on EXIT"
Total Catchment area 48.450 hectare"
Total Impervious area 0.000 hectare"
Total % Impervious 0.000
EXIT"

```



```

217127 - Pre 100 yr - Aug19
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473"
MIDUSS created Sunday, February 07, 2010"
Units used: \\os-2k8\users_private\awilkinson\Documents\
Job folder: MIDUSS\217127"
Output filename: 217127 - Pre 100 yr - Aug19.out
Licensee name: gmbp
Company Hewlett-Packard Company"
Date & Time last used: 8/5/2019 at 7:05:57 PM"
TIME PARAMETERS"
31 10.000 Time Step"
360.000 Max. Storm Length"
2400.000 Max. Hydrograph"
10 1 STORM Chicago storm"
1 Chicago storm"
5607.280 Coefficient A"
19.798 Constant B"
0.977 Exponent C"
0.375 Fraction R"
360.000 Duration"
1.000 Time step multiplier"
Maximum Intensity 200.453 mm/hr"
Total depth 101.430 mm"
6 100hyd Hydrograph extension used in this file"
CATCHMENT 10"
1 Triangular SCS"
1 Equal length"
1 SCS method"
10 Lands Draining to the Baker Subdivision"
0.000 % Impervious"
48.450 Total Area"
850.000 Flow Length"
0.500 Overland Slope"
48.450 Pervious Area"
850.000 Pervious Length"
0.500 Pervious Slope"
0.000 Impervious Area"
850.000 Impervious Length"
0.300 Impervious Slope"
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.405 Pervious Runoff Coefficient"
0.100 Pervious Ia/S Coefficient"
10.886 Pervious Initial Abstraction"
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.000 Impervious Runoff Coefficient"
0.000 Impervious Ia/S Coefficient"
0.100 Impervious Initial Abstraction"
0.518 1.448 0.000 0.000 0.000 c.m/sec"
Catchment 10 Pervious Impervious Total Area "
Surface Area 48.450 0.000 48.450 hectare"
Time of concentration 153.552 19.057 153.551 minutes"
Rainfall depth 366.357 183.652 366.556 mm"
Rainfall volume 101.430 101.430 4.9143 ha-m"
Rainfall losses 60.321 6.026 60.321 mm"
Runoff depth 41.109 95.403 41.109 mm"
Runoff volume 1.9917 0.0000 1.9917 ha-m"
Runoff coefficient 0.405 0.000 0.405 c.m/sec"
Maximum Flow 1.448 0.000 1.448 c.m/sec"
HYDROGRAPH Add, Runoff"
4 Add Runoff"
1.448 1.448 0.000 0.000"
HYDROGRAPH Copy to Outflow"
8 Copy to Outflow"
1.448 1.448 0.000"
HYDROGRAPH Combine 1"
6 Combine "
1 Node #
1 Total Runoff Draining to Baker Subdivision"
Maximum Flow 1.448 c.m/sec"

```

```

217127 - Pre 100 yr - Aug19
Hydrograph volume 1.448 1.448 c.m"
19917.244 1.448"
38 START/RE-START TOTALS 10"
Runoff Totals on EXIT"
48.450 hectare"
Total Catchment area 0.000 hectare"
Total % impervious 0.000"
EXIT"
19

```


APPENDIX B:
MIDUSS MODELLING – POST-DEVELOPMENT CONDITIONS


```

217127 - Post 2 yr - Scenario A - Aug19
-----
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8users_private\awilkinson\Documents\MIDUSS\217127
Output filename: 217127 - Post 2 yr - Scenario A - Aug19.out
Licensee name: MIDUSS
Company: Hewlett-Packard Company
Date & Time last used: 8/5/2019 at 8:56:15 PM

TIME PARAMETERS
10.000 Time Step
360.000 Max. Storm Length
2400.000 Max. Hydrograph
STORM Chicago storm
1 Chicago storm
1264.600 Coefficient A
10.288 Constant B
0.889 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 85.735 mm/hr
Total depth 39.484 mm
6 002hyd Hydrograph extension used in this file"
CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method
100 Lands Easterly of the Re-Aligned BR33 Draining to the Baker
Subdivision"
2.000 % Impervious
50.550 Total Area
500.000 Flow length
0.500 Overland Slope
49.539 Pervious Area
500.000 Pervious length
0.500 Pervious slope
1.011 Impervious Area
500.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.151 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
98.000 Impervious SCS Curve No.
0.864 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.122 0.000 0.000 c.m/sec"
Catchment 100 Pervious
Surface Area 49.539 50.550 hectare
Time of concentration 275.226 19.951 248.478 minutes
Rainfall depth 521.419 192.540 486.958 mm
Rainfall volume 39.484 39.484 39.484 ha-m
Rainfall losses 1.9560 0.0399 1.9959 mm
Runoff depth 33.534 5.362 32.970 mm
Runoff volume 2947.36 344.97 3292.33 c.m
Runoff coefficient 0.151 0.864 0.165 c.m/sec"
Maximum flow 0.151 0.864 0.165 c.m/sec"
HYDROGRAPH Add Runoff " 0.118 0.109 0.122 c.m/sec"
4 Add Runoff " 0.122 0.122 0.000 0.000"
CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
200 Lands Westerly of the Re-Aligned BR33 Draining to the Baker
Subdivision"
13.000 % Impervious

```

```

217127 - Post 2 yr - Scenario A - Aug19
-----
Total Area" 5.970
Flow length" 150.000
Overland Slope" 0.500
Pervious Area" 5.194
Pervious length" 150.000
Pervious slope" 0.500
Impervious Area" 0.776
Impervious length" 150.000
Impervious slope" 0.500
Pervious Manning "n" 0.250
Pervious SCS Curve No. 70.000
Pervious Runoff coefficient 0.151
Pervious Ia/S coefficient 0.100
Pervious Initial abstraction 10.886
Impervious SCS Curve No. 98.000
Impervious Runoff coefficient 0.864
Impervious Ia/S coefficient 0.100
Impervious Initial abstraction 0.518
0.121 0.122 0.000 c.m/sec"
Catchment 200 Pervious
Surface Area 5.194 5.970 hectare
Time of concentration 133.648 76.429 minutes
Rainfall depth 349.893 176.910 270.046 mm
Rainfall volume 2050.73 306.43 2357.17 c.m
Rainfall losses 33.535 5.355 29.872 mm
Runoff depth 5.948 34.128 9.612 mm
Runoff volume 308.95 264.87 573.82 c.m
Runoff coefficient 0.151 0.864 0.243 c.m/sec"
Maximum flow 0.151 0.864 0.243 c.m/sec"
HYDROGRAPH Add Runoff " 0.119 0.121 0.000 c.m/sec"
4 Add Runoff " 0.121 0.232 0.000 0.000"
POND DESIGN"
0.232 Current peak flow c.m/sec"
0.001 Target outflow c.m/sec"
3866.2 Hydrograph volume c.m
Number of stages" 7
Minimum water level metre
Maximum water level metre
Starting water level metre
Keep Design Data: 1 = True; 0 = False"
Level Discharge Volume"
0.000 0.000 0.000
1.000 0.08700 1370.000
2.000 0.2870 2940.000
3.000 0.4930 4135.000
4.000 0.8200 5780.000
5.000 1.120 7120.000
6.000 1.448 8485.000
Peak outflow 0.087 c.m/sec"
Maximum level 0.998 metre
Maximum storage 1367.673 c.m
Centroidal lag 11.951 hours
0.121 0.232 0.087 0.000 c.m/sec"
HYDROGRAPH " Combine 1"
6 Combine
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0.087 c.m/sec"
Hydrograph volume 3860.840 c.m
0.121 0.232 0.087 0.087"
START/RE-START TOTALS 200"
3 Runoff Totals on EXIT"
Total Catchment area 56.520 hectare
Total Impervious area 1.787 hectare
Total % Impervious 3.162"
EXIT"

```


217127 - Post 5 yr - Scenario A - Aug19

MIDUSS Output -----
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: \\os-2k8\users\private\awilkinson\Documents\MIDUSS\217127
Job folder:
Output filename: 217127 - Post 5 yr - Scenario A - Aug19.out
Licensee name: Hewlett-Packard Company
Date & Time last used: 8/5/2019 at 8:57:20 PM
TIME PARAMETERS

31 10.000 Time step
360.000 Max. Storm length
2400.000 Max. Hydrograph
32 STORM Chicago storm
1 Chicago storm
2258.600 Coefficient A
14.090 Constant B
0.927 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 116.710 mm/hr
Total depth 55.992 mm
6 003hyd Hydrograph extension used in this file
33 CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method
1 Lands Easterly of the Re-Aligned BR33 Draining to the Baker

Subdivision"
2.000 % Impervious
50.550 Total Area
500.000 Flow length
0.500 Overland Slope
49.539 Pervious Area
500.000 Pervious length
0.500 Pervious slope
1.011 Impervious Area
500.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
0.236 Pervious SCS Curve No.
0.036 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
0.015 Pervious Initial abstraction
98.000 Impervious Manning "n"
0.904 Impervious SCS Curve No.
0.000 Impervious Runoff coefficient
0.010 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.400 0.000 c.m/sec
Catchment 100 Pervious 0.000
Surface Area 49.539 1.011 50.550
Time of concentration 187.508 17.405 175.169
Rainfall depth 412.049 395.599 185.269
Rainfall volume 55.992 55.992 55.992
Rainfall losses 2.7738 2.6304 2.6304
Runoff depth 42.729 42.030 42.030
Runoff volume 6945.91 511.96 13.962
Runoff coefficient 0.236 0.904 0.249
Maximum flow 0.392 0.180 0.400
HYDROGRAPH Add Runoff "
4 Add Runoff " 0.400 0.000 0.000
CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
1 Lands westerly of the Re-Aligned BR33 Draining to the Baker
Subdivision"
200
13.000 % Impervious

217127 - Post 5 yr - Scenario A - Aug19

5.970 Total Area"
150.000 Flow length
0.500 Overland Slope
5.194 Pervious Area
150.000 Pervious length
0.500 Pervious slope
0.776 Impervious Area
150.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.236 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.896 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.189 0.400 0.000 c.m/sec
Catchment 200 Pervious 0.000
Surface Area 5.194 0.776 5.970
Time of concentration 91.053 8.452 61.152
Rainfall depth 292.453 172.194 248.920
Rainfall volume 55.992 55.992 55.992
Rainfall losses 42.781 42.781 42.781
Runoff depth 13.212 13.212 13.212
Runoff volume 686.20 389.33 1075.53
Runoff coefficient 0.236 0.896 0.322
Maximum flow 0.075 0.177 0.189
HYDROGRAPH Add Runoff "
4 Add Runoff " 0.189 0.451 0.000 0.000
POND DESIGN"
0.451 Current peak flow c.m/sec
0.001 Target outflow c.m/sec
8.1334 Hydrograph volume c.m
Number of stages
0.000 Minimum water level metre
6.000 Maximum water level metre
0.000 Starting water level metre
0 Keep Design Data: 1 = True; 0 = False
Level Discharge Volume
0.000 0.000 0.000
1.000 0.08700 1370.000
2.000 0.2870 2940.000
3.000 0.4930 4135.000
4.000 0.8200 5780.000
5.000 1.120 7120.000
6.000 1.448 8485.000
Peak outflow 0.287 c.m/sec
Maximum level 1.999 metre
Maximum storage 2938.128 c.m
Centroidal lag 0.189 0.451 0.287 0.000 c.m/sec
HYDROGRAPH " Combine 1
6 Combine
1 Node #
Total Runoff Draining to Baker Subdivision"
Maximum flow 0.287 c.m/sec
Hydrograph volume 8127.396 c.m
START/RE-START TOTALS 200"
3 Runoff Totals on EXIT
Total Catchment area
Total Impervious area
Total % Impervious
EXIT"
56.520 hectare
1.787 hectare
3.162

217127 - Post 10 yr - Scenario A - Feb19

WIDUSS Output
WIDUSS version Version 2.25 rev. 473
Sunday, February 07, 2010
Units used: \\\os-2k8\users_private\awilkinson\Documents\1e METRIC
Job folder: MIDUSS\217127
Output filename: 217127 - Post 10 yr - Scenario A - Feb19.out
Licensee name: Hewlett-Packard Company
Company gmpb
Date & Time last used: 2/14/2019 at 5:59:07 PM

TIME PARAMETERS

31 10.000 Time Step

360.000 Max. Storm Length

2400.000 Max. Hydrograph

32 STORM Chicago storm

3043.260 Coefficient A

16.180 Coefficient B

0.946 Exponent n

0.375 Fraction R

360.000 Duration

1.000 Time step multiplier

Maximum intensity 136.818 mm/hr

Total depth 67.019 mm

6 010hyd Hydrograph extension used in this file

33 CATCHMENT 100

1 Triangular SCS

1 Equal length

1 SCS method

100 Lands to the East of the Re-Aligned BR33 Draining to the Baker

Subdivision

2.000 % Impervious

42.650 Total Area

600.000 Flow length

0.500 Overland Slope

41.797 Pervious Area

600.000 Pervious length

0.500 Pervious slope

0.853 Impervious Area

600.000 Impervious length

0.500 Impervious slope

0.250 Pervious Manning 'n'

70.000 Pervious SCS Curve No.

0.285 Pervious Runoff coefficient

0.100 Pervious Ia/S coefficient

10.886 Pervious Initial abstraction

0.015 Impervious Manning 'n'

98.000 Impervious SCS Curve No.

0.918 Impervious Runoff coefficient

0.100 Impervious Ia/S coefficient

0.518 Impervious Initial abstraction

Catchment 100 Pervious 0.000 c.m/sec

Surface Area 41.797 Impervious Total Area

Time of Concentration 175.825 42.650 hectare

Rainfall depth 397.300 18.138 minutes

Rainfall volume 2.8012 384.197 mm

Rainfall losses 47.925 67.019 ha-m

Runoff depth 19.094 5.521 mm

Runoff volume 7980.69 61.498 mm

Runoff coefficient 0.285 524.58 c.m

Maximum flow 0.509 0.298 c.m/sec

HYDROGRAPH Add Runoff

4 Add Runoff 0.518 0.000 0.000

CATCHMENT 200

1 Triangular SCS

1 Equal length

1 SCS method

200 Lands to the West of the Re-Aligned BR33 Draining to the Baker

Subdivision

10.000 % Impervious

217127 - Post 10 yr - Scenario A - Feb19

5.800 Total Area
150.000 Flow length
0.500 Overland Slope
5.220 Pervious Area
150.000 Pervious length
0.500 Pervious slope
0.580 Impervious Area
150.000 Impervious length
0.500 Impervious slope
0.250 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.285 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning 'n'
98.000 Impervious SCS Curve No.
0.903 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
0.184 0.518 0.000 c.m/sec
Catchment 200 Pervious 0.000 c.m/sec
Surface Area 5.220 Impervious Total Area
Time of concentration 76.532 5.800 hectare
Time to Centroid 272.413 7.895 minutes
Rainfall depth 67.019 245.753 mm
Rainfall volume 3498.38 388.71 c.m
Rainfall losses 47.938 6.531 c.m
Runoff depth 19.080 60.487 mm
Runoff volume 996.00 350.83 mm
Runoff coefficient 0.285 0.903 c.m
Maximum flow 0.128 0.160 c.m/sec
HYDROGRAPH Add Runoff
4 Add Runoff 0.591 0.000 0.000
POND DESIGN
0.591 Current peak flow c.m/sec
0.001 Target outflow c.m/sec
9852.1 Hydrograph volume c.m
7. Number of stages
0.000 Minimum water level metre
6.000 Maximum water level metre
0.000 Starting water level metre
0 Keep Design Data: 1 = True; 0 = False
Level Discharge
0.000 0.000 volume
1.000 0.09600 470.000
2.000 0.31800 980.000
3.000 0.54300 1385.000
4.000 0.90900 1920.000
5.000 1.243 2350.000
6.000 1.604 2800.000
Peak outflow 0.543 c.m/sec
Maximum level 2.099 metre
Maximum storage 1384.503 c.m
Centroidal tag 0.184 0.591 0.543 0.000 c.m/sec
HYDROGRAPH Combine 1
6 Combine
1 Node #
Total Runoff Draining to Baker Subdivision
Maximum flow 0.543 c.m/sec
Hydrograph volume 9851.292 c.m
0.184 0.591 0.543
3 START/RE-START TOTALS 200
3 Runoff Totals on EXIT
Total Catchment area 48.450 hectare
Total Impervious area 1.433 hectare
Total % Impervious 2.958
EXIT

217127 - Post 25 yr - Scenario A - Aug19

MIDUSS Output ----->
 MIDUSS version Version 2.25 rev. 473
 MIDUSS created Sunday, February 07, 2010
 Units used: \\\os-2k8\users_private\awilkinson\Documents\ie METRIC
 Job folder: MIDUSS\217127
 Output filename: 217127 - Post 25 yr - Scenario A - Aug19.out
 Licensee name: Hewlett-Packard Company
 Date & Time last used: 8/5/2019 at 8:49:15 PM

TIME PARAMETERS

31 10.000 Time Step
 360.000 Max. Storm length
 2400.000 Max. Hydrograph

STORM

32 4026.220 Chicago storm
 17.817 Coefficient A
 0.960 Constant B
 0.375 Exponent C
 360.000 Fraction R
 1.000 Duration

33 162.743 mm/hr
 80.877 mm
 6 02Shyd Hydrograph extension used in this file
 CATCHMENT 100

1 Triangular SCS
 1 Equal length
 1 SCS method

Subdivision 100 Lands Easterly of the Re-Aligned BR33 Draining to the Baker

% Impervious
 2.000 Total Area
 50.550 Flow length
 500.000 Overland Slope
 49.539 Pervious Area
 500.000 Pervious length
 0.500 Pervious slope
 1.011 Impervious Area
 500.000 Impervious length
 0.500 Impervious slope
 0.250 Pervious Manning "n"
 70.000 Pervious SCS Curve No.
 0.339 Pervious Runoff coefficient
 0.100 Pervious Ia/S coefficient
 10.886 Pervious Initial abstraction
 0.015 Impervious Manning "n"
 98.000 Impervious SCS Curve No.
 0.927 Impervious Runoff coefficient
 0.100 Impervious Ia/S coefficient
 0.518 Impervious Initial abstraction

Catchment 100 Pervious 0.000 c.m/sec
 Surface Area 49.539 Impervious Total Area
 Time of Concentration 133.634 50.550 hectare
 Time to Centroid 127.335 15.113 minutes
 Rainfall depth 343.987 175.391 minutes
 Rainfall volume 80.877 80.877 mm
 Rainfall losses 5.066 4.0884 ha-m
 Runoff volume 53.491 52.540 mm
 Runoff depth 27.386 74.959 mm
 Runoff volume 1.3567 1.4325 ha-m
 Runoff coefficient 0.339 0.927
 Maximum flow 1.109 0.315 c.m/sec
 HYDROGRAPH Add Runoff

4 Add Runoff 1.126 0.000 0.000

33 CATCHMENT 200
 1 Triangular SCS
 1 Equal length
 1 SCS method

Subdivision 200 Lands westerly of the Re-Aligned BR33 Draining to the Baker

13.000 % Impervious

217127 - Post 25 yr - Scenario A - Aug19

5.970 Total Area
 150.000 Flow length
 0.500 Overland Slope
 5.194 Pervious Area
 150.000 Pervious length
 0.500 Pervious slope
 0.776 Impervious Area
 150.000 Impervious length
 0.500 Impervious slope
 0.250 Pervious Manning "n"
 70.000 Pervious SCS Curve No.
 0.339 Pervious Runoff coefficient
 0.100 Pervious Ia/S coefficient
 10.886 Pervious Initial abstraction
 0.015 Impervious Manning "n"
 98.000 Impervious SCS Curve No.
 0.909 Impervious Runoff coefficient
 0.100 Impervious Ia/S coefficient
 0.518 Impervious Initial abstraction

Catchment 200 Pervious 0.000 c.m/sec
 Surface Area 5.194 Impervious Total Area
 Time of concentration 64.882 7.339 hectare
 Time to Centroid 255.738 168.161 minutes
 Rainfall depth 80.877 80.877 mm
 Rainfall volume 4200.70 627.69 c.m
 Rainfall losses 53.500 7.387 mm
 Runoff volume 27.377 73.491 mm
 Runoff depth 1421.94 570.36 mm
 Runoff coefficient 0.339 0.909
 Maximum flow 0.207 0.258 c.m/sec
 HYDROGRAPH Add Runoff

4 Add Runoff 1.261 0.000 0.000

POND DESIGN
 1.261 Current peak flow c.m/sec
 0.001 Target outflow c.m/sec
 16317.1 Hydrograph volume c.m
 7. Number of stages
 0.000 Minimum water level metre
 6.000 Maximum water level metre
 0.000 Starting water level metre
 0 Keep Design Data: 1 = True; 0 = False

Level Discharge Volume
 0.000 0.000
 1.000 0.08700 1370.000
 2.000 0.2870 2940.000
 3.000 0.4930 4135.000
 4.000 0.8200 5780.000
 5.000 1.120 7120.000
 6.000 1.448 8485.000
 Peak outflow 0.819 c.m/sec
 Maximum level 3.998 metre
 Maximum storage 5776.709 c.m
 Centroidal lag 0.307 1.261 0.819 0.000 c.m/sec
 HYDROGRAPH Combine

6 Combine
 1 Node #
 Total Runoff Draining to Baker Subdivision
 Maximum flow 0.819 c.m/sec
 Hydrograph volume 16311.807 c.m
 0.307 1.261 0.819

3 START/RE-START TOTALS 200
 Runoff Totals on EXIT
 Total Catchment area
 Total Impervious area
 Total % Impervious
 EXIT

56.520 hectare
 1.787 hectare
 3.162

217127 - Post 50 yr - Scenario A - Aug19

MIDUSS Output
 MIDUSS version Version 2.25 rev. 473
 MIDUSS created Sunday, February 07, 2010
 Units used: 1e METRIC
 Job folder: \\os-2k8\users_private\awilkinson\Documents\MIDUSS\217127
 Output filename: 217127 - Post 50 yr - Scenario A - Aug19.out
 Licensee name: Hewlett-Packard Company
 Date & Time last used: 8/5/2019 at 8:50:30 PM

TIME PARAMETERS

10.000 Time step
 360.000 Max. Storm length
 2400.000 Max. Hydrograph
 1 Chicago storm
 4882.600 Coefficient A
 19.202 Constant B
 0.973 Exponent C
 0.373 Fraction R
 360.000 Duration
 1.000 Time step multiplier

Maximum intensity 181.226 mm/hr
 Total depth 91.285 mm
 6 050hyd Hydrograph extension used in this file

CATCHMENT 100

1 Triangular SCS
 1 Equal length
 1 SCS method
 100 Lands easterly of the Re-Aligned BR33 Draining to the Baker

% Impervious 2.000
 Total Area 50.550
 Flow length 500.000
 Overland Slope 0.500
 Pervious Area 49.539
 Pervious length 500.000
 Pervious slope 0.500
 Impervious Area 1.011
 Impervious length 500.000
 Impervious slope 0.500
 Pervious Manning 'n' 0.250
 Pervious SCS Curve No. 70.000
 Pervious Runoff coefficient 0.374
 Pervious Ia/S coefficient 0.100
 Pervious Initial abstraction 10.886
 Impervious Manning 'n' 0.015
 Impervious SCS Curve No. 98.000
 Impervious Runoff coefficient 0.932
 Impervious Ia/S coefficient 0.100
 Impervious Initial abstraction 0.518

Catchment 100 Pervious 0.000 c.m/sec
 Surface Area 49.539
 Time of concentration 121.328
 Time to Centroid 325.776
 Rainfall depth 91.285
 Rainfall volume 4.5222
 Rainfall losses 57.135
 Rainfall depth 34.150
 Runoff volume 1.6918
 Runoff coefficient 0.374
 Maximum flow 0.932
 HYDROGRAPH Add Runoff 1.508

4 Add Runoff 1.529 1.529 0.000 0.000
 CATCHMENT 200
 1 Triangular SCS
 1 Equal length
 1 SCS method
 200 Lands westerly of the Re-Aligned BR33 Draining to the Baker

% Impervious 13.000

217127 - Post 50 yr - Scenario A - Aug19

5.970 Total Area
 150.000 Flow length
 0.500 Overland Slope
 5.194 Pervious Area
 150.000 Pervious length
 0.500 Pervious slope
 0.776 Impervious Area
 150.000 Impervious length
 0.500 Impervious slope
 0.250 Pervious Manning 'n'
 70.000 Pervious SCS Curve No.
 0.374 Pervious Runoff coefficient
 0.100 Pervious Ia/S coefficient
 10.886 Pervious Initial abstraction
 0.015 Impervious Manning 'n'
 98.000 Impervious SCS Curve No.
 0.919 Impervious Runoff coefficient
 0.100 Impervious Ia/S coefficient
 0.518 Impervious Initial abstraction

Catchment 200 Pervious 0.000 c.m/sec
 Surface Area 5.194
 Time of concentration 58.916
 Time to Centroid 246.510
 Rainfall depth 91.285
 Rainfall volume 4741.24
 Rainfall losses 57.151
 Rainfall depth 34.134
 Runoff volume 1772.88
 Runoff coefficient 0.374
 Maximum flow 0.283
 HYDROGRAPH Add Runoff 1.717

4 Add Runoff 1.717 1.717 0.000 0.000
 POND DESIGN
 1.717 Current peak flow c.m/sec
 0.001 Target outflow c.m/sec
 20202.1 Hydrograph volume c.m
 7. Number of stages
 0.000 Minimum water level metre
 6.000 Maximum water level metre
 0.000 Starting water level metre
 0 Keep Design Data: 1 = True; 0 = False
 Level Discharge Volume
 0.000 0.000
 1.000 0.08700 1370.000
 2.000 0.2870 2940.000
 3.000 0.4930 4135.000
 4.000 0.8200 5780.000
 5.000 1.120 7120.000
 6.000 1.448 8485.000

Peak outflow 1.118 c.m/sec
 Maximum level 4.999 metre
 Maximum storage 7118.040 c.m
 Centroidal lag 7.539 hours
 HYDROGRAPH Combine 1
 6 Combine
 1 Node #
 Total Runoff Draining to Baker Subdivision
 Maximum flow 1.118 c.m/sec
 Hydrograph volume 20197.775 c.m
 3 START/RE-START TOTALS 200
 3 Runoff Totals on EXIT
 Total Catchment area 56.520 hectare
 Total Impervious area 1.787 hectare
 Total % Impervious 3.162%
 EXIT

217127 - Post 2 yr - Scenario B - Aug19

MIDUSS Output
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: ie METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\MIDUSS\217127
Output filename: 217127 - Post 2 yr - Scenario B - Aug19.out
Licensee name: Hewlett-Packard Company
Date & Time last used: 8/6/2019 at 11:10:06 AM
TIME PARAMETERS
31 10.000 Time Step
360.000 Max. Storm length
2400.000 Max. Hydrograph
STORM Chicago storm
1264.600 Coefficient A
10.288 Constant B
0.889 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time Step multiplier
Maximum intensity 85.735 mm/hr
Total depth 39.484 mm
6 002hyd Hydrograph extension used in this file
33 1 Triangular SCS
1 Equal length
1 SCS method
Lands Easterly of the Re-Aligned BR33 Draining to the Baker

10

31

32

33

Subdivision

19.000 % Impervious
50.550 Total Area
50.000 Flow length
2.000 Overland Slope
40.945 Pervious Area
50.000 Pervious length
2.000 Pervious slope
3.604 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.151 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.860 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
Catchment 100 Pervious 0.000 0.000 0.000 c.m/sec
Surface Area 40.945 Impervious 9.604 Total Area 50.550
Time of concentration 45.611 Pervious 3.306 Impervious 12.107
Rainfall depth 243.269 Pervious 39.484 Total 182.848
Rainfall volume 39.484 Pervious 39.484 Total 39.484
Rainfall losses 33.540 Pervious 33.540 Total 33.540
Runoff depth 5.944 Pervious 5.944 Total 5.944
Runoff volume 2433.60 Pervious 2433.60 Total 2433.60
Runoff coefficient 0.151 Pervious 0.151 Total 0.151
Maximum flow 5993.48 Pervious 5993.48 Total 5993.48
HYDROGRAPH Add Runoff " 0.408 Pervious 0.408 Total 0.408
4 Add Runoff " 1.648 Pervious 1.648 Total 1.648
CATCHMENT 200 Pervious 1.648 0.000 0.000
1 Triangular SCS
1 Equal length
1 SCS method
Lands westerly of the Re-Aligned BR33 Draining to the Baker

40

33

Subdivision

40.000 % Impervious

217127 - Post 2 yr - Scenario B - Aug19

5.970 Total Area
50.000 Flow length
2.000 Overland Slope
3.582 Pervious Area
50.000 Pervious length
2.000 Pervious slope
2.388 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.250 Pervious Manning "n"
70.000 Pervious SCS Curve No.
0.151 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning "n"
98.000 Impervious SCS Curve No.
0.860 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction
Catchment 200 Pervious 0.000 0.000 0.000 c.m/sec
Surface Area 3.582 Impervious 2.388 Total Area 5.970
Time of concentration 45.611 Pervious 3.306 Impervious 12.107
Rainfall depth 243.269 Pervious 39.484 Total 182.848
Rainfall volume 39.484 Pervious 39.484 Total 39.484
Rainfall losses 33.540 Pervious 33.540 Total 33.540
Runoff depth 5.944 Pervious 5.944 Total 5.944
Runoff volume 212.90 Pervious 212.90 Total 212.90
Runoff coefficient 0.151 Pervious 0.151 Total 0.151
Maximum flow 810.52 Pervious 810.52 Total 810.52
HYDROGRAPH Add Runoff " 0.036 Pervious 0.036 Total 0.036
4 Add Runoff " 0.405 Pervious 0.405 Total 0.405
POND DESIGN
2.053 Current peak flow c.m/sec
9.001 Target outflow c.m/sec
6716.3 Hydrograph volume c.m
Number of stages 7
Minimum water level metre
Maximum water level metre
Starting water level metre
Keep Design Data: 1 = True; 0 = False
Level Discharge Volume
0.000 0.000 0.000
1.000 0.08700 5375.000
2.000 0.28700 8810.000
3.000 0.49300 11345.00
4.000 0.82000 14770.00
5.000 1.120 17425.00
6.000 1.448 20065.00
Peak outflow 0.087 c.m/sec
Maximum level 0.999 metre
Maximum storage 5368.302 c.m
Centroidal lag 19.757 hours
0.405 2.053 0.087 0.000 c.m/sec
HYDROGRAPH Combine
6 Combine
1 Node #
Total Runoff Draining to Baker subdivision
Maximum flow 0.087 c.m/sec
Hydrograph volume 5927.753 c.m
0.405 2.053 0.087 0.087
3 START/RE-START TOTALS 200
Runoff Totals on EXIT
Total Catchment area
Total Impervious area
Total % Impervious
EXIT

40

54

40

38

19

217127 - Post 5 yr - Scenario B - Aug19

WIDUSS Output
WIDUSS version Version 2.25 rev. 473
WIDUSS created Sunday, February 07, 2010
Units used: \\\os-2k8\users_private\awilkinson\Documents\1e METRIC
Job folder: MIDUSS\217127
Output filename: 217127 - Post 5 yr - Scenario B - Aug19.out
Licensee name: Hewlett-Packard Company
Company gmp
Date & Time last used: 8/6/2019 at 11:12:51 AM
TIME PARAMETERS
31 10.000 Time Step
360.000 Max. Storm Length
2400.000 Max. Hydrograph
STORM Chicago storm
1 2258.600 Coefficient A
14.090 Constant B
0.927 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 116.710 mm/hr
Total depth 55.992 mm
6 00Shyd Hydrograph extension used in this file
33 1 1 Triangular SCS
1 Equal length
1 SCS method
Lands Easterly of the Re-Aligned BR33 Draining to the Baker

Subdivision
19.000 % Impervious
50.550 Total Area
50.000 Flow length
2.000 Overland Slope
40.945 Pervious Area
50.000 Pervious length
2.000 Pervious slope
3.604 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.230 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.235 Pervious runoff coefficient
0.100 Pervious Ia/s coefficient
10.886 Pervious Initial abstraction
0.015 Pervious Manning 'n'
98.000 Impervious SCS Curve No.
0.892 Impervious runoff coefficient
0.100 Impervious Ia/s coefficient
0.518 Impervious Initial abstraction
Catchment 100 Pervious 0.000 c.m/sec
Surface Area 40.945 Impervious 9.604 Total Area 50.550
Time of Concentration 31.074 minutes
Rainfall depth 218.148 mm
Rainfall volume 55.992 ha-m
Rainfall losses 42.819 mm
Runoff depth 13.173 mm
Runoff volume 0.5394 ha-m
Runoff coefficient 0.235
Maximum flow 1.273 c.m/sec
HYDROGRAPH Add Runoff " 4 Add Runoff " 2.529 0.000 0.000
CATCHMENT 200
1 Triangular SCS
1 Equal length
1 SCS method
Lands westerly of the Re-Aligned BR33 Draining to the Baker
Subdivision
40.000 % Impervious

217127 - Post 5 yr - Scenario B - Aug19

5.970 Total Area
50.000 Flow length
2.000 Overland Slope
3.582 Pervious Area
50.000 Pervious length
2.000 Pervious slope
2.388 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.250 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.235 Pervious runoff coefficient
0.100 Pervious Ia/s coefficient
10.886 Pervious Initial abstraction
0.015 Pervious Manning 'n'
98.000 Impervious SCS Curve No.
0.892 Impervious runoff coefficient
0.100 Impervious Ia/s coefficient
0.518 Impervious Initial abstraction
Catchment 200 Pervious 0.000 c.m/sec
Surface Area 3.582 Impervious 2.388 Total Area 5.970
Time of Concentration 31.074 minutes
Rainfall depth 218.148 mm
Rainfall volume 55.992 ha-m
Rainfall losses 42.819 mm
Runoff depth 13.173 mm
Runoff volume 0.5394 ha-m
Runoff coefficient 0.235
Maximum flow 1.111 c.m/sec
HYDROGRAPH Add Runoff " 4 Add Runoff " 3.133 0.000 0.000
POND DESIGN
3.133 Current peak flow c.m/sec
0.001 Target outflow c.m/sec
11853.2 Hydrograph volume c.m
7. Number of stages
0.000 Minimum water level metre
6.000 Maximum water level metre
0.000 Starting water level metre
0 Keep Design Data: 1 = True; 0 = False
Level Discharge Volume
0.000 0.000
1.000 0.08700 5375.000
2.000 0.2870 8810.000
3.000 0.4930 11345.00
4.000 0.8200 14770.00
5.000 1.120 17425.00
6.000 1.448 20065.00
Peak outflow 0.287 c.m/sec
Maximum level 1.998 metre
Maximum storage 8804.438 c.m
Centroidal lag 16.094 hours
0.604 0.287 0.000 c.m/sec
HYDROGRAPH " Combine 1
6 Combine " Combine 1
1 Node #
Total Runoff Draining to Baker subdivision
Maximum flow 0.287 c.m/sec
Hydrograph volume 10825.848 c.m
0.604 0.287 0.287
3 START/RE-START TOTALS 200
3 Runoff Totals on EXIT
Total Catchment area
Total Impervious area
Total % Impervious
EXIT
56.520 hectare
11.993 hectare
21.218

217127 - Post 10 yr - Scenario B - Aug19

WIDUSS Output
WIDUSS version Version 2.25 rev. 473
WIDUSS created Sunday, February 07, 2010
Units used: \\\os-2k8\users_private\awilkinson\Documents\WIDUSS\217127\Job folder:
Output filename: 217127 - Post 10 yr - Scenario B - Aug19.out
Licensee name: Hewlett-Packard Company
Company
Date & Time last used: 8/6/2019 at 11:13:38 AM
TIME PARAMETERS
31 10.000 Time step multiplier 136.818 mm/hr
360.000 Max. Storm length 67.019 mm
2400.000 Max. Hydrograph
32 STORM Chicago storm
1 Chicago storm
3043.260 Coefficient A
16.180 Constant B
0.946 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier
Maximum intensity 136.818 mm/hr
Total depth 67.019 mm
6 010hyd Hydrograph extension used in this file
33 CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method
1 Lands Easterly of the Re-Aligned BR33 Draining to the Baker

| | | | | | |
|----|----------|---|---------|------------|---------------|
| 31 | 10.000 | Time step multiplier | 136.818 | mm/hr | |
| 32 | 360.000 | Max. Storm length | 67.019 | mm | |
| 33 | 2400.000 | Max. Hydrograph | | | |
| 34 | 1 | Chicago storm | | | |
| 35 | 3043.260 | Coefficient A | | | |
| 36 | 16.180 | Constant B | | | |
| 37 | 0.946 | Exponent C | | | |
| 38 | 0.375 | Fraction R | | | |
| 39 | 360.000 | Duration | | | |
| 40 | 1.000 | Time step multiplier | | | |
| 41 | | Maximum intensity | 136.818 | mm/hr | |
| 42 | | Total depth | 67.019 | mm | |
| 43 | 6 | 010hyd Hydrograph extension used in this file | | | |
| 44 | 33 | CATCHMENT 100 | | | |
| 45 | 1 | Triangular SCS | | | |
| 46 | 1 | Equal length | | | |
| 47 | 1 | SCS method | | | |
| 48 | 1 | Lands Easterly of the Re-Aligned BR33 Draining to the Baker | | | |
| 49 | | % Impervious | | | |
| 50 | 19.000 | Total Area | | | |
| 51 | 50.550 | Flow length | | | |
| 52 | 2.000 | Overland Slope | | | |
| 53 | 40.945 | Pervious Area | | | |
| 54 | 50.000 | Pervious length | | | |
| 55 | 2.000 | Pervious slope | | | |
| 56 | 3.604 | Impervious Area | | | |
| 57 | 50.000 | Impervious length | | | |
| 58 | 2.000 | Impervious slope | | | |
| 59 | 0.250 | Pervious Manning 'n' | | | |
| 60 | 70.000 | Pervious SCS Curve No. | | | |
| 61 | 0.284 | Pervious Runoff coefficient | | | |
| 62 | 0.100 | Pervious Ia/S coefficient | | | |
| 63 | 10.886 | Pervious Initial abstraction | | | |
| 64 | 0.015 | Impervious Manning 'n' | | | |
| 65 | 98.000 | Impervious SCS Curve No. | | | |
| 66 | 0.904 | Impervious Runoff coefficient | | | |
| 67 | 0.100 | Impervious Ia/S coefficient | | | |
| 68 | 0.518 | Impervious Initial abstraction | | | |
| 69 | | Catchment 100 | | | |
| 70 | | Surface Area | 40.945 | Pervious | 0.000 c.m/sec |
| 71 | | Time of Concentration | 26.119 | Impervious | Total Area |
| 72 | | Time to Centroid | 209.065 | | hectare |
| 73 | | Rainfall depth | 67.019 | | minutes |
| 74 | | Rainfall volume | 2.7441 | | mm |
| 75 | | Rainfall losses | 48.001 | | mm |
| 76 | | Runoff depth | 19.018 | | mm |
| 77 | | Runoff volume | 0.7787 | | mm |
| 78 | | Runoff coefficient | 0.284 | | ha-m |
| 79 | | Maximum flow | 1.955 | | ha-m |
| 80 | | HYDROGRAPH Add Runoff | 1.955 | | c.m/sec |
| 81 | 4 | Add Runoff | 3.187 | 0.000 | 0.000 |
| 82 | | CATCHMENT 200 | | | |
| 83 | 1 | Triangular SCS | | | |
| 84 | 1 | Equal length | | | |
| 85 | 1 | SCS method | | | |
| 86 | 200 | Lands westerly of the Re-Aligned BR33 Draining to the Baker | | | |
| 87 | | % Impervious | | | |
| 88 | 40.000 | | | | |

217127 - Post 10 yr - Scenario B - Aug19

| | | | | | |
|---------|--|-----------|------------|---------------|------------|
| 5.970 | Total Area | | | | |
| 50.000 | Flow length | | | | |
| 2.000 | Overland Slope | | | | |
| 3.582 | Pervious Area | | | | |
| 50.000 | Pervious length | | | | |
| 2.000 | Pervious slope | | | | |
| 2.388 | Impervious Area | | | | |
| 50.000 | Impervious length | | | | |
| 2.000 | Impervious slope | | | | |
| 0.250 | Pervious Manning 'n' | | | | |
| 70.000 | Pervious SCS Curve No. | | | | |
| 0.284 | Pervious Runoff coefficient | | | | |
| 0.100 | Pervious Ia/S coefficient | | | | |
| 10.886 | Pervious Initial abstraction | | | | |
| 0.015 | Impervious Manning 'n' | | | | |
| 98.000 | Impervious SCS Curve No. | | | | |
| 0.904 | Impervious Runoff coefficient | | | | |
| 0.100 | Impervious Ia/S coefficient | | | | |
| 0.518 | Impervious Initial abstraction | | | | |
| | Catchment 200 | | | | |
| | Surface Area | 3.582 | Pervious | 0.000 c.m/sec | Total Area |
| | Time of Concentration | 26.119 | Impervious | | hectare |
| | Time to Centroid | 209.065 | | | minutes |
| | Rainfall depth | 67.019 | | | mm |
| | Rainfall volume | 2400.61 | | | mm |
| | Rainfall losses | 48.001 | | | mm |
| | Runoff depth | 19.018 | | | mm |
| | Runoff volume | 681.23 | | | mm |
| | Runoff coefficient | 0.284 | | | c.m |
| | Maximum flow | 0.171 | | | c.m/sec |
| 4 | HYDROGRAPH Add Runoff | 0.171 | | | |
| | Add Runoff | 0.740 | 3.916 | 0.000 | 0.000 |
| | POND DESIGN | | | | |
| 3.916 | Current peak flow | c.m/sec | | | |
| 0.001 | Target outflow | c.m/sec | | | |
| 15730.2 | Hydrograph volume | c.m | | | |
| 7. | Number of stages | metre | | | |
| 0.000 | Minimum water level | metre | | | |
| 6.000 | Starting water level | metre | | | |
| 0.000 | Keep Design Data: 1 = True; 0 = False | | | | |
| | Level Discharge | Volume | | | |
| | 0.000 | 0.000 | | | |
| | 1.000 | 0.08700 | 5375.000 | | |
| | 2.000 | 0.28700 | 8810.000 | | |
| | 3.000 | 0.49300 | 11345.00 | | |
| | 4.000 | 0.82000 | 14770.00 | | |
| | 5.000 | 1.120 | 17425.00 | | |
| | 6.000 | 1.448 | 20065.00 | | |
| | Peak outflow | 0.493 | c.m/sec | | |
| | Maximum level | 2.998 | metre | | |
| | Maximum storage | 11340.784 | c.m | | |
| | Centroidal lag | 14.185 | hours | | |
| | HYDROGRAPH Combine | 1 | 0.493 | 0.000 c.m/sec | |
| 6 | Combine | | | | |
| 1 | Node # | | | | |
| | Total Runoff Draining to Baker Subdivision | | | | |
| | Maximum flow | 0.493 | c.m/sec | | |
| | Hydrograph volume | 14617.795 | c.m | | |
| | START/RE-START TOTALS 200 | | | | |
| 3 | Runoff Totals on EXIT | 3.916 | 0.493 | | |
| | Total Catchment area | | | | |
| | Total Impervious area | | | | |
| | Total % Impervious | | | | |
| | EXIT | | | | |
| 19 | | | | | |

217127 - Post 50 yr - Scenario B - Aug19

MIDUSS Output
MIDUSS version
Units created
Job folder:
Output filename:
License name:
Company:
Date & Time last used:

Version 2.25 rev. 473
Sunday, February 07, 2010
\\os-2k8\users_private\awikinson\Documents\MIDUSS\217127
217127 - Post 50 yr - Scenario B - Aug19.out
Hewlett-Packard Company
8/6/2019 at 11:16:38 AM

TIME PARAMETERS

10.000 Time step
360.000 Max. Storm length
2400.000 Max. Hydrograph
1 Chicago storm
4882.600 Coefficient A
19.202 Constant B
0.972 Exponent C
0.375 Fraction R
360.000 Duration
1.000 Time step multiplier

Maximum intensity 181.226 mm/hr
Total depth 91.285 mm
6 050hyd Hydrograph extension used in this file

CATCHMENT 100
1 Triangular SCS
1 Equal length
1 SCS method

100 Lands easterly of the Re-Aligned BR33 Draining to the Baker

Subdivision

19.000 % Impervious
50.550 Total Area
50.000 Flow length
2.000 Overland Slope
40.945 Pervious Area
50.000 Pervious length
2.000 Pervious slope
9.604 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.250 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.372 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Pervious Manning 'n'
98.000 Impervious SCS Curve No.
0.918 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction

5.840 0.000 0.000 c.m/sec
Catchment 100 Pervious
Surface Area 40.945
Time of concentration 20.107
Time to Centroid 197.269
Rainfall depth 91.285
Rainfall volume 37.308
Rainfall losses 33.977
Runoff depth 121.06
Runoff volume 0.372
Runoff coefficient 0.365
Maximum flow 0.365
HYDROGRAPH Add Runoff 4.171

4 Add Runoff 5.840 0.000 0.000

CATCHMENT 200

1 Triangular SCS
1 Equal length
1 SCS method

200 Lands westerly of the Re-Aligned BR33 Draining to the Baker

Subdivision

40.000 % Impervious

217127 - Post 50 yr - Scenario B - Aug19

5.970 Total Area
50.000 Flow length
2.000 Overland Slope
3.582 Pervious Area
50.000 Pervious length
2.000 Pervious slope
2.388 Impervious Area
50.000 Impervious length
2.000 Impervious slope
0.250 Pervious Manning 'n'
70.000 Pervious SCS Curve No.
0.372 Pervious Runoff coefficient
0.100 Pervious Ia/S coefficient
10.886 Pervious Initial abstraction
0.015 Impervious Manning 'n'
98.000 Impervious SCS Curve No.
0.918 Impervious Runoff coefficient
0.100 Impervious Ia/S coefficient
0.518 Impervious Initial abstraction

1.062 5.840 0.000
Catchment 200 Pervious
Surface Area 40.945
Time of concentration 20.107
Time to Centroid 197.269
Rainfall depth 91.285
Rainfall volume 37.308
Rainfall losses 33.977
Runoff depth 121.06
Runoff volume 0.372
Runoff coefficient 0.365
Maximum flow 0.365
HYDROGRAPH Add Runoff 4.171

4 Add Runoff 5.840 0.000 0.000

POND DESIGN

6.787 Current peak flow c.m/sec
0.001 Target outflow c.m/sec
25184.0 Hydrograph volume c.m
0.000 Number of stages
0.000 Minimum water level metre
6.000 Maximum water level metre
0.000 Starting water level metre
0 Keep Design Data: 1 = True; 0 = False

Level Discharge Volume
0.000 0.000
1.000 0.08700 5375.000
2.000 0.2870 8810.000
3.000 0.4930 11345.00
4.000 0.8200 14770.00
5.000 1.120 17425.00
6.000 1.448 20065.00

Peak outflow 1.118 c.m/sec
Maximum level 4.999 metre
Maximum storage 17421.602 c.m
Centroidal lag 11.435 hours
1.062 6.787 1.118 0.000 c.m/sec
HYDROGRAPH Combine

6 Combine

1 Node

Total Runoff Draining to Baker Subdivision

Maximum flow 1.118 c.m/sec

Hydrograph volume 23960.918 c.m

START/RE-START TOTALS 200

3 Runoff Totals on EXIT

Total Catchment area

Total Impervious area

Total % impervious

EXIT

56.520 hectare

11.993 hectare

21.218

APPENDIX C:
MIDUSS MODELLING – ENHANCED GRASS SWALES


```

217127 - Post 4hr25mm - Scenario A - Aug19
-----
MIDUSS Output ----->
MIDUSS version Version 2.25 rev. 473
MIDUSS created Sunday, February 07, 2010
Units used: \os-2k8\users_private\awilkinson\Documents\
Job folder: MIDUSS\217127
Output filename: 217127 - Post 4hr25mm - Scenario A - Aug19.out
Licensee name: gmbp
Company: Hewlett-Packard Company
Date & Time last used: 8/6/2019 at 11:50:54 AM

31 TIME PARAMETERS
    Time Step 10.000
    Max. Storm length 240.000
    Max. Hydrograph 2400.000
32 STORM Chicago storm
    1 Chicago storm
    847.870 Coefficient A
    10.288 Constant B
    0.889 Exponent C
    0.375 Fraction R
    240.000 Duration
    1.000 Time step multiplier
    Maximum intensity 46.347 mm/hr
    Total depth 25.000 mm
33 CATCHMENT 100
    1 Triangular SCS
    1 Equal length
    1 SCS method
    1 Lands Easterly of the Re-Aligned BR33 Draining to the Baker
Subdivision 100
    % Impervious 2.000
    Total Area 50.550
    Flow length 500.000
    Overland Slope 0.500
    Pervious Area 49.539
    Pervious length 500.000
    Pervious slope 0.500
    Impervious Area 1.011
    Impervious length 500.000
    Impervious slope 0.500
    Pervious Manning 'n' 0.250
    Pervious SCS Curve No. 70.000
    Pervious Runoff coefficient 0.065
    Pervious Ia/S coefficient 0.100
    Pervious Initial abstraction 10.886
    Impervious Manning 'n' 0.015
    Impervious SCS Curve No. 98.000
    Impervious Runoff coefficient 0.804
    Impervious Ia/S coefficient 0.100
    Impervious Initial abstraction 0.518
    Catchment 100 Pervious 0.000
    Surface Area 49.539 Impervious 1.011
    Time of concentration 469.153 Total Area 50.550
    Time to Centroid 643.230 25.665 379.531
    Rainfall depth 25.000 146.398 542.828
    Rainfall volume 1.2385 25.000 25.000
    Rainfall losses 23.380 0.0253 25.000
    Runoff losses 1.620 4.897 23.637
    Runoff depth 802.49 20.103 23.637
    Runoff volume 802.49 203.24 1.990
    Runoff coefficient 0.065 0.804 1005.73
    Maximum flow 0.063 0.080
    HYDROGRAPH Add Runoff " 0.021 c.m/sec"
4 Add Runoff " 0.064 0.000 0.000"
52 CHANNEL DESIGN
    0.064 Current peak flow c.m/sec"
    0.027 Manning 'n'
    0. Cross-section type: 0=trapezoidal; 1=general"
    1.050 Basewidth metre"
    3.000 Left bank slope"
    3.000 Right bank slope"

```

```

1.000 Channel depth metre"
0.500 Gradient %
    Depth of flow 0.098 metre"
    Velocity 0.483 m/sec"
    Channel capacity 7.113 c.m/sec"
    Critical depth 0.068 metre"
    ROUTE Zero Route"
    0.00 Zero Route Reach length (metre)"
    0.064 0.064 0.000 c.m/sec"
6 HYDROGRAPH Combine 1"
1 Node #
    Maximum Water Quality Flow through EGS"
    Maximum flow 1.044 c.m/sec"
    Hydrograph volume 3589.901 c.m"
    0.064 0.064 1.044"
38 START/RE-START TOTALS 100"
    Runoff Totals on EXIT"
    Total Catchment area 50.550 hectare"
    Total Impervious area 1.011 hectare"
    Total % Impervious 2.000"
    EXIT"
19

```



```

217127 - Post 4hr25mm - Scenario B - Aug19
----->
WDUSS Output
WDUSS version Version 2.25 rev. 473
WDUSS created Sunday, February 07, 2010
Units used: le METRIC
Job folder: \\os-2k8\users_private\awilkinson\Documents\
MIDUSS\217127
Output filename: 217127 - Post 4hr25mm - Scenario B - Aug19.out
Company: gmbp
Licensee name: Hewlett-Packard Company
Date & Time last used: 8/6/2019 at 11:49:31 AM

TIME PARAMETERS
Time Step 10.000
Max. Storm Length 240.000
Max. Hydrograph 2400.000
STORM Chicago storm
1 Chicago storm
Coefficient A 847.870
Constant B 10.288
Exponent C 0.889
Fraction R 0.375
Duration 240.000
Time step multiplier 1.000
Maximum intensity 46.347 mm/hr
Total depth 25.000 mm
6 001hyd Hydrograph extension used in this file"
CATCHMENT 100"
1 Triangular SCS
1 Equal length
1 SCS method
100 Lands Easterly of the Re-Aligned BR33 Draining to the Baker
Subdivision"
19.000 % Impervious"
50.550 Total Area"
50.000 Flow length"
2.000 Overland Slope"
40.945 Pervious Area"
50.000 Pervious length"
2.000 Pervious Slope"
9.604 Impervious Area"
50.000 Impervious length"
2.000 Impervious slope"
0.250 Pervious Manning 'n'"
70.000 Pervious SCS Curve No."
0.065 Pervious Runoff coefficient"
0.100 Pervious Ia/S coefficient"
10.886 Pervious Initial abstraction"
0.015 Impervious Manning 'n'"
98.000 Impervious SCS Curve No."
0.800 Impervious Runoff coefficient"
0.100 Impervious Ia/S coefficient"
0.518 Impervious Initial abstraction"
1.017 0.000 0.000 0.000 c.m/sec"
Catchment 100 Pervious Total Area "
Surface Area 40.945 50.550 hectare"
Time of concentration 77.749 23.109 minutes"
Time to Centroid 222.988 118.447 minutes"
Rainfall depth 25.000 25.000 mm"
Rainfall volume 1.0326 0.2401 ha-m"
Rainfall losses 23.381 19.888 mm"
Runoff depth 1.619 5.112 mm"
Runoff volume 862.98 2584.17 c.m"
Runoff coefficient 0.065 0.800 c.m/sec"
Maximum flow 0.076 1.014 c.m/sec"
HYDROGRAPH Add Runoff "
4 Add Runoff " 1.017 1.017 0.000 0.000"
CHANNEL DESIGN"
1.017 Current peak flow c.m/sec"
0.027 Manning 'n'"
0. Cross-section type: 0=trapezoidal; 1=general"
3.000 Basewidth metre"
3.000 Left bank slope"
3.000 Right bank slope"

```

```

217127 - Post 4hr25mm - Scenario B - Aug19
----->
1.000 Channel depth metre
0.500 Gradient %
Depth of flow 0.276 metre"
Velocity 0.962 m/sec"
Channel capacity 11.712 c.m/sec"
Critical depth 0.211 metre"
ROUTE Zero Route"
0.00 Zero Route Reach length (metre)"
1.017 1.017 0.000 c.m/sec"
HYDROGRAPH " Combine 1"
6 Combine " Node #
1 Node #
Maximum water Quality Flow through EGS"
Maximum flow 1.017 c.m/sec"
Hydrograph volume 2584.167 c.m"
1.017 1.017
START/RE-START TOTALS 100"
3 Runoff Totals on EXIT"
Total Catchment area 50.550 hectare"
Total Impervious area 9.604 hectare"
Total % Impervious 19.000"
EXIT"

```


APPENDIX D:
MIN. WQT VOLUME AND FOOTPRINT AREA CALCULATIONS

Project : **Bruce Road 33 Re-Aignment**
Project No. : **217127**
Date : **August 2019**

INVESTIGATION OF SWM FACILITY FOOTPRINT AREA FOR ALTERNATIVE 3

| Type of Facility | Required Total Storage Volume for WQT (m³/ha) | | | Required Storage Volume by Components for WQT | | Active Storage | | | | | Permanent Storage | | | Min. Area based on Facility Type | |
|--------------------|---|--------|---------|---|-------------------|-------------------|----------------------------------|-------------------------------|-------------------------------|---------------------------------|-------------------|------------------------------|--------------------------------|------------------------------------|------------------------------|
| | Imperviousness | | | Active (m³/ha) | Permanent (m³/ha) | Req. for WQT (m³) | Req. for Peak Flow Att. *** (m³) | Governing Active Storage (m³) | Max. Active Storage Depth (m) | Min. Area - Active Storage (m²) | Req. for WQT (m³) | Max. Perm. Storage Depth (m) | Min. Area - Perm. Storage (m²) | Governing Storage Volume Component | Corresponding Min. Area (m²) |
| | 35 % * | 55 % * | 22 % ** | | | | | | | | | | | | |
| Infiltration Basin | 25 | 30 | 22 | 22 | | 1,245 | 20,100 | 20,100 | 0.6 | 33,500 | 1,245 | 0.6 | 2,075 | Active (Peak Flow Att.) | 33,500 |
| Wetland | 80 | 105 | 64 | 40 | 24 | 2,265 | 20,100 | 20,100 | 1 | 20,100 | 1,360 | 0.3 | 4,535 | Active (Peak Flow Att.) | 20,100 |
| Wet Pond | 140 | 190 | 108 | 40 | 68 | 2,265 | 20,100 | 20,100 | 2 | 10,050 | 3,845 | 3 | 1,285 | Active (Peak Flow Att.) | 10,050 |

- Water Quality Treatment (WQT) is considered to be provided to an Enhanced level (80% TSS Removal)

* Defined within Table 3.2 of the Stormwater Management Planning and Design Manual

** Extrapolated for tributary imperviousness

*** From Section 5.5 of text

APPENDIX E:
PCSWMM FOR STORMCEPTOR SIZING TOOL

Detailed Stormceptor Sizing Report – BR33 - Alternative 4

| Project Information & Location | | | |
|--------------------------------|---------------------------------|----------------------------|-----------|
| Project Name | Bruce Road 33 Re-Alignment | Project Number | 217127 |
| City | Town of Saugeen Shores | State/ Province | Ontario |
| Country | Canada | Date | 2/14/2019 |
| Designer Information | | EOR Information (optional) | |
| Name | Alexander Wilkinson | Name | |
| Company | GM BluePlan Engineering Limited | Company | |
| Phone # | 519-376-1805 | Phone # | |
| Email | alex.wilkinson@gmblueplan.ca | Email | |

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

| | |
|--------------------------------------|----------------------|
| Site Name | BR33 - Alternative 4 |
| Recommended Stormceptor Model | StormceptorMAX |
| Target TSS Removal (%) | 80.0 |
| TSS Removal (%) Provided | - |
| PSD | Fine Distribution |
| Rainfall Station | OWEN SOUND MOE |

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

| Stormceptor Sizing Summary | | |
|----------------------------|------------------------|-----------------------------------|
| Stormceptor Model | % TSS Removal Provided | % Runoff Volume Captured Provided |
| STC 300 | 15 | 15 |
| STC 750 | 30 | 25 |
| STC 1000 | 34 | 25 |
| STC 1500 | 34 | 25 |
| STC 2000 | 40 | 37 |
| STC 3000 | 42 | 37 |
| STC 4000 | 49 | 50 |
| STC 5000 | 50 | 50 |
| STC 6000 | 55 | 59 |
| STC 9000 | 62 | 69 |
| STC 10000 | 61 | 69 |
| STC 14000 | 67 | 76 |
| StormceptorMAX | Custom | Custom |

Stormceptor

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur. Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology

Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:

- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station

| | | | |
|-------------------------------|------------------|---|---------|
| State/Province | Ontario | Total Number of Rainfall Events | 3762 |
| Rainfall Station Name | OWEN SOUND MOE | Total Rainfall (mm) | 18531.0 |
| Station ID # | 6132 | Average Annual Rainfall (mm) | 463.3 |
| Coordinates | 44°35'N, 80°56'W | Total Evaporation (mm) | 443.6 |
| Elevation (ft) | 580 | Total Infiltration (mm) | 14427.7 |
| Years of Rainfall Data | 40 | Total Rainfall that is Runoff (mm) | 3659.7 |

Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
- For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

| Drainage Area | | Up Stream Storage | |
|-------------------------------|-------|------------------------------------|-----------------|
| Total Area (ha) | 56.52 | Storage (ha-m) | Discharge (cms) |
| Imperviousness % | 22.0 | 0.000 | 0.000 |
| Water Quality Objective | | Up Stream Flow Diversion | |
| TSS Removal (%) | 80.0 | Max. Flow to Stormceptor (cms) | |
| Runoff Volume Capture (%) | 90.00 | Design Details | |
| Oil Spill Capture Volume (L) | | Stormceptor Inlet Invert Elev (m) | |
| Peak Conveyed Flow Rate (L/s) | | Stormceptor Outlet Invert Elev (m) | |
| Water Quality Flow Rate (L/s) | | Stormceptor Rim Elev (m) | |
| | | Normal Water Level Elevation (m) | |
| | | Pipe Diameter (mm) | |
| | | Pipe Material | |
| | | Multiple Inlets (Y/N) | No |
| | | Grate Inlet (Y/N) | No |

| Particle Size Distribution (PSD) | | |
|---|----------------|------------------|
| Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design. | | |
| Fine Distribution | | |
| Particle Diameter (microns) | Distribution % | Specific Gravity |
| 20.0 | 20.0 | 1.30 |
| 60.0 | 20.0 | 1.80 |
| 150.0 | 20.0 | 2.20 |
| 400.0 | 20.0 | 2.65 |
| 2000.0 | 20.0 | 2.65 |

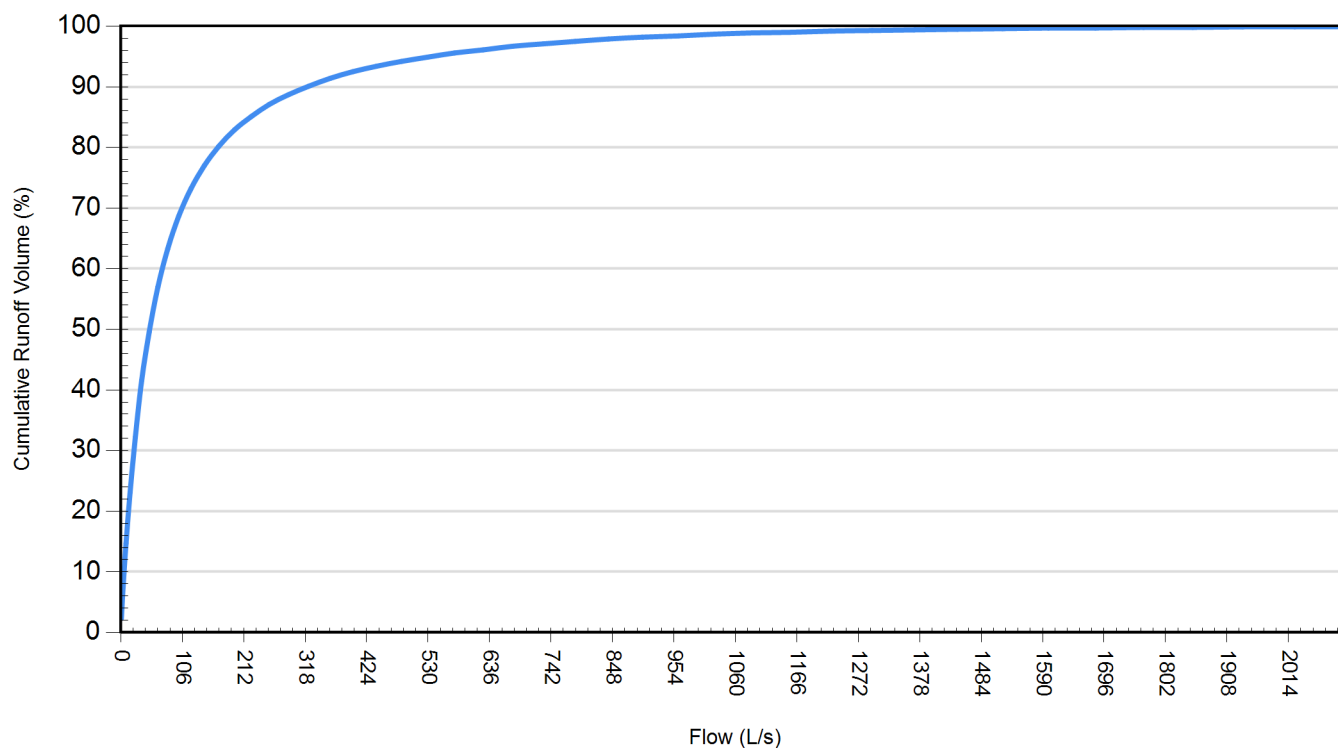
| | | | |
|------------------------------------|---------|--|---------|
| Site Name | | BR33 - Alternative 4 | |
| Site Details | | | |
| Drainage Area | | Infiltration Parameters | |
| Total Area (ha) | 56.52 | Horton's equation is used to estimate infiltration | |
| Imperviousness % | 22.0 | Max. Infiltration Rate (mm/hr) | 61.98 |
| Surface Characteristics | | Min. Infiltration Rate (mm/hr) | 10.16 |
| Width (m) | 1504.00 | Decay Rate (1/sec) | 0.00055 |
| Slope % | 2 | Regeneration Rate (1/sec) | 0.01 |
| Impervious Depression Storage (mm) | 0.508 | Evaporation | |
| Pervious Depression Storage (mm) | 5.08 | Daily Evaporation Rate (mm/day) | 2.54 |
| Impervious Manning's n | 0.015 | Dry Weather Flow | |
| Pervious Manning's n | 0.25 | Dry Weather Flow (lps) | 0 |
| Maintenance Frequency | | Winter Months | |
| Maintenance Frequency (months) > | 12 | Winter Infiltration | 0 |
| TSS Loading Parameters | | | |
| TSS Loading Function | | | |
| Buildup/Wash-off Parameters | | TSS Availability Parameters | |
| Target Event Mean Conc. (EMC) mg/L | | Availability Constant A | |
| Exponential Buildup Power | | Availability Factor B | |
| Exponential Washoff Exponent | | Availability Exponent C | |
| | | Min. Particle Size Affected by Availability (micron) | |

| Cumulative Runoff Volume by Runoff Rate | | | |
|---|--------------------|------------------|------------------------------|
| Runoff Rate (L/s) | Runoff Volume (m³) | Volume Over (m³) | Cumulative Runoff Volume (%) |
| 1 | 47148 | 2027227 | 2.3 |
| 4 | 158235 | 1916187 | 7.6 |
| 9 | 305597 | 1768856 | 14.7 |
| 16 | 478559 | 1595760 | 23.1 |
| 25 | 668509 | 1405427 | 32.2 |
| 36 | 862944 | 1211960 | 41.6 |
| 49 | 1029179 | 1045479 | 49.6 |
| 64 | 1181661 | 892710 | 57.0 |
| 81 | 1313535 | 761046 | 63.3 |
| 100 | 1424839 | 649445 | 68.7 |
| 121 | 1518186 | 556268 | 73.2 |
| 144 | 1597384 | 477125 | 77.0 |
| 169 | 1663417 | 410842 | 80.2 |
| 196 | 1718644 | 355626 | 82.9 |
| 225 | 1765445 | 308825 | 85.1 |
| 256 | 1805724 | 268597 | 87.1 |
| 289 | 1840272 | 234013 | 88.7 |
| 324 | 1869811 | 204479 | 90.1 |
| 361 | 1895399 | 178897 | 91.4 |
| 400 | 1917865 | 156489 | 92.5 |
| 441 | 1937527 | 136815 | 93.4 |
| 484 | 1954531 | 119766 | 94.2 |
| 529 | 1969396 | 104931 | 94.9 |
| 576 | 1982514 | 91799 | 95.6 |
| 625 | 1994390 | 79931 | 96.1 |
| 676 | 2004971 | 69330 | 96.7 |
| 729 | 2014451 | 59869 | 97.1 |
| 784 | 2022693 | 51627 | 97.5 |
| 841 | 2029959 | 44348 | 97.9 |
| 900 | 2036322 | 37983 | 98.2 |
| 961 | 2041916 | 32388 | 98.4 |
| 1024 | 2046726 | 27582 | 98.7 |
| 1089 | 2050734 | 23571 | 98.9 |
| 1156 | 2054118 | 20186 | 99.0 |
| 1225 | 2057110 | 17195 | 99.2 |
| 1296 | 2059742 | 14566 | 99.3 |
| 1369 | 2061964 | 12343 | 99.4 |

| | | | |
|------|---------|-------|------|
| 1444 | 2063818 | 10486 | 99.5 |
| 1521 | 2065515 | 8789 | 99.6 |
| 1600 | 2067138 | 7165 | 99.7 |
| 1681 | 2068633 | 5671 | 99.7 |
| 1764 | 2069883 | 4421 | 99.8 |
| 1849 | 2070845 | 3459 | 99.8 |
| 1936 | 2071611 | 2693 | 99.9 |
| 2025 | 2072199 | 2104 | 99.9 |
| 2116 | 2072631 | 1672 | 99.9 |

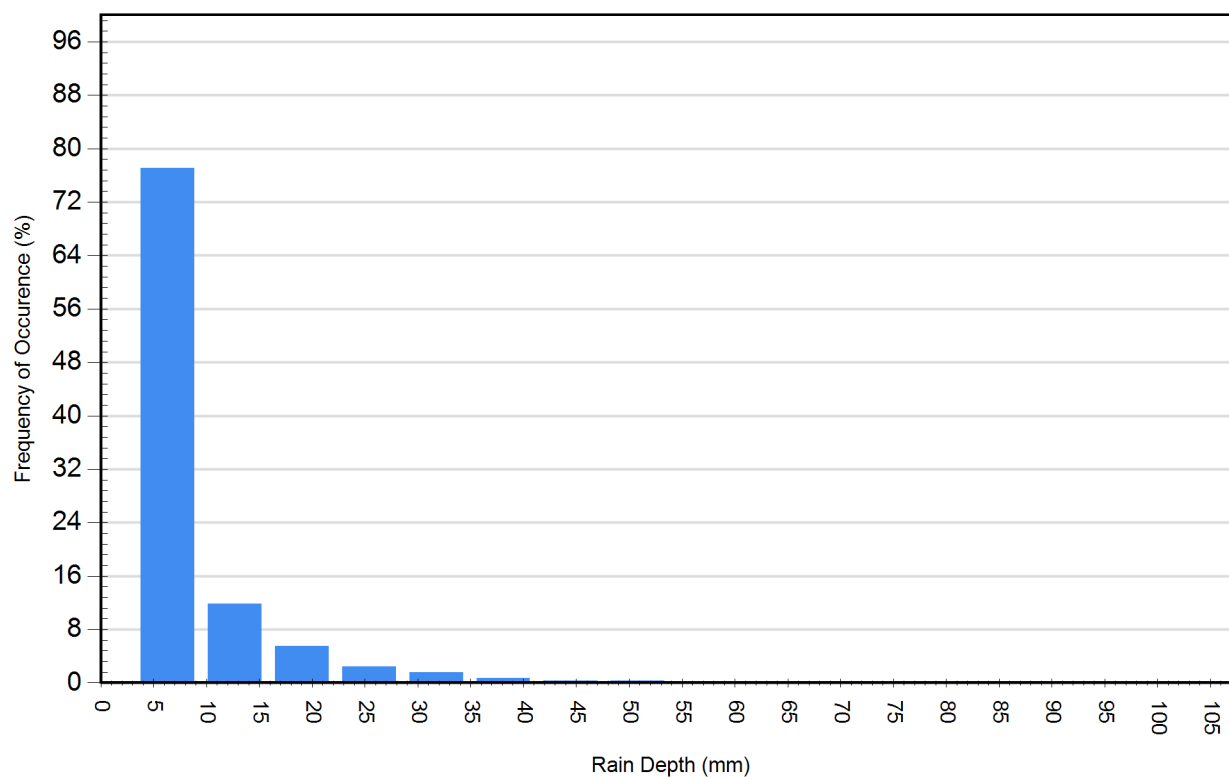
Cumulative Runoff Volume by Runoff Rate

For area: 56.52(ha), imperviousness: 22.0%, rainfall station: OWEN SOUND MOE



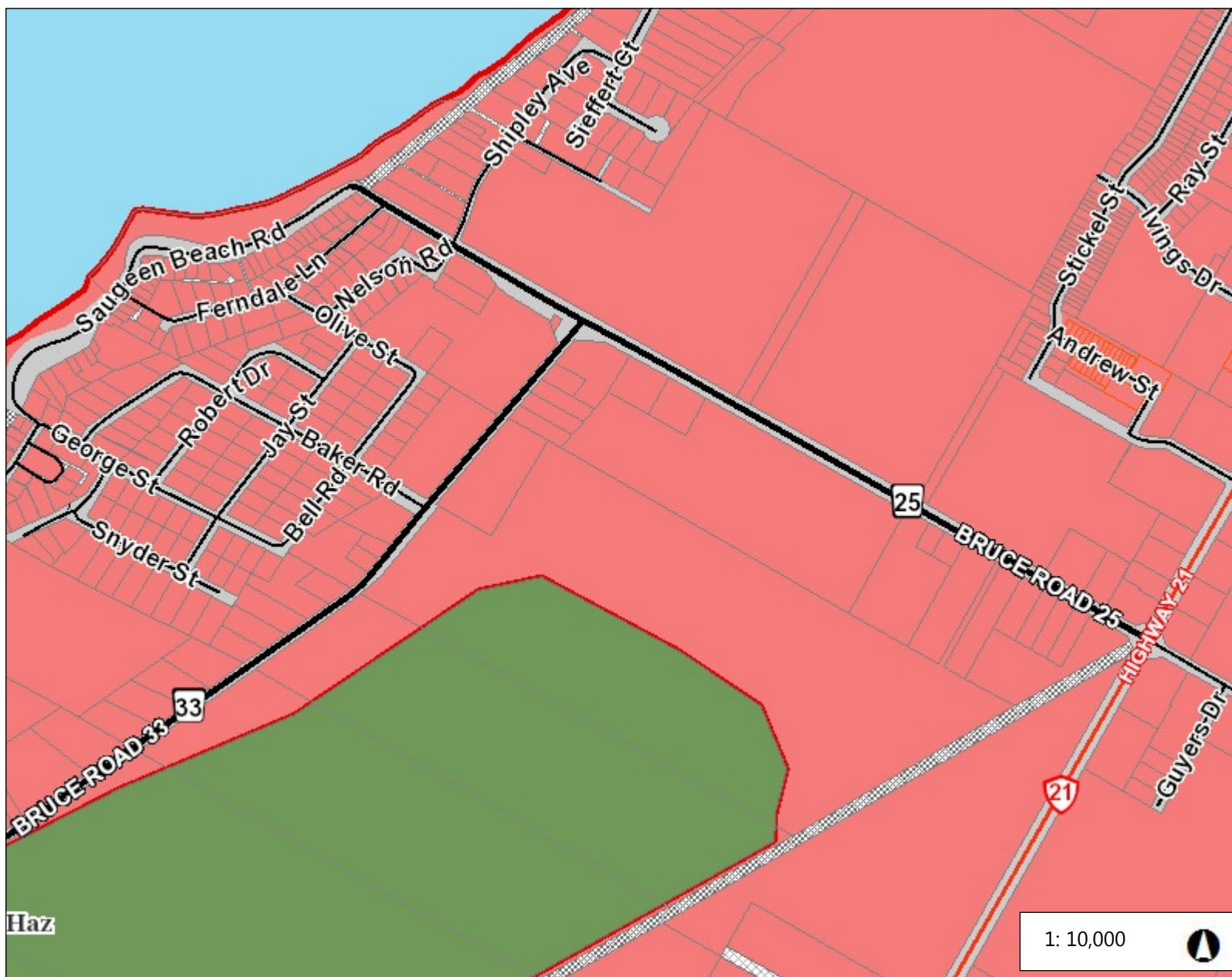
| Rainfall Event Analysis | | | | |
|-------------------------|---------------|--------------------------------|-------------------|---------------------------------|
| Rainfall Depth (mm) | No. of Events | Percentage of Total Events (%) | Total Volume (mm) | Percentage of Annual Volume (%) |
| 6.35 | 2901 | 77.1 | 5026 | 27.1 |
| 12.70 | 444 | 11.8 | 3983 | 21.5 |
| 19.05 | 207 | 5.5 | 3215 | 17.4 |
| 25.40 | 90 | 2.4 | 1973 | 10.6 |
| 31.75 | 59 | 1.6 | 1656 | 8.9 |
| 38.10 | 26 | 0.7 | 898 | 4.8 |
| 44.45 | 12 | 0.3 | 504 | 2.7 |
| 50.80 | 10 | 0.3 | 470 | 2.5 |
| 57.15 | 8 | 0.2 | 433 | 2.3 |
| 63.50 | 1 | 0.0 | 63 | 0.3 |
| 69.85 | 0 | 0.0 | 0 | 0.0 |
| 76.20 | 2 | 0.1 | 144 | 0.8 |
| 82.55 | 1 | 0.0 | 79 | 0.4 |
| 88.90 | 1 | 0.0 | 87 | 0.5 |
| 95.25 | 0 | 0.0 | 0 | 0.0 |
| 101.60 | 0 | 0.0 | 0 | 0.0 |

Frequency of Occurrence by Rainfall Depths



For Stormceptor Specifications and Drawings Please Visit:
<http://www.imbriumsystems.com/technical-specifications>

**ENCLOSURE D:
TRANSPORTATION PLANNING MAPS**



Legend

- BCOP hazard labels
- Municipal or Other Road (large scale labels)
- Ferry
- Provincial Highway
- County Road
- Municipal or Other Road
- Road Allowance/Right-of-way
 - Private Road Allowance
 - Right-of-Way
 - Road Allowance or Condo Road
 - Unopened Road Allowance
- Hamlet
- Hazard
- BCOP Plan Designation
 - Agricultural
 - Bruce Nuclear Power Development
 - Escarpment Natural Area
 - Estate Residential Development
 - Inland Lake Development
 - Major Open Space
 - Primary Urban Community
 - Secondary Urban Community
 - Rural
 - Rural Recreational
 - Travel Trailer Park/Commercial Campgrou
- Body of Water (small scale)
- Adjacent Counties (small scale)
- Wetland
- Adjacent Counties
- Lake Huron and Georgian Bay
- Adjacent Counties
- Lake Huron and Georgian Bay
- Adjacent Counties

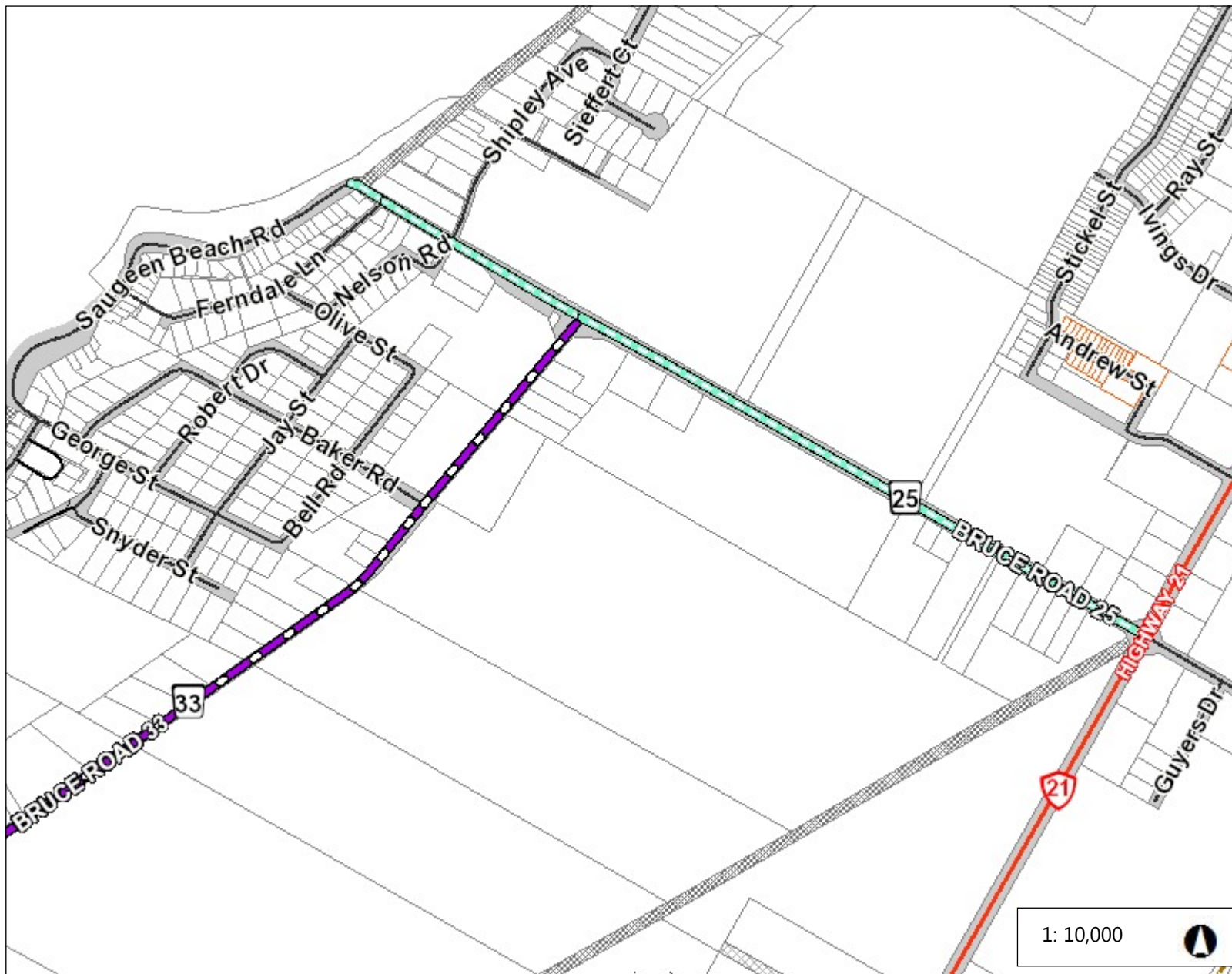
Notes

0.5 0 0.25 0.5 Kilometers

NAD_1983_UTM_Zone_17N
© 2019 County of Bruce

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



Legend

- Municipal or Other Road (large scale labels)
- Airport
- Classified Roads
 - Arterial Urban
 - Arterial Rural
 - Collector Urban
 - Collector Rural
- Bruce County Rail Trail
- Municipal Road
- Provincial Highway
- County Road
- Municipal or Other Road
- Road Allowance/Right-of-way
 - Private Road Allowance
 - Right-of-Way
 - Road Allowance or Condo Road
 - Unopened Road Allowance

1: 10,000



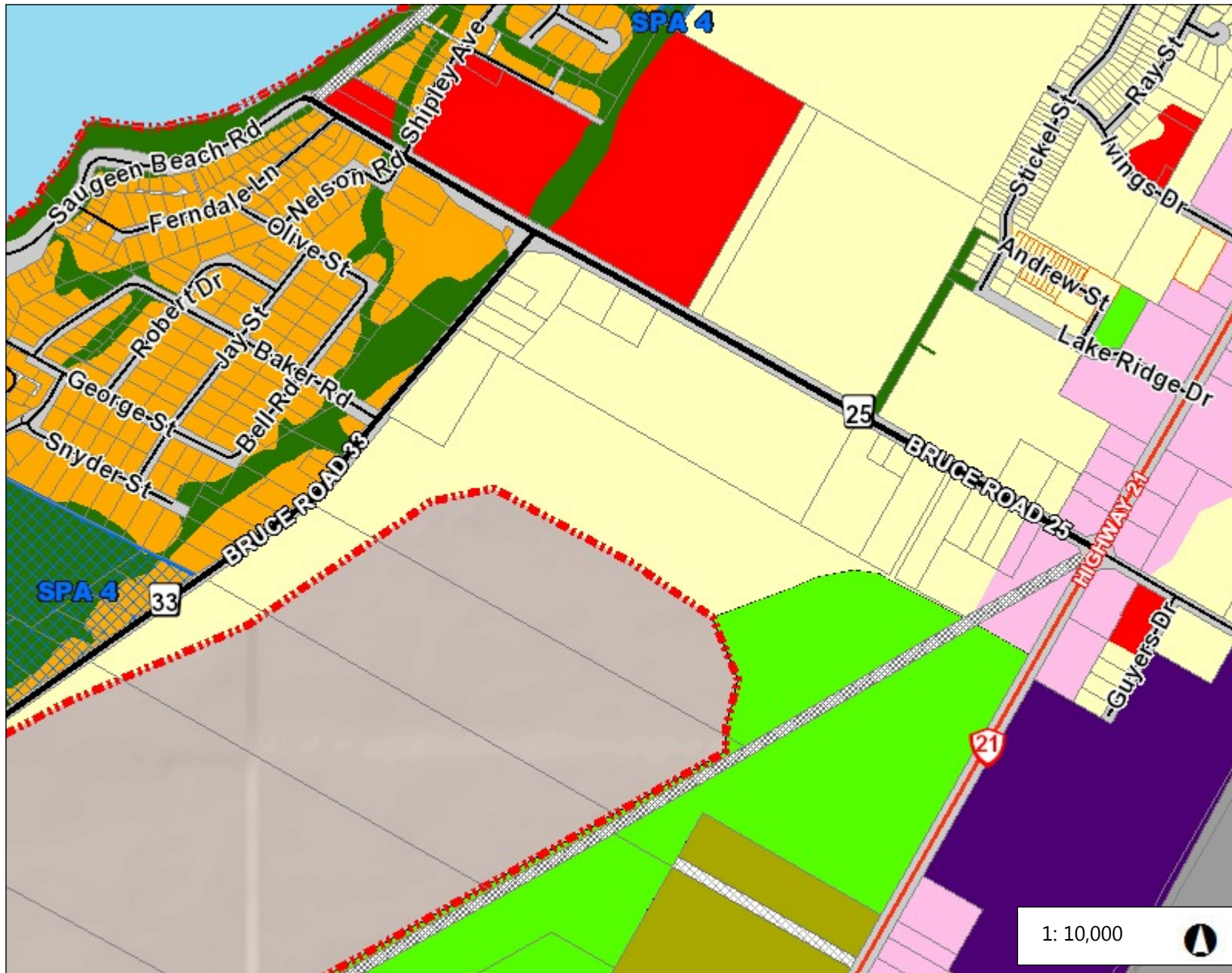
0.5 0 0.25 0.5 Kilometers

NAD_1983_UTM_Zone_17N
© 2019 County of Bruce

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes



Legend

- Local OP SPA labels (SS)
- Municipal or Other Road (large scale labels)
- Provincial Highway
- County Road
- Municipal or Other Road
- Road Allowance/Right-of-way
 - Private Road Allowance
 - Right-of-Way
 - Road Allowance or Condo Road
 - Unopened Road Allowance
- Special Policy Area
- Overlay
 - Methane Buffer
 - Significant Woodland
- Boundary of Local Plan/Settlement Area
- SS Plan Designation
 - Residential
 - Commercial
 - Open Space
 - Resort Recreational
 - High Density Residential
 - Medium Density Residential
 - Low Density Residential
 - Shoreline Residential
 - Recreational
 - Core Commercial Area
 - Office Residential
 - Highway Commercial
 - Marine Commercial
 - Employment
 - Extractive Industrial
 - Institutional
 - Parks and Open Space
 - Environmental Hazard
 - Solid Waste Management Site

1: 10,000



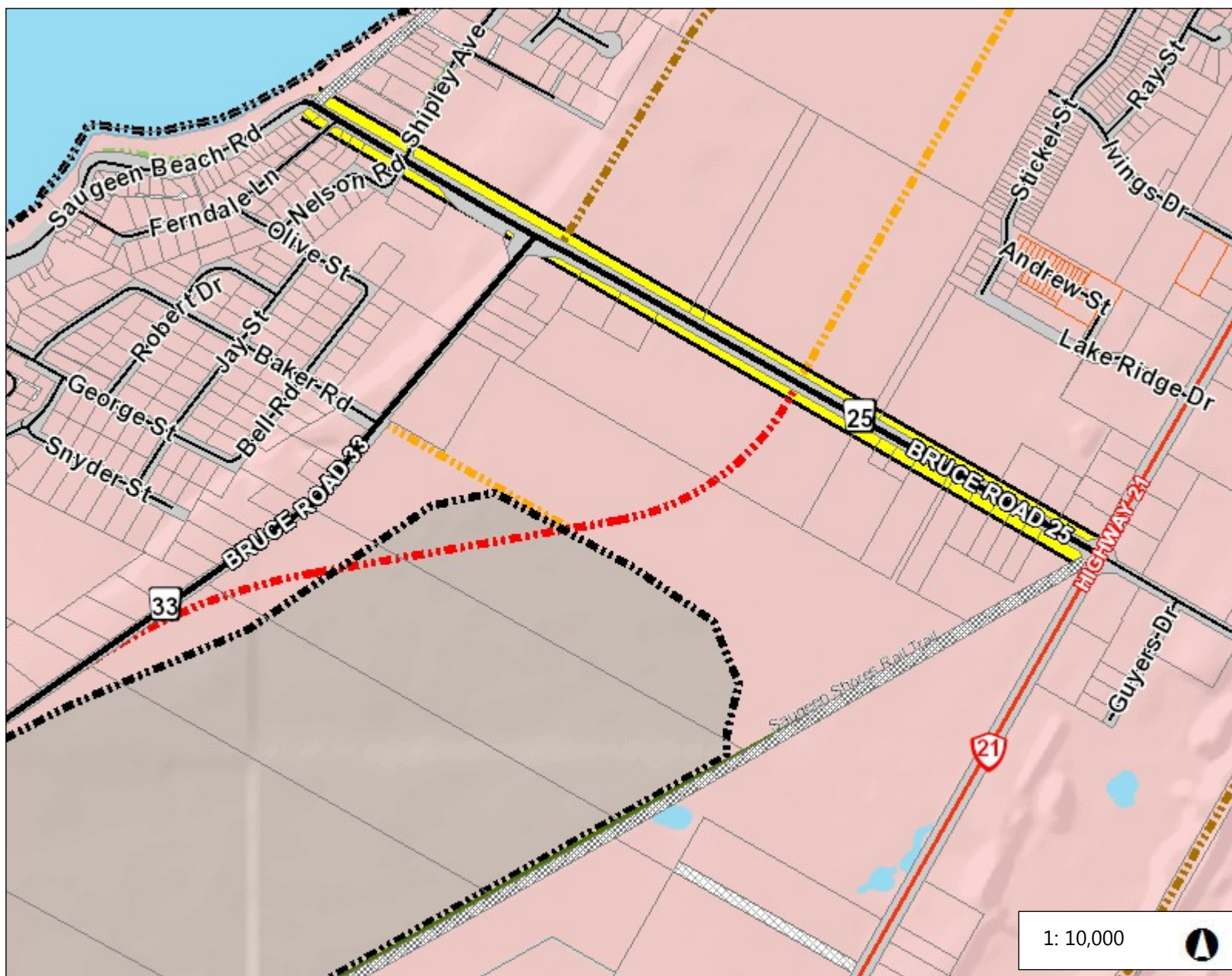
0.5 0 0.25 0.5 Kilometers

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Notes



Legend

- Municipal or Other Road (large scale labels)
- Provincial Highway
- County Road
- Municipal or Other Road
- Road Allowance/Right-of-way
 - Private Road Allowance
 - Right-of-Way
 - Road Allowance or Condo Road
 - Unopened Road Allowance
- Trail
 - Existing Trail
 - Proposed Trail
 - Saugeen Shores Rail Trail
 - Proposed Active Transportation Route
- Boundary of Local Plan/Settlement Area
- Roads and Proposed Roads
 - Arterial Road
 - Collector Road
 - Proposed Arterial
 - Proposed Collector
 - Local Road
- Active Transportation
- Body of Water (small scale)
- Adjacent Counties (small scale)
- Wetland
- Adjacent Counties
- Lake Huron and Georgian Bay
- Adjacent Counties
- Wetland
- Body of Water

1: 10,000



0.5 0 0.25 0.5 Kilometers

NAD_1983_UTM_Zone_17N
© 2019 County of Bruce

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THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

**ENCLOSURE E:
PUBLIC, AGENCY, UTILITY AND
INDIGENOUS COMMUNITY COMMENTS**

Drea Nelson - GM BluePlan

From: Carl Seider <c.seider@greysauble.on.ca>
Sent: Wednesday, October 09, 2019 10:48 AM
To: Drea Nelson - GM BluePlan
Cc: jdonohoe@brucecounty.on.ca; John Slocombe - GM BluePlan; RMO Mailbox
Subject: RE: 217127 Notice of Project Change: Bruce County Road 33 Re-Alignment

Hi Andrea,

Thank you for providing a copy of the Project File regarding the re-alignment of County Road 33.

As noted in your letter, this project does not fall within a high vulnerable source protection area (wellhead protection area or intake protection zone) where Source Protection Plan policies apply. Furthermore, the Source Protection Plan does not contain any policies directed to activities within significant groundwater recharge areas or highly vulnerable aquifers, therefore Source Protection Plan policies do not apply to the proposed road re-alignment project.

Based on the location of the project and proposed works, I can confirm that project activities are not considered a prescribed drinking water threat, and that any activities associated with the project will not change or create new vulnerable source protection areas.

If you have any questions related to this email, feel free to contact me directly.

Carl Seider, Risk Management Official

Grey Sauble Conservation
Risk Management Office
237897 Inglis Falls Road, RR 4
Owen Sound, Ontario, N4K 5N6
Phone: 519-470-3000 Ext. 201
Toll Free: 877-470-3001
Fax: 519-371-0437
c.seider@greysauble.on.ca



From: Drea Nelson - GM BluePlan [mailto:Drea.Nelson@gmblueplan.ca]
Sent: Tuesday, October 08, 2019 12:01 PM
To: Carl Seider <c.seider@greysauble.on.ca>; Carl Seider <c.seider@greysauble.on.ca>
Cc: jdonohoe@brucecounty.on.ca; John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>
Subject: 217127 Notice of Project Change: Bruce County Road 33 Re-Alignment

Good Afternoon,

An addendum to the 'Bruce County Road 33 Re-Alignment Project File' (April 2018), which provides a review and assessment of the alternatives for stormwater management associated with the re-alignment of Bruce Road 33, has been completed to satisfy the Municipal Class Environmental Assessment (EA) process (Municipal Engineers Association, 2015). Version 1 of this addendum discusses the findings, to date, of Phases 1 and 2 of the Environmental Assessment. This correspondence is being provided to your agency (i.e. department, ministry, or authority) as it has been identified to have an area of interest that may be affected by this project.

The *Notice of Project Change* is attached and the Project File Addendum (Version 1) is available for viewing and can be accessed/saved by clicking on the link below. This link will be valid for 21 days.

[https://sendafile.gmblueplan.ca/uploads/10-08-19_093554_Bruce_Road_33_Project_File_Addendum_\(October_8_2019\).pdf](https://sendafile.gmblueplan.ca/uploads/10-08-19_093554_Bruce_Road_33_Project_File_Addendum_(October_8_2019).pdf)

The County of Bruce and the Town of Saugeen Shores also have the Project File Addendum (Version 1) posted on their websites for viewing purposes. Other relevant reports, including the Master Plan (2016) and the Bruce County Road 33 Re-Alignment Project File (April 2018), are also posted.

With the circulation of this *Notice of Project Change* and the Project File Addendum (Version 1), comments regarding the *Preliminary Recommended Solution* for stormwater management are invited for incorporation into the planning of this project. **Comments will be received by GM BluePlan Engineering and/or the County until November 1, 2019.** The public comments received, and agency feedback provided, will be incorporated into the review and assessment of the *Recommended Preferred Solution*, for consideration and acceptance (or otherwise) by Council.

Further, in support of the EA process for this project, we are consulting you with respect to Source Water Protection. Please find enclosed correspondence describing the project that requests your comment.

Please contact Jim Donohoe, Engineering Manager, Transportation and Environmental Services and/or John Slocombe, Project Manager (GM BluePlan Engineering) at the addresses listed on the attached *Notice of Project Change*, with any questions or comments regarding this project.

Best Regards,
Andrea Nelson

Andrea Nelson, M.Sc.

Senior Hydrogeologist / Environmental Planner

GM BluePlan Engineering Limited

1260-2nd Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2219 | c: 519.372.4678

andrea.nelson@gmblueplan.ca | www.gmblueplan.ca



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Drea Nelson - GM BluePlan

Subject: FW: Request for Comments - Saugeen Shores - Notice of Project Change, Bruce County Road 33 Re-Alignment

From: Chris Hachey <hsmasstlrcc@bmts.com>

Sent: Friday, October 11, 2019 11:03 AM

To: jdonohoe@brucecounty.on.ca; John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>

Subject: Request for Comments - Saugeen Shores - Notice of Project Change, Bruce County Road 33 Re-Alignment

Your File: 217127

Our File: Bruce County - Saugeen Shores (Projects)

Dear Mr. Donohoe and Mr. Slocombe,

The Historic Saugeen Métis (HSM) Lands, Resources and Consultation Department has received a copy of the Notice of Project Change for the Bruce County Road 33 Re-Alignment, Class EA located in Saugeen Shores. HSM has taken the time to review the Addendum for the Stormwater Management Facility dated October 8, 2019. HSM has no objection or opposition to the Proposed Bruce County Road 33 Re-Alignment Project as presented.

Thank you for the opportunity to review this matter.

Regards,

Chris Hachey

Assistant Coordinator, Lands, Resources and Consultation

Historic Saugeen Métis
204 High Street
Southampton, Ontario, N0H 2L0
Telephone: (519) 483-4000
Fax: (519) 483-4002
Email: hsmasstlrcc@bmts.com

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1078 Bruce Road 12, P.O. Box 150, Formosa ON Canada N0G 1W0
Tel 519-367-3040, Fax 519-367-3041, publicinfo@svca.on.ca, www.svca.on.ca

October 29, 2019

The County of Bruce
Brian Know, P.Eng.
30 Park St., Box 398
Walkerton, ON
N0G 2V0

Town of Saugeen Shores
Amanda Froese, P.Eng.
600 Tomlinson Drive
P.O. Box 820
Port Elgin, ON
N0H 2C0

GM BluePlan Engineering Limited
Consulting Professional Engineers
John Slocombe, P.Eng.
1260-2nd Ave. East, Unit 1
Owen Sound, ON
N4K 2J3

Dear Mr. Donohoe, Ms. Froese, and Mr. Slocombe:

RE: Notice of Project Change – Schedule B Municipal Class Environmental Assessment
Bruce Rd. 33 Re-Alignment
Part Lot 27-30, Lake Range
Geographic Township of Saugeen
Town of Saugeen Shores

Saugeen Valley Conservation Authority (SVCA) staff have reviewed this proposal in accordance with the SVCA's mandate and the Environmental Planning and Regulations Policies Manual, amended October 2018. The proposed Bruce Rd. 33 Re-Alignment would facilitate a new roadway pattern and drainage plan in an area of drainage problems. SVCA Staff provided comments February 8, 2018 associated with this project as a part of the larger proposal in the area.

Details to the proposed have been provided to the SVCA October 8, 2019, January 16, 2018, and November 20, 2017. The SVCA has reviewed the County of Bruce & Town of Saugeen Shores, Bruce Road 33 Re-Alignment – Addendum: Stormwater Management Facility, Schedule 'B' Environmental Assessment - Project File dated October 8, 2019. The SVCA has also reviewed some related plans associated with Bruce Rd. 25 proposed works and the related drainage proposal. Those works are completed now the SVCA understands on BR 25. SVCA staff offer the following comments.



Watershed Member Municipalities

Municipality of Arran-Elderslie, Municipality of Brockton, Township of Chatsworth, Municipality of Grey Highlands,
Town of Hanover, Township of Howick, Municipality of Morris-Turnberry, Municipality of South Bruce,
Township of Huron-Kinloss, Municipality of Kincardine, Town of Minto, Township of Wellington North,
Town of Saugeen Shores, Township of Southgate, Municipality of West Grey

- 1) The SVCA would recommend larger runoff events be considered then 100 yr. event given sensitive receptors in area, the intent of this work to resolve drainage issues, and given climate change considerations as indicated to be an intent of EA process. Ultimately the intent of this proposal is not to maintain current problems, but it is to resolve problems SVCA staff understand.
- 2) Water quality improvements are sought associated with the Lake Huron Shoreline. While 'Enhanced' water quality treatment is proposed associated with the proposal, higher targets could be set to increased water quality to represent a net gain at shoreline.
- 3) The SVCA's Regulation may be applicable to the proposed Bruce Road 33 western/southern realignment. Road widening or works at the top of the slope, or within 15 metres of the slope and related 'rills' would require SVCA permission. Design details are not yet known at this location for SVCA review.

The SVCA will continue our review upon clarifications and/or revisions being provided to the SVCA.

If you have any questions on the above, please do not hesitate to contact this office.

Yours Sincerely,



Erik Downing
Manager, Environmental Planning & Regulations
Saugeen Conservation

ED/

cc: Mike Myatt, Authority Member, SVCA, via email
Cheryl Grace, Authority Member, SVCA, via email.

Drea Nelson - GM BluePlan

From: Newton, Craig (MECP) <Craig.Newton@ontario.ca>
Sent: Thursday, November 07, 2019 9:39 AM
To: Jim Donohoe (JDonohoe@brucecounty.on.ca)
Cc: Drea Nelson - GM BluePlan; John Slocombe - GM BluePlan; Ritchie, John (MECP); Lafrance, Crystal (MECP); Robinson, Callee (MECP); Amanda Froese; Miguel Pelletier; 'kmeier@brucecounty.on.ca'; Rising, Lareina (MECP); Smith, Mark (MECP); Abernethy, Scott (MECP); DesLauriers, Angelune (MECP); Scheifley, Jody (MECP)
Subject: FW: 217127 Notice of Project Change: Bruce County Road 33 Re-Alignment
Attachments: 217127 Notice of Project Change.pdf; 1. MECP Ltr - K. Meier (Jan 8, 2019).pdf

Good Morning Jim:

This e-mail acknowledges this ministry's receipt with thanks, the immediately preceding email dated October 8th, 2019 and accompanying attachment received directly from the County's consultant for this proposed project, GM Blueplan. This Ministry comments were requested, if any, by November 1st, 2019. I apologize for this ministry's slight delay in providing a written response back to you.

To recap, as discussed during our recent teleconference of October 21st, 2019, the Ministry's position is that the undertaking (the Bruce Road 33 Road Project and the associated Stormwater Management Pond) did not meet the EA requirements (refer to attached ministry letter dated January 8th, 2019). The County of Bruce was required to withdraw their Notice of Completion, and issue a Notice of Project Change for the entirety of the project. Once the additional work and EA is completed, a new Notice of Completion of the EA is to be issued, which will provide an opportunity, for members of the public, agencies and Indigenous communities to submit Part II Order request(s) should they choose to do so on both the road realignment and the stormwater management approach, as they were defined as the undertaking in the Project File.

The County's reference in the preceding email to an Addendum, and Project File Addendum in the associated link, and also in the County's website: https://brucecounty.on.ca/sites/default/files/10-08-19_093554_Bruce_Road_33_Project_File_Addendum_%28October_8_2019%29.pdf is not appropriate as the EA requirements of the original EA were not met. More specifically, the proponent can't author or use an Addendum approach to the original EA, since that original EA never met EA requirements in the first place.

When the MECP advised the County to withdraw the Notice of Completion, the MECP also advised a Part II Order requestor that they would have another opportunity to submit a Part II Order request on the subsequent EA, should they choose to do so, once the Notice of Completion on the subsequent EA was issued. Please ensure once you complete the EA, to reissue a Notice of Completion for the EA (not a Notice of Completion of an addendum), and immediately advise the previous Part II Order requestor directly once the Notice of Completion of the EA has been issued.

With respect to MECP comments on the information you provided in your preceding email of October 8th, 2019, MECP SWR offers the following comments for your due consideration and assistance in ultimately completing the EA:

Source Water Protection:

Per the recent amendments to the Municipal Engineers Association (MEA) Class EA parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be addressed (requirements under the Clean Water Act). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the final EA/Project File/ESR on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. (As a note, even if the project activities in a vulnerable area are deemed to not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important).

Indigenous Consultation:

The information provided through GM Blueplan's email of October 8th, 2019 does not refer to Aboriginal/Indigenous consultation at all. However, in Appendix B "Agencies-Circulation list" the proponent does provide a table that shows that they provided the Notice of Project Change and the information in your October 8th, 2019 email documentation to a list of communities by email and mail. That said, there is no evidence of follow-up (phone calls / subsequent letters) to ascertain if Indigenous Communities have any concerns and/or desire a face to face meeting. It also states that Notice was only provided on October 8, 2019 so in fairness, Bruce County may still intend to do so.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before the County of Bruce may proceed with this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of consultation to project proponents while retaining oversight of the process.

The County of Bruce's proposed project may have the potential to affect Aboriginal or treaty rights protected under section 35 of Canada's *Constitution Act 1982*. Where the Crown's duty to consult is triggered in relation to the County of Bruce's proposed project, the MECP is delegating the procedural aspects of rights-based consultation to the County of Bruce through this email. The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the “Code of Practice for Consultation in Ontario’s Environmental Assessment Process” which can be found at the following link:

<https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process>

Additional information related to Ontario’s *Environmental Assessment Act* is available online at:

www.ontario.ca/environmentalassessments

Indigenous Consultation should not be limited solely to the issuance of the requisite Notices. It should also include follow-up phone calls to confirm Notices were received, confirm whether there are any issues of concern to Indigenous communities, accompanied by offers to meet one on one. The Indigenous Consultation Log to indicate whom was contacted, how and when, and what concerns if any were raised, and how they were addressed, or will be addressed moving forward.

You must contact the Director of Environmental Assessment and Permissions Branch (Director) under the following circumstances subsequent to initial discussions with the communities identified by MOECC:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation has reached an impasse;
- A Part II Order request or elevation request is expected.

The Director can be notified either by email, mail or fax using the information provided below:

| | |
|-----------------|---|
| Email: | enviropermissions@ontario.ca Subject: Potential Duty to Consult |
| Fax: | 416-314-8452 |
| Address: | Environmental Assessment and Permissions Branch 135 St. Clair Avenue West, 1 st Floor Toronto, ON, M4V 1P5 |

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role the County of Bruce will be asked to play should additional steps and activities be required

Species At Risk:

The project encompasses intensive agricultural lands and as such it would be highly unlikely that the proponent would contravene the Endangered Species Act, That said, the final EA should still confirm whether or not this property has the potential habitat for SAR. It is the proponents responsibility to

determine if any SAR or SAR habitat exists within the proposed development. Once the proponent has completed a preliminary screening they can reach out to MECP at SAROntario@ontario.ca with their findings if they so desire.

Yours truly,

Craig Newton
Regional Environmental Planner / Regional EA Coordinator
Ministry of the Environment, Conservation and Parks
Southwestern Region
733 Exeter Road
London, Ontario
N6E 1L3

Telephone: (519) 873-5014
E-mail: craig.newton@ontario.ca

From: Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>
Sent: October-08-19 11:50 AM
To: jdonohoe@brucecounty.on.ca
Cc: John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>
Subject: 217127 Notice of Project Change: Bruce County Road 33 Re-Alignment

Good Afternoon,

An addendum to the '*Bruce County Road 33 Re-Alignment Project File*' (April 2018), which provides a review and assessment of the alternatives for stormwater management associated with the re-alignment of Bruce Road 33, has been completed to satisfy the Municipal Class Environmental Assessment (EA) process (Municipal Engineers Association, 2015). Version 1 of this addendum discusses the findings, to date, of Phases 1 and 2 of the Environmental Assessment. This correspondence is being provided to your agency (i.e. department, ministry, or authority) as it has been identified to have an area of interest that may be affected by this project.

The *Notice of Project Change* is attached and the Project File Addendum (Version 1) is available for viewing and can be accessed/saved by clicking on the link below. This link will be valid for 21 days.

[https://sendafile.gmblueplan.ca/uploads/10-08-19_093554_Bruce_Road_33_Project_File_Addendum_\(October_8_2019\).pdf](https://sendafile.gmblueplan.ca/uploads/10-08-19_093554_Bruce_Road_33_Project_File_Addendum_(October_8_2019).pdf)

The County of Bruce and the Town of Saugeen Shores also have the Project File Addendum (Version 1) posted on their websites for viewing purposes. Other relevant reports, including the Master Plan (2016) and the Bruce County Road 33 Re-Alignment Project File (April 2018), are also posted.

With the circulation of this *Notice of Project Change* and the Project File Addendum (Version 1), comments regarding the *Preliminary Recommended Solution* for stormwater management are invited for incorporation into the planning of this project. **Comments will be received by GM BluePlan Engineering and/or the County until November 1, 2019.** The public comments received, and agency feedback provided, will be incorporated into the review and assessment of the *Recommended Preferred Solution*, for consideration and acceptance (or otherwise) by Council.

Please contact Jim Donohoe, Engineering Manager, Transportation and Environmental Services and/or John Slocombe, Project Manager (GM BluePlan Engineering) at the addresses listed on the attached *Notice of Project Change*, with any questions or comments regarding this project.

Best Regards,
Andrea Nelson

Andrea Nelson, M.Sc.

Senior Hydrogeologist / Environmental Planner

GM BluePlan Engineering Limited

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SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|----------|--|---|
| 1 | 8-Oct-19 | <p>(NAME) our group's technical resource is away until October 20th in Europe. Our email now reaches all our board members.</p> <p>As president of the Beachers Organization I would like to keep our members informed about this project.</p> <p>Since I lack the engineering expertise to understand the purpose of this document would you be kind enough to provide a lay person's explanation that I could share with our members as an introduction to this report.</p> <p>Thanks for your help,</p> | <p>Email Response sent October 21, 2019:</p> <p>As per the Master Plan for Roads and Drainage (2017), the County of Bruce proposes to construct a new roadway to re-align Bruce Road 33 (BR33) to intersect Bruce Road 25 (BR25) at the planned extension of Bruce Street, as outlined in the Project File. The information provided on October 8th pertains to part of the planning process required to advance the re-alignment of BR33.</p> <p>The planning process for the BR33 re-alignment was initiated in January 2018. The Project File, dated April 2018, identified the re-alignment of BR33 to intersect at the future Bruce Street intersection as the Preferred Solution and considered that land acquisition necessary for the planned road re-alignment would also be sufficient to accommodate a stormwater management facility required to support the new road alignment. However, the Ministry of the Environment, Conservation and Parks determined that an assessment of the stormwater management alternatives (related to the road re-alignment) should also be completed. The review of stormwater management alternatives is considered to form a component of the BR33 re-alignment (planning process). The Project File Addendum, although prepared as a 'stand-alone document', forms part of the Project File for the Bruce Road 33 Re-Alignment. The Project File Addendum was issued earlier this week (October 8, 2019) and a link to the report was provided.</p> <p>The purpose of the Addendum is to document the additional review of various stormwater management alternatives associated with the road re-alignment planned in the original report (i.e. the 'Bruce County Road 33 Re-Alignment Project File', dated April 2018). The Addendum recommends that a stormwater management pond ancillary to the road be considered as the appropriate solution to stormwater management associated with the BR33 re-alignment.</p> <p>A description of the alternatives considered, and an evaluation and assessment of the alternatives, are provided in the Report (i.e., the Project File Addendum). The Project File Addendum is posted on the County of Bruce and Town of Saugeen Shores websites.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|---|---|
| 2 | 20-Oct-19 | <p>To whom it may concern,</p> <p>We are the owners of the property located at (--) Baker Road in Saugeen Shores (Lot parcel ID provided). The various small creeks which run through the Baker Street subdivision meet at our property. The small, quiet creek then wraps around our recently-constructed cottage before winding its way toward Lake Huron. In order to build our cottage, we had to comply with strict regulations by the Saugeen Valley Conservation Authority and the Town of Saugeen Shores. This was necessary to protect the creek and surrounding land areas from ecological harm, and to protect our cottage from damage due to potential changes in water flow.</p> <p>As the County, Town and GM BluePlan now consider options for the re-alignment of Road 33 and the associated drainage requirements, it is our hope that the effects on the creek, surrounding property and our cottage have been sufficiently taken into consideration. While we have examined the Project File and the Schedule 'B' Project File Addendum, we cannot determine from these dense and lengthy documents exactly how the various alternatives might affect our land, the creek (where it traverses our property) and, potentially, our property value.</p> <p>We would like further information about how the various project alternatives might affect our property in the following ways:</p> <ul style="list-style-type: none"> • any expected changes to flow volume on our property (increase or decrease) • any expected erosion to land surrounding the creek (if an increase in flow is projected) • size and location of any structures (e.g. pipes, culverts) that might be installed on our property in any of the alternatives • potential redirection or alteration of the creek's path as it traverses our property • any other changes that might occur on or to our property as a result of the implementation of any of the alternatives under study <p>We thank you in advance for your assistance in providing clear and precise details about how the four alternative plans would specifically impact the value, enjoyment and ecological stewardship of our property. We would also like to be notified directly of any further updates or decisions that would affect our property.</p> | <p>An assessment of how the various project alternatives might affect properties in the Baker Subdivision was completed as part of the Project File Addendum. As noted in the Addendum, each of the stormwater management alternatives considered 'no net increase in peak flow' through the Baker Subdivision as a basic requirement. More specifically, the Preliminary Recommended Solution, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, will attenuate post-development peak flow rates to less than, or equal to, pre-development conditions. Ultimately, it is expected that the management of drainage from the area upstream of the Baker Subdivision will result in improvements to the existing drainage conditions through the Baker Subdivision. Therefore, it is not anticipated that any changes to the drainage system, west of Lake Range Road, will be required at this time.</p> <p>Prior to construction, the County will be required to obtain permits from the SVCA and MECP to ensure compliance with their regulations. It is noted that the design phase for the proposed stormwater management facility will be advanced following the completion of the Environmental Assessment process. The design drawings will form part of the applications to the SVCA and MECP for their review and approval.</p> <p>We note that the Master Plan considers a future storm sewer system within the Baker Subdivision, the installation of which would coincide with a sanitary sewer installation project. Although the Town previously has submitted funding applications to the Province, to make such a project economically viable, the Town, as yet, has not been successful in securing funding.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|-----------|---|-------------------------------------|
| 3 | 21-Oct-19 | <p>Thanks for the opportunity to comment on the project change for Bruce Rd 33. As a property owner for 35 years and full time resident for 16 years in the Baker subdivision, I have been following drainage issues for Lake Range Rd (Bruce Rd 33) since the early 1990s. It was at that time the former Saugeen Township rebuilt Lake Range Rd. It is my understanding that contrary to the engineered design of the road, drainage water was diverted from the upper fields to the Baker subdivision. Now for the most part, runoff has been rectified as a result of development along Bruce Road 33.</p> <p>Therefore I support Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, as the Preliminary Recommended Solution.</p> | Support for Alternative 2 is noted. |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|--|--|
| 4 | 25-Oct-19 | <p>Re: Road 33 Notice of Project Change</p> <p>SUMMARY</p> <p>I am intimately familiar with the storm drainage in the area of County Roads 33/25 and have serious interest in ensuring the impacts of development are minimized. It is hoped my comments will enhance the drainage design proposed to ensure the intent of good engineering practice is achieved rather than simply meeting the minimum interpretation of the written guidelines to achieve a design that may be technically acceptable but misses the main focus which is environmental protection.</p> <ol style="list-style-type: none"> 1. Provide a Hybrid SWM Pond with a forebay, permanent pool and wetland fringes rather than a Dry Pond to maximize quality treatment. 2. Provide a communal treatment facility for the entire watershed rather than relying on multiple privately installed and maintained systems. 3. Use the Road 33 re-alignment and SWM facility as an opportunity to reduce the drainage area and resulting contributing flows to the Gobles Grove Beach outlet. 4. Ensure storm water discharge from the SWM facility matches the capacity of the Baker Subdivision receiving system in its present condition and adjust the discharge rates as required in the future when improvements are made. 5. Ensure the modelling parameters are accurately calibrated to measured flows to ensure true pre-development to post-development control is achieved. <p>All of these concerns and others were identified in my initial response to the proposed work on Road 33/25 at the start of the review process. Some were addressed in the design and Environmental Assessment process however the more critical items noted above were apparently judged inappropriate and/or ignored. Hopefully with further consideration the merits of each will be seen.</p> <p>The remainder of the submission elaborates on and provides support for the above comments. Several potential as-built deficiencies have been identified in support of these suggestions and should not be ignored.</p> <p>NOTE: Outlined above is the summary provided. A copy of the entire correspondence providing more detailed comments is included in this Appendix.</p> | <ol style="list-style-type: none"> 1. During the subsequent design phase water quality treatment provisions will be detailed in accordance with MECP requirements. Due to the sandy nature of the local soils an infiltration type system may be more suitable than a wet-pond type system to enhance downstream water quality. 2. The recommended stormwater management solution addresses increase in runoff from the new road itself. Future development may expand on this facility at the time of a Planning Act application. It would be pre-mature to anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes. 3. This Bruce Road 33 stormwater management review follows the direction for drainage as established in the Master Plan. 4. The intention is to ensure sufficient land is available at this time for a stormwater management facility, such that no net increase in downstream peak flow, at a minimum, is realized due to the construction of BR33. The Town may consider advancing a future project to install storm sewers, coincident with sanitary sewers, within the Baker Subdivision as funding permits. 5. The analyses are prepared using standard practices. |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|---|---|
| 5 | 28-Oct-19 | <p>I was unable to find any information on the increase in flow to the BR25 outlet or Shipley Creek in this report.</p> <p>Has there been any public consultation regarding the stormwater management options now that it is a Schedule B project.</p> | <p>The analyses relate to the planned construction of the Bruce Road 33 re-alignment, as outlined in the Master Plan for Roads and Drainage (2017).</p> <p>Stormwater management alternatives related to the planned construction of BR33 are being reviewed as part of the Schedule 'B' process for the re-alignment of Bruce County Road 33 which was initiated in January 2018. The Notice of Project Change was issued on October 8th, 2019 to solicit comments and feedback from the public, stakeholders, interested public, agencies and Indigenous Communities specific to the stormwater management alternatives being reviewed for the re-alignment of BR33.</p> |
| 6 | 3-Nov-19 | <p>I am responding to the notice of project that was sent on Oct. 7.</p> <p>I feel that the County should design and build infrastructure that assesses the drainage from the entire area instead of a fragment of the area.</p> <p>There are several reasons why this should be done.</p> <p>1. It is important that all of the stormwater in the area be taken into account while planning both the roads and the future land use to get the best end result. This is the time to do it instead of piecemealing infrastructure and subdivision projects. An example where proper planning has not been done is on CR 25. There is significant erosion occurring at the outlet of the drain on CR25, and although we were told otherwise, water is constantly flowing out of the basin and there is algae in the outflow into the lake.</p> <p>2. There is a need for sanitary sewers in the Baker Subdivision and they have been discussed for years. We were told that sewers would be built in the Baker subdivision at the same time as storm sewers. With increasing year round development, larger houses and aging septic, it is time to build the necessary infrastructure.</p> <p>I understand that the County would rather push the stormwater planning and construction to developers, but I feel that proper development of infrastructure is important and should be planned for the long term.</p> <p>I appreciate the opportunity to input into this project.</p> | <p>Alternatives that considered stormwater management for future development within the Town lands upstream of the Baker Subdivision, in addition to the management of runoff specific to the re-alignment of Bruce County Road 33, were completed. An evaluation and assessment of these alternatives is included in the Project File Addendum.</p> <p>1. The recommended stormwater management solution addresses increase in runoff from the re-alignment of the County road (i.e. BR33) itself. Future development within Town lands may expand on this facility at the time of a Planning Act application. It would be pre-mature to anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes.</p> <p>2. The Master Plan for Roads and Drainage (2017) considers a future storm sewer system within the Baker Subdivision, the installation of which would coincide with a sanitary sewer installation project. Although the Town previously has submitted funding applications to the Province, to make such a project economically viable, the Town, as yet, has not been successful in securing funding.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|----------|---|--|
| 7 | 6-Nov-19 | <p>[We] just returned from holidays so we are a bit late with our response to the notice we received in the mail regarding the change to the Bruce Road 33 Project. It is noted that Alternative 2 - Construct a SWM facility to manage runoff related only to the Bruce Road 33 as the preferred alternative.</p> <p>However, no information has been provided as to where/how the SWM system will be done. We are very concerned about this. The SWM system (drain) at the end of the CAW Road is really quite a disaster. The beach erosion has already been significant and it has only been there for a few months! Coupled with the extremely high lake levels right now, it would be very damaging to another beach area to have another drain installed somewhere else?</p> <p>Can you provide clarification on what the County Road 33 SWM system will consist of?</p> | <p>An assessment of how the various project alternatives might affect properties in the Baker Subdivision was completed as part of the Addendum to the Project File. As noted in the Addendum, each of the stormwater management alternatives considered 'no net increase in peak flow' through the Baker Subdivision as a basic requirement. More specifically, the Preliminary Recommended Solution, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, will attenuate post-development peak flow rates to less than, or equal to, pre-development conditions. Ultimately, it is expected that the management of drainage from the area upstream of the Baker Subdivision will result in improvements to the existing drainage conditions through the Baker Subdivision. Therefore, it is not anticipated that any changes to the drainage system, west of Lake Range Road, will be required at this time.</p> <p>The design of the stormwater mangement system will be advanced during the design phase.</p> |

October 25, 2019

Re: Road 33 Notice of Project Change

SUMMARY

I am intimately familiar with the storm drainage in the area of County Roads 33/25 and have serious interest in ensuring the impacts of development are minimized. It is hoped my comments will enhance the drainage design proposed to ensure the intent of good engineering practice is achieved rather than simply meeting the minimum interpretation of the written guidelines to achieve a design that may be technically acceptable but misses the main focus which is environmental protection.

1. Provide a Hybrid SWM Pond with a forebay, permanent pool and wetland fringes rather than a Dry Pond to maximize quality treatment.
2. Provide a communal treatment facility for the entire watershed rather than relying on multiple privately installed and maintained systems.
3. Use the Road 33 re-alignment and SWM facility as an opportunity to reduce the drainage area and resulting contributing flows to the Gobles Grove Beach outlet.
4. Ensure storm water discharge from the SWM facility matches the capacity of the Baker Subdivision receiving system in its present condition and adjust the discharge rates as required in the future when improvements are made.
5. Ensure the modelling parameters are accurately calibrated to measured flows to ensure true pre-development to post-development control is achieved.

All of these concerns and others were identified in my initial response to the proposed work on Road 33/25 at the start of the review process. Some were addressed in the design and Environmental Assessment process however the more critical items noted above were apparently judged inappropriate and/or ignored. Hopefully with further consideration the merits of each will be seen.

The remainder of the submission elaborates on and provides support for the above comments. Several potential as-built deficiencies have been identified in support of these suggestions and should not be ignored.

[REDACTED]
[REDACTED]
[REDACTED]

COMMENTS

1) Storm Runoff Quality/Quantity Control

Potential Problem

The proposed roadside ditches are described as 'enhanced swales' for quality control, when in reality, they are conveyance channels that intercept the overland sheet flow, concentrate it and re-direct it to the outlet with a reduced time of concentration thereby potentially increasing the peak discharge rate. The only quality control provided is the minor filtration that occurs in the maintained grass surface and the fact that a dense turf surface reduces potential scour compared to sparse vegetation or bare ground. High maintenance is required to maintain this type of surface and regular mowing will be difficult to achieve due to the seasonally wet ditch bottom areas that will result from the shallow profile slope.

A 'Dry Pond' provides quantity control but very little quality control. Sands and gravel will easily be captured in the roadside ditches, however, silts, clays and fine suspended solids are difficult to capture in a dry pond that has a limited storage period. Most of the suspended solids and all dissolved materials (salt) will simply pass through the facility untreated and undiluted. The first flush runoff which has the highest pollutant levels will pass through the facility with no treatment prior to the start of active storage. A Dry Pond can therefore not be described as 'polishing' the discharge. A dry pond is not aesthetically pleasing or of any biological significance.

Suggested Solution

A hybrid pond with permanent pool and wetland fringes would be much more efficient at achieving the desired goal of 'polishing' the storm water discharge before it enters the receiving system and the Lake. The roadside ditches would provide conveyance to the detention facility with minor passive quality control through capture of any coarse sediment. The facilities forebay would capture the major sediment load before it flows over a forebay berm submerged 100 to 200mm below the permanent pool elevation. The major sediment deposits are retained in the confined forebay area for easy cleanout once every 5 to 10 years (perhaps longer as the contributing area is built-up). The permanent pool with wetland fringes would provide extended detention, dilution of discharge and biological cleansing of the runoff.

A hybrid pond can be an aesthetically pleasing feature if constructed with varying side slopes and an irregular, natural shape. Fencing can be minimized by heavily vegetating sloped areas greater than 3:1 but eliminated elsewhere, further softening the impact of the facility on the area. There is also the added bonus of habitat creation for reptiles, amphibians and birds.

Many major communities in southern Ontario are now in a retrofit mode to provide hybrid features to old SWM systems to resolve deficient storm water management issues. We have an opportunity now to learn from their past mistakes by building a proper pond in the first place.

2) Local vs Communal SWM Facility

Potential Problem

It is difficult to achieve continued long term functionality of private SWM facilities when the owners, current and future, do not fully understand their purpose. There have been instances where a well-meaning land owner 'solved' the temporary ponding that occurred in their parking lot after significant rainfall events by removing 'that piece of steel' that was partially blocking the outlet pipe of the catchbasin. They didn't realize that this orifice plate and temporary surface storage was vital to the SWM performance of the entire watershed.

When divided into small contributing areas, the overall time of concentration of the watershed is severely impacted. Individual sites may have a time of concentration of 10 minutes or less and use this criteria for design purposes. The result is artificially high allowable discharge rates with everyone releasing the 'controlled flow' at the same time. Under pre-development conditions, the overall time of concentration of the watershed could have been 60 minutes or more with correspondingly lower peak flow rates.

Suggested Solution

A communal Storm Water Management facility is highly recommended over a series of small systems in private ownership that also rely on private maintenance. A single system with dedicated maintenance staff requires far less overall time expenditure and provides superior SWM quality treatment and peak discharge rate control. The upfront costs of the facility may be a temporary burden on the municipality, but they will be recovered over time through development lot levies. If the facility is constructed within a reasonable lead time before development, costs will be returned rather quickly.

3) Adjacent Drainage Issues

While currently divided into separate watersheds, the Road 33 and Road 25 reconstruction projects are linked and require a coordinated design approach to address the SWM issues.

Potential Problem

I am of the understanding the current Road 25 design captures runoff from future development primarily north of Road 25 and directs it through a major 100 year trunk sewer to the top of the Nipissing Bluff. At this point, the pipe capacity reduces to a more typical 5 year design and surplus runoff is intended to surcharge and flow overland on the roadway to Lake Huron and/or the cold-water stream adjacent to the Nelson Road/ShIPLEY Ave intersection. A visual appraisal of the current as-built conditions identifies the following concerns:

- There is currently no defined relief structure for the 100 year flows to surcharge onto the roadway.

- The five year pipe will be subject to a significant upstream head before (and during) surface relief and the five year pipe will therefore be subject to pressure flow. The discharge velocity in the pipe and at the beach outfall may be significantly higher than that calculated assuming gravity flow.
- If the intended surcharging occurs, there appear to be minimal measures taken to ensure the runoff spills to the roadway rather than down the steep embankment slope to the Unifor property.
- Major overland runoff that results in flow depths greater than 50mm+/- at the gutter line will spill through two reverse graded driveway ramps onto the Unifor property
- The road profile has been designed to create surface ponding at the coldwater stream crossing.
- As-built grading encourages the ponded waters to spill into the coldwater stream on the upstream side of the road culvert.
- The road culvert will be a restriction to the major flow and upstream ponding could occur with potential flooding on Nelson Road and private properties both upstream and downstream of the Nelson Road culvert.
- Regardless of where the spill occurs to the cold-water stream, the downstream channel and driveway culverts may be severely impacted by the direct connection of major flows to the watercourse. There may also be detrimental impacts to the trout habitat within the stream.
- Stormceptor units installed for SWM treatment are effectively oil/grit separators for minor flows only. Major flows as well as suspended and dissolved solids pass through without capture. These units are better suited for use as a local parking lot capture device as part of a treatment train that provides further downstream cleansing rather than the sole means of treatment prior to discharge to a vulnerable cold-water stream.

Suggested Solution

The contributing area to the Road 33 watershed and Baker Road SWM facility should be expanded to include the future development areas north of Road 33 and east of Bruce Street. This will reduce the contributing area to the Gobles Grove Beach outlet thereby reducing the peak flows in the watershed considerably.

4) Baker Subdivision Outlet

Potential Problem

Discharge will be required to the Baker subdivision prior to the installation of a new storm sewer system designed to accommodate the local runoff and controlled detention facility discharge. This delay poses some design limitations. In addition, the road network and adjacent grading within the subdivision will not be suitable for overland spill of the major storm.

Suggested Solution

The discharge orifice of the detention facility could be sized on an interim basis to restrict flows to acceptable levels using the volume available for ultimate development during a period when the watershed is largely undeveloped. As development occurs, the Baker subdivision improvements will probably also occur and the allowable discharge rate could be adjusted to match the new receiving system capacity.

The discharge controls of a hybrid SWM pond system typically restrict all flows up to the 100 year event to levels that approximate that of the pre-development five year storm. Major 100 year flows are typically well contained within the facility with the exception of relatively short term spill flows that occur over only a few modelling time-steps, typically 30 minutes or less. This short duration spill could be directed southerly through the Road 33 ditch to the Gore Drain outlet. Significant attenuation and storage of this spill flow would occur in the roadside ditch. Modelling of both watersheds should be performed to ensure the peaks from each do not coincide. The resulting flows in the Gore Drain outlet could be over a marginally longer time period but not of a greater discharge rate depending on the timing of the peaks.

5) Model Calibration

Modelling is often performed using general assumptions for the watershed. Field calibration of the design flows to actual flows frequently indicates adjustments are required to the modelling input parameters. Photos were taken immediately following a short duration high intensity rainfall event April 26, 2019. The Photo A series shows the Baker subdivision storm sewer system flowing near capacity. The Photo B series shows zero discharge through the Howard Chappell culvert located north of Baker Road on Road 33. The Photo C series shows relatively minor flows occurring on Road 25 under predevelopment conditions prior to road reconstruction; roadside discharge was occurring to the cold-water stream, but no concentrated discharge was observed at the lake.

The flows experienced on Baker Road confirm that this was indeed a severe event, however, under the same conditions, Road 25 received minimal discharge and very low suspended solid concentration. The current as-built conditions have improved the Road 25 storm water collection and transport system significantly and much higher peak flows and sediment load can now be expected. Mitigating measures should be seriously considered to alleviate quality and quantity concerns as well as potential property, stream and beach damage that may now occur from the potentially higher flow rates.



A1 - Baker Road south ditch line at Bell Rd Culvert

April 26, 2019 11:41am



A2 - Baker Road north ditch line at Jay Street Culvert

April 26, 2019 11:44am



A3 - Baker Road north ditch line at Robert Drive Culvert

April 26, 2019 11:45am



**A4 - Baker Road north ditch line
driveway culvert**

April 26, 2019 11:46am



**B1 - Downstream end of Chappell
Culvert on Road 33 north of Baker
Street intersection**

April 26, 2019 11:37am



**B2 - Upstream end of Chappell Culvert
on Road 33 north of Baker Street
intersection**

April 26, 2019 11:37am

| | |
|--|--|
|  | <p>C1 - Cold-water Stream culvert on Road 25 adjacent to Shipley/Nelson intersection.</p> <p>Note that even after an intense rainfall event, the base flow and sediment load in the cold-water stream are barely impacted.</p> <p>April 26, 2019 11:50am</p> |
|  | <p>C2 - Cold-water Stream culvert on Road 25 adjacent to Shipley/Nelson intersection</p> <p>Minor sediment load (discoloured water) can be seen where the ditch flow merges with the stream base flow (still clear).</p> <p>April 26, 2019 11:50am</p> |

BACKGROUND *(Who is this guy?)*

I have resided in Gobles Grove for 60+ years on both a full time and seasonal basis. Our permanent address is Port Elgin; however, we have maintained a Kitchener address for seasonal use.

I retired in 2011 with 35 years of experience as a Civil Engineering Technologist working out of the Kitchener/Waterloo office of AECOM, a large consulting firm with over 50,000 employees worldwide. I was a Senior Designer in both the Community Infrastructure and Water Resources Groups working on a broad range of projects in the public and private sectors. These projects included Site Development, Subdivision Design, Watershed Planning and Management, Channel Naturalization, Road Reconstruction, Communal Water Supply and Distribution, Subsurface Sewage Disposal and Environmental Assessment. My speciality was Storm Water Management Design and Modelling. Prior to this, I worked for two summers in the early 1970's on the Bruce County Highways survey crew.

I am not interested in design issue confrontations. (I had enough of that in my career) but simply request careful consideration of the personal and professional suggestions provided in order to

minimize any negative impacts of the proposed development. I am not a member of The Beachers' Association since I prefer to be a small somewhat experienced voice with the matters at hand rather than a large one that may have sincere passion and valid concerns but may offer solutions that still require design refinement. They have been copied on this submission and will hopefully find them of value.

I don't deny that I have strong environmental concerns. I was the founding president of the Friends of MacGregor Point Park. I am currently on the Huron Fringe Birdfest organizing committee. I am a property steward for four properties within Saugeen Shores that are owned or managed by the Escarpment Biosphere Conservancy. I am also involved with many other nature and environmental activities of local, provincial and national interest. I was fortunate that my career gave me the opportunity to design many projects with justifiable concern for the environment. We need more of this.

**ENCLOSURE F:
COMMITTEE REPORT**



Committee Report

To: Warden Mitch Twolan
Members of the Transportation & Environmental Services
Committee

From: Miguel Pelletier
Director of Transportation & Environmental Services

Date: November 21, 2019

Re: Bruce Road 33 Environmental Assessment (EA)

Staff Recommendation:

That, in consideration of the accepted Preferred Solution for the Bruce Road 33 Schedule B Environmental Assessment, to re-align Bruce Road 33 to intersect Bruce Road 25 at the future Bruce Street intersection, the Preferred Solution to stormwater management (SWM) be Alternative 2: to construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment, be approved.

Background:

The County and Town of Saugeen Shores completed a Master Plan for Roads and Drainage for Bruce Road 33 and Bruce Road 25 in May 2017. The outcome of the Master Plan identified the re-alignment of Bruce Road 33 to intersect with Bruce Road 25 at the future Bruce Street alignment as a Schedule B project. The attached map provides an overview of the phases resulting from the Master Plan.

The Bruce Road 33 project was undertaken in accordance with the Municipal Class Environmental Assessment (EA) Planning Process as a Schedule B Project. Committee approved the preferred solution for the Bruce Road 33 EA to be alternative 3: realign the Bruce Road 33 intersection with future Bruce Street Intersection. On May 1, 2018, the County issued a Notice of Completion related to the proposed re-alignment of Bruce Road 33. During the 30-day public review period the Ministry of Environment, Conservation and Parks (MECP) received one Part II Order Request. In its review of the Project File, the Ministry determined that an additional study was required relating to the stormwater management facility, as a result the Notice of Completion, issued at that time, was no longer valid.

Additional studies associated with the stormwater management facility were completed and an addendum to the Project File was prepared and circulated to agencies and the public for review and comment. The County issued a Notice of Project Change on October 8, 2019, to landowners, aboriginal communities, agencies and the public.

Summary of Landowner and Public Comments received:

1. One comment requested clarification on how the various project alternatives may impact the properties and creek system to the west of Lake Range Road (i.e. within Baker Subdivision), citing concern for potential impacts to property value. Potential impacts of concern included changes to flow volume (particularly the potential for increased flows), impacts directly to the residential properties via erosion to land surrounding the creek or alteration to the creek's path, and additional structures that may need to be installed within the Baker Subdivision to support the stormwater management system for Bruce Road 33.

2. Support for Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of Bruce Road 33 as the Preliminary Recommended Solution, was provided. The basis for this support was that, under Alternative 2, drainage from the upper fields to the Baker Subdivision, which is currently diverted to the Subdivision, may be 'rectified as a result of development along Bruce Road 33'.

3. Comments were provided with the intention to ensure that impacts of the development will be minimized and to potentially 'enhance the drainage design proposed'. In general, a preference for an alternative that considered stormwater management for future development within Town lands upstream of the Baker Subdivision, in addition to the management of runoff specific to the re-alignment of County Road 33, was corresponded. In addition, feedback specific to the analysis (i.e. modelling) and general design features, which may be further considered during the subsequent design phase, were also outlined in detail.

It is noted that the intention of the analysis and preliminary design completed to support the selection of a preferred stormwater management alternative was to confirm that sufficient land area may be available including the proposed construction of ancillary works (as identified in the Parent Project File). These preliminary assessments were also completed to ensure no net increase in peak flow downstream through the Baker Subdivision, as a result of the construction of Bruce Road 33.

4. Clarification of the EA Process was requested and a question stating '... has there been any public consultation regarding the stormwater management options now that it is a Schedule B project?' was posed.

5. Comments were provided re-iterating the preference for the County to consider the Town's future land use and identifying the 'need for sanitary sewers in the Baker Subdivision'. As discussed in the Addendum to the Project File, although alternatives considering stormwater management for future development within the Town lands upstream of the Baker Subdivision were evaluated, the recommended stormwater management solution addresses increase in runoff from the re-alignment of the County road (i.e. Bruce Road 33) itself.

Future development within Town lands may expand on this facility at the time of a Planning Act application, at the cost of the developer as an alternative to constructing a facility within the development lands. It would be pre-mature to

anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes. Some of the future lands are not within the Settlement Boundary for the Town and would therefore are not likely to be developed in the near future.

These comments will be more fully addressed in the updated '*Bruce County Road 33 Re-Alignment Project File (including Addendum) - Schedule 'B' Municipal Class EA*' (Version 2 of the Addendum). A preliminary summary of the comments and general responses is provided as an attachment.

Agency Comments received can be summarized as follows:

1. Comments received from the Saugeen Valley Conservation Authority (SVCA) indicate that 'given the sensitive receptors in the area, the intent of this work to resolve drainage issues, and given climate change considerations', run-off events, greater than the 100-year event, and 'higher targets', to increase water quality and effect a net gain at the shoreline, be considered. As noted in the Project File, the design phase will address requirements of the SVCA and MECP and will be advanced following the completion of the Environmental Assessment Process. The SVCA and MECP will be issued a copy of the design drawings for review and approval in conjunction with the required permit applications.
2. Ministry of Environment Conservation & Parks (MECP) comments emphasized that, since the original Notice of Completion was withdrawn, the new Notice of Completion should '*provide an opportunity for members of the public, agencies and Indigenous Communities to submit Part II Order request(s) should they choose to do so on both the road re-alignment and the stormwater management approach*'. Consistent with this requirement, the attached Notice of Completion (Draft) identifies the opportunity for the public to comment on both aspects of the project.

The MECP re-iterates that the Project File must address Source Water Protection (SWP). SWP concerns are addressed in Section 9.3.4 of the supplement (or Addendum) to the Project File. Further, the SVCA Risk Management Office was consulted via the Notice of Project Change. Correspondence provided from the SVCA Risk Management Office on October 9, 2019 confirmed that, based on the location of the project and the proposed works, project activities are not considered a prescribed drinking water threat, and that any activities associated with the project will not change or create new vulnerable source protection areas.

Indigenous Community consultation requirements for the project were reviewed by the MECP. It is noted that correspondence was provided via email and letter mail to Indigenous Communities on October 8th, 2019. Comments were received from the Historic Saugeen Métis (HSM) which included confirmation of the receipt of the Notice, review of the information provided, and confirmation that the HSM has no objection or opposition to the proposed works, as presented. Consistent with the requirements of the EA Process, continued notification and consultation will be provided through the remainder of the EA Process.

Species at Risk (SAR): The MECP re-iterated that, since the project encompasses intensive agricultural lands, it is unlikely that the proponent would contravene the Endangered Species Act and indicated that the potential for SAR habitat on the subject lands should be confirmed. Consistent with these requirements, the findings of the Natural Heritage Environmental Impact Assessment (July 2017) included in Appendix B of the Parent Project File confirmed that no SAR occur within the study lands.

Summary

The County, Town and Consultant reviewed all comments received through the Notice of Project Change (October 8, 2019) and Recommend a Preferred Solution as Alternative 2: to construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment.

The Preferred Solution to re-align Bruce Road 33 to intersect Bruce Road 25 at the future Bruce Street was previously accepted by Committee in April 2018. The subsequent Recommended Preferred Solution for stormwater management is to construct a SWM facility to manage run off related only to the Bruce Road 33 re-alignment (Alternative 2). Therefore, the County wishes to proceed with issuing the attached Notice of Completion for the Bruce Road 33 EA. The Notice of Completion will inform interested parties that the updated Project File dated April 2018, including addendum dated November 2019 is available on the County and Town websites and at their offices for viewing purposes. The Department will provide a status report on the project following the 30-day review period.

Financial/Staffing/Legal/IT Considerations:

There are no financial, staffing, legal or IT considerations associated with this report.

Interdepartmental Consultation:

Not applicable.

Link to Strategic Goals and Elements:

Goal #6 - Explore alternative options to improve efficiency, service
Element #D - Coordinate working with other agencies

Approved by:



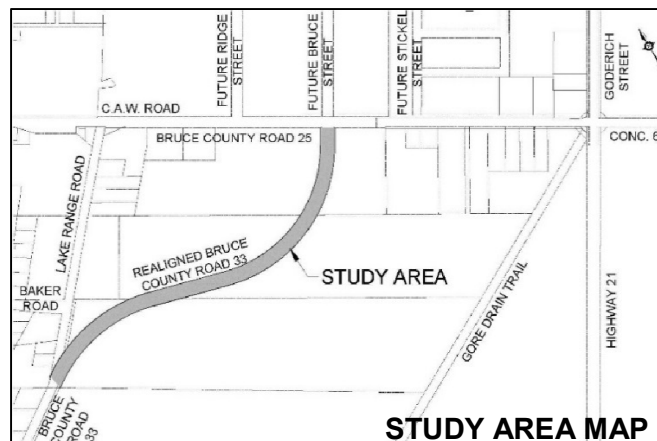
Bettyanne Cobean
Acting Chief Administrative Officer

**BRUCE COUNTY ROAD 33 RE-ALIGNMENT
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA): SCHEDULE 'B'**

NOTICE OF PROJECT COMPLETION

In May 2017, the County of Bruce (County), as the proponent, with the Town of Saugeen Shores (Town), as a principle partner, completed a Master Plan to plan various road and drainage undertakings within a broad area central to Saugeen Shores along Bruce Roads 25 and 33 (BR25 & BR33). The Master Plan identified several projects including the re-alignment of BR33 to intersect BR25 from the south at the same location as the Town's future Bruce Street alignment, where shown on the Study Area Map provided.

In January 2018, the County initiated a Schedule 'B' EA process, appropriately to plan the BR33 re-alignment as considered in the Master Plan. A *Notice of Study Completion* to the process, identifying the re-alignment of the BR33 intersection with the future Bruce Street intersection as the *Preferred Solution*, was advertised on May 1, 2018. However, during the 30-day public review period, the Ministry of the Environment, Conservation and Parks (MECP) received a Part-II Order Request. In its review of the Project File, the MECP determined that additional study was required appropriately to plan the associated stormwater management (SWM) facility. As such, the MECP concluded that the *Notice of Study Completion* was no longer valid, citing that additional review of SWM alternatives was necessary. The County advanced this additional study and is providing the findings via this *Notice of Project Completion*.



The '*Bruce County Road 33 Re-Alignment - Project File*', dated April 2018, now has an Addendum dated November 2019. The Addendum was prepared to meet the Schedule 'B' requirements for the conceptual SWM facility and to document the additional review of alternatives for stormwater management associated with the re-alignment of BR33. SWM alternatives reviewed include the following:

- Alternative 1: Do Nothing
- Alternative 2: Construct a SWM facility to manage runoff related only to the Bruce Road 33 re-alignment
- Alternative 3: Construct a SWM facility to manage runoff from Bruce Road 33 & future development
- Alternative 4: Construct a new storm sewer system through the Baker Subdivision to Lake Huron

Based on the *Preferred Solution*, to re-align BR33 to intersect BR25 at the future Bruce Street intersection, previously accepted by Council (the Transportation and Environmental Services [T&ES] Committee) in April 2018, and the subsequent *Preferred Solution* to stormwater management, to construct a SWM facility to manage runoff related only to the BR33 re-alignment (Alternative 2), accepted by the T&ES Committee on November 21st, 2019, the County intends to proceed with the construction of the proposed BR33 re-alignment and associated stormwater management facility. Documentation of the development and review of alternatives considered, including a summary of the planning and consultation process, a detailed evaluation and assessment of the alternatives and the rationale for the selection of the *Preferred Solutions*, is provided in the '*Bruce County Road 33 Re-Alignment Project File (including Addendum) - Schedule 'B' Municipal Class EA*', dated April 2018 (Addendum: November 2019). The Master Plan (July 2016) and the Bruce County Road 33 Re-Alignment Project File, including the stormwater management Addendum to the Project File, are available on the County and Town websites and at their offices for viewing purposes.

This Notice initiates the minimum 30 calendar day review period. In consideration of the holiday season, an extended review period has been considered. Interested persons are requested to provide written comment to the County of Bruce and/or GM BluePlan Engineering by January 3rd, 2020.

The County of Bruce
Mr. Jim Donohoe
30 Park Street, Box 398
Walkerton, ON N0G 2V0
jdonohoe@brucecounty.on.ca
Tel: 519-881-2400
www.brucecounty.on.ca

The Town of Saugeen Shores
Ms. Amanda Froese, P.Eng.
600 Tomlinson Drive, Box 820
Port Elgin, ON N0H 2C0
amanda.froese@saugeenshores.ca
Tel: 519-832-2008
www.saugeenshores.ca

GM BluePlan Engineering Limited
Mr. John Slocombe, P.Eng.
1260-2nd Avenue East, Unit 1
Owen Sound, ON N4K 2J3
john.slocombe@gmblueplan.ca
Tel: 519-376-1805
www.gmblueplan.ca

If concerns arise regarding this project, that cannot be resolved through discussions with the County, then members of the public, interested groups or technical agencies may request the Minister of the MECP to issue a 'Part II Order' for the project. Within the Part II Order request, the Minister may be requested to refer the matter to mediation, impose additional project conditions, and/or request an elevated scope of study (i.e. an individual environmental assessment). A Part II Order request requires the completion of a 'Part II Order Request' Form (Form ID No.012-2206E), which can be found on Service Ontario's website (<http://www.forms.ssb.gov.on.ca/>).

Requests may be received by the Minister at the address below until January 3rd, 2020. If there is no request received by January 3rd, 2020, the project will proceed to design and construction. A copy of the request must also be sent to the Director of the Environmental Assessment and Permissions Branch (MECP) and the County of Bruce.

Minister
Ministry of the Environment, Conservation and Parks
Ferguson Block, 77 Wellesley Street West, 11th Floor
Toronto, ON M7A 2T5
Fax: (416)314-8452
Minister.MECP@ontario.ca

Director, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
enviropemissions@ontario.ca

This *Notice of Project Completion* is advertised in the Shoreline Beacon and is also posted on the County and Town websites, where additional information is provided.

This Notice first issued on November 26th, 2019.

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|----------|--|---|
| 1 | 8-Oct-19 | <p>(NAME) our group's technical resource is away until October 20th in Europe. Our email now reaches all our board members.</p> <p>As president of the Beachers Organization I would like to keep our members informed about this project.</p> <p>Since I lack the engineering expertise to understand the purpose of this document would you be kind enough to provide a lay person's explanation that I could share with our members as an introduction to this report.</p> <p>Thanks for your help,</p> | <p>Email Response sent October 21, 2019:</p> <p>As per the Master Plan for Roads and Drainage (2017), the County of Bruce proposes to construct a new roadway to re-align Bruce Road 33 (BR33) to intersect Bruce Road 25 (BR25) at the planned extension of Bruce Street, as outlined in the Project File. The information provided on October 8th pertains to part of the planning process required to advance the re-alignment of BR33.</p> <p>The planning process for the BR33 re-alignment was initiated in January 2018. The Project File, dated April 2018, identified the re-alignment of BR33 to intersect at the future Bruce Street intersection as the Preferred Solution and considered that land acquisition necessary for the planned road re-alignment would also be sufficient to accommodate a stormwater management facility required to support the new road alignment. However, the Ministry of the Environment, Conservation and Parks determined that an assessment of the stormwater management alternatives (related to the road re-alignment) should also be completed. The review of stormwater management alternatives is considered to form a component of the BR33 re-alignment (planning process). The Project File Addendum, although prepared as a 'stand-alone document', forms part of the Project File for the Bruce Road 33 Re-Alignment. The Project File Addendum was issued earlier this week (October 8, 2019) and a link to the report was provided.</p> <p>The purpose of the Addendum is to document the additional review of various stormwater management alternatives associated with the road re-alignment planned in the original report (i.e. the 'Bruce County Road 33 Re-Alignment Project File', dated April 2018). The Addendum recommends that a stormwater management pond ancillary to the road be considered as the appropriate solution to stormwater management associated with the BR33 re-alignment.</p> <p>A description of the alternatives considered, and an evaluation and assessment of the alternatives, are provided in the Report (i.e., the Project File Addendum). The Project File Addendum is posted on the County of Bruce and Town of Saugeen Shores websites.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|-----------|---|---|
| 2 | 20-Oct-19 | <p>To whom it may concern,</p> <p>We are the owners of the property located at (--) Baker Road in Saugeen Shores (Lot parcel ID provided). The various small creeks which run through the Baker Street subdivision meet at our property. The small, quiet creek then wraps around our recently-constructed cottage before winding its way toward Lake Huron. In order to build our cottage, we had to comply with strict regulations by the Saugeen Valley Conservation Authority and the Town of Saugeen Shores. This was necessary to protect the creek and surrounding land areas from ecological harm, and to protect our cottage from damage due to potential changes in water flow.</p> <p>As the County, Town and GM BluePlan now consider options for the re-alignment of Road 33 and the associated drainage requirements, it is our hope that the effects on the creek, surrounding property and our cottage have been sufficiently taken into consideration. While we have examined the Project File and the Schedule 'B' Project File Addendum, we cannot determine from these dense and lengthy documents exactly how the various alternatives might affect our land, the creek (where it traverses our property) and, potentially, our property value.</p> <p>We would like further information about how the various project alternatives might affect our property in the following ways:</p> <ul style="list-style-type: none"> • any expected changes to flow volume on our property (increase or decrease) • any expected erosion to land surrounding the creek (if an increase in flow is projected) • size and location of any structures (e.g. pipes, culverts) that might be installed on our property in any of the alternatives • potential redirection or alteration of the creek's path as it traverses our property • any other changes that might occur on or to our property as a result of the implementation of any of the alternatives under study <p>We thank you in advance for your assistance in providing clear and precise details about how the four alternative plans would specifically impact the value, enjoyment and ecological stewardship of our property. We would also like to be notified directly of any further updates or decisions that would affect our property.</p> | <p>An assessment of how the various project alternatives might affect properties in the Baker Subdivision was completed as part of the Project File Addendum. As noted in the Addendum, each of the stormwater management alternatives considered 'no net increase in peak flow' through the Baker Subdivision as a basic requirement. More specifically, the Preliminary Recommended Solution, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, will attenuate post-development peak flow rates to less than, or equal to, pre-development conditions. Ultimately, it is expected that the management of drainage from the area upstream of the Baker Subdivision will result in improvements to the existing drainage conditions through the Baker Subdivision. Therefore, it is not anticipated that any changes to the drainage system, west of Lake Range Road, will be required at this time.</p> <p>Prior to construction, the County will be required to obtain permits from the SVCA and MECP to ensure compliance with their regulations. It is noted that the design phase for the proposed stormwater management facility will be advanced following the completion of the Environmental Assessment process. The design drawings will form part of the applications to the SVCA and MECP for their review and approval.</p> <p>We note that the Master Plan considers a future storm sewer system within the Baker Subdivision, the installation of which would coincide with a sanitary sewer installation project. Although the Town previously has submitted funding applications to the Province, to make such a project economically viable, the Town, as yet, has not been successful in securing funding.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|---|-------------------------------------|
| 3 | 21-Oct-19 | <p>Thanks for the opportunity to comment on the project change for Bruce Rd 33. As a property owner for 35 years and full time resident for 16 years in the Baker subdivision, I have been following drainage issues for Lake Range Rd (Bruce Rd 33) since the early 1990s. It was at that time the former Saugeen Township rebuilt Lake Range Rd. It is my understanding that contrary to the engineered design of the road, drainage water was diverted from the upper fields to the Baker subdivision. Now for the most part, runoff has been rectified as a result of development along Bruce Road 33.</p> <p>Therefore I support Alternative 2, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, as the Preliminary Recommended Solution.</p> | Support for Alternative 2 is noted. |

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SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|--|--|
| 4 | 25-Oct-19 | <p>Re: Road 33 Notice of Project Change</p> <p>SUMMARY</p> <p>I am intimately familiar with the storm drainage in the area of County Roads 33/25 and have serious interest in ensuring the impacts of development are minimized. It is hoped my comments will enhance the drainage design proposed to ensure the intent of good engineering practice is achieved rather than simply meeting the minimum interpretation of the written guidelines to achieve a design that may be technically acceptable but misses the main focus which is environmental protection.</p> <ol style="list-style-type: none"> 1. Provide a Hybrid SWM Pond with a forebay, permanent pool and wetland fringes rather than a Dry Pond to maximize quality treatment. 2. Provide a communal treatment facility for the entire watershed rather than relying on multiple privately installed and maintained systems. 3. Use the Road 33 re-alignment and SWM facility as an opportunity to reduce the drainage area and resulting contributing flows to the Gobles Grove Beach outlet. 4. Ensure storm water discharge from the SWM facility matches the capacity of the Baker Subdivision receiving system in its present condition and adjust the discharge rates as required in the future when improvements are made. 5. Ensure the modelling parameters are accurately calibrated to measured flows to ensure true pre-development to post-development control is achieved. <p>All of these concerns and others were identified in my initial response to the proposed work on Road 33/25 at the start of the review process. Some were addressed in the design and Environmental Assessment process however the more critical items noted above were apparently judged inappropriate and/or ignored. Hopefully with further consideration the merits of each will be seen.</p> <p>The remainder of the submission elaborates on and provides support for the above comments. Several potential as-built deficiencies have been identified in support of these suggestions and should not be ignored.</p> <p>NOTE: Outlined above is the summary provided. A copy of the entire correspondence providing more detailed comments is included in this Appendix.</p> | <ol style="list-style-type: none"> 1. During the subsequent design phase water quality treatment provisions will be detailed in accordance with MECP requirements. Due to the sandy nature of the local soils an infiltration type system may be more suitable than a wet-pond type system to enhance downstream water quality. 2. The recommended stormwater management solution addresses increase in runoff from the new road itself. Future development may expand on this facility at the time of a Planning Act application. It would be pre-mature to anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes. 3. This Bruce Road 33 stormwater management review follows the direction for drainage as established in the Master Plan. 4. The intention is to ensure sufficient land is available at this time for a stormwater management facility, such that no net increase in downstream peak flow, at a minimum, is realized due to the construction of BR33. The Town may consider advancing a future project to install storm sewers, coincident with sanitary sewers, within the Baker Subdivision as funding permits. 5. The analyses are prepared using standard practices. |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments (<i>recorded sic erat scriptum</i>) | General Response |
|-----|-----------|---|---|
| 5 | 28-Oct-19 | <p>I was unable to find any information on the increase in flow to the BR25 outlet or Shipley Creek in this report.</p> <p>Has there been any public consultation regarding the stormwater management options now that it is a Schedule B project.</p> | <p>The analyses relate to the planned construction of the Bruce Road 33 re-alignment, as outlined in the Master Plan for Roads and Drainage (2017).</p> <p>Stormwater management alternatives related to the planned construction of BR33 are being reviewed as part of the Schedule 'B' process for the re-alignment of Bruce County Road 33 which was initiated in January 2018. The Notice of Project Change was issued on October 8th, 2019 to solicit comments and feedback from the public, stakeholders, interested public, agencies and Indigenous Communities specific to the stormwater management alternatives being reviewed for the re-alignment of BR33.</p> |
| 6 | 3-Nov-19 | <p>I am responding to the notice of project that was sent on Oct. 7.</p> <p>I feel that the County should design and build infrastructure that assesses the drainage from the entire area instead of a fragment of the area.</p> <p>There are several reasons why this should be done.</p> <p>1. It is important that all of the stormwater in the area be taken into account while planning both the roads and the future land use to get the best end result. This is the time to do it instead of piecemealing infrastructure and subdivision projects. An example where proper planning has not been done is on CR 25. There is significant erosion occurring at the outlet of the drain on CR25, and although we were told otherwise, water is constantly flowing out of the basin and there is algae in the outflow into the lake.</p> <p>2. There is a need for sanitary sewers in the Baker Subdivision and they have been discussed for years. We were told that sewers would be built in the Baker subdivision at the same time as storm sewers. With increasing year round development, larger houses and aging septic, it is time to build the necessary infrastructure.</p> <p>I understand that the County would rather push the stormwater planning and construction to developers, but I feel that proper development of infrastructure is important and should be planned for the long term.</p> <p>I appreciate the opportunity to input into this project.</p> | <p>Alternatives that considered stormwater management for future development within the Town lands upstream of the Baker Subdivision, in addition to the management of runoff specific to the re-alignment of Bruce County Road 33, were completed. An evaluation and assessment of these alternatives is included in the Project File Addendum.</p> <p>1. The recommended stormwater management solution addresses increase in runoff from the re-alignment of the County road (i.e. BR33) itself. Future development within Town lands may expand on this facility at the time of a Planning Act application. It would be pre-mature to anticipate area requirements for future SWM pond sizing, as currently there is no Planning Act application in progress for those lands. Any such application will be addressed through the Town and County planning processes.</p> <p>2. The Master Plan for Roads and Drainage (2017) considers a future storm sewer system within the Baker Subdivision, the installation of which would coincide with a sanitary sewer installation project. Although the Town previously has submitted funding applications to the Province, to make such a project economically viable, the Town, as yet, has not been successful in securing funding.</p> |

SUMMARY OF PUBLIC COMMENTS RECEIVED (October & November 2019)

| No. | Date | Comments <i>(recorded sic erat scriptum)</i> | General Response |
|-----|----------|---|--|
| 7 | 6-Nov-19 | <p>[We] just returned from holidays so we are a bit late with our response to the notice we received in the mail regarding the change to the Bruce Road 33 Project. It is noted that Alternative 2 - Construct a SWM facility to manage runoff related only to the Bruce Road 33 as the preferred alternative.</p> <p>However, no information has been provided as to where/how the SWM system will be done. We are very concerned about this. The SWM system (drain) at the end of the CAW Road is really quite a disaster. The beach erosion has already been significant and it has only been there for a few months! Coupled with the extremely high lake levels right now, it would be very damaging to another beach area to have another drain installed somewhere else?</p> <p>Can you provide clarification on what the County Road 33 SWM system will consist of?</p> | <p>An assessment of how the various project alternatives might affect properties in the Baker Subdivision was completed as part of the Addendum to the Project File. As noted in the Addendum, each of the stormwater management alternatives considered 'no net increase in peak flow' through the Baker Subdivision as a basic requirement. More specifically, the Preliminary Recommended Solution, to construct a stormwater management facility to manage runoff from the re-alignment of BR33, will attenuate post-development peak flow rates to less than, or equal to, pre-development conditions. Ultimately, it is expected that the management of drainage from the area upstream of the Baker Subdivision will result in improvements to the existing drainage conditions through the Baker Subdivision. Therefore, it is not anticipated that any changes to the drainage system, west of Lake Range Road, will be required at this time.</p> <p>The design of the stormwater mangement system will be advanced during the design phase.</p> |

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