

Regular Council Meeting Agenda

Date: Tuesday, February 28, 2023, 7:00 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Pages

- A. Roll Call
- B. Order
- C. Report Out of Closed Meeting
- D. Moment of Silence
- E. National Anthem
- F. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Lenni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

G. Disclosure of Pecuniary Interest

H. Minutes

- | | |
|--|---------|
| 1. Regular Council Meeting, February 14, 2023 | 8 - 19 |
| 2. Public Council Meeting, February 14, 2023, Gouin Drain | 20 - 22 |
| 3. Public Council Meeting, February 14, 2023, Demonte Branch Drain | 23 - 25 |
| 4. Special Council Meeting, February 14, 2023, Shoreline Master Plan | 26 - 28 |

5. Special Council Meeting, February 13, 2023 Strategic Priorities 29 - 32

Recommendation

That the February 14, 2023 minutes of the Regular Council, the February 14, 2023 Public Council Meetings, and the February 13 and 14, 2023 Special Council Meetings as were duplicated and delivered to the members, **be adopted**.

I. Supplementary Agenda Adoption

Recommendation

That the supplementary items added to the Regular Meeting agenda regarding the Delegation PowerPoint Presentation and Executive Summary, and the revised Report PWES-2022-22, **be approved**

J. Delegations

1. Corporate Records and Information Management Service Review 33 - 58

Imerge Consulting, Paula Lederman

Supplementary Item

Recommendation

That Report LCS-2023-03 Corporate Records and Information Management Review **be brought forward** on the agenda for discussion and consideration.

K. Communications - For Information

1. Town of Essex dated February 14, 2023 59 - 60

Re: Ontario School Board Elections

Recommendation

That Communications - For Information item 1 as listed on the Tuesday, February 28, 2023 Regular Council Agenda, **be received**.

L. Communications - Action Required

M. Committee Minutes

1. Court of Revision, February 14, 2023 Antaya Drain 61 - 63

Recommendation

That the Tuesday, February 14, 2023 minutes of the Court of Revision for the Antaya Drain as were duplicated and delivered to the members, **be adopted**.

2. Court of Revision, February 14, 2023, Branch of South Talbot and Holden Outlet Drain – Meo Bridge

64 - 66

Recommendation

That the Tuesday, February 14, 2023 minutes of the Court of Revision for the Branch of South Talbot and Holden Outlet Drain - Meo Bridge as were duplicated and delivered to the members, **be adopted**.

N. Reports

1. Financial Services

- a. FS- 2023-02 2021 Development Charge Reserve Fund Statement

67 - 75

Recommendation

That the 2021 Development Charge Reserve Fund Statement, prepared in accordance with the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43, **be received**;

And that the 2021 Development Charge Reserve Fund Statement **be made available** to the public on the Town's website in accordance with the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43 (2.1); 2015, c. 26, s. 7 (1);

And further that the report **be forwarded upon request** to the Ministry of Municipal Affairs and Housing as per the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43 (3); 2015, c. 26, s. 7 (2).

2. Legislative & Clerk Services

- a. LCS-2023-03 Corporate Records and Information Management Review

76 - 81

Recommendation

That Report LCS-2023-03 entitled “Corporate Records and Information Management Review” together with the presentation by Paula Lederman of Imerge Consulting **be received**;

And that the independent third party review final report entitled, “Corporate Records and Information Management Review - Information Management Strategy, February 2023”, as prepared by Imerge Consulting **be endorsed** in principle;

And further that Administration report back to Council with its recommendations and implementation framework arising from the Corporate Records and Information Management Review;

And furthermore that the independent third party review final report entitled “Corporate Records and Information Management Review - Information Management Strategy, February 2023”, as prepared by Imerge Consulting **be posted** to the Town of Tecumseh website in accordance with the requirements of the funding received from the Municipal Modernization Program – Intake 3.

3. Public Works & Engineering Services

- a. PWES-2023-016 Annual and Summary Reports for Year 2022 Town of Tecumseh Water Distribution System

82 - 108

Recommendation

That the 2022 Ministry of the Environment, Conservation and Parks Annual Report and the Summary Report for the Town of Tecumseh Water Distribution System (260004969) for the Year 2022, as prepared in accordance with the Safe Drinking Water Act, O.Reg. 170/03, Section 11 – Annual Reports and Schedule 22 – Summary Reports, **be adopted**;

And that the Annual Report and Summary Report **be made available** for public viewing through the Town of Tecumseh website.

- b. PWES-2023-17 Tecumseh Water Distribution System MECP January 1, 2022 to December 31, 2022 Inspection Report 109 - 136

Recommendation

That the Ministry of the Environment, Conservation and Parks Inspection Report for the Tecumseh Water Distribution System, dated February 6, 2023, **be received**.

- c. PWES-2023-018 Drinking Water Quality Management System Operational Plan 137 - 360

Recommendation

That Report PWES-2023-18 Drinking Water Quality Management System Operational Plan **be received**;

And that Tecumseh Town Council **endorse and commit to** the Town of Tecumseh Distribution System, Drinking Water Quality Management System Operational Plan, Revision Date: February 28, 2023.

- d. PWES-2023-021 Amendment to the 2023-2027 PWES Capital Works Plan, Tecumseh Hamlet Northwest Water and Wastewater Infrastructure 361 - 368

Recommendation

That report PWES-2023-21 Amendment to the 2023-2027 PWES Capital Works Plan, Tecumseh Secondary Plan Area, Northwest Water & Wastewater Infrastructure Project, **be received**;

And that expenditures for the expanded scope and construction costs for the Tecumseh Secondary Plan Area Northwest Water & Wastewater Infrastructure Project, of \$15,598,500, for a total project cost of \$16,618,500, **be authorized and funded from**:

- \$3,885,000 from the Watermain Reserve Fund
- \$6,853,500 from the Wastewater Sewer Reserve Fund
- \$3,510,000 from the Road Lifecycle Reserve
- \$1,350,000 from the Storm Sewer Lifecycle Reserve

- | | | |
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| e. | PWES-2023-22 Tecumseh Hamlet Secondary Plan Area
Environmental Assessment and Functional Servicing Report | 369 - 377 |
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Recommendation

That Dillon Consulting Limited **be retained** for Consulting Services for the Tecumseh Hamlet Secondary Plan Area, Environmental Assessment and Functional Servicing Report in the amount of \$482,800 excluding HST as a Single Source under the Town of Tecumseh Purchasing Policy and Schedule “A” of By-law 2021-60 and as amended by By-law 2021-103;

And that Council **delegate the authority** to the Chief Administrative Officer, the Purchasing Coordinator, and the Director of Public Works & Engineering Services to execute an agreement, satisfactory in form to the Town Solicitor, with Dillon Consulting Limited.

O. By-Laws

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| 1. | By-Law 2023-027 Shuttleworth Drain - First and Second Readings

Being a by-law to provide for the repair and improvements to the Shuttleworth Drain | 378 - 564 |
| 2. | By-Law 2023-028 Sullivan Creek Drain - First and Second Readings

Being a by-law to provide for the repair and improvements to the Sullivan Creek Drain | 565 - 797 |

P. Unfinished Business

- | | | |
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| 1. | February 28, 2023 | 798 - 798 |
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Q. New Business

R. Motions

- | | | |
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| 1. | Confirmatory By-Law 2023-029 | 799 - 800 |
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Recommendation

That By-Law 2023-029 being a by-law to confirm the proceedings of the Tuesday, February 28, 2023, regular meeting of the Council of The Corporation of the Town of Tecumseh **be given** first, second, third and final reading.

S. Notices of Motion

T. Next Meeting

Tuesday, March 14, 2023

4:45 pm Court of Revision - Demonte Drain & Gouin Drain

5:30 pm In-Camera Meeting

6:30 pm Special Council Meeting - Awards

7:00 pm Regular Council Meeting

U. Adjournment

Recommendation

That there being no further business, the Tuesday, February 28, 2023 meeting of the Regular Council **be adjourned** at pm.

Regular Meeting of Council

Minutes

Date: Tuesday, February 14, 2023
Time: 7:00 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present:

Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, James Dorner
Councillor, Alicia Higgison
Councillor, Brian Houston
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present:

Chief Administrative Officer, Margaret Misk-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Community Safety & Fire Chief, Wade Bondy
Director Technology & Client Services, Shaun Fuerth
Director Community & Recreation Services, Beth Gignac
Director Development Services, Brian Hillman
Director Financial Services & Chief Financial Officer, Tom Kitsos
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson
Manager Facilities & Energy Management, Daniel Wolicki

A. Roll Call

B. Order

The Mayor calls the meeting to order at 7:12 pm.

C. Report Out of Closed Meeting

A closed meeting was held in accordance with and as permitted by Section 239 (2) (k) of the Municipal Act, 2001.

At this meeting, the Council received information and provided direction to Administration regarding a Town facility and plan/position to negotiations to be carried on behalf of the municipality.

D. Moment of Silence

The Members of Council and Administration observe a moment of silence.

E. National Anthem

The Members of Council and Administration observe the National Anthem of Canada.

F. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

G. Disclosure of Pecuniary Interest

Deputy Mayor Joe Bachetti declares a pecuniary interest on By-Law 2023-022 Gouin Drain as he owns affected property. Councillor Houston declares a pecuniary interest on the By-Law 2023-022 Gouin Drain as he owns affected property.

H. Minutes

1. **Regular Council Meeting - January 25, 2023**
 2. **Public Council Meeting - January 25, 2023, Tender Results**
 3. **Public Council Meeting - January 25, 2023, Antaya Drain**
 4. **Public Council Meeting - January 25, 2023, Branch of South Talbot and Holden Outlet Drain - Meo Bridge**
 5. **Special Council Meeting - January 25, 2023, Council Workshop on Procedure By-Law**
 6. **Special Council Meeting - January 17, 2023, Proposed Business Plan and Budget 2023**
 7. **Special Council Meeting - January 26, 2023, Capital Work Plans**
- Motion: RCM - 17/23**

Moved by Councillor Tania Jobin
Seconded by Councillor Brian Houston

That the January 25, 2023 minutes of the Regular Council, the January 25, 2023 Public Council Meetings, and the January 17 and 26, 2023, Special Council Meetings as were duplicated and delivered to the members, **be adopted**.

Carried

I. Supplementary Agenda Adoption

There are no supplementary agenda items.

J. Delegations

Essex County Library Board

Adam Craig, Chief Librarian, Essex County Library, and Settimo Vilardi, Architect, Archon Architects, review the proposed architect drawings for the Cada library as appended to Report CRS-2023-01 on the agenda.

The Mayor opens the floor to questions from the Members.

In response to a inquiry on space for senior activities, the Chief Librarian explains that the renovated space will provide for senior space.

A Member inquired on the exterior lighting of the building highlighted in a recent community walk. The Director Community & Recreation Services indicates that exterior lighting has been addressed in the design along with security measures.

A Member inquired if there will be rental space available for community groups. The Chief Librarian explains that rental space will be available and hopes this will encourage more people to use the library.

Motion: RCM - 18/23

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Rick Tonial

That the Essex County Library representatives, Adan Craig, Chief Librarian, and Settimo Vilardi, Archon Architects, **be permitted** to be a delegation.

Carried

Motion: RCM - 19/23

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Brian Houston

That Report CRS-2023-01 be brought forward on the agenda for discussion and considerations.

Carried

1. CRS-2023-01 CADA Library Renovation - Final Concept Design

Motion: RCM - 20/23

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Rick Tonial

That Report CRS-2023-01 CADA Library Renovation – Final Concept Design, **be received**;

And that the final conceptual design recommendations outlined in Attachment 1 to Report CRS-2023-01 to renovate the CADA Library Building located at 13675 St. Gregory's Road, **be approved**.

Carried

K. Communications - For Information

1. Essex Region Conservation Authority dated January 25, 2023

Re: Fee Schedule for 2023 ([View here](#))

2. Town of Tecumseh dated January 31, 2023

Re: Support for requests by Toronto Police Services Board related to Federal Bail Reform

3. Municipality of Lakeshore dated February 1, 2023

Re: Stormwater Master Plan - Notice of Public Information Centre

4. Deputy Minister and Commissioner of Emergency Management dated February 3, 2023

Re: Ontario's Provincial Emergency Management Strategy and Action Plan

Motion: RCM - 21/23

Moved by Councillor Rick Tonial
Seconded by Councillor James Dorner

That Communications - For Information 1 through 4 as listed on the Tuesday, February 14, 2023 Regular Council Agenda, **be received**.

Carried

L. Communications - Action Required

1. Essex Region Conservation Authority dated February 1, 2023

Re: Support for Municipal Member Appointment for the Essex Region Source Protection Committee

Motion: RCM - 22/23

Moved by Councillor Brian Houston
Seconded by Councillor Rick Tonial

That the Council of the Town of Tecumseh **endorse** the municipal appointments of Dennis Rogers, Union Water Supply System; and Frank Garardo, City of Windsor, to the Essex Region Source Protection Committee;

And that this motion be sent to the Essex Region Conservation Authority to be included in the Essex Region Source Protection Authority Committee meeting scheduled for April 13, 2023.

Carried

M. Committee Minutes

1. Police Services Board - January 16, 2023

Motion: RCM - 23/23

Moved by Councillor Rick Tonial
Seconded by Councillor Alicia Higgison

That the January 16, 2023 minutes of the Police Services Board as were duplicated and delivered to the members, **be accepted**.

Carried

N. Reports

1. Chief Administrative Officer - People & Culture

- a. CAO-2023-02 Non-Union and Council Economic Salary Adjustment 2023

Motion: RCM - 24/23

Moved by Councillor Brian Houston

Seconded by Councillor Alicia Higgison

That CAO-2023-02 entitled "Non-Union and Council Economic Adjustment for 2023", **be received**;

And that an annual economic adjustment for 2023 of 2.0% **be approved**, effective January 1, 2023, for the Management and Non-union Administrative Staff Wage Grid, in accordance with the Compensation and Salary Administration Policy No. 67;

And further that an annual economic adjustment for 2023 **be approved** as follows, in accordance with By-Law No. 2006-84, as amended by By-Law No. 2019-62, being a by-law to provide for the remuneration of Members of Council:

Mayor 2.0%

Deputy Mayor 0.5%

Councillors 1.0%

Carried

2. Community & Recreation Services

Report CRS-2023-01 CADA Library Renovation - Final Concept Design was brought forward on the agenda to Delegations for discussion and consideration.

3. Financial Services

a. FS-2023-01 Taxes Receivable December 2022

Motion: RCM - 25/23

Moved by Councillor Brian Houston

Seconded by Councillor Alicia Higgison

That Report FS-2023-01 Taxes Receivable December 2022, **be received**.

Carried

4. Legislative & Clerk Services

a. LCS-2023-01 Procedural By-Law Sub-Committee

Motion: RCM - 26/23

Moved by Councillor Brian Houston

Seconded by Councillor Rick Tonial

That Report LCS-2023-01 entitled “Procedural By-Law Sub-Committee” **be received;**

And that consideration be given to strike an Ad-hoc Sub-Committee of Council for the purpose or mandate of providing a review together with recommendations concerning amendments to the Town’s current Procedural By-Law 2022-013;

And further that Council **appoint** (3) Members: Mayor, Gary McNamara, Councillor Tania Jobin and Councillor Alicia Higgison to this committee to carry out the mandate of this Sub-Committee in consultation with the Clerk.

Carried

b. LCS-2023-02 Court of Revision Appointment for 4th Concession Drain

Motion: RCM - 27/23

Moved by Councillor Brian Houston

Seconded by Deputy Mayor Joe Bachetti

That Report LCS-2023-02 entitled Court of Revision Appointment - 4th Concession Drain **be received;**

And that Council **appoint** Councillor Tania Jobin to the Town of Lasalle Court of Revision (scheduled to convene and sit on March 23, 2023 at 4 p.m. in LaSalle Council Chambers) to hear any appeals on the assessment from the Drainage Report in relation to improvements for the 4th Concession Drain, as prepared by RC Spencer Associates Inc. dated August 5, 2022.

Carried

5. Public Works & Engineering Services

- a. PWES-2023-09 DMAF Phase 1 Scully-St. Mark's Pump Station Pre-Order for Generators - Tender Results

Motion: RCM - 28/23

Moved by Councillor Brian Houston
Seconded by Councillor James Dorner

That Report PWES-2023-09 Disaster Mitigation and Adaptation Fund Phase 1: Scully-St. Mark's Pump Station Preselection and Prepurchase of Backup Generator Request for Quotations Results, **be received**;

And that the quotes submitted on January 12, 2023 for the supply of one diesel generator set for the Scully-St. Mark's Pump Station Project, **be rejected**.

Carried

- b. PWES-2023-14 DMAF 2020 Intake - Phase 2 PJ Cecile Storm Pump Station - Award of Engineering Consulting Services

Motion: RCM - 29/23

Moved by Councillor Brian Houston
Seconded by Councillor Alicia Higgison

That Council **award** the Engineering Consulting Services for the P.J. Cecile Storm Pump Station Replacement Project in the amount \$1,157,400 excluding HST to Stantec Consulting Ltd. as an Irregular Result under the Town of Tecumseh Purchasing Policy and Schedule 'A' of By-law 2021-60;

And that By-law 2023-20 **be given** the first, second, third and final reading to authorize the Mayor and Clerk to execute an agreement, satisfactory in form to the Town's Solicitor, with Stantec Consulting Ltd.

Carried

O. By-Laws

1. **By-Law 2023-020 St. Cecile Pumping Station Replacement Project - Engineering Services with Stantec Consulting**

Being a by-law to authorize the execution of an Agreement between the Corporation of the Town of Tecumseh and Stantec Consulting Inc for Engineering Services for the PJ Cecile Pump Station Replacement Project

2. **By-Law 2023-021 Demonte Drain (1st and 2nd reading)**

Being a by-law to provide for the repair and improvements to the Demonte Drain

3. By-Law 2023-022 Gouin Drain (1st and 2nd Reading)

Being a by-law to provide for the repair and improvements to the Gouin Drain

4. By-Law 2023-023 Dog Tag Fees

Being a by-law to amend By-Law No. 2003-91, being a by-law to provide for the regulation, restriction and prohibition of the keeping and running-at-large of dogs in the Town of Tecumseh

5. By-Law 2023-025 Amendment to Water and Wastewater Rates for 2023

Being a by-law to amend By-Law 2022-102, being a by-law to establish the water and wastewater rates for the year 2023

Given that Deputy Mayor Joe Bachetti and Councillor Brian Houston declared a pecuniary interest on By-law 2023-022, they refrained from discussion or voting on the following by-law.

Motion: RCM - 30/23

Moved by Councillor Alicia Higgison
Seconded by Councillor Rick Tonial

That By-Law 2023-22 being a bylaw to provide for the repair and improvements to the Gouin Drain.

Be given first and second reading.

Carried

Motion: RCM - 31/23

Moved by Councillor Brian Houston
Seconded by Councillor Tania Jobin

That By-Law 2023-020 being a by-law to authorize the execution of an Agreement between the Corporation of the Town of Tecumseh and Stantec Consulting Inc for Engineering Services for the PJ Cecile Pump Station Replacement Project;

That By-Law 2023-021 being a by-law to provide for the repair and improvements to the Demonte Drain;

That By-Law 2023-023 being a by-law to amend By-Law 2003-91, being a by-law to provide for the regulation, restriction and prohibition of the keeping and running-at-large of dogs in the Town of Tecumseh;

That By-Law 2023-025 being a by-law to amend By-Law 2022-102, being a by-law to establish the water and wastewater rates for the year 2023.

Be given first and second readings.

Carried

Motion: RCM - 32/23

Moved by Councillor Brian Houston

Seconded by Councillor Tania Jobin

That By-Law 2023-020 being a by-law to authorize the execution of an Agreement between the Corporation of the Town of Tecumseh and Stantec Consulting Inc for Engineering Services for the PJ Cecile Pump Station Replacement Project;

That By-Law 2023-023 being a by-law to amend By-Law 2003-91, being a by-law to provide for the regulation, restriction and prohibition of the keeping and running-at-large of dogs in the Town of Tecumseh;

That By-law 2023-025 being a by-law to amend By-law 2022-102, being a by-law to establish the water and wastewater rates for the year 2023.

Be given third and final reading.

Carried

P. Unfinished Business

1. February 14, 2023

In response to an inquiry, a report to Council will be presented in Q2 on the E-Scooter Program.

Q. New Business

VIA Rail and Lesperance Road Construction

A Member inquired on the communications plan to local business regarding the construction timeline for VIA Rail and Lesperance Road. The Director Public Works & Engineering Services indicates that there will be an information session on February 22, 2023 to review the details with local business owners. There will be communications and notices published and along with updates provided on the Town's website. It is recommended that the school boards be notified as school busses will need to have alternative routes during the construction period.

R. Motions

1. County Road 46 Request for Speed Reduction

Motion: RCM - 33/23

Moved by Councillor Tania Jobin
Seconded by Councillor Rick Tonial

That the County of Essex **be requested** to amend the speed limit on County Road 46 from 80 km/hr to 60 km/hr, from County Road 46 at the intersection of County Road 19 (Manning Road);

And that as County Road 46 east of County Road 19 (Manning Road) is located within the Municipality of Lakeshore that this motion **be sent** to the Clerk of the Municipality of Lakeshore for Council's support and endorsement;

And further that this motion and background **be sent** to the Clerk for the County of Essex requesting they be placed on the next regular meeting of County Council's Agenda for consideration.

Carried

2. Confirmatory By-Law 2023-026

Motion: RCM - 34/23

Moved by Councillor Rick Tonial
Seconded by Councillor James Dorner

That By-Law 2023-026 being a by-law to confirm the proceedings of the Tuesday, February 14, 2023, regular meeting of the Council of The Corporation of the Town of Tecumseh **be given** first, second, third and final reading.

Carried

S. Notices of Motion

There are no Notices of Motion presented to Council.

T. Next Meeting

Tuesday, February 28, 2023

4:00 pm Special Council Meeting - MFIPPA Workshop

5:00 pm Public Council Meeting - ZBA - 13931 Riverside Drive

6:00 pm Public Council Meeting - Shuttleworth Drain

6:30 pm Public Council Meeting - Sullivan Creek Drain

7:00 pm Regular Council Meeting

U. Adjournment

Motion: RCM - 35/23

Moved by Councillor Brian Houston
Seconded by Councillor Tania Jobin

That there being no further business, the Tuesday, February 14, 2023 meeting of the Regular Council **be adjourned** at 8:23 pm.

Carried

Gary McNamara, Mayor

Robert Auger, Clerk

Public Meeting of Council

Minutes

Date: Tuesday, February 14, 2023
Time: 5:30 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present: Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, James Dorner
Councillor, Alicia Higgison
Councillor, Brian Houston
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present: Chief Administrative Officer, Margaret Misk-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Technology & Client Services, Shaun Fuerth
Director Financial Services & Chief Financial Officer, Tom Kitsos
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson
Drainage Superintendent, Alessia Mussio

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 5:36 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are

dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

Deputy Mayor Joe Bachetti declares a pecuniary interest on the Gouin Drain as he owns affected property. Councillor Houston declares a pecuniary interest on the Gouin Drain as he owns affected property. Both Members refrained from discussion and voting.

E. Introduction and Purpose of Meeting

The purpose of the meeting is to hear public comment any affected landowners on the proposed drainage works set out in the Drainage Repot filed by Mark Hernandez of Dillon Consulting dated January 20, 2023 for the Gouin Drain.

The Town Drainage Superintendent provided background for the drainage works proposed in the Drainage Report which is appended to the agenda. Mr. Palombo, the applicant, also joined the meeting as a delegate but did not ask any questions when called upon by the Chair.

F. Delegations

1. Mark Hernandez, P.Eng, Drainage Engineer, Dillon Consulting
Mark Hernandez, Drainage Engineer, was available to answer any questions from the Members on the Drainage Report. There were no questions raised from the Members or the public.

G. Communications

1. **Notice of Public Meeting dated January 30, 2023**
2. **By-Law 2023-022**

Being a bylaw to provide for the repair and improvements to the Gouin Drain

Motion: PCM - 13/23

Moved By Councillor Rick Tonial
Seconded By Councillor James Dorner

That Communications - For Information 1 and 2 as listed on the Tuesday, February 14, 2023 Public Council Meeting Agenda, **be received**.

Carried

H. Reports

1. PWES-2023-05 Request to Consider Engineer's Report - Gouin Drain

Motion: PCM - 14/22

Moved By Councillor Alicia Higgison
Seconded By Councillor James Dorner

That the Drainage Report and Specifications for the Gouin Drain (Drain) as prepared by Mark Hernandez, P.Eng., of Dillon Consulting Limited, dated January 20, 2023 (Drainage Report) **be received**;

And that consideration **be given** to the first and second readings of a provisional by-law to adopt the Drainage Report in accordance with Section 42 of the Drainage Act (Act);

And further that notice **be given** to all affected landowners of the Court of Revision to be held on Tuesday, March 14, 2023, at 5:00 pm in accordance with Section 46(1) of the Act, subject to the adoption of the provisional by-law.

Carried

I. Adjournment

Motion: PCM - 15/23

Moved By Councillor Rick Tonial
Seconded By Councillor Alicia Higgison

That there being no further business, the Tuesday, February 14, 2023 meeting of the Public Council Meeting **be adjourned** at 5:42 pm.

Carried

Gary McNamara, Mayor

Robert Auger, Clerk

Public Meeting of Council

Minutes

Date: Tuesday, February 14, 2023
Time: 3:30 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present: Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, James Dorner
Councillor, Alicia Higgison
Councillor, Brian Houston
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present: Chief Administrative Officer, Margaret Misek-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Technology & Client Services, Shaun Fuerth
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 3:30 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

There is no pecuniary interest declared by a Member of Council.

E. Introduction and Purpose of Meeting

The purpose of the meeting is to hear comments from any affected landowners on the proposed drainage works, as set out in the Drainage Report, filed by Mark Hernandez, P.Eng., Dillon Consulting Limited dated August 5, 2022 for the Demonte Drain.

The Drainage Superintendent provides an overview of the proposed drainage works as appended on the agenda.

F. Delegations

1. Mark Hernandez P. Eng., Drainage Engineer, Dillon Consulting Limited
2. Av Maharaj, Affected Property Owner

Mr. Av Maharaj did not attend the meeting to provide comments.

The Mayor open the floor to the members for questions. There were no questions raised.

G. Communications

1. Notice of Public Meeting dated January 30, 2023
2. By-Law 2023-021

Being a by-law for the repair and improvements to the Demonte Drain

Councillor Tania Jobin arrives at 3:34 pm.

Motion: PCM - 09/23

Moved By Councillor Rick Toniai
Seconded By Councillor James Dorner

That Communications - For Information 1 and 2 as listed on the Tuesday, February 14, 2023 Public Council Meeting Agenda, **be received**.

Carried

H. Reports

1. PWES-2023-10 Request to Consider Engineer's Report - Demonte Branch Drain

Motion: PCM - 10/23

Moved By Deputy Mayor Joe Bachetti
Seconded By Councillor Brian Houston

That the Drainage Report and Specifications for the Demonte Branch (Drain) as prepared by Mark Hernandez, P.Eng., of Dillon Consulting Limited, dated August 5, 2022 (Drainage Report) **be received**;

And that consideration **be given** to the first and second readings of a provisional by-law to adopt the Drainage Report in accordance with Section 42 of the Drainage Act (Act);

And further that notice **be given** to all affected landowners of the Court of Revision to be held on Mach 14, 2023, at 4:30 pm in accordance with Section 46(1) of the Act, subject to the adoption of the provisional by-law.

Carried

I. Adjournment

Motion: PCM - 11/23

Moved By Councillor Brian Houston
Seconded By Councillor Alicia Higgison

That there being no further business, the Tuesday, February 14, 2023 meeting of the Public Council Meeting **be adjourned** at 3:36 pm.

Carried

Gary McNamara, Mayor

Robert Auger, Clerk

Special Meeting of Council

Minutes

Date: Tuesday, February 14, 2023
Time: 6:00 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present:

Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, James Dorner
Councillor, Alicia Higgison
Councillor, Brian Houston
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present:

Chief Administrative Officer, Margaret Misek-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Community Safety & Fire Chief, Wade Bondy
Director Technology & Client Services, Shaun Fuerth
Director Community & Recreation Services, Beth Gignac
Director Development Services, Brian Hillman
Director Financial Services & Chief Financial Officer, Tom Kitsos
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Manager Water Services, Brad Dupuis
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson
Manager Planning Services & Local Economic Development, Chad Jeffery
Manager Public Works & Transportation, Kirby McArdle

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 6:00 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied

Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

There is no pecuniary interest declared by a Member of Council.

E. Delegations

1. Shoreline Management Plan Coastal Flood Risk Assessment Report

Peter Zuzek, Zuzek Inc.

Mr. Peter Zuzek presents the "Town of Tecumseh Coastal Flood Risk Assessment" PowerPoint as appended on the agenda. The Consultant provides a background of the study conducted and advises on various options and their possible costs to reduce coastal flood risk and cost estimates for mitigation measures.

The Mayor opens the floor to questions from the Members.

In response to an inquiry, the Consultant indicates more work needs to be done with property owners to come up with solutions to be attractive with mitigation in mind.

The Director Public Works & Engineering Services explained that next steps would be to integrate this report into the Public Works and Engineering Services Capital Works Plan with focus on public engagement and how to implement this study.

A Member inquires if there are temporary measures that can be done. The Consultant reviewed some temporary measures that have been implemented in various locations in Europe but he opined that those temporary measures likely would not be optimal for this community.

A Member suggested that this study be circulated to our neighboring municipalities and the County of Essex. The CAO requested that the study be circulated first through the Flood Working Group for discussion and consideration.

F. Communications

There are no Communication items presented to Council.

G. Reports

- 1. PWES-2023-08 Shoreline Management Plan, Town of Tecumseh Coastal Flood Risk Assessment Report**

Motion: SCM - 09/23

Moved By Councillor Tania Jobin
Seconded By Councillor Brian Houston

That Report PWES-2023-08 Shoreline Management Plan – Town of Tecumseh Coastal Flood Risk Assessment Report, **be received.**

H. Adjournment

Motion: SCM - 10/23

Moved By Councillor Alicia Higgison
Seconded By Councillor Rick Toniai

That there being no further business, the Tuesday, February 14, 2023 meeting of the Special Council Meeting **be adjourned** at 7:06 pm.

Carried

Gary McNamara, Mayor

Robert Auger, Clerk

Special Meeting of Council

Minutes

Date: Monday, February 13, 2023
Time: 1:00 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present:

Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, James Dorner
Councillor, Alicia Higgison
Councillor, Brian Houston
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present:

Chief Administrative Officer, Margaret Misek-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Community Safety & Fire Chief, Wade Bondy
Director Technology & Client Services, Shaun Fuerth
Director Community & Recreation Services, Beth Gignac
Director Development Services, Brian Hillman
Director Financial Services & Chief Financial Officer, Tom Kitsos
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 1:02 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires

Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

There is no pecuniary interest declared by a Member of Council.

E. Delegations

1. StrategyCorp

Sabine Matheson, Principal, StrategyCorp. and Tony Haddad, Senior Advisor, StrategyCorp

Janice Forsyth, Forsyth Consulting, will be available to answer any questions that may arise.

With reference to the Presentation attached to the meeting Agenda Ms. Matheson proceeded to present and provide Council with an overview of the strategic planning process explaining the importance and purpose of a municipal council strategic plan and its impact on a municipality as a whole. Ms. Matheson proceeded to advise on: the value of a strategic plan, its role in the overall decision making cycle, the five principles of good strategic planning, the importance of timelines in the process, the scope of planning and the need to utilize all governmental tools in carrying out the eventual strategic plan that is created.

Motion: SCM - 07/23

Moved By Councillor Tania Jobin

Seconded By Councillor Alicia Higgison

That the presentation from Sabine Matheson of StrategyCorp entitled "Tecumseh Pre-Strategic Planning Session" **be received.**

Carried

F. Communications

There are no Communication items presented to Council.

G. Reports

There are no Reports presented to Council.

Council recessed at 2:06 pm and returned from recess at 2:21 pm.

H. Motion to Proceed In-Camera

Motion: SCM - 08/23

Moved By Councillor Alicia Higgison
Seconded By Councillor James Dorner

That Council now move into closed session at 2:22 pm in accordance with the *Municipal Act, 2001* Section 239 (2)(k) which states that a meeting or part of a meeting may be closed to the public if the subject matter being considered is:

A position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the municipality or local board.

Carried

I. Motion to Leave In-Camera Session

Motion: CW-06/23

Moved By Councillor Rick Tonial
Seconded By Councillor Tania Jobin

That Council rise from the closed session and return to open session at 4:15 pm.

Carried

J. Reporting Out of In-Camera Session

The Chair reported out that Council had just held a discussion in closed session in accordance with and as permitted by Section 239 (2) (k) of the *Municipal Act, 2001*. During this closed session Council received information regarding intergovernmental relations and negotiation strategies for the municipality to consider as relating to future interactions with those intergovernmental bodies during the current term of Council.

K. Adjournment

Motion: SCM - 09/23

Moved By Councillor Alicia Higgison

Seconded By Deputy Mayor Joe Bachetti

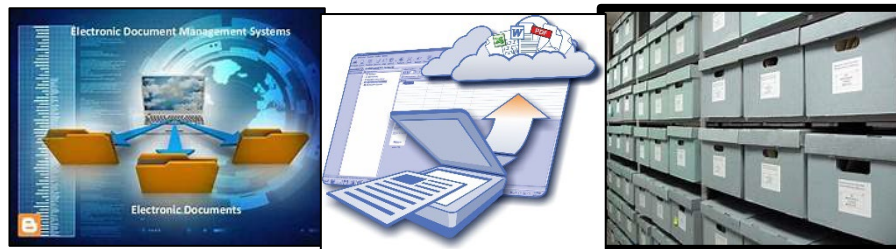
That there being no further business, the Monday, February 13, 2023 meeting of the Special Council Meeting **be adjourned** at 4:17 pm.

Carried

Gary McNamara, Mayor

Robert Auger, Clerk

Corporate Records and Information Management Review Implementation Strategy



Imerge Consulting Inc.
February 28, 2023

Agenda

1. Current State
2. Document Repositories
3. Three Year Plan
4. Costs and Benefits

Scope of Information Governance Strategy

- Email
- SharePoint
- Backups
- Social Media
- Network Servers (Shared Drives)
- Laptops
- Structured Systems
- Cloud Based Storage (Future, Selected Applications)

Deliverables

1. Project Schedule
2. Current State Assessment (**complete**)
 - Internal policies, procedures, guidelines and practices (**complete**)
 - Industry best practices (**complete**)
 - SWOT analysis Benchmarking to municipal norms or comparative data (to do - identify and confirm participants) (**complete**)
3. Information Management and Governance Gaps and Actionable Recommendations (**Complete**)
4. Information Management and Governance Implementation Plan (**DRAFT for review**)
 - Components
 - Timing
 - Resources (Staffing, Services, Software)
 - Success Factors (Including Training and Audit)
 - Change Management

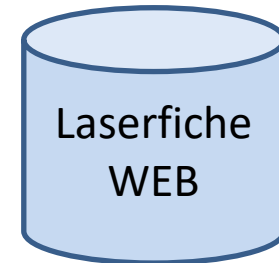
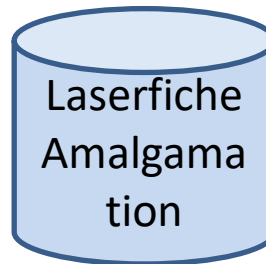
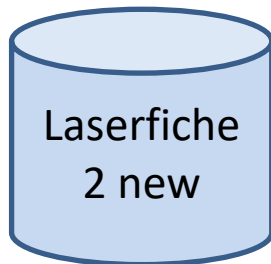
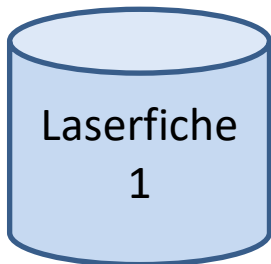
Document and Record Repositories (Approx. 100,000 records)

15 licenses
Original
implementation
Records and
Building and
Planning
52,868 records

50 licenses
Use limited to
Clerks at this
time;
Classification
integrated with
TOMRMS, no
retention
functions
23,195 records

15 licenses
Records from
amalgamation
17,241 records

Public facing
documents
Some
Duplication of
docs in
Laserfiche 1,2
Operates
through County
16,712 records



Other Repositories with Records (Approx. 6 million documents)

Other Repositories of Content/Records

- Escribe
- Network Drives (some use of TOMRMS classification), 1.4 million files
- Email 4.7 million emails
- Dept. Specific software (e.g.HR, Parks)
- Estimate of documents to be saved in repository (20% of 6 million)1.2 million to be managed as records

Strengths and Opportunities

- Some familiarity with TOMRMS
- Enthusiasm from staff to use managed repositories
- Good life cycle management of paper records
- Ability to tie into Digital strategy initiatives

Weaknesses and Threats

- Consolidation of Repositories
- Integration of Records Retention and Disposition for Electronic Records
- Staff Training
- Resources to Support Content Migration
- Public Facing Content and AODA Solutions
- Focus on EDRMS vendor alone will not address weaknesses

RECOMMENDATIONS AND PRIORITIES FOR IMPROVED INFORMATION MANAGEMENT

Information Management Roles

Review existing information management roles, to allow adequate time and skills for qualified staff to address information management weaknesses by:

- automating life cycle management of records in existing repository,
- planning migration of content into a managed repository,
- Reviewing options to enhance, replace or transfer to cloud records repository management functions

Role of Liaisons:

Need to become more involved in records management tasks in terms of hours, training, and presence in each department.

Role of Records Coordinator:

Recommendation for Level 2 Records Coordinator as full time position.

Role of Technical Analyst:

Recommendation of one half time role to support Records Coordinator and Interface with Software Vendor and system implementation tasks involving software and data.

Metrics:

Establish metrics to guide implementation and net change in annual records retention and disposals

Information Management Practices

- Update Information and records management policies to reflect roles of Records Coordinator, Technology, Liaisons
- Formalize stakeholders roles to review ongoing policies, implementation (Records, Technology)
- Update procedures for physical storage regarding labelling, numbering of boxes and listing of box contents
- Update policy to document legal hold procedures
- Review strategy to clean up and consolidate Laserfiche repositories into a single Laserfiche repository
- Develop and plan strategy to clean network drives (elimination of duplicates, transitory records) prior to migration and assignment of metadata related to Classification
- Plan migration of content from network drives and emails into controlled document repository
- Update software to automate retention and disposition management

Storage and Security

- Apply retention rules to boxed paper records
- Re-label boxes for remaining records and index through Excel spreadsheet.
- Improve security and access (tracking) to inactive storage areas
- Implement records retention rules for ongoing disposals of electronic records through automation of disposal process and application of TOMRMS rules within Laserfiche.
- Apply to stored records and authorize disposals.
- Plan for Digital Preservation procedures for electronic records held longer than ten years

Technology to Support Content Management Requirements

- Testing and implementation of life cycle management using TOMRMS and disposals within Laserfiche
- Assess Laserfiche software alternative options after cleanup and consolidation
- Develop content migration plan
- Review scanning initiatives and develop scanning plans and priorities

Communications and Training

Develop training plan targeted to:

- Management
- Liaisons
- Records Coordinator and Analyst
- All content creators and users

Develop communication plan. Communicate on a monthly basis to all staff regarding progress and implementation status

Initiate some change management strategies

Benefits of Improved Use of EDRMS

1. Staff Productivity
2. Opportunity for Work Flow Automation and Process Improvements
3. Reduced Administrative Day to Day Management of Records
4. Accountability for Information Management
5. Protection of Personal Information
6. Reduced Electronic Storage of Duplicate Records
7. Efficient Access and Retrieval of Correct Versions of Records
8. Preservation and Protection of Electronic Records
9. Timely Disposal of Records no Longer Required
10. Ability to Respond to Information Requests
11. Basis on Which to Improve Customer Service Delivery
12. Reduced Legal Risk
13. Reduced Onsite File Storage Cost
14. More effective and efficient back up procedures

Estimated Incremental Cost Summary by Year

Year	Cost
Year 1	\$77,000*
Year 2	\$182,200
Year 3	\$202,200
Total 3 Year Cost	\$461,400

*Estimate based on salary + 10% benefits

Costs of Implementation

Actions	Estimated Cost Range for External Consultants, Contractors, Vendors, SAAS **	Year 1	Year 2	Year 3	Total
IG Information Governance					
Planning and Oversight	\$	Internal	Internal		\$
Roles and Responsibilities	\$	Internal	Internal	Internal	\$
Monitoring and Auditing	Internal	Internal	Internal	Internal	\$
Subtotal	Internal	\$	\$	\$	\$
IM Corporate Practice					
IM Procedures	\$	Internal	Internal	Internal	\$
Classification	**\$10,000	Internal	\$10,000		\$10,000
Disposition	**\$20,000	\$	\$20,000	Internal	\$20,000
Metadata	**\$5,000		\$5,000	\$5,000	\$10,000
Subtotal		\$	\$35,000	\$5,000	\$40,000
Storage and Security					
Content Migration	**\$10,000	Internal	\$10,000	\$10,000	\$20,000
Security	\$	Internal	Internal		\$
Long Term Digital Preservation	**\$15,000	Internal	Internal	\$15,000	\$15,000
Subtotal		\$	\$10,000	\$25,000	\$35,000
Technology					
RM Software	**\$30,000	Internal	\$	\$35,000	\$35,000
Migration Software	**\$15,000		\$15,000		\$15,000
Scanning	**\$15,000			\$15,000	\$15,000
Subtotal		\$	\$15,000	\$50,000	\$65,000
Communication and Training					
Communications	\$		Internal	Internal	\$
Training	\$	\$	Internal	Internal	\$
Total Vendor Cost (**)	**\$130,000	\$	\$60,000	\$80,000	\$140,000
*One Additional FTE to coordinate and support implementation @ \$77,000/yr.		\$77,000	\$77,000	\$77,000	\$231,000
*One half FTE or contractor to provide technology support to coordinate and sustain IM Program and implementation @ \$45,200/yr			\$45,200	\$45,200	\$90,400
Sub Total:		\$77,000	\$122,200	\$122,200	\$321,400
All figures in current (C\$) dollars					
* One FTE Level 2 - Salary and Benefits (10%):	\$77,000				
* One half 0.5 FTE Technology Support (Contract or Staff +13% HST or Benefits):	\$45,200				
** Vendor or Contractor Services					
Total Cost Over 3 years for incremental Internal Staff and Vendor or Contractor Costs		\$77,000	\$182,200	\$202,200	\$461,400

Questions?



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1.416. 953. 2012



Corporate Records and Information Management Review



Information Management Strategy

FINAL REPORT

February 28, 2023

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Executive Summary

What is the issue?

The Town of Tecumseh has spent over ten years utilizing an Electronic Document and Records Management System (EDRMS) known as Laserfiche which can be used in conjunction with a published subscription guide to records categorization and recommended record retention periods (TOMRMS). At a time when efficient and comprehensive information management is generally accepted as a crucial component of organizational effectiveness, the Town's electronic information remains partially unmanaged. The most consistent use of these tools has been on the management of records under control of the Town Clerk. However, unstructured information (those documents not part of a data base of columns and rows) comprises the bulk of the electronic content and includes Word documents, Excel spreadsheets, scanned images, email and other document formats. Consequently, the Town finds itself with inconsistent records and information management across departments.

Efficient, information-driven business processes are the core of effective and cost-efficient government. Compliance with legislative obligations require the Town's information in all formats to be maintained, secure, accessible, and preserved. This is critical to the democratic concepts of accountability and transparency. Despite the fact that most of the records are born digital, documents continue to be printed, filed, and used inconsistently as official records, with the digital versions being managed on an ad hoc basis. As the volume of electronic records has grown, the time required for staff members to sort, file and dispose of electronic records makes compliance difficult. While electronic storage costs are in the acceptable range, as the volume of records has grown at an exponential rate, the ability to find the right document, and to trust that the source is authoritative has become a challenge. Long-time employees who are nearing retirement often hold the knowledge of where to find critical information, be it in physical or electronic form, and their departure represents a risk in the ability to locate specific documents.

In summary, the implementation of the existing electronic information management infrastructure does not adequately manage the life cycle (creation to disposition) required of electronic records. After almost twenty years of use, dispositions of electronic records and more comprehensive coverage of content (i.e. inclusion of most emails and electronic files now on network drives) adversely affects the Town's operations and compromises compliance with legislative obligations for all records to be maintained, accessible, secure, and preserved.

Enhanced use of the existing EDRMS, Laserfiche, also offers an opportunity to address these issues by building on the Town's strengths and successes in managing paper-based records to encompass its digital information.

In light of these findings, documented in the prior Current State Report (January 2023), a study was undertaken to review the current state of the Corporate Records and Information Management Program and propose a strategy and implementation plan to manage the current volume of both electronic and paper records.

The study asked a few basic questions and found the following answers.

Does the Town have an information management problem?

The Town does have many of the necessary tools and resources to manage electronic records, however, they have not used the full potential of the existing tools, and staff do not have the training, expertise, and leadership to move forward with managing electronic records by automating the life cycle of records from creation to disposition.

What tools should the Town invest in to address the concerns?

This report identifies a strategy with five components and tasks to address existing information management gaps:

1) Information Governance Model

Provide governance at the senior level to manage unstructured data in order to break down existing information silos, including monitoring and audit to measure compliance and performance. This includes clarification of metrics to establish a baseline of the number of records under life cycle management and monitor net change through addition of records and disposition on an annual basis. Increase in-house staff resources to oversee consolidation of existing repositories of electronic records; automation of the life cycle management of dispositions of electronic records; migration of relevant email and network drive content to a consolidated and automated life cycle records management repository, and potential transfer of software to cloud based service or alternate vendor.

2) Information Management Corporate Practices

Consolidate and simplify records and information management policies and procedures and implement the existing records retention schedule to better address electronic records and improve the findability of information regardless of the format it is stored in, and reduce risk through timely disposition as defined by the existing records retention rules. Automate the disposition process including addition of metadata into document repository and automated update of retention rules as connected to The Ontario Municipal Records Management System (TOMRMS) classification (metadata) for records held in repository.

3) Storage and Security

Review and increase security by identifying Personal Identifiable information, vital records, and distinguish between public, internal and confidential information within the retention schedule and the repository. Consolidate and manage storage of content through content migration into Laserfiche repositories with automated life-cycle management functions. This includes long term preservation of digital records for those electronic documents held over ten years or permanently.

4) Information Management Technology

Test and validate the capacity of existing Laserfiche software to manage electronic documents through the life cycle including disposition and audit trail management. This includes standardizing metadata used across departments to improve access and search results. Establish scanning standards for vital records and for continuously used paper records, and acquire migration software to move electronic records from network drives, email and other repositories into managed document repositories. Finally, address standards and processes for life cycle management of email, to encourage preservation of those emails critical and required to document operational processes and to delete and reduce volume of transitory (those records having no operational value) email records.

5) Communication and Training

Provide more staff training on the records policies and procedures, and software tools. Prepare a communications plan to make sure staff understand the “why and how” this will be accomplished and use change management techniques to support compliance and acceptance of these changes.

The first three actions are leveraged by, or require, a tool such as an Electronic Document Records Management System (EDRMS/Content Services) to provide the functions and features to manage electronic and paper records and to protect them according to Records Management best practices and the Town’s legal and business obligations. This system can also provide valuable metrics to help manage the governance of this type of information. The options to continue use of Laserfiche, move content into a cloud storage model, or transition to a SharePoint based solution or alternative vendor should all be assessed in detail over the next three years. Immediate improvements in use of the existing software in the near term (one to two years) will serve to create a strong base and familiarity using a more complete repository can be used as a good basis on which to consider the options moving forward in the longer term (three to five years). A change of vendor is not recommended at this time until a consolidated repository with a higher percentage of content (from network drives and email) is adapted and accepted by current staff. Familiarity and strong benefits will then make a transition to an alternative vendor more viable.

What will these actions deliver?

Properly implemented, and with sufficient training and ongoing support, these actions will deliver better information management which will enable Tecumseh to:

- Save up to a million dollars per year in staff productivity from managed email, trusted and protected records which are easy to find; reduced paper filing costs;
- Leverage economic opportunities resulting from transforming business to provide digital services and offer faster service transaction times;

- Better compliance with existing legislation such as Municipal Freedom of Information and Protection of Privacy Act;
- Improve and make consistent information sharing across departments;
- Provide a platform to better manage information security and to be able to audit the integrity of the information;
- Find information faster, and organize information to better meet business needs; and,
- Develop foundational components for future initiatives such as Smart City¹, Open Data² and inter-government service delivery.

The Information Management Strategy will provide a roadmap for the implementation of the tools. Implementation will ensure, on an ongoing basis that the management and protection of the Town's unstructured information continues to evolve to meet the Town's needs and to benefit from evolving technologies. This is in addition to activities by the Town Clerk and Deputy Clerk, engage department 'liaisons' (proposed designation to serve as a conduit to the Town's records management policies, procedures and tools), under the leadership of a proposed "Records Coordinator". This would add a new role as Records Coordinator under the direction of the Deputy Clerk. The Records Coordinator role would be to maintain the records policies and procedures and to continue to provide staff training and support for managing unstructured data.

What will it cost?

Imerge has developed budget estimates based on the continued use of the existing EDRMS while planning for a transition to a cloud based option to address the Town's future recordkeeping needs. Total **incremental** costs to implement the system over a three year period are estimated at approximately \$461,400 dollars for vendor, contractor, and/or services related costs and increased staffing costs. Costs to sustain the system, over time, will include a minimum of one new role (1 FTE) for ongoing internal support of the Information Management Strategy as a Records, Coordinator and 0.5 FTE for the coordination with Technology and Client Services. The risk of only a single person is the ability to find a person with the full range of skills, and the need for backup of this position given the number of tasks in the implementation roadmap. If only one position is available, vendor and or service costs will increase to cover the difference. The expenditure in staff costs will come with benefits in staff productivity, reduced legal risk, the ability to sustain growth, and the tools to support business transformation initiatives and innovation. Estimates of staff productivity is anticipated at approximately \$750,000 per year as detailed in the section on [Information Management Benefits](#).

¹ [Microsoft smart cities link](#)

² [City of Waterloo Example of Open Data](#)

What will it look like?

A fully implemented information management program will enable access to all formats and types of records through a single search using consistent rules and controls that only allow access to those who are entitled to view records. It will facilitate sharing between departments in a way that protects the information and provides an audit trail of all operations on versions or copies of a record. It will move from the current “keep everything” approach to keeping only those electronic records of business and historic value. An automated EDMRS system automates the life cycle management of the record, providing tools to facilitate long term transfer to archival status and disposal in compliance with laws and regulations. The integration of access to all record types, formats, access tools and consistent management of records between departments will create the opportunity to improve business processes and undertake service renewals through workflow, collaboration and a sustainable Information Management program.

An updated and comprehensive records by-law and records policies and procedures will ensure consistency in the management of information across departments and over time. It will help staff classify records so they can be located more easily.

A strong Information Management structure will ensure that:

- records policies are implemented;
- the EDRMS is used properly through the life cycle phases and contains information which is stored appropriately to ensure maximum usability;
- information is protected, and where needed, preserved;
- the foundation for smart-city support, with additional data and analytics is provided;
- future integration between the EDMRS and existing applications to further improve staff efficiency and information integrity.

In summary, EDMRS software will be the core of an integrated information management system designed to optimize business efficiency, while facilitating accountability, transparency, and legislative compliance.

How should the Town implement the changes?

Imerge has provided a roadmap of the tasks over a three year period by year and Principle to guide the preparation for, implementation of, and maintenance of an enhanced Information Management strategy. Costs and Benefits are also addressed over this three year time frame. The implementation does not end after the three years, as monitoring compliance with the Records Management policy, further benefits through business process workflow implementation, and auto-categorization tools will create further efficiencies and ease of use in finding and managing information.



CORPORATION OF THE TOWN OF ESSEX

33 Talbot Street South, Essex, Ontario, N8M 1A8
p: 519.776.7336 f: 519.776.8811 | essex.ca

February 14, 2023

Honourable Steven Lecce, Minister of Education

Ministry of Education
315 Front Street West, 14th Floor
Toronto, ON M7A 0B8

RE: Ontario School Board Elections

Dear Minister Lecce,

At its Regular Meeting on February 6, 2023, Council received correspondence from the Town of Petrolia regarding School Board Elections in Ontario. Through discussion, Council determined that organizing, hosting, and promoting School Board Elections requires an extensive use of municipal resources and co-ordination. It was further discussed that the act of conducting School Board Elections, without compensation or re-imbursement, places a significant financial burden on municipalities.

As a result of that discussion, Council passed the following resolution:

R23-02-034

Moved by: Deputy Mayor Shepley
Seconded by: Councillor Allard

That the correspondence dated January 23, 2023 from the Town of Petrolia regarding School Board Elections be received and supported; and

That a letter of support be sent to the Town of Petrolia, the Honourable Steven Lecce, Minister of Education, MPP Anthony Leardi, the County of Essex and all other municipalities.

Carried

Yours truly,

A handwritten signature in blue ink, appearing to read "Shelley Brown".

Shelley Brown

Acting Clerk, Legal and Legislative Services
sbrown@essex.ca



CORPORATION OF THE TOWN OF ESSEX

33 Talbot Street South, Essex, Ontario, N8M 1A8
p: 519.776.7336 f: 519.776.8811 | **essex.ca**

c.c. Mandi Pearson, Clerk/Operations Clerk, Town of Petrolia
mpearson@petrolia.ca

Anthony Leardi, MPP
Anthony.Leardi@pc.ola.org

Mary Birch, Acting CAO, County of Essex
m.birch@countyofessex.ca

All 444 Municipalities of Ontario

Court of Revision Meeting

Minutes

Date: Tuesday, February 14, 2023
Time: 4:00 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present: Mayor, Gary McNamara - Chair
Councillor, James Dörner
Councillor, Alicia Higgison
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present: Chief Administrative Officer, Margaret Misk-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson
Drainage Superintendent, Alessia Mussio
Director Technology & Client Services, Shaun Fuerth

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 4:00 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

There is no pecuniary interest declared by a Member of Council.

E. Introduction and Purpose of Meeting

The purpose of the meeting is to hear from any affected owner who wishes to appeal his/her assessment or any part thereof as set out in the Drainage Report, prepared by Mark Hernandez, P.Eng, of Dillon Consulting, dated March 16, 2022 for the Antaya Drain.

The Drainage Superintendent provides the background of the proposed drainage works as appended to the agenda. She advises that she has not received any calls or correspondence from any affected property owners regarding the assessment of the proposed works.

The Mayor opens the floor to questions from the Court. There are no inquiries raised on the proposed works for the Antaya Drain.

F. Delegations**1. Mark Hernandez, Drainage Engineer, Dillon Consulting**

Mr. Hernandez advises that he has not received any calls or correspondence from affected property owners.

G. Communications**1. Public Notice dated January 31, 2023****2. PWES-2023-04 Request to Reconsider Engineers Report - Antaya Drain****3. By-Law 2023-008**

Being a by-law to provide for the repair and improvement to the Antaya Drain

Motion: CR - 01/23

Moved By Councillor Tania Jobin

Seconded By Councillor Rick Tonial

That Communications - For Information 1 through 3 as listed on the Tuesday, February 14, 2023 Court of Revision Agenda, **be received**.

Carried

H. Adjournment

Motion: CR - 02/23

Moved By Councillor Tania Jobin

Seconded By Councillor Alicia Higgison

That there being no further business, the Tuesday, February 14, 2023 meeting of the Court of Revision **be adjourned** at 4:03 pm.

Carried

Chair Gary McNamara, Mayor

Robert Auger, Clerk

Court of Revision Meeting

Minutes

Date: Tuesday, February 14, 2023
Time: 4:30 pm
Location: Tecumseh Town Hall - Council Chambers
917 Lesperance Road
Tecumseh, Ontario N8N 1W9

Present: Mayor, Gary McNamara - Chair
Councillor, James Dörner
Councillor, Alicia Higgison
Councillor, Tania Jobin
Councillor, Rick Tonial

Also Present: Chief Administrative Officer, Margaret Misk-Evans
Director Legislative Services & Clerk, Robert Auger
Director Public Works & Engineering Services, Phil Bartnik
Director Technology & Client Services, Shaun Fuerth
Director Financial Services & Chief Financial Officer, Tom Kitsos
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Deputy Clerk - Clerks Services & Policy Advisor, Christina Hebert
Manager Engineering Services, John Henderson
Drainage Superintendent, Alessia Mussio

A. Roll Call

B. Call to Order

The Mayor calls the meeting to order at 4:30 pm.

C. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Leni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

D. Disclosure of Pecuniary Interest

There is no pecuniary interest declared by a Member of Council.

E. Introduction and Purpose of Meeting

The purpose of the meeting is to hear from any affected owner who wishes to appeal his/her assessment or any part thereof as set out in the Drainage Report, prepared by Mark Hernandez, P. Eng., of Dillon Consulting Limited, dated October 7, 2022 for the Branch of South Talbot and Holden Outlet Drain - Meo Bridge.

The Drainage Superintendent provides a background on the proposed drainage works as appended in the Drainage Report on the agenda.

F. Delegations

1. Mark Hernandez, Drainage Engineer, Dillon Consulting
Mark Hernandez advises that he has not received any calls or correspondence from the affected property owner or the public.

G. Communications

1. Public Notice dated January 31, 2023
2. PWES-2023-06 Request to Consider Engineers Report - Branch of South Talbot and Holden Outlet Drain - Meo Bridge
3. By-Law 2023-009

Being a bylaw to provide for the repair and improvements to the Branch of South Talbot and Holden Outlet Drain – Meo Bridge

Motion: CR - 03/23

Moved By Councillor Tania Jobin
Seconded By Councillor Alicia Higgison

That Communications - For Information 1 to 3 as listed on the Tuesday, February 14, 2023 Court of Revision Agenda, **be received**.

Carried

H. Adjournment

Motion: CR - 04/23

Moved By Councillor Alicia Higgison

Seconded By Councillor Rick Toniai

That there being no further business, the Tuesday, February 14, 2023 meeting of the Court of Revision **be adjourned** at 4:32 pm.

Carried

Chair Gary McNamara, Mayor

Robert Auger, Clerk



The Corporation of the Town of Tecumseh

Financial Services

To: Mayor and Members of Council

From: Tom Kitsos, Director Financial Services & Chief Financial Officer

Date to Council: February 28, 2023

Report Number: FS-2023-02

Subject: 2021 Development Charge Reserve Fund Statement

Recommendations

It is recommended:

That the 2021 Development Charge Reserve Fund Statement, prepared in accordance with the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43, **be received**;

And that the 2021 Development Charge Reserve Fund Statement **be made available** to the public on the Town's website in accordance with the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43 (2.1); 2015, c. 26, s. 7 (1);

And further that the report **be forwarded upon request** to the Ministry of Municipal Affairs and Housing as per the Development Charges Act, 1997, S.O. 1997, c. 27, s. 43 (3); 2015, c. 26, s. 7 (2).

Background

Section 43 of the Development Charges Act states, "the Treasurer of a municipality shall each year on or before such date as the council of the municipality may direct, give the council a financial statement relating to development charge by-laws and reserve funds established under section 33."

By motion RCM 779/03, Council directed that the Development Charge (DC) financial statement be provided by June 30 of each year following.

The statement must include opening and closing balances, transactions and such information as is prescribed in the regulations.

Section 43 of the Development Charges Act, 1997, prescribes the statement must be made available to the public.

Comments

The development charge reserve fund balance as of December 31, 2021 is \$1,699,302 (2020 balance was \$1,059,359). This represents the amount of funds in specific DC reserve fund categories that have been collected through development charges and are available to fund growth related projects (Attachment 1).

A number of growth-related projects have been undertaken in the last several years. The DC reserve funds for many of the DC reserve fund categories have been inadequate to fully fund these projects so it has been necessary to temporarily fund these works from other sources until DC fund revenue is collected.

The amounts remaining unfunded as of December 31, 2021 are presented below. Details are provided in Attachment 4 (Schedule "C").

DC Category	2021	2020	2019	2018
Roads	\$ 149,355	\$ 360,594	\$ 967,428	\$ 1,105,613
Wastewater	\$ 11,097,886	\$ 11,895,806	\$ 12,109,917	\$ 11,780,052
Watermain	\$ 487,984	\$ 746,837	\$ 901,304	\$ 968,283
Recreation	\$ 947,100	\$ 1,070,231	\$ 1,224,667	\$ 898,391
Studies	\$ 933,313	\$ 1,118,405	\$ 966,297	\$ 861,876
Total Unfunded	\$ 13,615,638	\$ 15,167,158	\$ 16,169,613	\$ 15,614,215

Interim financing for the Roads, Recreation and Studies unfinanced components has been provided from reserves and taxation while Wastewater and Watermain unfinanced amounts have been provided from wastewater and water rates.

As amounts become available to repay the unfunded balances, these funds are used to repay the original source of funding or allocated to the Capital Infrastructure Reserve where the amount was funded by taxation (RCM-287/09; FS Report 13/09).

Based on the current rate of development and projects being completed it is anticipated it will be a number of years before there are sufficient funds available in the DC reserve fund to repay unfunded balances.

Consultations

None

Financial Implications

The Town's DC Reserve Funds have accumulated an overall deficit balance as DC revenues have historically been insufficient to cover eligible growth expenditures. The Town has funded this shortfall internally through Town Lifecycle Reserves and/or Water/Wastewater Reserve Funds, with the intention of repaying the funds as DC revenues are received.

That overall deficit was reduced for the year ended 2021 as DC revenues collected during the year exceeded eligible expenditures.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Zora Visekruna, MBA
Deputy Treasurer & Manager Financial Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Development Charge Reserve Fund Statement
2	Schedule "A" – Development Charge Related Capital Projects
3	Schedule "B" – Development Charge Related Studies
4	Schedule "C" – Unfunded Development Charge Amounts

Town of Tecumseh
Development Charge Reserve Fund Statement
For the Year Ended December 31, 2021

Attachment 1

	Fire	Police	Roads	Wastewater	Water	10 Year Services			Total
						Studies	Library	Recreation	
Balance as of December 31, 2020	\$ 301,123	\$ 70,376	\$ -	\$ -	\$ -	\$ 88,063	\$ 94,829	\$ 504,969	\$ 1,059,359
<u>Add:</u>									
Development Charges Collected	\$ 52,960	\$ 24,808	\$ 1,031,762	\$ 797,920	\$ 270,696	\$ 219,893	\$ 20,640	\$ 584,163	\$ 3,002,842
Interest earned	\$ 4,566	\$ 966				\$ 1,209	\$ 1,302	\$ 6,930	\$ 14,973
Repayment of Amts. Borrowed from Fund Incl. Interest	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total	\$ 57,526	\$ 25,774	\$ 1,031,762	\$ 797,920	\$ 270,696	\$ 221,102	\$ 21,942	\$ 591,093	\$ 3,017,815
<u>Deduct:</u>									
Fund Capital Projects - Schedule "A"	\$ 144,607	\$ -	\$ 360,593	\$ 797,920	\$ 270,696	\$ -	\$ -	\$ 584,163	\$ 2,157,979
Fund Studies - Schedule "B"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 219,893	\$ -	\$ -	\$ 219,893
Amounts Refunded	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Loans to Other D.C. Categories for Interim Financing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Credits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sub-Total	\$ 144,607	\$ -	\$ 360,593	\$ 797,920	\$ 270,696	\$ 219,893	\$ -	\$ 584,163	\$ 2,377,872
Balance as of December 31, 2021	\$ 214,042	\$ 96,150	\$ 671,169	\$ -	\$ -	\$ 89,271	\$ 116,770	\$ 511,899	\$ 1,699,302

Schedule "A"

Attachment 2

**Town of Tecumseh
Development Charge
Related Capital Projects
For the Year Ended
December 31, 2021**

Fund/Capital Project	Cost	Taxes/Rates/ Part XII	Grants/Other	DC Draw	Unfunded
Fire					
Prior Years Unfunded - 2020 correction				\$ (24,715)	
High Water Rescue Vehicle	\$ 169,322	\$ -	\$ -	\$ 169,322	\$ -
Fire Total	\$ 169,322	\$ -	\$ -	\$ 144,607	\$ -
Police					
-	\$ -	\$ -	\$ -	\$ -	\$ -
Police Total	\$ -	\$ -	\$ -	\$ -	\$ -
Roads					
Prior Years Unfunded - Various Roads Projects	\$ -	\$ -	\$ -	\$ 360,593	\$ -
Manning Road Reconstruction Ph 2	\$ 605,857	\$ 378,151	\$ 155,677	\$ -	\$ 72,029
Manning Road Reconstruction Ph 3	\$ 23,277	\$ 19,554	\$ -	\$ -	\$ 3,723
Lesperance Multi-Use Trail	\$ 68,709	\$ 6,871	\$ -	\$ -	\$ 61,838
Malden Road Pathway Extension	\$ 13,102	\$ 1,337	\$ -	\$ -	\$ 11,765
Roads Total	\$ 710,945	\$ 405,913	\$ 155,677	\$ 360,593	\$ 149,355
Wastewater					
Prior Years Unfunded - Various Wastewater Projects	\$ -	\$ -	\$ -	\$ 797,920	\$ -
Wastewater Total	\$ -	\$ -	\$ -	\$ 797,920	\$ -
Water					
Prior Years Unfunded - Various Water Projects	\$ -	\$ -	\$ -	\$ 270,696	\$ -
CR19 Watermain - CR22 to S. of Jamsyl (part of W-2B)	\$ 14,803	\$ 2,960	\$ -	\$ -	\$ 11,843
Water Total	\$ 14,803	\$ 2,960	\$ -	\$ 270,696	\$ 11,843
Library					
-	\$ -	\$ -	\$ -	\$ -	\$ -
Library Total	\$ -	\$ -	\$ -	\$ -	\$ -
Recreation					
Prior Years Unfunded - Various Recreation Projects				\$ 584,163	\$ -
Pickleball Court - Lacasse Park	\$ 595,090	\$ 81,358	\$ 52,700		\$ 461,032
Indoor Recreation Total	\$ 595,090	\$ 81,358	\$ 52,700	\$ 584,163	\$ 461,032
Total	\$ 1,490,160	\$ 490,231	\$ 208,377	\$ 2,157,979	\$ 622,230

Schedule "B"

Attachment 3

**Town of Tecumseh
Development Charge Related Studies
For the Year Ended
December 31, 2021**

Studies	Fund	Cost	Taxes	Grants/Other	DC Draw	Unfunded
Fund Prior Year Studies	Studies	\$ -	\$ -	\$ -	\$ 219,893	
Parks Master Plan Update	Studies	\$ 61,341	\$ 30,671	\$ -	\$ -	\$ 30,670
Tecumseh Hamlet Servicing	Studies	\$ 3,155	\$ 315	\$ -	\$ -	\$ 2,840
Sanitary Sewer Model Update	Studies	\$ 3,248	\$ 2,923	\$ -	\$ -	\$ 325
Official Plan	Studies	\$ 1,486	\$ 520			\$ 966
Total		\$ 69,230	\$ 34,429	\$ -	\$ 219,893	\$ 34,801

Schedule "C"

Attachment 4

**Town of Tecumseh
Unfunded Development Charge Amounts
For the Year Ended
December 31, 2021**

	Reserve Fund							
	Fire	Police	Roads	Wastewater	Watermain	Recreation	Studies	Total
Unfunded DC Balance at Dec. 31, 2020	\$ -	\$ -	\$ 360,593	\$ 11,895,806	\$ 746,837	\$ 1,070,231	\$ 1,118,405	\$ 15,191,872
Amounts Funded Schedule "A"	\$ -	\$ -	\$ (360,593)	\$ (797,920)	\$ (270,696)	\$ (584,163)	\$ -	\$ (2,013,372)
Amounts Unfunded Schedule "A"	\$ -	\$ -	\$ 149,355	\$ -	\$ 11,843	\$ 461,032	\$ -	\$ 622,230
Amounts Funded Schedule "B"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (219,893)	\$ (219,893)
Amounts Unfunded Schedule "B"	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34,801	\$ 34,801
Net (Funded) Unfunded	\$ -	\$ -	\$ (211,238)	\$ (797,920)	\$ (258,853)	\$ (123,131)	\$ (185,092)	\$ (1,576,234)
Subtotal	\$ -	\$ -	\$ 149,355	\$ 11,097,886	\$ 487,984	\$ 947,100	\$ 933,313	\$ 13,615,638
Unfunded DC Balance at Dec. 31, 2021	\$ -	\$ -	\$ 149,355	\$ 11,097,886	\$ 487,984	\$ 947,100	\$ 933,313	\$ 13,615,638

Change \$ (1,576,234)



The Corporation of the Town of Tecumseh

Legislative & Clerk Services

To: Mayor and Members of Council

From: Robert Auger, Director Legislative Services & Clerk

Date to Council: February 28, 2023

Report Number: LCS-2023-03

Subject: Corporate Records and Information Management Review

Recommendations

It is recommended:

That Report LCS-2023-03 entitled “Corporate Records and Information Management Review” together with the presentation by Paula Lederman of Imerge Consulting **be received**;

And that the independent third party review final report entitled, “Corporate Records and Information Management Review - Information Management Strategy, February 2023”, as prepared by Imerge Consulting **be endorsed** in principle;

And further that Administration report back to Council with its recommendations and implementation framework arising from the Corporate Records and Information Management Review;

And furthermore that the independent third party review final report entitled “Corporate Records and Information Management Review - Information Management Strategy, February 2023”, as prepared by Imerge Consulting **be posted** to the Town of Tecumseh website in accordance with the requirements of the funding received from the Municipal Modernization Program – Intake 3.

Background

The Province of Ontario has been providing funding to help small and rural municipalities to modernize service delivery and identify new ways to be more efficient and effective under its Municipal Modernization Program (MMP) since 2019.

In 2021, the Province announced a third intake under its MMP to allow municipalities to benefit from provincial funding to conduct third party reviews, as well as to implement projects to increase efficiency and effectiveness and lower costs in the longer term. Projects that support the following priorities were eligible:

- Digital modernization
- Service integration
- Streamlined development approvals
- Shared services/alternative delivery models.

These initiatives are to be undertaken by a third party reviewer and result in a public report posted to the municipality's website.

The Town made application under the MMP – Intake 3 (Program) seeking funding to support an independent comprehensive assessment of the Town's physical and electronic records and provide the framework for improving service delivery and cost efficiencies, as detailed in Report LCS-2022-04 'Corporate Records and Information Management Review'.

The Town was awarded \$50,880 through the Program to undertake this work.

In accordance with the Town's Purchasing Policy, a Request for Proposal (RFP) seeking a third party service review of the Corporate Records and Information Management Systems was issued in June 2022 and through the process secured consultant services from Imerge Consulting to perform the service delivery review.

Comments

Imerge Consulting commenced the review in September 2022 and undertook the following phases to evaluate the Town's physical and electronic records to identify the strategies and processes to optimize software platforms, integrate applications and digitize manual paper processes to improve both service delivery and efficiency:

Phase 1: Detailed Project Plan

- Detailing of roles and responsibilities, project reporting and updating, compile and review background material and data gathering methodologies

- Project kickoff with Corporate Records and Information Management Steering Committee – Chief Administrative Officer, Director Technology & Client Services, Deputy Clerk & Manager Legislative Services and Deputy Clerk – Clerks Services & Policy Advisor

Phase 2: Data Gathering and Consultation for Current State Assessment

- Undertake inventory and analysis of existing physical and electronic records including life cycle and systems which are serving as repositories
- Review recordkeeping policies, procedures and tools (TOMRMS/Retention/Laserfiche) to identify a strategy which allows records to proceed through their life cycle using an integrated solution and efficient workflows
- Consultation through interviews using a guided questionnaire and discussion to identify gaps between existing and best practices (13 interviews were held with approximately 31 staff representing all departments)
- Conduct survey with industry comparable municipalities regarding their respective information management practices
- Complete a detailed Generally Accepted Recordkeeping Principles (GARP) review to benchmark and assess the current state of recordkeeping for all records, paper and electronic

Phase 3: Strategic Analysis and Recommendations

- Develop an implementation plan which focuses on operational efficiencies in creating, finding, managing and protecting information
- Analysis includes policies and procedures, physical infrastructure (storage), digitization priorities (scanning and retrieval), security of records, technology of records (software), staffing resources, email management and electronic records clean up and content migration to lifecycle managed repositories

Phase 4: Implementation Plan

- Create a roadmap, timing and implementation plan to achieve recordkeeping compliance with ISO Standards and GARP best practices
- The timeline highlights specifics regarding cost and resources required for the following components:

- Information Governance – roles, responsibilities, policies, procedures, tools, vital records, security and disaster recovery
- Technology – software, content migration and cleanup, email management, backup procedures and digital preservation
- Training & Compliance – types of training, communications and change management, compliance and information management audit process.

Imerge Consulting will be presenting their findings and recommendations to Council at the February 28 Regular Council Meeting.

Following the presentation, Administration will report back to Council with a framework for the implementation of recommendations from the Corporate Records and Information Management Review, including any budgetary impacts.

Consultations

All Departments
Corporate Records and Information Management Steering Committee

Financial Implications

There are no financial implications at this time.

The third party review cost of the Corporate Records and Information Management Review is fully funded through the Municipal Modernization Program – Intake 3.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Christina Hebert, BA (Hons), MA, Dipl. M.A.
Deputy Clerk – Clerks Services & Policy Advisor

Reviewed by:

Robert Auger, LL.B.
Director Legislative Services & Clerk

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
None	None



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-16

Subject: Annual Report and Summary Report for the Year 2022
Town of Tecumseh Water Distribution System (260004969)

Recommendations

It is recommended:

That the 2022 Ministry of the Environment, Conservation and Parks Annual Report and the Summary Report for the Town of Tecumseh Water Distribution System (260004969) for the Year 2022, as prepared in accordance with the Safe Drinking Water Act, O.Reg. 170/03, Section 11 – Annual Reports and Schedule 22 – Summary Reports, **be adopted;**

And that the Annual Report and Summary Report **be made available** for public viewing through the Town of Tecumseh website.

Background

The Ministry of the Environment, Conservation and Parks (MECP) Annual Report and the Summary Report for the Town of Tecumseh Water Distribution System (260004969) provide information pertaining to the Town's drinking water system on an annual basis.

In accordance with Ontario Regulation (O.Reg.) 170/03, the Annual Report and Summary Report are to be provided to:

- Drinking Water System Owners (Mayor and Council)

- Owner and Operating Authority Top Management
- The Public

The **Annual Report** identifies specific details regarding the overall quality of drinking water supplied to consumers and must be made available to the public by February 28th of each year.

The **Summary Report** contains information on the drinking water system's operation and management and provides a summary of the regulatory activity in Tecumseh's water distribution system during the year. The Summary Report is required to contain any regulatory requirements that the drinking water system failed to meet along with a description of the non-compliance event, the immediate actions taken to correct the issue, as well as the control measures put in place to mitigate or prevent future occurrences. The Summary Report must also include a summary of the quantities and flow rates of water supplied for the year, tallying monthly average and maximum daily flows for all municipal drinking water systems. The Summary Report must be completed and made available to the public by March 31st of each year.

Comments

The Water Services Division completed the Annual Report and Summary Report for 2022, each of which are provided as Attachments 1 and 2 respectively and were prepared using the format established by the MECP.

This Administrative report and attachments support Council, as the system owner, in meeting its statutory standard of care under the *Safe Drinking Water Act, 2002* (SDWA). Council's commitment to the provision of safe drinking water ensures financial sustainability, asset management and continual improvement of the Town's water distribution system to proactively manage risks and increase efficiency.

The Town's strict adherence to the regulations under the SDWA and the dedication of its highly trained and qualified Water Services staff provides consumers with reliable, safe drinking water.

We are pleased to announce that there were **zero non-compliance events to report in 2022**.

The Town is legislatively required to provide these reports to the public for review. Accordingly, it is recommended that following Council's adoption of the Annual and Summary Reports for the Tecumseh Distribution System (260004969) for the year 2022, these reports be placed on the Town's website for public access.

Consultations

Ministry of the Environment, Conservation and Parks

Financial Implications

There are no financial implications arising from this report.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input checked="" type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input checked="" type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

Brad Dupuis, C. Tech.
Manager Water Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	2022 Ministry of the Environment, Conservation and Parks Annual Report
2	Summary Report for the Tecumseh Distribution System (260004969) for the Year 2022

SUMMARY REPORT

For the

TECUMSEH DISTRIBUTION SYSTEM

(260004969)

For the year

2022

Prepared for the Town of Tecumseh

By Brad Dupuis, C.Tech.
Manager Water Services O.R.O.

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Section 1: Overview

This report has been prepared and submitted in accordance with Schedule 22 of O. Reg. 170/03 under the *Safe Drinking Water Act*. Schedule 22 requires:

The owner of a drinking-water system shall ensure that, not later than March 31 of each year after 2003, a report is prepared in accordance with subsections (1) and (2) for the preceding calendar year and is given to the members of the municipal council.

Schedule 22 also states that:

- 1) The report must:
 - a) list the requirements of the *Act*, the regulations, the system's approval and any order that the system failed to meet at any time during the period covered by the report and specify the duration of the failure; and
 - b) for each failure referred to in clause (a), describe the measures that were taken to correct the failure.
- 2) The report must also include the following information for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system. A summary of the quantities of the water supplied during the period covered by the report, including monthly flows.

In June 2003, the provincial *Safe Drinking Water Act* came into effect. The Drinking-Water Systems Regulation (O.Reg. 170/03) defines how various drinking-water systems are to be operated.

According to this Regulation, the Tecumseh Distribution System is classified as a Large Municipal Residential System (LMR).

Section 2: Non-Compliance Issues

1. During the year 2022 there was zero **(0) reportable issues**.

Section 3: System Capability – 2022 Water Consumption

In accordance with the Agreement between the Town of Tecumseh and the City of Windsor for the provision of water services to the Town of Tecumseh, executed under By-Law No. 2004-71, the Maximum Daily Flow shall not exceed **87 Million Litres** (87 MLD) or 87,000 cubic meters.

The **Maximum Daily Flow** for 2022 was 15,661,000 **Litres** (15,661 Cubic Meters) on August 17, 2022.

Monthly average and daily flows for 2022 are attached for reference.

A summary of the **monthly** total volume supplied by the City of Windsor to the Town of Tecumseh is provided below:

2022 Water Consumption	
Month	Total Volume (cubic meters)
January	216,158
February	190,164
March	208,740
April	211,046
May	262,392
June	287,386
July	416,289
August	381,957
September	378,445
October	313,177
November	260,345
December	241,345
Total	3,367,444



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/02/2022 03:26:00 AM

Report Date From: 01/01/2022 12:00:00 AM

To: 01/02/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	655.0	397.0	1600.0	2970.0	0.0	-33.0	41.0	148.0	283.0	313.0	-70.0	0.0	6304.0
2	661.0	407.0	1636.0	3004.0	0.0	-13.0	52.0	158.0	279.0	321.0	-61.0	0.0	6444.0
3	638.0	403.0	1584.0	2948.0	0.0	-44.0	24.0	189.0	353.0	507.0	-28.0	0.0	6574.0
4	664.0	413.0	1580.0	2937.0	0.0	-40.0	26.0	204.0	407.0	670.0	20.0	0.0	6881.0
5	699.0	421.0	1607.0	2966.0	0.0	-30.0	38.0	194.0	396.0	620.0	8.0	0.0	6919.0
6	683.0	418.0	1586.0	2947.0	0.0	-32.0	33.0	188.0	395.0	613.0	9.0	0.0	6840.0
7	668.0	411.0	1580.0	2943.0	0.0	-48.0	18.0	201.0	382.0	572.0	-17.0	0.0	6710.0
8	698.0	414.0	1708.0	3152.0	0.0	-18.0	56.0	177.0	316.0	433.0	-26.0	0.0	6910.0
9	712.0	415.0	1726.0	3207.0	0.0	-24.0	47.0	181.0	309.0	358.0	0.0	0.0	6931.0
10	691.0	420.0	1603.0	3001.0	0.0	-34.0	49.0	159.0	375.0	588.0	10.0	0.0	6862.0
11	781.0	476.0	1671.0	3078.0	0.0	-33.0	56.0	163.0	374.0	574.0	-8.0	0.0	7132.0
12	832.0	509.0	1727.0	3163.0	0.0	-23.0	44.0	187.0	401.0	632.0	9.0	0.0	7481.0
13	801.0	486.0	1710.0	3142.0	0.0	-19.0	43.0	198.0	429.0	707.0	37.0	0.0	7534.0
14	743.0	431.0	1673.0	3109.0	0.0	-13.0	55.0	173.0	383.0	587.0	3.0	0.0	7144.0
15	758.0	454.0	1770.0	3292.0	0.0	-11.0	54.0	174.0	322.0	417.0	-57.0	0.0	7173.0
16	920.0	551.0	1844.0	3342.0	0.0	-11.0	52.0	177.0	333.0	490.0	-45.0	0.0	7653.0
17	734.0	450.0	1634.0	3038.0	0.0	-46.0	20.0	189.0	403.0	669.0	7.0	0.0	7098.0
18	722.0	436.0	1627.0	3014.0	0.0	-42.0	22.0	199.0	415.0	675.0	48.0	0.0	7116.0
19	710.0	439.0	1635.0	3058.0	0.0	-50.0	31.0	199.0	422.0	689.0	19.0	0.0	7152.0
20	730.0	450.0	1630.0	3038.0	0.0	-71.0	-1.0	189.0	418.0	659.0	-3.0	0.0	7039.0
21	726.0	439.0	1621.0	3044.0	0.0	-68.0	9.0	197.0	416.0	655.0	-7.0	0.0	7032.0
22	726.0	431.0	1705.0	3158.0	0.0	-34.0	34.0	182.0	343.0	469.0	-53.0	0.0	6961.0
23	695.0	409.0	1674.0	3120.0	0.0	-34.0	28.0	160.0	333.0	443.0	-54.0	0.0	6774.0
24	699.0	425.0	1592.0	2974.0	0.0	-40.0	23.0	168.0	388.0	616.0	-17.0	0.0	6828.0
25	718.0	445.0	1616.0	3039.0	0.0	-52.0	16.0	183.0	396.0	613.0	7.0	0.0	6981.0
26	693.0	432.0	1611.0	3037.0	0.0	-43.0	25.0	189.0	410.0	658.0	14.0	0.0	7026.0
27	698.0	434.0	1612.0	3031.0	0.0	-44.0	18.0	178.0	426.0	680.0	18.0	0.0	7051.0
28	688.0	427.0	1615.0	3045.0	0.0	-51.0	13.0	129.0	409.0	659.0	12.0	0.0	6946.0
29	702.0	427.0	1711.0	3184.0	0.0	-42.0	25.0	162.0	329.0	434.0	-56.0	0.0	6876.0
30	705.0	424.0	1731.0	3223.0	0.0	-38.0	28.0	162.0	316.0	394.0	-71.0	0.0	6874.0
31	689.0	432.0	1609.0	3021.0	0.0	-79.0	-13.0	185.0	406.0	657.0	5.0	0.0	6912.0
Monthly T...	22239.00	13526.00	51228.00	95225.00	0.00	-1160.00	966.00	5542.00	11567.00	17372.00	-347.00	0.00	216158.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/03/2022 03:26:00 AM

Report Date From: 01/02/2022 12:00:00 AM

To: 01/03/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	689.0	426.0	1576.0	2965.0	0.0	-89.0	-24.0	193.0	411.0	667.0	5.0	0.0	6819.0
2	651.0	391.0	1542.0	2921.0	0.0	-98.0	-37.0	153.0	309.0	542.0	0.0	0.0	6374.0
3	633.0	371.0	1542.0	2903.0	0.0	-60.0	1.0	171.0	389.0	627.0	0.0	0.0	6577.0
4	672.0	401.0	1586.0	2983.0	0.0	-65.0	8.0	184.0	389.0	618.0	6.0	0.0	6782.0
5	725.0	430.0	1716.0	3211.0	0.0	-40.0	33.0	166.0	345.0	489.0	-40.0	0.0	7035.0
6	693.0	396.0	1705.0	3196.0	0.0	-29.0	37.0	169.0	327.0	437.0	-55.0	0.0	6876.0
7	637.0	390.0	1560.0	2970.0	0.0	-81.0	-12.0	183.0	412.0	686.0	31.0	0.0	6776.0
8	652.0	391.0	1544.0	2936.0	0.0	-75.0	-10.0	200.0	431.0	728.0	36.0	0.0	6833.0
9	671.0	397.0	1590.0	3026.0	0.0	-87.0	-19.0	203.0	416.0	670.0	8.0	0.0	6875.0
10	661.0	395.0	1564.0	2995.0	0.0	-85.0	-20.0	213.0	463.0	771.0	22.0	0.0	6979.0
11	657.0	396.0	1561.0	2988.0	0.0	-80.0	-9.0	205.0	412.0	662.0	8.0	0.0	6800.0
12	696.0	403.0	1697.0	3197.0	0.0	-46.0	24.0	174.0	349.0	474.0	-44.0	0.0	6924.0
13	664.0	383.0	1677.0	3153.0	0.0	-40.0	26.0	185.0	343.0	440.0	-67.0	0.0	6764.0
14	665.0	400.0	1588.0	3061.0	0.0	-96.0	-28.0	190.0	412.0	664.0	-2.0	0.0	6854.0
15	673.0	397.0	1572.0	3051.0	0.0	-103.0	-33.0	204.0	416.0	661.0	3.0	0.0	6841.0
16	642.0	377.0	1564.0	3011.0	0.0	-74.0	-7.0	196.0	435.0	740.0	36.0	0.0	6920.0
17	629.0	375.0	1527.0	2918.0	0.0	-66.0	4.0	190.0	430.0	709.0	29.0	0.0	6745.0
18	607.0	365.0	1544.0	2949.0	0.0	-66.0	1.0	180.0	395.0	630.0	20.0	0.0	6625.0
19	654.0	376.0	1663.0	3135.0	0.0	-47.0	25.0	140.0	324.0	465.0	-29.0	0.0	6706.0
20	644.0	380.0	1648.0	3105.0	0.0	-37.0	36.0	137.0	308.0	429.0	-41.0	0.0	6609.0
21	655.0	383.0	1639.0	3099.0	0.0	-49.0	15.0	153.0	352.0	533.0	-17.0	0.0	6763.0
22	677.0	409.0	1594.0	2991.0	0.0	-53.0	15.0	181.0	411.0	675.0	25.0	0.0	6925.0
23	660.0	393.0	1554.0	2924.0	0.0	-55.0	14.0	183.0	414.0	673.0	27.0	0.0	6787.0
24	667.0	401.0	1558.0	2976.0	0.0	-73.0	-5.0	175.0	410.0	680.0	30.0	0.0	6819.0
25	637.0	380.0	1539.0	2948.0	0.0	-81.0	-9.0	190.0	410.0	662.0	15.0	0.0	6691.0
26	689.0	399.0	1692.0	3191.0	0.0	-40.0	25.0	159.0	319.0	427.0	-50.0	0.0	6811.0
27	677.0	401.0	1703.0	3212.0	0.0	-38.0	31.0	171.0	319.0	408.0	-63.0	0.0	6821.0
28	673.0	404.0	1593.0	3021.0	0.0	-84.0	-18.0	194.0	401.0	637.0	12.0	0.0	6833.0
Monthly T...	18550.00	11010.00	44838.00	85036.00	0.00	-1837.00	64.00	5042.00	10752.00	16804.00	-95.00	0.00	190164.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/04/2022 03:26:49 AM

Report Date From: 01/03/2022 12:00:00 AM

To: 01/04/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	651.0	390.0	1563.0	2989.0	0.0	-75.0	-6.0	182.0	409.0	673.0	31.0	0.0	6807.0
2	671.0	403.0	1598.0	3054.0	0.0	-66.0	3.0	158.0	400.0	648.0	17.0	0.0	6886.0
3	699.0	423.0	1609.0	3064.0	0.0	-67.0	4.0	187.0	419.0	684.0	17.0	0.0	7039.0
4	680.0	411.0	1595.0	3038.0	0.0	-62.0	10.0	182.0	399.0	621.0	11.0	0.0	6885.0
5	704.0	407.0	1702.0	3231.0	0.0	-29.0	41.0	176.0	352.0	497.0	-43.0	0.0	7038.0
6	693.0	403.0	1716.0	3214.0	0.0	-29.0	36.0	174.0	336.0	441.0	-53.0	0.0	6931.0
7	664.0	403.0	1592.0	3002.0	0.0	-32.0	34.0	184.0	411.0	663.0	15.0	0.0	6936.0
8	683.0	405.0	1576.0	3009.0	0.0	-59.0	8.0	146.0	352.0	677.0	32.0	0.0	6829.0
9	664.0	397.0	1569.0	2998.0	0.0	-72.0	-5.0	189.0	419.0	678.0	21.0	0.0	6858.0
10	626.0	370.0	1545.0	2951.0	0.0	-66.0	-3.0	191.0	426.0	702.0	36.0	0.0	6778.0
11	659.0	398.0	1558.0	2979.0	0.0	-64.0	8.0	160.0	387.0	608.0	33.0	0.0	6726.0
12	663.0	390.0	1662.0	3125.0	0.0	-24.0	45.0	103.0	331.0	463.0	-35.0	0.0	6723.0
13	570.0	337.0	1554.0	2924.0	0.0	-7.0	54.0	90.0	290.0	411.0	-36.0	0.0	6187.0
14	609.0	377.0	1546.0	2952.0	0.0	-73.0	-10.0	179.0	413.0	647.0	18.0	0.0	6658.0
15	584.0	352.0	1492.0	2871.0	0.0	-76.0	-7.0	174.0	413.0	679.0	29.0	0.0	6511.0
16	595.0	363.0	1530.0	2935.0	0.0	-75.0	-7.0	182.0	415.0	700.0	37.0	0.0	6675.0
17	604.0	368.0	1532.0	2961.0	0.0	-74.0	-5.0	169.0	406.0	677.0	30.0	0.0	6668.0
18	579.0	358.0	1502.0	2890.0	0.0	-64.0	9.0	153.0	370.0	602.0	22.0	0.0	6421.0
19	659.0	390.0	1642.0	3134.0	0.0	-90.0	-17.0	214.0	344.0	431.0	-113.0	0.0	6594.0
20	639.0	363.0	1676.0	3196.0	0.0	-83.0	-14.0	281.0	355.0	342.0	-185.0	0.0	6570.0
21	631.0	376.0	1554.0	2933.0	0.0	-64.0	1.0	171.0	402.0	670.0	32.0	0.0	6706.0
22	622.0	375.0	1527.0	2899.0	0.0	-63.0	8.0	174.0	403.0	686.0	36.0	0.0	6667.0
23	609.0	364.0	1540.0	2905.0	0.0	-46.0	31.0	160.0	382.0	617.0	20.0	0.0	6582.0
24	619.0	371.0	1527.0	2888.0	0.0	-45.0	21.0	156.0	382.0	653.0	32.0	0.0	6604.0
25	595.0	362.0	1519.0	2887.0	0.0	-56.0	16.0	169.0	385.0	617.0	15.0	0.0	6509.0
26	618.0	363.0	1637.0	3070.0	0.0	-36.0	42.0	155.0	342.0	507.0	-20.0	0.0	6678.0
27	620.0	372.0	1674.0	3133.0	0.0	-28.0	48.0	169.0	334.0	448.0	-43.0	0.0	6727.0
28	645.0	388.0	1587.0	2994.0	0.0	-39.0	30.0	188.0	426.0	721.0	18.0	0.0	6958.0
29	682.0	395.0	1565.0	2969.0	0.0	-55.0	13.0	190.0	416.0	673.0	-1.0	0.0	6847.0
30	654.0	378.0	1533.0	2912.0	0.0	-46.0	20.0	198.0	427.0	702.0	22.0	0.0	6800.0
31	685.0	407.0	1575.0	2944.0	0.0	-23.0	42.0	158.0	412.0	704.0	38.0	0.0	6942.0
Monthly T...	19876.00	11859.00	48997.00	93051.00	0.00	-1688.00	450.00	5362.00	11958.00	18842.00	33.00	0.00	208740.00



Monthly Report
Meter Chamber
Net Flow Totals

Town of Tecumseh
Water System
Reports
M_FlowTotal_Net_MCx
06/01/2023 08:29:42 AM

Report Date From: 01/04/2022 12:00:00 AM
To: 01/05/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	635.0	382.0	1554.0	2936.0	0.0	-45.0	25.0	204.0	419.0	663.0	-11.0	0.0	6762.0
2	692.0	399.0	1680.0	3115.0	0.0	-27.0	36.0	172.0	348.0	462.0	-48.0	0.0	6829.0
3	678.0	384.0	1673.0	3111.0	0.0	-23.0	44.0	157.0	321.0	418.0	-61.0	0.0	6702.0
4	647.0	383.0	1547.0	2914.0	0.0	-72.0	-4.0	177.0	411.0	681.0	30.0	0.0	6714.0
5	650.0	380.0	1534.0	2933.0	0.0	-97.0	-23.0	199.0	417.0	692.0	18.0	0.0	6703.0
6	632.0	374.0	1527.0	2899.0	0.0	-76.0	-6.0	201.0	418.0	706.0	39.0	0.0	6714.0
7	628.0	380.0	1549.0	2912.0	0.0	-85.0	-11.0	182.0	429.0	743.0	44.0	0.0	6771.0
8	636.0	387.0	1550.0	2922.0	0.0	-96.0	-30.0	182.0	400.0	664.0	0.0	0.0	6615.0
9	676.0	395.0	1662.0	3101.0	0.0	-37.0	37.0	154.0	321.0	462.0	0.0	0.0	6771.0
10	711.0	414.0	1723.0	3208.0	0.0	-22.0	44.0	149.0	331.0	463.0	0.0	0.0	7021.0
11	714.0	426.0	1612.0	3024.0	0.0	-71.0	3.0	165.0	423.0	723.0	0.0	0.0	7019.0
12	740.0	444.0	1617.0	3105.0	0.0	-53.0	20.0	185.0	429.0	722.0	57.0	0.0	7266.0
13	656.0	408.0	1626.0	3029.0	0.0	-54.0	21.0	173.0	429.0	707.0	32.0	0.0	7027.0
14	678.0	421.0	1631.0	3037.0	0.0	-51.0	28.0	178.0	421.0	713.0	39.0	0.0	7095.0
15	731.0	427.0	1709.0	3172.0	0.0	-24.0	46.0	138.0	335.0	464.0	-46.0	0.0	6952.0
16	694.0	403.0	1687.0	3155.0	0.0	-28.0	42.0	157.0	335.0	466.0	-43.0	0.0	6868.0
17	689.0	394.0	1658.0	3114.0	0.0	-32.0	44.0	137.0	334.0	463.0	-51.0	0.0	6750.0
18	674.0	387.0	1585.0	2993.0	0.0	-44.0	29.0	187.0	418.0	686.0	26.0	0.0	6941.0
19	722.0	415.0	1603.0	3028.0	0.0	-63.0	7.0	163.0	411.0	704.0	49.0	0.0	7039.0
20	728.0	436.0	1614.0	3075.0	0.0	-72.0	-6.0	187.0	430.0	754.0	52.0	0.0	7198.0
21	740.0	433.0	1609.0	3053.0	0.0	-53.0	15.0	165.0	413.0	720.0	44.0	0.0	7139.0
22	719.0	432.0	1629.0	3039.0	0.0	-56.0	21.0	165.0	407.0	682.0	45.0	0.0	7083.0
23	846.0	497.0	1871.0	3453.0	0.0	-20.0	33.0	165.0	358.0	508.0	-38.0	0.0	7673.0
24	857.0	493.0	1874.0	3477.0	0.0	-10.0	20.0	155.0	340.0	455.0	-65.0	0.0	7596.0
25	747.0	449.0	1663.0	3103.0	0.0	-43.0	-13.0	154.0	410.0	678.0	18.0	0.0	7166.0
26	762.0	464.0	1674.0	3112.0	0.0	-53.0	-25.0	180.0	418.0	697.0	30.0	0.0	7259.0
27	704.0	418.0	1614.0	3044.0	0.0	-58.0	-31.0	175.0	424.0	706.0	25.0	0.0	7021.0
28	791.0	463.0	1692.0	3169.0	0.0	-65.0	-38.0	191.0	414.0	687.0	23.0	0.0	7327.0
29	831.0	493.0	1739.0	3254.0	0.0	-39.0	-15.0	171.0	415.0	722.0	38.0	0.0	7609.0
30	830.0	485.0	1821.0	3360.0	0.0	-13.0	8.0	133.0	333.0	493.0	-34.0	0.0	7416.0
Monthly T...	21438.00	12666.00	49527.00	92847.00	0.00	-1482.00	321.00	5101.00	11712.00	18704.00	212.00	0.00	211046.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/06/2022 03:26:00 AM

Report Date From: 01/05/2022 12:00:00 AM

To: 01/06/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	787.0	442.0	1761.0	3302.0	0.0	-39.0	2.0	168.0	334.0	406.0	-77.0	0.0	7086.0
2	757.0	446.0	1638.0	3071.0	0.0	-44.0	-18.0	166.0	390.0	647.0	23.0	0.0	7076.0
3	723.0	439.0	1622.0	3017.0	0.0	-42.0	-17.0	170.0	389.0	647.0	18.0	0.0	6966.0
4	801.0	487.0	1723.0	3196.0	0.0	-48.0	-24.0	203.0	435.0	738.0	27.0	0.0	7538.0
5	820.0	486.0	1693.0	3154.0	0.0	-57.0	-34.0	167.0	422.0	722.0	35.0	0.0	7408.0
6	776.0	468.0	1668.0	3113.0	0.0	-58.0	-27.0	165.0	385.0	632.0	25.0	0.0	7147.0
7	927.0	534.0	1941.0	3645.0	0.0	-17.0	9.0	177.0	357.0	519.0	-33.0	0.0	8059.0
8	919.0	521.0	1926.0	3536.0	0.0	-3.0	20.0	166.0	304.0	453.0	-59.0	0.0	7783.0
9	1002.0	594.0	1956.0	3599.0	0.0	-30.0	-22.0	215.0	34.0	760.0	34.0	0.0	8142.0
10	1098.0	667.0	2065.0	3777.0	0.0	-40.0	-21.0	228.0	272.0	844.0	36.0	0.0	8926.0
11	1221.0	738.0	2247.0	4067.0	0.0	6.0	19.0	229.0	0.0	871.0	42.0	0.0	9440.0
12	1204.0	713.0	2253.0	4103.0	0.0	-13.0	10.0	244.0	243.0	922.0	48.0	0.0	9727.0
13	985.0	725.0	2360.0	4265.0	0.0	3.0	24.0	228.0	0.0	908.0	17.0	0.0	9515.0
14	1101.0	762.0	2532.0	4516.0	0.0	20.0	30.0	237.0	1.0	608.0	-86.0	0.0	9721.0
15	1254.0	730.0	2513.0	4540.0	0.0	8.0	29.0	249.0	0.0	523.0	-106.0	0.0	9740.0
16	836.0	540.0	1923.0	3501.0	0.0	-51.0	-19.0	226.0	0.0	761.0	23.0	0.0	7740.0
17	776.0	604.0	2054.0	3801.0	0.0	-49.0	-19.0	269.0	3.0	850.0	36.0	0.0	8325.0
18	681.0	635.0	1997.0	3667.0	0.0	-46.0	-5.0	253.0	417.0	847.0	39.0	0.0	8485.0
19	691.0	597.0	2026.0	3805.0	0.0	-29.0	-4.0	221.0	474.0	823.0	31.0	0.0	8635.0
20	1044.0	631.0	2154.0	4025.0	0.0	-13.0	16.0	212.0	460.0	758.0	-4.0	0.0	9283.0
21	1075.0	642.0	2212.0	4128.0	0.0	-48.0	-8.0	223.0	397.0	486.0	-107.0	0.0	9000.0
22	207.0	565.0	1981.0	3645.0	0.0	-50.0	-3.0	174.0	329.0	437.0	-75.0	0.0	7210.0
23	444.0	587.0	2127.0	3960.0	0.0	-7.0	27.0	209.0	380.0	531.0	-66.0	0.0	8192.0
24	278.0	620.0	2108.0	3923.0	0.0	-43.0	-8.0	249.0	489.0	812.0	29.0	0.0	8457.0
25	557.0	628.0	2108.0	3913.0	0.0	-39.0	-30.0	223.0	461.0	790.0	26.0	0.0	8637.0
26	527.0	553.0	1909.0	3563.0	0.0	-74.0	-69.0	133.0	247.0	430.0	35.0	0.0	7254.0
27	841.0	628.0	2044.0	3850.0	0.0	-42.0	24.0	135.0	285.0	380.0	20.0	0.0	8165.0
28	1274.0	776.0	2468.0	4543.0	0.0	-7.0	15.0	85.0	121.0	222.0	-47.0	0.0	9450.0
29	1228.0	828.0	2636.0	4822.0	0.0	-1.0	32.0	0.0	0.0	0.0	-21.0	0.0	9524.0
30	959.0	887.0	2674.0	4933.0	0.0	-24.0	32.0	0.0	0.0	0.0	50.0	0.0	9511.0
31	991.0	899.0	2698.0	5046.0	0.0	-26.0	16.0	131.0	181.0	277.0	37.0	0.0	10250.0
Monthly T...	26784.00	19372.00	65017.00	120026.00	0.00	-903.00	-23.00	5755.00	7810.00	18604.00	-50.00	0.00	262392.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/07/2022 03:26:00 AM

Report Date From: 01/06/2022 12:00:00 AM

To: 01/07/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	726.0	823.0	2433.0	4509.0	0.0	-58.0	-31.0	217.0	473.0	814.0	20.0	0.0	9926.0
2	1285.0	774.0	2328.0	4247.0	0.0	-32.0	-5.0	310.0	584.0	1016.0	39.0	0.0	10546.0
3	1078.0	844.0	2606.0	4827.0	0.0	-24.0	18.0	352.0	668.0	1168.0	66.0	0.0	11603.0
4	205.0	136.0	432.0	826.0	0.0	-53.0	-39.0	104.0	119.0	166.0	-31.0	0.0	1865.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	550.0	471.0	1616.0	2940.0	0.0	11.0	23.0	163.0	420.0	766.0	86.0	0.0	7046.0
11	994.0	608.0	2183.0	4073.0	0.0	-22.0	-2.0	274.0	489.0	769.0	3.0	0.0	9369.0
12	815.0	584.0	2335.0	4340.0	0.0	-28.0	11.0	273.0	470.0	669.0	-62.0	0.0	9407.0
13	540.0	670.0	2289.0	4238.0	0.0	-53.0	-35.0	318.0	614.0	1059.0	53.0	0.0	9693.0
14	350.0	603.0	2206.0	4097.0	0.0	-36.0	-7.0	284.0	565.0	968.0	51.0	0.0	9081.0
15	1033.0	774.0	2649.0	4905.0	0.0	-10.0	22.0	359.0	674.0	1115.0	37.0	0.0	11558.0
16	1416.0	797.0	2561.0	4790.0	0.0	-20.0	-5.0	325.0	620.0	990.0	-1.0	0.0	11473.0
17	1403.0	815.0	2713.0	5023.0	0.0	-11.0	6.0	345.0	664.0	1116.0	29.0	0.0	12103.0
18	1551.0	905.0	2848.0	5265.0	0.0	-3.0	27.0	342.0	531.0	718.0	-131.0	0.0	12053.0
19	1615.0	903.0	3009.0	5594.0	0.0	14.0	55.0	386.0	554.0	701.0	-170.0	0.0	12661.0
20	1339.0	796.0	2471.0	4521.0	0.0	-47.0	-17.0	346.0	599.0	949.0	-53.0	0.0	10904.0
21	1757.0	974.0	3044.0	5554.0	0.0	-108.0	-70.0	455.0	720.0	1114.0	-91.0	0.0	13349.0
22	1182.0	1126.0	3223.0	5928.0	0.0	-27.0	15.0	463.0	769.0	1204.0	-79.0	0.0	13804.0
23	1769.0	1030.0	3129.0	5758.0	0.0	-41.0	-16.0	482.0	729.0	1107.0	-135.0	0.0	13812.0
24	1823.0	1015.0	3226.0	5978.0	0.0	1.0	20.0	425.0	728.0	1152.0	-65.0	0.0	14303.0
25	1766.0	1018.0	3241.0	5981.0	0.0	23.0	46.0	440.0	674.0	963.0	-126.0	0.0	14026.0
26	1729.0	997.0	3076.0	5670.0	0.0	1.0	34.0	396.0	599.0	802.0	-168.0	0.0	13136.0
27	1828.0	1076.0	3127.0	5743.0	0.0	-37.0	-19.0	455.0	723.0	1141.0	-99.0	0.0	13938.0
28	1818.0	993.0	3169.0	5858.0	0.0	3.0	15.0	467.0	759.0	1203.0	-49.0	0.0	14236.0
29	1560.0	911.0	2828.0	5294.0	0.0	-93.0	-51.0	471.0	772.0	1226.0	-70.0	0.0	12848.0
30	1888.0	1102.0	3242.0	6064.0	0.0	-39.0	-2.0	485.0	794.0	1205.0	-93.0	0.0	14646.0
Monthly T...	32020.00	20745.00	65984.00	122023.00	0.00	-689.00	-7.00	8937.00	15311.00	24101.00	-1039.00	0.00	287386.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/08/2022 03:26:00 AM

Report Date From: 01/07/2022 12:00:00 AM

To: 01/08/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	1930.0	1107.0	3224.0	5925.0	0.0	-1.0	42.0	369.0	624.0	935.0	-166.0	0.0	13989.0
2	1712.0	995.0	3059.0	5642.0	0.0	-29.0	-3.0	413.0	625.0	927.0	-110.0	0.0	13231.0
3	1996.0	1128.0	3457.0	6388.0	0.0	26.0	56.0	407.0	652.0	934.0	-166.0	0.0	14878.0
4	1861.0	1089.0	3238.0	5971.0	0.0	-41.0	-7.0	478.0	759.0	1161.0	-118.0	0.0	14391.0
5	1398.0	763.0	2560.0	4810.0	0.0	-98.0	-72.0	398.0	661.0	1057.0	-19.0	0.0	11458.0
6	1185.0	685.0	2354.0	4432.0	0.0	-82.0	-58.0	319.0	589.0	984.0	25.0	0.0	10433.0
7	1511.0	882.0	2759.0	5111.0	0.0	-11.0	19.0	368.0	620.0	1004.0	15.0	0.0	12278.0
8	1780.0	1037.0	3018.0	5495.0	0.0	-24.0	23.0	385.0	646.0	1015.0	-46.0	0.0	13329.0
9	1864.0	1090.0	3246.0	5919.0	0.0	41.0	75.0	382.0	623.0	945.0	-46.0	0.0	14139.0
10	2089.0	1210.0	3584.0	6598.0	0.0	63.0	95.0	418.0	650.0	937.0	-101.0	0.0	15543.0
11	2052.0	1222.0	3374.0	6154.0	0.0	12.0	43.0	449.0	759.0	1225.0	-69.0	0.0	15221.0
12	1989.0	1111.0	3407.0	6218.0	0.0	14.0	52.0	450.0	754.0	1168.0	-77.0	0.0	15086.0
13	1792.0	1052.0	2977.0	5357.0	0.0	-42.0	-12.0	381.0	651.0	1032.0	-64.0	0.0	13124.0
14	1762.0	1037.0	3036.0	5550.0	0.0	-32.0	0.0	408.0	698.0	1100.0	-60.0	0.0	13499.0
15	1969.0	1145.0	3314.0	5978.0	0.0	2.0	31.0	386.0	670.0	1074.0	-41.0	0.0	14528.0
16	1652.0	964.0	2940.0	5369.0	0.0	1.0	33.0	350.0	560.0	792.0	-95.0	0.0	12566.0
17	1398.0	798.0	2699.0	4894.0	0.0	-40.0	0.0	325.0	490.0	632.0	-143.0	0.0	11053.0
18	1492.0	900.0	2732.0	4954.0	0.0	-88.0	-59.0	360.0	625.0	998.0	-57.0	0.0	11857.0
19	1897.0	1057.0	3260.0	6004.0	0.0	-208.0	-172.0	514.0	779.0	1144.0	-159.0	0.0	14116.0
20	1651.0	984.0	2910.0	5309.0	0.0	-145.0	-117.0	425.0	719.0	1150.0	-51.0	0.0	12835.0
21	1816.0	1071.0	3125.0	5730.0	0.0	-80.0	-79.0	451.0	783.0	1270.0	-5.0	0.0	14082.0
22	1966.0	1154.0	3357.0	6006.0	0.0	-33.0	7.0	380.0	687.0	1082.0	24.0	0.0	14630.0
23	1777.0	1029.0	3158.0	5601.0	0.0	-5.0	38.0	333.0	528.0	752.0	-132.0	0.0	13079.0
24	1407.0	833.0	2671.0	4837.0	0.0	-65.0	-25.0	318.0	495.0	646.0	-109.0	0.0	11008.0
25	1820.0	1083.0	3136.0	5697.0	0.0	-68.0	-45.0	392.0	678.0	1066.0	-58.0	0.0	13701.0
26	1877.0	1075.0	3194.0	5815.0	0.0	-20.0	-10.0	397.0	716.0	1152.0	-43.0	0.0	14153.0
27	1826.0	1110.0	3018.0	5508.0	0.0	-118.0	-82.0	420.0	685.0	1074.0	-102.0	0.0	13339.0
28	1668.0	1035.0	2894.0	5350.0	0.0	-105.0	-83.0	418.0	696.0	1091.0	-112.0	0.0	12852.0
29	1828.0	1105.0	3202.0	5949.0	0.0	-55.0	-27.0	467.0	732.0	1115.0	-147.0	0.0	14169.0
30	1967.0	397.0	3396.0	6248.0	0.0	40.0	50.0	405.0	623.0	913.0	-142.0	0.0	13897.0
31	1849.0	653.0	3305.0	6131.0	0.0	12.0	43.0	425.0	633.0	920.0	-146.0	0.0	13825.0
Monthly T...	54781.00	30801.00	95604.00	174950.00	0.00	-1179.00	-244.00	12391.00	20410.00	31295.00	-2520.00	0.00	416289.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/09/2022 03:26:00 AM

Report Date From: 01/08/2022 12:00:00 AM

To: 01/09/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	1681.0	926.0	3108.0	5784.0	0.0	5.0	22.0	420.0	656.0	986.0	-162.0	0.0	13426.0
2	1781.0	998.0	3216.0	6012.0	0.0	-33.0	-22.0	456.0	763.0	1198.0	-82.0	0.0	14287.0
3	1865.0	1135.0	3103.0	5655.0	0.0	-73.0	-37.0	427.0	754.0	1224.0	-59.0	0.0	13994.0
4	1551.0	942.0	2635.0	4726.0	0.0	-45.0	-22.0	308.0	569.0	943.0	-10.0	0.0	11597.0
5	1642.0	962.0	2817.0	5062.0	0.0	-52.0	-8.0	324.0	577.0	916.0	-32.0	0.0	12208.0
6	1816.0	1080.0	3127.0	5583.0	0.0	20.0	54.0	318.0	540.0	784.0	-83.0	0.0	13239.0
7	1924.0	1113.0	3291.0	5872.0	0.0	10.0	48.0	346.0	543.0	711.0	-149.0	0.0	13709.0
8	1606.0	905.0	2725.0	4932.0	0.0	-118.0	-75.0	291.0	597.0	988.0	-27.0	0.0	11824.0
9	1658.0	960.0	2804.0	5121.0	0.0	-123.0	-84.0	371.0	147.0	1072.0	-31.0	0.0	11895.0
10	1902.0	1156.0	3091.0	5719.0	0.0	-103.0	-59.0	397.0	0.0	1174.0	-41.0	0.0	13236.0
11	2010.0	1213.0	3186.0	5843.0	0.0	-79.0	-31.0	407.0	0.0	1143.0	-37.0	0.0	13655.0
12	2232.0	1313.0	3526.0	6451.0	0.0	-41.0	25.0	410.0	0.0	1136.0	-58.0	0.0	14994.0
13	2123.0	1255.0	3374.0	6020.0	0.0	-14.0	32.0	383.0	0.0	832.0	-143.0	0.0	13862.0
14	2161.0	1250.0	3493.0	6267.0	0.0	3.0	57.0	363.0	0.0	703.0	-175.0	0.0	14122.0
15	2126.0	1225.0	3434.0	5928.0	0.0	-37.0	0.0	434.0	497.0	1217.0	-47.0	0.0	14777.0
16	2174.0	1272.0	3512.0	6356.0	0.0	-41.0	-6.0	430.0	745.0	1171.0	-52.0	0.0	15561.0
17	2199.0	1338.0	3506.0	6398.0	0.0	-57.0	-13.0	448.0	760.0	1186.0	-104.0	0.0	15661.0
18	2161.0	1313.0	3400.0	6195.0	0.0	-83.0	-44.0	459.0	732.0	1149.0	-70.0	0.0	15212.0
19	676.0	355.0	1122.0	2057.0	0.0	-55.0	-31.0	187.0	252.0	354.0	-75.0	0.0	4842.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	1229.0	707.0	2364.0	4314.0	0.0	-23.0	-19.0	316.0	345.0	610.0	0.0	0.0	9843.0
23	1709.0	1017.0	2802.0	5017.0	0.0	-38.0	-2.0	337.0	646.0	1050.0	-14.0	0.0	12524.0
24	1914.0	1193.0	3101.0	5455.0	0.0	-24.0	10.0	359.0	680.0	1097.0	-8.0	0.0	13777.0
25	1852.0	1137.0	3019.0	5380.0	0.0	-10.0	12.0	361.0	696.0	1164.0	26.0	0.0	13637.0
26	1774.0	1050.0	2958.0	5322.0	0.0	-1.0	32.0	329.0	648.0	1085.0	-2.0	0.0	13195.0
27	1864.0	1129.0	3166.0	5708.0	0.0	26.0	54.0	362.0	574.0	833.0	-87.0	0.0	13629.0
28	1861.0	1102.0	3240.0	5872.0	0.0	15.0	53.0	357.0	584.0	797.0	-118.0	0.0	13763.0
29	1837.0	1094.0	2984.0	5290.0	0.0	-28.0	1.0	325.0	664.0	1119.0	3.0	0.0	13289.0
30	1857.0	1143.0	2920.0	5062.0	0.0	-17.0	12.0	274.0	563.0	925.0	4.0	0.0	12743.0
31	2004.0	1247.0	3118.0	5469.0	0.0	-5.0	27.0	330.0	82.0	1134.0	50.0	0.0	13456.0
Monthly T...	53189.00	31530.00	88142.00	158870.00	0.00	-1021.00	-14.00	10529.00	13614.00	28701.00	-1583.00	0.00	381957.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/10/2022 03:26:00 AM

Report Date From: 01/09/2022 12:00:00 AM

To: 01/10/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	1972.0	1209.0	3135.0	5605.0	0.0	-41.0	-14.0	397.0	0.0	1211.0	37.0	0.0	13511.0
2	2141.0	1307.0	3433.0	6146.0	0.0	14.0	54.0	421.0	0.0	1231.0	-6.0	0.0	14741.0
3	2139.0	1298.0	3448.0	6139.0	0.0	23.0	56.0	371.0	0.0	819.0	-120.0	0.0	14173.0
4	1691.0	1050.0	2824.0	4970.0	0.0	18.0	52.0	250.0	0.0	655.0	-86.0	0.0	11424.0
5	1889.0	1130.0	3110.0	5409.0	0.0	16.0	18.0	288.0	0.0	678.0	-125.0	0.0	12413.0
6	1840.0	1121.0	2970.0	5260.0	0.0	-47.0	-28.0	362.0	0.0	1074.0	-29.0	0.0	12523.0
7	1977.0	1245.0	3149.0	5629.0	0.0	-57.0	-41.0	377.0	0.0	1075.0	-64.0	0.0	13290.0
8	1967.0	1218.0	3189.0	5674.0	0.0	-23.0	-4.0	368.0	133.0	1029.0	-39.0	0.0	13512.0
9	2121.0	1287.0	3371.0	6014.0	0.0	-6.0	30.0	381.0	291.0	1042.0	-20.0	0.0	14511.0
10	2266.0	1403.0	3560.0	6343.0	0.0	9.0	43.0	398.0	270.0	779.0	-130.0	0.0	14941.0
11	2001.0	1237.0	3306.0	5836.0	0.0	4.0	44.0	319.0	237.0	701.0	-119.0	0.0	13566.0
12	1822.0	1112.0	2879.0	5040.0	0.0	-28.0	4.0	293.0	256.0	958.0	-24.0	0.0	12312.0
13	1810.0	1118.0	2849.0	4929.0	0.0	-18.0	9.0	315.0	256.0	952.0	-13.0	0.0	12207.0
14	1870.0	1191.0	2985.0	5252.0	0.0	-7.0	26.0	331.0	271.0	1001.0	-56.0	0.0	12864.0
15	1894.0	1166.0	3029.0	5317.0	0.0	-20.0	6.0	369.0	279.0	1014.0	-74.0	0.0	12980.0
16	2039.0	1245.0	3239.0	5690.0	0.0	5.0	28.0	337.0	274.0	974.0	-50.0	0.0	13781.0
17	1981.0	1219.0	3249.0	5752.0	0.0	30.0	41.0	338.0	233.0	735.0	-138.0	0.0	13440.0
18	1774.0	1075.0	3088.0	5427.0	0.0	-9.0	26.0	313.0	223.0	676.0	-144.0	0.0	12449.0
19	1698.0	989.0	2832.0	5004.0	0.0	-71.0	-41.0	366.0	282.0	1015.0	-53.0	0.0	12021.0
20	1719.0	1019.0	2810.0	4977.0	0.0	-101.0	-74.0	410.0	289.0	943.0	-114.0	0.0	11878.0
21	1696.0	1064.0	2733.0	4735.0	0.0	-26.0	4.0	244.0	248.0	933.0	-31.0	0.0	11600.0
22	1740.0	1075.0	2735.0	4751.0	0.0	-51.0	-28.0	334.0	264.0	964.0	-4.0	0.0	11780.0
23	1720.0	1032.0	2772.0	4850.0	0.0	-25.0	12.0	304.0	259.0	1016.0	19.0	0.0	11959.0
24	1746.0	1060.0	2828.0	4892.0	0.0	6.0	36.0	223.0	208.0	699.0	-49.0	0.0	11649.0
25	1676.0	1013.0	2792.0	4779.0	0.0	13.0	54.0	214.0	180.0	577.0	-63.0	0.0	11235.0
26	1581.0	945.0	2620.0	4499.0	0.0	-27.0	0.0	262.0	233.0	893.0	35.0	0.0	11041.0
27	1674.0	1001.0	2655.0	4533.0	0.0	-24.0	4.0	271.0	230.0	893.0	23.0	0.0	11260.0
28	1664.0	1036.0	2631.0	4586.0	0.0	-13.0	10.0	271.0	226.0	821.0	10.0	0.0	11242.0
29	1783.0	1087.0	2725.0	4765.0	0.0	-15.0	8.0	273.0	231.0	848.0	10.0	0.0	11715.0
30	1846.0	1100.0	2890.0	5179.0	0.0	63.0	95.0	236.0	227.0	811.0	-20.0	0.0	12427.0
Monthly T...	55737.00	34052.00	89836.00	157982.00	0.00	-408.00	430.00	9636.00	5600.00	27017.00	-1437.00	0.00	378445.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/11/2022 03:26:00 AM

Report Date From: 01/10/2022 12:00:00 AM

To: 01/11/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	1871.0	1133.0	2925.0	5073.0	0.0	3.0	34.0	285.0	209.0	674.0	-63.0	0.0	12144.0
2	1777.0	1066.0	2879.0	4968.0	0.0	6.0	32.0	268.0	189.0	540.0	-128.0	0.0	11597.0
3	1608.0	922.0	2645.0	4621.0	0.0	-51.0	-22.0	348.0	253.0	902.0	-32.0	0.0	11194.0
4	1658.0	989.0	2686.0	4713.0	0.0	-41.0	-7.0	300.0	259.0	984.0	13.0	0.0	11554.0
5	1653.0	1025.0	2661.0	4710.0	0.0	-49.0	-34.0	366.0	268.0	991.0	-47.0	0.0	11544.0
6	1622.0	998.0	2645.0	4643.0	0.0	-44.0	-14.0	312.0	249.0	918.0	-41.0	0.0	11288.0
7	1561.0	934.0	2549.0	4431.0	0.0	-3.0	21.0	271.0	214.0	760.0	-19.0	0.0	10719.0
8	1529.0	935.0	2580.0	4532.0	0.0	5.0	32.0	242.0	185.0	577.0	-63.0	0.0	10554.0
9	1504.0	909.0	2560.0	4551.0	0.0	-6.0	18.0	253.0	183.0	514.0	-117.0	0.0	10369.0
10	1785.0	1050.0	2898.0	5026.0	0.0	32.0	52.0	218.0	199.0	601.0	-103.0	0.0	11758.0
11	1499.0	894.0	2453.0	4332.0	0.0	11.0	23.0	309.0	263.0	935.0	28.0	0.0	10747.0
12	1437.0	898.0	2366.0	4167.0	0.0	-48.0	-31.0	263.0	427.0	805.0	-16.0	0.0	10268.0
13	1405.0	884.0	2349.0	4191.0	0.0	-40.0	-10.0	263.0	517.0	798.0	-3.0	0.0	10354.0
14	1396.0	890.0	2373.0	4167.0	0.0	-18.0	6.0	201.0	506.0	805.0	23.0	0.0	10349.0
15	1550.0	956.0	2562.0	4501.0	0.0	-6.0	17.0	239.0	430.0	551.0	-89.0	0.0	10711.0
16	1495.0	928.0	2552.0	4493.0	0.0	8.0	32.0	215.0	399.0	474.0	-114.0	0.0	10482.0
17	1415.0	888.0	2331.0	4088.0	0.0	-52.0	-13.0	241.0	492.0	751.0	-32.0	0.0	10109.0
18	1319.0	824.0	2227.0	3958.0	0.0	-39.0	27.0	192.0	468.0	716.0	5.0	0.0	9697.0
19	1309.0	829.0	2212.0	3889.0	0.0	-39.0	24.0	209.0	477.0	738.0	14.0	0.0	9662.0
20	1238.0	770.0	2136.0	3749.0	0.0	-27.0	36.0	160.0	473.0	755.0	41.0	0.0	9331.0
21	1218.0	760.0	2120.0	3766.0	0.0	-42.0	23.0	205.0	484.0	741.0	14.0	0.0	9289.0
22	1226.0	759.0	2256.0	3994.0	0.0	-53.0	15.0	213.0	438.0	612.0	-62.0	0.0	9398.0
23	1056.0	670.0	2203.0	3888.0	0.0	-22.0	39.0	208.0	418.0	553.0	-58.0	0.0	8955.0
24	1020.0	644.0	2016.0	3635.0	0.0	-82.0	-6.0	245.0	537.0	857.0	7.0	0.0	8873.0
25	988.0	628.0	1953.0	3504.0	0.0	-68.0	0.0	230.0	499.0	772.0	11.0	0.0	8517.0
26	1083.0	685.0	2036.0	3581.0	0.0	-29.0	34.0	190.0	451.0	709.0	11.0	0.0	8751.0
27	1086.0	691.0	2040.0	3614.0	0.0	-29.0	32.0	199.0	437.0	687.0	19.0	0.0	8776.0
28	1155.0	732.0	2124.0	3742.0	0.0	-24.0	40.0	200.0	451.0	719.0	22.0	0.0	9161.0
29	1182.0	736.0	2230.0	3930.0	0.0	1.0	63.0	159.0	362.0	511.0	-34.0	0.0	9140.0
30	1189.0	736.0	2262.0	3985.0	0.0	4.0	66.0	175.0	350.0	423.0	-71.0	0.0	9119.0
31	1116.0	709.0	2042.0	3599.0	0.0	-6.0	52.0	164.0	412.0	660.0	19.0	0.0	8767.0
Monthly T...	42950.00	26472.00	73871.00	130041.00	0.00	-748.00	581.00	7343.00	11499.00	22033.00	-865.00	0.00	313177.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/12/2022 03:26:00 AM

Report Date From: 01/11/2022 12:00:00 AM

To: 01/12/2022 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	1118.0	705.0	2054.0	3639.0	0.0	-39.0	29.0	191.0	455.0	725.0	25.0	0.0	8902.0
2	1018.0	646.0	1995.0	3574.0	0.0	-32.0	30.0	201.0	457.0	733.0	29.0	0.0	8651.0
3	1040.0	674.0	2038.0	3587.0	0.0	-24.0	36.0	206.0	449.0	722.0	31.0	0.0	8759.0
4	1129.0	719.0	2094.0	3669.0	0.0	-18.0	35.0	183.0	456.0	752.0	41.0	0.0	9060.0
5	1184.0	739.0	2201.0	3848.0	0.0	-5.0	57.0	153.0	352.0	482.0	-34.0	0.0	8977.0
6	1587.0	1019.0	3051.0	5460.0	0.0	-158.0	-62.0	417.0	570.0	538.0	-205.0	0.0	12217.0
7	1004.0	639.0	1961.0	3522.0	0.0	-46.0	22.0	203.0	449.0	735.0	32.0	0.0	8521.0
8	1129.0	713.0	2065.0	3650.0	0.0	-31.0	38.0	209.0	476.0	774.0	35.0	0.0	9058.0
9	1142.0	720.0	2090.0	3321.0	0.0	-17.0	26.0	198.0	461.0	728.0	22.0	0.0	8691.0
10	1021.0	648.0	1984.0	3518.0	0.0	-33.0	29.0	182.0	459.0	719.0	18.0	0.0	8545.0
11	986.0	624.0	1944.0	3459.0	0.0	-21.0	39.0	191.0	434.0	667.0	3.0	0.0	8326.0
12	1019.0	650.0	2071.0	3658.0	0.0	-7.0	52.0	177.0	359.0	451.0	-64.0	0.0	8366.0
13	1076.0	673.0	2140.0	3755.0	0.0	-3.0	58.0	161.0	353.0	436.0	-74.0	0.0	8575.0
14	1009.0	646.0	1971.0	3527.0	0.0	-32.0	27.0	202.0	460.0	749.0	43.0	0.0	8602.0
15	957.0	608.0	1913.0	3422.0	0.0	-42.0	16.0	174.0	448.0	723.0	29.0	0.0	8248.0
16	979.0	618.0	1933.0	3474.0	0.0	-61.0	0.0	202.0	436.0	662.0	3.0	0.0	8246.0
17	1019.0	642.0	1950.0	3462.0	0.0	-33.0	29.0	168.0	441.0	724.0	49.0	0.0	8451.0
18	976.0	620.0	1936.0	3458.0	0.0	-42.0	18.0	179.0	412.0	621.0	8.0	0.0	8186.0
19	1055.0	651.0	2102.0	3703.0	0.0	-22.0	38.0	164.0	356.0	481.0	-41.0	0.0	8487.0
20	1019.0	633.0	2085.0	3665.0	0.0	-7.0	56.0	163.0	334.0	406.0	-75.0	0.0	8279.0
21	994.0	623.0	2046.0	3632.0	0.0	-36.0	23.0	195.0	437.0	683.0	23.0	0.0	8620.0
22	958.0	609.0	2048.0	3632.0	0.0	-23.0	32.0	214.0	469.0	745.0	35.0	0.0	8719.0
23	1029.0	634.0	1973.0	3474.0	0.0	0.0	58.0	194.0	438.0	671.0	19.0	0.0	8490.0
24	1181.0	729.0	2129.0	3741.0	0.0	-50.0	11.0	212.0	454.0	708.0	5.0	0.0	9120.0
25	1047.0	661.0	2029.0	3574.0	0.0	-55.0	8.0	215.0	456.0	680.0	0.0	0.0	8615.0
26	1120.0	690.0	2158.0	3789.0	0.0	-43.0	12.0	191.0	373.0	483.0	-66.0	0.0	8707.0
27	1037.0	650.0	2120.0	3710.0	0.0	-27.0	36.0	181.0	363.0	419.0	-93.0	0.0	8396.0
28	981.0	614.0	1962.0	3465.0	0.0	-57.0	6.0	191.0	431.0	643.0	3.0	0.0	8239.0
29	966.0	608.0	1942.0	3437.0	0.0	-63.0	1.0	212.0	449.0	687.0	9.0	0.0	8248.0
30	906.0	568.0	1888.0	3369.0	0.0	-69.0	-1.0	226.0	459.0	691.0	7.0	0.0	8044.0
Monthly T...	31686.00	19973.00	61873.00	109194.00	0.00	-1096.00	759.00	5955.00	12946.00	19238.00	-183.00	0.00	260345.00



**Monthly Report
Meter Chamber
Net Flow Totals**

**Town of Tecumseh
Water System
Reports**

M_FlowTotal_Net_MCx
01/01/2023 03:26:00 AM

Report Date From: 01/12/2022 12:00:00 AM

To: 01/01/2023 12:00:00 AM

Day of the Month	MCT01 (m3)	MCT02 (m3)	MCT03 (m3)	MCT04 (m3)	MCT05 (m3)	MCT06 (m3)	MCT07 (m3)	MCT08 (m3)	MCT09 (m3)	MCT10 (m3)	MCT11 (m3)	MCT12 (m3)	System Total (m3)
1	937.0	583.0	1913.0	3404.0	0.0	-78.0	-5.0	199.0	459.0	725.0	31.0	0.0	8168.0
2	1043.0	652.0	2009.0	3583.0	0.0	-77.0	-2.0	221.0	457.0	672.0	0.0	0.0	8558.0
3	1003.0	617.0	2085.0	3609.0	0.0	-16.0	43.0	186.0	388.0	517.0	-45.0	0.0	8387.0
4	997.0	617.0	2089.0	3679.0	0.0	-41.0	25.0	216.0	387.0	435.0	-101.0	0.0	8303.0
5	895.0	561.0	1880.0	3331.0	0.0	-44.0	18.0	178.0	439.0	703.0	24.0	0.0	7985.0
6	996.0	619.0	1949.0	3468.0	0.0	-64.0	-1.0	255.0	490.0	721.0	-1.0	0.0	8432.0
7	943.0	587.0	1900.0	3404.0	0.0	-56.0	26.0	210.0	461.0	698.0	24.0	0.0	8197.0
8	910.0	572.0	1873.0	3371.0	0.0	-78.0	-12.0	245.0	473.0	697.0	-2.0	0.0	8049.0
9	958.0	592.0	1922.0	3414.0	0.0	-61.0	4.0	207.0	432.0	652.0	-1.0	0.0	8119.0
10	1056.0	657.0	2104.0	3685.0	0.0	-14.0	48.0	180.0	354.0	460.0	-63.0	0.0	8467.0
11	1036.0	647.0	2113.0	3721.0	0.0	-24.0	41.0	181.0	368.0	438.0	-90.0	0.0	8431.0
12	952.0	600.0	1946.0	3475.0	0.0	-59.0	3.0	221.0	427.0	639.0	-14.0	0.0	8190.0
13	827.0	561.0	2004.0	3533.0	0.0	-27.0	30.0	237.0	446.0	670.0	-7.0	0.0	8274.0
14	929.0	608.0	1983.0	3516.0	0.0	-36.0	23.0	217.0	456.0	707.0	9.0	0.0	8412.0
15	953.0	621.0	2013.0	3587.0	0.0	-50.0	12.0	215.0	435.0	655.0	-19.0	0.0	8422.0
16	753.0	501.0	1839.0	3335.0	0.0	-65.0	1.0	225.0	452.0	693.0	-7.0	0.0	7727.0
17	705.0	472.0	1906.0	3459.0	0.0	-36.0	28.0	203.0	385.0	519.0	-49.0	0.0	7592.0
18	740.0	485.0	1936.0	3486.0	0.0	-29.0	37.0	205.0	368.0	460.0	-76.0	0.0	7612.0
19	696.0	463.0	1770.0	3266.0	0.0	-85.0	-9.0	231.0	455.0	702.0	0.0	0.0	7489.0
20	622.0	418.0	1706.0	3180.0	0.0	-58.0	6.0	238.0	483.0	764.0	30.0	0.0	7389.0
21	592.0	389.0	1666.0	3116.0	0.0	-84.0	-17.0	217.0	449.0	699.0	21.0	0.0	7048.0
22	616.0	386.0	1657.0	3127.0	0.0	-55.0	11.0	187.0	424.0	681.0	38.0	0.0	7072.0
23	685.0	421.0	1754.0	3242.0	0.0	-20.0	42.0	164.0	386.0	550.0	-15.0	0.0	7209.0
24	806.0	482.0	1917.0	3552.0	0.0	3.0	61.0	173.0	355.0	428.0	-71.0	0.0	7706.0
25	749.0	457.0	1786.0	3464.0	0.0	-30.0	-12.0	150.0	356.0	451.0	-62.0	0.0	7309.0
26	721.0	438.0	1757.0	3382.0	0.0	-55.0	-33.0	154.0	346.0	471.0	-30.0	0.0	7151.0
27	642.0	405.0	1770.0	3347.0	0.0	-81.0	-44.0	195.0	384.0	511.0	-55.0	0.0	7074.0
28	622.0	404.0	1785.0	3385.0	0.0	-64.0	-26.0	187.0	407.0	618.0	3.0	0.0	7321.0
29	598.0	398.0	1761.0	3378.0	0.0	-68.0	-33.0	197.0	404.0	583.0	-34.0	0.0	7184.0
30	565.0	366.0	1728.0	3291.0	0.0	-66.0	-30.0	182.0	385.0	529.0	-50.0	0.0	6900.0
31	642.0	401.0	1831.0	3441.0	0.0	-50.0	-13.0	192.0	360.0	448.0	-84.0	0.0	7168.0
Monthly T...	25189.00	15980.00	58352.00	106231.00	0.00	-1568.00	222.00	6268.00	12871.00	18496.00	-696.00	0.00	241345.00



OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	260004969
Drinking-Water System Name:	Town of Tecumseh Distribution System
Drinking-Water System Owner:	The Corporation of The Town of Tecumseh
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	01- January -2022 to 31- December – 2022

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [x] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [x] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Town of Tecumseh Municipal Office 917 Lesperance Road Tecumseh, Ontario N8N 1W9</p> </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">N/A</div> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [X] No []</p> <p>Number of Interested Authorities you report to:</p> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">2</div> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [x] No []</p>
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Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Lakeshore Dist. System	260004982

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [x] No []



Indicate how you notified system users that your annual report is available, and is free of charge.

- ☒ Public access/notice via the web
☐ Public access/notice via Government Office
☐ Public access/notice via a newspaper
☒ Public access/notice via Public Request
☐ Public access/notice via a Public Library
☐ Public access/notice via other method _____

Describe your Drinking-Water System

Water Distribution System

The Town of Tecumseh, City of Windsor and the Windsor Utilities Commission (WUC) entered into a 50-year Service Agreement in November 2004. The Service Agreement was implemented on March 31, 2006 when four boundary metering chambers were installed and maintained by the Town of Tecumseh. Tecumseh's drinking water system also includes a water tower located on Tecumseh Road, with no re-chlorination stations within the distribution system

Prior to August 1, 2008, WUC provided water to 2,400 residents in the former Township of Sandwich South, south of Highway 401 ("South Water Area"). The Town installed eight additional boundary meter chambers and assumed the responsibility for the operations and maintenance of the water distribution system from WUC in this South Water Area effective August 1, 2008.

The Town of Tecumseh and the Town of Lakeshore entered into an agreement on May 13, 2003 whereby the Tecumseh distribution system supplies drinking water to the Lakeshore distribution system. This agreement expired on December 31, 2007 and is currently being renegotiated; the status quo is maintained until a new agreement is signed.

List all water treatment chemicals used over this reporting period

N/A

Were any significant expenses incurred to?

- No ☐ Yes ☐ Install required equipment
No ☐ Yes ☐ Repair required equipment
No ☐ Yes ☒ Replace required equipment- PWES-2022-03



Please provide a brief description and a breakdown of monetary expenses incurred

Construction for replacement of existing 200mm diameter cast iron watermain with the new directionally drilled 20mm diameter PVC watermain on Old Tecumseh Road from Brighton to the Pike Creek Bridge. Approximately 150m. Total cost of projects was \$99,073, excluding HST.

PWES Capital works plan for 2022 included replacement of 10 water sampling stations. Due to material shortage, 5 sampling stations were replaced. The remaining will be completed in 2023. The total estimated cost is \$37,000.

PWES had included the Watermain Anode Program – Inspection/Replacement in its approved 2021 Capital Works Plan. In September of 2021, the tender was awarded to C.P. Systems to undertake the continuation of the program. Following award of the tender, C.P. Systems advised that there is shortage of anodes and they are unable to obtain enough anodes to complete the work in 2021. Accordingly, it was agreed that the work would be postponed until 2022 when there is a sufficient supply of anodes to allow the contractor to complete the work in its entirety. Work was completed in 2022 with a total cost of the project being \$271,672, excluding HST.

County Road 42 and County Road 43 Improvements, Phase 1.

Phase 1 started and includes the underground work along County Road 42 between 11th Concession and Pike Creek. The scope of construction generally includes storm and sanitary sewers, watermain and restoration. This work is being done in advance of the road improvements in order to facilitate the utility relocations required along this corridor and to provide the storm outlet for the County Road 43 Diversion (Phase 2) slated for a construction start sometime in 2024. Total costs of the project for Tecumseh's portion (water and wastewater) are estimated at 6,476,000 excluding HST (\$3,359,000 for Water and \$3,117,000 for Wastewater).

Construction continued for the Manning Road Improvement Project (Phase 2)

This project involved the replacement of the existing 150mm diameter of Cast Iron watermain on Manning Road from St. Thomas Street to Riverside Drive with new 250mm diameter watermain (approximately 690m). Included in this project was replacement of 150mm diameter Cast Iron watermain on St. Thomas from Manning Road to Grace Road with 150mm diameter PVC watermain (approximately 90m) and connecting Little River Road between Manning Road and Grace Road (approximately 90m). Total cost of the watermain portion of the project was \$657,400 excluding HST.

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
None					

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	N/A				
Treated	N/A				
Distribution	519	0 to 0	0 to 0	156	0 to 20

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	N/A	
Chlorine <i>Tecumseh Water Tower</i>	8760	Max 1.27 mg/L Min 0.83 mg/L
Chlorine <i>Distribution Free Chlorine Residuals</i>	1626	Max 1.78 mg/L Min 0.37 mg/L
Fluoride (If the DWS provides fluoridation)	N/A	

NOTE: For continuous monitors use 8760 as the number of samples.

*NOTE: Record the unit of measure if it is **not** milligrams per litre.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
N/A				

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony				
Arsenic				
Barium				
Boron				
Cadmium				



Chromium				
*Lead				
Mercury				
Selenium				
Sodium				
Uranium				
Fluoride				
Nitrite				
Nitrate				

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type Distribution	Number of Samples	Alkalinity Result (range 30-500)	Lead Result (range 0-0.01)	Unit of Measure	Field pH (range 0-14)	Number of Exceedances
Winter Session – Collection Date: March 9, 2022						
279 Edgewater	1	83	0.00096	Mg/L	7.2	None
284 Coronado	1	90	0.00231	Mg/L	7.2	
645 William	1	81	0.00107	Mg/L	7.3	
12117 Evergreen	1	90	0.00017	Mg/L	7.3	

Location Type Distribution	Number of Samples	Alkalinity Result (range 30-500)	Lead Result (range 0-0.01)	Unit of Measure	Field pH (range 0-14)	Number of Exceedances
Summer Session – Collection Date: October 14, 2022						
279 Edgewater	1	82	0.00005	Mg/L	7.2	None
284 Coronado	1	79	0.00009	Mg/L	7.2	
645 William	1	80	0.00014	Mg/L	7.1	
12117 Evergreen	1	82	0.00003	Mg/L	7.1	

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor				
Aldicarb				



Aldrin + Dieldrin				
Atrazine + N-dealkylated metabolites				
Azinphos-methyl				
Bendiocarb				
Benzene				
Benzo(a)pyrene				
Bromoxynil				
Carbaryl				
Carbofuran				
Carbon Tetrachloride				
Chlordane (Total)				
Chlorpyrifos				
Cyanazine				
Diazinon				
Dicamba				
1,2-Dichlorobenzene				
1,4-Dichlorobenzene				
Dichlorodiphenyltrichloroethane (DDT) + metabolites				
1,2-Dichloroethane				
1,1-Dichloroethylene (vinylidene chloride)				
Dichloromethane				
2,4-Dichlorophenol				
2,4-Dichlorophenoxy acetic acid (2,4-D)				
Diclofop-methyl				
Dimethoate				
Dinoseb				
Diquat				
Diuron				
Glyphosate				
Haloacetic Acids (HAAs) (NOTE: show latest running annual average)	quarterly	16.4	µg/L	None
Heptachlor + Heptachlor Epoxide				
Lindane (Total)				
Malathion				
Methoxychlor				
Metolachlor				
Metribuzin				
Monochlorobenzene				
Paraquat				
Parathion				
Pentachlorophenol				
Phorate				
Picloram				



Polychlorinated Biphenyls(PCB)				
Prometryne				
Simazine				
THM (NOTE: show latest running annual average)	quarterly	22.46	µg/L	None
Temephos				
Terbufos				
Tetrachloroethylene				
2,3,4,6-Tetrachlorophenol				
Triallate				
Trichloroethylene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)				
Trifluralin				
Vinyl Chloride				

Summary table for Running Annual Averages of Organic Parameters sampled during this reporting period.

Parameter	Sample Date	Result	Running Annual Average	Unit of Measure	Number of Exceedances
HAA	Jan.10, 2022	11.7	16.4	µg/L	None
	Apr.11, 2022	11.9		µg/L	
	July 11, 2022	24.1		µg/L	
	Oct.14, 2022	17.8		µg/L	

Parameter	Sample Date	Average Result	Running Annual Average	Unit of Measure	Number of Exceedances
THM	Jan.10, 2022	19.5	22.46	µg/L	None
	Apr.11, 2022	21.7		µg/L	
	July 11, 2022	26.7		µg/L	
	Oct.14, 2022	22.0		µg/L	

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
N/A			



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-17

Subject: Tecumseh Water Distribution System
Ministry of the Environment, Conservation and Parks
January 1, 2022 to December 31, 2022 Inspection Report

Recommendations

It is recommended:

That the Ministry of the Environment, Conservation and Parks Inspection Report for the Tecumseh Water Distribution System, dated February 6, 2023, **be received**.

Background

One of the most important tools for helping to ensure the delivery of high-quality drinking water is regular monitoring and inspection of regulated drinking water systems. Ontario sets stringent limits for contaminants in drinking water. Most are based on Health Canada's [Canadian Drinking Water Quality Guidelines](#) and are reviewed on a regular basis to ensure that they reflect new information when it becomes available. The [Ontario Drinking Water Quality Standards Regulation](#) under the [Safe Drinking Water Act, 2002](#), sets out standards for microbiological, chemical and radiological parameters.

The primary focus of inspections conducted by the Ministry of the Environment, Conservation and Parks (MECP) is to confirm compliance with ministry legislation as well as evaluating compliance and conformance with related permission, policies and guidelines.

The MECP conducted an inspection of Tecumseh's Water Distribution System from January 19, 2023 to January 27, 2023. The final inspection report, dated February 6, 2023, provides an assessment of compliance and conformance based on observations and information available during the inspection review period. Refer to Attachment 1.

Comments

The inspection report contains a summary of compliance inspection ratings, non-compliance items and best practice recommendations.

To measure individual inspection results, the MECP has established an inspection compliance risk framework based on the principles of the Inspection, Investigation and Enforcement Secretariat and advice of internal/external risk experts.

The **Inspection Summary Rating Record** provides the MECP, the system owner and the local Public Health Unit with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance.

The Town's municipal residential drinking water system achieved an **Inspection Summary Rating Record of 100%**.

There were **zero instances of non-compliance** and **no best practice recommendations** noted, and the **Town's inspection risk rating is 0.00%**.

Water Services staff is commended for their efforts and dedication to protect the Town's water distribution system.

Consultations

Ministry of the Environment, Conservation and Parks

Financial Implications

There are no financial implications arising from this report.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input checked="" type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

Brad Dupuis, C. Tech.
Manager Water Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Tecumseh Water Distribution System Inspection Report

Ministry of the Environment,
Conservation and Parks

Ministère de l'Environnement, de la
Protection de la nature et des Parcs

Southwestern Region

Direction régionale du Sud-Ouest

620 – 4510 Rhodes Drive
Windsor ON N8W 5K5

Tel.: 519 948-1464

Fax.: 519 948-2396

TTY: 416 456-1234

620 – 4510, chemin Rhodes
Windsor ON N8W 5K5

Tél. : 519 948-1464

Télééc. : 519 948-2396

ATS : 416 456-1234

File# SI-ES-TE-540

February 6, 2023

Town of Tecumseh
917 Lesperance Road
Tecumseh, ON
N8N 1W9

Attention: Margaret Misk-Evans, CAO
mevans@tecumseh.ca

Re: Tecumseh Water Distribution System
O.Reg. 170/03 Inspection Report

Please find enclosed the Drinking Water System Inspection Report for the Tecumseh Distribution System (DWS#260004969). The review period for this inspection was from January 1 to December 31, 2022. There were no Non-Compliance/Non-Conformance Items identified during this review period.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in *"Taking Care of Your Drinking Water: A guide for members of municipal council"* found on the Drinking Water Ontario website at www.ontario.ca/drinkingwater.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating

Record (IRR), included as Appendix B of the inspection report, provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance.

IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspectors' Annual Report. If you have any questions or concerns regarding the rating, please contact Marc Bechard, Water Compliance Supervisor, at (519) 490-0761.

Likewise, if you have any questions or concerns regarding this report, please call me at (226) 280-1556.

Yours truly,



Neil Gilbert, P.Eng.
Provincial Officer – Water Inspector
Southwestern Region
Ministry of the Environment, Conservation and Parks
Sarnia District – Windsor Area Office

Encl.

cc: Dr. Shanker Nesathurai, Medical Officer of Health, Windsor-Essex County HU, shnesathurai@wechu.org
Kristy McBeth, Director of Health Protection, Windsor-Essex County HU, kmcbeth@wechu.org
Victoria Peczulis, Manager, Environmental Health, Windsor-Essex County HU, vpeczulis@wechu.org
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Phil Bartnik, Director of Public Works & Eng. Services, Town of Tecumseh, pbartnik@tecumseh.ca
Brad Dupuis, Water Services Division, Town of Tecumseh, bdupuis@tecumseh.ca
Marc Bechard, Water Compliance Supervisor, MECP Sarnia District, marc.bechard@ontario.ca

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Appendix A: Stakeholder Appendix

Appendix B: Inspection Rating Record



TECUMSEH DISTRIBUTION SYSTEM

Inspection Report

System Number: 260004969
Entity: THE CORPORATION OF THE
TOWN OF TECUMSEH
Inspection Start Date: 01/19/2023
Inspection End Date: 01/27/2023
Inspected By: Neil Gilbert
Badge #: 1072

(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

This should not be construed as a confirmation of full compliance with all potential applicable legal requirement and BMPs. These inspection findings are limited to the components and/or activities that were assessed, and the legislative framework(s) that were applied. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

If you have any questions related to this inspection, please contact the signed Provincial Officer.

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: DRINKING WATER | **Regulated Activity:** DW Municipal Residential

Question ID	MRDW1001001	Question Type	Information
Question: What was the scope of this inspection?			
Legislative Requirement	Not Applicable		
Observation			
<p>The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices.</p> <p>This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O. Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.</p> <p>This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements. The review period for this inspection was from January 1 to December 31, 2022.</p>			

Question ID	MRDW1000001	Question Type	Information
Question: Does this drinking water system provide primary disinfection?			
Legislative Requirement	Not Applicable		
Observation This Drinking Water System provides for only secondary disinfection and distribution of water. Primary disinfection is undertaken by another regulated Drinking Water System which provides treated water to this Drinking Water System.			

Question ID	MRDW1020001	Question Type	Legislative
Question: Is the owner/operating authority able to demonstrate that, when required during the inspection period, Form 1 documents were prepared in accordance with their Drinking Water Works Permit?			
Legislative Requirement		SDWA 31 (1);	
Observation The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.			

Question ID	MRDW1025001	Question Type	Legislative
Question: Were all parts of the drinking water system that came in contact with drinking water (added, modified, replaced or extended) disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?			
Legislative Requirement	SDWA 31 (1);		
Observation All parts of the drinking water system were disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit.			

Question ID	MRDW1033001	Question Type	Legislative
Question: Is the secondary disinfectant residual measured as required for the large municipal residential distribution system?			
Legislative Requirement	SDWA O. Reg. 170/03 7-2 (3); SDWA O. Reg. 170/03 7-2 (4);		
Observation The secondary disinfectant residual was measured as required for the large municipal residential distribution system. As per O.Reg. 170/03 s 7-2 (3), the owner/operating authority of a system that provides secondary disinfection shall ensure that at least seven distribution samples are taken each week and are tested immediately for, (a) free chlorine residual, if the system provides chlorination and does not provide chloramination; or (b) combined chlorine residual, if the system provides chloramination. The following rules apply to the distribution samples referred above unless at least one sample is taken on each day of the week: At least four of the samples must be taken on one day of the week, at least 48 hours after the last sample was taken in the previous			

week. Then, at least three of the samples must be taken on a second day of the week, at least 48 hours after the last sample was taken on the first day of the sampling week. When more than one sample is taken on the same day of the week then each sample must be taken from a different location.

During the inspection review period (January 1 to December 31, 2022) at least seven distribution samples were collected each week using the 4/3 rule and tested for free chlorine residuals.

Question ID	MRDW1099001	Question Type	Information
Question: Do records show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O. Reg. 169/03)?			
Legislative Requirement		Not Applicable	
Observation Records showed that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O. Reg. 169/03).			

Question ID	MRDW1081001	Question Type	Legislative
Question: For LMR systems, are all microbiological water quality monitoring requirements for distribution samples being met?			
Legislative Requirement	SDWA O. Reg. 170/03 10-2 (1); SDWA O. Reg. 170/03 10-2 (2); SDWA O. Reg. 170/03 10-2 (3);		
Observation All microbiological water quality monitoring requirements prescribed by legislation for distribution samples in a large municipal residential system were being met. As per O.Reg. 170/03 s10-2, the owner/operating authority for the system shall ensure that if a system serves 100,000 people or less, at least eight distribution samples, plus one additional sample for every 1,000 people served, are taken every month, with at least one sample being taken each week. Each of the distribution samples collected must be tested for E. coli and total coliforms and at least 25 percent of these samples must be tested for general bacteria population expressed as colony counts on a heterotrophic plate count (HPC). During the inspection review period (January 1 to December 31, 2022) all microbiological water monitoring requirements for distribution water samples were performed.			

Question ID	MRDW1096001	Question Type	Legislative
Question: Do records confirm that chlorine residual tests are being conducted at the same time and at the same location that microbiological samples are obtained?			
Legislative Requirement	SDWA O. Reg. 170/03 6-3 (1);		
Observation Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.			

Question ID	MRDW1086001	Question Type	Legislative
Question: Are all haloacetic acid water quality monitoring requirements prescribed by legislation conducted within the required frequency and at the required location?			
Legislative Requirement	SDWA O. Reg. 170/03 13-6.1 (1); SDWA O. Reg. 170/03 13-6.1 (2); SDWA O. Reg. 170/03 13-6.1 (3); SDWA O. Reg. 170/03 13-6.1 (4); SDWA O. Reg. 170/03 13-6.1 (5); SDWA O. Reg. 170/03 13-6.1 (6);		
Observation All haloacetic acid water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location. As per O.Reg 170/03 s13-6.1, the owner/operating authority shall ensure that a minimum of one sample is collected and tested for haloacetic acid (HAA) per calendar quarter. On January 1, 2020, the O.Reg. 169/03 standard for HAA (80ug/L) came into effect and is expressed as a RAA, where RAA is defined as "the running annual average of quarterly results" for HAA for a drinking water system. During the inspection review period (January 1 to December 31, 2022), these HAA samples were collected on Jan. 10, 2022 (HAA result = 11.7ug/L), Apr. 11, 2022 (HAA result = 11.9 ug/L), July 11, 2022 (HAA result = 24.1ug/L) and Oct. 11, 2022 (HAA result = 17.8ug/L). All of these HAA results were below 80ug/L and the average for the inspection review period was 16.4ug/L.			

Question ID	MRDW1087001	Question Type	Legislative
Question: Have all trihalomethane water quality monitoring requirements prescribed by legislation been conducted within the required frequency and at the required location?			
Legislative Requirement		SDWA O. Reg. 170/03 13-6 (1); SDWA O. Reg. 170/03 13-6 (2); SDWA O. Reg. 170/03 13-6 (3); SDWA O.	

	Reg. 170/03 13-6 (4); SDWA O. Reg. 170/03 13-6 (5); SDWA O. Reg. 170/03 13-6 (6);
Observation	
<p>All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location. As per O.Reg. 170/03 s13-6, the owner/operating authority of a system that provides chlorination or chloramination shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the distribution system that is likely to have an elevated potential for the formation of trihalomethanes (THMs), and have the sample tested for THMs.</p> <p>During the inspection review period (January 1 to December 31, 2022), these THM quarterly samples were collected on Jan. 10, 2022 (at 4 locations with a THM average = 19.5ug/L), Apr. 11, 2022 (at 3 locations with a THM average = 21.7ug/L), July 11, 2022 (at 3 locations with a THM average = 26.7ug/L) and Oct. 11, 2022 (at 3 locations with a THM average = 22ug/L).</p> <p>The Ontario Drinking Water Quality Standard (ODWQS) for THM is 100ug/L (expressed as a running annual average of quarterly results). All of the THM results were below 100ug/L and the average for the inspection review period was 22.5ug/L.</p>	

Question ID	MRDW1113000	Question Type	Legislative
Question: Have all changes to the system registration information been provided to the Ministry within ten (10) days of the change?			
Legislative Requirement	SDWA O. Reg. 170/03 10.1 (3);		
Observation All changes to the system registration information were provided within ten (10) days of the change.			

Question ID	MRDW1059000	Question Type	Legislative
Question: Do the operations and maintenance manuals contain plans, drawings and process descriptions sufficient for the safe and efficient operation of the system?			
Legislative Requirement	SDWA O. Reg. 128/04 28;		
Observation The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.			

Question ID	MRDW1060000	Question Type	Legislative
Question: Do the operations and maintenance manuals meet the requirements of the DWWP and MDWL issued under Part V of the SDWA?			
Legislative Requirement SDWA 31 (1);			
Observation <p>The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA. Condition 16.2 under Schedule B of Tecumseh's Drinking Water Licence (#040-101, Issue #4 dated May 24, 2019) notes that the operations and maintenance manuals shall include (at a minimum) the following:</p> <ul style="list-style-type: none"> 16.2.1 The requirements of this licence and associated procedures; 16.2.2 The requirements of the drinking water works permit for the drinking water system; 16.2.3 A description of the processes used to achieve secondary disinfection within the drinking water system; 16.2.4 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system; 16.2.5 Procedures for the operation and maintenance of monitoring equipment; 16.2.6 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown; 16.2.7 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint. <p>A review of Tecumseh's operating manual and standard operating procedures suggests that these conditions appear to be satisfied. All secondary disinfection is provided by the City of Windsor's A.H. Weeks Water Treatment Plant and Tecumseh does not maintain or operate a re-chlorination system.</p>			

Question ID	MRDW1061001	Question Type	Legislative
Question: Are logbooks properly maintained and contain the required information?			
Legislative Requirement SDWA O. Reg. 128/04 27 (1); SDWA O. Reg. 128/04 27 (2); SDWA O. Reg. 128/04 27 (3); SDWA O. Reg. 128/04 27 (4); SDWA O. Reg. 128/04 27 (5); SDWA O. Reg. 128/04 27 (6); SDWA O. Reg. 128/04 27 (7);			
Observation Logbooks were properly maintained and contained the required information.			

Question ID	MRDW1062001	Question Type	Legislative
Question: Do records or other record keeping mechanisms confirm that operational testing not performed by continuous monitoring equipment is being done by a certified operator, water quality analyst, or person who meets the requirements of O. Reg. 170/03 7-5?			
Legislative Requirement	SDWA O. Reg. 170/03 7-5;		
Observation Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.			

Question ID	MRDW1071000	Question Type	BMP
Question: Has the owner provided security measures to protect components of the drinking water system?			
Legislative Requirement	Not Applicable		
Observation The owner had provided security measures to protect components of the drinking water system.			

Question ID	MRDW1073001	Question Type	Legislative
Question: Has the overall responsible operator been designated for all subsystems which comprise the drinking water system?			
Legislative Requirement	SDWA O. Reg. 128/04 23 (1);		
Observation The overall responsible operator had been designated for each subsystem.			

Question ID	MRDW1074001	Question Type	Legislative
Question: Have operators-in-charge been designated for all subsystems for which comprise the drinking water system?			

Legislative Requirement	SDWA O. Reg. 128/04 25 (1);
Observation	
Operators-in-charge had been designated for all subsystems which comprise the drinking water system.	

Question ID	MRDW1075001	Question Type	Legislative
Question: Do all operators possess the required certification?			
Legislative Requirement	SDWA O. Reg. 128/04 22;		
Observation All operators possessed the required certification.			

Stakeholder Appendix

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.

To access these materials online click on their titles in the table below or use your web browser to search for their titles. Contact the Ministry if you need assistance or have questions at 1-866-793-2588 or waterforms@ontario.ca.

For more information on Ontario's drinking water visit www.ontario.ca/drinkingwater



PUBLICATION TITLE	PUBLICATION NUMBER
FORMS: Drinking Water System Profile Information Laboratory Services Notification Adverse Test Result Notification	012-2149E 012-2148E 012-4444E
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	Website
Procedure for Disinfection of Drinking Water in Ontario	Website
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	Website
Filtration Processes Technical Bulletin	Website
Ultraviolet Disinfection Technical Bulletin	Website
Guide for Applying for Drinking Water Works Permit Amendments, & License Amendments	Website
Certification Guide for Operators and Water Quality Analysts	Website
Guide to Drinking Water Operator Training Requirements	9802E
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	Website
Drinking Water System Contact List	7128E01
Ontario's Drinking Water Quality Management Standard - Pocket Guide	Website
Watermain Disinfection Procedure	Website
List of Licensed Laboratories	Website

Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment. Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le ministère au 1-866-793-2588, ou encore à waterforms@ontario.ca si vous avez des questions ou besoin d'aide.



Pour plus de renseignements sur l'eau potable en Ontario, consultez le site www.ontario.ca/eaupotable

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Renseignements sur le profil du réseau d'eau potable	012-2149F
Avis de demande de services de laboratoire	012-2148F
Avis de résultats d'analyse insatisfaisants et de règlement des problèmes	012-4444F
Prendre soin de votre eau potable - Un guide destiné aux membres des conseils municipaux	Site Web
Marche à suivre pour désinfecter l'eau potable en Ontario	Site Web
Stratégies pour minimiser les trihalométhanes et les acides haloacétiques de sous-produits de désinfection	Site Web
Filtration Processes Technical Bulletin (en anglais seulement)	Site Web
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	Site Web
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable	Site Web
Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable	Site Web
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802F
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	Site Web
Liste des personnes-ressources du réseau d'eau potable	Site Web
L'eau potable en Ontario - Norme de gestion de la qualité - Guide de poche	Site Web
Procédure de désinfection des conduites principales	Site Web
Laboratoires autorisés	Site Web

Inspection Rating Record

DWS Name: TECUMSEH DISTRIBUTION SYSTEM
DWS Number: 260004969
DWS Owner: THE CORPORATION OF THE TOWN OF TECUMSEH
Municipal Location: TECUMSEH

Regulation: O.REG. 170/03
DWS Category: DW Municipal Residential
Type of Inspection: Focused
Inspection Date: Jan-19-2023
Ministry Office: Windsor Area Office

Maximum Risk Rating: 175

Inspection Module	Non Compliance Rating
Operations Manuals	0 / 28
Reporting & Corrective Actions	0 / 4
Other Inspection Findings	0 / 143
Overall - Calculated	0 / 175

Inspection Risk Rating: 0.00%

Final Inspection Rating: 100.00%

DWS Name: TECUMSEH DISTRIBUTION SYSTEM
DWS Number: 260004969
DWS Owner Name: THE CORPORATION OF THE TOWN OF TECUMSEH
Municipal Location: TECUMSEH

Regulation: O.REG. 170/03
DWS Category: DW Municipal Residential
Type of Inspection: Focused
Inspection Date: Jan-19-2023
Ministry Office: Windsor Area Office

All legislative requirements were met. No detailed rating scores.

Maximum Question Rating: 175

Inspection Risk Rating:	0.00%
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FINAL INSPECTION RATING:	100.00%
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APPLICATION OF THE RISK METHODOLOGY USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS



The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection

results since fiscal year 2008-09. The primary goals of this assessment are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains 15 inspection modules consisting of approximately 100 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

ontario.ca/drinkingwater

The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system’s operation can improve. The ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry’s annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario’s Risk Management Framework. Risk management is a systematic approach to identifying potential hazards, understanding the likelihood and consequences of the hazards, and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

RISK = LIKELIHOOD × CONSEQUENCE
(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

TABLE 1:	
Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 – 10% (Unlikely)	L = 1
11 – 49% (Possible)	L = 2
50 – 89% (Likely)	L = 3
90 – 100% (Almost Certain)	L = 4

TABLE 2:	
Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8

The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

Table 3 presents a sample question showing the risk rating determination process.

TABLE 3:							
Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?							
Risk = Likelihood × Consequence							
C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	Major Administrative Consequence	Minor Environmental Consequence	Minor Health Consequence	Medium Environmental Consequence	Major Environmental Consequence	Medium Health Consequence	Major Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely)	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely)	L=3 (Likely)	L=2 (Possible)
R=4	R=2	R=6	R=12	R=15	R=6	R=21	R=16

Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions related to regulatory compliance and input their “yes”, “no” or “not applicable” responses into the Ministry’s Laboratory and Waterworks Inspection System (LWIS) database. A “no” response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone); type of inspection (i.e., focused, detailed); and source type (i.e., groundwater, surface water).

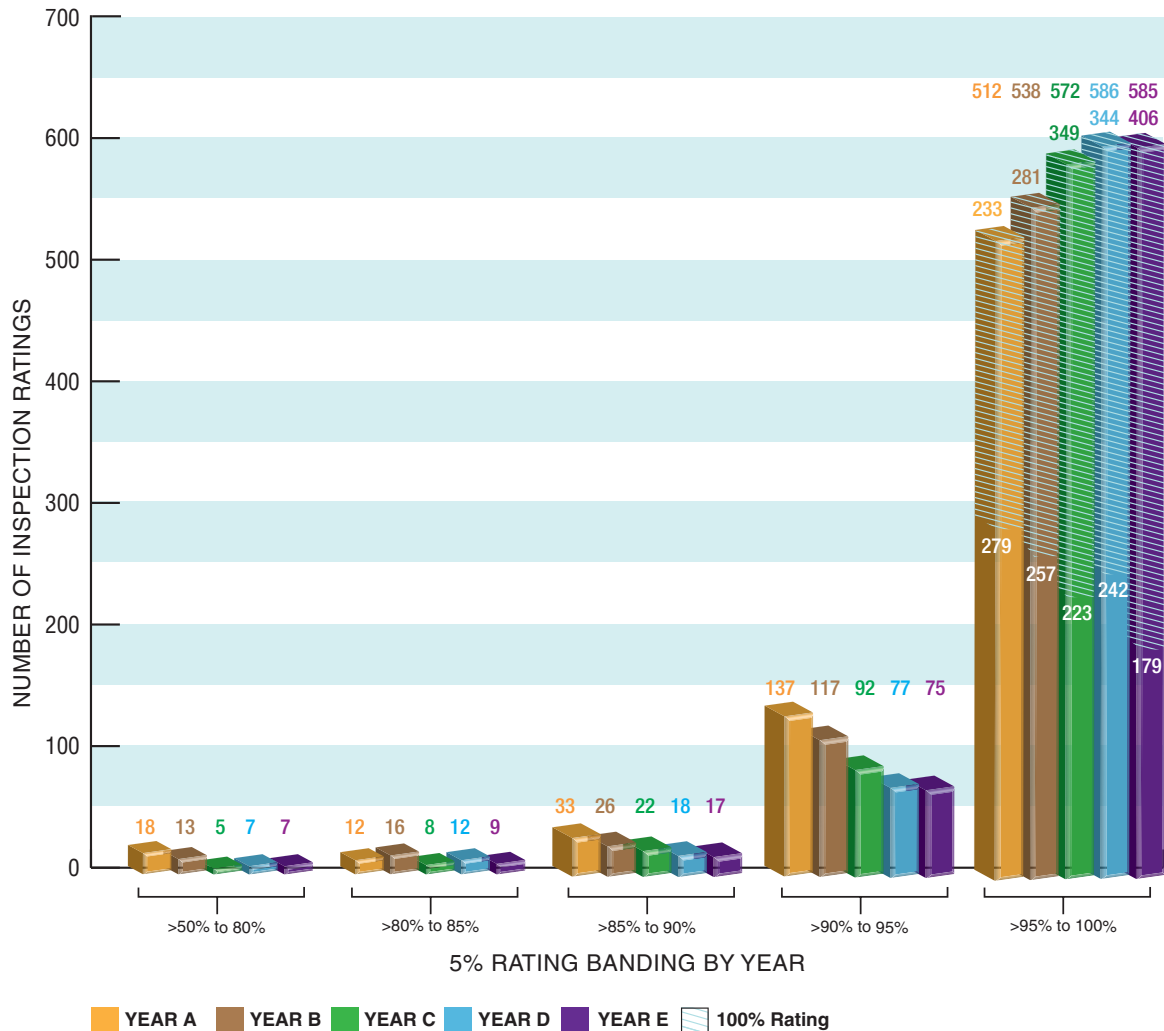
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry’s Chief Drinking Water Inspector’s Annual Report.

Figure 1 presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

Figure 1: Year Over Year Distribution of MRDWS Ratings



Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 15 possible modules of the inspection protocol,

which would provide the system owner/operator with information on the areas where they need to improve. The 15 modules are:

- | | | | |
|-------------------------|---------------------------------|--|--|
| 1. Source | 5. Treatment Process Monitoring | 9. Logbooks | 13. Water Quality Monitoring |
| 2. Permit to Take Water | 6. Process Wastewater | 10. Contingency and Emergency Planning | 14. Reporting, Notification and Corrective Actions |
| 3. Capacity Assessment | 7. Distribution System | 11. Consumer Relations | 15. Other Inspection Findings |
| 4. Treatment Processes | 8. Operations Manuals | 12. Certification and Training | |

For further information, please visit www.ontario.ca/drinkingwater



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-18

Subject: Drinking Water Quality Management System
Operational Plan

Recommendations

It is recommended:

That Report PWES-2023-18 Drinking Water Quality Management System Operational Plan **be received**;

And that Tecumseh Town Council **endorse and commit to** the Town of Tecumseh Distribution System, Drinking Water Quality Management System Operational Plan, Revision Date: February 28, 2023.

Background

Following the contamination of the water supply in Walkerton, Ontario in May 2000, a provincial inquiry was held that investigated the cause of the water contamination, which then triggered an examination of the state of drinking water protection in Ontario.

The Walkerton Inquiry Report outlined a number of recommendations for drinking water protection in Ontario that resulted in the [Safe Drinking Water Act](#) and [Clean Water Act](#) that regulate our water systems today.

The legacy of events in Walkerton has resulted in a significantly improved legal framework for drinking water protection that includes a multi-barrier approach.

The requirement for Owners and Operating Authorities of municipal residential drinking water systems to develop and implement Drinking Water Quality Management Systems (DWQMS) was legislated under the [Safe Drinking Water Act](#) (SDWA) and forms part of the Ministry of the Environment, Conservation and Parks (MECP) [Municipal Drinking Water Licensing Program](#). The idea of mandated implementation of a DWQMS originated as recommendations in Part Two of the [Walkerton Inquiry Report](#).

The DWQMS requires that an Operational Plan for the Drinking Water System is established and that this Operational Plan be endorsed and committed to by the Owners/Operating Authority – Tecumseh Town Council.

The Operational Plan must include elements that are fundamental to ensuring the long-term sustainability of a Drinking Water System including: management processes employed within the system; the maintenance of infrastructure used to supply drinking water; and identification of potential risks and risk mitigation strategies for items such as system security, water treatment, and the impacts of climate change.

As legislatively required by the province, the Town of Tecumseh is required to review, update, and maintain its DWQMS Operational Plan on an annual basis. This is an important element, which is key to the continuous improvement process.

Comments

Updates to the Operational Plan can be effected by staff suggestions, changes in administrative or work processes, internal audits, external audits, MECP inspections and regulatory updates.

Updates to the Operational Plan are submitted to and approved by the Management Review Committee, which is comprised of the Town's Chief Administrative Officer (Marg Misek-Evans), Director Public Works & Engineering Services (Phil Bartnik), Manager Water Services (Brad Dupuis) and the DWQMS Representative/Water Operator (Nicole Bradley).

Updates to the Operational Plan were due in part to the following:

1. Legislative and Regulatory Changes

The Operational Plan was updated to include reference to O.Reg. 128/04: Certification of Drinking Water System Operators and Water Quality Analysts, and O.Reg. 129/04: Licensing of Sewage Works Operators, for personnel coverage during emergency situations where staff may not be available to work.

In April 2022, the MECP also updated the municipal risk assessments for drinking water systems to explicitly consider cybersecurity threats. This update effected a change to Element 7 of the Operational Plan.

2. Risk Assessment Review

A Risk Assessment Review was conducted in accordance with Element 7 of the Operational Plan which subsequently resulted in an update to the Hazard Analysis and Critical Control Point Worksheets to include Cyber Security as a potential hazard to the Town's drinking water system.

3. Audit and Inspection Reports

Audits and inspections are conducted on the Town's Drinking Water Distribution System to ensure the DWQMS conforms to the requirements of the Operational Plan and to determine compliance with requirements under the [Safe Drinking Water Act, 2002](#) and associated regulations. An audit of the Town's DWQMS identified an opportunity for improvement by including additional processes to manage the potential for personnel shortages during emergency situations. The Operational Plan was updated accordingly.

4. Management Review Committee recommendations.

The Management Review Committee reviews recommended changes to the Operational Plan and ensures and evaluates the continuing suitability, adequacy and effectiveness of the DWQMS. These recommended changes are implemented in the updated Operational Plan.

The Management Review Committee approved the suggested updates to the Operational Plan at their meeting held October 24, 2022. The minutes recorded at said Management Review Committee meeting are provided in Attachment 1.

Key updates and revisions to the Operational Plan include but are not limited to the following:

Element No.	Title	Revision	Page No. in Operational Plan
General	Operational Plan	Spelling and grammar revisions.	Throughout
General	Operational Plan	Position title of "Water Operator" was amended to "Water Distribution Operator".	Throughout

Element No.	Title	Revision	Page No. in Operational Plan
General	Operational Plan	Included “or designate” following “Manager Water Services/ORO.”	Throughout
6	Drinking Water System	Amended Appendix 2.1: Data in the table updated to current values.	62
7 & 8	Risk Assessment	Amended Appendix 3.8: MECP’s “Potential Hazardous Events for Municipal Drinking Water Systems” updated to current version.	73
7 & 8	Risk Assessment	Amended Appendix 4.1: Addition of new Worksheet No. 19 – Cyber Security.	99
11	Personnel Coverage	Addition of statement referring to amended O.Reg. 128/04 and 129/04 “Emergency Situations.”	36

The above-noted changes were implemented in the updated Operational Plan, dated February 28, 2023, which is appended to this report as Attachment 2.

Tecumseh’s Water Services staff strives to continually improve the effectiveness of its DWQMS to provide reliable and safe drinking water for consumers.

Consultations

Chief Administrative Officer
 Ministry of the Environment, Conservation and Parks

Financial Implications

There are no financial implications arising from this report.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input checked="" type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

Brad Dupuis, C. Tech.
Manager Water Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Management Review Committee Meeting Minutes dated October 24, 2022
2	Town of Tecumseh Distribution System Drinking Water Quality Management System Operational Plan, Revision Date: February 28, 2023

Meeting Minutes / Report			(Attachment 5)		
Meeting Type:		DWQMS - Management Review Meeting			
Date:		October 24, 2022			
Called by:		Nicole Bradley			
Attendees:		Margaret Misek-Evans (ME)– Chief Administration Officer (CAO) Phil Bartnik (PB) – Director, Public Works & Engineering Services Brad Dupuis (BD) – Manager, Water Services / ORO Nicole Bradley (NB) – DWQMS Representative / Water Operator			
Location:		Lacasse Board Room			
Minutes prepared by:		Nicole Bradley			
Agenda / Minutes					
Item Code: AI=Action Item, DM=Decision Made. IS=Information Sharing, MRC=Management Review Committee					
Item	Item Description	Notes	Item Code	Assigned to	Completion Timeline
	Attendance	The sign-in sheet is appended to these minutes as Attachment #1 .	IS	n/a	n/a
	General Notes	All Reports mentioned are available on the shared drive for the Town of Tecumseh	IS	n/a	n/a
1	Previous DWQMS Management Review Meeting Outstanding Action Items	A) In the previous Management Review Meeting minutes there are 4 outstanding Action Items to review. Full minutes of the previous Management Review Meeting held on Mar.1, 2022 are appended to these minutes as Attachment #2 . AI-09 Due to Covid-19 training was put on hold. As outside suppliers have limited staffing, need to be onsite and 2 operators need to be in a vehicle for long durations. Training has been put on hold due to short staffing issues within Water Services. Will look at scheduling into 2023 once Water Services is back to full compliments.	IS <		

		<p>AI-11 <i>In response to the Town's 2021 Organizational Review the Manager of Water & Wastewater/ORO title has been changed to Manager of Water Services/ORO effective immediately. All water documents will now need to be revised to reflect this change.</i> Forms, documents and records have been reviewed and title / position revisions made. Completion date left as is to allow for any missed revisions.</p> <p>AI-12 <i>Operational Plan version 12 draft has been created showing needed revisions.</i> Findings will be discussed in further detail under Item 11 of this report.</p> <p>AI-13 <i>The SCADA system has been configured to have a low alarm and a high alarm. The low alarm is considered an initial warning while the high alarm is considered to be the Critical Control Point (CCP). Documentation of these alarms can be found on the Town's SCADA system.</i> <i>In February of 2019 ONYX Engineering was the awarded contractor and is currently working with TCS, Shaun Fuerth (SF) and Water Services to implement the upgrades.</i> <i>A global shortage in materials is creating the project to be completed later than expected.</i> The TCS department along with Water Services are continuing to work with ONYX Engineering to complete the implementation of the SCADA system alarm upgrades. Timeline has been set for Sep 2022.</p>	AI	NB	Dec 2022
			AI	BD	Apr 2022 Done Apr.26,2022
			AI	BD SF	Sep 2022
2	Incidents of Adverse Drinking Water Tests	There have been (0) Adverse Drinking Water Results since the last Management Review Meeting held on Mar.1, 2022.	IS	n/a	n/a
3	Results of Internal Audits	<p>The Internal Audit for 2022 was completed during the following dates: Sep.30, 2022 and Oct.3, 2022. The audit process was conducted remotely.</p> <p>2022 Internal Audit Findings: (0) Non-Conformities and (2) Opportunities for Improvements.</p> <p>The 2022 Internal Audit Final Report is attached to these meeting minutes as Attachment #3.</p>	IS	n/a	n/a

		Review of the 2022 Internal Audit Report with the Water Service Operators will be completed and proof of training documented.	AI-01	NB	Mar 2023
4	Results of External Audit	<p>Annually a desktop DWQMS Surveillance Audit is to be completed by an accredited third party.</p> <p>Every 3 years an On-site DWQMS Recertification Audit must be completed by an accredited third party. Our DWQMS Recertification Audit was completed on Nov. 6 & 7, 2020</p>	IS	n/a	n/a
		<p><u>Surveillance Audit</u> A less extensive, annual review of a Company's Quality Management System's elements could look at entire System or just certain elements of the System. It is performed by an accredited company and any 'gaps' in the Management System will be noted and non-conformance or opportunity for improvement will be issued.</p> <p><u>Recertification Audit:</u> An audit that occurs every 3 years from the original certification audit. Performed by an accredited company and looks to ensure that the company has documented any revisions and/or updates within their Management System appropriately and has provided the required training associated.</p> <p>2022 External Audit (surveillance) date is scheduled for Nov.4, 2022. Audit to be completed by NSF, accredited third party.</p> <p>Review of the 2022 External Audit with the Water Service Operators will be completed and proof of training documented.</p>	<p>IS</p> <p>AI-02</p>	<p>n/a</p> <p>NB</p>	<p>n/a</p> <p>Mar 2023</p>
5	Results of MECP Inspection	<p>Once the 2022 MECP inspection is completed and the final report received it will be brought to Council for endorsement by the Manager of Water Services/ORO during the beginning of the 2023 calendar year.</p> <p>Review of the 2022 MECP Inspection Report with the Water Service Operators will be completed and proof of training documented.</p>	<p>AI-03</p> <p>AI-04</p>	<p>BD</p> <p>NB</p>	<p>Mar 2023</p> <p>Mar 2023</p>
6	Incidents of Non-Compliance with Applicable Regulations	There has been (0) Non-Compliance issues since the last DWQMS Management Review Meeting which was held on Mar.1, 2022.	IS	n/a	n/a

7	Consumer Feedback	<p>(9) Consumer complaints regarding water quality were made to the Town of Tecumseh since the last Management Review Meeting which was held on Mar.1, 2022.</p> <p>It was suggested by PB that the current best practice system pressure limit also be listed in the descriptions of the complaints when a pressure reading is taken.</p>	IS	n/a	n/a
		<p>Manager of Water Services/ORO has reviewed the Survey Monkey results covering the time between Management Review Meetings. (Mar.1, 2022 to Oct. 24, 2022)</p> <p>Survey Monkey Data to be reviewed twice per year to ensure that possible issues are not missed when reported.</p>	IS	n/a	n/a
8	Operational Performance	<p>The <i>Hydrant Flushing Program</i> for 2022 is set to begin in the spring and every hydrant in Tecumseh is scheduled to be operated and inspected.</p>	AI-05	BD	Jun 2022 Done Jun.10, 2022
		<p>The <i>Hydrant Winterizing Program</i> for 2022 will begin in the fall and all data will be uploaded and saved in the Town's shared hard drive.</p> <p>First round of Hydrant Winterizing was completed Oct.14, 2022.</p>	IS	n/a	n/a
		<p>The <i>Valve Turning Program</i> for 2022 is on hold due to Covid-19 work restrictions and limited staff. Once restrictions ease and operators become available the program will continue.</p> <p>Covid-19 restrictions have lifted but we are still experiencing staff shortage. Therefore, program will remain on hold.</p>	IS	n/a	n/a
		<p>For the 2022 year we will be assessing 5 – 10 sample stations and then scheduling the appropriate maintenance measures (repair or full replacement) to be completed by the end of 2022.</p> <p>It was noted by PB and ME that more information regarding life cycles, years in service and replacement dates be captured for the sample stations.</p>	IS	n/a	n/a
		<p>It was suggested through the 2021 External Audit to perform verifications on our handheld pocket colorimeter units. In preparing for this task it was discovered that our current units (7), even though functioning, are obsolete. There is no longer any support for these units, it is recommended to replace our units with the most current units available.</p>	IS	n/a	n/a

		<p>(7) New pocket colorimeter units to be ordered and put into service once received.</p> <p>2022 Winter and Summer Lead Testing results will be communicated to Town Council during the first part of the 2023 calendar year.</p> <p>2022 Lead Testing-Winter session is scheduled to be collected on Mar.7, 2022. 2022 Lead Testing-Summer session is scheduled to be collected on Oct.14, 2022. Winter and Summer session samples were collected on their scheduled dates and all results are within the regulatory limits .</p>	<p>AI-06</p> <p>AI-07</p> <p>AI-08</p>	<p>BD NB</p> <p>BD</p> <p>Water Service Operators</p>	<p>Apr 2022 Done Jul.19, 2022</p> <p>Mar 2023</p> <p>Oct 2022 Done Oct.14, 2022</p>
9	Changes to Services, Activities, Regulations, etc. that could affect DWQMS	<p>Continue to deal with limited staffing and limited senior experience of operators, therefore, internal projects have been put on hold and/or contractors have been utilized to complete jobs.</p> <p>Concerns have been noted over the requests made by Building Department to cease our methods of inspection of the installation and disinfection of watermain on the private side. Meetings and discussions continue to take place to find an effective and feasible solution.</p> <p>Amendments made to O. Reg 128/04 and O. Reg 129/04 in regards to "Emergency Substitute Operators".</p> <p>The enforcement of O. Reg 406/19 "On-site and Excess Soils Management", which begins January 2023.</p>	IS	n/a	n/a
10	Infrastructure Review Results	<p><u>Private Projects:</u></p> <p>(1) <u>Oeadan Detech (Briday Inc.)- Victoria on the Lake</u></p> <p>(2) <u>Oldcastle Heights</u></p> <p>(3) <u>Arbour Heights</u></p> <p>(4) <u>Pawluk Island</u></p> <p>(5) <u>Various severances</u></p> <p>(6) <u>North Shore Public School</u></p>	IS	n/a	n/a

		<p>(7) <u>Santarossa Industrial Dev.</u></p> <p>(8) <u>Multi-level Housing Dev.</u></p> <p>(9) <u>Gateway Towers</u></p> <p>(10) <u>Urban Suites</u></p> <p>(11) <u>Townsend Development</u></p> <p>(12) <u>Harbour Club</u></p>			
		<p><u>Town Projects:</u></p> <p>(1) <u>CR 42 Reconstruction & CR 43 Diversion Phase 1</u></p> <p>(2) <u>Various Valve Replacement</u></p> <p>(3) <u>12th Concession (Dimu to CR 42)</u></p> <p>(4) <u>12th Concession</u></p> <p>(5) <u>CR 43</u></p> <p>(6) <u>Shields</u></p> <p>(7) <u>CR 17 & CR 46 Culvert Installation</u></p> <p>(8) <u>OASIS Upgrade</u></p> <p>(9) <u>PWES 1189 Lacasse yard-gas fill station</u></p> <p>(10) <u>PWES 1189 Lacasse yard-power gate</u></p> <p>(11) <u>Town of Tecumseh-hydrant reflectors</u></p> <p>(12) <u>CR 19 between Jamsyl & CR 22</u></p> <p>(13) <u>Aecom-water modelling</u></p> <p>(14) <u>Investing in Canada Infrastructure Program</u></p> <p>(15) <u>Town of Tecumseh-ITRON at boundary meters</u></p> <p>(16) <u>Riverside Drive Trail</u></p>	IS	n/a	n/a

		<p>(17)<u>Lesperance / VIA Rail Improvements</u></p> <p>(18)<u>Snake Lane Culverts no. 42, 53 & 54</u></p> <p>(19)<u>PWES 1189 Lacasse-new soil bays</u></p> <p>(20)<u>CR 43 / Banwell</u></p> <p>(21)<u>Watermain Anode Program</u></p> <p>(22)<u>Water and wastewater rate study</u></p> <p>(23)<u>CR 46 / Webster / Laval Sanitary Sewer Extension</u></p> <p>(24)<u>SCADA</u></p> <p>(25)<u>Tecumseh Rd Storm and Road Improvements</u></p> <p>(26)<u>MECP Consolidated Linear Infrastructure, Environmental Compliance Approval</u></p> <p>There has been (5) broken watermain repairs from Mar.1, 2022 through to Oct. 24, 2022</p>	IS	n/a	n/a
11	Currency of Operational Plan	<p>AI-12 – Operational Plan version 12 has been created and is waiting to be finalized. Plan was finalized in the month of March, 2022.</p> <p>Once finalized Brad will bring it forward to Council in 2022 for endorsement. Proof of Council endorsement of Operational Plan version 12 is amended to these minutes as Attachment #4.</p> <p>Once the Operational Plan version 12 has received endorsement from Council, it will be reviewed with Water Service operators. Proof of training/review will be documented.</p> <p>A draft version 13 of the Operational Plan has been created and revisions are being tracked as they are found (stemming from Audit Reports, Inspections and Regulation amendments).</p>	<p>IS</p> <p>AI-08</p> <p>AI-10</p>	<p>n/a</p> <p>BD</p> <p>NB BD</p>	<p>n/a</p> <p>May 2022 Done Apr.26, 2022</p> <p>Jun 2022 Done Jul.19, 2022</p>
12	Deviations from CCP Limits	There has been no CCP limit deviations since our last Managers Review Meeting which was held on Mar.1, 2022.	IS	n/a	n/a

13	Effectiveness of Risk Assessment Process	Every three years a full comprehensive review shall be complete.	IS	n/a	n/a
		The results from the Risk Assessment full comprehensive (36 month) meeting will be reviewed with the Water Service operators and proof of review will be documented.	AI-14	NB	Apr 2022 Done Apr.13, 2022
		The 2022 Annual Risk Assessment meeting will be completed later this calendar year. Results of this meeting will be reviewed with the Water Service operators and proof of review will be documented. Annual Risk Assessment Review meeting minutes are appended to these minutes as Attachment #5 .	AI-15	NB	Aug 2022 Done Aug.16, 2022
14	Emergency Preparedness	Emergency Response Plan version 13 will be reviewed and revised to version 14.	IS	n/a	n/a
		Once finalized, Emergency Response Plan version 14 will be reviewed with the Water Service operators along with two mock exercises, within this calendar year.	AI-16	NB BD	Aug 2022 Done Aug.16, 2022
15	Trends in Quality of Raw Water & Drinking Water Supply	The Town of Tecumseh is connected to the Town of LaSalle through Meter Chamber 12 (MCT-12). The valve remains off until an agreement has been made between Windsor and LaSalle. As part of the construction of the Herb Gray Parkway, the supply watermain to the Howard Avenue MCT-12 was re-routed through the Town of LaSalle. Subsequent to the re-routing of the supply watermain, the connection was closed and the supply of potable water to the Town of Tecumseh through MCT-12 is no longer utilized.	IS	n/a	n/a
		Fluoride was reintroduced into the water system on Jan.12, 2022. Enwin Utilities Ltd. released a statement on behalf of the Board of Commissioners of the WUC in regards to the processes taken up to and including the reintroduction.	IS	n/a	n/a
		The Town of Tecumseh receives an Annual Report from the Windsor Utilities Commission in regard to the water that is supplied to the town.	IS	n/a	n/a
		The Town of Tecumseh receives an Annual report from the Town of Lakeshore in regards to the water that is supplied to the town.			

		These reports received from our neighbouring Municipalities are saved on the Town's shared hard drive.			
16	Resources needed for DWQMS Maintenance	Technology and software based training for the Manager, Water Services/ORO and the DWQMS Rep will be considered throughout the following calendar years.	IS	n/a	n/a
17	Town of Tecumseh website	Manager, Water Services/ORO reviewed the Town website, ensuring the water information is current.	IS	n/a	n/a
18	Retention Table	<p>Manager, Water Services/ORO and DWQMS Rep have reviewed the retention table along with the documents and records pertaining to it.</p> <p>From DWQMS meeting it was noted that the retention table requires revision and updating and any associated documents/records will be added as required.</p>	<p>IS</p> <p>AI-17</p>	<p>n/a</p> <p>NB</p>	<p>n/a</p> <p>Oct 2022 Done Sep.21/2022</p>
19	Review of Best Practices	<p>Review of related and appropriate industry material, memberships in water industry organizations such as Ontario Municipal Water Association and Municipal Water, Wastewater Regulatory Committee and continued networking with neighbouring Municipalities allow for the continuous review of current Best Practices.</p> <p>Discussion of relevant Best Practice items with the Water Service operators will be documented.</p> <p>Review of two different Cybersecurity issues in Ontario within the water industry. Operators had opportunity for questions and discussion.</p>	<p>IS</p> <p>AI-18</p>	<p>n/a</p> <p>NB BD</p>	<p>n/a</p> <p>Mar 2022 Done Jul.19, 2022</p>
20	Comments / Suggestions made by Water Service Personnel	<p>No suggestions or feedback was given.</p> <p>Shawn LaPorte has left Water Services and is no longer employed by the Town of Tecumseh.</p> <p>Kevin McGuire – start date May.16, 2022 and Tony Vendrasco – start date Oct.24, 2022 are new hires within Water Services.</p>	IS	n/a	n/a
	<u>Meeting Adjournment</u>	Meeting adjourned by NB at 5:00pm.			

Attachments

Attachment #1



10-24-2022 Sign-in
& Endorsement.pdf

Attachment #2



03-01-2022 FINAL-
Mngt Rev Minutes.p

Attachment #3



010-03-2022 Final
Audit Report.pdf

Attachment #4



2022-04-26 RCM
Minutes- Acceptanc

Attachment #5



07-27-2022 Annual
RA mtg minutes.pdf

ATTACHMENT 1

DWQMS MANAGEMENT REVIEW MEETING

OCTOBER 24, 2022

Management Review Commitment and Endorsement Statement

This statement is intended to capture the commitment and endorsement of top management through the management review committee. Below are the definitions of commitment and endorsement represented within the context of the management review minutes referenced within this statement.

Commitment




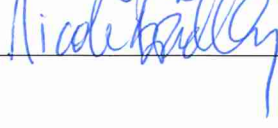
- 1) To represent that the committee has been given access to participated and/or reviewed the inputs covered within the minutes.
- 2) That the content of the minutes meets the input requirements of the Town of Tecumseh DWQMS management review meeting.
- 3) That the committee is aware of actions assigned to appropriate resources as a results of the management review meeting.
- 4) To provide objective evidence of top management's participation and commitment to the management review program.

Endorsement

- 1) That the management review committee endorses the commitments made within the associated management review minutes including:
 - a) Resources allocated to the items.
 - b) Within the timelines committed to in the meeting.
- 2) Approval to empower the DWQMS represented to ensure that commitments are followed through with the authority of the management review committee.
- 3) Where timelines cannot be met or where previous actions have not been verified by the management review committee as complete, a corrective action will be required.

Commitment and Endorsement Record

Minutes Referenced: March 1, 2022

Name / Delegate Name	Title	Signature	Date
Margaret Misek-Evans	Chief Administrative Officer (CAO)		October 24, 2022
Phil Bartnik	Director of Public Works & Engineering Services		October 24, 2022
Brad Dupuis	Manager , Water Services / ORO		October 24, 2022
Nicole Bradley	Water Operator / DWQMS Representative		October 24, 2022

PURPOSE: TOWN OF TECUMSEH DWQMS MANAGEMENT REVIEW MEETING

DATE: OCTOBER 24, 2022

NAME (PRINT)	POSITION	SIGNATURE
MARGARET MISEK- EVANS	CHIEF ADMINISTRATIVE OFFICER	<i>Margaret Misek-Evans</i>
PHIL BARTNIK	DIRECTOR, PUBLIC WORKS & ENGINEERING SERVICES	<i>Phil Bartnik</i>
BRAD DUPUIS	MANAGER, WATER SERVICES / ORO	<i>Brad Dupuis</i>
NICOLE BRADLEY	WATER OPERATOR / DWQMS REPRESENTATIVE	<i>Nicole Bradley</i>

ATTACHMENT 2

DWQMS MANAGEMENT REVIEW MEETING

OCTOBER 24, 2022

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	<p>AI-03 <i>(OFI-3) Recognizing staff burnout currently being experienced among the Town's senior water operations staff (3 senior Certified Operators are currently on leaves), a critical opportunity is presented to support the hard-working team in the provision of additional Certified Operators.</i></p> <p><i>While the water division team recognizes the Town's provision of necessary physical resources to operate, maintain and continually improve its drinking water system, there is a deficiency in the provision of sufficient staff resources to consistently accomplish intended outcomes of the growing community and the corresponding levels of service.</i></p> <p><i>The provision of additional necessary staff would support ensuring proper on-the-job training of junior Certified Operators by senior Certified Operators to effectively transfer the knowledge, experiences and skills necessary to operate, maintain and continually improve the Town's drinking water system.</i></p> <p><i>Addressing this opportunity would help support meeting the requirements of DWQMS Element 3 DO b) + d), Element 10 DO a) + b), and Element 11 D0.</i></p> <p><i>Findings will be discussed in further detail under Item 9 of this report.</i></p>	IS	BD PB	Apr 2022 Done Feb.25, 2022
	<p>AI-04 <i>Review of 2021 Internal Audit Report with the Water Service operators to be completed and documented.</i></p> <p><i>Findings will be discussed in further detail under Item 3 of this report</i></p>	IS	NB BD	Jan 2022 Done Jan.21, 2022
	<p>AI-05 <i>Review 2021 External Audit Report with Water Service operators is to be completed and documented.</i></p> <p><i>Findings will be discussed in further detail under Item 4 of this report.</i></p>	IS	NB BD	Jan 2022 Done Jan.21, 2022
	<p>AI-06 <i>Annual desktop DWQMS Surveillance Audit (External) to be scheduled within the 2022 calendar year with an accredited third party.</i></p> <p><i>Findings will be discussed in further detail under Item 4 of this report.</i></p>	IS	NB BD	Dec 2021 Done Nov.29, 2021
	<p>AI-07 <i>Review 2020 MECP Inspection Report with Water Service operators.</i></p> <p><i>Findings will be discussed in further detail under Item 5 of this report.</i></p>	IS	NB BD	Jan 2022 Done Jan.21, 2022

	<p>AI-08 <i>Once MECP Inspection for 2021 is complete and final report issued, it will be reviewed with the Water Service operators.</i> Findings will be discussed in further detail under Item 5 of this report.</p>	IS	NB BD	Mar 2022 Done Feb.23, 2022
	<p>AI-09 <i>Due to Covid-19 training was put on hold. As outside suppliers have limited staffing, need to be onsite and 2 operators need to be in a vehicle for long durations.</i> Findings will be discussed in further detail under Item 8 of this report.</p>	AI	BD	Jun 2022
	<p>AI-10 <i>All (8) samples taken were within the Tecumseh distribution system and all were well below the allowable threshold of 0.010 mg/L.</i> <i>Brad to communicate results through MECP 2021 Annual Report</i> Findings will be discussed in further detail under Item 8 of this report.</p>	IS	BD	Feb 2022 Done Feb.22, 2022
	<p>AI-11 <i>In response to the Town's 2021 Organizational Review the Manager of Water & Wastewater/ORO title has been changed to Manager of Water Services/ORO effective immediately. All water documents will now need to be revised to reflect this change.</i> Findings will be discussed in further detail under Item 9 of this report.</p>	AI	NB	Dec 2022
	<p>AI-12 <i>Operational Plan version 12 draft has been created showing needed revisions.</i> Findings will be discussed in further detail under Item 11 of this report.</p>	AI	BD	Apr 2022
	<p>AI-13 <i>The SCADA system has been configured to have a low alarm and a high alarm. The low alarm is considered an initial warning while the high alarm is considered to be the Critical Control Point (CCP).</i> <i>Documentation of these alarms can be found on the Town's SCADA system.</i> <i>In February of 2019 ONYX Engineering was the awarded contractor and is currently working with TCS, Shaun Fuerth (SF) and Water Services to implement the upgrades.</i> <i>A global shortage in materials is creating the project to be completed later than expected.</i> Findings will be discussed in further detail under Item 12 of this report.</p>	AI	BD SF	Sep 2022

		<p>The 2021 External Audit (surveillance) was completed on Nov.25 & 26, 2021 and the results are as follows: (0) Non-Conformances (NC) and (2) Opportunity for Improvement (OFI)</p> <p>The 2021 External Audit Report is appended to this Report as Attachment #3.</p> <p>(OFI-01) <i>The management review process was found to be overall effectively implemented. An opportunity exists to consistently record proposed implementation timelines for management review action items</i></p> <p>DWQMS Management Review Meeting minutes has new column added to track proposed completion dates (if required) for Action Items.</p> <p>(OFI-02) <i>Calibration of processes were found to be overall effectively implemented. Consideration could be given to performing periodic verification of pocket colorimeters (e.g. quarterly)</i></p> <p>Monthly verification of our pocket colorimeters against an approved set of standards will be implemented and tracked. We are currently waiting on delivery of supplies.</p> <p>AI-06 – 2022 External Audit (surveillance) date is scheduled for Nov.4, 2022. Audit to be completed by NSF, accredited third party.</p>	IS	n/a	n/a
5	Results of MECP Inspection	<p>AI-07 – Jan.21, 2022, review of the 2020 MECP Inspection Report with the Water Services operators was completed and proof of training/review is documented.</p> <p>MECP Inspection for 2021 was completed on Jan.06, 2022 and the results are as follows: 0.00% Risk Rating. With a final inspection Rating of 100% compliance.</p> <p>The 2021 MECP Inspection Report is appended to this report as Attachment #4.</p> <p>AI-08 – Feb. 23, 2022, review of the 2021 MECP Inspection Report with Water Service operators was completed and proof of training/review is documented.</p> <p>The final report for the 2021 MECP Inspection was endorsed by Council on Feb.22, 2022. Report Number PWES-22-12-Tecumseh Water Distribution System-MECP Dec.1/20 – Dec.31/21 Inspection Report.</p>	IS IS IS	n/a n/a n/a	n/a n/a Mar 2022 Done Feb 22, 2022

6	Incidents of Non-Compliance with Applicable Regulations	There has been (0) Non-Compliance issues since the last DWQMS Management Review Meeting (Nov.23, 2021).	IS	n/a	n/a
7	Consumer Feedback	<p>(8) Consumer complaints regarding water quality were made to the Town of Tecumseh since the last DWQMS Management Review Meeting (Nov. 23, 2021).</p> <p>(1) Nov.23, 2021 (2720 Wildberry)</p> <ul style="list-style-type: none"> Aesthetics – Odour – Consumer reported an odour when the water was being ran. Operator investigated and found that the issue was with the P-Trap on the internal plumbing. Operator obtained a chlorine residual of 1.25ppm. (Acceptable MECP range 0.05-4.0ppm). <p>(2) Nov.27, 2021 (13349 St.Thomas)</p> <ul style="list-style-type: none"> Aesthetics – Consumer reported that their water is cloudy. Operator responded to the consumer complaint and found that the cloudiness was due to air in the lines. Operator flushed the lines and obtained a chlorine residual of 0.82ppm (Acceptable MECP range 0.05-4.0ppm). <p>(3) Nov.29, 2021 (1050 Lesperance)</p> <ul style="list-style-type: none"> Low Pressure – Consumer stated that there was intermittent instances of low water pressure at certain taps. Operator investigated and found that low pressure was occurring at certain taps only in the office area. Pressure outside the building was at 60psi. Operator obtained a chlorine residual of 1.27pm (Acceptable MECP range 0.05-4.0ppm). <p>(4) Dec.8, 2021 (4040 County Rd46)</p> <ul style="list-style-type: none"> Low Pressure – Consumer reported low pressure in the building, they had recorded a reading of 40psi. Operator attended site and investigated, found no cause at the residence and recorded a pressure of 43psi at a fire hydrant located next to residence. This is normal operating pressure for this area. 	IS	n/a	n/a

		<p>(5) Dec.8, 2021 (7325 Manning)</p> <ul style="list-style-type: none"> • Low Pressure – Consumer reported low pressure at his residence, throughout all taps. Operator attended location and investigated. Found that the service line is a very long run from the road to the home and that when the line enters the home it decreased in size to ¼inch. Operator informed the consumer that, that size of service is too small therefore causing the pressure issues. <p>(6) Dec.13, 2021 (521 Michael)</p> <ul style="list-style-type: none"> • Aesthetics – Odour – Consumer reported the presence of an odour similar to that of very high chlorine. Operator attended the site and investigated. Found nothing at that time. Operator obtained a chlorine residual of 1.27ppm). (Acceptable MECP range 0.05-4.0ppm). <p>7) Jan.27, 2022 (St.Pierre)</p> <ul style="list-style-type: none"> • Aesthetics – Consumer reported that their water is cloudy. Operator let the consumer know that the cloudiness is due to the temperature of the water at this time of year. Once the water sits and warms up (5min) the cloudiness will disappear. <p>(8) Feb.01, 2022 (1106 Laramie)</p> <ul style="list-style-type: none"> • Low Pressure – Consumer reported that there was low pressure at their establishment. Operator attended location and investigated. Found a leak in their service next to the building. Operator informed them of the appropriate steps to be taken. <p>Please note all actions mentioned above were completed following Town policy in dealing with Covid-19. Clerks division would perform standard Covid-19 screening prior to making appointment along with the operator following the same screening process upon arrival.</p> <p>Manager of Water Services/ORO has reviewed the Survey Monkey results covering the time between DWQMS Management Review Meetings. (Nov.23, 2021 to March 1, 2022)</p> <p>Survey Monkey Data to be reviewed twice per year to ensure that possible issues are not missed when reported.</p>			
			IS	n/a	n/a

		<p>(0) Questionnaires were completed for the <i>Water Services Customer Survey</i> stating any issue or concern.</p> <p>Results are shown below for the <i>Water Services Customer Survey</i>.</p> <ol style="list-style-type: none"> 1) Billing Concern- 0 individuals 2) Request for Locate- 0 individuals 3) Water Leak- 0 individuals 4) Water Quality- 0 individuals 5) Water Meter Issue- 0 individuals 6) Connection / disconnection of water service- 0 individuals 7) Other (Please specify)- 0 individuals 			
8	Operational Performance	<p>The <i>Hydrant Flushing Program</i> for 2022 is set to begin in the spring and every hydrant in Tecumseh is scheduled to be operated and inspected.</p> <p>Documentation for this program will be stored in the Town's shared hard drive.</p> <p>The <i>2021 Hydrant Winterizing Program</i> has been completed, all data has been uploaded. Saved in the Town's shared hard drive.</p> <p>The <i>Valve Turning Program</i> for 2022 will be put on hold due to Covid-19 work restrictions and limited staff. Once restrictions ease and operators become available the program will continue.</p> <p>Current FC300 Itron reading system is being replaced with MC3Lite. Brad has been working with Shaun Fuerth (TCS), Wolseley, Itron and Essex Power for the implementation and training of new software. It is in the final stages of completion.</p> <p>AI-09 – When Covid-19 restrictions have been downgraded and training for the MC3Lite system can be carried out safely for all parties involved a date will be scheduled and the training completed. We have set a June 2022 timeline, if training has not been completed by that date we will revisit and try to schedule again.</p> <p>For the 2022 year we will be assessing 5 – 10 sample stations and then scheduling the appropriate maintenance measures (repair or full replacement)</p>	AI	BD	Jun 2022
			IS	n/a	n/a
			IS	n/a	n/a
			IS	n/a	n/a
			IS	n/a	n/a
			IS	n/a	n/a

		<p>It was suggested through the 2021 External Audit to perform verifications on our handheld pocket colorimeter units. In preparing for this task it was discovered that our current units (7), even though functioning, are obsolete. There is no longer any support for these units, it is recommended to replace our units with the most current units available.</p> <p>(7) New pocket colorimeter units to be ordered and put into service once received.</p>	IS	n/a	n/a
		<p>AI-10 – 2021 Winter and Summer Lead Testing results were communicated to Town Council on Feb.22, 2022 through report PWES-2022-09 – Annual Reports for Year 2021-Town of Tecumseh Water Distribution System</p> <p>2022 Lead Testing-Winter session is scheduled to be collected on Mar.7, 2022.</p> <p>2022 Lead Testing-Summer session is scheduled to be collected on Oct.3, 2022.</p>	AI	BD NB	Apr 2022
		<p>AI-10 – 2021 Winter and Summer Lead Testing results were communicated to Town Council on Feb.22, 2022 through report PWES-2022-09 – Annual Reports for Year 2021-Town of Tecumseh Water Distribution System</p> <p>2022 Lead Testing-Winter session is scheduled to be collected on Mar.7, 2022.</p> <p>2022 Lead Testing-Summer session is scheduled to be collected on Oct.3, 2022.</p>	IS	n/a	n/a
		<p>AI-10 – 2021 Winter and Summer Lead Testing results were communicated to Town Council on Feb.22, 2022 through report PWES-2022-09 – Annual Reports for Year 2021-Town of Tecumseh Water Distribution System</p> <p>2022 Lead Testing-Winter session is scheduled to be collected on Mar.7, 2022.</p> <p>2022 Lead Testing-Summer session is scheduled to be collected on Oct.3, 2022.</p>	AI	Water Service Operators	Oct 2022
9	Changes to Services, Activities, Regulations, etc. that could affect DWQMS	<p>Due to Covid-19:</p> <ul style="list-style-type: none"> - Extra monitoring was implemented in areas such as schools, Town Hall, Arenas and other Town facilities. -Operator training was slowly transitioned to on-line format from hands-on. -Town policies implemented: 1 person per vehicle unless barriers are present. -Covid-19 Screening of residents by Town operators prior to entry on property. Entry into consumer's residence shall be approved by the Manager of Water Services. -Public access to Town facilities restricted. -Daily Covid-19 screening of Water Service Operators. -Town implemented Covid-19 policies regarding employee vaccinations. -Water Leader off on extended sick leave, with unknown date of return. -Additional Senior water operator away on paternity leave until 2022. - Due to limited staffing / senior experience of operators, internal projects have been put on hold and/or contractors have been utilized to complete jobs. <p>AI-03 – As per discussion held during our November 23, 2021 DWQMS Management Review meeting, the Director of Public Works & Engineering Services, the Manager Water Services/ORO and the Director of People and Culture are to work together to find a solution to</p>	IS	n/a	n/a
		<p>AI-03 – As per discussion held during our November 23, 2021 DWQMS Management Review meeting, the Director of Public Works & Engineering Services, the Manager Water Services/ORO and the Director of People and Culture are to work together to find a solution to</p>	IS	n/a	n/a

		<p>the Water Service Operator's burnout as reported in the 2021 Internal Audit.</p> <p>Director of Public Works & Engineering, Manager, Water Services, Director of People & Culture met and currently have an exterior job posting for a new water operator, posted on Feb.25, 2022.</p> <p>AI-11 – Throughout the 2022 calendar year Water Service documents will be reviewed and revised to show the changes implemented through the 2021 Organizational Review.</p>	<p>ISI</p> <p>IS</p>	<p>n/a</p> <p>n/a</p>	<p>n/a</p> <p>n/a</p>
10	Infrastructure Review Results	<p><u>Private Projects:</u></p> <p>(1) <u>Sky Dev.</u> - Private development on Southfield.</p> <p>(2) <u>Oeadan Detech (Briday Inc.)- Victoria on the Lake</u> - Private development on Dillon</p> <p>(3) <u>Oldcastle Heights</u> - Private development on North Talbot Rd & 8th Concession</p> <p>(4) <u>Arbour Heights</u> - Private development on Lesperance and Arbour</p> <p>(5) <u>Pawluk Island</u> - Private development on Brighton Rd</p> <p>(6) <u>Various severances</u> - Private development serving lots throughout the town</p> <p>(7) <u>North shore Public School</u> - Private development for new public school on Tecumseh Rd</p> <p>(8) <u>Santarossa Industrial Dev.</u> - Private development on CR 46 & 8th Concession</p> <p><u>Town Projects:</u></p> <p>(1) <u>Old Tecumseh Rd</u> - Replacing 200mm watermain</p>	IS	n/a	n/a

		<p>(2) <u>Manning Rd phase 2</u> - Continuing from 2021 replacing watermain & services</p> <p>(3) <u>CR 42 Reconstruction & CR 43 Diversion Phase 1</u> - Transmission and local watermain</p> <p>(4) <u>Various Valve Replacement</u> - Replacement of valves on CR 34 and HWY#3</p> <p>(5) <u>12th Concession (Dimu to CR 42)</u> - Replacing watermain & services</p> <p>(6) <u>12th Concession</u> - South Section- replacing watermain & Services</p> <p>(7) <u>CR 43</u> - Replacement of existing cast iron watermain & services. - To be completed during CR 42 Reconstruction & CR 43 Diversion Phase 2</p> <p>(8) <u>Shields</u> - Connecting Shields to Shields (between CR 43 & St.Alphonse)</p> <p>(9) <u>CR 17 & CR 46 Culvert Installation</u> - During installation of culvert: raise hydrant, install autoflusher, install sample station. - Work being completed to increase the safety zone for operators completing weekly maintenance.</p> <p>(10) <u>Anode Program 2021</u> - Watermain Anode Program continued</p> <p>(11) <u>OASIS Upgrade</u> - Complete install of new water fill stations (south & north stations) by Flowmetrix. - South End OASIS to have existing asphalt removed and prepped for proper drainage and base for concrete.</p>			
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		<p>(12)<u>PWES 1189 Lacasse yard</u> - Gas fill station. Remove and reinstall gas fill station at proper location.</p> <p>(13)<u>PWES 1189 Lacasse yard</u> - Install power gate for yard to work hand and hand with fuel fill station.</p> <p>(14)<u>PWES 1189 Lacasse yard</u> - Improvements. Prep & install concrete blocks behind salt shed, install asphalt widening.</p> <p>(15)<u>Town of Tecumseh</u> - Install Hydrant reflectors throughout the town</p> <p>(16)<u>CR 19 between Jamsyl & CR 22</u> - Watermain replacement.</p> <p>(17)<u>Aecom</u> - Completing water modeling on North and South ends of the system.</p>			
		There has been (8) broken watermain repairs from Nov.22, 2021 through to Mar.1, 2022.	IS	n/a	n/a
		<p>(5) in former Tecumseh Hamlet area (3) in former St.Clair Beach area (0) in former Sandwich South area</p> <p>To date, for this calendar year, there has been a total of (6) broken watermain repairs within the Town of Tecumseh.</p>			
11	Currency of Operational Plan	<p>Operational Plan version 11 has been reviewed and revised. The revisions have been implemented into the current Operational Plan version 12.</p> <p>AI-01 – As recommended in the 2021 Internal Audit, the DWS name was entered onto the title page of version 12 of the Operational Plan.</p> <p>AI-12 – Operational Plan version 12 has been created and is waiting to be finalized.</p> <p>Once finalized Brad will bring it forward to Council in 2022 for endorsement.</p>	<p>IS</p> <p>IS</p> <p>IS</p> <p>AI</p>	<p>n/a</p> <p>n/a</p> <p>n/a</p> <p>BD</p>	<p>n/a</p> <p>n/a</p> <p>n/a</p> <p>May 2022</p>

		Once the Operational Plan version 12 has received endorsement from Council, it will be reviewed with Water Service operators. Proof of training/review will be documented.	AI	NB BD	Jun 2022
12	Deviations from CCP Limits	<p>AI-13 – The TCS department along with Water Services are continuing to work with ONYX Engineering to complete the implementation of the SCADA system alarm upgrades. Timeline has been set for Sep 2022.</p> <p>There has been no CCP limit deviations since our last DWQMS Managers Review Meeting (Nov.23, 2021)</p>	IS IS	n/a n/a	n/a n/a
13	Effectiveness of Risk Assessment Process	<p>Every three years a full comprehensive review shall be complete.</p> <p>AI-14 – The Risk Assessment full comprehensive review was completed on Feb.2, 2022. The Risk Assessment meeting minutes are appended to this report as Attachment #5.</p> <p>The results from the Risk Assessment full comprehensive meeting will be reviewed with the Water Service operators and proof of review will be documented.</p>	IS AI	n/a NB	n/a Apr 2022
		The 2022 Annual Risk Assessment meeting will be completed later this calendar year. Results of this meeting will be reviewed with the Water Service operators and proof of review will be documented.	AI	NB	Aug 2022
14	Emergency Preparedness	<p>Emergency Response Plan version 13 will be reviewed and revised to version 14.</p> <p>Once finalized, Emergency Response Plan version 14 will be reviewed with the Water Service operators along with two mock exercises, within this calendar year.</p>	IS AI	n/a NB BD	n/a Aug 2022
15	Trends in Quality of Raw Water & Drinking Water Supply	The Town of Tecumseh is connected to the Town of LaSalle through Meter Chamber 12 (MCT-12). The valve remains off until an agreement has been made between Windsor and LaSalle. As part of the construction of the Herb Gray Parkway, the supply watermain to the Howard Avenue MCT-12 was re-routed through the Town of LaSalle. Subsequent to the re-routing of the supply watermain, the connection was closed and the supply of potable water to the Town of Tecumseh through MCT-12 is no longer utilized.	IS	n/a	n/a

		<p>The Town of Tecumseh receives an Annual Report from the Windsor Utilities Commission in regard to the water that is supplied to the town.</p> <p>The Town of Tecumseh receives an Annual report from the Town of Lakeshore in regards to the water that is supplied to the town.</p> <p>These reports received from our neighbouring Municipalities are saved on the Town's shared hard drive.</p> <p>The Town of Tecumseh 2021 Annual Report and The Town of Tecumseh 2021 Summary Report were communicated to Council for endorsement on Feb.22, 2022, through Report PWES-2022-09 – <i>Annual Reports for Year 2021-Town of Tecumseh Water Distribution System.</i></p>	IS	n/a	n/a
16	Resources needed for DWQMS Maintenance	AI-02 – As per 2021 Internal Audit, technology and software based training for the Manager, Water Services and the DWQMS Rep will be considered throughout the 2022 calendar year.	IS	n/a	n/a
17	Town of Tecumseh website	Manager, Water Services reviewed the Town website, ensuring the water information is current.	IS	n/a	n/a
18	Retention Table	Manager, Water Services and DWQMS Rep have reviewed the retention table along with the documents and records pertaining to it.	IS	n/a	n/a
19	Review of Best Practices	<p>Review of related and appropriate industry material, memberships in water industry organizations such as Ontario Municipal Water Association and Municipal Water, Wastewater Regulatory Committee and continued networking with neighbouring Municipalities allow for the continuous review of current Best Practices.</p> <p>Brad attended a two day online conference “Best Management Practices Summit Feb.23-24, 2022. Proof of training is documented.</p> <p>Quarterly discussion of relevant Best Practice items with the Water Service operators will be documented.</p>	IS AI	n/a NB BD	n/a Mar 2022
20	Comments / Suggestions made by Water Service Personnel	<p>No suggestions or feedback was given.</p> <p>Question raised in regards to returning to in-person training sessions due to the lifting of some COVID-19 restrictions. The Town's stance is to stay “status quo” for the time being. They are</p>	IS	n/a	n/a

		looking at re-visiting our policies and guidelines for possible amendments towards the end of March into the beginning of April.			
	<u>Meeting Adjournment</u>	Meeting adjourned by Nicole Bradley at 3:15pm.			

ATTACHMENT 3

DWQMS MANAGEMENT REVIEW MEETING

OCTOBER 24, 2022

Drinking Water Quality Management Standard (DWQMS 2.0)

Internal Audit Report

For the period of:

October 30, 2021 to October 3, 2022

For:

Town of Tecumseh

Water Services

Tecumseh Distribution System

Conducted by:



Audit dates: September 30-October 3, 2022

Report date: October 3, 2022

1.0 Overview & Objectives

Acclaims Environmental Inc. was retained to conduct an internal audit of the Town of Tecumseh's quality management system (QMS) on September 30 – October 3, 2022 to determine whether it conforms to the requirements of the Drinking Water Quality Management Standard (DWQMS 2.0); and to assess whether the QMS is effectively implemented.

The internal audit was conducted with one lead auditor, Brigitte Roth of Acclaims Environmental Inc.

This report summarizes the audit results in section 2.0 Audit Findings, categorizing positive findings, non-conformities and opportunities for improvement.

1.1 Risks and Opportunities

The risk-based approach was used in conducting this audit; which considers risks and opportunities to ensure that the audit focuses on matters that are significant for the auditee and for achieving the audit program objectives.

In any audit, potential risks can include those related to *ineffective*: planning / identification of external and internal issues; resources; audit team; communication; audit program implementation / monitoring / improvement; control of documented information; and availability of auditee and/or evidence.

Also, opportunities can include *efficiencies* such as: allowing multiple audits to be conducted in a single visit; minimizing time and distances travelling to sites; matching competencies of audit team to competencies needed; and aligning audit dates with the availability of auditee's staff.

This audit was conducted remotely, using information and communications technology (ICT) for audit interviews. Potential risks in conducting audits remotely include: issues related to ICT availability / capability / reliability; auditee knowledge and familiarity with ICT; evidence presented might not be representative; and additional follow-up may be required. Opportunities in conducting this audit remotely: supports business continuity, allows for internal audits to be conducted in extraordinary times; improved efficiency with auditees' time; can follow-up with requested information.

1.2 Scope

This internal audit was performed remotely, using information and communications technology (ICT). The COVID-19 pandemic response (in implementing measures to prevent the spread of the virus) has presented unique opportunities for organizations to explore alternative approaches for business continuity. Conducting audits remotely was one of these opportunities and is a permitted practice under normal operating conditions through the province's Municipal Drinking Water Licensing Program and through ISO 19011:2018 Guidelines for auditing management systems.

The Operational Plan for the Town of Tecumseh was reviewed for conformity to the Drinking Water Quality Management Standard (DWQMS 2.0). This audit also reviewed the Water Services' planned processes and programs to evaluate how well QMS requirements are integrated into them.

Process audits examine the resources (equipment, materials and people) used to transform the inputs into outputs, the methods (procedures and instructions) followed and the measures collected to determine process performance. Process audits check the adequacy and effectiveness of the process controls established by procedures, work instructions, training and process specifications.

As the last internal audit was conducted on October 26-29, 2021, this audit focused on the period between October 30, 2021 and October 3, 2022.

1.3 Methodology

The audit was conducted in accordance with ISO 19011:2018 – Guidelines for auditing management systems.

The list of all auditing criteria is included in Appendix "A" – Audit Plan. Appendix "B" – Interviews, Documents and Records lists persons interviewed, along with documents and processes reviewed. Appendix "C" – Audit Checklists includes the checklists used to conduct the audit.

In order to conduct audits within scope, time and budgetary constraints, audit evidence is based on a sampling of processes, programs, and information available. The size of the sample selected is appropriate to the size and scale of the operation and information available. Objective evidence collected is based upon the sampling.

The conclusions presented in this report are based on information presented during the internal audit.

1.4 Audit Program Monitoring and Reviewing

The implementation of the audit program was monitored and, at appropriate intervals, reviewed to assess whether the objectives have been met and to identify opportunities for improvement. The results of this review will be included in this report, if applicable.

Performance indicators were used to monitor characteristics such as:

- conformity with the audit program, schedules and audit objectives,
- the ability to implement the audit plan,
- feedback from top management, auditees, auditors and other interested parties, and
- adequacy of documented information in the whole audit process.

The audit program review considered:

- a) results and trends from monitoring,
- b) conformity with procedures,
- c) evolving needs and expectations of relevant interested parties,
- d) audit program records,
- e) alternative or new auditing methods / practices,
- f) effectiveness of the actions to address the risks and opportunities, and internal and external issues associated with the audit program, and
- g) confidentiality and information security issues relating to the audit program.

Corrective actions and opportunities for improvement from the results of audit program reviews, if any, are included in the internal audit report's section 2.0 Audit Findings.

1.5 Auditors

The Lead Auditor was Brigitte Roth, who has extensive auditing experience and is a certified auditor with the Environmental Careers Organization of Canada (ECO Canada). Auditor qualifications are included in Appendix "D" – Auditor CV and Training Certificates.

1.6 Confidentiality

The information gathered by Acclaims Environmental Inc. is the property of Town of Tecumseh only and will not be transmitted to any third party without the prior written consent of an authorized representative. All documents provided by the organization prior to and during the assessment are kept only for the purpose of audit review and audit report preparation.

2.0 Audit Findings

2.1 Positive Findings

The following positive audit findings were noted during the audit:

Commitment

- Staff interviewed were knowledgeable about their processes and programs and their roles' impacts on achieving the commitments included in the QMS Policy.
- All staff interviewed felt they had the support from management and resources they needed to carry-out their jobs well (aside from staff shortages experienced and currently being worked-on).
- Excellent practices are in place at the Town to ensure sanitary conditions for water services' initial connections by verifying correct installations, flushing carried-out, and safe drinking water is provided to the customer's tap. These great practices support due diligence in the provision of safe drinking water to the Town's residents and water consumers.
- Great customer service is a priority among staff across all areas of water services.

Culture of continual improvement

- Consistently throughout the audit, improvements were noted with regards to achieving intended outcomes of drinking water system processes and programs.
- All opportunities for improvement identified in the previous internal and external audits have been verified as completed.

Risk-based decision making

- As evidence of supply chain disruptions and delays were noted, Tecumseh staff took initiative to build on existing stock levels to ensure that the parts, materials and chemicals needed for the provision of safe drinking water is assured on an ongoing basis.

2.2 Non-Conformities

No non-conformities were noted during the audit.

2.3 Opportunities for Improvement

The following is a list of opportunities for improvement noted in conducting this audit:

Reference	Opportunity for Improvement – Description
Risk assessments once every 36 mos. (El. 7)	Consider including in the QMS Schedule a reminder for the next complete risk assessment within the required timeframe (e.g. 36 months).
Personnel coverage & staff shortage (El. 11/18)	Consider describing in OP s.11 Personnel Coverage the latest provisions and Ministry requirements in the use of "Emergency Substitute Operators" as now more fully described in the ERO notices amending O. Reg. 128/04 and O. Reg. 129/04 .

3.0 Conclusions

The results of the internal audit performed for the Town of Tecumseh regarding the Tecumseh Distribution System confirm that the quality management system established is effective in conforming with the requirements of Drinking Water Quality Management Standard (DWQMS 2.0).

While opportunities for improvement are cited in this audit report, they do not undermine the positive programs and attitudes already in place among Town of Tecumseh staff.



Brigitte Roth, BES, EP(EMSLA)

Appendix "A" – Audit Plan

Internal Audit Start Date: September 30, 2022				Internal Audit End Date: October 3, 2022																				
Date	Time	Auditor	Auditee	Process / Program	DWQMS Element – <u>Standard and version: DWQMS 2.0</u>																			
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
09-30	8:00 – 4:00	BR	Doc. Info.	Desktop review	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10-03	8:00	BR	ALL	Opening Meeting	x																	x		x
10-03	8:30	BR	NB	QMS Representative responsibilities		x		x	x	x		x					x					x	x	x
10-03	10:00	BR	BD	Top Management responsibilities		x	x	x	x	x		x	x	x	x	x	x	x					x	x
10-03	11:00	BR	MH	Distribution O&M and construction activities		x			x	x		x	x	x	x	x	x	x	x	x	x			x
10-03	11:30	BR	MH	Sampling, monitoring, testing programs		x			x			x	x	x	x	x			x	x	x			x
10-03	1:00	BR	--	Audit summary	x																	x		x
10-03	2:30	BR	ALL	Closing Meeting	x																	x		x

Legend for QMS Elements: 1-Quality Management System, 2-Quality Management System Policy, 3-Commitment and Endorsement, 4-QMS Representative, 5-Document and Records Control, 6-Drinking Water System, 7-Risk Assessment, 8-Risk Assessment Outcomes, 9-Organizational Structure, Roles, Responsibilities and Authorities, 10-Competencies, 11-Personnel Coverage, 12-Communications, 13-Essential Supplies and Services, 14-Review and Provision of Infrastructure, 15-Infrastructure Maintenance, Rehabilitation and Renewal, 16-Sampling, Testing and Monitoring, 17-Measurement and Recording Equipment Calibration and Maintenance, 18-Emergency Management, 19-Internal Audits, 20-Management Review, 21-Continual Improvement

Auditee initials: NB-Nicole Bradley, BD-Brad Dupuis, MH-Mike Hardy, ALL-anyone interested.

Appendix “B” – Documents and Records

The list of documents and records were reviewed and observations made during the audit include:

- Town of Tecumseh staff interviews October 3, 2022
 - Nicole Bradley, QMS Representative
 - Brad Dupuis, Manager of Water Services
 - Mike Hardy, Acting Water Leader
- DWQMS Water Services Operational Plan (OP), dated April 26, 2022
- Schedule C – Director’s Directions for Operational Plans
- Operational plan available to the public at <https://www.tecumseh.ca/en/town-hall/resources/Documents/Water-Documents/PWES-2022-19-Attachment-3---Tecumseh-Distribution-System-DWQMS-Operational-Plan-Rev-26Apr2022.pdf>, accessed on October 3, 2022
- OP s.2 Quality Management System Policy
- QMS Policy available online, available at: <https://www.tecumseh.ca/en/living-here/water-quality.aspx> as accessed on October 3, 2022
- OP s.3 Commitments and Endorsement
- Appendix 1 – Commitment and Endorsement
- Report to council, dated April 26, 2022 (Report Number – PWES-2022-19)
- OP s.4 Drinking Water Quality Management System (DWQMS) Representative
- Annual Review of DWQMS Operational Plan on-the-job training record, dated July 19 2022.
- DWQMS Meeting minutes, dated July 13, 2022
- OP s. 5 – Document and Records Control
- Request for new or changed DWQMS document forms completed for 2022
- OP s.6 Drinking Water System
- OP s.1 Quality Management System
 - Table 1: Watermain material type and length in Tecumseh Water Distribution System
 - Map 1: Town of Tecumseh Water Distribution System – Overall Service Area
 - Map 2: Town of Tecumseh Water Distribution System – North Service Area
 - Map 3: Town of Tecumseh Water Distribution System – South Service Area
- OP s.7. Risk Assessment
- Appendix 3 – Risk Assessment
- OP s.8 Risk Assessment Outcomes
- Appendix 4 – Risk Assessment Outcomes
- Hazard analysis and critical control point worksheets
- Town of Tecumseh Annual Risk Assessment Review Meeting, dated July 27, 2022
- 36-month RA Review Meeting Minutes, dated February 2, 2022
- Town’s Critical Control Point Limit Exceedances form
- OP s.9 Organizational Structure, Roles, Responsibilities and Authorities
- OP s.10 Competencies
- On-the-Job Training forms completed for QMS tasks and reviewed with all staff for the following:
 - Review of Risk Assessment Worksheets and Review of 36-month RA Review Meeting minutes, April 13, 2022
 - Risk Assessment Review, dated August 16, 2022
- OWWCO’s Operating Listing Report accessed at <https://owwco.ca/operator-listing-report/> on September 30, 2022 and reviewed the certification statuses for the Town’s certified operators
- OP s.11 Personnel Coverage
- OP s.12 Communications

- Tecumseh’s Supplier, Contractor and Inspector Sign-off form for Water Standards and Materials Specifications, dated November 4, 2021
- OP s.13 Essential Supplies and Services
- Water Distribution System Standards and Material Specifications available on the town’s website, available at: <https://www.tecumseh.ca/en/living-here/resources/Documents/Water-Distribution-System-Standards-and-Material-Specifications-VERSION-14.pdf>, accessed on October 3, 2022
- Appendix 5 – Essential Supplies and Services List
- OP s.14 Review and provision of infrastructure
- OP s.15 Infrastructure Maintenance, Rehabilitation and Renewal
- Report to council (#PWES-2022-03) re: Approval of the 2022 Public Works & Engineering Services 2022 Capital Works Projects, dated January 25, 2022
- OP s.16 Sampling, Testing, Monitoring
- 2022-Weekly Sampling Schedule
- OP s.17 Measurement and Recording Equipment Calibration and Maintenance
- SCG Flowmetrix Verification / Calibration Reports, dated November 2021
- OP s.18 Emergency Management
- Water Services Emergency Response Plan OTJ Training – Scenario 6 – Vandalism / Terrorism resulting in AWQI, conducted on August 16, 2022
- Water Services Emergency Response Plan OTJ – Scenario 3 – Watermain Break in Distribution System, conducted on August 16, 2022
- Emergency Response Plan Review on-the-job training record, dated July 19, 2022
- OP s.19 Internal Audits
- 2021 Surveillance Audit report by NSF-ISR, dated November 25-26, 2021
- 2021 Internal Audit report by Acclaims Environmental, dated October 29, 2021
- OP s.20 Management Review
- Management Review Meeting Sign-in Sheet, dated November 23, 2021
- Management Review Commitment and Endorsement Statement, dated March 1, 2022
- Management Review Meeting, dated November 23, 2021
- Management Review Meeting minutes, dated March 1, 2022
- OP s.21 Continual Improvement
- CAR’s initiated since the last internal audit using the CAR form for internal audits, external audits and the risk assessment activity

ATTACHMENT 4

DWQMS MANAGEMENT REVIEW MEETING

OCTOBER 24, 2022

Regular Meeting of Council

Minutes

Date: Tuesday, April 26, 2022
Time: 7:00 pm
Location: Electronic meeting live streamed at:
<https://video.isilive.ca/tecumseh/live.html>.

Present:
Mayor, Gary McNamara
Deputy Mayor, Joe Bachetti
Councillor, Bill Altenhof
Councillor, Andrew Dowie
Councillor, Brian Houston
Councillor, Tania Jobin

Absent:
Councillor, Rick Tonial

Also Present:
Chief Administrative Officer, Margaret Misk-Evans
Director Public Works & Engineering Services, Phil Bartnik
Director Community Safety & Fire Chief, Wade Bondy
Director People & Culture, Michelle Bonnici
Director Technology & Client Services, Shaun Fuerth
Director Development Services, Brian Hillman
Director Financial Services & Chief Financial Officer, Tom Kitsos
Director Legislative Services & Clerk, Laura Moy
Deputy Clerk & Manager Legislative Services, Jennifer Alexander
Manager Water Services, Brad Dupuis
Fire Prevention Officer, Nicole Fields
Manager Committee & Community Services, Christina Hebert
Manager Planning Services & Local Economic Development,
Chad Jeffery
Senior Manager Recreation Services, Brett Palmer

A. Roll Call

B. Order

The Mayor calls the meeting to order at 7:00 pm.

C. Report Out of Closed Meeting

An electronic closed session was held earlier this evening at the Personnel Committee meeting at 6:00 pm in accordance with Section 239.2 (b) of the *Municipal Act*. At the meeting, Administration was given direction on employment arrangements for identified individuals.

D. Moment of Silence

The Moment of Silence is waived in light of the electronic holding of this meeting.

E. National Anthem

The National Anthem is waived in light of the electronic holding of this meeting.

F. Land Acknowledgement

We acknowledge that we are on land and surrounded by water, originally inhabited by Indigenous Peoples who have travelled this area since time immemorial. This territory is within the lands honoured by the Wampum Treaties; agreements between the Anishinaabe, Haudenosaunee, Lenni Lenape and allied Nations to peacefully share and care for the resources around the Great Lakes. Specifically, we would like to acknowledge the presence of the Three Fires Confederacy Ojibwe, Odawa, Potawatomi and Huron/Wendat Peoples. We are dedicated to honouring Indigenous history and culture while remaining committed to moving forward respectfully with all First Nations, Inuit and Métis.

G. Disclosure of Pecuniary Interest

Councillor Dowie declares a conflict with Agenda item 3a. as he is working with his employer on this matter. No other members declared a pecuniary interest.

H. Minutes**1. Regular Council Meeting - April 7, 2022****Motion: RCM - 119/22**

Moved by Deputy Mayor Joe Bachetti

Seconded by Councillor Tania Jobin

That the April 7, 2022 minutes of the Regular Council meeting as were duplicated and delivered to the members, **be adopted**.

Carried

I. Supplementary Agenda Adoption

There are no supplementary agenda items presented to Council.

J. Delegations**1. Town of Tecumseh 2022 Awards Presentation**

- Dr. Henri Breault Community Excellence Award, Anita Imperioli;
- Donald 'Donny' Massender Memorial Volunteer Award, Edward Janisse;
- Youth of the Year Award, Jocelyn Adams (2022), and Teanna Kavanagh (2021);
- Senior of the Year Award, Lynda Lacombe.

The Members of Council recognize the Award recipients for their outstanding volunteering efforts.

K. Communications - For Information**1. City of Windsor dated March 21, 2022**

Re: Official Plan Volume I Primary Plan Amendment -11646 Tecumseh Road E. from Industrial to Mixed Use

2. Ministry of Municipal Affairs and Housing dated April 6, 2022

Re: MMAH Orders under the Reopening Ontario Act

3. City of St. Catharines dated April 19, 2022

Re: St. Catharines Response to Ontario Housing Affordability Task Force Recommendations

4. Town of Gravenhurst dated April 19, 2022

Re: Year of the Garden

5. Town of Gravenhurst dated April 19, 2022

Re: Russian Sanctions Resolution

6. Office of the Fire Marshal dated April 14, 2022

Re: O. Reg. 343/22: Firefighter Certification

7. Town of Gravenhurst dated April 19, 2022

Re: Floating Accommodations Resolution

8. County of Peterborough dated April 13, 2022

Re: Provincial Request for Comments on Floating Accommodations

9. Lake of Bays dated April 12, 2022

Re: Notice of Motion - Floating Accommodations

10. Municipality of Hastings Highlands dated April 20, 2022

Re: Support for Township of Clearview's resolution in Funding Support for Infrastructure

11. Town of Halton Hills dated April 20, 2022

Re: Build it Right the First Time Resolution

Motion: RCM - 120/22

Moved by Councillor Andrew Dowie
Seconded by Councillor Bill Altenhof

That Communications - For Information 1 through 11 as listed on the Tuesday, April 26, 2022 Regular Council Agenda, **be received**.

Carried

Motion: RCM - 121/22

Moved by Councillor Brian Houston
Seconded by Councillor Bill Altenhof

That the Town of Tecumseh **support** the April 12, 2022 resolution passed by the Town of Gravenhurst in support of the Federal Government of Canada sanctions on Russian and denouncing Russia's unjustifiable war against Ukraine.

Carried

L. Communications - Action Required

There are no Communications-Action Required items presented to Council.

M. Committee Minutes

There are no Committee Minutes presented to Council.

N. Reports

1. Community & Recreation Services

a. CRS-2022-06 Pathway to Potential Funding Agreement 2022

Motion: RCM - 122/22

Moved by Councillor Tania Jobin
Seconded by Councillor Bill Altenhof

That Report CRS-2022-06 Pathway to Potential Agreement 2022 **be received**;

And that The Corporation of the Town of Tecumseh **enter** into an Agreement with The Corporation of the City of Windsor for the Pathway to Potential Program for budget year 2022, at no cost to the Town;

And further that By-Law 2022-030 authorizing the Mayor and the Clerk to execute a Service Agreement between The Corporation of the Town of Tecumseh and The Corporation of the City of Windsor for the Pathway to Potential Program (2022) **be adopted**.

Carried

- b. CRS-2022-07 Optimist Club's Victoria Day Weekend Fireworks 2022

Motion: RCM - 123/22

Moved by Councillor Tania Jobin

Seconded by Councillor Bill Altenhof

That the Town of Tecumseh **pay** the cost for enhanced OPP service during the 43rd annual Victoria Day Fireworks event to be held on May 21 or 22, 2022, estimated to be in the order of \$1,500.00;

And that this cost **be funded from** the Police Contracts budget.

Carried

- c. CRS-2022-08 Taste of Tecumseh Festival 2022

Motion: RCM - 124/22

Moved by Councillor Tania Jobin

Seconded by Councillor Bill Altenhof

That the Optimist Club of St. Clair Beach **be authorized** to sell and serve alcoholic beverages for consumption by patrons at Lakewood Park from Friday, June 17, 2022 through to and including Saturday, June 18, 2022, subject to compliance with the provisions of the Town's Municipal Alcohol Risk Management Policy 31 for the purposes of hosting the 2022 Taste of Tecumseh Festival;

And that relief **be granted** from Noise By-law No. 2002-07, as amended, in order to permit the Optimist Club of St. Clair Beach to operate loud speakers or sound amplifying equipment during the 2022 Taste of Tecumseh Festival for the purposes of musical entertainment and event announcements on Friday, June 17, 2022 and Saturday, June 18, 2022 from 5:00 p.m. to 1:00 a.m.

Carried

2. Development Services

- a. DS-2022-12 Zoning By-law Amendment 1401-1429 Lesperance Road
Results of Public Meeting and Final Recommendations

Motion: RCM - 125/22

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Brian Houston

That a by-law having the effect of amending the Tecumseh Zoning By-law 1746 by rezoning a 0.29 hectare (0.71 acre) parcel of land situated on the southwest corner of the Lesperance Road/Arbour Street intersection (1401-1429 Lesperance Road) from “Residential Zone 2 (R2)” and “Residential Zone 2 (R2-25)” to “Residential Zone 3 (R3-21)” in order to facilitate the construction of a residential development consisting of three, 2.5 storey, six-unit dwellings and establish site-specific lot, building and yard provisions in keeping with DS-2022-12, **be adopted**.

Carried

- b. DS-2022-13 Zoning By-law Amendment, D19 12322RIV, 12322 Riverside Drive, Scheduling of a Public Meeting

Motion: RCM - 126/22

Moved by Councillor Tania Jobin
Seconded by Councillor Brian Houston

That the scheduling of a public meeting, on May 24, 2022 at 5:30 p.m., in accordance with the *Planning Act*, for an application seeking to amend Zoning By-law 1746 by rezoning a 0.12 hectare (0.29 acre) parcel of land situated on the north side of Riverside Drive (12322 Riverside Drive), approximately 45 metres (147 feet) east of its intersection with Lesperance Road, in order to permit the conversion of an existing accessory structure into an Additional Residential Unit, in accordance with subsection 4.2.2 viii) of the Tecumseh Official Plan, **be authorized**.

Carried

- c. DS-2022-14 Zoning By-law Amendment, Condition of Consent Application B-01-22, 6780 Holden Road, Scheduling of a Public Meeting

Motion: RCM - 127/22

Moved by Councillor Brian Houston
Seconded by Councillor Andrew Dowie

That the scheduling of a public meeting, to be held on Tuesday, May 24, 2022, at 6:00 p.m., in accordance with the *Planning Act* for a zoning by-

law amendment application submitted for a 20.68 hectare (51.1 acre) parcel of land situated on the east side of Holden Road, approximately 1.1 kilometres north of its intersection with County Road 8 (6780 Holden Road), seeking to amend Zoning By-law 85-18 by:

- i. rezoning the 0.55 hectare (1.35 acre) non-farm related residential lot (6780 Holden Road), from “Agricultural Zone (A)” to a site specific “Agricultural Zone (A-37)” in order to establish a maximum lot area of 0.55 hectares (1.35 acres); and
- ii. rezoning the 20.13 hectare (49.7 acre) agricultural parcel from “Agricultural Zone (A)” to a site specific “Agricultural Zone (A-38)” in order to prohibit a residential dwelling from being constructed

all of which is in accordance with Condition No. 5 of Severance Application B-01-22, **be authorized**.

Carried

- d. DS-2022-15 Renewal of Municipal Housing Facility By-law, Ontario Priorities Housing Initiatives, Tecumseh Participation

Motion: RCM - 128/22

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Tania Jobin

That By-law 2022-032 **be adopted** having the effect of renewing the Municipal Housing Facilities By-law for the Town of Tecumseh, all of which is in accordance with the requirements of the 2021 Rental Housing Component of the Ontario Priorities Housing Initiatives (OPHI) program, PBS-2021-42 and DS-2022-15.

Carried

- e. DS-2022-16 Tecumseh Road Main Street Community Improvement Plan (CIP), Review of Grant Programs

Motion: RCM - 129/22

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Bill Altenhof

That Council **receive** Report DS-2022-12, entitled “Tecumseh Road Main Street Community Improvement Plan (CIP): Summary of Committed Grant Program Funds and Private Development Since CIP Adoption”;

And that Council **discontinue support** for the current Tecumseh Road Main Street CIP Building and Property Improvement Grant (BPIG) Program for grant applications received after April 26, 2022;

And further that Administration **be directed** to report back with a revised BPIG Program that establishes criteria for the purpose of providing BPIG grants to those residential development proposals that meet specific affordability criteria over a specified period of time.

Carried

3. Legislative & Clerk Services

- a. LCS-2022-12 Court of Revision Appointment - Lachance Drain

Motion: RCM - 130/22

Moved by Councillor Bill Altenhof
Seconded by Councillor Brian Houston

That Councillor Brian Houston **be appointed** to the Court of Revision for the City of Windsor respecting any appeals on the Drainage Report for the New Drain Alignment of a portion of the Lachance Drain in the City of Windsor and Town of Tecumseh, as prepared by Dillon Consulting, dated March 25, 2022.

And that LCS-2022-12 entitled "Court of Revision Appointment – Lachance Drain" **be received**.

Carried

- b. LCS-2022-14 National AccessAbility Week

Motion: RCM - 131/22

Moved by Councillor Brian Houston
Seconded by Councillor Tania Jobin

That Report LCS-2022-14 entitled "National AccessAbility Week 2022", **be received**.

Carried

4. Public Works & Engineering Services

- a. PWES-2022-15 Appointment of Engineer - Cunningham Drain

Motion: RCM - 132/22

Moved by Councillor Tania Jobin

Seconded by Councillor Bill Altenhof

That Dillon Consulting Limited **be appointed** drainage engineer to make an examination of the Cunningham Drain drainage area as submitted by the landowner in the "Notice of Request for Drainage Improvement" dated February 3, 2022;

And that a Drainage Report **be prepared** in accordance with Section 78 of the *Drainage Act*, including provisions for future maintenance.

Carried

- b. PWES-2022-19 Drinking Water Quality Management System Operational Plan, Revision Date April 26, 2022

Motion: RCM - 133/22

Moved by Councillor Tania Jobin

Seconded by Deputy Mayor Joe Bachetti

That Tecumseh Town Council **endorse and commit to** the Town of Tecumseh Distribution System, Drinking Water Quality Management System Operational Plan, Revision Date: April 26, 2022.

Carried

- c. PWES-2022-20 Request to Consider Drainage Petition and Appointment of Engineer - Shields Street

Motion: RCM - 134/22

Moved by Councillor Andrew Dowie

Seconded by Councillor Brian Houston

That the Petition for Drainage Works for Shields Street dated March 3, 2022 as submitted by the Road Authority in accordance with Section 4(1) of the *Drainage Act*, **be received**;

And that Dillon Consulting Limited **be appointed** drainage engineer in accordance with Section 8(1) of the *Drainage Act* to make an examination of the area requiring drainage and to prepare a Preliminary Report in accordance with Section 10(1) of the *Drainage Act*.

Carried

d. PWES-2022-22 Asphalt Paving Tender Award

Motion: RCM - 135/22

Moved by Councillor Brian Houston
Seconded by Councillor Tania Jobin

That the low tender from Coco Paving Inc. in the amount of \$997,750 plus HST, for the 2022 Asphalt Paving Tender, **be approved** and that the Mayor and Clerk **be authorized** to enter into a contract for the services with Coco Paving Inc.

Carried

e. PWES-2022-23 Tar and Chip Tender Award

Motion: RCM - 136/22

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Bill Altenhof

That the sole tender from Shepley Road Maintenance Ltd. in the amount of \$209,690 plus HST for the 2022 Tar and Chip Tender, **be approved**;

And that the Mayor and Clerk **be authorized** to enter into contract for the services with Shepley Road Maintenance Ltd.

Carried

O. By-Laws

1. By-Law 2022-028

Being a by-law to levy a special charge of the Business Improvement Area and to provide for its collection for the year 2022

2. By-Law 2022-029

Being a bylaw to provide for the repair and improvements to the Lachance Drain

3. By-Law 2022-030

Being a by-law to authorize the execution of a Service Agreement between The Corporation of the Town of Tecumseh and the City of Windsor to administer funds for the Pathway to Potential Program for the year 2022.

4. By-Law 2022-031

Being a by-law to provide for the adoption of tax rates, area rates and additional charges for Municipal, County and Education purposes for the year 2022

5. By-Law 2022-032

Being a by-law to provide for Municipal Housing (Municipal Housing Facilities By-Law)

6. By-Law 2022-033

Being a by-law to amend By-law 1746, the Town's Comprehensive Zoning By-law for those lands in the former Town of Tecumseh.

(Planning File: D19 1415LES – 1401-1429 Lesperance Road)

7. By-Law 2022-034

Amendment No. 3 to the Town of Tecumseh Official Plan

(Planning File: D19 HO – Home Hardware – 1613 Lesperance Road)

8. By-Law 2022-035

Being a by-law to amend By-law 85-18, the Town's Comprehensive Zoning By-law for those lands in the former Township of Sandwich South.
(Planning File: D19 HO – Home Hardware – 1613 Lesperance Road)

Motion: RCM - 137/22

Moved by Deputy Mayor Joe Bachetti
Seconded by Councillor Brian Houston

That By-Law 2022-28 being a by-law to levy a special charge of the Business Improvement Area to provide for its collection for the year 2022;

That By-Law 2022-029 being a by-law to provide for the repair and improvement of the Lachance Drain;

That By-Law 2022-030 being a by-law to authorize the execution of a Service Agreement between The Corporation of the Town of Tecumseh and the City of Windsor to administer funds for the Pathway for Potential Program for the year 2022;

That By-Law 2022-031 being a by-law to provide for the adoption of tax rates, area rates and additional charges for Municipal, County and Education purposes for the year 2022;

That By-Law 2022-032 being a by-law to provide for Municipal Housing (Municipal Housing Facilities By-Law);

That By-Law 2022-033 being a by-law to amend By-law 1746, the Town's Comprehensive Zoning By-law for those lands in the Former Town of Tecumseh (1401-1429 Lesperance Road);

That By-Law 2022-034 Amendment No. 3 to the Town of Tecumseh Official Plan (Home Hardware -1613 Lesperance Road);

That By-Law 2022-035 being a by-law to amend By-Law 85-18, the Town's Comprehensive Zoning By-law for those lands in the former Township of Sandwich South. (Home Hardware - 1613 Lesperance Road).

Be given first and second reading.

Carried

Motion: RCM - 138/22

Moved by Councillor Bill Altenhof

Seconded by Councillor Brian Houston

That By-Law 2022-28 being a by-law to levy a special charge of the Business Improvement Area to provide for its collection for the year 2022;

That By-Law 2022-030 being a by-law to authorize the execution of a Service Agreement between The Corporation of the Town of Tecumseh and the City of Windsor to administer funds for the Pathway for Potential Program for the year 2022;

That By-Law 2022-031 being a by-law to provide for the adoption of tax rates, area rates and additional charges for Municipal, County and Education purposes for the year 2022;

That By-Law 2022-032 being a by-law to provide for Municipal Housing (Municipal Housing Facilities By-Law);

That By-Law 2022-033 being a by-law to amend By-law 1746, the Town's Comprehensive Zoning By-law for those lands in the Former Town of Tecumseh (1401-1429 Lesperance Road);

That By-Law 2022-034 Amendment No. 3 to the Town of Tecumseh Official Plan (Home Hardware -1613 Lesperance Road);

That By-Law 2022-035 being a by-law to amend By-Law 85-18, the Town's Comprehensive Zoning By-law for those lands in the former Township of Sandwich South. (Home Hardware - 1613 Lesperance Road).

Be given third and final reading.

Carried

P. Unfinished Business

1. April 26, 2022

The Members receive the Unfinished Business listing for Tuesday, April 26, 2022.

Q. New Business

Town Hall Parking Lot

A request to repair a crack in the pavement at the back parking lot of Town Hall.

R. Motions

1. Confirmatory By-Law 2022-036

Motion: RCM - 139/22

Moved by Councillor Bill Altenhof
Seconded by Councillor Brian Houston

That By-Law 2022-036 being a by-law to confirm the proceedings of the Tuesday, April 26, 2022, regular meeting of the Council of The Corporation of the Town of Tecumseh **be given** first, second, third and final reading.

Carried

S. Notices of Motion

There are no Notices of Motion presented to Council.

T. Next Meeting

Thursday, May 5, 2022

4:30 pm Special Council Meeting - Strategic Priorities

Tuesday, May 10, 2022

4:30 pm Special Council Meeting - Clerk's Service Delivery Review

7:00 pm Regular Council Meeting

U. Adjournment

Motion: RCM - 140/22

Moved by Councillor Bill Altenhof

Seconded by Councillor Brian Houston

That there being no further business, the Tuesday, April 26, 2022 meeting of the Regular Council **be adjourned** at 9:21 pm.

Carried

Gary McNamara, Mayor

Laura Moy, Clerk

ATTACHMENT 5

DWQMS MANAGEMENT REVIEW MEETING

OCTOBER 24, 2022

SIGN-IN SHEET

PURPOSE: TOWN OF TECUMSEH ANNUAL RISK ASSESSMENT REVIEW MEETING

DATE: WEDNESDAY, JULY 27, 2022

NAME (PRINT)	POSITION	SIGNATURE
BRAD DUPUIS	MANAGER, WATER SERVICES / ORO	<i>Bradley Dupuis</i>
NICOLE BRADLEY	DWQMS REPRESENTATIVE / WATER OPERATOR	<i>Nicole Bradley</i>
MIKE HARDY	ACTING – LEAD WATER OPERATOR	<i>M Hardy</i>

Annual Risk Assessment Review

Prepared By: Nicole Bradley

Discussion Topics / Notes				
Date:		July 27, 2022		
Attendees:		Brad Dupuis (DP), Nicole Bradley (NB), Mike Hardy (MH)		
Location:		1189 Lacasse – Meeting Room		
Topics / Notes:				
Topic	Topic Description	Notes	Who Responsible/ Code	Timing / Status
1	<u>Hazard / Risk Events</u> i) review RA worksheets ii) consider currency and validity	A) Current RA worksheets reviewed for the Tecumseh Distribution system. B) Discussion of all potential hazardous events listed. - Review of RA worksheets and discussions were completed. See Topic 4 for more details.	NB / BD	Done Jul 27/22
2	<u>Control Measures</u> i) review control measures for RA hazards / risk events ii) consider currency and validity	A) Current control measures for RA hazards reviewed for the Tecumseh Distribution System. B) Discussion of control measures listed. -Review of control measures and discussions were completed. See Topic 4 for more details.	NB / BD	Done Jul 27/22
3	<u>CCP Analysis</u> i) review existing CCP's and CCL's ii) consider currency and validity	A) Current CCP's and CCL's for Tecumseh reviewed. B) Discussion of CCP's and CCL's listed. -Review of CCP's and CCL's and discussion were completed. See Topic 4 for more details.	NB / BD	Done Jul 27/22
4	<u>Notes & Questions</u>	** A comprehensive review and revision of RA worksheets, hazardous events, control measures, CCP's and CCL's was completed during the 36 month RA review which occurred on February 2, 2022. ** Hazard / Risk Events - From the 36 month review (2) CAR's were created with respect to RA worksheets & SOP's. a) <u>2022-CAR-01</u> : Creation of new SOP's to help strengthen RA worksheet #2: <i>Vandalism /Tampering of Water Infrastructure</i> and RA worksheet #15: <i>Extreme cold/heat/long-term impacts of climate change</i> . -the SOP's are being created and undergoing review with the lead operator and the DWQMS	NB/MH	Dec 31/22

Annual Risk Assessment Review

Prepared By: Nicole Bradley

		<p>Rep. Once completed they will be given to the Manager, Water Services/ORO for acceptance.</p> <p>b) <u>2022-CAR-02</u>: the addition of Cybersecurity to the RA outcome worksheets.</p> <p>-new RA worksheet (#19) was created for the potential hazardous event of Cybersecurity.</p> <p>- It will be reviewed with the Water operators during the Water Services Emergency Response Plan annual review</p> <p>Control Measures</p> <p>- Review of control measures for new RA worksheet #19: <i>Cybersecurity</i> was completed under 2022-CAR-02.</p> <p>CCP & CCL</p> <p>-Review of CCL deviation tracking log.</p> <p>-CCL deviation tracking log was reviewed – No deviations thus far for 2022.</p> <p>General</p> <p>Note: the new “<i>Potential Hazardous Events for Municipal Residential Drinking Water Systems to consider in the DWQMS Risk Assessment</i>” was utilized during the review of the RA worksheets and will be uploaded into the appropriate, corresponding documents.</p>	<p>NB</p> <p>NB</p> <p>NB</p>	<p>Done Jul 14/22</p> <p>Aug 19/22</p> <p>Done Jul 27/22</p>
5	<u>Meeting Adjournment</u>	Meeting adjourned at 10:30AM.		

Risk Assessment Team Members:

QMS Representative Nicole Bradley

Manager, Water & Wastewater/ORO Brenda Shaw

Lead Water Operator (acting) Mike du

Date

July 28/22

July 28/22

Aug 2 2022



Town of Tecumseh Distribution System

Drinking Water Quality Management System

Operational Plan

Water Services
Revision Date: February 28, 2023

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Town of Tecumseh Distribution System Drinking Water Quality Management System Operational Plan

Introduction

Quality Management Systems and Standards have been widely used in North America since the early 1950's. In 1984, the International Organization for Standardization (ISO) released the first version of the ISO 9001 Quality Management System Standard, which is used worldwide.

As recommended by Justice Dennis O'Connor, in Part 2 of the [Walkerton Inquiry](#), the government of Ontario has implemented a licensing program for municipal drinking water systems. The program requires owners and operating authorities of drinking water systems to incorporate the concepts of quality management into water system operation and maintenance. In response to this recommendation, the Ministry of the Environment, Conservation and Parks developed the [Drinking Water Quality Management Standard](#), which sets out the framework for the development of a Quality Management System. Owners and operating authorities of a drinking water system are mandated to implement a Quality Management System by the provincial government through the [Safe Drinking Water Act, 2002](#).

The Town of Tecumseh Drinking Water Quality Management System Operational Plan was first endorsed and committed to by Council in 2008. The Operational Plan provides an understanding of the drinking water system, the roles and responsibilities of the owner and operational staff, procedures to operate and maintain the drinking water system, and a commitment and endorsement by the owner to provide safe drinking water to consumers.

The Operational Plan provides a foundation for consistency, safety, and efficiency, as well as meeting legislative and regulatory requirements.

Element 1 Quality Management System

This Operational Plan documents the Drinking Water Quality Management System for The Corporation of Town of Tecumseh Water Distribution System. The Corporation of the Town of Tecumseh Water Distribution System is owned and operated by The Corporation of the Town of Tecumseh. The Drinking Water Quality Management System (DWQMS) for The Corporation of the Town of Tecumseh covers the transmission and distribution of potable drinking water to consumers within the Town of Tecumseh.

Under the terms and conditions of the 2004 Water Agreement executed among the Windsor Utilities Commission (WUC), City of Windsor and The Corporation of the Town of Tecumseh, the Tecumseh water distribution system (formerly north and south Tecumseh water distribution systems) is currently supplied by the Windsor Water System.

Treated potable drinking water is purchased from the Windsor Utilities Treatment Plant, which is owned by the Windsor Utilities Commission (WUC) and is a separately held entity managed by ENWIN Utilities, which operates and manages the production and distribution of potable water.

The potable water enters The Corporation of the Town of Tecumseh Water Distribution System through 12 locations bordering the City of Windsor, Town of LaSalle and the Town of Tecumseh. Each location is metered and monitored using a Supervisory Control and Data Acquisition system (SCADA). Storage for equalization and peak hour flow of water for Tecumseh is the responsibility of the Windsor Utilities Commission (WUC).

The Corporation of the Town of Tecumseh, in turn, supplies potable drinking water to the Town of Lakeshore at 4 locations all bordering Manning Road: Scott Side Rd; County Rd. 42; Little Baseline; and Amy Croft.

The Corporation of the Town of Lakeshore owns and operates the production and distribution facilities of potable water within their boundary. The Corporation of the Town of Lakeshore is a fully owned local government and is represented by elected officials of the Town of Lakeshore.

The Corporation of the Town of Tecumseh is connected with the Town of LaSalle at one location bordering Howard Avenue. The Corporation of the Town of LaSalle owns and operates the distribution facilities of potable water within their boundary. Town of LaSalle's treated potable drinking water is purchased from the Windsor Utilities

Treatment Plant, which is owned by the Windsor Utilities Commission (WUC) and is a separately held entity managed by ENWIN Utilities, which operates and manages the production and distribution of potable water. The Corporation of the Town of LaSalle is a fully owned local government and is represented by elected officials of the Town of LaSalle.

Additional details about the Town of Tecumseh Water Distribution System are included in [Element 6 – Drinking Water System](#).

Element 2 Quality Management System Policy

The Corporation of the Town of Tecumseh is committed to supplying a safe, consistent, drinking water supply while maintaining strict adherence to all applicable legislative and regulatory requirements. The Corporation of the Town of Tecumseh will strive to achieve these goals through the implementation of a management system and staff competency to our consumers.

The municipal owners, management and the employees of The Corporation of the Town of Tecumseh who are directly involved in the supply of drinking water, share in the responsibilities of implementing, maintaining, and contributing to the continual improvement of the Drinking Water Quality Management System (DWQMS).

The Quality Management System Policy is available on the Town's website at <https://www.tecumseh.ca/en/living-here/water-quality.aspx>.

Element 3 Commitments and Endorsement

This Operational Plan has been reviewed and approved by The Corporation of the Town of Tecumseh. The purpose of this document is for the planning, operation, and maintenance of The Corporation of the Town of Tecumseh Water Distribution System.

This document will be reviewed and approved by:

- **Municipal Owner/Operating Authority:** Mayor and Council
- **Top Management:** Chief Administrative Officer, Director of Public Works and Engineering Services and the Manager, Water Services/ORO (Overall Responsible Operator)

Top Management and Owner endorsement includes the following commitments:

- a) ensuring that a Quality Management System is in place that meets the requirements of the Drinking Water Quality Management Standard,
- b) ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,
- c) communicating the Quality Management System according to the procedure for communications, and
- d) determining, obtaining or providing the resources needed to maintain and continually improve the Quality Management System.

The DWQMS Representative will keep the DWQMS document up-to-date and promote continual improvement. All recommended changes are to be approved by Municipal Owner/Operating Authority resolution (refer to [Appendix 1 - Commitments and Endorsement](#)).

Element 4 Drinking Water Quality Management System (DWQMS) Representative

The Corporation of the Town of Tecumseh has designated a DWQMS Representative and an alternate DWQMS Representative:

DWQMS Representative

Name: Nicole Bradley

Position: DWQMS Representative/Water Distribution Operator

Alternate DWQMS Representative

Name: Brad Dupuis

Position: Manager, Water Services/ORO or designate

The DWQMS Representative is responsible for the following:

- Ensures that processes and procedures needed for the DWQMS are established and maintained,
- Reports to Top Management on the performance of the DWQMS and any need for improvement, as needed, or during the Management Review meetings,
- Ensures that current versions of documents required by the DWQMS are being used at all times, and reviews DWQMS documentation and record control,
- With members of Top Management, ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the drinking water system, and
- Promotes awareness of the DWQMS throughout Water Services and The Corporation of the Town of Tecumseh.

Element 5 Document and Records Control

This procedure is applicable to the following DWQMS documents:

- Operational Plan and associated procedures
- DWQMS Forms
- Equipment Manuals
- As Built Drawings
- Applicable drinking water regulations (e.g. [O. Reg. 170/03](#), [O. Reg. 128/04](#), [O.Reg. 169/03](#))

5.1 Creating New or Updating Existing Documents

The need for document changes or for new documents may be identified through Audits, Management Reviews, DWQMS Committee or staff. Any employee of Water Services may request a change to an existing DWQMS document. The request must be made in writing, dated and submitted to the DWQMS Representative.

The request must include the following information:

- Reason for the new or changed document (one of the following needs to apply):
 - Is it required by the DWQMS?
 - Will it enhance process control?
 - Can it reduce risk?
 - Will it support regulatory requirements?
 - Will it improve operational efficiency?
- A proposed document change or new document content when applicable to Water Services or the Operational Plan.

5.2 Proposed Document Change or New Document Content

The requester shall develop the new/changed document and submit it to the DWQMS Representative for review.

The DWQMS Committee shall review the document, make any changes as required, and approve changes if applicable.

5.3 Approving Documents

- DWQMS-related documents may be approved by Municipal Owner; Operating Authority's Top Management: CAO, Director of Public Works & Engineering Services, Manager, Water Services/ORO or designate; or the DWQMS Representative.
- DWQMS documentation shall be stored at the Water Services office or stored in document control software.
- Water Services staff has read-only access to the electronic version of the documentation. The Manager, Water Services/ORO or designate, DWQMS Representative and Clerical Staff have access rights to manage and/or edit the electronic version of DWQMS-related documents.
- The DWQMS Representative is responsible to ensure that new or changed documents are communicated and /or distributed to the appropriate staff members.
- Documents shall be collected, archived, stored, and disposed of as per legislation under the [Safe Drinking Water Act 2002](#) and The Corporation of the Town of Tecumseh Records Retention By-law, [By-law 2018-39](#).

5.4 Reviewing Documents

The Operational Plan and procedures shall be reviewed by the DWQMS Committee for applicability and relevance.

5.5 Document Availability

- The current copy of the Operational Plan, procedures and associated documents are retained electronically on The Corporation of the Town of Tecumseh network servers and at the Water Services office.
- Original sets of equipment manuals / specifications and drinking water regulations are kept at the Water Services office.
- Copies of As-Builts are stored at the Water Services office and electronically on The Corporation of the Town of Tecumseh network servers.

5.6 DWQMS Records Control

This procedure is applicable to all records and documents that demonstrate conformance to the DWQMS and compliance to legislative requirements:

- **DWQMS records and documents** include (and are not limited to) Council Resolutions (for Operational Plan endorsement); risk assessment outcomes, training information, evidence of communications, procurement-related (e.g. specifications for essential supplies and services), evidence of infrastructure reviews, evidence of equipment maintenance and calibration, emergency preparedness, results of internal and external audits, and management review meetings.
- **Compliance records and documents** demonstrate compliance with legislative requirements and include (and are not limited to) the records required by the Safe Drinking Water Act and related regulations (e.g. [O.Reg. 170/03](#), [O.Reg. 128/04](#), [O.Reg. 169/03](#), etc.), the [Municipal Drinking Water Licence](#) (and its parts, including: [Drinking Water Works Permit](#), approved [Financial Plan](#), [Accreditation](#)) and all related records (e.g. annual reports, Operator certification, sampling and testing, forms documenting changes to the distribution system, etc.).
- **Records are stored** in such a manner as to prevent their deterioration. All records are filed and/or archived (as per retention table) at the Water Services office and The Corporation of the Town of Tecumseh network servers.

5.7 Records Management

Records are stored and protected to ensure that they are kept legible, readily identifiable, and are retrievable when they are required by personnel of the Town of Tecumseh Drinking Water System.

Paper records are maintained on-site in file folders, filing cabinets, binders, or by other means deemed acceptable by individual responsible for the records. Electronic records are stored on the organization's network, and within the Town of Tecumseh's Management System Software. Regularly scheduled back-ups help protect electronic information from damage or loss.

All employees have access to the files appropriate to their roles and responsibilities. The Management System Software is also used to facilitate access to and retrieval of the required information.

Minimum record retention periods are determined according to appropriate legislative and regulatory requirements. Retention periods for records not governed by standards or legislation are established through the by-laws of the Town of Tecumseh. Records specific to the Town of Tecumseh Water Distribution System have been documented on a Record Retention Table. The records will be disposed of by either recycling, shredding, or in the case of electronic documentation archival and deletion.

Element 6 Drinking Water System

6.1 System Overview

[Section 1](#) of this Operational Plan provides a general overview of the Town of Tecumseh's Water Distribution System and its connections to other area Municipalities' water systems with different Owners and Operating Authorities (refer to [Appendix 2 - the overall service area is identified on Map 1](#)).

The Town is responsible for its own distribution system within the boundaries of Tecumseh and is responsible for any new storage works that may be required to supply its fire flow of water. The Town of Tecumseh also has a 4,546m³ elevated water tower, located in the North end of Tecumseh. This elevated water tower is monitored by Windsor Utilities Commission (WUC) and the Town of Tecumseh through SCADA (Supervisory Control and Data Acquisition system).

The north Tecumseh water service area (north of Highway 401) includes the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet and rural areas north of Highway 401; and is supplied from the Windsor Water System through metering facilities at the Town boundary on Dillon Drive, McNorton Street, Tecumseh Road, Mulberry Drive, County Road 42, Baseline Road and, in the future, on Intersection Road.

The south Tecumseh water service area (south of Highway 401) includes urban settlement areas of Oldcastle Hamlet, Maidstone Hamlet and rural areas south of Highway 401; and is supplied from the Windsor Water System through existing metering facilities at the Town boundary in Oldcastle Hamlet on the 8th Concession Road, County Road 46, Walker Road and North Talbot Road. The south Tecumseh water service area is also supplied from the Town of LaSalle through a connection at Howard Avenue.

6.2 Service Areas and Water Distribution System Components

a) North Tecumseh Water Service Area

The distribution system in the north Tecumseh water service area is operated by The Corporation of the Town of Tecumseh and consisting of watermains ranging in size from 100 mm (4") to 600 mm (24") in diameter (refer to [Appendix 2- the north service area boundary is identified on Map 2](#)).

The feeder mains on Dillon Drive, McNorton Street, Tecumseh Road and Mulberry Drive extend from the Town boundary through the centre of Tecumseh (Planning Area) to the elevated water tower on Tecumseh Road, and are interconnected through a new 300 mm diameter feeder main on Lesperance Road and the existing 400 mm diameter trunk watermain on Lacasse Boulevard. The 600 mm diameter feeder main on County Road 22 extends from the Town boundary to Manning Road (County Road 19) and is connected to the 400 mm diameter feeder main on Tecumseh Road. The 600 mm diameter feeder main on County Road 42 extends from the Town Boundary to Lesperance Road and is connected to the 300 mm diameter distribution mains on St. Alphonse Avenue and on Lesperance Road.

b) South Tecumseh Water Service Area

The distribution system in the south Tecumseh water service area is operated by The Corporation of the Town of Tecumseh consisting of water mains ranging in size from 100 mm (4") to 600 mm (24") in diameter (refer to [Appendix 2 - the south service area boundary is identified on Map 3](#)).

The feeder mains on 8th Concession Road and County Road 46 supply the northeast end of Oldcastle Hamlet. The 300 mm diameter feeder main on Walker Road and North Talbot Street connect to the 300 mm diameter trunk watermain on Talbot Road (Highway 3) which supplies Oldcastle Hamlet, the rural areas south of Highway 401, and Maidstone Hamlet.

c) Consolidated Water Distribution System

The existing water distribution system will be operated as a single distribution system with connections through the Windsor Supply System. In the future, the Town intends to extend trunk water mains from County Road 42 to connect to the south service area to improve system performance. A copy of the approved Water and Wastewater Master Plan can be viewed at the Water Services office (refer to [Appendix 2 – Table 1 Watermain Material Type and Length in Tecumseh Water Distribution System](#)).

d) Sampling and Monitoring Disinfectant Residuals

Tecumseh Water Distribution System staff sample and monitor disinfectant residuals on a regular basis through regulatory sampling programs and during response activities related to consumer water quality calls.

Staff also carry-out work to improve disinfectant residuals within the distribution system through:

- regular maintenance programs (e.g. flushing);
- the practice of cycling water in the elevated water tower (reducing water age);
- optimizing distribution system flows (e.g. close-looping and eliminating system dead ends); and
- responding in a timely manner to watermain breaks (and carrying out proper disinfection in accordance with the province's [Watermain Disinfection Procedure](#)).

Element 7 Risk Assessment

7.1 Risk Assessment Team

The Risk Assessment Team shall be no less than a three-member forum and will be made up of the Manager, Water Services/ORO or designate in conjunction with the Lead Water Distribution Operator and one other Water Distribution Operator.

The Risk Assessment Team shall meet once a calendar year to review the validity of the assumptions and the currency of the information used in the risk assessment. A comprehensive risk assessment will be done every thirty-six months unless changing conditions indicate that it should be done more frequently. In each of the risk assessment update activities, the risk assessment outcomes are presented to Top Management at Management Review for their official review and approval.

The Risk Assessment Team considers the Ministry's ["Potential Hazardous Events for Municipal Drinking Water Systems"](#) (dated April 2022) in the risk assessment process and is to identify and assess:

- Potential hazardous events and associated hazards as listed in the Ministry's document, and any additional potential hazardous events,
- The risks with the occurrence of potential hazardous events which could affect the water system,
- The ranking of hazardous events according to the associated risk,
- The control measures to address the potential hazards and hazardous events,
- The Critical Control Points and their respective Critical Control Limits,
- The associated procedures and/or processes to monitor Critical Control Limits,
- The procedures to respond to deviations from the Critical Control Limits,
- The procedures for reporting and recording deviations from the Critical Control Limits, and
- Consideration of the reliability and redundancy of equipment.

Element 8 Risk Assessment Outcomes

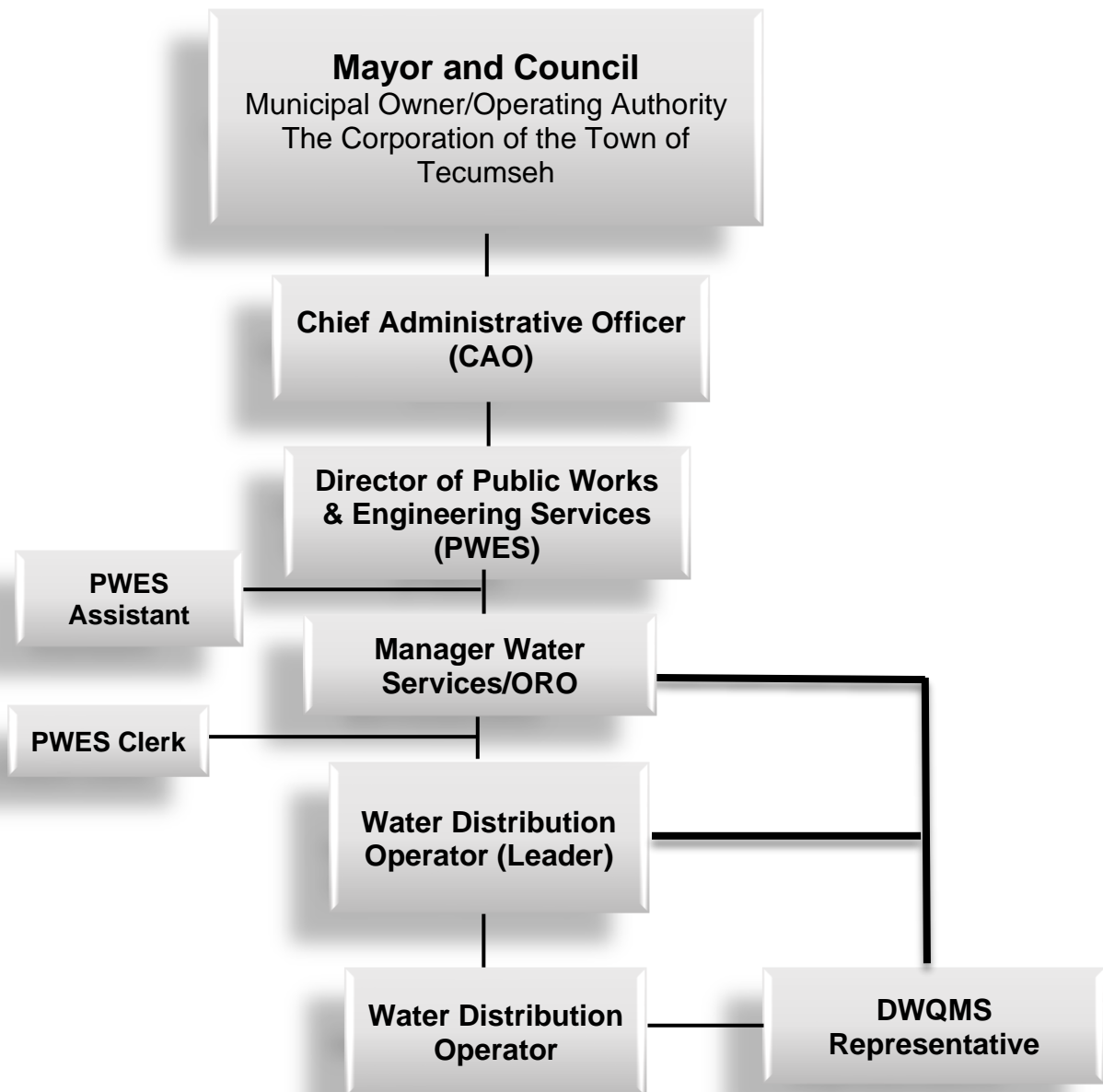
The risk assessment will be facilitated by developing and completing Risk Assessment Worksheets. As the Risk Assessment Team conducts this assessment, it will document the results of each step of the risk assessment procedure. The risk assessment process is an ongoing activity.

The DWQMS Representative shall ensure that relevant information is circulated to all members of the Risk Assessment Team; and update the outcomes of each risk assessment activity (whether it is for the calendar year or thirty-six-month update).

- [Refer to Appendix 3 – Risk Assessment](#)
- [Refer to Appendix 4 – Risk Assessment Outcomes](#)

Element 9 Organizational Structure, Roles, Responsibilities and Authorities

9.1 The Corporation of the Town of Tecumseh Water Services Organizational Chart



9.2 Operational Roles, Responsibilities and Authorities

a) Municipal Owner/Operating Authority (Mayor and Council)

- Responsibilities

In addition to ensuring the provision of a safe and reliable municipal water supply to the serviced areas, The Corporation of the Town of Tecumseh Council is also responsible for:

- Complete legal oversight of The Corporation of The Town of Tecumseh Water Distribution System and the DWQMS,
- Ultimate responsibility for the provision of safe potable drinking water under the [Safe Drinking Water Act 2002](#),
- Ensures compliance with applicable legislation and regulations,
- Participating in Council meetings and Council committee meetings and meetings of other bodies to which they are appointed by the Council,
- Obtaining and giving due consideration to information about the operation or administration of the Municipality from the Chief Administrative Officer, (CAO) and from other appropriate Town staff,
- Evaluating the policies and programs of the Municipality such as bylaw enforcement, taxation, property permits and inspections, planning, public works (roads, water, and sewer), parks and recreation, fire services, police services, and
- Endorsing the DWQMS and providing a representative to participate on the DWQMS Management Review Committee.

- Authorities

On behalf of the electorate of The Corporation of the Town of Tecumseh, and in accordance with the Municipal Act, Council is authorized to:

- Implement Drinking water system and DWQMS improvements or changes,

- Authorize resources to improve or change the drinking water system and DWQMS,
- Approve and review policies for the management and operation of Town assets,
- Review, revise, and approve proposed and existing bylaws, expenditures, user fees, taxation rates,
- Hire, evaluate, discipline, or terminate Town Management Staff and contracted service providers, and
- Provide financial, administrative authority related to the distribution of safe drinking water.

b) Top Management

Top Management Management is comprised of the following: Chief Administrative Officer; Director, Public Works & Engineering Services; and Manager, Water Services/Overall Responsible Operator (ORO) or designate.

i. Chief Administrative Officer (CAO)

- Responsibilities

As the senior Town staff member reporting to Council, the Chief Administrative Officer (CAO) responsibilities include:

- Oversight of the operation and management of all Town departments,
- Ensuring that the policies and direction from Council are effectively communicated to senior department Managers,
- Ensuring that policies and direction from Council is carried out by the appropriate Town departments,
- Direct supervision of senior department Directors and Managers, and
- Endorsing the ongoing development of the DWQMS and participating on the DWQMS Management Review Committee.

- Authorities

Authorities of the CAO include:

- Communicate information from senior Managers directly to Council,
- Request expenditure approval from Council and implement approved expenditures,
- To convey and mandate council policy and direction to the department senior Managers,
- To hire, evaluate, discipline, or terminate utility management staff, and
- Staffing (within the guidelines of The Corporation of the Town of Tecumseh and any collective agreements).

ii. Director Public Works & Engineering Services

- Responsibilities

Reporting to the Chief Administrative Officer (CAO), the responsibilities of the Director of Public Works and Engineering Services responsibilities include:

- Ensuring the safe, reliable, and compliant management and operation of all of the Towns physical infrastructure as well as Water Distribution System,
- Direct supervision of Engineering Services and Public Works department supervisors and administrative staff,
- Coordinating budget preparation,
- Preparation and presentation of Public Works and Engineering Services Department Reports to Council,
- Administration of the Collective Bargaining Agreement for department personnel,
- Ensuring adequate and competent staffing,
- Ensuring appropriate staff training,

- Investigating and responding to public complaints and inquiries, and
- Participate and represent the Municipal Owner/Operating Authority (Mayor and Council) on the DWQMS Committee.
- Authorities

The Director of Public Works and Engineering Services is authorized to:

- Evaluate and prioritize long-term department needs,
 - Prepare, review, and approve design specifications,
 - Select contractors, and equipment,
 - Develop and implement departmental administrative and technical policy,
 - Recruit, hire, evaluate, discipline, or terminate Public Works and Engineering Services staff in accordance with Town policies,
 - Within the scope of the Public Works and Engineering Services , communicate directly with regulatory agencies and the public on behalf of the Town Municipal Owner/Operating Authority,
 - When necessary, will appoint a temporary Overall Responsible Operator (ORO) position, in absence of the designated ORO.
- iii. Manager Water Services/Overall Responsible Operator (ORO)

- Responsibilities

Reporting to the Director of Public Works and Engineering Services, the responsibilities include:

- Ensuring the efficient, safe and compliant operation of the Towns Water Distribution System,
- Providing supervision, technical direction and training to water distribution staff,
- Maintaining provincial operator certification,

- Assisting the Director of Public Works and Engineering Services with the water distribution budget preparation and long-term planning,
 - Communicating with regulatory authorities to ensure compliance with applicable legislation,
 - Preparing and presenting Municipal distribution information to Council, Town staff, Managers and the Public, and
 - Serving as an alternate DWQMS Representative and participating on the DWQMS Committee and Management Review Committee.
- Authorities

The Manager, Water Services /ORO, Water System is authorized to:

- Act and is the Overall Responsible Operator (ORO) and therefore must be available to be contacted 24/7. The ORO will make arrangements with the Director of Public Works and Engineering Services for a designated ORO in the event he/she is not available and cannot be contacted,
 - Develop, approve and implement operations, maintenance and safety policies and procedures related to water distribution,
 - Supervise and inspect the work of contractors,
 - Evaluate and prioritize the long-term rehabilitation and upgrade to the Town's infrastructure(s),
 - Participate in hiring, evaluation and discipline of unionized and non-unionized staff in accordance with Town Policies,
 - Communicate with Regulatory Agencies,
 - Order/purchase necessary supplies and services, and
 - Apply various Town By-laws.
- c) DWQMS Representative
- Responsibilities

Reporting to the Manager, Water Services/ORO or designate, the responsibilities include:

- Promotes awareness of the DWQMS,
 - Reports DWQMS results to staff,
 - Ensures DWQMS documentation is prepared and maintained, as needed,
 - Provides all staff with technical and administrative consultation related to DWQMS document preparation and implementation, as needed,
 - Reviews and may approve DWQMS documentation,
 - Implements and oversees document control procedure,
 - Coordinates internal auditing acts as the external audit liaison,
 - Communicates DWQMS information to staff and facilitates training when needed,
 - May report DWQMS results to Municipal Owner/Operating Authority and Top Management, and any needs for improvement, and
 - Assist Municipal Owner/Operating Authority and Top Management, that personnel who directly impact drinking water for The Corporation of the Town of Tecumseh are aware of all applicable legislative and regulatory requirements that pertain to their duties in reference to the DWQMS.
- Authorities

The DWQMS Representative is authorized to:

- The overall managing role, responsible for overseeing the development and implementation of the DWQMS.
- d) Designated DWQMS Representative Alternate
- Performs all roles of Designated DWQMS Representative.

e) Water Distribution Operator (Leader)

- Responsibilities

Reporting to the Manager, Water Services/ORO or designate, the responsibilities include:

- Oversees day-to-day activities relating to maintenance of the water distribution system,
- Communicates and liaises with the Manager, Water Services/ORO or designate, Water Distribution Operators and Clerical Staff,
- Works with the Manager, Water Services/ORO or designate in completing the Water Distribution Operators' performance assessments,
- Assists with developing procedures and processes for assuring water quality, and
- Has input into the development of procedures and processes for assuring water quality.

- Authorities

The Water Distribution Operator (Leader) is authorized to:

- Directs Operators in day-to-day operations of water distribution system,
- Orders day-to-day supplies as needed,
- Respond to public complaints as relayed from Manager, Water Services/ORO or designate, Clerical Staff and/or after-hours answering service.

f) Water Distribution Operator

- Responsibilities

Reporting to the Manager, Water Services/Overall Responsible Operator/ORO and the Water Distribution Operator (Leader), the responsibilities include:

- Performs weekly testing of drinking water,

- Performs regular maintenance of the water distribution system,
- Reports any incidents of non-compliance, and
- Responds to repairs.
- Authorities

The Water Distribution Operator is authorized to:

- Monitor process and equipment of day-to-day operations of the water distribution system,
- Respond to public complaints as relayed from Manager, Water Services/ORO or designate, Clerical Staff, Water Distribution Operator Leader and/or after-hours answering service.

g) Clerical Staff

The Clerical staff refer to the Public Works and Engineering Services Assistant and Public Works and Engineering Services Clerk.

- Responsibilities

Reporting to the Director of Public Works and Engineering Services and the Manager, Water Services/ORO or designate, the responsibilities include:

- Communicates/liaises with the following: Director, Public Works & Engineering Services; Manager, Water Services/ORO or designate; Water Distribution Operator (Leader); and Water Distribution Operators,
- Responds to and documents public inquiries. Example- drinking water quality inquiries, broken watermain, hydrant hit by car etc.,
- Inputs lab results,
- Prepares reports as required by regulations and circulates to management,
- Assists with DWQMS documentation and record control, and

- Assists with communication during emergency situations.
- Authorities

The Clerical staff is authorized to:

- Update and implement document changes as directed by applicable administration identified in the Water Services Organizational Chart.

Element 10 Competencies

The MECP classified The Corporation of the Town of Tecumseh as a “Water Distribution Subsystem Class II”. The following identifies the competencies required of staff whose performance may have a direct impact on drinking water quality.

10.1 Municipal Owners/Operating Authorities

Municipal Owners/Operating Authorities who have complete legal oversight of The Corporation of The Town of Tecumseh Water Distribution System and the DWQMS are briefed on operating conditions and are provided updates by Senior Management to ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water and shall maintain records of these activities. They may also attend relevant drinking water training courses, conferences, and seminars to assist in their overall knowledge pertaining to regulatory and legislative requirements.

10.2 Director Public Works & Engineering Services

The Director shall possess advanced theoretical and working knowledge of administrative skills expected of a senior level manager. In addition, the Director shall possess an intermediate theoretical and working knowledge of the [Safe Drinking Water Act, 2002](#) and applicable regulations and legislations, and The Corporation of the Town of Tecumseh Drinking Water Distribution System. When necessary, will appoint a temporary Over All Responsible Operator (ORO) position, in absence of the designated ORO.

10.3 Manager Water Services/ORO

Shall possess advanced theoretical and working knowledge of administrative skills. The Manager, Water Services/ORO or designate shall also possess advanced theoretical and working knowledge of the [Safe Drinking Water Act, 2002](#) and applicable regulations and legislation. The Manager, Water Services/ORO or designate should also have a good working knowledge of The Corporation of the Town of Tecumseh Drinking Water Distribution System and its components. Is the Overall Responsible Operator (ORO) and therefore must be available to be contacted 24/7. The ORO will make arrangements with the Director of Public Works & Engineering Services for a designated ORO in the event he/she is not available and cannot be contacted.

10.4 New Operators in Training (OITs)

Must complete the OIT Water Distribution Prep Course and OIT exam as per MECP [O.Reg.128/04](#) requirements.

10.5 Class I Water Distribution Operators

The operator must successfully complete the Class I Water Distribution Exam and obtain the required training credits to become a Class I Water Distribution Operator as per MECP [O.Reg.128/04](#) requirements.

10.6 Class II Water Distribution Operators

The Class I level operator can advance to a Class II Water Distribution operator by successfully completing the Class II Water Distribution Exam and obtaining the required training credits as per MECP [O.Reg.128/04](#) requirements.

10.7 Class III Water Distribution Operators

The Class II level operator can advance to a Class III Water Distribution operator by successfully completing the Class III Water Distribution Exam and obtaining the required training credits as per MECP [O.Reg.128/04](#) requirements.

- a) Water Distribution Operator Competencies
 - Water Distribution Operators Shall possess an OIT or Class 1 Operating Certificate as per [O.Reg. 128/04](#) requirements.
 - The ORO shall have a minimum Class II Water Distribution Certificate as per [O.Reg. 128/04](#) requirements.
- b) Water Distribution Operator Skills and Knowledge
 - The Water Distribution Operator performs a variety of skilled and semi-skilled tasks independently, or as part of the Water Services team, including;
 - Safe operation of heavy machinery and locate/metering equipment.
 - Utilizes GIS mapping software and applies their working knowledge in interpreting blueprints/drawings to aide in the construction, repair and maintenance of the water distribution system as well as various public buildings and facilities.

- Collaborates with private contractors as authorized and oversees and inspects the work to ensure projects are performed and completed as planned.
- Maintaining work and preventative maintenance records, addressing public inquiries and customer billing issues, completing infrastructure locates as per Ontario One Call.
- Liaises with municipal staff, contractors/suppliers, Ministry officials / inspectors, auditors and the general public maintaining co-operative working relationships with all groups.
- Ensures compliance and conformance to current standards legislated by the Ministry of Environment, Conservation and Parks and is required to maintain detailed and concise records and logs.

c) Methods to Develop, Assess and Maintain Competencies

The following methods develop, assess and maintain the required competencies for personnel performing duties directly affecting drinking water quality:

i. Identify Training Requirements

The Manager, Water Services/ORO or designate and Water Distribution Operators must meet the training requirements as per MECP [O.Reg.128/04](#) requirements.

The required competencies include, but are not limited to the following:

- Class I Water Distribution Operator Certificate
- Understanding the Quality Management System
- Familiarity with the Town's water distribution system
- Knowledge of regulations and identifying, reporting and responding to adverse drinking water conditions as required by regulations.

ii. Assess Competencies

The Corporation of the Town of Tecumseh may administer certain tests, conduct interviews, verify references and/or request specific documentation as part of the hiring process in order to verify skills, experience and knowledge.

In order to meet the ongoing changes to technology, software, the requirements of [O.Reg. 128/04](#) and Water Services processes, Water Distribution Operators shall receive training as required by [O. Reg. 128/04](#), at a minimum. The training may be provided on or off site by qualified employees or contracted subject matter experts. Training effectiveness is evaluated when appropriate through testing, or a demonstration of knowledge gained.

Training records are maintained by the Manager, Water Services/ORO or designate and/or the DWQMS Representative, stored in document control software and filed in hard copy in the Water Services office as proof that the required training has been successfully completed. The Manager, Water Services/ORO or designate is responsible for ensuring that all identified training is completed.

iii. Maintain Competencies

The Manager, Water Services/ORO or designate will ensure that the Standard Operating Procedures and Quality Management System are reviewed every calendar year. Furthermore, the Water Distribution Operators will meet or exceed the training hours required by MECP [O.Reg.128/04](#) to maintain Water Distribution Operator Certificates. Training hours and courses completed by the Water Distribution Operators are logged and tracked by the Manager, Water Services/ORO or designate and/or the DWQMS Representative and are documented in document control software.

Element 11 Personnel Coverage

Water Services is staffed as per the Collective Agreement between the Corporation of the Town of Tecumseh and the Outside Bargaining workers represented by CUPE Local 702.1. The Manager, Water Services is the designated ORO. After hours calls are managed by the Water Distribution Operator (Leader) using an emergency call-out service with the staff seniority list for overtime as set out by the Collective Agreement.

11.1 Regular Hours Coverage

- All work orders are generated through the Water Services office during regular working hours.
- Created work orders will have date and time of the call, location of the problem, details of the problem, name and contact information of person initiating service call.
- Work orders are distributed through the Manager, Water Services/ORO or designate and the Water Distribution Operator (Leader).

11.2 After Hours Coverage

- The Water Distribution Operator (Leader) receives a call from the answering service, assesses information and provides direction.
- If the Water Distribution Operator (Leader) cannot be contacted, the call will bump to the next Water Distribution Operator according to seniority.
- When necessary, staff is called in to do repairs, and or deal with public inquiries.
- All reports and forms are authorized by the Manager, Water Services/ORO or designate.
- Reports, forms and or work orders, will have date and time of the call, location of the problem, details of the problem, name and contact information of person initiating service call.
- If required, sub-contractors are approved by the Manager, Water Services/ORO or designate and are used in digression of the Water Distribution Operator.

11.3 Pandemic, Strikes and/or Lockouts

The provisions for personnel coverage during situations where staff may not be available to work include the following:

- a) Pandemic
 - Should a pandemic occur the Town will request from surrounding Municipalities with qualified licensed operators as well as private contractors for assistance.
- b) Strikes and/or Lockouts
 - The Manager, Water Services is designated as the Overall Responsible Operator (ORO) for the distribution system and has the appropriate Water Distribution Operators License. In the event of a union strike and/or lockout, the ORO is qualified to maintain the water distribution system.
 - In the event the ORO is not available or if additional staff is required to maintain the distribution system, Town will request from surrounding Municipalities with qualified licensed operators as well as private contractors for assistance.

In the event of either a) Pandemic or b) Strikes and/or Lockouts, O. Reg 128/04 and O. Reg 129/04 – “Emergency Situations” may also be used to provide the Town with direction during those situations where staff are not available to work.

Element 12 Communications

The DWQMS Representative shall ensure the Municipal Owner/Operating Authority and Top Management is provided with a current copy of the Operational Plan. The DWQMS Representative shall keep the Municipal Owner/Operating Authority and Top Management informed of any changes to the DWQMS as a result of Management Review and other DWQMS issues when necessary.

A current version of the Operational Plan is available to staff at the Water Services office. A hard copy of the DWQMS Operational Plan will be kept at the Water Services office and an electronic copy can be obtained using the document control software. Personnel will be informed of DWQMS changes or updates through regular staff meetings with the DWQMS Representative or the Manager, Water Services/ORO or designate.

Any suggested revisions or recommendations to the DWQMS Operational Plan submitted by staff will be documented and provided to the DWQMS Representative.

The DWQMS Committee will meet to review and update the Operational Plan and review any staff recommendations.

Town of Tecumseh Water Services will utilize a [web-based survey/questionnaire](#) to allow the public and essential suppliers to have input and communication with all levels of the Town's Water Services and Management. The Manager, Water Services/ORO or designate will collect and analyze all data communicated to the town. The Manager, Water Services/ORO or designate will then make changes if necessary/ or may make recommendations to the Municipal Owners/ Operating Authority any changes or improvements identified.

Essential suppliers and service providers receive relevant DWQMS information regarding product or service requirements from the purchaser in the form of quality / quantity specifications and timeframes, as required by regulations, the Municipal Drinking Water Licence and Drinking Water Works Permit.

Notification is provided to The Corporation of the Town of Tecumseh suppliers and service providers that a copy of the current [Water Distribution System Standards and Material Specifications](#) is available on the Town's website or in hardcopy from the Water Services office.

The DWQMS Policy is available to the consumers of The Corporation of the Town of Tecumseh water distribution system at the Water Services office, Town Hall and can be

viewed on the Town's website <https://www.tecumseh.ca/en/living-here/water-quality.aspx>.

Element 13 Essential Supplies and Services

Where applicable, supplies must meet AWWA and NSF/ANSI standards. Supplies are verified against the order requisition when received (refer to [Appendix 5 - Essential Supplies and Service List](#)).

Element 14 Review and Provision of Infrastructure

Infrastructure for The Corporation of the Town of Tecumseh consists of a water distribution system, water tower and monitoring equipment at the boundary meters. The Corporation of the Town of Tecumseh has in place a [Water & Wastewater Master Plan](#), which has been accepted and adopted by the Municipal Owners/Operating Authority.

Rehabilitation and renewal of the water distribution system is performed on a needs schedule in association with the Water & Wastewater Master Plan. Capital and operational money is allocated each calendar year for improvements to the system.

The Director, Public Works & Engineering Services, under the advisement of the Manager, Water Services/ORO or designate and Manager, Engineering Services, will identify areas needed for rehabilitation and renewal taking into consideration risk assessment.

A report detailing the maintenance programs, any requirements for infrastructure, rehabilitation and renewal is prepared annually by the Director, Public Works & Engineering Services and Director, Financial Services/Treasurer. The capital requirements are then submitted to Top Management and Municipal Owner/Operating Authority for budgetary approval.

Element 15 Infrastructure Maintenance, Rehabilitation and Renewal

The Manager, Water Services/ORO or designate will annually review the planned and unplanned maintenance reports and programs. A summary will be prepared and communicated to the Director, Public Works & Engineering Services under advisement of the Manager, Engineering Services and will identify areas that may need rehabilitation and renewal planning (refer to [Appendix 6: Public Works & Engineering Services Capital Works Plan](#)).

15.1 Planned Maintenance

All planned maintenance is scheduled and communicated to staff by the Manager, Water Services/ORO or designate. All records are retained at the Water Services office.

- Annual valve exercising programs
- Annual flushing programs
- Annual hydrant inspection, maintenance and painting

Planned maintenance is scheduled on an electronic spreadsheet stored on the central office computer server. Server files are backed up daily. The long-term forecast of major infrastructure maintenance, rehabilitation and renewal activities is kept current by reviewing planned rehabilitation and renewal programs on an annual basis as capital works are planned for each calendar year by the Manager, Water Services/ORO or designate with the following: Director, Public Works & Engineering Services; Director, Financial Services/Treasurer; Manager, Engineering Services; and Manager, Public Works & Transportation.

Scheduled tasks are typically defined by manufacturer's literature when available and revised as needed according to operator experience/observations. Planned maintenance tasks are communicated to the person responsible by issuance of work orders from the Manager, Water Services/ORO or designate or the Water Distribution Operator (Leader). Completed work orders are reviewed and signed by the Manager, Water Services/ORO or designate or DWQMS Representative.

If feasible, rehabilitation or replacement of water distribution piping is coordinated with the Town's scheduled wastewater and road resurfacing projects.

15.2 **Unplanned Maintenance**

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Manager, Water Services/ORO or designate.

- Service leaks
- Meter repairs
- Emergency hydrant repairs
- Water quality inquiries
- General consumer inquiries

Element 16 Sampling, Testing and Monitoring

Sampling, testing and monitoring of the treated water produced at the Windsor Utilities Commission (WUC) Water Treatment Plant is conducted by Windsor Utilities Commission Water Distribution Operators as required by [O.Reg. 170/03](#).

A competent certified Water Distribution Operator for the Town performs all in house sampling. Results are recorded on a weekly log sheet and monitored by Water Distribution Operators. Detailed procedures for all tests performed on-site are provided in Standard Operating Procedures (SOP's).

The operators ensure that the water supplied to The Corporation of the Town of Tecumseh Water Distribution System meets the [Safe Drinking Water Act, 2002](#). Sampling and testing for The Corporation of the Town of Tecumseh Water Distribution System is limited to the distribution system only as required by [O.Reg. 170/03](#).

The results at all boundary meters and the water tower are displayed and recorded on the SCADA system and monitored by the Manager, Water Services/ORO or designate and Water Distribution Operators.

Free chlorine will be done in-house. All other regulatory testing is contracted out and performed by an accredited lab chosen by The Corporation of the Town of Tecumseh. Records and logs are kept at the Water Services office.

Sampling and monitoring Standard Operating Procedures (SOP) are established for operating the water distribution system. Provisions have been made when sampling and monitoring under abnormal circumstances.

16.1 Adverse Water Quality Sample

- If the accredited laboratory discovers adverse water quality in a sample, they are obligated to notify Water Services within 24 hours. All adverse water results prescribed by Schedule 16 of [O.Reg.170/03](#) must be immediately reported by Water Services to the Medical Officer of Health, Spill Action Centre and the MECP.
- During adverse water quality incidents, maps and drawings are provided to the local health authority whereby direction is given to the Town as to the locations of sampling and monitoring upstream and downstream of the location from which the adverse sample was found.

16.2 Power/Communication Loss

- Water Services staff is alerted via telephone in the event of a power/communication loss that affects the SCADA system (refer to [Element 11 for call-out procedure during working hours and after working hours](#)).
- The SCADA system is programmed to continue calling the emergency contact list until the alarm is acknowledged.

16.3 Inclement Weather

- Additional Staff and/or equipment will be provided as needed.

Element 17 Measurement and Recording Equipment Calibration and Maintenance

The portable chlorine analyzers and flow meters are calibrated by contractors according to the manufacturers' specifications or as mandated by legislation. All calibrations are recorded and filed at the Water Services office.

Contractors that are used for performing calibrations are identified in the "Essential Supplies and Services List" (refer to [Appendix 5 - Essential Supplies and Services List](#)).

Element 18 Emergency Management

The Corporation of the Town of Tecumseh's Water Distribution Operators have in-house emergency training and are aware of the location of written procedures to deal with emergencies in the water distribution system. Specific instructions for responding to emergencies, including emergency situations that have the potential to result in acute drinking water health risks, are saved in hardcopy form in the Water Services office and electronically in the document control software. Once a year, a training exercise will be conducted to test selected emergency procedures. If present methods should change, or if new employees are brought into the system, semi-annual training will occur on dealing with emergencies. Senior employees or direct supervisors would provide this training. All training is documented and placed in employee training files.

Water Distribution Operators are on twenty-four hour call to ensure that a qualified staff member will attend and assess any water emergency.

18.1 Emergencies

- Adverse Water Quality
- Water distribution cannot supply fire protection or safe drinking water
- Situations in the water distribution system that have the potential to result in acute drinking water health risks

In the event of an identified emergency the Manager, Water Services/ORO or designate shall be contacted immediately. The Manager, Water Services/ORO or designate is designated to be responsible for overall management, decision-making, and communications at the entail level of emergency.

In the event the Manager, Water Services/ORO or designate is unavailable, the Director of Public Works and Engineering Services shall be contacted and will appoint a temporary ORO.

The Manager, Water Services/ORO or designate will then report all incidents and corrective actions to the Director, Public Works and Engineering Services or designate.

The Director, Public Works and Engineering Services, in collaboration with the Manager, Water Services/ORO or designate, will advise the Municipal Owners/Operating Authorities of the system.

The Mayor and CAO of The Corporation of the Town of Tecumseh shall only be notified in the event that water cannot be supplied to the Town in sufficient amounts for fire protection, or that water quality poses an acute health risk to consumers and a boil water advisory or drinking water advisory must be issued.

The Water Services Emergency Response Plan is an emergency plan consisting of a set of guidelines assembled to assist water staff in emergency response procedures and is intended to facilitate a systematic and coordinated response to a variety of water emergencies or major incidents. The Water Services Emergency Response Plan has been formulated to assign emergency response roles and responsibilities, and to guide immediate and long-term response to incidents adversely affecting the water operations.

In the event of a problem occurring greater than a water emergency the Corporation of the Town of Tecumseh Emergency Response Plan will be implemented. A hardcopy is stored in the Water Services office and electronically in the document control software.

An extensive emergency contact list is provided within the Water Services Emergency Response Plan. The Water Services Emergency Response Plan is reviewed on an annual basis.

Element 19 Internal Audits

Internal audits will be performed in entirety at least once every calendar year as legislated, to ensure the DWQMS conforms to the requirements of the DWQMS Operational Plan. These requirements include ensuring that the DWQMS has been effectively implemented and properly maintained.

The Corporation of the Town of Tecumseh will conduct internal audits by trained auditors internally or by a contracted trained auditor chosen by The Corporation of the Town of Tecumseh.

19.1 Internal Audits Conducted by Town of Tecumseh Auditors

- The assignment of auditor's and schedules will be the responsibility of the DWQMS Representative.
- Internal audits will be conducted by a person who has successfully completed a recognized Internal Auditor workshop.
- Internal audits will be scheduled based on the availability and schedules of the participants.
- DWQMS will be audited as per the legislative requirements.
- The auditor shall review all related DWQMS documentation.
- The auditor shall observe activities, review records, review previous internal and external audit results, and interview personnel as necessary to ensure that the status of the audited Elements of the DWQMS has been effectively covered.
- The auditor shall submit completed reports to the DWQMS Representative and the Manager, Water Services/ORO or designate.
- The report shall include any corrective actions requests required to address discrepancies.
- Responses to corrective action request shall be designated to the responsible individual by the DWQMS Management Review Committee.

Element 20 Management Review

Management Review (Also referred to as the DWQMS Committee) ensures and evaluates the continuing suitability, adequacy and effectiveness of the DWQMS. This process reviews the effectiveness of the DWQMS by the Management Review Committee.

20.1 Review Participants

Management Reviews shall be conducted during a meeting of the Management Review Committee that is comprised of the following:

- Chief Administrative Officer (CAO)
- The Director of Public Works & Engineering Services
- The Manager, Water Services/ORO or designate
- The meeting is chaired by DWQMS Representative

The DWQMS Rep will communicate the meeting minutes to all management Review Committee members.

20.2 Review Frequency

Management Reviews shall be conducted after the internal audit has been completed and submitted to the DWQMS Representative by the Internal Auditor. The Management Review shall be conducted at least once a calendar year unless additional meetings are required as per the DWQMS Committee.

20.3 Review Input

The DWQMS Representative and/or Manager, Water Services/ORO or designate shall provide information and data concerning the following categories for the review if requested:

- Incidents of adverse drinking water tests
- Results of Internal Audits
- Results of External Audits

- Results of MECP Inspection
- Incidents of non-compliance with applicable regulations
- Consumer feedback
- Operational performance
- Changes to services, activities, regulations etc. that could affect DWQMS
- Infrastructure review results
- Currency of operational plan
- Deviations from CCP limits
- Effectiveness of risk assessment process
- Emergency preparedness
- Trends in quality of raw water & drinking water supply
- Resources needed for DWQMS maintenance
- Town of Tecumseh website
- Retention table
- Review of best practices
- Comments / suggestions made by water services personnel

20.4 Review Process

The Management Review Committee shall review and discuss all information presented.

The Committee shall make recommendations and initiate an action plan, including the person(s) responsible for delivering the action items and the proposed timelines, to improve the content and implementation of the Operational Plan and related procedures, and to ensure the provision of adequate resources.

The DWQMS Representative shall be responsible for communication and implementation of the Management Review findings.

Element 21 Continual Improvement

The Corporation of the Town of Tecumseh strives to continually improve the effectiveness of its DWQMS. Issues of non-compliance, non-conformance and opportunities for improvement are presented through:

- The review of best management practices (BMP's) at least once every 36 months (including the review of MECP's BMP document, when published) will undergo the same schedule as the comprehensive risk assessment.
- MECP compliance inspections.
- Adverse water quality incidents.
- External DWQMS accreditation audits.
- Internal DWQMS audits.
- Management reviews.
- Staff suggestions.
- Consumer calls.
- Other means (e.g. near-misses, other utilities' experiences, etc.).

Using the [Request for New or changed DWQMS Document form included in Appendix 7](#), the DWQMS Representative tracks and measures continual improvement.

Corrective actions are taken to address issues (e.g. non-conformities, non-compliances and other drinking water system failures) where:

- Causes of the issues are investigated.
- Actions taken to correct the issues are documented.
- Actions are taken to prevent the issues from re-occurring.
- Reviews of actions taken to correct / prevent the issues are carried out to verify they are implemented and effective in correcting / preventing the re-occurrence of the issue.

Preventative actions may also be taken to eliminate potential issues – and these are documented and reviewed to ensure they are implemented an effective in preventing the potential issue from occurring.

Appendices

Appendix 1 Commitment and Endorsement

The endorsement of the Tecumseh Distribution System Operational Plan by Municipal Owner/Operating Authority (The Corporation of the Town of Tecumseh, Municipal Council) will be added to Appendix 1 when the report to Council, submitted by the Manager, Water Services/ORO or designate, is formerly approved.



**The Corporation of the
Town of Tecumseh**

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-18

Subject: Drinking Water Quality Management System
Operational Plan

Recommendations

It is recommended:

That Report PWES-2023-18 Drinking Water Quality Management System Operational Plan, **be received**;

And that Tecumseh Town Council **endorse and commit to** the Town of Tecumseh Distribution System, Drinking Water Quality Management System Operational Plan, Revision Date: February 28, 2023.

Background

Following the contamination of the water supply in Walkerton, Ontario in May 2000, a provincial inquiry was held that investigated the cause of the water contamination, which then triggered an examination of the state of drinking water protection in Ontario.

The Walkerton Inquiry Report outlined a number of recommendations for drinking water protection in Ontario that resulted in the [Safe Drinking Water Act](#) and [Clean Water Act](#) that regulate our water systems today.

The legacy of events in Walkerton has resulted in a significantly improved legal framework for drinking water protection that includes a multi-barrier approach.

2021-2022 Council Report Template R2022-06-08

Report No. PWES-2023-18
February 28, 2023
Drinking Water Quality Management System
Operational Plan

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The requirement for Owners and Operating Authorities of municipal residential drinking water systems to develop and implement Drinking Water Quality Management Systems (DWQMS) was legislated under the [Safe Drinking Water Act](#) (SDWA) and forms part of the Ministry of the Environment, Conservation and Parks (MECP) [Municipal Drinking Water Licensing Program](#). The idea of mandated implementation of a DWQMS originated as recommendations in Part Two of the [Walkerton Inquiry Report](#).

The DWQMS requires that an Operational Plan for the Drinking Water System is established and that this Operational Plan be endorsed and committed to by the Owners/Operating Authority – Tecumseh Town Council.

The Operational Plan must include elements that are fundamental to ensuring the long-term sustainability of a Drinking Water System including: management processes employed within the system; the maintenance of infrastructure used to supply drinking water; and, identification of potential risks and risk mitigation strategies for items such as system security, water treatment, and the impacts of climate change.

As legislatively required by the province, the Town of Tecumseh is required to review, update, and maintain its DWQMS Operational Plan on an annual basis. This is an important element, which is key to the continuous improvement process.

Comments

Updates to the Operational Plan can be effected by staff suggestions, changes in administrative or work processes, internal audits, external audits, MECP inspections and regulatory updates.

Updates to the Operational Plan are submitted to and approved by the Management Review Committee, which is comprised of the Town's Chief Administrative Officer (Marg Misek-Evans), Director Public Works & Engineering Services (Phil Bartnik), Manager Water Services (Brad Dupuis) and the DWQMS Representative/Water Operator (Nicole Bradley).

Updates to the Operational Plan were due in part to the following:

1. Legislative and Regulatory Changes

The Operational Plan was updated to include reference to O.Reg. 128/04: Certification of Drinking Water System Operators and Water Quality Analysts, and O.Reg. 129/04: Licensing of Sewage Works Operators, for personnel coverage during emergency situations where staff may not be available to work.

In April 2022, the MECP also updated the municipal risk assessments for drinking water systems to explicitly consider cybersecurity threats. This update effected a change to Element 7 of the Operational Plan.

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2. Risk Assessment Review

A Risk Assessment Review was conducted in accordance with Element 7 of the Operational Plan which subsequently resulted in an update to the Hazard Analysis and Critical Control Point Worksheets to include Cyber Security as a potential hazard to the Town's drinking water system.

3. Audit and Inspection Reports

Audits and inspections are conducted on the Town's Drinking Water Distribution System to ensure the DWQMS conforms to the requirements of the Operational Plan and to determine compliance with requirements under the [Safe Drinking Water Act, 2002](#) and associated regulations. An audit of the Town's DWQMS identified an opportunity for improvement by including additional processes to manage the potential for personnel shortages during emergency situations. The Operational Plan was updated accordingly.

4. Management Review Committee recommendations.

The Management Review Committee reviews recommended changes to the Operational Plan and ensures and evaluates the continuing suitability, adequacy and effectiveness of the DWQMS. These recommended changes are implemented in the updated Operational Plan.

The Management Review Committee approved the suggested updates to the Operational Plan at their meeting held October 24, 2022. The minutes recorded at said Management Review Committee meeting are provided in Attachment 1.

Key updates and revisions to the Operational Plan include but are not limited to the following:

Element No.	Title	Revision	Page No. in Operational Plan
General	Operational Plan	Spelling and grammar revisions.	Throughout
General	Operational Plan	Position title of "Water Operator" was amended to "Water Distribution Operator".	Throughout

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Element No.	Title	Revision	Page No. in Operational Plan
General	Operational Plan	Included “or designate” following “Manager Water Services/ORO.”	Throughout
6	Drinking Water System	Amended Appendix 2.1: Data in the table updated to current values.	62
7 & 8	Risk Assessment	Amended Appendix 3.8: MECP’s “Potential Hazardous Events for Municipal Drinking Water Systems” updated to current version.	73
7 & 8	Risk Assessment	Amended Appendix 4.1: Addition of new Worksheet No. 19 – Cyber Security.	99
11	Personnel Coverage	Addition of statement referring to amended O.Reg. 128/04 and 129/04 “Emergency Situations.”	36

The above-noted changes were implemented in the updated Operational Plan, dated February 28, 2023, which is appended to this report as Attachment 2.

Tecumseh’s Water Services staff strives to continually improve the effectiveness of its DWQMS to provide reliable and safe drinking water for consumers.

Consultations

Chief Administrative Officer
Ministry of the Environment, Conservation and Parks

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Financial Implications

There are no financial implications arising from this report.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input checked="" type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

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This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

Brad Dupuis, C. Tech.
Manager Water Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Management Review Committee Meeting Minutes dated October 24, 2022
2	Town of Tecumseh Distribution System Drinking Water Quality Management System Operational Plan, Revision Date: February 28, 2023

Appendix 2 Drinking Water System

2.1 Watermain Material Type and Length in Tecumseh Water Distribution System

a) Table 1: Watermain Type and Length

Watermain Material	50mm dia. (m)	100mm dia. (m)	150mm dia. (m)	200mm dia. (m)	250mm dia. (m)	300mm dia. (m)	400mm dia. (m)	600mm dia. (m)	Total Length (m)
Cast Iron	-	108.9	18,406.7	112.2	784	-	3.4	-	19,415.2
Concrete	-	-	-	-	-	-	2,525.5	-	2,525.5
Ductile Iron	-	-	10,040.6	6,510.5	1,062	1,659.7	2,428.9	500.2	22,201.9
PolyVinylChloride (PVC)	510.8	1822.1	58,613.6	68,388.0	15,172.3	19,377.4	8,519.6	3,734	176,137.2
Polyethylene	7.7	-	60.2	-	-	-	-	145.6	213.5
Copper	6.7	-	-	-	-	-	-	-	6.7
Total	523.8	1898.7	87,000.6	74,926.4	17,014.2	21,037.1	13,477.4	4,379.8	220,500

2.2 Metering Connections

a) North Distribution System

The north distribution system is currently supplied from the Windsor Water System through the following metering connection:

- 400 mm diameter feedermain on Dillon Drive
- 300 mm diameter feedermain on McNorton Street
- 400 mm diameter feedermain on Tecumseh Road
- 600 mm diameter feedermain on Mulberry Drive
- 600 mm diameter feedermain on County Road 42
- (future) 600 mm diameter feedermain on Intersection Road

b) South Distribution System

The south distribution system is currently supplied from the Windsor Water System through the following connections:

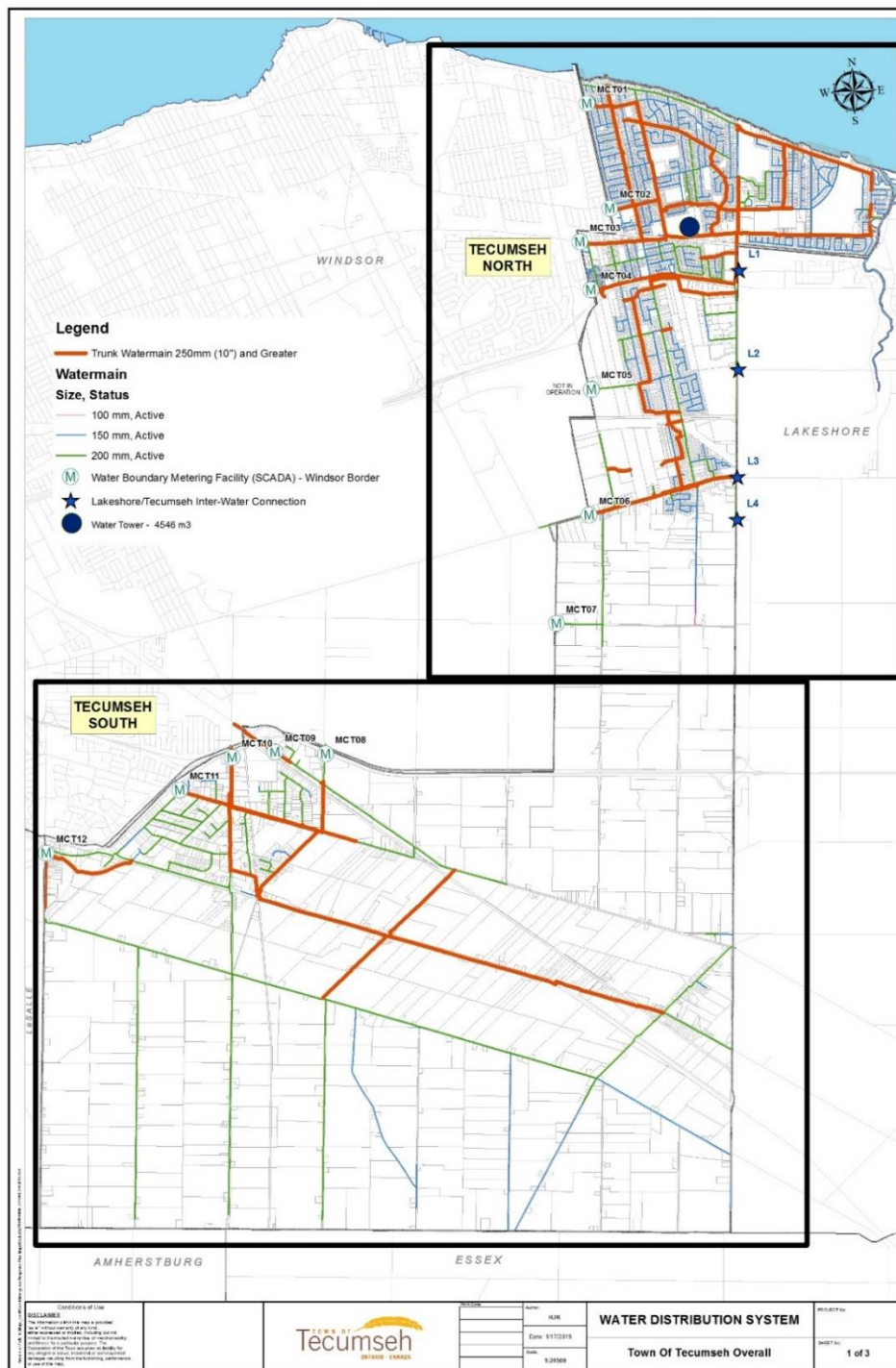
- 200 mm diameter feedermain on Baseline Road
- 200 mm diameter feedermain on 8th Concession Road
- 600 mm diameter feedermain on County Road 46
- 300 mm diameter feedermain on Walker Road
- 300 mm diameter feedermain on North Talbot Road

The south distribution system is also supplied from the Town of LaSalle Water System through the following connection:

- 200 mm diameter feedermain on Howard Avenue

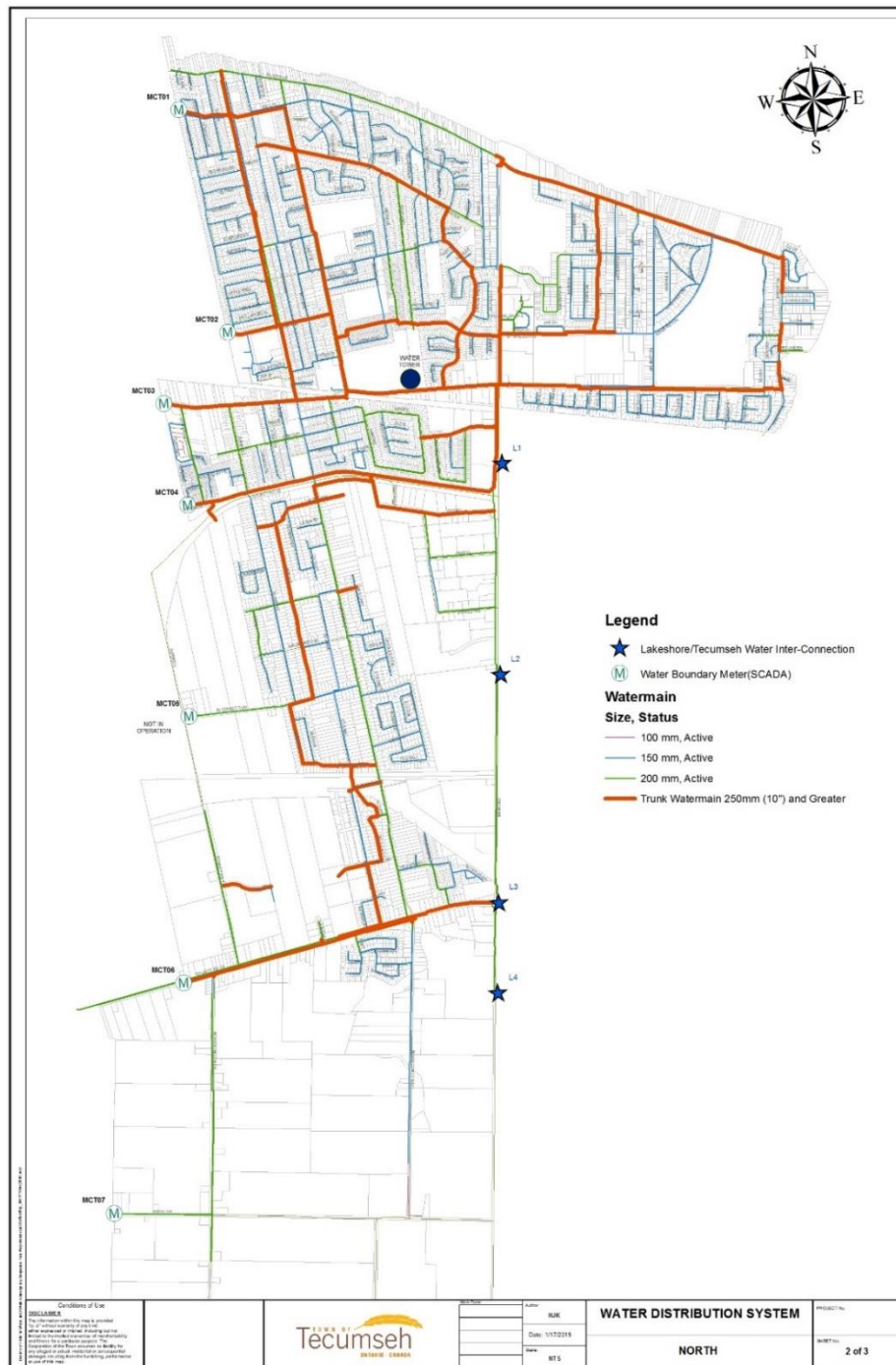
2.3 Town of Tecumseh Water Distribution System, Overall Service Area

a) Map 1: Overall Service Area



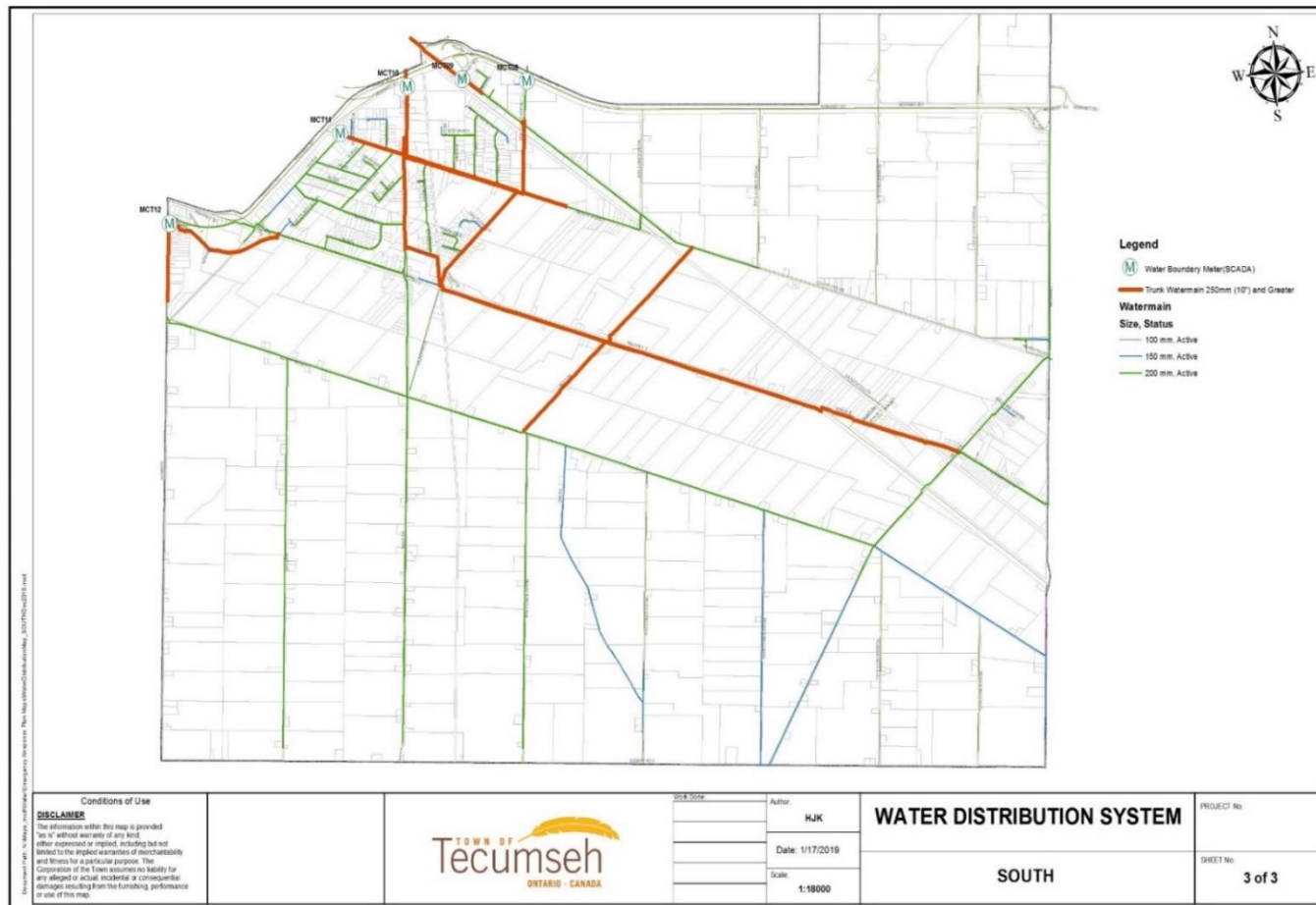
2.4 Town of Tecumseh Water Distribution System, North Service Area

a) Map 2: North Service Area



2.5 Town of Tecumseh Water Distribution System, South Service Area

a) Map 3: South Service Area



Appendix 3 Risk Assessment

3.1 Completing the Hazard Analysis and Critical Control Point Worksheet Procedure

The Risk Assessment Team is to complete the tasks outlined in [Element 7 Risk Assessment](#) and [Element 8 Risk Assessment Outcomes](#) (included as part of this Operational Plan) along with the instructions included as part of [Appendix 3 – Risk Assessment](#) (this section) and [Appendix 4 – Risk Assessment Outcomes](#).

The Hazard Analysis & Critical Control Point (CCP) Worksheets included in Appendix 4 are reviewed and used to record the results of the risk assessment.

- A. **Getting Started:** Follow the flow and process of receiving and delivering of clean drinking water to the consumer.
- B. **Activity or Process Step:** This column refers to specific areas within a particular process step (pumps, tower, distribution system, etc.).
- C. **Description of Hazard:** This column refers to an incident or situation that can lead to the presence of a hazard. Hazards and Hazardous events can result from natural or technological causes, or from human activities. At a minimum, the Ministry's "[Potential Hazardous Events for Municipal Drinking Water Systems](#)" (dated April 2022) is considered as part of this assessment. Any additional potential hazardous events and associated hazards also need to be included.
- D. **Potential Result of Hazard:** This column refers to the source of danger or a property that may cause drinking water to be unsafe for human consumption. Biological, Chemical, Physical and Radiological. A description of each hazard is outlined in (Table 1).
- E. **Comments:** This column refers to any additional information that will help in the description of the hazard or identification.
- F. **Available Monitoring & Control Measures:** This column refers to any monitoring and control measures in place or need to be identified as a need to be put in place. Control measures must be addressed for all potential hazards and hazardous events, regardless of whether they are CCP's or not. This may include monitoring, preventive measures, regular inspection, back-up equipment, written standard operating procedures etc.

- G. **Emergency Procedures or Contingency Plan:** This column identifies any emergency procedure or contingency plan in place to deal with the hazards identified.
- H. **Likelihood, Consequence, Detectability and Total:** These columns refer to the ranking criteria identified in (Tables 2, 3, 4, 5.).
- I. **Critical Control Point (CCP):** Identifies the total value of the columns, and determines if the value are above or below the set threshold.
- J. **Control Procedure:** This column is where you apply some sort of control, to prevent or eliminate a drinking water health hazard or to reduce the health hazard to an acceptable level.
- Hazards identified as CCP's or Recommended Minimum CCP's require control measures, which are documented in procedures or work instructions.

Control Measures include:

- Work Instructions.
- Monitoring, reporting and recording requirements.
- Support information.
- Response for a deviation from critical control point.
- Recovery procedures if necessary.
- Equipment reliability and redundancies.

3.2 Determining the Level of Risk for each Hazard

- A. Using the Ranking criteria set out at the bottom of each work sheet estimate the level of risk for each hazard.
- B. Using the criteria set out at the bottom of the work sheet assign a value to each **Likelihood, Consequence and Detectability**.
- C. Once the value for each is assigned, add the three values together
A+B+C=Total.
- D. The **Total** will be ranked as per the criteria in the “Total Analysis” table found at the bottom of the work sheet.
- E. If the Total is in the High or Very High range as a hazard, it will require either a Critical Control Point procedure, or a response procedure.

3.3 Table 1: Hazards

Type of Hazard	Description of Hazard
Biological Hazards	Biological pathogens are usually considered the most significant drinking water health risk because the effects are acute; Waterborne biological hazards include bacterial, viral and parasitic organisms. These organisms are commonly associated with faecal wastes from humans and other animals, and some can occur naturally in the environment.
Chemical Hazards	Chemical hazards in drinking water may come from a source or occur in the treatment and distribution system. They include but are not limited to: toxic spills, naturally occurring minerals, heavy metals, dissolved gases (e.g. radon), pesticides, fertilizers, endocrine disruptors, personal care products and pharmaceutical residuals, cyanotoxins, flocculants, coagulants, lubricants, copper, iron, zinc, and lead from pipes and fittings.
Physical Hazards	Sediments are the most common physical hazard associated with drinking water and are of concern as they may carry with them microbiological hazards and interfere with disinfection system efficiency. Other physical hazards include biofilms, pipe materials etc.
Radiological Hazards	Radiological hazards may arise from man-made or natural sources, with naturally occurring chemicals (uranium, radon, etc.) most frequently found in groundwater.

3.4 Table 2: Likelihood

Description	Likelihood of Hazardous Event Occurring	Rating
Rare	May occur in exceptional circumstances, and has not occurred in past.	1
Unlikely	Could occur at some time, historically has occurred less than once every five or 10 years.	2
Possible	Has occurred or may occur once or more per year.	3
Likely	Has occurred or may occur on a monthly to quarterly basis.	4
Very Likely	One or more occurrences on a monthly or more frequent basis.	5

3.5 Table 3: Consequence

Description	Consequence of Hazardous Event Occurring	Rating
Insignificant	Insignificant impact, little public exposure, little or no health risk.	1
Minor	Limited public exposure, minor health risk.	2
Moderate	Minor public exposure, health impact on small part of the population.	3
Major	Large part of the population at risk.	4
Catastrophic	Major impact for large part of the population, complete failure of systems.	5

3.6 Table 4: Detectability

Description	Detectability of Hazardous Event Occurring	Rating
Very Detectable	Easy to detect, on-line monitoring through SCADA.	1
Moderately Detectable	Moderately detectable, alarm present but not in SCADA, may require operator to walk by and notice alarm; problem is indicated promptly by in-house lab test results.	2
Normally Detectable	Normally detectable, visually detectable on rounds or through regular maintenance.	3
Unlikely Detectable	Unlikely detectable, visually detectable but not inspected on a regular basis; not normally detected before problem becomes evident; lab tests are not done on a regular basis (e.g. quarterly).	4
Undetectable	Cannot be detected.	5

3.7 Table 5: Risk Analysis (Total)

Likelihood + Consequence + Detectability	(Total) Risk Category
3 to 5	Low
6 to 7	Moderate
8 to 11	High
12 to 16	Very High

3.8 Provincial Government Bulletin



Ministry of the Environment, Conservation and Parks

Potential Hazardous Events for Municipal Residential Drinking Water Systems to Consider in the DWQMS Risk Assessment

April 2022

1.0 Background

A risk assessment must be conducted for all municipal residential drinking water systems, as part of the operational plans for those systems. These operational plans form the basis upon which third party auditors assess conformance to the Drinking Water Quality Management Standard.

This approach includes identification of potential risks and risk mitigation strategies for items such as system security, water treatment, and the impacts of climate change. This document lists the potential hazardous events and associated hazards that are, at a minimum, required to be assessed as part of these risk assessments.

2.0 Definitions

All Systems - all municipal residential drinking water systems, including distribution-only systems.

Treatment Systems - all municipal residential drinking water systems that include equipment used to provide primary and/or secondary disinfection of the drinking water, including those with groundwater and/or surface water sources unless otherwise noted.

April 2022

1

3.0 Potential Hazardous Events

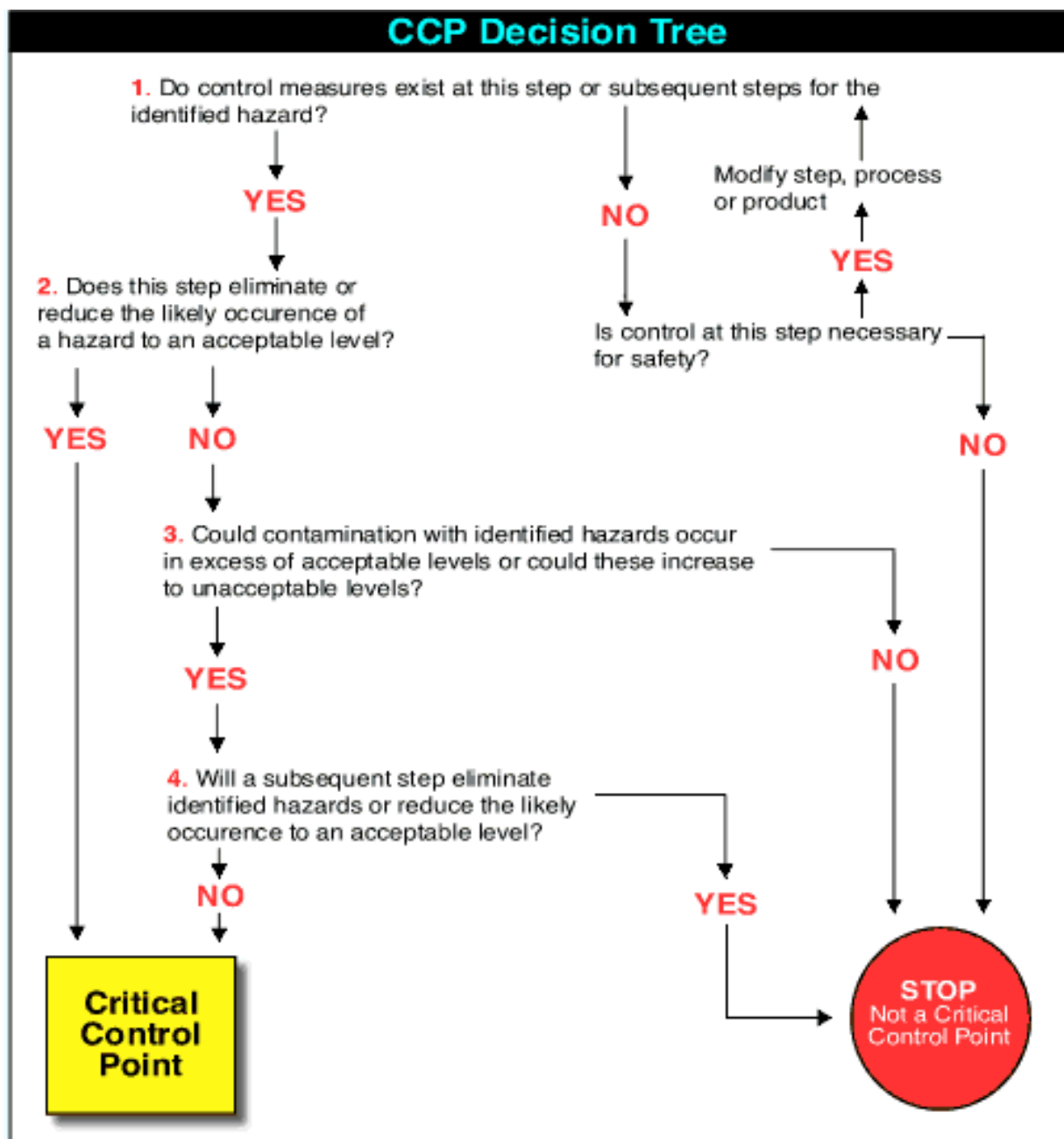
System Type	Description of Hazardous Event / Hazard
All systems	Long Term Impacts of Climate Change
All systems	Water supply shortfall
All systems	Extreme weather events (e.g., tornado, ice storm)
All systems	Sustained extreme temperatures (e.g., heat wave, deep freeze)
All systems	Chemical spill impacting source water
All systems	Terrorist and vandalism actions
All systems	Cybersecurity threats
Distribution Systems	Sustained pressure loss
Distribution Systems	Backflow
Treatment Systems	Sudden changes to raw water characteristics (e.g., turbidity, pH)
Treatment Systems	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system).
Treatment Systems and Distribution Systems providing secondary disinfection	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)
Treatment Systems using Surface Water	Algal blooms

April 2022

2

Appendix 4 Risk Assessment Outcomes

Once the values for likelihood, consequence, and detectability are assessed, the determination of whether an identified risk is also a critical control point (CCP) is made using the following decision tree:



The control points generally meet the characteristics of an ideal critical control point as they typically are:

- Able to prevent, eliminate or reduce hazards,
- Monitored, preferably in real time,
- Able to have determined control limits, and,
- Essential to ensure the safety of the drinking water.

These control points also provide important barriers in the multiple barrier process to ensure that pathogens that could be present in the water are effectively inactivated and/or removed, and that secondary disinfection is maintained in the distribution system. CCP's often have corresponding Critical Control Limits, which are identified in the following tables:

Critical Control Point (CCP)	Critical Control Limit (CCL)	Monitoring Process and/or Procedures	Response Procedure
Loss of Chlorine Residual (Secondary Disinfection)	Free Chlorine Target Residual in the Distribution System: <ul style="list-style-type: none"> • > 0.20 ppm (operational minimum) Reportable under the SDWA: <ul style="list-style-type: none"> • 0.05 ppm 	<ul style="list-style-type: none"> • Certified and competent operators performing regulatory sampling, testing, and monitoring of system residuals as applicable. • Watermain flushing programs. • Installation of blow-offs and auto-flushers in dead ends. • Regular samples taken and analyzed for chlorine residual. • Water quality concerns tracked through consumer complaints. • SOP-002: Distribution Sampling for Chlorine Residuals. 	Emergency Response procedures: <ul style="list-style-type: none"> • 2.1 Boil Water Advisory • 2.2 Adverse Laboratory Water Quality Results • 2.3 Loss of Secondary Disinfectant (Chlorine) • 2.14 Water Shortage • 2.16 Establishing Potable Water Filling Stations • Response to consumer calls • Service Request tracking and monitoring Repair and system rehabilitation • Use of appropriately certified and competent contractors and suppliers

Critical Control Point (CCP)	Critical Control Limit (CCL)	Monitoring Process and/or Procedures	Response Procedure
Commissioning new Watermains causing Contamination Distribution	<p>Free Chlorine</p> <p>Target Residual in the Distribution System:</p> <ul style="list-style-type: none"> 0.20 ppm (operational minimum) <p>Reportable under the SDWA:</p> <ul style="list-style-type: none"> 0.05 ppm 	<ul style="list-style-type: none"> Certified and competent operators performing microbiological sampling, monitoring, and testing of chlorine residuals throughout the watermain commissioning process. Watermain flushing procedures during commissioning of watermain. Pressure testing and monitoring processes SOP-007: <i>Commissioning New Watermains</i> 	<p>Emergency Response procedures:</p> <ul style="list-style-type: none"> 2.1 2.1 Boil Water Advisory (if bacteriological) 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.11 Watermain Break 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations Contact MOH, MECP & SAC Communicate water advisory, if issued by MOH Follow corrective actions required by O.Reg. 170/03

4.1 Hazard Analysis and Critical Control Point Worksheets

Worksheet Number and Description	Page No.
Worksheet 1 – Contamination of Source Water	81
Worksheet 2 – Vandalism/Tampering of Water Infrastructure	82
Worksheet 3 – Sediment Build-up in Water Distribution System	83
Worksheet 4 – Terrorism	84
Worksheet 5 – Spills from Freight Trains on Railway Tracks	85
Worksheet 6 – Power Failure	86
Worksheet 7 – Loss of Communication	87
Worksheet 8 – Watermain Breaks within the Distribution System	88
Worksheet 9 – Loss of Chlorine Residual (Secondary Disinfection)	89
Worksheet 10 – Commissioning New Watermains Causing Contamination	90
Worksheet 11 – Loss of Pressure Resulting from a Watermain Break	91
Worksheet 12 – Bacteriological Test Failure	92
Worksheet 13 – Failure of Backflow Prevention Device	93
Worksheet 14 – Adverse Drinking Water Lead Results	94
Worksheet 15 – Extreme Cold/Heat/Long-term Impacts of Climate Change	95
Worksheet 16 – Loss of Pressure Resulting from Major Fire	96
Worksheet 17 – Loss of System Pressure	97
Worksheet 18 – Staff Shortage	98
Worksheet 19 – Cyber Security	99

Worksheet No. 1 Contamination of Source Water

Contamination of Source Water			
Activity or Process Step: <ul style="list-style-type: none"> Source Water 			
Description of Hazard: <ul style="list-style-type: none"> Contamination of Source Water 			
Potential Results of Hazard: <ul style="list-style-type: none"> Biological Chemical Physical 			
Comments: <ul style="list-style-type: none"> No Control System water received from Windsor Utilities Commission 			
Identified Control Measures: <ul style="list-style-type: none"> Mandatory weekly sampling throughout distribution system as per O.Reg.170/03 On-line monitoring at (WUCTP) Reference SOP-012: <i>Bad Sample or Adverse Water Quality</i> Contact MECP, MOH & SAC Communication with the (WUCTP) Conducting all sampling and testing as necessary or as directed at points in the distribution system under the direction of the MOH. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> 			
Emergency Response Procedure: <ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.4 Contamination of Water Transmission System 2.14 Water Shortage 2.16 Establishing Potable Filling Stations 2.20 Epidemic / Pandemic 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	4
		Detectability	2
		(High Risk Threshold = 8)	Total = 7 (CCP = No)

Worksheet No. 2 Vandalism/Tampering of Water Infrastructure

Vandalism/Tampering of Water Infrastructure			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Vandalism/ Tampering 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological Physical Chemical 			
Comments:			
<ul style="list-style-type: none"> No Control Water distribution system infrastructure such as but not limited to sample stations, hydrants, auto-flushers and meter chambers are covered within this work sheet. 			
Identified Control Measures:			
<ul style="list-style-type: none"> Security fence locked and gated Secure entry into Water Tower through pass card and keyed Alarm system with SCADA Security Cameras Visual inspections of infrastructure completed Where applicable, infrastructure is locked Reference SOP-013: <i>SCADA Alarm Procedure</i> and SOP-022: <i>Fire Hydrant Inspection, Maintenance & Flushing</i> Contact Emergency Services, MOH, MECP & SAC Communicate drinking water advisory if issued by MOH Sample water quality until two consecutive samples are negative within 48hrs. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> Take Tower offline if necessary and monitor conditions. Return to service when safe to do so. Reference SOP-023: <i>Taking Tower Offline</i> Conduct sampling, microbiological & Cl₂ residual. Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Contact WUCTP about closure of water valve for tower 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.4 Contamination of Water Transmission System 2.5 Emergency Evacuation 2.6 Illegal Entry / Vandalism 2.8 Loss of Access to Facility 2.9 Bomb Threat at any Water Facility 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 2.20 Epidemic / Pandemic 2.21 Terrorism 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	4
		Detectability	1
		(High Risk Threshold = 8)	Total= 6 (CCP = No)

Worksheet No. 3 Sediment Build-up in Water Distribution System

Sediment Build-up in Water Distribution System			
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard: <ul style="list-style-type: none"> Sediment buildup 			
Potential Results of Hazard: <ul style="list-style-type: none"> Biological Chemical Physical 			
Comments: <ul style="list-style-type: none"> No Control Flushing program in place to aide in system water circulation / flow 			
Identified Control Measures: <ul style="list-style-type: none"> Inspection of tower every 5 years as prescribed by AWWA standards or per legislation Monitoring water levels Sample testing of chlorine residuals weekly. Reference SOP-004: <i>Chlorine Residual Sampling and Calibration of Chlorine Analyzer (Water Tower)</i> Cleaning tower using a qualified contractor Take Tower offline if necessary and monitor conditions. Return to service when safe to do so. Reference SOP-023: <i>Taking Tower Offline</i> 			
Emergency Response Procedure: <ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.3 Loss of Secondary Disinfectant (Chlorine) 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	3
		Detectability	3
		(High Risk Threshold = 8)	Total= 7 (CCP = No)

Worksheet No. 4 Terrorism

Terrorism			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Terrorism 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological 	<ul style="list-style-type: none"> Physical 	<ul style="list-style-type: none"> Chemical 	
Comments:			
<ul style="list-style-type: none"> No Control 			
Identified Control Measures:			
<ul style="list-style-type: none"> Security fence locked and gated Add secure entry Alarm system with SCADA Security Cameras Reference SOP-013: <i>SCADA Alarm Procedure</i> Contact Emergency Services, MOH, MECP & SAC Communicate drinking water advisory if issued by MOH Sample water quality until two consecutive samples are negative within 48hrs. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> Take Tower offline if necessary and monitor conditions. Return to service when safe to do so. Reference SOP-023: <i>Taking Tower Offline</i> Conduct sampling, microbiological & Cl₂ residual. Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Contact WUCTP about closure of water valve for tower 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.4 Contamination of Water Transmission System 2.5 Emergency Evacuation 2.6 Illegal Entry / Vandalism 2.8 Loss of Access to Facility 	<ul style="list-style-type: none"> 2.9 Bomb Threat at any Water Facility 2.14 Water Shortage 2.16 Establishing potable water filling stations 2.20 Epidemic / Pandemic 2.21 Terrorism 		
Risk Analysis Ranking		<i>RISK ANALYSIS</i>	<i>RANKING</i>
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	5
		Detectability	1
		(High Risk Threshold = 8)	Total = 7 (CCP = No)

Worksheet No. 5 Spills from Freight Trains on Railway Tracks

Spills from Freight Trains on Railway Tracks			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Spills from CN freight trains on VIA tracks. 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Physical 	<ul style="list-style-type: none"> Biological 	<ul style="list-style-type: none"> Chemical 	
Comments:			
<ul style="list-style-type: none"> No Control 			
Identified Control Measures:			
<ul style="list-style-type: none"> Security fence locked and gated Add secure entry at Water Tower through pass card and keyed Alarm system with SCADA On-line monitoring at (WUCTP) Security Cameras Reference SOP-013: <i>SCADA Alarm Procedure</i> Passenger & Freight trains limited to max speed of 50mph zone Contact Emergency Services, MOH, MECP & SAC Communicate drinking water advisory if issued by MOH Sample water quality until two consecutive samples are negative within 48hrs. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> Take Tower offline if necessary and monitor conditions. Return to service when safe to do so. Reference SOP-023: <i>Taking Tower Offline</i> Conduct sampling, microbiological & Cl₂ residual. Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Contact WUCTP about closure of water valve for tower 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.4 Contamination of Water Transmission System 2.5 Emergency Evacuation 	<ul style="list-style-type: none"> 2.8 Loss of Access to Facilities 2.12 On-Site Injury 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 		
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	Total= 5 (CCP = No)

Worksheet No. 6 Power Failure

Power Failure			
Activity or Process Step:			
<ul style="list-style-type: none"> Power Supply / Communications 			
Description of Hazard:			
<ul style="list-style-type: none"> Physical 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Loss of SCADA network 			
Comments:			
<ul style="list-style-type: none"> No Control Power loss in general and also from extreme weather conditions 			
Identified Control Measures:			
<ul style="list-style-type: none"> UPS battery backup at monitoring stations UPS battery backup on server Reference SOP-013: <i>SCADA Alarm Procedure</i> System alarmed Backup generator for server SCADA system checks completed on scheduled work days Data is backed up daily onto main server 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.7 Interruption of SCADA Components 2.15 Failure of Control Systems 2.18 Equipment Failure 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	2
		Detectability	1
		(High Risk Threshold = 8)	

Worksheet No. 7 Loss of Communication

Loss of Communications			
Activity or Process Step: <ul style="list-style-type: none"> Power Supply / Communications 			
Description of Hazard: <ul style="list-style-type: none"> Physical 			
Potential Results of Hazard: <ul style="list-style-type: none"> Failure of business telephone lines Failure of local telephone provider's circuit connections, radio signals, and Ethernet connections Failure of cellular telephones 			
Comments: <ul style="list-style-type: none"> None 			
Identified Control Measures: <ul style="list-style-type: none"> UPS battery backup at monitoring stations UPS battery backup on server Reference SOP-013: <i>SCADA Alarm Procedure</i> System alarmed Backup generator for server SCADA system checks completed on scheduled work days Data is backed up daily onto main server 			
Emergency Response Procedure: <ul style="list-style-type: none"> 2.7 Interruption of SCADA Components 2.15 Failure of Control Systems 2.18 Equipment Failure 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	5
		Detectability	1
		(High Risk Threshold = 8)	Total= 7 (CCP = No)

Worksheet No. 8 Watermain Breaks within the Distribution System

Watermain Breaks within the Distribution System		
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 		
Description of Hazard: <ul style="list-style-type: none"> Watermain breaks within the distribution system possibly causing adverse conditions. 		
Potential Results of Hazard: <ul style="list-style-type: none"> Biological Chemical Physical 		
Comments: <ul style="list-style-type: none"> No control 		
Identified Control Measures: <ul style="list-style-type: none"> Consumer complaints; low pressure or visual inspection General inspection of distribution system Controlling valves, looping and replacing watermain SCADA alarm system Reference SOP-009: <i>Watermain Repair Procedure Category 1</i> Reference SOP-010: <i>Watermain Repair Procedure Category 2</i> Reference SOP-014: <i>Responding to Afterhours Call Outs</i> Reference SOP-021: <i>Valve Exercising Maintenance Program</i> 		
Emergency Response Procedure: <ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.3 Loss of Secondary Disinfection 2.4 Contamination of Water Transmission System 2.11 Watermain Break 2.13 Street Flooding Due to Watermain Break 2.17 Damage to Main Supply Transmission Line 		
Risk Analysis Ranking		RISK ANALYSIS
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood
		Consequence
		Detectability
		(High Risk Threshold = 8)
		RANKING
		4
		2
		3
		Total= 9 (CCP = No)

Worksheet No. 9 Loss of Chlorine Residual (Secondary Disinfection)

Loss of Chlorine Residual (Secondary Disinfection)			
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard: <ul style="list-style-type: none"> Loss of chlorine residual (secondary disinfection) 			
Potential Results of Hazard: <ul style="list-style-type: none"> Biological Physical 			
Comments: <ul style="list-style-type: none"> Critical Control Limit of 0.05ppm free chlorine residual 			
Identified Control Measures: <ul style="list-style-type: none"> Weekly monitoring chlorine residuals throughout the distribution system Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-004: <i>Chlorine Residual Sampling and Calibration of Chlorine Analyzer- Water Tower</i> Flush affected area to increase Cl₂ residual Follow corrective actions required by O.Reg. 170/03. Resample and reference SOP-011: <i>Low Chlorine Result Procedure</i> 			
Emergency Response Procedure: <ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.3 Loss of Secondary Disinfectant (Chlorine) 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	2
		Consequence	3
		Detectability	3
		(High Risk Threshold = 8)	Total= 8 (CCP = Yes)

Worksheet No. 10 Commissioning New Watermains Causing Contamination

Commissioning New Watermains Causing Contamination			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Commissioning new watermains causing contamination 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological Chemical Physical 			
Comments:			
<ul style="list-style-type: none"> Critical Control Limit of 0.05ppm free chlorine residual 			
Identified Control Measures:			
<ul style="list-style-type: none"> Reference SOP-007: <i>Commissioning New Watermains</i> Check Cl₂ residuals. Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Take microbiological samples. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> Follow corrective action as per O.Reg.170/03 Communicate Boil Water Advisory if issued by MOH Reference SOP-019: <i>Accepting / Inspecting Material meeting Water Standards & Material Specifications</i> 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.11 Watermain Break 2.14 Water Shortage 2.15 Failure of Control Systems 2.16 Establishing Potable Water Filling Stations 2.18 Equipment Failure 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	Total= 5 (CCP = Yes)

Worksheet No. 11 Loss of Pressure Resulting from a Watermain Break

Loss of Pressure Resulting from a Watermain Break			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Loss of pressure due to watermain break 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological 	<ul style="list-style-type: none"> Chemical 	<ul style="list-style-type: none"> Physical 	
Comments:			
<ul style="list-style-type: none"> As a best practice measure a Water Distribution System pressure of 20psi is targeted. 			
Identified Control Measures:			
<ul style="list-style-type: none"> Consumer complaints Pressure gauges on boundary meters and tower monitored and alarmed by SCADA Backflow prevention by-law and program Check pressures in affected area. If necessary, discuss with MOH and MECP/SAC Communicate water advisory if issued by MOH Restore pressure and chlorine residuals and conduct testing and sampling in affected area Notify (WUCTP) of low-pressure alarms Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-004: <i>Chlorine Residual Sampling and Calibration of Chlorine Analyzer- Water Tower</i> Reference SOP-006: <i>Distribution Flow Testing Program</i> Reference SOP-009: <i>Watermain Repair Procedure Category 1</i> Reference SOP-010: <i>Watermain Repair Procedure Category 2.</i> Reference SOP- 011: <i>Low Chlorine Result Procedure</i> Reference SOP-013: <i>SCADA Alarm Procedure</i> Reference SOP-014: <i>Responding to Afterhours Call Out</i> Reference SOP-017: <i>Meter-Backflow Inspection Procedure</i> 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.11 Watermain Break 	<ul style="list-style-type: none"> 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 2.17 Damage to Main Supply Transmission Line 		
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	2
		Consequence	4
		Detectability	1
		(High Risk Threshold = 8)	

Worksheet No. 12 Bacteriological Test Failure

Bacteriological Test Failure		
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 		
Description of Hazard: <ul style="list-style-type: none"> Bacteriological test failure 		
Potential Results of Hazard: <ul style="list-style-type: none"> Biological 		
Comments: <ul style="list-style-type: none"> No control 		
Identified Control Measures: <ul style="list-style-type: none"> Weekly monitoring: bacteriological testing throughout the distribution system Contact MOH, MECP & SAC Communicate water advisory if issued by MOH Sample water quality until two consecutive samples are negative within 48hrs Take Tower offline if necessary and monitor conditions. Return to service when safe to do so Flush affected area to increase Cl₂ residual. Reference SOP-006: <i>Distribution Flow Testing Program</i> Follow corrective actions required by O.Reg. 170/03. Reference SOP-001: <i>Distribution Sampling for Bacteriological & HPC</i> Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-012: <i>Bad Sample or Adverse Water Quality</i> 		
Emergency Response Procedure: <ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.3 Loss of Secondary Disinfection 2.4 Contamination of Water Transmission System 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 		
Risk Analysis Ranking		<i>RISK ANALYSIS</i>
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> [A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total </div> <div style="width: 45%;"> 3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH </div> </div>		Likelihood
		3
		Consequence
		3
		Detectability
		2
		(High Risk Threshold = 8)
		Total= 8 (CCP = No)

Worksheet No. 13 Failure of Backflow Prevention Device

Failure of Backflow Prevention Device			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Failure of Backflow Prevention Device 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological Chemical Radiological 			
Comments:			
<ul style="list-style-type: none"> No control 			
Identified Control Measures:			
<ul style="list-style-type: none"> Visual on- site inspection Backflow prevention by-law and program If backflow is suspected, report to MOH and MECP, SAC Isolate area. Flush the system and sample as needed. Re-pressurize system Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i> Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-006: <i>Distribution Flow Testing Program</i> Reference SOP-017: <i>Meter-Backflow Inspection Procedure</i> 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.14 Water Shortage 2.15 Failure of Control Systems 2.16 Establishing Potable Water Filling Stations 2.18 Equipment Failure 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	4
		Detectability	4
		(High Risk Threshold = 8)	Total= 9 (CCP = No)

Worksheet No. 14 Adverse Drinking Water Lead Results

Adverse Drinking Water Lead Results			
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard: <ul style="list-style-type: none"> Adverse drinking water lead results 			
Potential Results of Hazard: <ul style="list-style-type: none"> Biological Chemical Physical 			
Comments: <ul style="list-style-type: none"> No control 			
Identified Control Measures: <ul style="list-style-type: none"> Reference SOP-005: <i>Lead Testing Procedure</i> Reference SOP-012: <i>Bad Sample or Adverse Water Quality Procedure</i> O.Reg. 170/03 mandating every water system in Ontario to test for lead in the drinking water 			
Emergency Response Procedure: <ul style="list-style-type: none"> 2.2 Adverse Laboratory Water Quality Results 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	2
		Detectability	2
		(High Risk Threshold = 8)	Total= 5 (CCP = No)

Worksheet No. 15 Extreme Cold/Heat/Long-term Impacts of Climate Change

Extreme Cold/Heat/Long-term Impacts of Climate Change		
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 		
Description of Hazard: <ul style="list-style-type: none"> Physical 		
Potential Results of Hazard: <ul style="list-style-type: none"> Maintain fire protection No access to water from the distribution system if pipes are frozen Maintain reliable and safe drinking water to consumers 		
Comments: <ul style="list-style-type: none"> No control Extreme cold / heat / long-term impacts of climate change (including frozen pipes, potential for wildfires) 		
Identified Control Measures: <ul style="list-style-type: none"> SCADA alarms Reference SOP-013: <i>SCADA Alarm Procedure</i> Maintenance program for infrastructure: installation of insulating blankets on boundary meters, blowing out sample station, Insulating auto flushers, etc. performed annually Installing indicators, such as, hydrant reflectors and valve locators on water distribution system infrastructure Reference SOP-024: <i>Frozen Services</i> and SOP-025: <i>Frozen Meters</i> Monitoring weather conditions via weather sites 		
Emergency Response Procedure: <ul style="list-style-type: none"> 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 2.19 Severe Storm (Tornado, Wind, Hurricane, Winter Storm etc.) 		
Risk Analysis Ranking		RISK ANALYSIS
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood
		Consequence
		Detectability
		(High Risk Threshold = 8)
		RANKING
		1
		1
		1
		Total= 3 (CCP = No)

Worksheet No. 16 Loss of Pressure Resulting from Major Fire

Loss of Pressure Resulting from Major Fire			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Loss of pressure due to major fire 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological 	<ul style="list-style-type: none"> Chemical 	<ul style="list-style-type: none"> Physical 	
Comments:			
<ul style="list-style-type: none"> No Control 			
Identified Control Measures:			
<ul style="list-style-type: none"> Notification from the fire department Firefighters trained to monitor pressure gauges on trucks so as not to drop distribution system pressure below 20psi. Consumer complaints Pressure gauges on boundary meters and tower monitored and alarmed by SCADA Backflow prevention Check pressures in affected area. If necessary, discuss with MOH and MECP/SAC If necessary, issue water advisory with consultation of MOH. Reference SOP-012: <i>Bad Sample or Adverse Water Quality</i> Restore pressure and chlorine residuals and conduct testing and sampling in affected area Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-004: <i>Chlorine Residual Sampling and Calibration of Chlorine Analyzer-Water Tower</i> Notify (WUCTP) of low-pressure alarms 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.10 Major Fire at any Facility 2.14 Water Shortage 2.16 Establishing Potable Water Filling Stations 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	

Worksheet No. 17 Loss of System Pressure

Loss of System Pressure			
Activity or Process Step:			
<ul style="list-style-type: none"> Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Loss of system pressure 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological 	<ul style="list-style-type: none"> Chemical 	<ul style="list-style-type: none"> Physical 	
Comments:			
<ul style="list-style-type: none"> No Control 			
Identified Control Measures:			
<ul style="list-style-type: none"> Consumer complaints Pressure gauges on boundary meters and tower monitored and alarmed by SCADA Backflow prevention Check pressures in affected area if necessary discuss with MOH and MECP/SAC If necessary, issue water advisory with consultation of MOH. Reference SOP-012: <i>Bad Sample or Adverse Water Quality</i> Restore pressure and chlorine residuals and conduct testing and sampling in affected area Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i> Reference SOP-004: <i>Chlorine Residual Sampling and Calibration of Chlorine Analyzer-Water Tower</i> Reference SOP-009: <i>Watermain Repair Procedure-Category 1</i> and SOP-010: <i>Watermain Repair Procedure-Category 2</i> Notify (WUCTP) of low pressure alarms 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.2 Adverse Laboratory Water Quality Results 2.4 Contamination of Water Transmission System 2.14 Water Shortage 2.16 Establishing Potable Water Filling Station 			
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	Total= 5 (CCP = No)

Worksheet No. 18 Staff Shortages

Staff Shortage		
Activity or Process Step: <ul style="list-style-type: none"> Water Distribution System 		
Description of Hazard: <ul style="list-style-type: none"> Staff shortage 		
Potential Results of Hazard: <ul style="list-style-type: none"> Physical 		
Comments: <ul style="list-style-type: none"> No Control Due to lottery, retirements, Illness/Pandemic, Strike/Lock-out 		
Identified Control Measures: <ul style="list-style-type: none"> Collective Agreements for both outside and inside workers Attendance/medical records MOH health advisories Town's Wellness Committee Having the proper amount of Licensed Water Distribution Operators The ORO has a Class III Water Distribution Operators License The ORO has the required competencies to maintain the water distribution system Town of Tecumseh Water Services Emergency Response Plan Will contract outside licensed Water Distribution Operators to assist the ORO if necessary Reference SOP No. 11: <i>Low Chlorine Result Procedure</i> Reference SOP No. 12: <i>Bad Sample or Adverse Water Quality Procedure</i> Reference SOP No. 13: <i>SCADA Alarm Procedure</i> Reference SOP No. 14: <i>Responding to Afterhours Call-Out</i> 		
Emergency Response Procedure: <ul style="list-style-type: none"> 2.20 Epidemic / Pandemic 		
Risk Analysis Ranking		RISK ANALYSIS
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	Likelihood
		Consequence
		Detectability
		(High Risk Threshold = 8)
		RANKING
		1
		4
		1
		Total= 6 (CCP = No)

Worksheet No. 19 Cyber-Security

Cyber-Security			
Activity or Process Step:			
<ul style="list-style-type: none"> Power Communications & Water Distribution System 			
Description of Hazard:			
<ul style="list-style-type: none"> Cyber-Security 			
Potential Results of Hazard:			
<ul style="list-style-type: none"> Biological Physical 			
Comments:			
<ul style="list-style-type: none"> None 			
Identified Control Measures:			
<ul style="list-style-type: none"> Town authorized internal firewalls, spyware, malware etc. on the network. Individual user passwords and login names. Individual user folders for saving documents and records. Employee training on detection of phishing messages and how to react. Security fence locked and gated. Security Cameras. Reference SOP-013: <i>SCADA Alarm Procedure</i>. Contact Emergency Services, MOH, MECP & SAC. Communicate drinking water advisory if issued by MOH. Sample water quality until two consecutive samples are negative within 48hrs. Reference SOP-001: <i>Distribution Sampling for Bacteriological and HPC Samples</i>. Take Tower offline if necessary and monitor conditions. Return to service when safe to do so. Reference SOP-023: <i>Taking Tower Offline</i>. Conduct sampling, microbiological & Cl₂ residual. Reference SOP-002: <i>Distribution Sampling for Chlorine Residuals</i>. Contact WUCTP about closure of water valve for tower 			
Emergency Response Procedure:			
<ul style="list-style-type: none"> 2.1 Boil Water Advisory 2.4 Contamination of Water Transmission System 2.5 Emergency Evacuation 2.6 Illegal Entry / Vandalism 2.8 Loss of Access to Facility 		<ul style="list-style-type: none"> 2.9 Bomb Threat at any Water Facility 2.14 Water Shortage 2.16 Establishing potable water filling stations 2.21 Terrorism 	
Risk Analysis Ranking		RISK ANALYSIS	RANKING
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 [A] + [B] + [C] = Total	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11 = HIGH 12 to 15 = VERY HIGH	Likelihood	1
		Consequence	5
		Detectability	1
		(High Risk Threshold = 8)	Total = 7 (CCP = No)

Appendix 5 Essential Supplies and Services

A list of supplies and services has been developed and is provided below. The list includes suppliers / service providers for each essential supply and service. A secondary source is also listed for each supply and service to ensure supplies and services are available as needed. This list is reviewed by the Manager, Water Services/ORO or designate to ensure that it is current and up to date.

All supplies and services shall meet AWWA and NSF/ANSI standards; these purchases must be in accordance with the Town of Tecumseh By-Law 2017-63, a by-law to govern procurement and procedures.

5.1 Essential Supplies and Service List

Product/Service	Primary Source	Secondary Source
Treated Drinking Water Supply	Windsor Utilities Commission P.O. Box 1625, Station A 4545 Rhodes Drive Windsor, ON N8W 5T1 Tel: 519-251-7300 Fax: 519-255-7423 www.enwin.com	Refer to the Water Services Emergency Response Plan, Section 2, Sub-Section 2.16 “Establishing Potable Water Filling Stations”
Accredited Laboratory Services	Caduceon Environmental Laboratories 3201 Marentette Ave. Windsor, ON N8X 4G3 Tel: 519-966-9541 Fax: 519-966-9567 contactwindsor@caduceonlabs.com	SGS Environmental Services 657 Consortium Crt. London, ON N6E 2S8 Tel: 519-672-4500 Fax: 519-672-0361 emily.crowey@sgs.com
Instrumentation Calibration	SCG Flowmetrix 2088 Jetstream Rd London, ON N5V 3P6 Tel: 519-870-3569 Fax: 519-268-3459 service@flowmetrix.ca	ACI Instrumentation Limited 14 Gormley Industrial Ave, Unit 5 Gormley, ON L0H 1G0 Tel: 905-888-0063 Fax: 905-888-6381 bhadresa@aciltd.ca

Product/Service	Primary Source	Secondary Source
Meter Supply & Service	Evans Utility and Municipal Products Supply Limited 338 Neptune Crescent London, ON N6M 1A1 Tel: 519-453-6515 Fax: 519-453-7756 www.evansupply.com	Underground Specialties Wolseley 5340 Walker Road Oldcastle, ON N0R 1L0 Tel: 519737-1263 Fax: 519-737-1712 bob.bezaire@wolseleyinc.ca
AMR/ERT Supply & Service	Underground Specialties Wolseley 5340 Walker Road Oldcastle, ON N0R 1L0 Tel: 519737-1263 Fax: 519-737-1712 bob.bezaire@wolseleyinc.ca	Itron Headquarters 2111 N Molter Rd Liberty Lake, WA 99019 Tech Support 1-877-487-6602 Chris.Jay@wolseleyinc.ca
Health & Safety Supplies	Great Lakes Safety Supply 3303 Walker Rd. Windsor, ON N8W 3R9 Tel: 519-972-6605 Fax: 519-972-6620 sales@glspi.com	HD Supply 3350 North Talbot Rd. Tecumseh, ON Tel: 519-737-7023 Fax: 519-737-9157 Meredith.stpierre@hdsupply.com
SCADA & Instrumentation	Onyx Engineering Ltd. 2960 Jefferson Blvd. Windsor, ON N8T 3J2 Tel: 519-948-4324 sales@onyxengineering.com	Summa Engineering Limited 3230 American Drive Mississauga, ON L4V 1B3 Tel: 905-678-3388 Fax: 905-678-0444 www.summaeng.com
Construction Contracting Services	Coco Paving Inc. 6725 South Service Road East Windsor, ON N8N 2M1 Tel: 519-948-7133 Fax: 519-948-7469 www.cocogroup.com	Amico Contracting and Engineering 2199 Blackacre Drive Oldcastle, ON N0R 1L0 Tel: 519-737-1577 Fax: 519-737-1929 sdraper@triamico.com

Product/Service	Primary Source	Secondary Source
Distribution Parts	Emco Waterworks 5255 County Rd 42 Windsor, ON N8N 2M1 Tel: 519-944-3626 Fax: 519-948-4210 www.emcoltd.com	Underground Specialties Wolseley 5340 Walker Road Oldcastle, ON N0R 1L0 Tel: 519-737-1263 Fax: 519-737-1712 bob.bezaire@wolseleyinc.ca
Disinfectant (Sodium Hypochlorite)	Emco Waterworks 5255 County Rd 42 Windsor, ON N8N 2M1 Tel: 519-944-3626 Fax: 519-948-4210 www.emcoltd.com	Underground Specialties Wolseley 5340 Walker Road Oldcastle, ON N0R 1L0 Tel: 519-737-1263 Fax: 519-737-1712 bob.bezaire@wolseleyinc.ca
Water Testing Supplies	SCG Flowmetrix 2088 Jetstream Rd London, ON N5V 3P6 Tel: 519-870-3569 Fax: 519-268-3459 service@flowmetrix.ca	Hach Canada 3020 Gore Rd London, ON N5V 4T7 Tel: 800-665-7635 Fax: 866-259-0984 www.ca.hach.com
Locators	Ontario One Call 104 Cooper Dr, Suite 1 Guelph, ON N1C 1C3 Tel: 800-400-2255 solutions@accu-link.ca	G-Tel Engineering 1150 Frances Street London, ON N5W 5N5 Tel: 866-692-0208 Fax: 866-692-0809 bgowan@gtel.ca
Communications Supplies	Information Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184 sfuerth@tecumseh.ca	Kelcom 363 Eugenie St. E. Windsor, ON N8X 2Y2 Tel: 519-250-5070 www.kelcom.com

Product/Service	Primary Source	Secondary Source
Computer Systems Supplies	Information Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184 sfuerth@tecumseh.ca	Summa Engineering Limited 3230 American Drive Mississauga, ON L4V 1B3 Tel: 905-678-3388 Fax: 905-678-0444 www.summaeng.com ONYX Engineering 2960 Jefferson Blvd. Windsor, ON N8T 3J2 Tel: 519-948-4324 Ext 210 Fax: 519-948-4840
Answering Service	Engineering Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184	After hour call Kelcom Answering Service Tel: 971-2866

Appendix 6 Public Works & Engineering Services Capital Works Plan



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council
From: Phil Bartnik, Director Public Works & Engineering Services
Date to Council: January 26, 2023
Report Number: PWES-2023-01
Subject: 2023-2027 Public Works & Engineering Services Five-year
Capital Works Plan

Recommendations

It is recommended:

That the Public Works & Engineering Services (PWES) Capital projects for 2023, as summarized in Attachment 1 to Report PWES-2023-01, 2023-2027 Public Works & Engineering Services Five-Year Capital Works Plan, **be approved**;

And that the 2023 PWES Capital projects be funded through the following reserves and reserve funds as set out in Report PWES-2023-01:

- Road Lifecycle Reserve
- Sidewalk Lifecycle Reserve
- Bridges Lifecycle Reserve
- Watermain Reserve Fund
- Wastewater Sewers Reserve Fund
- Wastewater Facilities Reserve Fund
- Storm Sewer Lifecycle Reserve
- Infrastructure Reserve

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And that the Public Works & Engineering Services Capital Works Plan for 2023-2027, as outlined in Attachment 2 to Report PWES-2023-01, **be approved**.

Executive Summary

The Public Works & Engineering Services (PWES) Department is recommending approval of the 2023 PWES Capital Works Projects and funding allocations for 2023 as well as approval of the capital works plan for 2023-2027.

The total number of 2023 projects for PWES is 24, representing \$38.6M in budget allocation, \$21.3M previously allocated and \$17.3M requested allocation for 2023. Most of these projects are on-going and approximately 7 are new projects. The new projects generally relate to water, road, sanitary and bridge repairs/ improvements required to maintain existing infrastructure, support proposed growth-related developments and/or satisfy funding agreements. Notable projects for 2023 consist of the following:

- Detailed design of the Tecumseh Secondary Plan Area Northwest water and wastewater infrastructure;
- Finalization of various studies such as the Shoreline Management Plan, the Stormwater Rates Study, and the Sanitary Sewer Model Update;
- Continuation of detailed design and construction for the Scully, St. Marks and PJ Cecile Storm Pump Stations under the Disaster Mitigation and Adaptation Fund program;
- Construction of the Lesperance Road/VIA Crossing Improvement Project;
- Construction of watermain and sanitary sewer infrastructure related to the County of Essex County Road 42 Improvements Project;

Details and in-progress updates for the 2023-2027 projects are provided within the following sections of this report.

Background

Approval of 2023 PWES Capital Works Projects and the full 2023-2027 capital works plan is sought to maintain a consistently high level of service and strive to improve the Town's infrastructure components in a timely manner. This capital works plan is the first to specifically tie in the capital priorities related to Council's growth-related direction.

Council received presentations on the PWES Capital Priorities 2023-2031 at the [March 29th](#) and [May 5th](#) Special Council Meetings (SCMs).

At the May 5th SCM, Administration was directed to incorporate the recommended hybrid scenario within the 2022 and 2023-2027 PWES Capital Works Plans. This hybrid scenario will address the strategic priorities of growth and economic development as well as Council approved mandates.

The recommended hybrid scenario was structured for proposed capital expenditures at 156% (\$15.10M annually) of the Town's past 10-year average (\$9.67M annually) for Public Works & Engineering Services. It also highlighted the need for extraordinary resources (staffing, financial, consulting services and construction) above the current annual PWES capital program.

In general, many of the projects listed in this report for 2023 are ongoing projects that require works to continue into 2023. Additionally, new projects are recommended to implement Council's growth-related direction, satisfy applicable legislation, and maintain assets. Applicable grants and user contributions are identified, where available (confirmed and applied).

The report is structured so that all projects with a funding allocation request in the 2023 budget year are detailed first in Section A, followed by ongoing projects which have prior funding allocations in Section B. Section C provides highlights of projects proposed for 2024-2027. Section D rounds out the report with municipal drain projects.

Comments

Detailed information is provided for all 2023 projects, both those previously approved and those newly proposed to commence in 2023. Generally, the description for each project includes cost estimates for each of the related infrastructure categories (i.e., roads, water, wastewater, storm, etc.). Project descriptions also outline the main project drivers, grant funding available, sources of internal funding and prior reports to Council.

Attachment 1 details the cost of each project by related infrastructure category and includes previously approved budget allocations, and requested budget allocations for 2023, as well as future and total costs. Attachment 2 provides the entire proposed Capital Works Plan for 2023-2027. Attachment 3 illustrates the geographic location of the 2023 projects, by ward.

Certain projects have been proposed to be phased in over a multi-year period because the project scope is too large or costly to be completed in one construction season or would be too disruptive over a large area and for too long relative to the adjacent properties. Phased projects are typically tendered as separate tender calls.

Finally, all new projects, and infrastructure replacement projects, will be designed to be compliant with the current requirements of the Accessibility for Ontarians with Disabilities Act (AODA).

In the following sections, unless otherwise noted, these acronyms are used: "CR" means County Road; "EA" means Environmental Assessment; "FSR" means Functional Servicing Report; "ERCA" means Essex Region Conservation Authority and "Ha" means hectares.

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Section A: Projects Requiring Funding Allocations in 2023

A1. Annual Tar & Chip, Asphaltting and Crack Sealing

Work	Requested for 2023	Location of Work	Extent
Asphaltting	\$650,000	Mayrand Crescent Shawnee Road Lacasse Park – Parking Lot	Full Extent Maisonneuve to Intersection Full Extent Full Extent
Crack Sealing	\$300,000	Various locations	To be determined.

Roads recommended for inclusion in the annual paving program are selected with reference to the Town's Road Needs Study, PWES staff input and recommendations from the Manager of Public Works & Transportation. PWES investigates and categorizes the needs based on the condition of the roads in comparison with other similar traffic volumes.

PWES also recommends that an amount be set aside for crack sealing of Town roads to extend the lifespan of the pavement before more substantial repairs or replacement are required. An amount of \$300,000 is set aside for crack sealing in the annual paving program.

Inspection and project administration will be carried out by PWES staff upon award of the Contract by Council. Quality control of the materials will be carried out by a Consulting Geotechnical Engineer.

Funding is to be provided from Road Lifecycle Reserve in the amount of \$950,000.

➤ Reference Reports:

- [Report PWES-2020-21](#), "Town of Tecumseh Road Needs Study 2019, Study Completion and Adoption", April 28, 2020; Motion RCM-139/20.

A2. Annual Project Contingency

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$250,000	\$0	\$250,000

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Administration recommends carrying an Annual Project Contingency for Public Works & Engineering Services. This allocation is for needs that arise from time to time that cannot be anticipated during the preparation of the PWES Five Year Capital Works Plan. The allocation will be used to address these needs in accordance with the Town Purchasing and Procurement Policies. Use of these funds is communicated through quarterly budget variance reports to Council.

Funding for this Annual Project Contingency is to be provided from the Road Lifecycle Reserve in the amount of \$250,000.

A3. 2023 Sidewalk Repair Projects

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$400,000	\$0	\$400,000

The 2023 sidewalk program will be based on sidewalk conditions determined through the comprehensive sidewalk inspection conducted annually. Currently this inspection is completed by Public Works staff and, along with input from Council and residents, this information is used to develop the annual program for recommended sidewalk repair and replacements. Should this inspection generate large amounts of sidewalk replacement, a Request for Quotation (RFQ) will be issued.

Trip hazards identified throughout the Town will be addressed to keep the Town in compliance with minimum maintenance standards and as a risk management measure. Currently, a detailed list of sidewalks to be repaired/ replaced has not been generated. The funding requested is for an upset limit to carry out the work. Inspection and project administration will be carried out by PWES Staff upon award of the Contract.

Additional funding is being requested in 2023 for the replacement of the existing brick pavers on Tecumseh Road from the City of Windsor limit to VIA Rail (just west of Lacasse Boulevard).

Funding for the 2023 sidewalk repair project is to be provided from the Sidewalk Lifecycle Reserve in the amount of \$400,000.

A4. Lesperance Road Multi-Use Trail – CR22 to CR42

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$137,500	\$2,661,250	\$0	\$2,798,750
Grant (confirmed): ICIP, Public Transit Stream 2019 Intake - \$466,707			

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In May 2019, Council approved the recommendation of Report No. PBS-2019-16 that endorsed this Multi-Purpose Pathway as a candidate project for funding through the Investing in Canada Infrastructure Program (2019 Intake of the Public Transit Funding Stream). Following this meeting, an application for funding was submitted which was ultimately approved by the funding agency. The maximum amount of funding available for this project is \$466,707 which will offset Town funds for the total project costs.

Dillon Consulting Ltd. was retained and is proceeding with the detailed design which is expected to be completed in 2023. It is planned to tender the project in Fall 2023 for construction to proceed in 2024.

The 2023 funding request for this project is to be provided from the Infrastructure Reserve in the amount of \$2,661,250.

➤ **Reference Reports:**

- [Report PBS-2019-16](#), "Investing in Canada Infrastructure Program, 2019 Intake of the Public Transit Funding Stream, Lesperance Road Multi-Purpose Pathway – Cty Rd 22 to Cty Rd 42 Final Recommendation", May 28, 2019; Motion RCM-150/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services, 2022 Capital Works Projects", December 8, 2020; Motion RCM-375/20.

A5. Snake Lane Road Culverts (with Spans <3.0m) – Culverts No. 42, 53 & 54

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$192,500	\$1,941,940	\$0	\$2,134,440

The 2016 Culvert Needs Study (Structures with Spans < 3.0m) identified the following Culverts for rehabilitation or replacement within a 1 to 5-year time frame:

- Culvert No. 42 – South Talbot Road Drain at Snake Lane Road (Est. cost \$650,440)
- Culvert No. 53 – 9th Line Drain at Snake Lane Road (Est. cost \$742,000)
- Culvert No. 54 – Webster Drain at Snake Lane Road (Est. cost \$742,000)

In December 2020, Council approved the recommendations of Report PWES-2020-33 that authorized Administration to proceed with the 2021 capital works projects, which included moving forward with the design for Culverts No. 42, 53 & 54. Dillon Consulting Ltd. was retained and detailed design for these Culverts commenced in 2021 and it is anticipated the design will be completed in early 2023. Administration is recommending construction commence in 2023.

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Additional funding for this project is to be provided from the Bridges Lifecycle Reserve in the amount of \$1,941,940.

➤ **Reference Reports:**

- [Report PWES No. 39/16](#), “2016 Culvert Needs Study (Structures with Spans < 3.0m)”, November 8, 2016; Motion RCM-384/16.
- [Report PWES-2020-33](#), “Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects”, December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#) “Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects”, January 25, 2022; Motion RCM-23/22.

A6. County Road 46 Municipal Class Environmental Assessment

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$70,000	\$0	\$70,000

The County of Essex is looking to proceed with a Municipal Class Environmental Assessment (Class EA) for County Road 46 from the City of Windsor limits to County Road 19 commencing as early as 2023. This Class EA will analyze all modes of transportation within this corridor and recommend improvements to the infrastructure based on the interim and long-term needs.

Town Administration is recommending to partner with the County of Essex on the Class EA, with an expanded scope to include the 8th & 9th Concession Roads (from County Road 46 to City of Windsor limits). This will ensure the integration between the County Road 46 Class EA and the Sandwich South Master Servicing Plan currently being undertaken by the City of Windsor.

Funding for this project is to be provided from the following:

- Road Lifecycle Reserve in the amount of \$70,000

A7. 12th Concession Watermain Replacement

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$247,900	\$32,100	\$0	\$280,000

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In December 2020, Council approved the recommendations of Report PWES-2020-33 that authorized Administration to proceed with various watermain replacement projects That included:

- 12th Concession Road Watermain (two sections South of CR42)
 - Once section of watermain will be included within the County's CR42 & CR43 Improvement Project phase 1, which is slated for construction in 2023.
 - One section of watermain will be tendered as a stand-alone project, with construction to commence in 2023.
- CR43 Watermain (CR42 northerly)
 - To be included in the County's CR42 & CR 43 Improvement Project Phase 2, slated for construction in 2024.
- Tecumseh Road Watermain (Brighton Road to Pike Creek)
 - Construction completed in 2022.

Dillon Consulting Ltd. was retained for engineering services for all the above watermain replacement projects. The above project budget has been revised to include the one watermain section in 12th Concession Road located approximately 450m south of CR42.

Additional funding for this project is to be provided from the following:

- Watermain Reserve Fund in the amount of \$32,100

➤ **Reference Reports:**

- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

A8. County Road 19 Improvements – County Road 22 to Jamsyl Drive

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$758,000	\$264,000	\$0	\$1,022,000

In 2017 the County implemented an interim solution at the CR22/CR19 intersection, and made improvements to the north, east and west legs to provide a greater level of service until the ultimate solution could be implemented. At this time, the south leg

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improvements of the intersection were not completed. The County of Essex is now proceeding with the design and construction of the south leg, which involves the interim widening of CR19 south of CR22 to Jamsyl Drive.

In March 2020, Council approved the recommendations of Report PWES-2020-13 that authorized Administration to add the CR19 Trunk Watermain Installation project to the 2020 Capital Works projects. Project expenditures of \$758,000 were also funded through the Watermain Reserve Fund. The installation of the 400mm dia. trunk watermain on CR19 was to be incorporated as part of the County's Improvement Project to CR19. Detailed design has been ongoing since 2020, with construction anticipated to commence in late 2023/early 2024.

The watermain budgetary estimate has been updated to reflect the current market conditions from recent tenders.

Additional funding for this project is to be provided from the following:

- Watermain Reserve Fund in the amount of \$264,000

➤ **Reference Reports:**

- [Report PWES-2020-15](#), "2018 Water and Wastewater Master Plan Update, Study Completion and Final Adoption", March 10, 2020; Motion RCM-87/20.
- [Report PWES-2021-13](#), "Amendment to the 2021 PWES Capital Works Projects, County Road 19 Trunk Watermain Installation (from County Road 22 to south of Jamsyl Drive)", March 9, 2021; Motion RCM-75/21.

A9. County Road 46, Webster and Laval Sanitary Sewer Extension

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$445,250	\$6,303,550	\$0	\$6,748,000
Estimated Landowner Recoveries (Sanitary Sewers): \$1,767,000			

In December 2018, Council approved the recommendations of Report PWES-2018-08 that authorized Administration to complete the engineering design for the CR46 Webster and Laval Sanitary Sewer Extension. In accordance with this report, Dillon Consulting Ltd. was retained to complete the engineering design.

The CR46 Webster and Laval Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. The project includes the extension of a sanitary sewer along CR46 from the 8th Concession Road to Webster Drive, as well as on Webster Drive (entire length), and the extension of a sanitary sewer through an easement just south of Highway 401. This project will

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incorporate the strategic priorities of growth and economic development as outlined within the May 5, 2022 SCM Presentation.

Detailed design, consultation with utility companies and preparation of final easement documentation continued in 2022. In addition, geotechnical investigations related to new regulations from the Ontario Ministry of Environment, Conservation and Parks for excess soil generated from construction projects commenced in late 2021. Detailed design will be completed in early 2023 with the preparation of tender documents, completion of the excess soil investigations and obtaining approvals. It is planned to tender the project in Fall of 2023 for construction to proceed in 2024.

The project cost of \$6,748,800 includes \$2,203,500 for road reconstruction, \$734,400 for storm sewers, \$2,101,300 sanitary sewers and \$1,709,600 for watermain.

Estimated recoveries from landowners for the sanitary sewers would be approximately \$1,767,000 and will be refined once the By-Law for the 8th Concession Road sanitary service area is in place.

Additional funding for this project is to be provided from the following:

- Road Lifecycle Reserve in the amount of \$2,082,750
- Wastewater Sewers Reserve Fund in the amount of \$1,934,600
- Storm Sewer Lifecycle Reserve in the amount of \$657,000
- Watermain Reserve Fund in the amount of \$1,629,20

➤ **Reference Reports:**

- [Report PWES-2018-08](#), "2019-2023 Public Works & Environmental Services Five Year Capital Works Plan", December 11, 2018; Motion RCM-361/18.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

A10. Del Duca Drive Sanitary Sewer Extension

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$524,350	\$4,880,350	\$0	\$5,404,700
Estimated Landowner Recoveries (Sanitary Sewers): \$1,050,000			

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In December 2018, Council approved the recommendations of Report PWES-2018-08 that authorized Administration to complete the engineering design for the Del Duca Drive Sanitary Sewer Extension. In accordance with this report, Stantec Consulting Ltd. was retained to complete the detailed design.

The Del Duca Drive Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. The project includes the extension of a sanitary sewer along Del Duca Drive and will incorporate the strategic priorities of growth and economic development as outlined within the May 5, 2022 SCM Presentation.

The Oldcastle Stormwater Master Plan was being completed concurrently with the design for the Del Duca Sanitary Sewer Extension. Through the Oldcastle Stormwater Master Plan it was determined that a future major storm event flow route is required from the Del Duca Drive cul-de-sac southerly to the Hurley Relief Drain. Coordination has occurred between these two projects to ensure that the Del Duca design provides for the anticipated recommendations of the Oldcastle Stormwater Master Plan. Based on this coordination, it was determined that a previously identified sanitary easement needs to be modified to accommodate a future storm sewer. Continued discussions will take place with property owners and it is anticipated the necessary easements will be obtained by mid-2023.

It is anticipated that completion of the detailed design, easement acquisition, geotechnical investigations related to new regulations from the Ontario Ministry of Environment, Conservation and Parks for excess soil generated from construction projects, utility relocations, preparation of tender documents and obtaining required approvals will occur in early 2023. It is planned to tender the project in Fall 2023 for construction to proceed in 2024.

The project cost of \$5,404,700 includes \$2,153,900 for road reconstruction, \$1,898,200 for storm sewers, \$1,316,700 for sanitary sewers and \$35,900 for watermains. Estimated recoveries from landowners for the sanitary sewers would be approximately \$1,050,000 and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed.

Additional funding for this project is to be provided from the following:

- Road Lifecycle Reserve in the amount of \$2,036,450
- Wastewater Sewers Reserve Fund in the amount of \$1,108,200
- Storm Sewer Lifecycle Reserves in the amount of \$1,708,350
- Watermain Reserve Fund in the amount of \$27,350

➤ **Reference Reports:**

- [Report PWES-2018-08](#), "2019-2023 Public Works & Environmental Services Five Year Capital Works Plan", December 11, 2018; Motion RCM-361/18.

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- [Report PWES-2020-33](#), “Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects”, December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), “Approval of 2022 Public Works & Engineering Services Capital Works Projects”, January 25, 2022; Motion RCM-23/22.

A11. 2023 Sanitary Pump Station Improvements

Previously Approved	Requested for 2022	Future Costs	Total Project Costs
\$0	\$130,000	\$0	\$130,000

The Town owns and operates four (4) sanitary pump stations. The 2016 Pump & Metering Station Condition Assessment identified 'Immediate Repairs' and '10 Year Repairs' for the sanitary pump stations. In addition, The Town contracts the Ontario Clean Water Agency (OCWA) as the Overall Responsible Operator for the Town's pump stations. Accordingly, OCWA also provides recommendation to the Town for the on-going maintenance needs of our pump stations.

Administration recommends the following sanitary pump station works be undertaken in 2023, based on the recommendations contained in the 2016 Pump & Metering Station Condition Assessment and the recommendations provided by OCWA:

- Sylvestre Drive Sanitary Pump Station (Estimated Cost \$30,000)
 - Purchase of a spare pump (emergency rentals are not available anymore)
- Lakewood Sanitary Pump Station (Estimated Cost \$70,000)
 - Purchase of a spare pump (emergency rentals are not available anymore)
- Gauthier Sanitary Pump Station (Estimated Cost \$30,000)
 - Screw inspection
 - Upper and lower bearing 30HP pump

Funding for this project is to be provided from the Wastewater Facilities Reserve Fund in the amount of \$130,000.

➤ Reference Reports:

- [Report PWES No. 51/16](#), “2016 Pump & Metering Station Condition Assessment”, December 13, 2016; Motion RCM-440/16.

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A12. Ministry of Environment, Conservation and Parks – Consolidated Linear Infrastructure

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$50,000	\$0	\$50,000

The Province has adopted a Consolidated Linear Infrastructure Permissions Approach (CLI) to replace the current Ontario Environmental Compliance Approvals (ECA) framework for low risk projects related to municipal sanitary collection and stormwater management.

The purpose of the CLI is to consolidate certain municipal sewage works approvals into the following: a single CLI ECA for all of a municipality's sanitary collection works and a single CLI ECA for all of a municipality's stormwater management works (collectively, CLI ECAs).

The Province's stated objective with transitioning to CLI and consolidating approvals under the CLI ECAs is to reduce administrative regulatory burden, provide clear and consistent requirements across the province and improve environmental protection. The CLI will replace the current 'one-for-one' or 'pipe-by-pipe' environmental compliance approval system with a consolidated list of approved municipal sewage works, in one approval document for each type of municipal sewage system, that will cover all infrastructure, as applicable, within i) the Town's sewage collection system and ii) the Town's stormwater management system.

In addition, the ECAs will outline the Town's requirements for establishing Operational & Maintenance (O&M) Manuals for all of the CLI infrastructure, criteria for an erosion control plan (ECP) and monitoring plans, as well as reporting timelines for all inspection, operational and maintenance activities.

In reviewing the draft CLI ECA for the Town, Administration is recommending allocating a \$50,000 allowance to retain consulting services as needed to assist in the creation of the required O&M Manual, Standard Operating Procedures, ECPs, Monitoring Plans and reporting documentation.

Funding for this project is to be provided from the following:

- Storm Sewer Lifecycle Reserve in the amount of \$25,000
- Wastewater Facilities Reserve Fund in the amount of \$25,000

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A13. Scully & St. Mark's Storm Pump Station & Riverside Drive Storm Sewers

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$17,050,000	\$6,285,000	\$0	\$23,335,000
Grant (confirmed): DMAF 2020 Intake - \$6,820,000			

This project consists of decommissioning the St. Mark's storm pump station and redirecting those flows into an upgraded and expanded Scully storm pump station to provide a greater level of service. The consolidated Scully St. Mark's pump station is to have increased pump capacity to accommodate the additional flows from the current St. Mark's service area, as well as other adjacent areas where interconnections and overland flows have been identified as part of the Town's Storm Drainage Master Plan (2019). This project also includes trunk storm sewer improvements along Riverside Drive to add resiliency to the system and improve the level of service to address area-wide issues of surface flooding.

In October 2020 the Town was advised that our funding application to the federal Disaster Mitigation and Adaptation Fund (DMAF) was approved for funding totalling \$10.7M for the following projects:

- Scully & St. Mark's Storm Pump Station & Riverside Drive Trunk Storm Sewers project.
- P.J. Cecile Storm Pump Station Improvements project.

Under DMAF, all works must be completed by March 31, 2028. The Scully & St. Mark's Storm Pump Station & Riverside Drive Trunk Storm Sewer project is a major infrastructure improvement project that will enhance the level of service and provide approximately 6-times more capacity than the existing pump station to accommodate the growing frequency of heavy rainfall events.

The DMAF projects were originally valued at \$26.7M with the Town receiving \$10.7M in DMAF grant funding. Phase 1, the Scully-St. Mark's Pump Stations and Riverside Storm Trunk Sewer was estimated at \$17.05M and Phase 2 PJ Cecile Storm Pump Station was estimated at \$9.70M.

The project cost estimates have been updated to be more in line with recent market conditions and inflation. The Scully-St. Marks Pump Stations and Riverside Drive estimate was increased to \$23,335,000 from \$17.05M, which is broken down as \$20,600,000 for storm sewers and pumping stations, \$635,000 for sanitary sewers and \$2,100,000 for road reconstruction. Discussions have been ongoing with DMAF staff on whether the grant funding allocation of \$10.7M will be increased, and the response to date has been to wait to see how the tendering costs are submitted.

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Throughout 2022 the Town's Consultant, Dillon Consulting Ltd., has continued with the engineering designs for the pump station and sewer improvements, which are nearing the 100% completion stage.

In August 2022, Wood Canada Limited was retained to perform ancillary consulting services, which included:

- Excess soils regulations and geotechnical services
- Shoreline protection wall design
- Stage 1 & 2 Archeological Assessment and Indigenous Consultation

It is planned to complete all design components of this project by Q1 2023 with tendering anticipated in Q1 2023.

Additional funding for this project is to be provided from the following:

- Storm Sewer Lifecycle Reserve in the amount of \$5,493,000
- Wastewater Sewers Reserve Fund in the amount of \$220,000
- Road Lifecycle Reserve in the amount of \$572,000

➤ **Reference Reports:**

- [Report PWES-2018-17](#), "Flood Mitigation Strategy", June 26, 2018; Motion RCM-194/18.
- [Report PWES-2018-08](#), "2019-2023 Public Works & Environmental Services Five Year Capital Works Plan", December 11, 2018; Motion RCM-361/18.
- [Report PWES-2019-02](#), "Disaster Mitigation and Adaptation Fund, Special Spring 2019 Flooding Intake, Expression of Interest and Full Application", July 23, 2019; Motion RCM-229/19.
- [Report PWES-2019-50](#), "Storm Drainage Master Plan, Study Completion and Final Adoption", December 10, 2019; Motion RCM-402/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services, 2022 Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2021-03](#), "Disaster Mitigation and Adaptation Fund, Agreement for Climate Change and Flood Resiliency Project, Storm Infrastructure Improvements", February 9, 2021; Motion RCM-40/21.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects", January 25, 2022; Motion RCM-23/22.

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- [Report PWES-2022-34](#) "Disaster Mitigation and Adaptation Fund 2020 Intake Ancillary Consulting Services for the Scully and St. Marks Pump Stations – Tender Award", August 09, 2022; Motion RCM-250/22

A14. P.J. Cecile (Kensington) Storm Pump Station

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$2,000,000	\$9,639,800	\$0	\$11,639,800
Grant (confirmed): DMAF 2020 Intake - \$3,880,000			

This project consists of the construction of a new pump station over the footprint of the existing structure with increased capacity and larger inlet and outlet piping.

As indicated in A13 above, the Town received federal funding for this project through the DMAF program. As noted, under the DMAF, all works must be completed by March 31, 2028.

The P.J. Cecile (Kensington) Storm Pump Station is a major infrastructure improvement project that will enhance the level of service and provide approximately 8-times more capacity than the existing pump station to accommodate the growing frequency of heavy rainfall events.

The DMAF projects were originally valued at \$26.7M with the Town receiving \$10.7M in DMAF grant funding. Phase 1, the Scully-St. Mark's Pump Stations and Riverside Storm Trunk Sewer was estimated at \$17.05M and Phase 2 PJ Cecile Storm Pump Station was estimated at \$9.70M.

The project cost estimates have been updated to be more in line with recent market conditions and inflation. The Scully-St. Marks Pump Stations and Riverside Drive estimate was increased to \$11,639,800 from \$9.70M, which is broken down as \$11,311,000 for storm sewers and pump stations and \$328,800 for road reconstruction. Discussions have been ongoing with DMAF staff on whether the grant funding allocation of \$10.7M will be increased, and the response to date has been to wait to see how the tendering costs are submitted.

A Request for Proposals for Engineering Consulting Services for the detailed design, contract administration and Inspection has been issued and Administration will be bringing forward a separate report for awarding those services.

Additional funding is to be provided from the following:

- Storm Sewer Lifecycle Reserve in the amount of \$9,367,500
- Road Lifecycle Reserve in the amount of \$272,300

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➤ **Reference Reports:**

- [Report PWES-2018-17](#), "Flood Mitigation Strategy", June 26, 2018; Motion RCM-194/18.
- [Report PWES-2018-08](#), "2019-2023 Public Works & Environmental Services Five Year Capital Works Plan", December 11, 2018; Motion RCM-361/18.
- [Report PWES-2019-02](#), "Disaster Mitigation and Adaptation Fund, Special Spring 2019 Flooding Intake, Expression of Interest and Full Application", July 23, 2019; Motion RCM-229/19.
- [Report PWES-2019-50](#), "Storm Drainage Master Plan, Study Completion and Final Adoption", December 10, 2019; Motion RCM-402/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2021-03](#), "Disaster Mitigation and Adaptation Fund, Agreement for Climate Change and Flood Resiliency Project, Storm Infrastructure Improvements", February 9, 2021; Motion RCM-40/21.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects", January 25, 2022; Motion RCM-23/22.

A15. Public Works & Transportation North Building Improvements

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$66,000	\$534,000	\$600,000

The original Public Works & Transportation north building is an older structure that has had two major expansions to it over the years. The first being an expansion to the east for a forebay and storage pre-1987, and the second being an expansion to the west that included four (4) forebays in 2001/2002. There have been no significant improvements to the kitchen, washroom, change room and employees work space in the last 20 years.

Improvements to the Public Works & Transportation north building are required to meet obligations under the Occupational Health & Safety Act, which include the recommendations of:

- A second washroom facility that will be accessible for staff and outside contractors (i.e. Essex Power) without having to walk through the employee change room.
- A new mud room and laundry facility.

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- A relocated storage room.
- An improved change room to include a new staff washroom w/ shower and private change areas.
- An improved kitchen, lunch area, work stations with computers and printer, a file area for drawings, first aid and eye wash station and a whiteboard/projector area for staff training and educational webinars.
- New HVAC system

The project budget is estimated to be \$600,000, with \$52,000 for design, \$428,000 for construction and \$120,000 for Contingency.

It is anticipated that design would commence in 2023 and the recommended improvements would take place in 2024.

Funding for the initial phase of this project is to be provided from:

- Road Lifecycle Reserve in the amount of \$22,000
- Wastewater Sewers Reserve Fund in the amount of \$22,000
- Storm Sewer Lifecycle Reserve in the amount of \$22,000

A16. Multi-Use Recreational Trails: Lesperance Road (Riverside Drive to First Street) & Little River Boulevard (Lesperance to City Limits) & Lesperance Road Rehabilitation (McNorton Street to First Street)

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$0	\$4,700,000	\$0	\$4,700,000
Grant (applied): Active Transportation Fund - \$2,616,000			

At the March 8, 2022 Regular Meeting of Council, Council authorized Administration, under report PWES-2022-11, to submit an application for funding under the Active Transportation Fund for a future commitment to install a multi-use recreational trail on the west side of Lesperance Road (from Riverside Drive to First Street) and on the north side of Little River Boulevard (from Lesperance Road to Gauthier Street).

The Active Transportation Fund (ATF) is a national, merit-based contribution program intended to support projects that improve active transportation infrastructure across Canada. The Fund will make available \$400 million over five years to help build new and expanded networks of pathways, bike lanes, trails and pedestrian bridges, as well as support Active Transportation planning and stakeholder engagement activities. Projects under the Capital Stream of the ATF will be funded up to 60% with no maximum amount payable.

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A formal announcement for funding has not yet been made, however, Administration has included this project within the 2023-2027 Five Year Capital Works Plan in the event the Town is successful in its application.

Should the Multi-Use Recreational Trails project proceed, Administration also recommends that Lesperance Road from McNorton Street to First Street be rehabilitated (milling and paving, catch basin and manhole repairs and new pavement markings for the continuation of the on-street bike lanes).

If the application to the Active Transportation Fund is successful, Administration will report back to Council for approval to enter into an agreement with the Government of Canada. Works would not commence on this project until confirmation that the grant is in place.

The estimated project cost is \$4,700,000, with \$4,360,000 for the Multi-Use Recreational Trails and \$340,000 for the rehabilitation of Lesperance Road from McNorton Street to First Street. The ATF grant would cover up to 60% of the \$4,360,000, totaling \$2,616,000.

Funding is to be provided from the following:

- Infrastructure Reserve in the amount of \$4,360,000
- Road Lifecycle Reserve in the amount of \$340,000

➤ **Reference Reports:**

- [Report PWES-2022-11](#), "Active Transportation Fund, Multi-Use Recreational Trails: Lesperance Road & Little River Boulevard", March 8, 2022; Motion RCM-84/22.

Section B: Carry Over Projects from 2022 Not Requiring Additional Funding in 2023

B1. Lesperance/VIA Rail Improvements

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$4,271,200	\$0	\$0	\$4,271,200
Grant (confirmed): Rail Safety Improvement Program - \$1,232,400			

On March 19, 2021, the Town received confirmation that the Tecumseh Road VIA Crossing Improvements project had been selected for 2021-2022 Rail Safety Improvement Funding. Subsequently, Dillon Consulting Ltd. was retained to undertake

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the detailed design for the project due to their past involvement in the crossing investigations and on-going work with the related Tecumseh CIP/Streetscape project.

On June 28, 2022, the members of Council rejected the single tender received due to it being significantly over budget. The project was re-tendered in November 2022 and subsequently the second tender was awarded to Rudak Excavating Inc. at the December 13, 2022 meeting of Council. It is anticipated that construction will commence in the Spring 2023.

The Town was successful in receiving funding through the Rail Safety Improvement Program (RSIP) for 80% of eligible costs up to a maximum of \$1,027,000. Subsequent discussions with RSIP Staff have resulted in additional funding (up to 20% of the original grant) being available, which would total \$205,400.

Additional details and project scope can be found within the reference reports listed below.

➤ **Reference Reports:**

- [Report PWES-2019-49](#), “2020-2024 Public Works & Environmental Services Five Year Capital Works Plan” December 10, 2019; Motion RCM-401/19
- [Report PWES-2020-24](#), “Rail Safety Improvement Program – Infrastructure, Technology and Research Funding (RSIP-ITR) 2021/2022 Intake VIA Crossing at Lesperance Road (Chatham Mile 99.31)”, July 28, 2020; Motion RCM-236/20
- [Report PWES-2021-32](#), “Rail Safety Improvement Program, 2021/2022 Intake Agreement for Rail Grade Crossing Improvements VIA Rail at Lesperance Road (Chatham Mile 99.31)”, July 13, 2021; Motion RCM-229/21
- [Report PWES-2022-32](#), “Lesperance Road VIA Rail Crossing Improvements – Tender Results”, June 28 2022; Motion RCM-198/22
- [Report PWES-2022-44](#), “Lesperance Road VIA Rail Crossing Improvements – Tender Award and VIA Rail Agreements”, December 13, 2022; Motion RCM-345/22)

B2. County Road 42 and County Road 43 Improvements – Phase 1

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$6,476,000	\$0	\$0	\$6,476,000

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Improvements to CR42 (City of Windsor to CR19) and CR43 (south of CR42 to CP Rail) were identified as part of the County's 25-year capacity program. Over the last few years, work on the project has progressed as the County retained an engineering consultant for the detailed design, acquired the required property and advanced utility relocations along CR42.

Based on these proposed road improvements, Tecumseh Administration identified improvements to existing or new municipal services (watermains and sanitary sewers) that were required. In December 2018, Council approved the recommendations of Report PWES-2018-08 that included the undertaking of advanced engineering design for these municipal services as part of the County's improvement project.

At the January 25, 2022 Regular Meeting of Council the members approved the recommendations (Motion: RCM-23/22) of Report PWES-2022-03, titled 'Approval of 2022 Public Works & Engineering Services Capital Works Projects' that authorized Administration to proceed with the identified 2022 capital works projects including the construction of water mains and sanitary sewers as part of the CR42 and CR43 improvement project.

At the September 7, 2022 Regular Meeting of County Council, the members adopted the County Administration Report on the CR42 and CR43 Phase 1 project. The report highlighted the County's procurement efforts that included and advertised tender and limited tender. The County retained a contractor and construction commenced in Q4 2022. Phase 1 works consists of the installation of underground infrastructure on CR42 from CR19 to CR43. Construction of Phase 1 is anticipated to be completed in December 2023.

➤ **Reference Reports:**

- [Report PWES-2018-08](#), "2019-2023 Public Works & Environmental Services, Five Year Capital Works Plan", December 11, 2018; Motion RCM-361/18.
- [Report PWES-2019-49](#), "2020-2024 Public Works & Environmental Services Five Year Capital Works Plan", December 10, 2019; Motion RCM-401/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report CAO-2020-06](#), "Boundary Adjustment Agreement and the County Road 43 Class Environmental Assessment Study", August 11, 2020; Motion RCM-245/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects", January 25, 2022; Motion RCM-23/22.

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B3. North Tecumseh Water Distribution Model

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$70,000	\$0	\$0	\$70,000

In March 2020, Council approved the recommendations of Report PWES-2020-15 which adopted the Tecumseh 2018 Water and Wastewater Master Plan Update.

The Town of Tecumseh receives its potable water supply from the ENWIN Utilities Water System. In 2019, the ENWIN Utilities Water System Master Plan was completed which incorporated information from the Tecumseh 2018 Water and Wastewater Master Plan Update.

As a result of the Master Plan recommendations, discussions have occurred between Town Administration and ENWIN to optimize the water system needs. ENWIN currently has a functional water model which accurately depicts the City of Windsor and Town of LaSalle's water distribution systems. ENWIN's model includes a high-level layout of the Tecumseh water distribution system, however, to optimize the system requirements a more detailed model of the Tecumseh water system is required.

In 2021, ENWIN, through coordination with the Town, expanded their water model to include a detailed assessment of the Town's South water distribution system to more accurately represent the system and use the model to determine the best location for an elevated water storage facility within the ENWIN-Tecumseh system. The detailed water model also allows Tecumseh to assess existing water flows and pressures within the south Tecumseh system and develop strategies to improve water supply in identified areas of concern.

A similar water model update is to be completed on the Town's North water distribution system. This model will provide insight into the existing characteristics of the water distribution system, assist with the design of future watermain replacement projects and assess available capacity to accommodate infill and redevelopment within the Town.

Funding for this project will be from the Watermain Reserve Fund in the amount of \$70,000.

➤ **Reference Reports:**

- [Report PWES-2020-15](#), "2018 Water and Wastewater Master Plan Update, Study Completion and Final Adoption", March 10, 2020; Motion RCM-87/20.

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- [Report PWES-2022-03](#), “Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects”, January 25, 2022; Motion RCM-23/22.

B4. Sanitary Sewer Model Update and Flow Monitoring

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$345,000	\$0	\$0	\$345,000

In June 2018, Council approved the recommendation of Report PWES-2018-17 “Flood Mitigation Strategy” that the report be received. Continued flow monitoring and sanitary sewer modeling were recommended flood mitigation strategies in the report. The report further identified that updating the sanitary sewer model would be incorporated within the 5-year PWES Capital Works Plan.

In December 2018, Council approved the recommendations of Report PWES-2018-08 that authorized Administration to complete a Sanitary Sewer Model Update and Flow Monitoring project. In accordance with this report, Dillon Consulting Ltd. was retained to undertake the modelling project.

A significant component of the model development is model calibration/verification. In order to calibrate/verify a model, flow monitoring data is used to confirm that the flows generated by the model are representative of actual flows measured in the sewers during recorded events. In order to assess rain derived inflow and infiltration, a significant rainfall event is required. During the scheduled flow monitoring period, only minor rain events were received. Accordingly, the flow monitoring was extended into Fall 2021 which captured the significant rainfall event of July 16, 2021.

The final report for this project is expected in early 2023. The updated model will provide insight into the existing flow characteristics of the sanitary sewer system and on available sanitary sewer capacity to accommodate infill development within the Town.

Funding for this project was previously provided from the Wastewater Sewers Reserve Fund in the amount of \$345,000.

➤ Reference Reports:

- [Report PWES-2018-17](#), “Flood Mitigation Strategy”, June 26, 2018; Motion RCM-194/18.
- [Report PWES-2018-08](#), “2019-2023 Public Works & Environmental Services Five Year Capital Works Plan”, December 11, 2018; Motion RCM-361/18.

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- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects", January 25, 2022; Motion RCM-23/22.

B5. 8th Concession Sanitary Sewer By-Law

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$45,000	\$0	\$0	\$45,000

The Oldcastle Hamlet is approximately 815 Ha of land which has largely developed for industrial purposes. Many existing developments within the hamlet had historically been serviced by private on-site sewage disposal (septic) systems.

Several studies, however, identified significant pollution problems and potential health risks attributed to the discharge of raw wastewater from failing septic systems into roadside open ditches. As a result of these studies, the Town commenced the phased introduction of sanitary sewers into the Oldcastle Hamlet in 2010. The Oldcastle Hamlet is serviced by two trunk sanitary sewers: North Talbot Road Trunk Sanitary Sewer and 8th Concession Road Trunk Sanitary Sewer.

In December 2011, Council approved the recommendations of PWES Report No.39/11 where it was recommended the cost of the sanitary sewer collection system (including the municipal sanitary sewers (sewer mains) and the pipes within the municipal road allowances that connect each property to a sewer main (laterals)) for the area within the North Talbot Road Sanitary Sewer Outlet be assessed against the benefitting lands within that area based on Main and Lateral Charges in accordance with Part XII of the Municipal Act 2001; and that the "North Talbot Road Sanitary Sewer Outlet Main and Lateral Charges By-Law" be considered.

Similar to the cost recovery process for the North Talbot Road Sanitary Sewer Outlet Area, it was intended that the cost of the sanitary sewer collection system for the 8th Concession Road Sanitary Sewer Outlet Area would be assessed against the benefitting lands within that area in accordance with Part XII of the Municipal Act.

In February 2018, Council approved the recommendations of Report PWES-2018-01 which included the cost of the sanitary sewer collection system for the "8th Concession Road Sanitary Sewer Outlet" area be assessed against the benefitting lands within that area based on Main and Lateral Charges in accordance with Part XII of the Municipal Act; and that a by-law that outlines the charges be considered.

In 2022 Watson & Associates was retained to assist the Town with the preparation of a Part XII By-Law to recover costs for the sanitary sewer collection system servicing

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the 8th Concession Sanitary Sewer Area from the benefitting lands. It is anticipated the a report and by-law would be brought to Council by mid-2023.

Funding for this project was previously provided from the Wastewater Sewers Reserve Fund in the amount of \$45,000.

➤ **Reference Reports:**

- [Report PWES No. 39/11](#), “North Talbot Road Sanitary Sewer Outlet, Part XII By- Law”, December 13, 2011; Motion RCM-427/11.
- [Report PWES No. 45/17](#), “8th Concession Road Sanitary Sewer Outlet, Main and Lateral Charges Cost Recovery By-Law”, September 26, 2017; Motion SCM- 13/17.
- [Report PWES-2018-01](#), “8th Concession Road Sanitary Sewer Outlet, Main and Lateral Charges Cost Recovery Part XII By-Law”, February 13, 2018; Motion SCM-02/18.
- [Report PWES-2022-03](#) “Approval of 2022 Public Works & Engineering Services Capital Works Projects”, January 25, 2022; Motion RCM-23/22.

B6. County Road 42 and County Road 43 Improvements – Phase 2

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$378,800	\$0	\$681,200	\$1,060,000

In December 2020 Council approved the recommendations of Report PWES-2020-33 that authorized Administration to proceed with the engineering design of two sections of watermain on CR43 and Banwell Road. These locations consist of:

- CR43 from CR42 to Shields Drive (\$260,000)
- Banwell Road / CR43 from Intersection Road to South of CP Rail (\$800,000)

Connection of these existing watermain will add resiliency to the water supply for the Tecumseh Vista School, improve water quality and reduce the required number of auto flushers.

Based on the County of Essex revised phasing plan for their CR 42/43 improvements, it is anticipated that the design of the CR43/Banwell watermain will be coordinated with the County's project and that construction would commence in 2024/2025.

Funding for this project was previously provided from the Watermain Reserve Fund in the amount of \$378,800.

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➤ **Reference Reports:**

- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

B7. Hwy 3/CR34 Water Valve Replacement

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$456,300	\$0	\$0	\$456,300

In December 2020, Council approved the recommendations of Report PWES-2020-33 that authorized Administration to proceed with the Hwy 3/CR43 Water Valve Replacement Project. This project consists of the replacement of water valves on the existing 300mm diameter watermain located on Highway No.3 (Oldcastle Road to CR34) and on CR34 (Highway No.3 to Malden Road). Blackrock Consulting Ltd. was retained to prepare tender documents and to assist with tendering and contract administration. Draft tender documents were prepared in 2021 along with preliminary discussions with approval agencies, it is anticipated construction will commence in 2023.

Funding for this project was previously provided from the Watermain Reserve Fund in the amount of \$456,300.

➤ **Reference Reports:**

- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

B8. Sylvestre Drive Sanitary Sewer Extension

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$285,000	\$0	\$2,211,900	\$2,496,900
Estimated Landowner Recoveries (Sanitary Sewers): \$1,324,400			

This project consists of the extension of a sanitary sewer on Sylvestre Drive from Sylvestre Drive to CR19 (approximately 410-metres), as well as adjacent to the CR19 right-of-way through a future easement (approximately 215-metres) or within an

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expanded County road right of way as part of a future CR19 improvement project. The installation of the sanitary sewers to service the properties identified within the study area is in keeping with Town's Water & Wastewater Master Plan, the Provincial Policy Statement, the County of Essex Official Plan, and the Town's Official Plan to provide full municipal services to those properties within designated Settlement Areas.

It was originally planned to obtain required approvals, prepare tender documents, obtain easements and undertake utility relocations in 2020 with construction tentatively planned to proceed in 2021. The County of Essex recently advised that future improvements to CR19 may commence in the next 5 to 10 years. The CR19 improvements will require the County to obtain a right of way widening over the area where the sanitary sewer easement is required. To obtain construction efficiencies and potentially avoid the need for the Town to obtain easements, it is beneficial to plan for this sanitary sewer construction when the CR19 improvements are completed. Accordingly, the potential construction of this project has tentatively been moved to beyond 2025. This schedule will be further updated in future Five Year Capital Works Plans as the County's schedule for the CR19 improvements is refined.

The project cost of \$2,496,900 includes \$1,114,000 for road works, \$1,324,400 for sanitary sewers and \$58,500 for storm sewers.

Estimated recoveries from landowners for the sanitary sewers would be approximately \$1,324,400, with assessments to be calculated by Administration and invoiced back to the landowners by means of a Part XII by-law (Municipal Act, s.391).

In January 2022, Council authorized Administration to hold a Public Information Centre to communicate estimated changes to the property owners and to report back to Council with a summary of the comments for consideration in preparing the cost recovery by-law. A virtual PIC was held between March 24 and April 22, 2022. The results of the PIC and a final by-law will be brought forward to Council in a separate report for the consideration in early 2023.

Funding for this project was previously provided from the following:

- Road Lifecycle Reserve in the amount of \$94,000
- Wastewater Sewers Reserve Fund in the amount of \$186,800
- Storm Sewer Lifecycle Reserves in the amount of \$4,200

➤ **Reference Reports:**

- [Report PWES No. 57/17](#), "2018-2022 Public Works & Environmental Services Capital Works Plan", December 12, 2017; Motion RCM-441/17.
- [Report PWES-2019-31](#), "Sylvestre Drive Sanitary Sewer Extension, Municipal Class Environmental Assessment, Schedule B – Filing the Notice of Study Completion", July 23, 2019; Motion RCM-232/19.

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- [Report PWES-2019-51](#), “Sylvestre Drive Sanitary Sewer Extension, Municipal Class Environmental Assessment, Schedule B – Study Completion and Final Adoption”, December 10, 2019; Motion RCM-403/19.
- [Report PWES-2020-33](#), “Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects”, December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), “Approval of 2022 Public Works & Engineering Services Capital Works Projects”, January 25, 2022; Motion RCM-23/22.

B9. Shoreline Management Plan

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$350,000	\$0	\$0	\$350,000

In June 2018, Report PWES-2018-17 outlined the need for a Shoreline Management Plan as one of the recommended flood mitigation strategies. This Plan was subsequently incorporated within the 2020 5-year PWES Capital Works Plan. Thereafter, Zuzek Inc. was retained to complete the study.

The Shoreline Management Plan commenced in 2020 with public information centres held on October 29, 2020, April 20, 2021 and August 18, 2021. The Shoreline Management Plan generally includes the following components:

- Re-assessment of the 1:100-year Lake St. Clair flood elevations.
- A detailed shoreline property inventory including topographic information for each shoreline property within the Town of Tecumseh.
- Determination of vulnerable flood locations along the shoreline.
- Determination of extent of inland flooding based on lake water conveyance through vulnerable areas.
- Assessment of potential impacts of climate change.
- Assessment of lake flooding plus rain generated runoff (Integration with Dillon 2D Storm Drainage Master Plan model).
- Damage value estimates for public and private properties.
- High level conceptual mitigation measures that could be considered in the next phases of the study.

The study is expected to be finalized and reported to Council in early 2023. It is intended that the final report to Council will include a presentation by the study consultant.

Funding for this project was previously provided from the Storm Sewer Lifecycle Reserve in the amount of \$350,000.

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➤ **Reference Reports:**

- [Report PWES-2018-17](#), "Flood Mitigation Strategy", June 26, 2018; Motion RCM-194/18.
- [Report PWES-2019-49](#), "2020-2024 Public Works & Environmental Services Five Year Capital Works Plan", December 10, 2019; Motion RCM-401/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services, 2022 Capital Works Projects", January 25, 2022; Motion RCM-23/22.

B10. Stormwater Rate Study

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$45,000	\$0	\$0	\$45,000

In December 2019, Council authorized Administration to undertake a Stormwater Rate Study, the study was to assess the feasibility of implementing a user fee system to meet the significant funding requirements needed to implement stormwater infrastructure improvements. Watson & Associates Economists Ltd were retained to undertake the Study, which is nearing completion.

Funding for this project was previously provided from the Storm Sewer Lifecycle Reserve in the amount of \$45,000.

➤ **Reference Reports:**

- [Report PWES-2019-50](#), "Storm Drainage Master Plan, Study Completion and Final Adoption", December 10, 2019; Motion RCM-402/19.
- [Report PWES-2019-49](#), "2020-2024 Public Works & Environmental Services Five Year Capital Works Plan", December 10, 2019; Motion RCM-401/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

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B11. Manning Road Secondary Plan Area (MRSPA) – Stormwater Infrastructure

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$2,780,000	\$0	\$9,955,000	\$12,735,000
Estimated Landowner Recoveries (Stormwater): \$10,188,000			

In December 2019 through Report PWES-2019-49, Council authorized Administration to complete the detailed design for the Manning Road Secondary Plan Area (MRSPA) stormwater facility and to move forward with acquiring property for the MRSPA stormwater management pond in 2020. In accordance with this report, Dillon Consulting Ltd. was retained based on their previous work on the MRSPA EA, MRSPA EA Addendum and related Functional Servicing Report (FSR).

This project will incorporate the strategic priorities of growth and economic development as outlined within the May 5, 2022 SCM Presentation.

During 2020, the Town acquired property for the MRSPA stormwater management facility. In addition, prior to completing the detailed design for the MRSPA stormwater facility, the previous 2015 Environmental Study Report and FSR must be updated to reflect the current storm design criteria as provided in the Windsor/Essex Region Stormwater Management Standards Manual (December 2018). This is anticipated to be completed in early 2023.

Options for cost recovery are currently being considered by Administration, and a future report will be brought forward to Council regarding cost recovery recommendations for this project.

Funding for this project was previously provided from the Storm Sewer Lifecycle Reserve in the amount of \$2,780,000.

➤ Reference Reports:

- [Report PWES-2019-55](#), "Amendment to 2019-2023 PWES Five Year Capital Works Plan, Manning Road Secondary Plan Area, Stormwater Management Facility", November 12, 2019; Motion RCM-369/19.
- [Report PWES-2019-49](#), "2020-2024 Public Works & Environmental Services Five Year Capital Works Plan", December 10, 2019; Motion RCM-401/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20.
- [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

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B12. Tecumseh Hamlet Environmental Assessment & Functional Servicing Report

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$805,000	\$0	\$0	\$805,000

In December 2019, Council authorized Administration to undertake various initiatives to move forward with the Tecumseh Hamlet Secondary Plan area. These initiatives included a stormwater management analysis, finalizing the road network and commencing the Class EA, which would run concurrently with the related planning process for the Tecumseh Hamlet Secondary Plan.

This project will incorporate the strategic priorities of growth and economic development as outlined within the May 5, 2022 SCM Presentation.

It is anticipated that the Tecumseh Hamlet Secondary Plan, along with the Class EA and Functional Servicing Report will be completed by early/mid 2023.

Funding for this project was previously provided from the following:

- Road Lifecycle Reserve in the amount of \$98,000
- Watermain Reserve Fund in the amount of \$98,000
- Wastewater Sewers Reserve Fund in the amount of \$113,000
- Storm Sewer Lifecycle Reserve in the amount of \$496,000

➤ Reference Reports:

- [Report PWES-2019-49](#), "2020-2024 Public Works & Environmental Services Five Year Capital Works Plan", December 10, 2019; Motion RCM-401/19.
- [Report PWES-2020-33](#), "Pre-Approval of 2021 Public Works & Environmental Services Capital Works Projects", December 8, 2020; Motion RCM-375/20. [Report PWES-2022-03](#), "Approval of 2022 Public Works & Engineering Services Capital Works Projects", January 25, 2022; Motion RCM-23/22.

B13. Centennial Drive & Woodridge Drive Watermain Replacement Project

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$3,500,000	\$0	\$0	\$3,500,000
Grant (confirmed): ICIP, Green Stream Stage II 2021 Intake - \$2,566,550			

In September 2021 Special Meeting of Council, Council authorized Administration to apply to the ICIP Green Stream Stage II 2021 Intake for the watermain replacement on

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the full length of Centennial Drive, a section of Woodridge Drive (from Dillon Drive to St. Thomas Street) and interconnections with Little River Boulevard and St. Thomas Street.

In April 2022, the Town received correspondence that their application to ICIP Green Stream Stage II 2021 Intake was successful. Projects under this intake are subject to a \$5 million funding cap for total eligible costs, with funding allocations of 40% Federal, 33.33% Provincial and 26.67% Municipal.

In June 2022, Council approved the recommendations of Report PWES-2022-21 that authorized Administration to add the Centennial Drive & Woodridge Drive Watermain Replacement project to the 2022 Capital Works projects. Total project expenditures of \$3,500,000 were also funded through the Watermain Reserve Fund.

A Request for Proposals was issued and HRYCAY Consulting Engineers Inc. was retained in September 2022 to undertake detailed design, contract administration and inspection for the project. Detailed design will be undertaken in 2022 and 2023, with construction tentatively scheduled for 2025.

With the ICIP Green Stream II 2021 Intake funding allocations of \$2,566,550, the Town's anticipated costs are \$933,450 of the total \$3.5M project cost.

Funding for this project was previously provided from the following:

- Watermain Reserve Fund in the amount of \$3,500,000

➤ **Reference Reports:**

- [Report PWES-2021-38](#), "Investing in Canada Infrastructure Program, Green Stream Stage II, 2021 Intake, Watermain Replacement Project: Centennial Drive & Woodridge Drive", September 8, 2021; Motion SCM-20/21.
- [Report PWES-2022-21](#), "Investing in Canada Infrastructure Program, Agreement for Green Stream Stage II, 2021 Intake, Watermain Replacement Project: Centennial Drive & Woodridge Drive", June 28, 2022; Motion RCM-197/22.

B14. Tecumseh Secondary Plan Area – Northwest Water & Wastewater Infrastructure Projects

Previously Approved	Requested for 2023	Future Costs	Total Project Costs
\$1,020,000	\$0	\$12,941,300	\$13,961,300

In June 2022, Council approved the recommendations of Report PWES-2022-27 that authorized Administration to add the Tecumseh Secondary Plan Area – Northwest Water & Wastewater Infrastructure Projects to the 2022 Capital Works projects.

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Expenditures for the completion of the detailed engineering design and funding for project management resources in 2022 and 2023 as outlined in the May 5, 2022 Special Council Meeting (SCM) PWES Capital Plan 2023-2031 Presentation to Council, were also authorized.

The recommended hybrid scenario from the May 5, 2022 SCM identified water and wastewater infrastructure projects to commence in the northwest area of the Tecumseh Hamlet between 2023 to 2026. This infrastructure will help facilitate development along the Banwell Road corridor (north of CP Rail) as well as provide sanitary relief to allow the area along the Manning Road corridor (south of CP Rail) to develop. The water and wastewater infrastructure includes the projects identified in the Town's Water & Wastewater Master Plan, 2018 Update, being: West Tecumseh Watermain (W-1), West Tecumseh Sanitary (WW-1) and Diversion Sanitary Sewer (WW-2).

It is anticipated that detailed engineering design will commence once the Tecumseh Hamlet Secondary Plan is completed in early 2023.

Funding for this project was previously provided from the following:

- Watermain Reserve Fund in the amount of \$300,000
- Wastewater Sewer Reserve Fund in the amount of \$720,000

➤ **Reference Reports:**

- [Report PWES-2020-15](#), "2018 Water and Wastewater Master Plan Update, Study Completion and Final Adoption", March 10, 2020; Motion RCM-87/20.
- [Report PWES-2022-27](#), "Amendment to the 2022 PWES Capital Works Projects, Tecumseh Secondary Plan Area – Northwest Water & Wastewater Infrastructure Projects", June 28, 2022; Motion RCM-199/22.

Section C: 2024-2027 Capital Projects

This section provides highlights of projects proposed for 2024-2027. Council approval and funding allocations will be sought for under the 5-year capital works plans that are brought forward to Council on an annual basis.

➤ **2024: Roads Needs Study (\$85,000)**

The Town utilizes a Road Needs Studies on a five-year basis to help prioritize road projects and gauge the Town's effectiveness in the replacement and rehabilitation strategies to date. The last Roads Needs Study was completed in 2019.

➤ **2024 & 2026: Bridge & Culvert Needs Study (Spans > 3m) (\$45,000 each)**

Inspection of the Town's 16 bridges and culverts with a span greater than 3.0 metres are to take place every two years as legislated by Section 2(3) of the *Public Transportation and Highway Act*. Previous studies were completed in 2003, 2008, 2014, 2016, 2018, 2020 and 2022.

➤ **2024/2026: Tecumseh Hamlet Secondary Plan Area – Northwest Stormwater Management Ponds, Gouin & Lachance (\$5,330,000)**

The northwest area of the Tecumseh Hamlet was identified as a high priority for development to proceed at the May 5, 2022 Capital Priorities Presentation to Council. The design of the trunk sanitary and watermain was approved in late 2022. This project has been identified should the Town need to assist the development community in the design, construction and financing of the regional stormwater management ponds. These costs would also be recoverable from the development community.

➤ **2024-2028: County Road 19 Improvements (\$4,225,000)**

The County of Essex will commence the first phase of construction in 2023/2024 on CR19 from CR22 to south of Jamsyl Drive. The timing of construction and costs allocated to the Town for the subsequent phases are as follows:

- 2026: Phase 2 Jamsyl to CP Rail – watermain (\$2,730,000)
- 2027: Phase 3 CP Rail Grade Separation – watermain (\$520,000)
- 2028: Phase 4 CP Rail to CR42 – watermain (\$975,000)

➤ **2025: Bridge & Culverts Needs Study (Spans < 3m) (\$80,000)**

A condition assessment was completed in 2016 on the Town's 72 bridges and culverts with spans that were less than 3.0 metres. It is recommended that an update to the study be completed to determine and prioritize the short, medium and long term recommended works.

➤ **2025: Lakewood Park Pedestrian Bridge Maintenance (\$200,000)**

As identified in the 2022 Bridge & Culvert Needs Study (Spans >3m), the Lakewood Park pedestrian bridge is showing signs of corrosion on the floor system (stringer members). It is recommended that maintenance be completed on the stringers and floor beams.

➤ **2025: Roadside Safety Improvements – Bridge #1010 (\$70,000)**

A roadside safety assessment, in accordance with the 2017 MTO Roadside Design Manual, of the Town's bridges and culverts identified the need to install a guide rail at Bridge #1010.

➤ **2025: Water & Wastewater Master Plan Update (\$200,000)**

The last update to the Water and Wastewater Master Plan was completed and brought to Council for approval in late 2019. Since that time, several studies are ongoing or completed that will impact the servicing strategy and warrant the need for a Master Plan update. These studies include:

- Water Model Update – South Service Area
- Water Model Update – North Service Area
- Tecumseh Hamlet Secondary Plan Area – Class EA and FSR
- Sanitary Sewer Model update

➤ **2025/2026: Riverside Drive East Pathway Improvements (\$487,500)**

Installation of a multi-use trail on the south side of Riverside Drive to connect the existing pathways between Arlington Boulevard and Kensington Boulevard. It is also recommended to install cross-rides at the intersections between Brighton Road and Manning Road and to conduct a lighting assessment to ensure the safety of trail users.

➤ **2025/2026: Brighton Road Pathway Extension and Traffic Calming (\$312,000)**

Extension of the existing pathway on the west side of Brighton Road, south of the Tecumseh Road roundabout for approximately 75-metres. This work would be in conjunction with a pedestrian cross-over and traffic calming measure on Brighton Road midway between Tecumseh Road and VIA Rail. The traffic calming measure was recommended as part of the 2019 Brighton Road Corridor Review.

➤ **2025-2027: County Road 42 & County Road 43 Improvements (\$882,000)**

The County of Essex has commenced the first phase of construction in 2022 and it is anticipated to be completed Q4 2023. The timing of construction and costs to the Town for the subsequent phases are estimated as follows:

- 2026: Phase 3 (CR42) – roads, sidewalks, bike lanes (\$247,000)
- 2027: Phase 4 (CR42) – sidewalks, bike lanes (\$635,000)

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➤ **2026: (Tecumseh) Storm Drainage Master Plan Update (\$200,000)**

The Tecumseh Storm Drainage Master Plan was completed in 2019 and had identified recommended solutions in the amount of \$107M. Its study area comprised the existing built-up area north of CR42 to Lake St. Clair. It is recommended to conduct an update to the Master Plan in 2026 to expand the study area to include lands in the Tecumseh Hamlet Secondary Planning area and the stormwater solutions that were determined in the stand-alone Class Environmental Assessments and Functional Servicing Reports for this area.

➤ **2026: Town Property Shoreline Protection Condition Assessment (\$50,000)**

The Town owns shoreline properties with shore protection structures of varying age, type and condition. To maintain this infrastructure and provide for necessary improvements in future capital works plans, it is recommended that a condition assessment be undertaken.

➤ **2026/2027: Oldcastle Stormwater Master Plan – Property & Easement Acquisition (\$4,000,000)**

The Oldcastle Stormwater Master Plan was completed and adopted by Council in June 2022. The Master Plan recommended stormwater solutions across the various watershed areas. It also recommended that the Town proceed as soon as possible to secure the lands and easements required for these improvements.

➤ **2027: Manning Road Improvements, Phase 3 (\$8,369,980)**

Phase 3 relates to the road re-construction component of the project from Riverside Drive to St. Gregory's Road including improvements to an urban cross-section that accommodates pedestrians, cyclists and urban design features to create a gateway into Lakewood Park. It is also intended to construct the storm overflow from St. Thomas Street to Lakewood Park which had been identified as a recommendation in the Town's Storm Drainage Master Plan as project ESL-1.

➤ **2027+: Ure Street Sanitary Sewer Extension (\$1,982,000)**

Ure Street Sanitary Sewer extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area in the Oldcastle Hamlet.

➤ **2027+: AODA Sidewalk Ramp Repairs (\$100,000 Annually)**

Review and repair sidewalk ramps throughout the Town to ensure that they are AODA compliant. The sidewalk ramp condition, alignment and location will all be reviewed as part of the assessment.

Section D: Municipal Drain Projects

Town of Tecumseh is obligated to manage, repair, maintain and improve the Town's 120 Municipal Drains (totaling 221km) in accordance with the Drainage Act, including assessing costs to the benefitting upstream landowners according to the most current by-law. Municipal Drains are not municipal infrastructure and only the actual Town assessments are funded from the general tax rate.

There are approximately 54 active drainage projects that the Town is undertaking. These works include new municipal drains (4), maintenance of existing drains (16), drain improvements requiring an engineer's report (30) and apportionment agreements (4) all of which are at various stages of completion. The Drainage Superintendent receives requests for maintenance or repair and improvements for Municipal Drains and determines which section of the Drainage Act is most suitable to proceed with the request. These drainage requests, and subsequent works, are addressed as they occur and are brought before Council for their approval on a project-by-project basis.

Funding for the Town's assessment for Municipal Drains will generally come from the Drains Lifecycle Reserve.

Consultations

Financial Services
Development Services

Financial Implications

The capital expenditures proposed for 2023 total just over \$38.8M in addition to unfinished works carried forward from 2022, with a preliminary estimate of an additional \$59.0M projected for future years.

Projects proposed are consistent with Council's adopted five-year strategic capital plan with the exception of some new projects added and the acceleration of some projects, totalling \$17.9M over the five-year period.

New projects added include: A15 Public Works & Transportation North Building Improvements (\$600,000), A16 Multi-Use Recreational Trails: Lesperance Road (\$4,700,000), future phases of CR19 Improvements (\$3,250,000) and future phases of CR42 & CR43 Improvement Project (\$882,000).

Accelerated projects include: A10 Del Duca Drive Sanitary Sewer Extension (\$5,404,700).

In addition, many project cost estimates have been increased to reflect recent inflationary pressures. Over the five-year period, inflationary costs totalling close to

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\$14M have been incorporated within the 2023-2027 Public Works & Engineering Services Five-Year Capital Works Plan.

Combined, estimated capital expenditure costs for the five-year period have increased by roughly \$32M as compared to the projections made in May 2022 when Council adopted the five-year strategic capital plan.

Offsetting some of this increase, the province announced OCIF allocations for 2023 including \$1.2M greater allocation for the Town than planned, 2021 Town Operating surpluses transferred to the Town's Infrastructure Reserve of \$810,000, confirmed increase to RSIP grant of \$205,000 and potential ATF grant funding of \$2,616,000.

Notwithstanding these offsetting sources of funds, the estimated net cost increases, if materialized, would significantly impact capital reserves.

Generally speaking, funding for most projects is covered through reserves, reserve funds and grants where reserves and reserve funds accumulate funds through annual budget allocations. There is, however, long-term debt planned with respect to the Scully/St. Marks and PJ Cecile Storm Pumping Station projects, with borrowing estimated at \$15M (PWES-2021-03) over the course of a few years commencing in 2023.

Although three of the Town's capital funding reserve/reserve fund categories are either in, or soon-to-be in a deficit position, the Town's overall capital funding reserve/reserve funds are relatively healthy.

The recent volatility in construction costs, capacity constraints in the construction sector and unpredictability with supply chains may make for challenging times ahead. Administration will continue to pursue transfer payment adjustments for grants secured to combat inflationary increases. Further, the Town's existing capital reserves and relatively low debt levels provide for financial flexibility and some additional funding capacity.

Administration is comfortable recommending the advancement of the projects identified in this report. However, should recent inflationary pressures experienced with 2022 capital projects occur in upcoming 2023 project tenders, alterations to capital plans may need to be considered.

Projected Lifecycle Reserve and Reserve Fund balances for 2023 are provided in Attachment 4.

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Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input checked="" type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input checked="" type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐ Social Media ☐ News Release ☐ Local Newspaper ☐

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This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Dana Reid
Public Works & Engineering Services Assistant

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Community Safety & Fire Chief

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Development Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Requested 2023 Budget Allocations
2	2023-2027 PWES Five Year Capital Works Plan
3	Location Map of 2023 Projects
4	Lifecycle Reserve Summaries

Drinking Water Quality Management System

Water Services Operational Plan – February 28, 2023

Attachment 1 2023-2027 PWES Five Year Capital Works Plan

	Previously Approved	Requested for 2023	Future Costs	Total Costs
Sidewalk Projects				
1. Sidewalk Repair Program - Various Locations	\$ -	\$ 400,000	\$ -	\$ 400,000
Sub-Total	\$ -	\$ 400,000	\$ -	\$ 400,000
Grants:	\$ -	\$ -	\$ -	\$ -
Recoveries:	\$ -	\$ -	\$ -	\$ -
Sidewalk Lifecycle Reserve:	\$ -	\$ 400,000	\$ -	\$ 400,000
New Infrastructure				
1. Lesperance Road Trail (CR22 to CR42)	\$ 137,500	\$ 2,661,250	\$ -	\$ 2,798,750
2. Multi-Use Trails: Lesperance & Little River	\$ -	\$ 4,360,000	\$ -	\$ 4,360,000
Sub-Total:	\$ 137,500	\$ 7,021,250	\$ -	\$ 7,158,750
Grants:	\$ -	\$ -	\$ 466,707	\$ 466,707
Recoveries:	\$ -	\$ -	\$ -	\$ -
Infrastructure Reserve:	\$ 137,500	\$ 7,021,250	\$ 466,707	\$ 6,692,043
Road Projects				
1. Road Paving - Asphaltting	\$ -	\$ 650,000	\$ -	\$ 650,000
2. Road Paving - Crack Sealing	\$ -	\$ 300,000	\$ -	\$ 300,000
3. Public Works North Building Improvements	\$ -	\$ 22,000	\$ 178,000	\$ 200,000
4. Lesperance Rd Rehabilitation (McNorton to First)	\$ -	\$ 340,000	\$ -	\$ 340,000
5. Tecumseh Hamlet SPA EA FSR	\$ 98,000	\$ -	\$ -	\$ 98,000
6. Lesperance/VIA Rail Improvements	\$ 3,746,000	\$ -	\$ -	\$ 3,746,000
7. Sylvestre Drive Sanitary Sewer Extension	\$ 94,000	\$ -	\$ 1,020,000	\$ 1,114,000
8. Scully & St. Mark's Storm PS/Riverside Drive	\$ 1,528,000	\$ 572,000	\$ -	\$ 2,100,000
9. Cty Rd 46/Webster/Laval Sanitary Sewer Extension	\$ 120,750	\$ 2,082,750	\$ -	\$ 2,203,500
# Del Duca Drive Sanitary Sewer	\$ 117,450	\$ 2,036,450	\$ -	\$ 2,153,900
# Annual Project Contingency	\$ -	\$ 250,000	\$ -	\$ 250,000
# County Road 46 Municipal Class EA	\$ -	\$ 70,000	\$ -	\$ 70,000
# PJ Cecile Storm Pump Station	\$ 56,500	\$ 272,300	\$ -	\$ 328,800
Sub-Total	\$ 5,760,700	\$ 6,595,500	\$ 1,198,000	\$ 13,554,200
Grants:	\$ -	\$ -	\$ -	\$ -
Recoveries:	\$ -	\$ -	\$ -	\$ -
Road Lifecycle Reserve:	\$ 5,760,700	\$ 6,595,500	\$ 1,198,000	\$ 13,554,200
Bridge Projects				
1. Culvert #42 - Snake Lane Road	\$ 62,300	\$ 588,140	\$ -	\$ 650,440
2. Culvert #53 - Snake Lane Road	\$ 65,100	\$ 611,800	\$ -	\$ 676,900
3. Culvert #54 - Snake Lane Road	\$ 65,100	\$ 611,800	\$ -	\$ 676,900
Sub-Total:	\$ 192,500	\$ 1,811,740	\$ -	\$ 2,004,240
Grants:	\$ -	\$ -	\$ -	\$ -
Recoveries:	\$ -	\$ -	\$ -	\$ -
Bridges Lifecycle Reserve:	\$ 192,500	\$ 1,811,740	\$ -	\$ 2,004,240
Water Projects				
1. Hwy3-CR34 Water Valve Replacement	\$ 456,300	\$ -	\$ -	\$ 456,300
2. Lesperance/VIA Rail Improvements	\$ 79,100	\$ -	\$ -	\$ 79,100
3. Tecumseh Hamlet SPA EA FSR	\$ 98,000	\$ -	\$ -	\$ 98,000
4. Cty Rd 46/Webster Laval Sanitary Sewer Exten.	\$ 80,400	\$ 1,629,200	\$ -	\$ 1,709,600
5. Del Duca Drive Sanitary Sewer	\$ 8,550	\$ 27,350	\$ -	\$ 35,900
6. CR42/43 Improvements Phase 1	\$ 3,359,000	\$ -	\$ -	\$ 3,359,000
7. TSPA Northwest W & WW Infrastructure (W-1)	\$ 300,000	\$ -	\$ 3,773,400	\$ 4,073,400
8. CR19 Improvements (CR22 to Jamsyl) (W-2B)	\$ 758,000	\$ 264,000	\$ -	\$ 1,022,000
9. 12th Concession Watermain Replacement	\$ 247,900	\$ 32,100	\$ -	\$ 280,000
# Centennial & Woodridge Watermain Replacements	\$ 3,500,000	\$ -	\$ -	\$ 3,500,000
# North Tecumseh Water Distribution Model	\$ 70,000	\$ -	\$ -	\$ 70,000
Sub-Total:	\$ 8,957,250	\$ 1,952,650	\$ 3,773,400	\$ 14,683,300
Grants:	\$ -	\$ -	\$ 2,566,550	\$ 2,566,550
Recoveries:	\$ -	\$ -	\$ -	\$ -
Watermain Reserve Fund:	\$ 8,957,250	\$ 1,952,650	\$ 1,206,850	\$ 12,116,750

Drinking Water Quality Management System
Operational Plan – Revision Date: February 2023

TOWN OF TECUMSEH
2023 - 2027 Public Works & Engineering Services Capital Works Plan

Note: Depicting Timing of Expenditures, not Budget Allocations

Infrastructure	Construction	Engineering	Contingency	Total	2023	2024	2025	2026	2027
Roads									
Paving	\$ 5,750,000	\$ -	\$ -	\$ 5,750,000	\$ 950,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000
Traffic Signal Controller Upgrade (w/ County) CFWD	\$ 150,000	\$ -	\$ -	\$ 150,000	\$ 125,000				
Lesperance Road Rehabilitation (McNorton to First)	\$ 290,000	\$ 25,000	\$ 25,000	\$ 340,000	\$ 20,000		\$ 320,000		
Public Works North Building Improvements	\$ 142,500	\$ 17,500	\$ 40,000	\$ 200,000	\$ 22,000	\$ 178,000			
CR42/CR43 Phase 3 CFWD	\$ 50,000	\$ 10,000	\$ 10,000	\$ 70,000			\$ 47,550		
Tecumseh Hamlet SPA EA FSR CFWD	\$ -	\$ 98,000	\$ -	\$ 98,000	\$ 30,000				
Lesperance/VIA Rail Improvements CFWD	\$ 1,456,800	\$ 318,700	\$ 73,800	\$ 1,849,300	\$ 1,850,000				
Manning Road Reconstruction - Phase 3 CFWD	\$ 6,863,880	\$ 898,000	\$ 286,000	\$ 8,047,880					\$ 7,722,380
Sylvestre Drive Sanitary Sewer Extension CFWD	\$ 895,700	\$ 173,500	\$ 44,800	\$ 1,114,000				\$ 1,020,000	
Roads Needs Study	\$ -	\$ 85,000	\$ -	\$ 85,000		\$ 85,000			
Scully & St Mark's Storm PS/Riverside Drive CFWD+	\$ 1,600,000	\$ 250,000	\$ 250,000	\$ 2,100,000	\$ 100,000		\$ 1,900,000		
CR46/Webster/Laval Sanitary Sewer (LRPCP) CFWD	\$ 1,870,000	\$ 245,000	\$ 88,500	\$ 2,203,500	\$ 10,000	\$ 2,072,750			
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ 1,900,000	\$ 194,200	\$ 59,700	\$ 2,153,900	\$ 30,000	\$ 2,006,450			
Ure Street Sanitary Sewer (LRPCP)	\$ 640,680	\$ 115,320	\$ 76,920	\$ 833,000					\$ 58,000
PJ Cecile Storm PS CFWD+	\$ 234,000	\$ 70,800	\$ 24,000	\$ 328,800	\$ 60,000	\$ 40,000			\$ 228,800
County Road 46 Municipal Class EA	\$ -	\$ 70,000	\$ -	\$ 70,000	\$ 70,000				
Annual Project Contingency	\$ -	\$ -	\$ 1,250,000	\$ 1,250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000
	\$ 21,843,560	\$ 2,571,020	\$ 2,228,720	\$ 26,643,380	\$ 3,517,000	\$ 5,832,200	\$ 3,717,550	\$ 2,470,000	\$ 9,459,180
Sidewalks/Pathways									
Sidewalk Repair Program	\$ 676,000	\$ -	\$ -	\$ 676,000	\$ 400,000	\$ 69,000	\$ 69,000	\$ 69,000	\$ 69,000
AODA Sidewalk Ramp Repair	\$ 100,000	\$ -	\$ -	\$ 100,000					\$ 100,000
Lesperance Road Trail (CR22 to CR42) CFWD	\$ 2,400,000	\$ 177,500	\$ 221,250	\$ 2,798,750	\$ 50,000	\$ 2,611,250			
Lesperance Road Trail (Riverside to First) & Little River	\$ 3,625,000	\$ 435,000	\$ 300,000	\$ 4,360,000	\$ 225,000	\$ 50,000	\$ 4,085,000		
Riverside Drive East Pathway Improvements	\$ 375,000	\$ 56,250	\$ 56,250	\$ 487,500			\$ 60,000	\$ 427,500	
CR42/CR43 Phase 3 (Sidewalks)	\$ 80,000	\$ -	\$ 12,000	\$ 92,000				\$ 92,000	
CR42/CR43 Phase 4 (Sidewalks)	\$ 400,000	\$ -	\$ 10,000	\$ 410,000					\$ 410,000
Brighton Rd Pathway Extension & Traffic Calming	\$ 240,000	\$ 36,000	\$ 36,000	\$ 312,000			\$ 50,000	\$ 262,000	
	\$ 7,896,000	\$ 704,750	\$ 635,500	\$ 9,236,250	\$ 675,000	\$ 2,730,250	\$ 4,264,000	\$ 850,500	\$ 579,000
CWATS Projects									
CR42/CR43 Phase 3 (Bike Lanes)	\$ 85,000	\$ -	\$ -	\$ 85,000				\$ 85,000	
CR42/CR43 Phase 4 (Bike Lanes)	\$ 225,000	\$ -	\$ -	\$ 225,000					\$ 225,000
	\$ 310,000	\$ -	\$ -	\$ 310,000	\$ -	\$ -	\$ -	\$ 85,000	\$ 225,000
Bridges									
Bridge & Culvert Condition Assessment (<3m Span)	\$ -	\$ 80,000	\$ -	\$ 80,000			\$ 80,000		
Bridge & Culvert Needs Study (>3m Span)	\$ -	\$ 90,000	\$ -	\$ 90,000		\$ 45,000		\$ 45,000	
Culvert #42: Snake Lane Road CFWD	\$ 499,440	\$ 79,000	\$ 72,000	\$ 650,440	\$ 588,140				
Culvert #53: Snake Lane Road CFWD	\$ 591,000	\$ 79,000	\$ 72,000	\$ 742,000	\$ 676,900				
Culvert #54: Snake Lane Road CFWD	\$ 591,000	\$ 79,000	\$ 72,000	\$ 742,000	\$ 676,900				
Roadside Safety Improvements - Bridge #1010	\$ 50,000	\$ 10,000	\$ 10,000	\$ 70,000			\$ 70,000		
Lakewood Park Pedestrian Bridge	\$ 200,000	\$ -	\$ -	\$ 200,000			\$ 200,000		
	\$ 1,931,440	\$ 417,000	\$ 226,000	\$ 2,574,440	\$ 1,941,940	\$ 45,000	\$ 350,000	\$ 45,000	\$ -

Drinking Water Quality Management System

Water Services Operational Plan – February 28, 2023

TOWN OF TECUMSEH 2023 - 2027 Public Works & Engineering Services Capital Works Plan

Note: Depicting Timing of Expenditures, not Budget Allocations

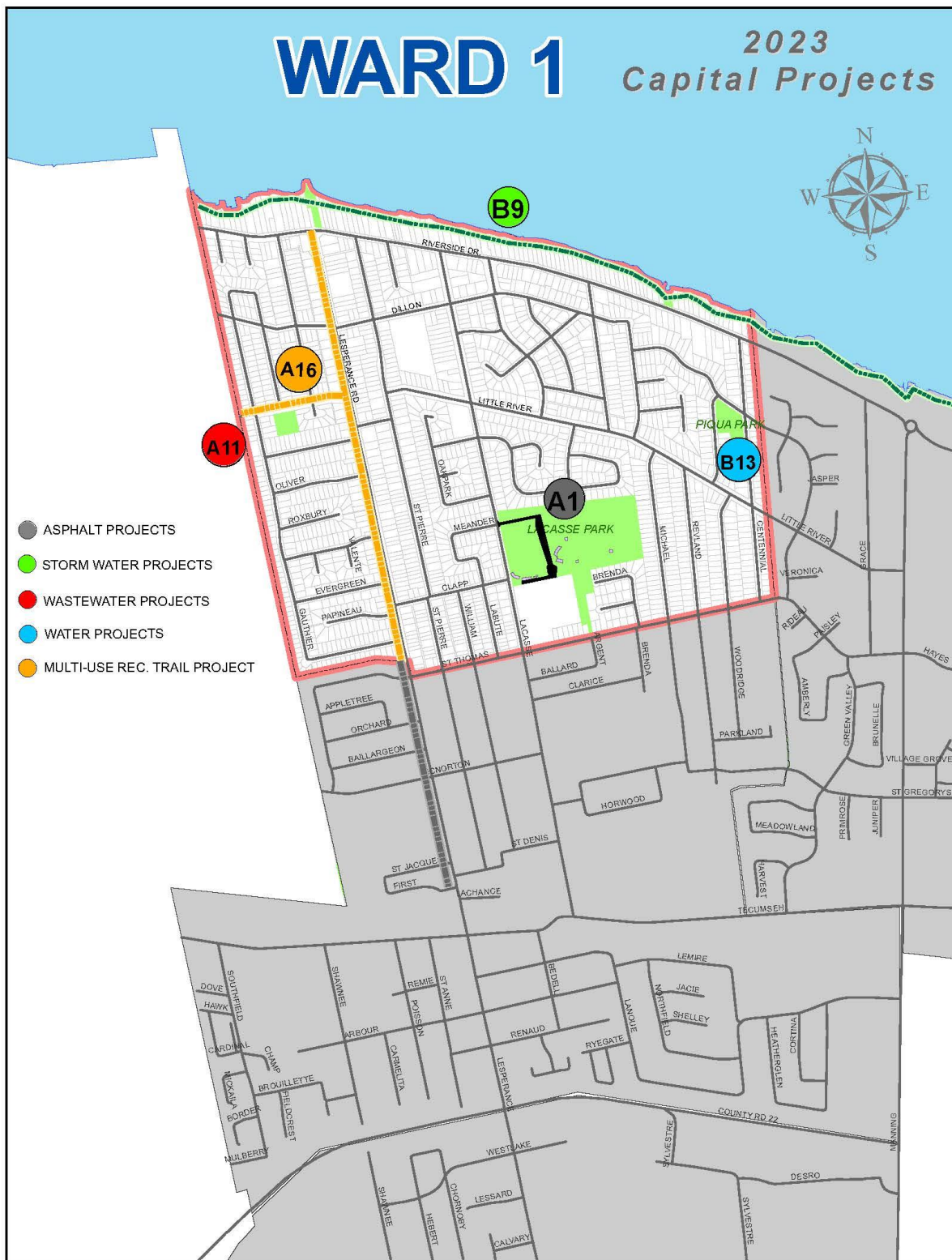
Infrastructure	Construction	Engineering	Contingency	Total	2023	2024	2025	2026	2027
Watermains									
Hwy3-CR34 Water Valve Replacement CFWD	\$ 370,700	\$ 30,000	\$ 55,600	\$ 456,300	\$ 431,000				
Tecumseh Hamlet SPA EA FSR CFWD	\$ -	\$ 98,000	\$ -	\$ 98,000	\$ 30,000				
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 1,500,000	\$ 154,000	\$ 55,600	\$ 1,709,600	\$ 50,000	\$ 1,579,200			
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ 30,480	\$ 4,100	\$ 1,300	\$ 35,900		\$ 27,350			
CR42/43 Phase 1 (Water) CFWD	\$ 2,895,000	\$ 264,000	\$ 200,000	\$ 3,359,000	\$ 3,227,000				
CR42/43 Phase 2 (Water) CFWD	\$ 820,000	\$ 120,000	\$ 120,000	\$ 1,060,000		\$ 1,010,000			
TSPA Northwest W & WW Infrastructure (W-1) CFWD	\$ 3,102,000	\$ 536,700	\$ 434,700	\$ 4,073,400	\$ 300,000	\$ 2,830,050	\$ 943,350		
CR19 Improvements Ph1: CR22 to Jamsyl (W-2B) CFWD	\$ 846,000	\$ 88,000	\$ 88,000	\$ 1,022,000	\$ 50,000	\$ 922,000			
CR19 Improvements Ph2: Jamsyl to CPR (W-2B)	\$ 2,100,000	\$ 315,000	\$ 315,000	\$ 2,730,000		\$ 180,000		\$ 2,550,000	
CR19 Improvements Ph3: @ CPR (W-2B & W-5A)	\$ 400,000	\$ 60,000	\$ 60,000	\$ 520,000			\$ 45,000		\$ 475,000
CR19 Improvements Ph4: CPR to CR42 (W-5A)	\$ 750,000	\$ 112,500	\$ 112,500	\$ 975,000				\$ 60,000	
North Tecumseh Water Distribution Model	\$ -	\$ 70,000	\$ -	\$ 70,000	\$ 70,000				
12th Concession Watermain Replacement CFWD	\$ 218,000	\$ 31,000	\$ 31,000	\$ 280,000	\$ 255,000				
Centennial & Woodridge Watermain Replacements	\$ 2,700,000	\$ 400,000	\$ 400,000	\$ 3,500,000	\$ 200,000		\$ 3,300,000		
Water/Wastewater Master Plan Update	\$ -	\$ 100,000	\$ -	\$ 100,000			\$ 100,000		
	\$ 15,732,180	\$ 2,383,300	\$ 1,873,700	\$ 19,989,200	\$ 4,613,000	\$ 6,548,600	\$ 4,388,350	\$ 2,610,000	\$ 475,000
Wastewater Projects									
Sylvestre Drive Sanitary Sewer Extension CFWD	\$ 940,000	\$ 290,400	\$ 94,000	\$ 1,324,400				\$ 1,137,600	
Sylvestre Drive Sanitary PS - 2023 Improvements	\$ 30,000	\$ -	\$ -	\$ 30,000	\$ 30,000				
Lakewood Sanitary PS - 2023 Improvements	\$ 70,000	\$ -	\$ -	\$ 70,000	\$ 70,000				
Gauthier Sanitary PS - 2023 Improvements	\$ 30,000	\$ -	\$ -	\$ 30,000	\$ 30,000				
Public Works North Building Improvements	\$ 142,500	\$ 17,500	\$ 40,000	\$ 200,000	\$ 22,000	\$ 178,000			
Tecumseh Hamlet SPA EA FSR CFWD	\$ 30,000	\$ -	\$ -	\$ 30,000	\$ 30,000				
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 1,870,000	\$ 170,000	\$ 61,300	\$ 2,101,300	\$ 25,000	\$ 1,909,600			
Scully & St Mark's Storm PS/Riverside Drive CFWD+	\$ 485,000	\$ 75,000	\$ 75,000	\$ 635,000	\$ 20,000		\$ 555,000		
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ 1,100,000	\$ 165,700	\$ 51,000	\$ 1,316,700	\$ 60,000	\$ 1,048,200			
Sanitary Sewer Model Update CFWD+	\$ -	\$ 345,000	\$ -	\$ 345,000					
CR42/43 Phase 1 (Wastewater) CFWD	\$ 2,671,000	\$ 246,000	\$ 200,000	\$ 3,117,000	\$ 2,994,000				
Ure Street Sanitary Sewer (LRPCP)	\$ 489,000	\$ 88,080	\$ 58,680	\$ 636,000					\$ 44,000
TSPA Northwest W & WW Infrastructure (WW-1 & WW-2)	\$ 7,513,000	\$ 1,338,700	\$ 1,036,200	\$ 9,887,900	\$ 720,000	\$ 6,875,925	\$ 2,291,975		
MRSPA WW Infrastructure (WW-12 & WW-13)	\$ 2,300,000	\$ 345,000	\$ 345,000	\$ 2,990,000				\$ 350,000	
8th Concession Sanitary Sewer By-Law	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ 45,000				
MECP Consolidated Linear Infrastructure ECA	\$ -	\$ 25,000	\$ -	\$ 25,000	\$ 25,000				
Water/Wastewater Master Plan Update	\$ -	\$ 100,000	\$ -	\$ 100,000			\$ 100,000		
	\$ 17,670,500	\$ 3,251,380	\$ 1,961,180	\$ 22,883,300	\$ 4,071,000	\$ 10,011,725	\$ 2,946,975	\$ 1,487,600	\$ 44,000

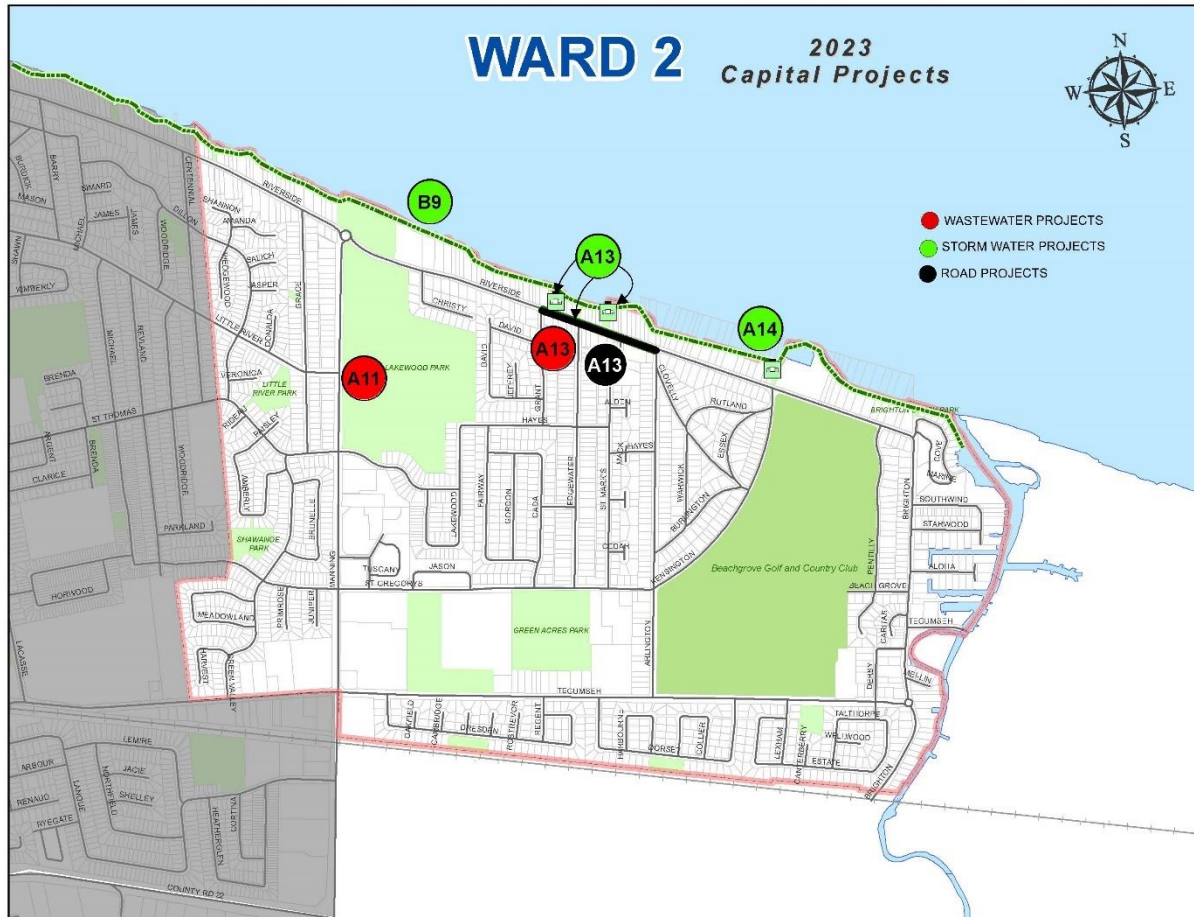
Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

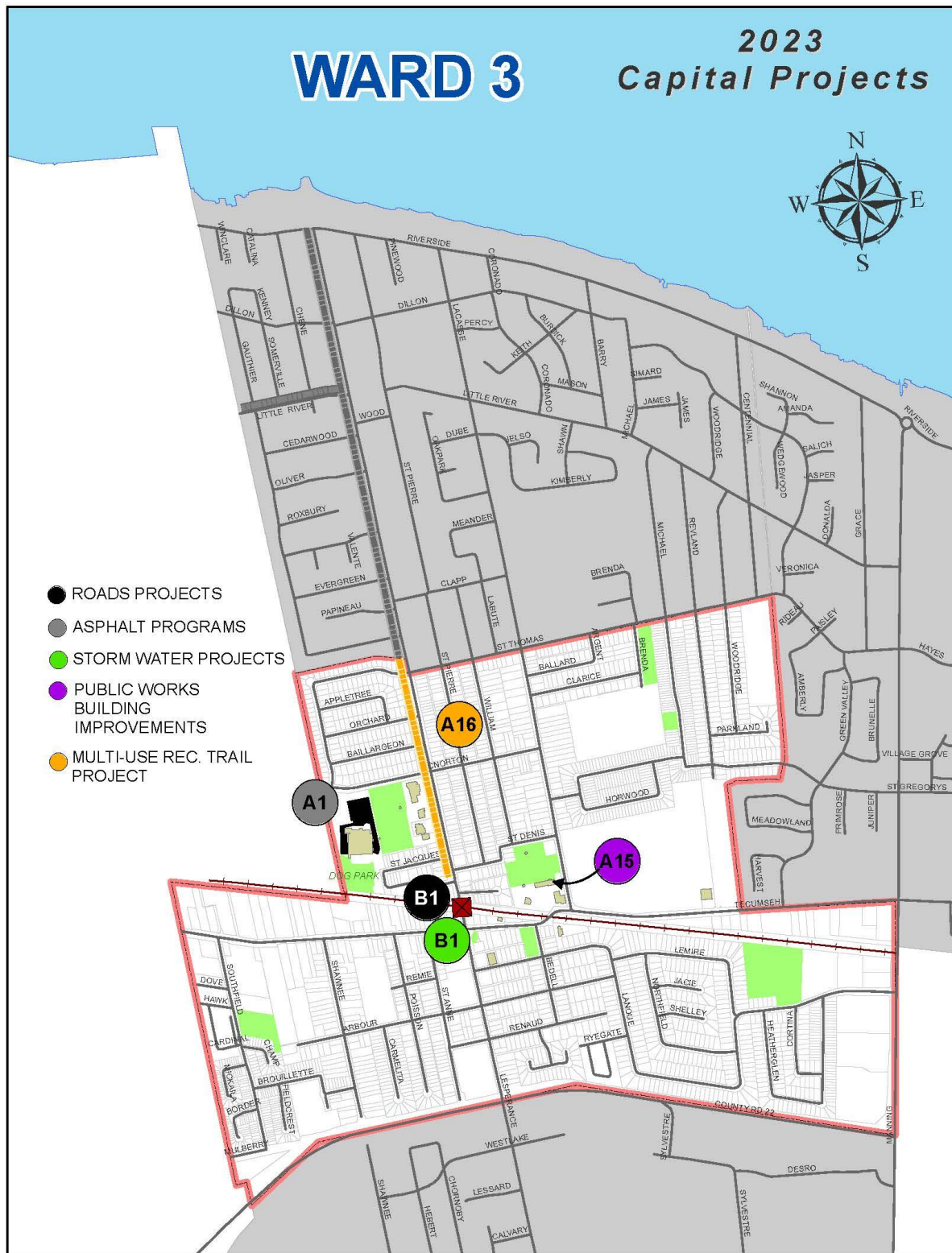
TOWN OF TECUMSEH
2023 - 2027 Public Works & Engineering Services Capital Works Plan

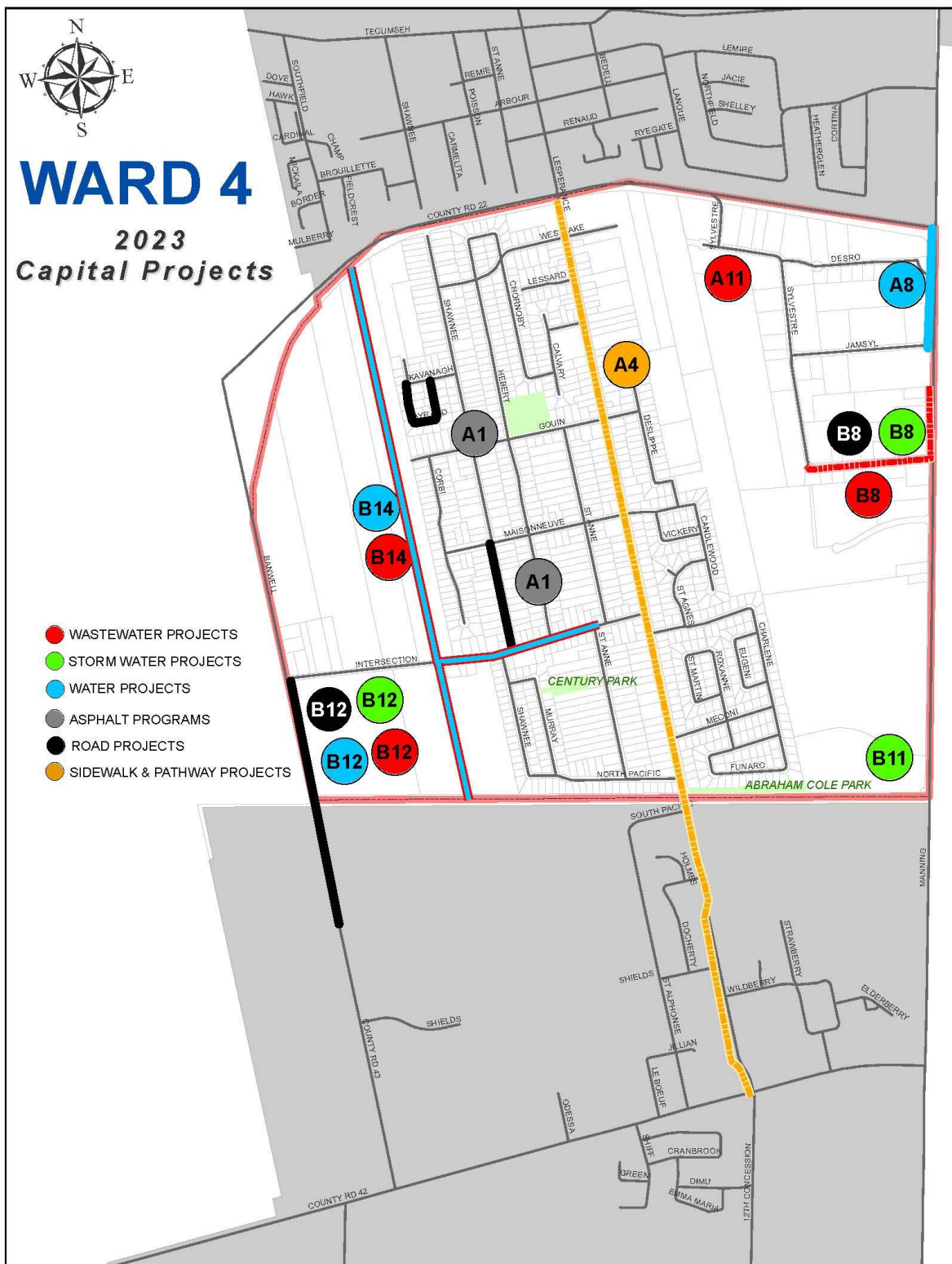
Note: Depicting Timing of Expenditures, not Budget Allocations

Infrastructure	Construction	Engineering	Contingency	Total	2023	2024	2025	2026	2027
Storm Sewers									
Manning Road Reconstruction - Phase 3 CFWD	\$ 266,800	\$ 42,000	\$ 13,300	\$ 322,100					\$ 319,600
Public Works North Building Improvements	\$ 142,500	\$ 17,500	\$ 40,000	\$ 200,000	\$ 22,000	\$ 178,000			
Lesperance/VIA Rail Improvements CFWD+	\$ 224,400	\$ 47,300	\$ 11,200	\$ 282,900	\$ 120,400				
Sylvestre Drive Sanitary Sewer Extension CFWD	\$ 43,500	\$ 10,000	\$ 5,000	\$ 58,500				\$ 54,300	
Oldcastle Storm Master Plan - Property/Easements	\$ -	\$ 4,000,000	\$ -	\$ 4,000,000				\$ 2,000,000	\$ 2,000,000
Tecumseh Hamlet SPA EA FSR CFWD	\$ -	\$ 496,000	\$ -	\$ 496,000	\$ 50,000				
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 650,000	\$ 62,000	\$ 22,400	\$ 734,400	\$ 10,000	\$ 647,000			
Scully & St Mark's Storm PS/Riverside Drive CFWD+	\$ 16,500,000	\$ 2,500,000	\$ 1,600,000	\$ 20,600,000	\$ 7,000,000	\$ 10,000,000	\$ 2,600,000		
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ 1,700,000	\$ 151,600	\$ 46,600	\$ 1,898,200	\$ 40,000	\$ 1,668,350			
Shoreline Management Plan CFWD	\$ -	\$ 350,000	\$ -	\$ 350,000	\$ 10,000				
Stormwater Rate Study	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ 5,000				
P.J. Cecile Storm PS * CFWD+	\$ 8,079,600	\$ 1,615,800	\$ 1,615,800	\$ 11,311,000	\$ 1,600,000	\$ 1,100,000	\$ 3,700,000	\$ 3,200,000	\$ 1,711,000
Ure Street Sanitary Sewer (LRPCP)	\$ 394,560	\$ 71,040	\$ 47,400	\$ 513,000					\$ 36,000
Breakwall Condition Assessment	\$ -	\$ 70,000	\$ -	\$ 70,000				\$ 70,000	
MECP Consolidated Linear Infrastructure ECA	\$ -	\$ 25,000	\$ -	\$ 25,000	\$ 25,000				
TSPA Northwest SWM Ponds (Gouin & Lachance)	\$ 4,100,000	\$ 615,000	\$ 615,000	\$ 5,330,000		\$ 400,000		\$ 4,930,000	
MRSPA SWM Infrastructure CFWD	\$ 9,775,000	\$ 1,660,000	\$ 1,300,000	\$ 12,735,000	\$ 50,000		\$ 500,000		\$ 6,000,000
Tecumseh Storm Drainage Master Plan Update	\$ -	\$ 200,000	\$ -	\$ 200,000				\$ 200,000	
	\$ 41,876,360	\$ 11,978,240	\$ 5,316,700	\$ 59,171,100	\$ 8,932,400	\$ 13,993,350	\$ 6,800,000	\$ 10,454,300	\$ 10,066,600
TOTAL	\$ 107,260,040	\$ 21,305,690	\$ 12,241,800	\$ 140,807,670	\$ 23,750,340	\$ 39,161,125	\$ 22,486,875	\$ 18,002,400	\$ 20,848,780









Drinking Water Quality Management System
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2023 Roads Lifecycle Reserve Projection

LC Road (1500)	2023	2024	2025	2026	2027
Reserve Balance Start of Year (estimated)	\$ 10,877,000	\$ 9,810,400	\$ 9,006,300	\$ 10,043,850	\$ 11,511,950
Budget Allocation	\$ 4,160,000	\$ 4,160,000	\$ 4,160,000	\$ 4,160,000	\$ 4,160,000
Funds Available	\$ 15,037,000	\$ 13,970,400	\$ 13,166,300	\$ 14,203,850	\$ 15,671,950
Committed					
Project Engineer % share	\$ 32,300	\$ 32,900	\$ 33,600	\$ 34,300	\$ 35,000
Capital Projects Manager % share	\$ 34,100	\$ 34,800	\$ 35,500	\$ 36,200	\$ 36,900
ICS GIS Tech % share	\$ 29,600	\$ 30,200	\$ 30,800	\$ 31,400	\$ 32,000
Traffic Signal Controller Upgrade (w/ County) CFWD	\$ 125,000	\$ -	\$ -	\$ -	\$ -
Tecumseh Hamlet SPA EA FSR CFWD	\$ 130,000	\$ -	\$ -	\$ -	\$ -
Tecumseh Road Storm Sewer and Road Improvements	\$ -	\$ -	\$ -	\$ -	\$ -
Lesperance/VIA Rail Improvements CFWD	\$ 4,000,000	\$ -	\$ -	\$ -	\$ -
Scully & St Mark's Storm PS/Riverside Drive CFWD	\$ 100,000	\$ -	\$ 1,328,000	\$ -	\$ -
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 50,000	\$ -	\$ -	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP) CFWD	\$ 125,000	\$ -	\$ -	\$ -	\$ -
PJ Cecile Storm PS CFWD	\$ 56,500	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ 4,682,500	\$ 97,900	\$ 1,427,900	\$ 101,900	\$ 103,900
Balance Uncommitted	\$ 10,354,500	\$ 13,872,500	\$ 11,738,400	\$ 14,101,950	\$ 15,568,050
Proposed					
AVL System for vehicles (operating budget one-time item)	\$ 10,000	\$ -	\$ -	\$ -	\$ -
Road Paving - Asphaltting (Note 1)	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000	\$ 1,200,000
Lesperance Road Rehabilitation (McNorton to First)	\$ 20,000	\$ -	\$ 320,000	\$ -	\$ -
Public Works North Building Improvements	\$ 66,000	\$ 534,000	\$ -	\$ -	\$ -
CR42/CR43 Phase 3 (Bike Lanes)	\$ -	\$ -	\$ 47,550	\$ -	\$ -
Manning Road Reconstruction - Phase 3	\$ -	\$ -	\$ -	\$ -	\$ 7,722,380
Sylvestre Drive Sanitary Sewer Extension	\$ -	\$ -	\$ -	\$ 1,020,000	\$ -
Roads Needs Study	\$ -	\$ 85,000	\$ -	\$ -	\$ -
Scully & St Mark's Storm PS/Riverside Drive (add'l funding)	\$ -	\$ -	\$ 572,000	\$ -	\$ -
CR46/Webster/Laval Sanitary Sewer(LRPCP)	\$ 10,000	\$ 2,072,750	\$ -	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP)	\$ 30,000	\$ 2,006,450	\$ -	\$ -	\$ -
Ure Street Sanitary Sewer (LRPCP)	\$ -	\$ -	\$ -	\$ -	\$ 58,000
PJ Cecile Storm PS (add'l funding)	\$ 3,500	\$ 40,000	\$ -	\$ -	\$ 228,800
County Road 46 Municipal Class EA	\$ 70,000	\$ -	\$ -	\$ -	\$ -
Annual Project Contingency	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000
Lesperance Rd Trail (Riverside to First and Little River)	\$ 225,000	\$ 50,000	\$ 65,000	\$ -	\$ -
CR42/CR43 Phase 3 (Bike Lanes)	\$ -	\$ -	\$ -	\$ 120,000	\$ -
CR42/CR43 Phase 4 (Bike Lanes)	\$ -	\$ -	\$ -	\$ -	\$ 225,000
Balance Proposed	\$ 1,884,500	\$ 6,238,200	\$ 2,454,550	\$ 2,590,000	\$ 9,684,180
Non Lifecycle Funding					
Storm Sewer Lifecycle Reserve re: PW North Building	\$ 22,000	\$ 178,000	\$ -	\$ -	\$ -
Wastewater Sewers Reserve Fund re: PW North Building	\$ 22,000	\$ 178,000	\$ -	\$ -	\$ -
RSIP Grant	\$ 1,232,400	\$ -	\$ -	\$ -	\$ -
DMAF Grant	\$ 64,000	\$ 16,000	\$ 760,000	\$ -	\$ 91,500
CCBF Grant	\$ -	\$ 1,000,000	\$ -	\$ -	\$ 2,000,000
CWATS	\$ -	\$ -	\$ -	\$ -	\$ 525,000
County Connecting Link Agreement	\$ -	\$ -	\$ -	\$ -	\$ 1,295,000
Total Non-Lifecycle Funding	\$ 1,340,400	\$ 1,372,000	\$ 760,000	\$ -	\$ 3,911,500
Balance Available	\$ 9,810,400	\$ 9,006,300	\$ 10,043,850	\$ 11,511,950	\$ 9,795,370

Notes:

1) General allowance for asphaltting

Drinking Water Quality Management System
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2023 Bridges Lifecycle Reserve Projection

LC Bridges (1660)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 1,128,500	\$ 821,560	\$ 1,211,560	\$ 1,296,560	\$ 1,686,560
Budget Allocation	\$ 435,000	\$ 435,000	\$ 435,000	\$ 435,000	\$ 435,000
Funds Available	\$ 1,563,500	\$ 1,256,560	\$ 1,646,560	\$ 1,731,560	\$ 2,121,560
Committed					
	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Uncommitted	\$ 1,563,500	\$ 1,256,560	\$ 1,646,560	\$ 1,731,560	\$ 2,121,560
Proposed					
Bridge & Culvert Condition Assessment (<3m Span)	\$ -	\$ -	\$ 80,000	\$ -	\$ -
Bridge/Culvert Needs Study (>3m)	\$ -	\$ 45,000	\$ -	\$ 45,000	\$ -
Culvert #42: Snake Lane Road	\$ 588,140	\$ -	\$ -	\$ -	\$ -
Culvert #53: Snake Lane Road	\$ 676,900	\$ -	\$ -	\$ -	\$ -
Culvert #54: Snake Lane Road	\$ 676,900	\$ -	\$ -	\$ -	\$ -
Roadside Safety Improvements - Bridge #1010	\$ -	\$ -	\$ 70,000	\$ -	\$ -
Lakewood Park Pedestrian Bridge	\$ -	\$ -	\$ 200,000	\$ -	\$ -
Balance Proposed	\$ 1,941,940	\$ 45,000	\$ 350,000	\$ 45,000	\$ -
Non Lifecycle Funding					
CCBF Grant	\$ 1,200,000	\$ -	\$ -	\$ -	\$ -
Total Non-Lifecycle Funding	\$ 1,200,000	\$ -	\$ -	\$ -	\$ -
Balance Available	\$ 821,560	\$ 1,211,560	\$ 1,296,560	\$ 1,686,560	\$ 2,121,560

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Sidewalks Lifecycle Reserve Projection

LC Sidewalk (1550)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 452,000	\$ 126,000	\$ 597,707	\$ 492,707	\$ (318,793)
Budget Allocation	\$ 74,000	\$ 74,000	\$ 74,000	\$ 74,000	\$ 74,000
Funds Available	\$ 526,000	\$ 200,000	\$ 671,707	\$ 566,707	\$ (244,793)
Committed					
Lesperance Road Trail (CR22 to CR42) CFWD	\$ 50,000	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ 50,000	\$ -	\$ -	\$ -	\$ -
Balance Uncommitted	\$ 476,000	\$ 200,000	\$ 671,707	\$ 566,707	\$ (244,793)
Proposed					
Sidewalk Repair Program (Note 1)	\$ 400,000	\$ 69,000	\$ 69,000	\$ 69,000	\$ 69,000
AODA Sidewalk Ramp Repair	\$ -	\$ -	\$ -	\$ -	\$ 100,000
Lesperance Road Trail (CR22 to CR42) CFWD	\$ -	\$ 2,611,250	\$ -	\$ -	\$ -
Lesperance Road Trail (Riverside to First) & Little River	\$ 225,000	\$ 50,000	\$ 4,085,000	\$ -	\$ -
Riverside Drive East Pathway Improvements	\$ -	\$ -	\$ 60,000	\$ 427,500	\$ -
CR42/CR43 Phase 3 (Sidewalks)	\$ -	\$ -	\$ -	\$ 127,000	\$ -
CR42/CR43 Phase 4 (Sidewalks)	\$ -	\$ -	\$ -	\$ -	\$ 410,000
Brighton Rd Pathway Extension & Traffic Calming	\$ -	\$ -	\$ 50,000	\$ 262,000	\$ -
Balance Proposed	\$ 625,000	\$ 2,730,250	\$ 4,264,000	\$ 885,500	\$ 579,000
Non Lifecycle Funding					
Grant funding - ICIP Transit	\$ -	\$ 466,707	\$ -	\$ -	\$ -
Infrastructure Reserve	\$ 275,000	\$ 2,661,250	\$ 4,085,000	\$ -	\$ -
Total Non-Lifecycle Funding	\$ 275,000	\$ 3,127,957	\$ 4,085,000	\$ -	\$ -
Balance Available	\$ 126,000	\$ 597,707	\$ 492,707	\$ (318,793)	\$ (823,793)

Notes:

1) General allowance

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Storm Lifecycle Reserve Projection

L.C Storm Sewer (1650)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 61,600	\$ (7,124,500)	\$ (17,373,050)	\$ (18,969,450)	\$ (25,841,550)
Budget Allocation	\$ 1,352,700	\$ 1,352,700	\$ 1,352,700	\$ 1,352,700	\$ 1,252,700
Funds Available	\$ 1,414,300	\$ (5,771,800)	\$ (16,020,350)	\$ (17,616,750)	\$ (24,588,850)
Committed					
Project Engineer % share	\$ 32,300	\$ 32,900	\$ 33,600	\$ 34,300	\$ 35,000
Capital Projects Manager % share	\$ 34,100	\$ 34,800	\$ 35,500	\$ 36,200	\$ 36,900
Manning Road Reconstruction - Phase 3 CFWD	\$ -	\$ -	\$ -	\$ -	\$ 319,600
Lesperance/VIA Rail Improvements CFWD+	\$ 120,400	\$ -	\$ -	\$ -	\$ -
Tecumseh Hamlet SPA EA FSR CFWD	\$ 150,000	\$ -	\$ -	\$ -	\$ -
Scully & St Mark's Storm PS/Riverside Drive CFWD+	\$ 7,000,000	\$ 7,107,000	\$ -	\$ -	\$ -
Shoreline Management Plan CFWD	\$ 10,000	\$ -	\$ -	\$ -	\$ -
Stormwater Rate Study CFWD	\$ 5,000	\$ -	\$ -	\$ -	\$ -
P.J. Cecile Storm PS * CFWD+	\$ 1,600,000	\$ 343,500	\$ -	\$ -	\$ -
MRSPA SWM Infrastructure CFWD	\$ 1,480,000	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ 10,431,800	\$ 7,518,200	\$ 69,100	\$ 70,500	\$ 391,500
Balance Uncommitted	\$ (9,017,500)	\$ (13,290,000)	\$ (16,089,450)	\$ (17,687,250)	\$ (24,980,350)
Proposed					
Sylvestre Drive Sanitary Sewer Extension CFWD	\$ -	\$ -	\$ -	\$ 54,300	\$ -
Oldcastle Storm Master Plan - Property/Easements	\$ -	\$ -	\$ -	\$ 2,000,000	\$ 2,000,000
CR46/Webster/Laval Sanitary Sewer (LRPCP) (Construction)	\$ 10,000	\$ 647,000	\$ -	\$ -	\$ -
Scully & St Mark's Storm PS/Riverside Drive (Add'l Funding)	\$ -	\$ 2,893,000	\$ 2,600,000	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ 40,000	\$ 1,668,350	\$ -	\$ -	\$ -
P.J. Cecile Storm PS * CFWD+ (Construction)	\$ -	\$ 756,500	\$ 3,700,000	\$ 3,200,000	\$ 1,711,000
Ure Street Sanitary Sewer (LRPCP)	\$ -	\$ -	\$ -	\$ -	\$ 36,000
Breakwall Condition Assessment	\$ -	\$ -	\$ -	\$ 50,000	\$ -
MECP Consolidated Linear Infrastructure ECA	\$ 25,000	\$ -	\$ -	\$ -	\$ -
TSPA Northwest SWM Ponds (Gouin & Lachance)	\$ -	\$ 400,000	\$ -	\$ 4,930,000	\$ -
MRSPA SWM Infrastructure CFWD	\$ 50,000	\$ -	\$ 500,000	\$ -	\$ 6,000,000
Tecumseh Storm Drainage Master Plan Update	\$ -	\$ -	\$ -	\$ 200,000	\$ -
Storm Sewer Lifecycle Reserve re: PW North Building	\$ 22,000	\$ 178,000	\$ -	\$ -	\$ -
Balance Proposed	\$ 147,000	\$ 6,542,850	\$ 6,800,000	\$ 10,434,300	\$ 9,747,000
Non Lifecycle Funding					
DMAF Grant	\$ -	\$ 1,459,800	\$ 2,520,000	\$ 1,280,000	\$ 684,400
Transfers from Infrastructure Reserve	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -
Estimated Landowner Recoveries	\$ 40,000	\$ -	\$ 400,000	\$ -	\$ 4,800,000
OCIF Grant	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
Total Non-Lifecycle Funding	\$ 2,040,000	\$ 2,459,800	\$ 3,920,000	\$ 2,280,000	\$ 6,484,400
Balance Available	\$ (7,124,500)	\$ (17,373,050)	\$ (18,969,450)	\$ (25,841,550)	\$ (28,242,950)

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Wastewater Sewers Reserve Fund Projection

RF Wastewater Sewers (2550)	2023	2024	2025	2026	2027
Reserve Balance Start of Year (Estimated)	\$ 3,419,800	\$ 1,468,724	\$ (3,303,401)	\$ (3,902,976)	\$ (1,736,876)
Estimated Allocation	\$ 2,172,900	\$ 2,326,500	\$ 2,396,300	\$ 2,468,200	\$ 2,542,200
Estimated Interest	\$ 103,000	\$ 44,000	\$ (99,000)	\$ (117,000)	\$ (52,000)
Development Charges	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Funds Available	\$ 5,845,700	\$ 3,989,224	\$ (856,101)	\$ (1,401,776)	\$ 903,324
Committed					
Tecumseh Hamlet SPA EA FSR CFWD	\$ 120,000	\$ -	\$ -	\$ -	\$ -
Scully & St. Mark's Storm PS/Riverside Drive CFWD	\$ 20,000	\$ -	\$ 335,000	\$ -	\$ -
CR42/43 Phase 1 (Wastewater) CFWD	\$ 3,069,000	\$ -	\$ -	\$ -	\$ -
Ure Street Sanitary Sewer (LRPCP)	\$ -	\$ -	\$ -	\$ -	\$ 44,000
TSPA Northwest W & WW Infrastructure (WW-1 & WW-2) CFWD	\$ 720,000	\$ -	\$ -	\$ -	\$ -
8th Concession Sanitary Sewer By-Law CFWD	\$ 45,000	\$ -	\$ -	\$ -	\$ -
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 50,000	\$ -	\$ -	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP) CFWD	\$ 125,000	\$ -	\$ -	\$ -	\$ -
IT GIS Tech % Share	\$ 29,624	\$ 30,200	\$ 30,800	\$ 31,400	\$ 32,000
Project Engineer % Share	\$ 32,266	\$ 32,900	\$ 33,600	\$ 34,300	\$ 35,000
Capital Projects Manager	\$ 34,086	\$ 34,800	\$ 35,500	\$ 36,200	\$ 36,900
Balance Committed	\$ 4,244,976	\$ 97,900	\$ 434,900	\$ 101,900	\$ 147,900
Balance Uncommitted	\$ 1,600,724	\$ 3,891,324	\$ (1,291,001)	\$ (1,503,676)	\$ 755,424
Proposed					
Sylvestre Drive Sanitary Sewer Extension CFWD	\$ -	\$ -	\$ -	\$ 1,207,600	\$ -
Wastewater Sewers Reserve Fund re: PW North Building	\$ 22,000	\$ 178,000	\$ -	\$ -	\$ -
CR46/Webster/Laval Sanitary Sewer(LRPCP) - (Construction)	\$ 25,000	\$ 1,909,600	\$ -	\$ -	\$ -
Scully & St. Mark's Storm PS/Riverside Drive CFWD (Add'l Funding)	\$ -	\$ -	\$ 220,000	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP) - (Construction)	\$ 60,000	\$ 1,048,200	\$ -	\$ -	\$ -
TSPA Northwest W & WW Infrastructure (WW-1 & WW-2)	\$ -	\$ 6,875,925	\$ 2,291,975	\$ -	\$ -
MRSPA WW Infrastructure (WW-12 & WW-13)	\$ -	\$ -	\$ -	\$ 350,000	\$ -
MECP Consolidated Linear Infrastructure ECA	\$ 25,000	\$ -	\$ -	\$ -	\$ -
Water/Wastewater Master Plan Update	\$ -	\$ -	\$ 100,000	\$ -	\$ -
Balance Proposed	\$ 132,000	\$ 10,011,725	\$ 2,611,975	\$ 1,557,600	\$ -
Non Lifecycle Funding					
Estimated Recoveries from Landowners - Sylvestre Drive	\$ -	\$ -	\$ -	\$ 1,324,400	\$ -
Estimated Recoveries from Landowners - CR46/Webster/Laval	\$ -	\$ 1,767,000	\$ -	\$ -	\$ -
Estimated Recoveries from Landowners - Delduca Drive	\$ -	\$ 1,050,000	\$ -	\$ -	\$ -
Total Non-Lifecycle Funding	\$ -	\$ 2,817,000	\$ -	\$ 1,324,400	\$ -
Balance Available	\$ 1,468,724	\$ (3,303,401)	\$ (3,902,976)	\$ (1,736,876)	\$ 755,424

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Wastewater Facilities Reserve Fund Projection

RF Wastewater Facilities (2560)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 3,080,900	\$ 3,493,300	\$ 4,048,100	\$ 4,619,500	\$ 5,208,100
Estimated Allocation	\$ 450,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 450,000
Estimated Interest	\$ 92,400	\$ 104,800	\$ 121,400	\$ 138,600	\$ 156,200
Funds Available	\$ 3,623,300	\$ 4,048,100	\$ 4,619,500	\$ 5,208,100	\$ 5,814,300
Committed					
	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Uncommitted	\$ 3,623,300	\$ 4,048,100	\$ 4,619,500	\$ 5,208,100	\$ 5,814,300
Proposed					
Sylvestre Drive Sanitary PS Improvements	\$ 30,000	\$ -	\$ -	\$ -	\$ -
Lakewood Sanitary PS Improvements	\$ 70,000	\$ -	\$ -	\$ -	\$ -
Gauthier Sanitary Pump Station	\$ 30,000	\$ -	\$ -	\$ -	\$ -
Balance Proposed	\$ 130,000	\$ -	\$ -	\$ -	\$ -
Non Lifecycle Funding					
	\$ -	\$ -	\$ -	\$ -	\$ -
Total Non-Lifecycle Funding	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Available	\$ 3,493,300	\$ 4,048,100	\$ 4,619,500	\$ 5,208,100	\$ 5,814,300

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Watermain Reserve Fund Projection


RF Watermain (2520)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 6,877,800	\$ 4,143,769	\$ (582,831)	\$ (820,691)	\$ (1,655,191)
Estimated Allocation	\$ 1,672,400	\$ 1,746,000	\$ 1,798,400	\$ 1,852,400	\$ 1,908,000
Estimated Interest	\$ 206,300	\$ 124,300	\$ (17,500)	\$ (24,600)	\$ (49,700)
Development Charges	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
Funds Available	\$ 8,806,500	\$ 6,064,069	\$ 1,248,069	\$ 1,057,109	\$ 253,109
Committed					
Hwy3-CR34 Water Valve Replacement CFWD	\$ 431,000	\$ -	\$ -	\$ -	\$ -
Tecumseh Hamlet SPA EA FSR CFWD	\$ 130,000	\$ -	\$ -	\$ -	\$ -
CR42/43 Phase 1 (Wastewater) CFWD	\$ 3,227,000	\$ -	\$ -	\$ -	\$ -
CR42/43 Phase 2 (Wastewater) CFWD	\$ -	\$ 328,800	\$ -	\$ -	\$ -
TSPA Northwest W & WW Infrastructure (W-1) CFWD	\$ 300,000	\$ -	\$ -	\$ -	\$ -
CR19 Improvements Ph1: CR22 to Jamsyl (W-2B) CFWD	\$ 50,000	\$ 658,000	\$ -	\$ -	\$ -
North Tecumseh Water Distribution Model	\$ 70,000	\$ -	\$ -	\$ -	\$ -
12th Concession Watermain Replacement CFWD	\$ 222,900	\$ -	\$ -	\$ -	\$ -
Centennial & Woodbridge Watermain Replacements	\$ 200,000	\$ -	\$ 3,300,000	\$ -	\$ -
IT GIS Tech % Share	\$ 29,624	\$ 30,200	\$ 30,800	\$ 31,400	\$ 32,000
Project engineer % Share	\$ 32,681	\$ 33,300	\$ 34,000	\$ 34,700	\$ 35,400
Capital Projects Manager % Share	\$ 34,086	\$ 34,800	\$ 35,500	\$ 36,200	\$ 36,900
Balance Committed	\$ 4,727,291	\$ 1,085,100	\$ 3,400,300	\$ 102,300	\$ 104,300
Balance Uncommitted	\$ 4,079,209	\$ 4,978,969	\$ (2,152,231)	\$ 954,809	\$ 148,809
Proposed					
CR46/Webster/Laval Sanitary Sewer(LRPCP) CFWD	\$ 50,000	\$ 1,579,200	\$ -	\$ -	\$ -
Delduca Drive Sanitary Sewer (LRPCP) CFWD+	\$ -	\$ 27,350	\$ -	\$ -	\$ -
CR42/43 Phase 2 (Wastewater) CFWD (Add'l Funding)	\$ -	\$ 681,200	\$ -	\$ -	\$ -
TSPA Northwest W & WW Infrastructure (W-1) CFWD	\$ -	\$ 2,830,050	\$ 943,350	\$ -	\$ -
CR19 Improvements Ph1: CR22 to Jamsyl (W-2B) CFWD	\$ -	\$ 264,000	\$ -	\$ -	\$ -
CR19 Improvements Ph2: Jamsyl to CPR (W-2B)	\$ -	\$ 180,000	\$ -	\$ 2,550,000	\$ -
CR19 Improvements Ph3: @ CPR (W-2B & W-5A)	\$ -	\$ -	\$ 45,000	\$ -	\$ 475,000
CR19 Improvements Ph4: CPR to CR42 (W-5A)	\$ -	\$ -	\$ -	\$ 60,000	\$ -
12th Concession Watermain Replacement	\$ 32,100	\$ -	\$ -	\$ -	\$ -
Water/Wastewater Master Plan Update	\$ -	\$ -	\$ 100,000	\$ -	\$ -
Balance Proposed	\$ 82,100	\$ 5,561,800	\$ 1,088,350	\$ 2,610,000	\$ 475,000
Non Lifecycle Funding					
ICIP Green Stream II 2021 Intake funding	\$ 146,660	\$ -	\$ 2,419,890	\$ -	\$ -
Total Non-Lifecycle Funding	\$ 146,660	\$ -	\$ 2,419,890	\$ -	\$ -
Balance Available	\$ 4,143,769	\$ (582,831)	\$ (820,691)	\$ (1,655,191)	\$ (326,191)

Drinking Water Quality Management System
Water Services Operational Plan – February 28, 2023

2023 Water Facilities Reserve Fund Projection


RF Water Facilities (2530)	2023	2024	2025	2026	2027
Reserve Balance Start of Year	\$ 7,977,600	\$ 8,089,900	\$ 7,493,100	\$ 7,972,300	\$ (215,000)
Estimated Allocation	\$ 223,000	\$ 247,000	\$ 254,400	\$ 262,000	\$ 269,900
Estimated Interest	\$ 239,300	\$ 242,700	\$ 224,800	\$ 239,200	\$ (6,500)
Funds Available	\$ 8,439,900	\$ 8,579,600	\$ 7,972,300	\$ 8,473,500	\$ 48,400
Committed					
	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Committed	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Uncommitted	\$ 8,439,900	\$ 8,579,600	\$ 7,972,300	\$ 8,473,500	\$ 48,400
Proposed					
Zone 2 Water Booster/Storage Site Select (W-9,10)	\$ 350,000	\$ -	\$ -	\$ -	\$ -
Zone 2 Booster Station (W-9)	\$ -	\$ 399,500	\$ -	\$ 2,925,500	\$ -
Zone 2 Water Storage Facility (W-10)	\$ -	\$ 687,000	\$ -	\$ 5,763,000	\$ -
Balance Proposed	\$ 350,000	\$ 1,086,500	\$ -	\$ 8,688,500	\$ -
Non Lifecycle Funding					
	\$ -	\$ -	\$ -	\$ -	\$ -
Total Non-Lifecycle Funding	\$ -	\$ -	\$ -	\$ -	\$ -
Balance Available	\$ 8,089,900	\$ 7,493,100	\$ 7,972,300	\$ (215,000)	\$ 48,400

Appendix 7 Continual Improvement Report

 TOWN OF Tecumseh <small>ONTARIO - CANADA</small>	WATER SERVICES REQUEST FOR NEW OR CHANGED DWQMS DOCUMENT Revision Date: January 17, 2022											
PLEASE PRINT ALL INFORMATION												
<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px;">Document Verified by (Initials Only)</td><td style="width: 80px; height: 30px;"></td></tr></table>		Document Verified by (Initials Only)										
Document Verified by (Initials Only)												
<i>When completed, submit this form to the DWQMS Representative or alternate. Please attach a printed hardcopy with all revisions when requesting changes to an existing DWQMS document.</i>												
DWQMS Document Title: <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td></tr></table>												
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Reason for Request:												
<input type="checkbox"/> Enhances process control	<input type="checkbox"/> Reduce risk											
<input type="checkbox"/> Supports regulatory requirements	<input type="checkbox"/> Improve operational efficiency											
<input type="checkbox"/> Required by the DWQMS												
Summary of Reason for Change / Addition:												
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Operator's Name (print)	<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td></tr></table>											
Operator's Signature		Date: <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="width: 20px; height: 15px;"></td><td style="width: 20px; height: 15px;"></td></tr></table>										

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Appendix 8 Schedule C – Director’s Direction for Operational Plans

Ontario 

Ministry of the Environment,
Conservation and Parks

[Print Form](#)

**Schedule C – Director’s Directions for Operational Plans
(Subject System Description Form)**
Municipal Residential Drinking Water System


Fields marked with an asterisk (*) are mandatory.

Owner of Municipal Residential Drinking Water System *
[The Corporation of the Town of Tecumseh](#)

Subject Systems

Name of Drinking Water System (DWS) *	Licence Number *	Name of Operating Subsystems (if applicable)	Name of Operating Authority *	DWS Number(s) *
1. Tecumseh Distribution System	040-101		The Corporation of the Town of Tecumseh	260004969

[Add item \(+\)](#)

Contact Information for Questions Regarding the Operational Plan 

Primary Contact

Last Name *	First Name *	Middle Initial
Dupuis	Brad	
Title *	Telephone Number *	Email Address *
Manager, Water Services	519-735-2184 ext. 145	bdupuis@tecumseh.ca

Secondary Contact

Last Name	First Name	Middle Initial
Bradley	Nicole	
Title	Telephone Number	Email Address
DWQMS Representative / Operator	519-735-2184 ext. 141	

[Save Form](#)[Print Completed Form](#)[Clear Form](#)

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Page 1 of 1



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-21

Subject: Amendment to the 2023-2027 PWES Capital Works Plan
Tecumseh Secondary Plan Area Northwest Water &
Wastewater Infrastructure Project

Recommendations

It is recommended:

That report PWES-2023-21 Amendment to the 2023-2027 PWES Capital Works Plan, Tecumseh Secondary Plan Area, Northwest Water & Wastewater Infrastructure Project, **be received;**

And that expenditures for the expanded scope and construction costs for the Tecumseh Secondary Plan Area Northwest Water & Wastewater Infrastructure Project, of \$15,598,500, for a total project cost of \$16,618,500, **be authorized and funded from:**

- \$3,885,000 from the Watermain Reserve Fund
- \$6,853,500 from the Wastewater Sewer Reserve Fund
- \$3,510,000 from the Road Lifecycle Reserve
- \$1,350,000 from the Storm Sewer Lifecycle Reserve

Background

At the May 5, 2022 Special Meeting of Council, the Members received a presentation on the '[PWES Capital Priorities 2023-2031](#)' and directed Administration to incorporate the recommended hybrid scenario within the 2022 and the 2023-2027 PWES Capital Works

Plans. This hybrid scenario will address the strategic priorities of growth and economic development as well as Council approved mandates. One of the highest priorities is the advancement of development and growth in the Tecumseh Hamlet Area.

At the June 28, 2022 Regular Council Meeting, the Members adopted the recommendations contained within report [PWES-2022-27](#) 'Amendment to the 2022 PWES Capital Works Projects, Tecumseh Secondary Plan Area – Northwest Water & Wastewater Infrastructure Projects' (Motion: RCM-199/22). This provided project approval and allocated funding for the engineering design of trunk water and wastewater infrastructure which will help facilitate the development of the Tecumseh Hamlet Secondary Plan Area along Banwell Road from County Road 22 to CP Rail.

At the January 26, 2023 Special Council Meeting, the Members adopted the recommendations contained within report [PWES-2023-01](#) '2023-2027 Public Works & Engineering Services 5-Year Capital Works Plan' (Motion: SCM-04/23), which included the Tecumseh Secondary Plan Area Northwest Water & Wastewater Infrastructure Project (design in 2023 and construction in 2024). The water and wastewater infrastructure includes projects identified in the Town's Water & Wastewater Master Plan 2018 Update, being: W-1 West Tecumseh Watermain, WW-1 West Tecumseh Sanitary Sewer, WW-2 Diversion Sanitary Sewer.

Comments

Tecumseh Hamlet Secondary Plan, Municipal Class Environmental Assessment and Functional Servicing Study

Council has previously authorized Administration to undertake various initiatives to move forward with the Tecumseh Hamlet Secondary Plan area, which included the completion of a stormwater management analysis, finalizing the final road network and commencing the Municipal Class Environmental Assessment (Class EA) and Functioning Servicing Report (FSR), which would run concurrently with the related planning, land use and concept plan process for the Tecumseh Hamlet Secondary Plan.

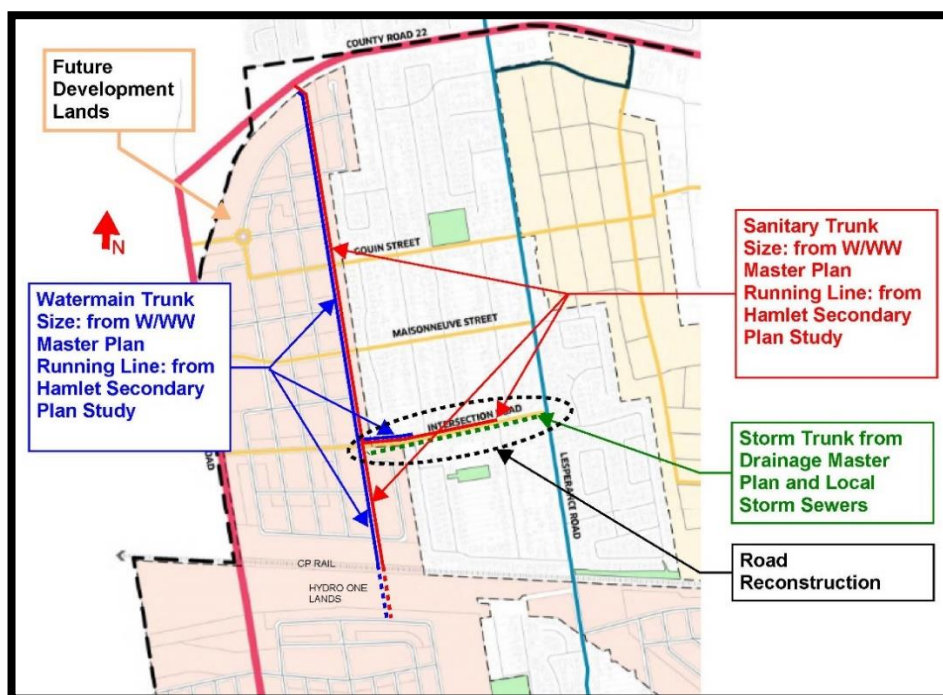
Work has progressed on these initiatives, including coordination with the City of Windsor and the Essex Region Conservation Authority with other ongoing studies within the area that impact the servicing design, including the 'City of Windsor Sandwich South Master Servicing Report' and the 'Little River Watershed Floodplain Mapping Project'. Administration and the Consultants are continuing work in 2023 and aim to have the planning and engineering studies completed by Q2/Q3 of 2023.

Tecumseh Secondary Plan Area, Northwest Water & Wastewater Infrastructure Projects

As progress continues with the Tecumseh Hamlet Secondary Plan and associated studies (as identified above), Administration has been working in parallel on the Request for Proposal (RFP) for Engineering Consulting Services for the 'Tecumseh Secondary Plan Area Northwest Water and Wastewater Infrastructure Project'. Through the development of the RFP a number of issues became apparent that warranted Administration to report back to Council, which included: an updated scope, strategic phasing of the project, and obtaining full project funding allocations.

1) Updated Scope

In preparing the RFP and review of the project specifics, Administration identified two separate areas where expanding the scope would find efficiencies in construction and positioning the development of lands south of the CP Rail and Hydro One Corridor in a shorter timeline. The proposed scope changes are depicted in the Figure below and outlined in the subsequent paragraphs.



CP Rail & Hydro One Corridors: It is recommended to extend the trunk sanitary sewer and trunk watermain by approximately 200-metres south through the CP Rail and the Hydro One corridors. The approval processes for crossing these corridors are quite lengthy and it is advantageous to undertake them at this time in order to help facilitate the development of the Tecumseh Hamlet areas southerly to County Road 42.

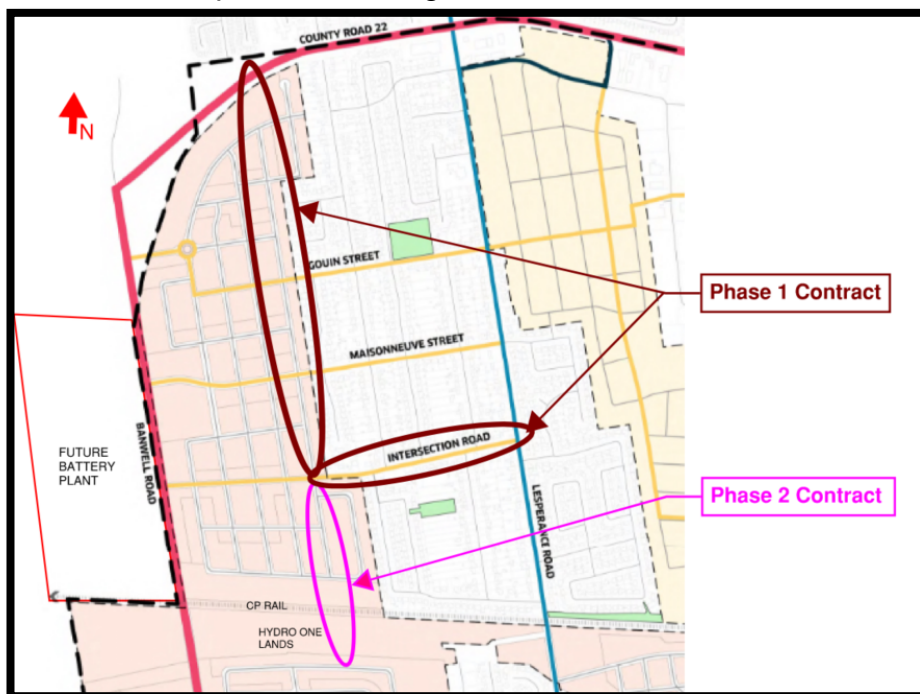
Intersection Road: In review of the sanitary sewer and watermain proposed on Intersection Road, it was identified that the alignments will be within the existing road pavement and that a full road reconstruction will be highly likely. The length of Intersection Road from the north-south easement to Lesperance Road is 700-metres. The proposed sanitary sewer and watermain will be installed for 560-metres and 215-metres respectively. This would entail approximately 80% of Intersection Road from the north-south easement to Lesperance Road to be disturbed and reconstructed to its current form.

It was also identified that Intersection Road is in need of storm sewer improvements, being the installation of a trunk sewer for approximately 180-metres as identified in the Tecumseh Storm Drainage Plan, as well as replacement of local storm sewers.

It is recommended that the scope be updated for construction efficiencies for the installation and replacement of storm sewers, complete road reconstruction to a Collector Road cross-section as outlined within the Town's Transportation Master Plan (inclusive of curb and gutter, pathway, sidewalk and streetlights) in addition to the sanitary sewer and watermain works on Intersection Road (from the north-south easement to Lesperance Road).

2) Strategic Phasing of the Project

In review of the constructability of the project and obtaining all the necessary approvals, Administration will look to complete this project in two separate contracts as depicted in the Figure below.



Contract 1: The proposed works will be undertaken within the existing north-south easement (between County Road 22 and Intersection Road) and within the Intersection Road right-of-way. Detailed design is anticipated to be completed by the Fall 2023, with construction to commence in early 2024. This will provide water and wastewater services within the Tecumseh Hamlet along Banwell Road north of Intersection Road.

Contract 2: The proposed works will be from Intersection Road to south of the CP Rail and Hydro One Utility corridors. It is anticipated that obtaining the necessary easements through private property, and approvals from CP Rail and Hydro One, will take a bit of time. It is anticipated that detailed design and obtaining all approvals will be completed by Spring/Summer 2024, with construction commencing in Winter 2024/2025. This will provide water and wastewater services within the Tecumseh Hamlet along Banwell Road south of Intersection Road and to parcels south of the CP Rail and Hydro One corridors.

3) Project Funding Allocations

With the updated scope to find project efficiencies and the strategic phasing plan, it is important to obtain approval for the full project funding allocation at this time. This will allow for the tendering of Contract 1 by the Fall 2023 and continued works (design, acquisition of easements, obtaining CP Rail and Hydro One approvals) on Contract 2.

Project financials are further discussed in the Financial Implications Section of this Administrative Report.

Consultations

Development Services

Financial Services

Financial Implications

Report PWES-2023-01 had identified a project cost estimate of \$13.96M that was calculated in the Fall 2022. The updated project estimate of \$16.62M (an increase of \$2.66M) was completed in February 2023, inclusive of the expanded scope as described within this report and is further broken down as follows:

Funding Source	Construction	Engineering	Contingency	Total	Previously Approved	Current Request
Watermain Reserve Fund	\$3,100,000	\$465,000	\$620,000	\$4,185,000	\$300,000	\$3,885,000
Wastewater Sewer Reserve Fund	\$5,610,000	\$841,500	\$1,122,000	\$7,573,500	\$720,000	\$6,853,500
Road LC Reserve	\$2,600,000	\$390,000	\$520,000	\$3,510,000	\$0	\$3,510,000
Storm Sewer LC Reserve	\$1,000,000	\$150,000	\$200,000	\$1,350,000	\$0	\$1,350,000
Totals	\$12,310,000	\$1,846,500	\$2,462,000	\$16,618,500	\$1,020,000	\$15,598,500

The current funding request of \$15,598,500 provides for the tendering of Contract 1 in 2023 with construction commencing in early 2024, as well as continuing with the detailed design and tendering of Contract 2 in mid/late 2024 with construction commencing in late 2024/early 2025.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐

Social Media ☐

News Release ☐

Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Development Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
None	None



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: February 28, 2023

Report Number: PWES-2023-22

Subject: Tecumseh Hamlet Secondary Plan Area
Environmental Assessment and Functional Servicing Report

Recommendations

It is recommended:

That Dillon Consulting Limited **be retained** for Consulting Services for the Tecumseh Hamlet Secondary Plan Area, Environmental Assessment and Functional Servicing Report in the amount of \$482,800 excluding HST as a Single Source under the Town of Tecumseh Purchasing Policy and Schedule "A" of By-law 2021-60 and as amended by By-law 2021-103;

And that Council **delegate the authority** to the Chief Administrative Officer, the Purchasing Coordinator, and the Director of Public Works & Engineering Services to execute an agreement, satisfactory in form to the Town Solicitor, with Dillon Consulting Limited.

Background

In 2011, Council approved Administration to engage the services of DIALOG, an Urban Design Consultant, to assist in the development of the Tecumseh Hamlet Secondary Plan. DIALOG was to assist Administration with stakeholder engagement and capacity building, organizing and facilitating design charettes and developing concept plans, policies and urban design guidelines to ensure orderly development of lands within the planning area.

In 2012, it was identified that a range of servicing issues needed to be addressed within the Tecumseh Hamlet Secondary Plan Area and that these servicing issues needed to be addressed concurrently with the land use planning issues. Accordingly, it was determined that an Environmental Assessment and a Functional Servicing Report would be required to address water distribution, wastewater servicing, stormwater management, transportation and the road network for the planned development area.

At the August 14, 2012 Regular Meeting of Council, the Members adopted the recommendations contained within PWES Report No. 38/12 “Tecumseh Hamlet Secondary Plan Area & Tecumseh Road Community Improvement Plan Area, Functional Servicing Plan and Environmental Assessment” (Motion: RCM-283/12). This included the recommendation to retain Dillon Consulting Limited (Dillon) for consulting services related to completing an Environmental Assessment and a Functional Servicing Report for the Tecumseh Hamlet Secondary Plan Area.

Engineering analysis commenced in 2012 by Dillon concurrent with the planning study. It was important to bring the lands to a higher state of ‘development readiness’ and provide engineering analysis to support the planning study. This included the review of water distribution, wastewater servicing, stormwater management, transportation and traffic issues.

At the March 25, 2014 Regular Council Meeting, the Members adopted the recommendations contained within PWES Report No. 20/14, which requested additional funding for the Functional Servicing Report, High Level Traffic Assessment and Class Environmental Assessment (Motion: RCM-126/14).

Around this same time in 2014, the Upper Little River Watershed Master Drainage and Stormwater Management Municipal Class Environmental Assessment Study (ULR) was being undertaken jointly by the Town of Tecumseh and City of Windsor, with project management being delivered by the Essex Region Conservation Authority. It had originally been intended that the general location and size of the required Tecumseh Hamlet stormwater facilities would be determined through the recommendations of the ULR study. Due to a number of issues, including the decision to integrate the ULR study process with a City of Windsor planning process for its Sandwich South planning district, the ULR study was delayed. In addition, additional traffic analysis was required by the Town as part of the City’s Municipal Class EA for Banwell road. Both studies resulted in the Tecumseh Hamlet Secondary Plan Environmental Assessment and Functional Servicing Report being delayed.

At the December 10, 2019 Regular Council Meeting, the Members adopted the recommendations contained within report PWES-2019-49 “2020-2024 Public Works & Environmental Services Five Year Capital Works Plan (Motion: RCM-401/19), which included the reinitiating of the Tecumseh Hamlet Secondary Plan Area, Environmental Assessment and Functional Servicing Report. This included continuing with both

planning and engineering consulting services to finalize the works that had commenced in 2011 and 2012.

Since 2020, both DIALOG and Dillon have been working on the Tecumseh Hamlet Secondary Plan Area Study, including analysis of the water distribution, wastewater servicing, stormwater management, and transportation updates. In addition to the ULR study, other studies undertaken by the City of Windsor have been incorporated into the engineering analysis including the 'City of Windsor Sandwich South Master Servicing Report' and the 'Little River Watershed Floodplain Mapping Project'. DIALOG, Dillon and Administration are continuing work in 2023 and aim to have the planning and engineering studies completed by Q2/Q3 of 2023.

Comments

With the reinitiating of the project in 2020, Dillon has staged their engineering work to align with, and provide assistance to, the ongoing planning study. These stages have consisted of the following:

- **Stage 1: March 2020 – Stormwater Facility and Road Network Servicing Review**
 - Update stormwater analysis based on the 2019 Windsor-Essex Regional Stormwater Standards, the analysis contained within the Upper Little River Watershed Drainage Master Plan and the City of Windsor's Little River Flood Plain Assessment.
 - Stormwater modelling analysis of the Hamlet, as well as the contributing watershed areas within the existing urban area to properly size the stormwater facilities and avoid potential conflicts with other infrastructure.
 - Develop road network layout scenarios to accommodate stormwater facilities as well as land use designations through the planning study.
 - Current status: ongoing, with revisions due to recent changes in land use and densities; to be completed concurrently with the Secondary Planning Study in Summer 2023.
- **Stage 2: July 2020 – Sanitary Sewer Analysis, County Road 42 Corridor**
 - Review of sanitary servicing within the Tecumseh Hamlet, including along the County Road 42 and 43 corridors.
 - Review of alternate west Hamlet Trunk Sanitary Sewer alignments including assessment of elevations and potential conflicts.

- Integration of sanitary sewers with the Town's sanitary model being prepared as part of a separate study.
 - Current status: completed.
- **Stage 3: July 2022 – Technical Support for Planning Study, Tecumseh Hamlet Secondary Plan – Associated Official Plan Amendment**
 - Preparation of engineering figures and presentation materials for public consultation throughout the planning study.
 - Transportation and traffic analysis to support land use designations and integrated with adjacent land uses and developments, including the NextStar Battery Plant to the west.
 - Preparation of final transportation technical reports to be included within the Tecumseh Secondary Plan document.
 - Current status: ongoing, with revisions due to recent changes in land use and densities; to be completed concurrently with the Secondary Planning Study in Summer 2023.
- **Stage 4: July 2022 – Groundwater and Methane Gas Investigation**
 - Conduct an environmental investigation (groundwater samples and monitoring wells) to determine the impacts from the existing Ministry of Transportation of Ontario (MTO) landfill parcel along County Road 22.
 - Establish mitigation measures and design parameters for the trunk sanitary sewer and trunk watermain to be installed in the Town's easement immediately west of the MTO landfill.
 - Current status: The lack of significant rainfall events in the Fall of 2022 has postponed the monitoring and testing period into Spring 2023.
- **Stage 5: February 2023 – Environmental Assessment and Functional Servicing Report**
 - Continue with the works that were initiated in 2012 on the Environmental Assessment and Functional Servicing Report for water distribution, wastewater servicing, stormwater management and transportation.
 - Hold integrated public consultation meetings for the Environmental Assessment and the planning study.
 - Completion of the Environmental Assessment Master Plan Report.

- Functional designs for trunk infrastructure and stormwater management facilities.
- Sanitary model analysis to include higher land use densities and provide flexibility within the proposed infrastructure to accommodate a changing housing market.
- Review of Natural Heritage areas and preliminary screening for Species at Risk.
- Completion of the Functional Servicing Report which will provide a framework for the detailed design and implementation of municipal services.
- Timing of completion: to be completed by Fall 2023.

Purchasing Policy

The Town's Purchasing Policy has undergone several revisions since 2006, the most recent being through By-Law 2021-60 and amending By-law 2021-103. Section 3.4 of the Purchasing Policy and Schedule 'A' of By-law 2021-60 states the following:

'In circumstances where there may be more than once source of supply in the open market, but only one of these is recommended by the Department Director, with concurrence of the Purchasing Officer, for consideration on the grounds that it is more cost effective or beneficial to the Town; and where the expenditure will exceed \$100,000, approval must be obtained from Town Council prior to negotiations with the single source. The Department Director shall be responsible for submitting a report detailing the rationale supporting the use of the single source.'

Recommendation

Given past and ongoing project involvement in all aspects of the engineering and servicing issues being addressed in this area, familiarity with other relevant engineering studies affecting servicing in this area and for the purpose of efficiency and expediency, it is recommended that the Town retain Dillon Consulting Limited to complete Stage 5 Environmental Assessment and Functional Servicing Report as detailed above.

At the May 5, 2022 Special Meeting of Council, the Members received a presentation on the '[PWES Capital Priorities 2023-2031](#)'. One of the highest priorities identified was the advancement of development and growth in the Tecumseh Hamlet Area, which will address the strategic priorities of growth and economic development. Accepting the recommendations of this report, it will assist in realizing the servicing and approval timelines contemplated with the 2023-2027 PWES Capital Works Plan.

Delegation of Authority

Stages 1 to 4 of the Engineering Consulting Services as outlined in the previous section, had previously been approved through Purchasing and Procurement By-law 2017-63 and By-law 2021-60. In these instances, the contract approval authority was the Director of the Public Works & Engineering Services Department and did not require a formal agreement with Council to be prepared. A formal agreement is required to be executed by the Mayor and Clerk in this particular instance as per Schedule "A" of By-Law 2021-60 with respect to Single Source contract approval greater than \$100,000.

Due to proprietary information contained with the consultant's scope of services and work plan for the Stage 5: Environmental Assessment and Functional Servicing Report, Administration is recommending an exception to Section 4.7(e) of the Purchasing Policy (Policy 17), which states:

'Where a formal agreement is required, as a result of the award of a contract, and approval for such a formal agreement has been provided in accordance with Schedule "A" of By-Law 2021-60, the Mayor and Town Clerk shall execute the agreement in the name of the Town of Tecumseh.'

In this instance, it is recommended that Council delegate the authority to the Chief Administrative Officer, the Purchasing Coordinator, and the Director of Public Works & Engineering Services to execute an agreement, satisfactory in form to the Town Solicitor, with Dillon Consulting Limited.

Consultations

Development Services
Financial Services
Dillon Consulting Limited

Financial Implications

Council previously approved an allocation of **\$805,000** for the Tecumseh Hamlet Secondary Plan Area, Environmental Assessment and Functional Servicing Report as part of the Public Works & Engineering Services Capital Works Plans, to be funded by:

Lifecycle Reserve Fund	Amount
Road Lifecycle Reserve	\$98,000
Watermain Reserve Fund	\$98,000
Wastewater Sewers Reserve Fund	\$113,000

Storm Sewer Lifecycle Reserve	\$496,000
TOTAL	\$805,000

The project budget summarized to date is as follows:

Project Stage and Budget Status	Amount
Previously Approved	
Stage 1: Stormwater Facility and Road Network Servicing Review	\$177,000
Stage 2: Sanitary Sewer Analysis, County Road 42 Corridor	\$13,000
Stage 3: Technical Support for Planning Study, Official Plan Update	\$85,600
Stage 4: Groundwater & Methane Gas Investigation	\$29,500
Sub-Total: Previously Approved	\$305,100
Current Request	
Stage 5: Environmental Assessment & Functional Servicing Report	\$482,800
Sub-Total: Current Request	\$482,800
TOTAL	\$787,900
Project Budget	\$805,000
Remaining Budget	\$17,100

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐

Social Media ☐

News Release ☐

Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Development Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
None	None

The Corporation of the Town of Tecumseh

By-Law Number 2023 - 027

Being a bylaw to provide for the repair and improvements to the Shuttleworth Drain

Whereas the Council of The Corporation of the Town of Tecumseh (hereafter “Town”) has been requested to provide for the repair and improvement of the Shuttleworth;

And Whereas the Town procured a Drainage Report for the Shuttleworth and specifications from the consulting engineering firm of Gerard Rood of Rood Engineering Inc, dated December 14, 2022 (hereafter “Drainage Report”);

And Whereas notice of a Public Meeting to hear comments from the affected property owners was given on Tuesday, February 14, 2023;

And Whereas a Public Meeting of Council was held on Tuesday, February 28, 2023, at 6:00 pm to hear from any affected property owners on the Drainage Report;

And Whereas the Council of The Corporation of the Town of Tecumseh is of the opinion that the repair and improvement of the Shuttleworth is desirable;

Now Therefore the Council of The Corporation of The Town of Tecumseh Enacts as follows:

1. **That** the Drainage Report providing for the repair and improvement of the Shuttleworth, dated December 14, 2022, as prepared by the consulting engineering firm Rood Engineering Inc. and attached hereto as Schedule “A” to this by-law, is hereby adopted and the drainage works as therein indicated and set forth is hereby approved and shall be completed in accordance therewith.
2. **That** the Treasurer, subject to the approval of Council, may agree with any bank or person for temporary advances of money to meet the costs of construction pending the completion of the drain and grants and computed payments are received.
3. **That** the Town may issue debentures for the amount borrowed and the amount of such debentures shall be reduced to the total amount of:
 - a) Grants received under Section 85 of the said Act;
 - b) Commuted payments made in respect of land and roads assessed.
4. **That** such debentures shall be made payable within five (5) years from the date of the debenture and shall bear interest at a rate as approved by resolution of Council.

5. **That** the specifications and General Specifications as established are adopted as set out in the Drainage Report which forms part of this by-law.
6. **That** the Mayor and Clerk are authorized to cause a contract for the construction of the works to be made and entered into with some person or persons, firm or corporations, subject to the approval of the Council to be declared by resolution.
7. **That** this by-law shall come into force upon and after the final passing thereof.

Read a first and second time this 28th day of February, 2023.

Gary McNamara, Mayor

Robert Auger, Clerk

Read a third and final time this Choose an item. day of Choose an item., 2023.

Gary McNamara, Mayor

Robert Auger, Clerk

SHUTTLEWORTH DRAIN

E09SH(88)

(Repair and Improvement)

Geographic Township of Sandwich South

TOWN OF TECUMSEH



Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario N8N 1W9
519-735-2184

Rood Engineering Inc.

Consulting Engineers

9 Nelson Street

Leamington, Ontario N8H 1G6

519-322-1621

REI Project 2017D020

December 14th, 2022

December 14th, 2022

Mayor and Municipal Council
Corporation of the Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario
N8N 1W9

Mayor McNamara and Members of Council:

**SHUTTLEWORTH DRAIN
E09SH(88) - Geographic Twp. of Sandwich South
Project REI2017D020
Town of Tecumseh, County of Essex**

I. INTRODUCTION

In accordance with the instructions provided at your June 13th, 2017 meeting and received from the Town by letter dated June 25th, 2017, from Laura Moy your Director Corporate Services & Clerk, we have prepared the following report that provides for new replacement bridges and repair and improvement to the open drain and ancillary work. The Shuttleworth Drain comprises of an open drain with an enclosure at the east end generally located along the north side of North Talbot Road extending from its outlet in the Washbrook Drain, proceeding easterly to the 9th Concession Drain located along the west side of the 9th Concession Road in the geographic township of Sandwich South, Town of Tecumseh. A plan showing the Shuttleworth Drain, as well as the general location of the replacement bridges and drain is included herein as part of the report.

Our appointment and the works relative to the new and replacement bridges and repair and improvements to the Shuttleworth Drain, proposed under this report, is in accordance with Section 78 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2021". We have performed all of the necessary survey, investigations, etcetera, for the proposed new and replacement bridges, repairs and improvements and we report thereon as follows.

II. BACKGROUND

From our review of the information provided from the Town's drainage files we have established the following reports that we utilized as reference for carrying out this project:

- | | | | |
|----|----------------|--------------------|--------------------------|
| 1) | July 7th, 1967 | Shuttleworth Drain | C.G.R. Armstrong, P.Eng. |
|----|----------------|--------------------|--------------------------|

Report - Shuttleworth Drain E09SH(88)
(Geographic Township of Sandwich South)
Town of Tecumseh - REI2017D020

2022-12-14

The 1967 report by C.G.R. Armstrong, P.Eng. provided for the construction of the Shuttleworth Drain and has the latest profile for the grading of the drain.

We arranged with the Town to provide us with the updated assessment roll information for the affected parcels. We also reviewed reports for the abutting drains and spoke to the owners to help in establishing the current watershed limit for the Shuttleworth Drain.

III. PRELIMINARY EXAMINATION AND ON-SITE MEETING

After reviewing all of the drainage information provided by the Town, we arranged with the Town Drainage Superintendent Sam Paglia, P.Eng., to schedule an on-site meeting for November 9th, 2017. The following people were in attendance at said meeting: Mario Conciatori, Linda & Mark Shafer, David Gates, Mark Fishleigh (County of Essex), Sam Paglia (Town Drainage Superintendent), and Gerard Rood (Rood Engineering).

Details of the drain were discussed, and the primary concern was the condition of the access bridge to the lands of Gary and Linda Deneau. It was discussed that the whole drain is going to receive maintenance work including the bridges along the drain length that would be inspected and owners of the bridges would be contacted if there were concerns with any of the structures. Once the work scope is confirmed, a final report is then prepared and submitted to Council and goes through the Drainage Act process of a Consideration meeting and Court of Revision meeting.

Mr. Rood asked the Town and owners to provide information on any drainage changes that they might be aware of. The last report assessed most of the area immediately to the north of the drain.

It was discussed that all trees within the drain cross section from top of bank to top of bank will be removed to prevent obstruction of drainage. The south side of the drain will be basically cleared for access to carry out the work and dispose of material; however, some mature trees may be able to be saved if the Contractor can work around them. Material excavated along lawn areas will be done from the road side and will be trucked away. It was clarified that owners pay a portion of the cost if adjacent to the work area or upstream of the work.

Cost sharing of work to the bridges was discussed. Sam Paglia pointed out that the Town bears the cost for the drainage from North Talbot Road. The Town expects to hold a Public Information Centre meeting with the owners to review the Draft report and get their input and address their questions on the project. It was discussed that owners may debenture the cost of \$5,000.00 or greater for the drainage work over a 5 year period to reduce the immediate cost burden of their assessment for the work. There were some general discussions about private ditches and options that are available to the owners.

IV. FIELD SURVEY AND INVESTIGATIONS

Subsequent to the on-site meeting we arranged for a topographic survey of the drain and bridges to be completed. We further arranged to get updated assessment roll information from the Town and obtained information on the tax class of each of the properties affected by the Municipal Drain.

The Town made initial submissions to the Essex Region Conservation Authority (E.R.C.A.) regarding their requirements or any D.F.O. (Department of Fisheries and Oceans) requirements for work that would be proposed to be carried out on the Shuttleworth Drain. A response from the Conservation Authority was received by email on June 22nd, 2017 and indicated that the Town must apply for a permit and follow standard mitigation requirements. We also reviewed the Town maps for fish and mussel species at risk and find that there are no species indicated in the vicinity of this project. A copy of the concerns and requirements to satisfy E.R.C.A. and D.F.O. is included in **Appendix "REI-A"** of this report.

We also arranged to review the Ministry of Natural Resources & Forestry (M.N.R.F.) Species at Risk (S.A.R.) Mitigation Plan for Drainage Works (March 2018-17-4938) that the Town has prepared to address the Endangered Species Act, 2007. Section 6.0 of the Mitigation Plan indicates that snake species are a concern for this work area and although turtles are not indicated, they are mobile and could be encountered. The Mitigation Plan includes measures to be followed as outlined in "Section 7.0 Mitigation Measures" of the document and a copy of same as it relates to turtles and snakes is included in **Appendix "REI-B"**. Providing mitigation requirements are implemented, it was concluded that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007. Based on this information we find that the Town can proceed with the eligible repairs, maintenance and improvements to the drain as they are exempt under Sections 9 and 10 of the Act, provided that they follow the rules within Ontario Regulation 242/08 and the Mitigation Measures in their S.A.R. Mitigation Plan. To address these requirements the Town has established comprehensive mitigation measures as well as species identification guides for reference. Copies of the measures and guides shall be provided to the successful Tenderer for use during construction, and these documents are available for viewing by any interested parties at the Town office.

V. BRIDGES REVIEW

As part of our investigations, we made detailed inspections of all of the bridges along the open drain. Their condition and proposed work if any are summarized as follows:

1. This bridge enclosure serves parcel 540-00800 owned by Fabio Pace & Giselle Rossi. It was found to be in poor-fair condition, given no evidence of sink holes around the enclosure, although the C.S.P. (Corrugated Steel Pipe) ends are crushed and are beginning to rust through.
2. This bridge serves parcel 540-00701 owned by Gary & Linda Deneau. The bridge is in poor condition with both pipe ends being buried in the mud/gravel in addition to the bridge being fairly dated. The existing bridge is to be removed and the drain to be restored with the replacement bridge constructed at a new location as discussed with the owner.

3. This bridge serves parcel 540-00700 owned by the Town of Tecumseh. The bridge, comprised of C.S.P., is a second access to the property located at its west limit, known as the 'Nature Trail', and is in poor-fair condition. The bridge currently experiences no active headwall protection, typical rusting, and crushed pipe ends. The bridge is to be replaced and should be replaced so that the standard minimum top width of 6.1 metres (20 feet) is provided and the pipe is set to the proposed profile grade of the drain.
4. This bridge also serves parcel 540-00700 owned by the Town of Tecumseh. The bridge is the primary access for the property which acts as a recreational site known as 'Weston Park'. The bridge, comprised of C.S.P., is in fair condition as it experiences typical rusting features in the pipe but has poor concrete block headwall features which are observed to be failing and falling into the drain. The existing bridge should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain with new precast concrete block headwall protection.
5. This bridge serves parcel 540-00600 owned by Theresa Gates. The bridge is in okay-fair condition and comprises of C.S.P. During inspection it has been noted that the drain has been cleaned out at pipe ends, with typical rusting occurring, fair headwall conditions but an end failure may be present at the pipe downstream. In coordination with the other replacement bridges along the drain the existing bridge should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain.
6. This bridge serves parcel 540-00500 owned by Robert and Peggy Weston. The bridge, comprised of C.S.P. is in fair condition with typical expected rusting, but features poor headwall conditions. In coordination with the other replacement bridges along the drain the existing bridge should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain.
7. This bridge enclosure serves parcel 540-00400 owned by Amelia Conciatori. The bridge enclosure, comprised of C.S.P. and a catch basin in the middle, is in fair condition with typical associated rusting. In coordination with the other replacement bridges along the drain the existing bridge enclosure should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain.
8. This bridge serves parcel 540-00360 owned by Emile & Marisa Nabbout. The bridge, comprised of C.S.P., is in poor condition and requires replacement as one end is buried. The existing bridge should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain.
9. This bridge serves parcel 540-00340 owned by Ronnie & Rosa Dowhan. This bridge is in poor condition with no pipe visible at either upstream or downstream ends. In coordination with the other replacement bridges along the drain the existing bridge should be removed and replaced so that the new pipe is set to the new proposed profile grade line of the drain.
10. This bridge serves parcel 540-00320 owned by Vittoria & Adam Fortier. This bridge comprised of C.S.P. is in fair condition. The existing pipe does not meet the minimal diameter requirements and should be removed and replaced so that the new pipe is sized accordingly and set to the new proposed profile grade line of the drain.

Report - Shuttleworth Drain E09SH(88)
(Geographic Township of Sandwich South)
Town of Tecumseh - REI2017D020

2022-12-14

11. This bridge serves parcel 540-00301 owned by John White. This bridge is a second access to the property near the west limit boundary and is comprised of C.S.P. The pipe experiences the typical associated rusting and is in good condition. The existing pipe does not meet the minimal diameter requirements and should be removed and replaced so that the new pipe is sized accordingly and set to the new proposed profile grade line of the drain.
12. This bridge enclosure serves the east portion of parcel 540-00301 owned by John White, and all across the other lands being parcel 540-00300 owned by Ian Bristow, parcel 540-00200 owned by Thomas & Debra McGuinness, and parcel 540-00100 owned by Mark & Linda Shafer. The enclosure pipe appears to be in fair condition with no observed problems and can be replaced in the future with the appropriate size pipe under maintenance to the drain.

VI. PUBLIC INFORMATION CENTRE AND THE DRAINAGE ACT

Arrangements were made to meet virtually online on March 1st, 2022 with the Drainage Superintendent, Drainage Engineer and interested owners to discuss the Draft drainage report dated February 10th, 2022 for this project. There was a question regarding the scope of work and enclosures. Mr. Rood outlined the scope of work included in the P.I.C. report that was based on input at the on-site meeting and in subsequent follow-ups that owners had with the Town and Engineer. The differences between bridges and enclosures was explained with the requesting owners being responsible for any extra costs for an enclosure beyond the standard access bridge that each parcel is entitled to under the Drainage Act. Mr. Paglia went through the assessment schedule and explained what is included in each column with reference to the definitions as outlined below. The values in the schedule are an estimate of the cost for the work with the final cost to owners based on a ratio of the actual cost applied to the estimated values. The tendering process is used to get the best price. Should the lowest tender exceed the report estimate of construction by 33% the Town sets up another meeting with the owners to review the details with options available. It was noted that the marketplace can vary. Mr. Rood explained the life of H.D.P.E. pipe with its cost being an investment that enhances the parcel values for the 75 to 100 year typical life expectancy.

A question was brought up on how assessments are paid. Mr. Paglia outlined how work under the Drainage Act is separate from typical municipal taxes. Drainage work is a communal project serving the affected lands. No grants from O.M.A.F.R.A. are expected for this project. The final cost of the project goes to Council for review and is then billed out. When an assessment is over \$5,000.00 to a parcel, the owner(s) may elect to debenture the cost for 5 or 10 years at current interest costs. An owner can decide to pay all the bill or decide to spread out the costs over a longer period.

There was a concern that the work is too expensive, and it may be preferred to delay it with questions on the sharing of cost and not necessarily seeing the benefit. Mr. Paglia explained that the Town has to maintain the drain and restore it and that we will not be creating any new works. The Engineer has to recommend the pipe replacements if the pipe is bad, and it is time to do it

now. The Town has the duty to do the work. There is a lot of benefits to have a working drain in place. All owners have a responsibility to maintain flows in the drain and it is Council's obligation to keep drains working. Owners may have their own opinions, but Council has to decide on whether to proceed. The pricing can be high, but no work has been done on the drain for almost 55 years. There are many ways to look at the drain, but they have to follow the Drainage Act. The intent is to treat everyone equally and the Town has a big bill for the road and for their parkland with their costs paid from the general tax levy. Apportionments are based on the parcels use and features with upstream owners typically having a bit higher cost sharing to get their water to a sufficient outlet per Common Law. The report includes cost sharing for the bridges and the open drain work is also shared by all lands using it. Works on downstream drains is also assessed to upstream affected lands and roads.

There was a question on how costly the work was. Mr. Rood explained the factors that are considered in establishing the cost estimates. Mr. Paglia pointed out that comparing cost for one parcel to another is indicating that the costs are accurate based on the ratio of lengths of bridges. In response to a question about pipe end treatments, Mr. Paglia described the end treatments and that rock on filter cloth is typically the most cost effective for a drain of this size. If a more fancy end treatment is desired, the owner is typically assessed for the extra cost associated with same. When asked about possible impact on property taxes, Mr. Paglia explained that drainage works do not affect the general tax levy and explained a block assessment, but this is not applied on this project. The MPAC does not consider drainage in land evaluation, and we are just fixing the existing drain under this project. When asked if there was any future work for trails and costs, he replied that he is not aware of any works. If a road needs to improve the drain, they pay all the costs for it. Developers can be responsible for extra costs. It was noted that there is a major development near the 8th Concession Road. Mr. Paglia stated that the development does not go into the Shuttleworth Drain and will be using the Washbrook Drain and will have similar responsibilities for that drain. He noted that Deneau and White will be responsible for extra costs due to their severances and those owners also share in the total drainage work costs.

There was a question about future enclosure of the drain and Mr. Rood explained the factors that will need to be considered at that time. Mr. Paglia noted that another drainage report would have to be done for a future enclosure with additional costs and this project cannot be delayed too long since appeals can be made. An owner can request changes at this time and all additional costs would go to the owner that requests changes. Extending an enclosure would have similar costs per metre as the estimates. The owners asked about quotation of costs and Mr. Paglia advised them that Mr. Rood could get this for them if they make a request and they would have to provide written approval to proceed with the extra work being requested. Once the request is made for extra enclosure it becomes part of the by-law for the work to the drain and cannot be abandoned later since the by-law must be followed. The owners were advised to contact Mr. Paglia or Mr. Rood with any requests and any extra works requested in writing will be included in the final drainage report that will go to Council for the Consideration of the drainage report with all affected owners participating.

Benefit and Outlet liability assessments were discussed as defined below. Establishment of pipe lengths is based on the minimum standard top width of 6.1m (20'), the depth of the drain and the type of end treatment provided. The cost of additional top width requested by an owner is fully borne by that owner. The owners are reminded that the drainage report provides estimates of costs, and the owners will only pay the actual cost shared on the basis of the assessment schedule. Lands eligible for the farm property tax class rate will be eligible for a grant in the amount of 1/3 of their total cost assessment but no parcels are expected to qualify for this. All of the cost for new access bridges and enclosures will be fully assessed to the lands served by the bridge and enclosure. Following construction of the bridge and enclosure, any future maintenance that is required will be shared by the parcel served by the bridge and upstream lands and roads as set out in the bridge cost sharing table of this drainage report with all increased cost for the enclosure being assessed to the lands served by same.

The Town hopes to have the project approved by the end of May. The fish protection timing window from March 15 to June 30th will come into effect and the work will have to be done after June 30th. Bridge and enclosure cost sharing will be reviewed with the owners if they have any questions.

It should be noted that the Public Information Centre (P.I.C.) meeting is not a requirement under the Drainage Act but the Town holds these meetings to address questions and concerns and to solicit comments from the affected owners and receive any requests for modifications to the scope of work.

Owners are reminded that they have the opportunity to present their concerns to Council regarding the report details at the Consideration meeting and assessment questions at the Court of Revision meeting, along with appeal rights to the Ontario Ministry of Agriculture, Food and Rural Affairs (O.M.A.F.R.A.) Appeals Tribunal and to the Drainage Referee as provided for in the Drainage Act.

The Drainage Act definitions and applicable clarifications are as follows:

“Benefit” means the advantages to any lands, roads, buildings or other structures from the construction, improvement, repair, or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures.

“Outlet liability” means the part of the cost of the construction, improvement or maintenance of a drainage works that is required to provide such outlet or improved outlet. Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek, or watercourse, may be assessed for outlet liability. The assessment for outlet liability shall be based upon the volume and rate of flow of the water artificially caused to flow upon the injured land or road or into the drainage works from

the lands and roads liable for such assessments. Every drainage works constructed under this Act shall be continued to a sufficient outlet.

Owners are advised that they have a legal responsibility to convey their drainage to a sufficient outlet. For this reason, they have a share in the cost for upkeep of the drain downstream of their lands and this obligation is reflected in the assessment for Outlet Liability. Owners are reminded that the responsibility for carrying out maintenance on a Municipal drain rests with the Town as set out in the Drainage Act. Any owner can notify the Town that the drain requires maintenance, and the Town has to take action pursuant to the Act. This system is generally reactive and requires the property owners to raise their concerns and issues to the Town. Owners are reminded that keeping brush clear along their portion of the drain and having buffer strips provides them with a direct benefit of reduced maintenance costs for the drain. Owners have an Outlet Liability for the downstream portion of the drain. The owners are reminded that Municipal drainage is a communal project and basically a user pay system.

Owners may appeal their assessment as set out in the drainage report. They are advised that they should submit their appeal to the Court of Revision at least 10 days before the scheduled date of the meeting; however, the Court of Revision can agree to hear appeals presented at the meeting. If owners are still dissatisfied with the report after that meeting, they may submit an appeal to the O.M.A.F.R.A. Appeals Tribunal through the Town Clerk within 21 days of the closing of the Court of Revision pursuant to Section 54 of the Drainage Act.

The cost sharing for bridges is based on the location of same along the overall length of the drainage system. Each owner has the right for one access across each Municipal drain. The owner generally pays 100% of the cost for the first bridge installation and it becomes part of the drain when included in an engineer's report and is then to be maintained by the drain with future costs shared as set out in the drainage report.

Owners should be aware that existing grass buffers and accesses will be protected and maintained as set out in the report specifications. Allowances as set out in the report are to offset damages to lands from the construction work and excavated material disposal. Owners are advised that the Contractor is responsible to remove any sticks and rocks (cobbles) etcetera from the spread materials and the Contractor is responsible to guarantee the work performed on the drain with a maintenance period of one year from the date of substantial completion.

VII. FINDINGS AND RECOMMENDATIONS

We find that the profile included in the 1967 report plans by engineer C.G.R. Armstrong provides a good fit to the existing west profile of the drain. Said report provided for the construction of the open drain portion that still appears to suit the current conditions of the watershed. Based on our detailed survey, investigations, examinations, and discussions with the affected Owners and governing Authorities, we would recommend that drain improvement works be carried out as follows:

- a) We recommend that all drain improvements, be carried out in accordance with the requirements established by E.R.C.A. and D.F.O. as set out in the documents within **Appendix "REI-A"** attached to this report.
- b) As this is an existing Municipal drain, and conditions have not changed and there is no information to indicate any new species concerns, the repair and improvement can be carried out based on the provisions included within the Town "S.A.R. Mitigation Plan for Drainage Works" and the mitigation measures included within same. A copy of said mitigation measures is included in **Appendix "REI-B"** within this report. We recommend that any work being completed shall be carried out in accordance with provisions as included in **Appendix "REI-B"** for reference by the land owners, the Town of Tecumseh, and the Contractor who will be conducting the works.
- c) We find that portions of the open drain have significant accumulation of silt and debris and we recommend that these be cleaned out as set out further in this report. The drain portion west of the Talbot McCarthy Drain will have the same 0.16% grade as set out in the Armstrong report plans, while the portion west of the Talbot McCarthy Drain will be repaired and improved to the design grade shown on the profile in the attached plans. The Enclosure 12 at the east end of the drainage works shall be repaired and improved in the future with the replacement pipe set to match the existing pipe grades.
- d) As provided for by Section 18 of the Drainage Act, we recommend that the bridges and enclosures along the drain be repaired and improved as outlined further in this report including the specifications and the plans that form part of the report.
- e) The existing drain has some buffer strips and grass areas along the Municipal drain that reduce the amount of erosion and the sediment entering the drain and enhance water quality. We recommend that the existing grass areas and buffer strips be protected as part of this project and recommend that new buffer strips with a minimum width of 1.0 metre be constructed as part of the works in all areas where no current grass buffer exists.
- f) No concerns were brought forward or seen for the enclosed portion at the east end. We recommend that the corrugated steel pipe covered drain Enclosure 12 be replaced with 375mm diameter 320 kPa H.D.P.E. smooth wall pipe when future maintenance is required with cost assessed on a frontage basis for the pipe length across each parcel as outlined in the Bridge Cost Sharing table below. Work shall include sloped quarried limestone on filter cloth end treatments as set out in the attached specifications and appendices that form part of this report.
- g) Subsequent to the on-site meeting, the Town and some owners advised us of new bridges required for requested severances to their lands. Details for the required bridges were provided and these have been included in this report for making them part of the drainage works and providing the Town with the information required for future maintenance.

- h) Following the P.I.C. meeting, requests were received from three landowners for providing enclosures along their frontage. The plans and estimates have been updated for Bridges and Enclosures 8, 9 and 10 including adjustments to the assessment schedule.
- i) M.E.C.P. requires proper handling of excess soils in accordance with Ontario Reg 406/19 pursuant to the Environmental Protection Act, R.S.O. 1990, c. E.19 and any subsequent amendments to same. In liaison with the Town Drainage Department, we arranged for the necessary investigations and testing by WSP E&I Canada Limited. Their report and findings are included in **Appendix "REI-F"** attached to this report. We recommend that handling of all excavated materials including disposal be carried out in accordance with the requirements set out in the WSP report.

We recommend that the Shuttleworth Drain be repaired and improved, and the new and replacement bridges and enclosures and future enclosure replacement be installed, in accordance with this report, the attached specifications and the accompanying drawings, using the design grades shown on the attached profile plans, and that all works associated with same be carried out pursuant to Section 78 of the "Drainage Act, R.S.O. 1990, Chapter D.17 as amended 2021".

VIII. ALLOWANCES

We have provided that all of the work will generally be completed from the south side of the drain. The Contractor will be required to restore any existing grassed buffer and driveway areas damaged by the work. We recommend that any materials removed from the open drain or existing bridges and enclosures, be loaded up and hauled away for disposal by the Contractor or placed beyond the limits of any existing grass buffer or driveway access should an owner desire same. Based on all of the above we find that allowances for damages are payable pursuant to Sections 29 and 30 of the Drainage Act.

We find that the provision of access along the south bank of the drain and disturbance to the abutting lands requires payment for the land necessary to carry out the work along the drain. We therefore recommend that the following owners be compensated for all work areas that will be impacted, including for the access to the drain and for damages to lawn areas, drain banks and grass buffers as follows, namely:

1)	John White, (540-00301),	Owner,	Part of Lot 10 & 11, N.T.R. Concession,	\$	110.00
2)	Adam and Vittoria Fortier, (540-00320),	Owners,	Part of Lot 10 & 11, N.T.R. Concession	\$	80.00
3)	Ronnie & Rosa Dowhan, (540-00340),	Owners,	Part of Lot 10 & 11, N.T.R. Concession	\$	60.00

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4)	Emile & Marisa Nabbout, (540-00360),	Owners,	Part of Lot 10 & 11, N.T.R. Concession	\$	60.00
5)	Amelia Conciatori, (540-00400)	Owner,	Part of Lot 10 & 11, N.T.R. Concession	\$	90.00
6)	Robert & Peggy Weston, (540-00500)	Owners,	Part of Lot 11, N.T.R. Concession	\$	120.00
7)	Theresa Gates, (540-00600)	Owner,	Part of Lot 11, N.T.R. Concession	\$	110.00
8)	Weston Park, Town of Tecumseh, (540-00700)	Owner,	Part of Lot 11, N.T.R. Concession	\$	260.00
9)	Fabio Pace & Giselle Rossi, (540-00800)	Owners,	Part of Lot 11, N.T.R. Concession	\$	230.00
10)	Gary & Linda Deneau (540-00701)	Owners,	Part of Lot 11, N.T.R. Concession	\$	240.00
TOTAL FOR ALLOWANCES AND DAMAGES					\$ 1,360.00

These values for allowances and damages are based on a strip of land parallel to and immediately adjacent to the drain or grassed buffer and driveway, for the parcels abutting the north side of the Municipal drain and are based on a value of \$1,225.00 per acre (\$3,027.00 per hectare) for the affected lands. Since grass seed restoration can take some time to bring affected areas back to original conditions, these allowances are calculated using a rate per acre of \$700.00 for year one, \$350.00 for year two and \$175.00 for the third year, similar to allowances for damages to lands and crops of agricultural parcels. These allowances will offset costs that owners may incur for watering, fertilizing, and adding additional grass seed if deemed necessary. The impact after 3 years is considered negligible.

We have provided for this in our estimate as is provided for under Sections 29 and 30 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2021".

IX. ESTIMATE OF COST

Our estimate of the Total Cost of this work, including all incidental expenses, is the sum of **TWO HUNDRED NINETY THOUSAND FIVE HUNDRED FIFTY DOLLARS (\$290,550.00)**, made up as follows:

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CONSTRUCTION

Item 1)	<u>Station 0+000 to Station 0+750;</u> Carry out excavation of the drain to remove accumulated sediment and restore the drain to the profile grade shown on the plans, including all disposal, hauling, and leveling of material, approximately 750 lineal metres (approximately 340 cubic metres).	Lump Sum	\$	13,600.00
Item 2)	<u>Station 0+000 to Station 0+750;</u> Supply and install new heavy duty H.D.P.E. plastic tile main extensions, including connections, rodent grate, removal of any deleterious materials, excavation, backfill, compaction and restoration, complete:			
	a) 3.0 metres (10') of 150mm (6") diameter pipe for 150mm diameter tiles: <u>1</u> required at <u>\$300.00</u> each		\$	300.00
Item 3)	<u>Station 0+000 to Station 0+750;</u> Brushing and grubbing including all disposal and clean up (approximately 750 lineal metres), removing and reinstalling fences, complete.	Lump Sum	\$	11,250.00
Item 4)	<u>Station 0+000 to Station 0+750;</u> Spread scavenged topsoil; carry out seeding and mulching on all newly excavated side slopes including all harrowing, raking, preparation and clean up, approximately 4,500 square metres, complete.	Lump Sum	\$	18,000.00
Item 5)	<u>Bridge No. 1 (Enclosure);</u> Excavate drain, completely remove enclosure and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install <u>60</u> metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete. (Fabio Pace & Giselle Grossi)	Lump Sum	\$	29,700.00

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- Item 6) **Bridge No. 2;** Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install 13 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete.
(Gary & Linda Deneau) Lump Sum \$ 10,400.00
- Item 7) **Bridge No. 2A;** Excavate drain, completely remove and dispose of the existing sediment and all unsuitable materials, including any other deleterious material encountered; supply and install 10 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete.
(Gary & Linda Deneau Severance) Lump Sum \$ 8,700.00
- Item 8) **Bridge No. 3;** Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install 10 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete.
(Weston Park, Town of Tecumseh) Lump Sum \$ 8,000.00
- Item 9) **Bridge No. 4;** Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install 8 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 600mm x 600mm x 1200mm precast concrete block end protection;

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	topsoil placement, seeding and mulching, and asphalt driveway restoration and clean up, complete. (Weston Park, Town of Tecumseh)	Lump Sum	\$	17,300.00
Item 10)	<u>Bridge No. 5</u> ; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install <u>12</u> metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete. (Theresa Gates)	Lump Sum	\$	7,800.00
Item 11)	<u>Bridge No. 6</u> ; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; supply and install <u>11</u> metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete. (Robert Weston)	Lump Sum	\$	7,600.00
Item 12)	<u>Bridge No. 7 (Enclosure)</u> ; Excavate drain, completely remove enclosure and dispose of the existing pipe, sediment and all east endwall materials, including any other deleterious material encountered; supply and install <u>41</u> metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including catch basin connections, Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and asphalt driveway restoration and clean up, complete. (Amelia Conciatori)	Lump Sum	\$	17,200.00

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- Item 13) **Bridge No. 8 (Enclosure)**; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; restore the drain cross section; topsoil placement, seeding and mulching, and restoration and clean up; at new location install 35.1 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface including 600mm square precast concrete catch basin with cast iron frame and grate, adjustment risers and connections; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and asphalt driveway restoration and clean up, complete.
(Emile & Marisa Nabbout) Lump Sum \$ 18,300.00
- Item 14) **Bridge No. 9 (Enclosure)**; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; restore the drain cross section; topsoil placement, seeding and mulching, and restoration and clean up; at new location install 34.3 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface including 600mm square precast concrete catch basin with cast iron frame and grate, adjustment risers and connections; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and asphalt driveway restoration and clean up, complete.
(Ronnie & Rosa Dowhan) Lump Sum \$ 16,200.00
- Item 15) **Bridge No. 10 (Enclosure)**; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; restore the drain cross section; topsoil placement, seeding and mulching, and restoration and clean up; at new location install 35.8 metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface including 600mm square precast concrete catch basin with cast iron frame and grate, adjustment risers and connections; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end

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	protection; topsoil placement, seeding and mulching, and asphalt driveway restoration and clean up, complete. (Adam & Vittoria Fortier)	Lump Sum	\$	21,800.00
Item 16)	<u>Bridge No. 11</u> ; Excavate drain, completely remove and dispose of the existing pipe, sediment and all endwall materials, including any other deleterious material encountered; restore the drain cross section; topsoil placement, seeding and mulching, and restoration and clean up; at new location install <u>11</u> metres of 450mm diameter, H.D.P.E. smooth wall Boss 2000 plastic pipe including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and driveway restoration and clean up, complete. (Timothy Kuhn & Sandra Vasquez)	Lump Sum	\$	7,200.00
Item 17)	<u>Bridge No. 12 (Enclosure)</u> ; Carry out flushing and cleaning of enclosure at east end including all loading, hauling, disposal, clean up and restoration, complete.	Lump Sum	\$	1,650.00
Item 18)	Complete final clean up and restoration of all work areas affected by the project.	Lump Sum	\$	1,000.00
Item 19)	Estimated net Harmonized Sales Tax (1.76% H.S.T.) on construction items above.	Lump Sum	\$	3,802.00
Item 20)	Contingency amount for construction including any extra costs for material handling in accordance with Excess Soil regulations.	Lump Sum	\$	14,968.00
TOTAL FOR CONSTRUCTION			\$	238,252.00

INCIDENTALS

1)	Report, Estimate, & Specifications	\$	10,000.00
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2) Survey, Assistants, Expenses, Drawings, Duplication Cost of Report and Drawings, Consideration Meeting, etc.	\$	22,500.00
3) Estimated Cost of Preparing Tender Documents	\$	900.00
4) Estimated Cost of Construction Supervision and Inspection (based on 10 days)	\$	8,000.00
5) Estimated Net H.S.T. on Items Above (1.76%)	\$	730.00
6) Estimated Cost of E.R.C.A. permit	\$	500.00
7) Estimated Cost of Environmental Investigations to Address Excess Soils	\$	6,700.00
8) Estimated Cost of Interim Financing	\$	500.00
9) Estimated Contingency Allowance	\$	1,118.00
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TOTAL FOR INCIDENTALS	\$	50,938.00
TOTAL FOR ALLOWANCES (brought forward)	\$	1,360.00
TOTAL FOR CONSTRUCTION (brought forward)	\$	238,252.00
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TOTAL ESTIMATE	\$	290,550.00
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X. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached design drawings for the construction of the new and replacement bridges, enclosures and drain improvements. The design drawings show the subject improvement locations and the details of the work, as well as the approximate location within the watershed area. The drain design drawings are attached to the back of this report and are labelled **Appendix "REI-E"**.

Also attached, we have prepared Specifications which set out the required construction details for the drain repair and improvements, which also include Standard Specifications labelled therein as **Appendix "REI-C"**.

XI. CONSTRUCTION SCHEDULE OF ASSESSMENT

We would recommend that all of the costs associated with the construction of the drain repair and improvements, and the preparation of this Engineer's report, be assessed against the

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affected lands in the geographic township of Sandwich South, Town of Tecumseh. A Schedule of Assessment has been prepared and included herein to indicate the lands assessed for the repair and improvement of the drain and bridges. The Schedule of Assessment includes a Special Benefit assessment to each parcel that is having their bridge/enclosure repaired and improved or a new bridge installed under this report. The new bridge is assessed 100% to the parcel and owners served by the new bridge.

Pursuant to the current Agricultural Drainage Infrastructure Program (A.D.I.P.) Policies that are in place, it is anticipated that the lands are eligible for a grant from the Ontario Ministry of Agriculture, Food and Rural Affairs (O.M.A.F.R.A.) in the amount of 1/3 of their total assessment for this project if they are agricultural lands designated as Farm Property Tax Class Rate. Where a bridge structure has increased top width beyond the standard 6.10 metre (20.0 ft.) top width, all of the increased costs resulting from same are assessed 100% to the Owner, as provided for in the cost sharing set out in the attached Table below and the Schedule of Assessment.

XII. FUTURE MAINTENANCE

When maintenance work is carried out in the future on the open drain portion, the cost for said future maintenance shall be assessed in accordance with the attached Schedule of Assessment excluding any Special Benefit. When future maintenance work is carried out, the assessment to the affected Owners shall be based on the actual future maintenance cost shared on a pro-rata basis with the Benefit and Outlet values shown in this assessment schedule.

When maintenance work is carried out on any bridges and enclosures in the future, we recommend that part of the cost be assessed as a Benefit to the abutting parcel served by the access bridge and enclosure, and the remainder shall be assessed to the upstream lands and roads based on their affected area and Outlet Liability assessments on a pro-rata basis as set out in the attached Schedule of Assessment. The share for Benefit and Outlet Liability for future maintenance shall be as set out in the Bridge Cost Sharing table below.

BRIDGE COST SHARING

<u>Bridge</u>	<u>Owners</u>	<u>Benefit to Owner</u>	<u>Outlet Upstream</u>
1	Fabio Pace & Giselle Rossi, (540-00800),	91.2%	8.8%
2	Gary & Linda Deneau, (540-00701),	85.7%	14.3%
2A	Gary & Linda Deneau, (540-00701 Severance),	85.7%	14.3%
3	Town of Tecumseh, (540-00700),	100.0%	0.0%

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4	Town of Tecumseh, (540-00700),	85.5%	14.5%
5	Theresa Gates, (540-00600),	80.7%	19.3%
6	Robert & Peggy Weston, (540-00500),	79.6%	20.4%
7	Amelia Conciatori, (540-00400),	92.5%	7.5%
8	Emile & Marisa Nabbout (540-00360),	92.4%	7.6%
9	Ronnie & Rosa Dowhan , (540-00340),	92.4%	7.6%
10	Adam & Vittoria Fortier, (540-00320),	93.3%	6.7%
11	John White, (540-00301 severance),	85.0%	15.0%
12	John White, (540-00301),	20.9%	0.0%
	Ian Bristow, (540-00300),	33.8%	
	Thomas & Debra McGuinness, (540-00200),	28.7%	
	Mark & Linda Shafer, (540-00100),	16.6%	

We recommend that the bridge structures and enclosures as identified herein, and the covered portion at the east end be maintained in the future as part of the drainage works by the Town of Tecumseh. The cost for a standard access bridge with a 6.1m (20 foot) top width is shared between the parcel served by the bridge as a Benefit and to upstream lands and roads as Outlet Liability based on the location of the structure relative to its position along the drain length. Where a bridge pipe or enclosure exceeds the length required for a standard access bridge, all of the increase in cost for the extra pipe, backfill and associated work is assessed 100% to the parcel that is served by the bridge pipe or enclosure as part of the Benefit assessed to same and shown as a Special Benefit in the attached Schedule of Assessment. For Enclosure 12 at the east end of the drainage works, and that flows from west to east, there is no upstream flows contributed and the cost sharing is therefore based on the abutting lands that Benefit from the Enclosure being in place along those lands, accounting for the length of enclosure pipe serving each parcel.

We would also recommend that the bridges and enclosures, for which the maintenance costs are to be shared with the upstream lands and roads within the watershed, be maintained by the

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Town and that said maintenance would include works to the bridge culvert, bedding, backfill and end treatment. Should concrete, asphalt, or other decorative driveway surfaces over these bridge culverts and enclosures require removal as part of the maintenance works, these surfaces shall also be repaired or replaced as part of the works. Likewise, if any fencing, gate, decorative walls, guardrails, or other special features exist that will be impacted by the maintenance work, they are also to be removed and restored or replaced as part of the bridge or enclosure maintenance work. However, the cost of the supply and installation of any surface materials other than Granular "A" material and the cost of removal and restoration or replacement, if necessary, of any special features, shall be totally assessed to the benefiting adjoining Owner(s) served by said access bridge or enclosure. The cost for maintenance and repair and improvement for the covered portion of the drain at the east end shall be assessed to the abutting owners based on the parcel frontage adjacent to the covered drain portion as illustrated in the Bridge Cost Sharing table above.

We further recommend that the maintenance cost sharing as set out above shall remain as aforesaid until otherwise determined and re-established under the provisions of the "Drainage Act, R.S.O. 1990, Chapter D.17 as amended 2021".

All of which is respectfully submitted.

Rood Engineering Inc.



Gerard Rood, P.Eng.



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att.

Rood Engineering Inc.

Consulting Engineers
9 Nelson Street
LEAMINGTON, Ontario N8H 1G6

SCHEDULE OF ASSESSMENT
SHUTTLEWORTH DRAIN
Town of Tecumseh

3. MUNICIPAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Acres Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
		North Talbot Road		2.00	0.809	Town of Tecumseh	\$ 39,227.00	\$ 2,859.00	\$ -	\$ 42,086.00
Total on Municipal Lands.....							\$ 39,227.00	\$ 2,859.00	\$ -	\$ 42,086.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Acres Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
540-00100	8	S PT LOT 10	0.28	0.14	0.057	Mark & Linda Shafer	\$ 550.00	\$ 146.00	\$ -	\$ 696.00
540-00200	8	S PT LOT 10	0.57	0.29	0.115	Thomas & Debra McGuiness	\$ 1,119.00	\$ 252.00	\$ -	\$ 1,371.00
540-00300	8	S PT LOT 10	0.66	0.33	0.133	Ian Bristow	\$ 1,294.00	\$ 283.00	\$ -	\$ 1,577.00
540-00301	8	PT LOT 10 & 11	1.21	0.60	0.244	John White	\$ 2,365.00	\$ 423.00	\$ -	\$ 2,788.00
540-003??	8	PT LOT 10 & 11	0.74	0.37	0.149	Timothy Kuhn & Sandra Vasquez	\$ 1,444.00	\$ 306.00	\$ 8,595.00	\$ 10,345.00
540-00320	8	PT LOTS 10 & 11	1.16	0.58	0.235	Adam & Vittoria Fortier	\$ 2,275.00	\$ 437.00	\$ 24,281.00	\$ 26,993.00
540-00340	8	PT LOTS 10 & 11	1.07	0.53	0.216	Ronnie & Rosa Dowhan	\$ 2,090.00	\$ 402.00	\$ 17,870.00	\$ 20,362.00
540-00360	8	PT LOTS 10 & 12	1.17	0.58	0.236	Emile & Marisa Nabbout	\$ 2,290.00	\$ 440.00	\$ 20,186.00	\$ 22,916.00
540-00400	8	PT LOTS 10 & 13	2.57	1.28	0.520	Amelia Conciatori	\$ 5,041.00	\$ 701.00	\$ 18,994.00	\$ 24,736.00
540-00500	8	S PT LOT 11	3.10	1.55	0.628	Robert & Peggy Weston	\$ 6,084.00	\$ 766.00	\$ 7,222.00	\$ 14,072.00
540-00600	8	S PT LOT 11	2.77	1.39	0.561	Theresa Gates	\$ 5,434.00	\$ 756.00	\$ 7,515.00	\$ 13,705.00
540-00700	8	S PT LOT 11	9.00	4.50	1.822	Town of Tecumseh	\$ 17,660.00	\$ 1,170.00	\$ 27,208.00	\$ 46,038.00

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Acres Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
540-00701	8	S PT LOT 11	1.42	0.71	0.287	Gary & Linda Deneau	\$ 2,785.00	\$ 480.00	\$ 10,640.00	\$ 13,905.00
540-00701 Severance	8	S PT LOT 11	1.42	0.71	0.287	Gary & Linda Deneau	\$ 2,785.00	\$ 480.00	\$ 10,386.00	\$ 13,651.00
540-00800	8	S PT LOT 11	1.29	0.64	0.260	Fabio Pace & Giselle Rossi	\$ 2,522.00	\$ 451.00	\$ 32,336.00	\$ 35,309.00
Total on Privately Owned - Non-Agricultural Lands.....							<u>\$ 55,738.00</u>	<u>\$ 7,493.00</u>	<u>\$ 185,233.00</u>	<u>\$ 248,464.00</u>
TOTAL ASSESSMENT				16.21	6.56		\$ 94,965.00	\$ 10,352.00	\$ 185,233.00	\$ 290,550.00
=====										

1 Hectare = 2.471 Acres
Project No.REI2017D020
December 14th, 2022

SPECIFICATIONS
SHUTTLEWORTH DRAIN
Repair, Improvement and New and Replacement Bridges and Enclosures
E09SH(88)
(Geographic Township of Sandwich South)
TOWN OF TECUMSEH

I. GENERAL SCOPE OF WORK

The Shuttleworth Drain comprises of an open drain generally located along the north side of North Talbot Road extending from its outlet in the Washbrook Drain, proceeding easterly past the parcel 540-00100 at Municipal Number (M.N.) 5790 to the 9th Concession Drain along the west side of the 9th Concession Road, in the geographic township of Sandwich South, Town of Tecumseh. The work under this project generally comprises of repairs and improvements to the open drain from the Washbrook Drain outlet to approximately the midpoint of the parcel 540-00301 at M.N. 5648 and cleaning of the enclosure at the east end. This includes bridge and enclosure repairs, removals and replacements, and new bridges as needed. The excess soil to be loaded up and hauled away for disposal shall be carried out in accordance with the requirements set out in the WSP report included in **Appendix "REI-F"**.

The general layout of the replacement and new access bridges, enclosures and other ancillary work shall be provided as shown and detailed in the accompanying drawings attached within **Appendix "REI-E"**. Benchmarks have been set near along the drain so that the same can be utilized for the setting of the new bridges culvert grades. The **Benchmarks** are as follows:

1. "top nut of fire hydrant located approximately 17.5 metres East of the East end of proposed bridge fronting Municipal Number (M.N.) 5074 on the North side of North Talbot Road", with the same being **Elevation 188.722 metres**
2. "top nut of hydrant on North side of North Talbot Road directly in front of Municipal Number (M.N.) 5410", with the same being **Elevation 188.632 metres**
3. "top nut of hydrant on North side of North Talbot Road at the east end of the bridge enclosure fronting Municipal Number (M.N.) 5480", with the same being **Elevation 188.673 metres**

All work shall be carried out in accordance with these specifications, the plans forming part of this drainage project, as well as the Standard Details included in **Appendix "REI-C"**. The bridge and enclosure replacements shall be of the size, type, depth, etcetera, as is shown in the accompanying drawings, as determined from the Benchmarks, and as may be further laid out at the site at the time of construction. All work carried out under this project shall be completed to the full satisfaction of the Town Drainage Superintendent and the Consulting Engineer.

II. E.R.C.A. AND D.F.O. CONSIDERATIONS

All of the work shall be carried out in accordance with any permits or authorizations issued by the Essex Region Conservation Authority (E.R.C.A.) or the Department of Fisheries and Oceans (D.F.O.), copies of which will be provided, if available. The standard mitigation response received from E.R.C.A. shall be followed and a copy of same is included within **Appendix "REI-A"**. The Contractor shall ensure that sediment and erosion control provisions, set out further in these specifications and in **Appendix "REI-A"**, are followed. Work shall be scheduled so that it can be completed in the dry and when there is no risk of a rain event that might exceed the capacity of the water control system that the Contractor employs. Any damming of the drain will be done on the upstream side in accordance with the provisions set out in **Appendix "REI-A"**. The Contractor will be required to carry out a fish salvage operation if there is water in the drain when the work is being done. Details for the fish salvage are set out in **Appendix "REI-A"** and the Contractor shall include any expected costs in the item prices of the tender.

The Contractor is to review **Appendix "REI-A"** in detail and is required to comply in all regards with the contents of said E.R.C.A. and D.F.O. measures, and follow the special requirements therein included during construction.

The Contractor will be required to implement stringent erosion and sedimentation controls during the course of the work to help minimize the amount of silt and sediment being carried downstream into the outlet drainage system. It is intended that work on this project be carried out during relatively dry weather to ensure proper site and drain conditions and to avoid conflicts with sediment being deposited into the outlet drainage system. All disturbed areas shall be restored as quickly as possible with grass seeding and mulching installed to ensure a protective cover and to minimize any erosion from the work sites subsequent to construction. The Contractor may be required to provide temporary silt fencing and straw bales as outlined further in these specifications.

III. M.N.R.F. & M.E.C.P. ENDANGERED SPECIES ACT CONSIDERATIONS

The Contractor is to note that the Ministry of Environment, Conservation and Parks (M.E.C.P.) screening process by way of a Species at Risk (S.A.R.) review of the M.E.C.P. "Endangered Species Act, 2007" (E.S.A.) will be completed as a self-assessment by the Town pursuant to Section 23.9 of the E.S.A. prior to construction. This Section allows the Town to conduct eligible works of repair, maintenance and improvement to existing municipal drains under the Drainage Act, and exemptions from Sections 9 and 10 of the E.S.A., provided that the requirements are followed in accordance with Ontario Regulation 242/08. The results of the review will be provided to the Contractor and copies of the mitigation measures, habitat protection and identification sheets will be included within **Appendix "REI-B"**.

Providing mitigation requirements are implemented, it was concluded that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007.

The Contractor is to review **Appendix "REI-B"** in detail and is required to comply in all regards with the contents of said M.N.R.F. & M.E.C.P. measures, and follow the special requirements therein included during construction. Throughout the course of construction the Contractor will be responsible to ensure that all necessary provisions are undertaken to protect all species at risk and their habitats. If a threatened or sensitive species is encountered, the Contractor shall notify the Town and M.N.R.F. - M.E.C.P. and provide all the equipment and materials stipulated by the mitigation requirements for handling the species and cooperate fully with the Town and M.N.R.F. - M.E.C.P. staff in the handling of the species.

IV. ACCESS TO WORK

The Contractor is advised that the majority of the work to be carried out on this project extends along the north side of North Talbot Road. The Contractor shall have access for the full width of the roadway abutting the proposed drainage works. The Contractor may utilize the right-of-way as necessary, to permit the completion of all of the work required to be carried out for this project. The Contractor shall also have access into the driveways as necessary to carry out the removal of the existing access bridges and to construct the new replacement access bridges, as set out on the plans and in these specifications, along with a sufficient area in the vicinity of the bridges to carry out the required construction of the removal and new structure installation and ancillary work.

The Contractor shall ensure that the traveling public is protected at all times while utilizing the roadway for its access. The Contractor shall provide traffic control, including flag persons when required. Should the Contractor have to close North Talbot Road for the proposed works, it shall obtain the permission of the Town Drainage Superintendent or Consulting Engineer and arrange to provide the necessary notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etcetera are contacted about the disruption to access at least 48 hours in advance of same. All detour routes shall be established in consultation with the Tecumseh Works Department.

Throughout the course of the work it is imperative that the Contractor protect as much landscaping and vegetation as possible when accessing along the drain. This will be of particular concern along the lawn areas of residential properties. Due to the extent of the work and the area for carrying out the work, the Contractor will be required to carry out all of the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including provision of all lights, signs, flag persons, and barricades required to protect the safety of the traveling public. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor at its cost, including topsoil placement and lawn restoration as directed by the Town Drainage Superintendent and the Consulting Engineer. Restoration shall include but not be limited to all necessary levelling, grading, shaping, topsoil, seeding, mulching, and granular placement required to make good any damage caused.

V. REMOVAL OF BRUSH, TREES AND RUBBISH

Where there is any brush, trees or rubbish along the course of the drainage works, including the full width of the work access, all such brush, trees or rubbish shall be close cut and grubbed out, and the whole shall be chipped up for recycling, burned or otherwise satisfactorily disposed of by the Contractor. The brush and trees removed along the course of the work are to be put into piles by the Contractor in locations where they can be safely chipped and disposed of, or burned by it, or hauled away and disposed of by the Contractor to a site to be obtained by it at its expense. Prior to and during the course of any burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment, and shall ensure that the Environmental Protection Act is not violated. The Contractor will be required to notify the local fire authorities to obtain any permits and co-operate with them in the carrying out of any work. Burning by-law information is included in **Appendix "REI-D"** for reference by the Contractor. The removal of brush and trees shall be carried out in close consultation with the Town Drainage Superintendent or Consulting Engineer to ensure that no decorative trees or shrubs are disturbed by the operations of the Contractor that can be saved. It is the intent of this project to save as many trees and bushes as practical within the roadway allowances and on private lands. Where decorative trees or shrubs are located directly over drainage pipes, the Contractor shall carefully extract same and turn them over to the Owner when requested to do so, and shall cooperate with the Owner in the reinstallation of same if required.

The Contractor shall protect all other trees, bushes, and shrubs located along the length of the drainage works except for those trees that are established, in consultation with the Town Drainage Superintendent, the Consulting Engineer, and the Owners, to be removed as part of the works. The Contractor shall note that protecting and saving the trees may require the Contractor to carry out hand work around the trees, bushes, and shrubs to complete the necessary final site grading and restoration.

Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

VI. FENCING

Where it is necessary to take down any fence to proceed with the work, the same shall be done by the Contractor across or along that portion of the work where such fence is located. The Contractor will be required to exercise extreme care in the removal of any fencing so as to cause a minimum of damage to same. The Contractor will be required to reinstall any fence that is taken down in order to proceed with the work, and the fence shall be reinstated in a neat and workmanlike manner. The Contractor will not be required to procure any new materials for rebuilding the fence provided that it has used reasonable care in the removal and replacement of same. When any fence is removed by the Contractor, and the Owner thereof deems it

advisable and procures new material for replacing the fence so removed, the Contractor shall replace the fence using the new materials and the materials from the present fence shall remain the property of the Owner.

VII. TOPSOIL, SEED AND MULCH

The Contractor shall be required to restore all existing grassed areas and drain side slopes damaged by the structure construction or cutting of the drain cross section, by placing topsoil, and then seed and mulch over said areas including any specific areas noted on the bridge details. The Contractor shall be required to provide all the material and to cover the above mentioned surfaces with approximately 50mm of good, clean, dry topsoil on slopes and 100mm of good, clean, dry topsoil on horizontal surfaces, fine graded and spread in place ready for seeding and mulching. The placing and grading of any topsoil shall be carefully and meticulously carried out in accordance with Ontario Provincial Standard Specifications, Form 802 dated November 2010, or as subsequently amended, or as amended by these specifications and be readied for the seeding and mulching process. The seeding and mulching of all of the above mentioned areas shall comply in all regards to Ontario Provincial Standard Specifications, Form 803 dated November 2010 and Form 804, dated November 2013, or as subsequently amended, or as amended by these specifications. The seeding mixture shall be the Standard Roadside Mix (Canada No. 1 Lawn Grass Seed Mixture) as set out in O.P.S.S. 804. All cleanup and restoration work shall be performed to the full satisfaction of the Town Drainage Superintendent or Engineer.

When all of the work for this installation has been completed, the Contractor shall ensure that positive drainage is provided to all areas, and shall ensure that the site is left in a neat and workmanlike manner, all to the full satisfaction of the Town Drainage Superintendent or Engineer.

VIII. DETAILS OF BRIDGE AND ENCLOSURE WORK

The Contractor shall provide all material, labour, and equipment to repair and improve the existing access bridges and enclosures in the Shuttleworth Drain requiring work, along with endwall repairs, catch basins and other improvements as noted.

The new access bridge and enclosure installations shall comprise of smooth wall H.D.P.E. (high density polyethylene) pipe with a minimum strength of 320 kPa. All piping sections shall be connected by the use of wrap couplers installed around the complete circumference of the pipe in accordance with the manufacturer's recommendation. Each coupler shall be wrapped in filter cloth material around the complete circumference to ensure that there will be no soil migration through the joints and into the pipe through said connections. All plastic pipe ends shall be anchored down by the Contractor to prevent flotation and deflection from the design grade.

The culvert pipe and enclosure replacements and new pipe and enclosure installations on this project shall be set to the grades as shown on the plans or as otherwise established herein and

the Town Drainage Superintendent or the Consulting Engineer may make minor changes to the bridge alignment as they deem necessary to suit the site conditions. All work shall be carried out in general accordance with the items in the **“STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION”** attached to this specification and labelled **Appendix “REI-C”**.

The Contractor shall also note that the placement of any new access bridge culvert or enclosure is to be performed totally in the dry, and it shall be prepared to take whatever steps are necessary to ensure same, all to the full satisfaction of the Town Drainage Superintendent or Engineer. As part of the work, the Contractor will be required to clean out the drain along the full length of the bridge and enclosure pipe and for a distance of 3.0 metres (10 ft.) both upstream and downstream of said pipe. The design parameters of the Shuttleworth Drain at the location of each new and replacement access bridge and enclosure installation consists of a 0.91m (3.0 ft.) bottom width, the grade shown on the profile, and 2.0 horizontal to 1.0 vertical sideslopes. The Contractor shall be required to cut any brush and strip the existing drain sideslopes of any vegetation as part of the grubbing operation. The Contractor shall also dispose of all excavated and deleterious materials, as well as any grubbed out materials, to a site to be obtained by it at its own expense. The Contractor shall note that the survey indicates that the existing drain bottom is slightly above the design grade. The Contractor shall be required to provide any and all labour, material, and equipment to set the pipes to the required design grades. The Contractor shall also be required to supply, if necessary for a solid base, a minimum thickness of 100mm (4”) of 20mm (3/4”) clear stone bedding underneath the culvert or enclosure pipe, extending from the bottom of the excavation to the culvert or enclosure invert grade, all to the full satisfaction of the Town Drainage Superintendent or Engineer.

The installation of the complete length of each new replacement access bridge culvert or enclosure, including all appurtenances, shall be completely inspected by the Town Drainage Superintendent or Engineer prior to backfilling any portions of same. Under no circumstance shall the Contractor backfill same until the Town Drainage Superintendent or Engineer inspects and approves said pipe installation. The Contractor shall provide a minimum notice of 2 working days to the Town Drainage Superintendent or Engineer prior to the commencement of this work. The installation of each new access bridge or enclosure is to be performed during the normal working hours from Monday to Friday of the Town Drainage Superintendent or Engineer.

Once the H.D.P.E. pipe has been satisfactorily set in place at the site, the Contractor shall completely backfill same at driveway entrances with granular material M.T.O. Type “B” O.P.S.S. (Ontario Provincial Standard Specification) Form 1010, with the exception of the top 305mm (12”) of the backfill material for the full top width of the drain and the access bridge, which shall be granular material M.T.O. Type “A” O.P.S.S. Form 1010. Enclosure pipes at lawn areas shall be backfilled with select native material compacted to a minimum of 95% of S.P.D. and include provision of swale grading to conduct flows to pipe ends or into catch basins. The end slopes of the backfill material over the H.D.P.E. plastic pipe from the invert of said pipe to the top of driveway or swale elevation shall be quarried limestone on filter cloth erosion protection. The end walls shall be extended around onto the drain banks in line with the end of the bridge culvert pipe as shown on the plans included in **Appendix “REI-E”**. The pipe ends shall be securely

anchored against flotation. Precast concrete block endwalls shall be provided where shown on the plans.

The Contractor shall also perform the necessary excavation to extend the driveway beyond the north top of bank for the Shuttleworth Drain as illustrated on the plans. This driveway approach from the existing edge of gravel shoulder to the north top of bank shall consist of a minimum of 305mm (12") of granular material M.T.O. Type "A" satisfactorily compacted in place. The gravel apron shall extend for the full width of the access culvert length and include a 5.0m radius daylighting section at the roadside to the edge of the gravel shoulder, as shown on the plans. The gravel backfill shall also extend across the pipe to approximately 1.0m past the north top of bank limit as shown on the plans.

Once the H.D.P.E. plastic pipe culvert has been set in place at the required location for the access driveway, the Contractor shall completely backfill same with granular material, and install the quarried limestone on filter cloth protection or precast concrete block headwalls on both ends of the bridge. The installation of the endwalls, as well as the backfilling of the pipe where applicable, shall be provided in compliance with Items 1), 2), 3), and 4) of the **"Standard Specifications for Access Bridge Construction"** attached within **Appendix "REI-C"** and in total compliance and in all respects with the General Conditions included in Item 4) of said Appendix. The Contractor, in all cases, shall comply with these specifications and upon completion of the sloped quarried limestone end protection or precast concrete block headwall installation shall restore the adjacent areas to their original conditions. The Contractor shall supply quarried limestone on filter cloth rock protection on each end of the pipe. All rock protection shall be 305mm (12") thick, installed on non-woven filter cloth, and shall be installed in accordance with Item 2) of the **"Standard Specifications for Access Bridge Construction"**. The synthetic filter fabric to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products through Underground Specialties - Wolseley in Windsor, Ontario, or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Industries Amherst Quarry, in Amherstburg, Ontario, or equal.

The H.D.P.E. plastic pipe for this installation shall be provided with a minimum depth of cover measured from the top of the H.D.P.E. plastic pipe to the top of the granular backfill or native backfill of approximately 305mm (1 ft.) for the new replacement bridge and if the culvert is placed at its proper elevations, this should be easily achieved. If the Contractor finds that the specified cover is not being met, they shall notify the Drainage Superintendent and the Engineer immediately so that steps can be taken to rectify the condition prior to the placement of any backfill. The cover requirement is **critical** and must be attained. In order for this new access bridge culvert and enclosure to properly fit the channel parameters, all of the design grade elevations provided must be strictly adhered to.

The Contractor shall also be required to provide all labour, equipment and material to provide granular fill to all gore areas at the laneway as noted on the plans. The Contractor shall provide

a 5.0 metre radius on the roadside approach of the drain as seen on the plans and protect any existing landscape features during the course of the work.

As part of the work provided for the construction of the access bridge, the Contractor shall be required to protect or extend any existing lateral tile ends and swales which conflict with the bridge installation. All existing lateral tile drains and swales, where required, shall be diverted and extended to the ends of the new access bridge culvert and shall be extended and installed in accordance with the "Standard Lateral Tile Detail" as shown in **Appendix "REI-C"**, unless otherwise noted. Connections shall be made using manufacturer's couplers wherever possible. All other connections shall be completely sealed with concrete grout around the full exterior perimeter of each joint.

The Contractor is to note that the granular driveway approaches extending from the existing edge of gravel shoulder to the north top of bank of the drain shall consist of granular material M.T.O. Type "A" O.P.S.S. Form 1010 and is to be provided to a minimum depth of 305mm (12"), and be satisfactorily compacted in place. The Contractor is to also note that all granular material being placed as backfill for this bridge installation shall be compacted in place to a minimum Standard Proctor Density of 100%, and that all native fill material to be used for the construction shall be compacted in place to a minimum Standard Proctor Density of 95%.

All of the granular backfill, native fill, and the compaction levels for same shall be provided to the full satisfaction of the Town Drainage Superintendent or the Engineer. The Contractor shall also note that any sediment being removed from the drain bottom as previously specified herein, shall not be utilized for the construction of the driveway, and shall be disposed of by the Contractor to a site to be obtained by it at its own expense.

The Contractor shall be required to restore any and all drain sideslopes damaged by the access bridge or enclosure installation and removal of vegetation, utilizing the available scavenged topsoil, and shall seed and mulch over all of said areas.

The placing and grading of any topsoil shall be carefully and meticulously carried out in accordance with Ontario Provincial Standard Specifications, Form 802 dated November 2010, or as subsequently amended, or as amended by these specifications and be readied for the seeding and mulching process. The seeding and mulching of all of the above mentioned areas shall comply in all regards to Ontario Provincial Standard Specifications, Form 803 dated November 2010 and Form 804, dated November 2013, or as subsequently amended, or as amended by these specifications. The seeding mixture shall be the Standard Roadside Mix (Canada No. 1 Lawn Grass Seed Mixture) as set out in O.P.S.S. 804. All cleanup and restoration work shall be performed to the full satisfaction of the Town Drainage Superintendent or Engineer.

When all of the work for this installation has been completed, the Contractor shall ensure that positive drainage is provided to all areas, and shall ensure that the site is left in a neat and workmanlike manner, all to the full satisfaction of the Town Drainage Superintendent or Engineer.

IX. DETAILS OF OPEN DRAIN WORK

The open drain shall be excavated to the lines, levels, grades and cross-sections as shown on the accompanying drawings, or as may be further established by the Town Drainage Superintendent or the Engineer at the time of the work. The drain shall be carefully excavated so as not to disturb the existing banks, rock protection and vegetation, except for those portions of the drain where widening or restoration of a stable drain bank configuration is required. The bottom width of the drain and the sideslopes of the excavation shall conform to the dimensions given on the drawings.

The drain shall be of the size, type, depth, etcetera as shown on the accompanying drawings. When completed, the drain shall have a uniform and even bottom and in no case shall such bottom project above the grade line, as shown on the accompanying drawings, and as determined from the Benchmarks. The finished side slopes of the drain shall be 2.0 metres horizontal to 1.0 metre vertical.

The excavated material to be cast onto the adjoining lands shall be well and evenly spread over a sufficient area so that no portion of the excavated earth is more than 100mm in depth. The material shall be kept at least 1.2 metres clear from the finished edge of the drain, care being taken not to fill up any existing tiles, ditches, furrows or drains with the excavated material. The excavated material to be spread upon the lands shall be free from rocks, cobbles, boulders, stumps, rubble, rubbish or other similar material and these materials, if encountered, shall be hauled away by the Contractor and disposed of at a site to be obtained by it at its expense.

Where the drain crosses any lawn, garden, orchard, roadway or driveway, etcetera, the excavated material for the full width of the above-mentioned areas shall be hauled away by the Contractor and disposed of to a site to be obtained by the Contractor at its expense. All work at the disposal site shall be established between the Contractor and the site owner. The Contractor shall be responsible for any permits required and shall provide copies of same to the Town and Consulting Engineer when requested. The handling of these excess soils shall be conducted in accordance with the requirements set out in **Appendix "REI-F"**.

Where there is any brush or rubbish in the course of the drain, including both side slopes of the drain, all such brush or rubbish shall be close cut and grubbed out. Where there is any brush or rubbish where the earth is to be spread, or on that strip of land between where the earth is to be spread and the edge of the drain, all such brush or rubbish shall be close cut and grubbed out. The whole is to be burned, chipped, or otherwise satisfactorily disposed of by the Contractor.

X. REMOVALS

Where existing access bridges and enclosures are to be completely removed and replaced, the Contractor shall be required to excavate and completely extract the existing structure or culvert pipe and the existing endwalls in their entirety, as well as any other deleterious materials that may be encountered in removing same, excluding poured concrete headwalls that are to be reused. The Contractor shall neatly saw cut any concrete or asphalt surfaces over the pipes for a sufficient width to allow for the safe removal of same or go to the nearest expansion joint panel of the concrete driveways. The Contractor shall also be required to completely dispose of all removed materials to a site to be obtained by it at its own expense in accordance with the excess soils handling requirements in **Appendix "REI-F"**. The Contractor shall note that when headwalls are shown to be left in place, the Contractor shall protect same and carry out its work for the pipe replacement as noted above and dispose of any debris resulting from the work.

All unsuitable and deleterious materials from the excavation and removal of the existing bridge and enclosure culverts and drain cleaning shall be hauled away and disposed of by the Contractor to a site to be obtained by it at its expense. Likewise, any material excavated to allow for the granular approaches to the bridge, driveway transitions, or installation of new headwalls shall also be hauled away and disposed of by the Contractor with all materials handled in accordance with the excess soil requirements in **Appendix "REI-F"**.

XI. CONCRETE FILLED JUTE BAG, PRECAST CONCRETE BLOCK OR SLOPED END PROTECTION

Unless otherwise shown or noted, the Contractor is to provide new concrete filled jute bag headwalls, precast concrete block, or sloped quarried limestone on non-woven filter cloth end protection for the access bridges and enclosures being replaced or constructed on this drain.

The concrete filled jute bags are to be provided and laid out as is shown and detailed in the drawings provided by the Town and as noted in the Standard Specifications in **Appendix "REI-C"**. In all cases, the concrete filled jute bag headwalls shall be topped with a minimum 100mm (4") thick continuous concrete cap comprising 30MPa concrete with 6% \pm 1% air entrainment for the entire length of the headwalls. The headwalls shall be installed on an inward batter to be not less than 1 horizontal to 5 vertical, and under no circumstances shall this batter, which is measured from the top of the headwall to the projection of the end of the pipe, be less than 305mm (12"). From the midpoint of the pipe height down to the concrete footing, the wall shall be a double concrete filled jute bag installation. On the road side the walls shall be deflected as shown to provide daylighting and a better approach across the new bridge.

The installation of the concrete filled jute bag headwalls, unless otherwise specified, shall be provided in total compliance with the Items 1, 3, and 4 included in the **"STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION"**. These are attached to the back of these specifications and labelled **Appendix "REI-C"**. The Contractor shall comply in all respects with

the General Conditions included in Item 4 and the **"Typical Concrete Filled Jute Bag Headwall End Protection"** detail also shown therein.

The Contractor shall install interlocking precast concrete blocks with filter cloth backing for walls on both ends of the bridges requiring same. The blocks shall be minimum 600X600X1200mm in size as available from Underground Specialties - Wolseley, Windsor, Ontario, or equal, and installed as set out in **Appendix "REI-C"**. Vertical joints shall be staggered by use of half blocks where needed and wingwall deflections when required shall employ 45-degree angled blocks. Voids between the blocks and the pipe shall be grouted with 30MPa concrete having 6% \pm 1% air entrainment and extend for the full thickness of the wall and have a smooth uniform finish on the face that blends with the precast blocks. The installation of the endwalls, as well as the backfilling of the pipe where applicable, shall be provided in compliance with Items 1), 3), and 4) of the "Standard Specifications for Access Bridge Construction" attached within **Appendix "REI-C"** and in total compliance and in all respects with the General Conditions included in said Appendix. The Contractor shall submit shop drawings for approval of the wall installation that includes details for a minimum 300mm thick concrete footing that extends from the pipe invert downward. The footing shall extend into the drain banks each side for the required embedment of the blocks and be constructed to ensure that the completed wall will be completely vertical or tipped slightly back towards the driveway. Where the block walls extend more than 1.8 metres in height, the supplier shall provide the Contractor with uni-axial geogrid (SG350 or equivalent) reinforcement for installation to tie the wall back into the granular backfill. The Contractor, in all cases, shall comply with these specifications and upon completion of the stacked precast concrete end protection installation shall restore the adjacent areas to their original conditions. The Contractor shall supply quarried limestone on filter cloth rock protection adjacent to the headwalls at each corner of the bridge. All rock protection shall be 1.0 metres wide and 305mm (12") thick, installed on non-woven filter cloth, and shall be installed in accordance with Item 2) of the "Standard Specifications for Access Bridge Construction". The synthetic filter mat to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products through Underground Specialties - Wolseley in Windsor, Ontario or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Industries Amherst Quarries, in Amherstburg, Ontario, or equal.

Where sloped end protection is specified, the top 305mm (12") of backfill material over the ends of the access pipe, from the invert of said pipe to the top of the driveway elevation of the access bridge or enclosure, shall be quarried limestone. The quarried limestone shall be provided as shown and detailed on the plans or as indicated in the Standard Specifications in **Appendix "REI-C"** and shall be graded in size from a minimum of 100mm (4") to a maximum of 250mm (10"). The quarried limestone to be placed on the sloped ends of an access bridge or enclosure shall be underlain with a synthetic **non-woven** geotextile filter fabric. The sloped quarried limestone protection is to be rounded as shown on the plan details and shall also extend along the drain side slopes to a point directly in line with the ends of the culvert pipe or enclosure. The road side approach to the entrance shall be provided with a minimum 5.0m radius at each end of the

driveway entrance. All work shall be completed to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer.

The installation of the sloped quarried limestone end protection, unless otherwise specified herein, shall be provided in total compliance with Item 2), 3), and 4) of the **“STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION”**. These are attached to the back of these specifications and labelled **Appendix “REI-C”**. The Contractor shall comply in all respects with the General Conditions included in Item 4 and the **“Typical Quarried Limestone End Protection Detail”** also in **Appendix “REI-C”**.

The quarried limestone erosion protection shall be embedded into the sideslopes of the drain a minimum thickness of 305mm and shall be underlain in all cases with non-woven synthetic filter mat. The filter mat shall not only be laid along the flat portion of the erosion protection, but also contoured to the exterior limits of the quarried limestone and the unprotected slope. The width of the erosion protection shall be as established in the accompanying drawings or as otherwise directed by the Town Drainage Superintendent or the Consulting Engineer during construction. In placing the erosion protection, the Contractor shall carefully tamp the quarried limestone pieces into place with the use of the excavator bucket so that the erosion protection when completed will be consistent, uniform and tightly laid. In no instance shall the quarried limestone protrude beyond the exterior contour of the unprotected drain sideslopes along either side of said protection. The synthetic filter mat fabric to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products, or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Aggregates Amherst Quarries, in Amherstburg, Ontario, or equal.

XII. BENCHMARKS

Also, for use by the Contractor, we have established Benchmarks along the course of the work and especially at the locations where existing access bridges are being replaced or new bridges are being constructed.

For each of the bridge and enclosure replacements and new bridges and enclosures, the plans include details illustrating the work to be carried out. For each bridge and enclosure detail a Benchmark has been indicated and the Elevation has been shown and may be utilized by the Contractor in carrying out its work. The Contractor shall note that in each case a specific design elevation grade has been provided for the invert at each end of the pipe in the table accompanying each detail. The table also sets out the pipe size, materials, and other requirements relative to the installation of the culvert or enclosure structure. In all cases, the Contractor is to utilize the specified drain grade to set any new pipe installation. The Contractor shall ensure that it takes note of the direction of flow and sets all pipes to assure that all grades flow from high to low points to match the direction of flow within the drain. The Contractor's attention is drawn to the fact that the pipe invert grades established herein provide for the pipes

to be set at least 10% of their diameter or pipe rise below the existing drain bottom or the design grade of the drain, whichever is lower.

XIII. ANCILLARY WORK

During the course of any work to the bridges and enclosures along the length of the project, the Contractor will be required to protect or extend any existing tile ends or swales and connect them to the drainage works to maintain the drainage from the adjacent lands. All existing tiles shall be extended utilizing solid Big 'O' "standard tile ends" or equal plastic pipe of the same diameter as the existing tile and shall be installed in accordance with the "Standard Lateral Tile Detail" included in the plans, unless otherwise noted. Connections shall be made using a manufacturer's coupling where possible. Wherever possible, tiles shall be extended to outlet beyond the end of any access culverts. When required, openings into new pipes shall be neatly bored, saw cut or burned with a torch to the satisfaction of the Town Drainage Superintendent or the Consulting Engineer. All cuts to steel pipes shall be touched up with a thick coat of zinc rich paint (Galvicon or equal) in accordance with the manufacturer's recommendations. For other connections, the Contractor shall utilize a grouted connection. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland cement with just sufficient water added to provide a stiff plastic mix, and the mortar connection shall be performed to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. The mortar joint shall be of a sufficient mass around the full circumference of the joint on the exterior side to ensure a tight, solid seal. The Contractor is to note that any intercepted pipes along the length of the existing culverts and enclosures are to be extended and connected to the open drain unless otherwise noted in the accompanying drawings.

Where the bridge or enclosure installation interferes with the discharge of an existing swale, the Contractor shall re-grade the existing swales to allow for the surface flows to freely enter the drain. Any disturbed grass areas shall be fully restored with topsoil, seed and mulch.

All granular backfill for the bridge and enclosure installations shall be satisfactorily compacted in place to a minimum Standard Proctor Density of 98% by means of mechanical compaction equipment. All other good, clean, native fill material or topsoil to be utilized, where applicable, shall be compacted in place to a minimum Standard Proctor Density of 95%. All of the backfill material, equipment used, and method of compacting the backfill material shall be provided and performed to the full satisfaction of the Town Drainage Superintendent or Consulting Engineer.

Where the Contractor removes concrete or asphalt hard surfaces over the pipes, the Contractor shall restore the hard surfaces as previously outlined. The Contractor will be responsible to restore any damage caused to these driveways at its cost. All damaged hard surface driveway areas shall be neatly saw cut and the damaged materials removed and disposed of by the Contractor prior to carrying out any restoration work.

Any new corrugated aluminized steel type II pipes for these installations are to be provided with a minimum depth of cover measured from the top of the pipe of 305mm (12") for a round pipe and 500mm for a pipe arch. If the bridge culvert pipes are placed at their proper elevations, same should be achieved. If the Contractor finds that the minimum cover is not being met, they shall notify the Town Drainage Superintendent and the Consulting Engineer immediately so that steps can be taken to rectify the condition prior to the placement of any backfill. The minimum cover requirement is **critical** and must be attained. In order for these new access bridge culverts to properly fit the channel parameters, **all of the design grade elevations must be strictly adhered to.**

As a check, all of the above access bridge and enclosure culvert design grade elevations should be confirmed before commencing to the next stage of the access bridge or enclosure installation. The Contractor is also to check that the pipe invert grades are correct by referencing the Benchmark.

Although it is anticipated that the culvert or enclosure installation at each site shall be undertaken in the dry, the Contractor shall supply and install a temporary straw bale or silt curtain check dam in the drain bottom immediately downstream of each culvert or enclosure site during the time of construction. The straw bale or silt curtain check dam shall be to the satisfaction of the Town Drainage Superintendent or Consulting Engineer and must be removed upon completion of the construction. The check dam materials may be reused at each site subject to their condition. All costs associated with the supply and installation of this straw bale or silt curtain check dam shall be included in the cost bid for the bridge or enclosure installations or replacements.

XIV. GENERAL CONDITIONS

- a) The Town Drainage Superintendent or Consulting Engineer shall have authority to carry out minor changes to the work where such changes do not lessen the efficiency of the work.
- b) The Contractor shall satisfy itself as to the exact location, nature and extent of any existing structure, utility or other object which it may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town of Tecumseh and the Consulting Engineer and their representatives for any damages which it may cause or sustain during the progress of the work. It shall not hold the Town of Tecumseh or the Consulting Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.
- c) The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and Consulting Engineer can review same and check that the work will generally conform to the design and project intent.
- d) The Contractor will be responsible for any damage caused by it to any portion of the Town road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of the road, the travelled

portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If any part of the travelled portion of the road is damaged by the Contractor, the Town shall have the right to have the necessary repair work done by its' employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the Town. The Contractor, upon completing the works, shall clean all debris and junk, etc., from the roadside of the drain, and leave the site in a neat and workmanlike manner. The Contractor shall be responsible for keeping all public roadways utilized for hauling materials free and clear of mud and debris.

- e) The Contractor shall provide all necessary lights, signs, and barricades to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, signing is to comply with the M.T.O. Manual of Uniform Traffic Control Devices (M.U.T.C.D.) for Roadway Work Operations and Ontario Traffic Manual Book 7.
- f) During the course of the work the Contractor shall be required to connect existing drainage pipes to the Municipal Drain. In the event that polluted flows are discovered, the Contractor shall delay the connection of the pipe and leave the end exposed and alert the Town, the Drainage Superintendent and the Consulting Engineer so that steps can be taken by the Town to address the concern with the owner and the appropriate authorities. Where necessary the Contractor shall cooperate with the Town in providing temporary measures to divert the drain or safely barricade same. Should the connection be found acceptable by the authorities, the Contractor shall complete the connection of the drain as provided for in the specifications, at no extra cost to the project.
- g) Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.
- h) The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no work shall be left in any untidy or incomplete state before subsequent portions are undertaken.
- i) During the course of the project the Contractor shall deal with any excess soil management from the project in accordance with Ontario Reg 406/19 pursuant to the Environmental Protection Act, R.S.O. 1990, c. E.19 and any subsequent amendments to same, and the provisions included in **Appendix "REI-F"**.
- j) All driveways, laneways and access bridges, or any other means of access on to the job site shall be fully restored to their former condition at the Contractor's expense. Before authorizing Final Payment, the Town Drainage Superintendent and the Consulting Engineer shall inspect the work in order to be sure that the proper restoration has been performed. In the event that the Contractor fails to satisfactorily clean up any portion of these accesses,

the Consulting Engineer shall order such cleanup to be carried out by others and the cost of same be deducted from any monies owing to the Contractor.

- k) The Contractor will be required to submit to the Town, a Certificate of Good Standing from the Workplace Safety and Insurance Board prior to the commencement of the work and the Contractor will be required to submit to the Town, a Certificate of Clearance for the project from the Workplace Safety and Insurance Board before Final Payment is made to the Contractor.
- l) The Contractor shall furnish a Performance and Maintenance Bond along with a separate Labour and Material Payment Bond within ten (10) days after notification of the execution of the Agreement by the Town. One copy of said bonds shall be bound into each of the executed sets of the Contract. Each Performance and Maintenance Bond and Labour and Material Payment Bond shall be in the amount of 100% of the total Tender Price. All Bonds shall be executed under corporate seal by the Contractor and a surety company, authorized by law to carry out business in the Province of Ontario. The Bonds shall be acceptable to the Town in every way and shall guarantee faithful performance of the contract during the period of the contract, including the period of guaranteed maintenance which will be in effect for twelve (12) months after substantial completion of the works.

The Tenderer shall include the cost of bonds in the unit price of the Tender items as no additional payment will be made in this regard.

- m) The Contractor shall be required, as part of this Contract, to provide Comprehensive Liability Insurance coverage for not less than \$5,000,000.00 on this project; and shall name the Town of Tecumseh and its' officials and the Consulting Engineer and their staff as additional insured under the policy. The Contractor must submit a copy of this policy to both the Town Clerk and the Consulting Engineer prior to the commencement of work.
- n) Monthly progress orders for payment shall be furnished the Contractor by the Town Drainage Superintendent. Said orders shall be for not more than 90% of the value of the work done and the materials furnished on the site. The paying of the full 90% does not imply that any portion of the work has been accepted. The remaining 10% will be paid 60 days after the final acceptance and completion of the work and payment shall not be authorized until the Contractor provides the following:
 - i) a Certificate of Clearance for the project from the Workplace Safety and Insurance Board
 - ii) proof of advertising

The Contractor shall satisfy the Consulting Engineer or Town that there are no liens or claims against the work and that all of the requirements as per the Construction Act, 2018 and its' subsequent amendments have been adhered to by the Contractor.

- o) In the event that the Specifications, Information to Tenderers, or the Form of Agreement do not apply to a specific condition or circumstance with respect to this project, the applicable section or sections from the Canadian Construction Documents Committee C.C.D.C.2 shall govern and be used to establish the requirements of the work.
- p) Should extra work be required by the Town Drainage Superintendent or Consulting Engineer and it is done on a time and material basis, the actual cost of the work will be paid to the Contractor with a 15% markup on the total actual cost of labour, equipment and materials needed to complete the extra work.

APPENDIX "REI-A"

STANDARD E.R.C.A. AND D.F.O.
MITIGATION REQUIREMENTS

As part of its work, the Contractor will implement the following measures that will ensure that any potential adverse effects on fish and fish habitat will be mitigated:

1. As per standard requirements, work will not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work will be done in the dry.
2. All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition to what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site, or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.
3. To prevent sediment entry into the drain in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with the related Ontario Provincial Standards. It is incumbent on the proponent and Contractors to ensure that sediment and erosion control measures are functioning properly and maintained/upgraded as required.
4. Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.
5. All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.
6. Any drain banks trimmed outside of the July 1st to September 15th timing window will require erosion control blankets to be installed to promote re-vegetation and to protect the slope from erosion in the interim.

Measures to Avoid Causing Harm to Fish and Fish Habitat

If you are conducting a project near water, it is your responsibility to ensure you avoid causing [serious harm to fish](#) in compliance with the *Fisheries Act*. The following advice will help you avoid causing harm and comply with the *Act*.

PLEASE NOTE: This advice applies to all project types and replaces all “Operational Statements” previously produced by DFO for different project types in all regions.

Measures

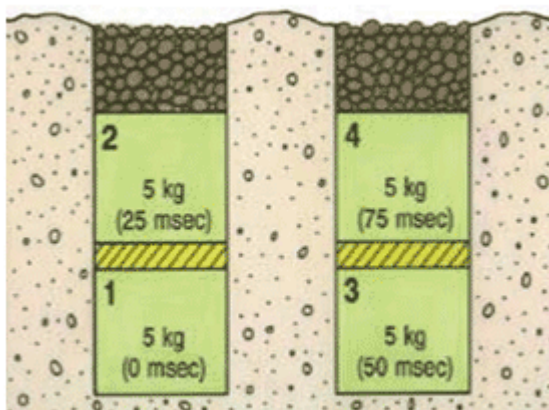
- Time work in water to respect [timing windows](#) to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.
- Minimize duration of in-water work.
- Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.
- Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.
- Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
- Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.
- Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.
- Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse.
- Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site.
- Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

- Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include:
 - Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
 - Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
 - Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation).
 - Measures for containing and stabilizing waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry.
 - Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
 - Repairs to erosion and sediment control measures and structures if damage occurs.
 - Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
- Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.
- Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.
- Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.
- Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
- If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.
- Remove all construction materials from site upon project completion.

- Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
- Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
- Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
 - In freshwater, follow these measures for design and installation of intake end of pipe fish screens to protect fish where water is extracted from fish-bearing waters:
 - Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
 - Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
 - The screen face should be oriented in the same direction as the flow.
 - Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
 - Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
 - Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
 - Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
 - Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.
 - Provision should be made for the removal, inspection, and cleaning of screens.
 - Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
 - Pumps should be shut down when fish screens are removed for inspection and cleaning.
- Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
 - If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a dam or water intake), the potential for impacts to fish and fish habitat should be minimized by implementing the following measures:

- Time in-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries [timing windows](#).
- Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
- Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting
- Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).
- Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
- Place blasting mats over top of holes to minimize scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.
- Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: Sample Blasting Arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes; and decking of charges within holes.

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

- Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
- Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
- Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

Date modified:
2013-11-25

SECTION II

SPECIFICATIONS

FOR FISH SALVAGE

GENERAL

SECTION 201

The Work shall include the capture, salvage and release of fish that are trapped or stranded as the result of the Contractor's operations, at locations identified in the Fish Salvage Plan, and in co-operation with the Essex Region Conservation Authority (E.R.C.A.).

Fish capture shall be performed prior to dewatering, and in such manner that will minimize the injury to the fish.

MATERIALS

SECTION 202

All materials required for fish capture, salvage and release shall be supplied by the Contractor.

CONSTRUCTION

SECTION 203

The Contractor shall not commence any fish capture, salvage and release work until the Fish Salvage Plan has been accepted by the Consultant and the Conservation Authority. All work shall be performed in accordance with the Fish Salvage Plan unless otherwise determined by the Consultant or the Conservation Authority.

The Contractor shall ensure an ice-free pool is maintained throughout all fish capture and release operations.

All fish shall be captured within the area specified and released at an acceptable location in the downstream water body. Fish shall be captured by electro fishing, netting, seining, trapping, or other method acceptable to the Consultant and/or the Conservation Authority.

MEASUREMENT AND PAYMENT

SECTION 204

Payment for this Work will be included in the price bid for drainage work components or made at the lump sum price bid for "Fish Capture and Release". The lump sum price will be considered full compensation for all labour, materials, equipment, tools, and incidentals necessary to complete the Work to the satisfaction of the Consultant.

APPENDIX "REI-B"

5.0 Location

Located along the southern shores of Lake St. Clair in Essex County and in the Essex Region Watershed, the Town of Tecumseh (Study Area) encompasses a geographic area of 9,538.60 hectares (ha) that is bordered by the City of Windsor and the Town of LaSalle on its western side and the Town of Lakeshore to the east and shown on **Figure 1** (Essex Region Conservation Authority (ERCA), 2013). There are four (4) subwatersheds (total area): Pike Creek subwatershed (8,993 ha), Canard River subwatershed (34,776 ha), Tecumseh Area Drainage subwatershed (1,150 ha), Turkey Creek subwatershed (6,112 ha), and Lile River subwatershed (6,490 ha) that traverse the lands within the Town's boundaries (ERCA, 2011). Approximately 95.15% (9,079.38 ha) of the landscape consists of anthropogenic features (residential, commercial, agricultural, etc.) while the remaining 4.81% (459.22 ha) is made up of natural areas (terrestrial (4.49%) and other terrestrial (0.32%)) (ERCA, 2013).

There are one hundred and twenty (120) municipal drains measuring 221 kilometers (km) within the Town of Tecumseh (Town of Tecumseh, 2014). Through our background review we identified 3 dominant habitat types surrounding/within the drains that have potential to provide habitat for SAR. Habitats consist of:

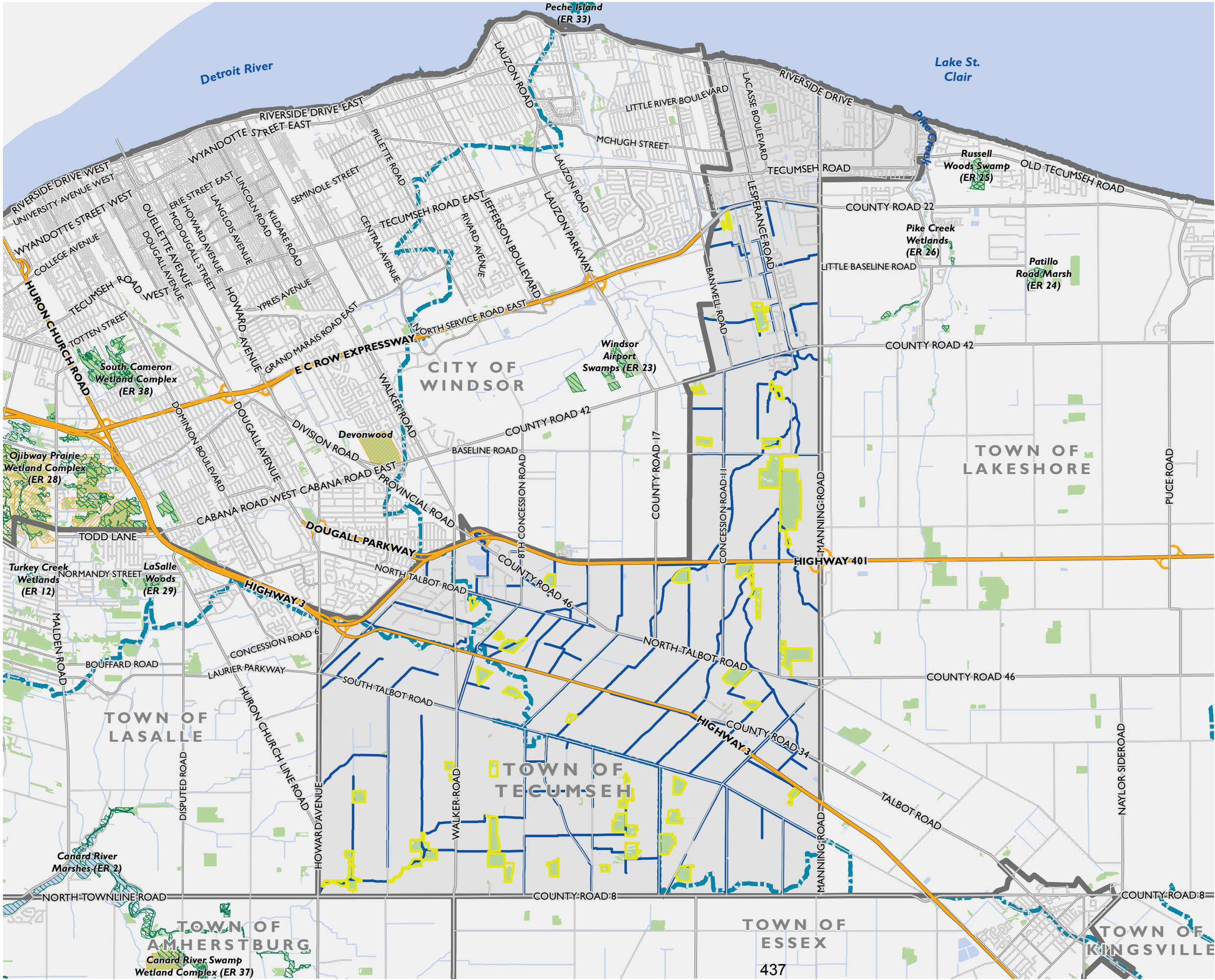
Existing Natural Features:

- Forest

Existing Anthropogenic Features:

- Urban (residential, commercial, recreational, right-of-ways)
- Agricultural (row crop, hayfield, old abandoned fields)

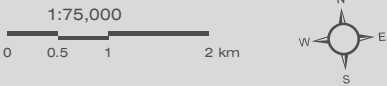
Within the Town, there are no forest patches greater than 100 ha in size with the largest being Fairplay Woods (an Environmentally Significant Area (ESA)) which spans a total area of 52.9 ha (ERCA, 2013). There are 2 forest patches that contain 200 m interior forest and 16 patches that contain 100 m interior forest (ERCA, 2013). In accordance with subparagraph i, of paragraph 2, of subsection 6 under Section 23.9 of O.Reg. 242/08, **Drainage Maps** have been prepared that show drain locations, surrounding land use types, proximity to sensitive natural features (e.g. Forest) and potential SAR habitat that exists within the Town's jurisdiction (see **Appendix B**). A list of all the drains and adjacent habitat type(s) has been provided in **Appendix B** following the Drainage Maps. In addition, a **Tecumseh Drain Database** (provided electronically) contains the drain names, adjacent habitat types, and relevant information found during our background review from the MNRF and ERCA.



TOWN OF TECUMSEH

NATURAL FEATURES
FIGURE 1

- Mainland
- Provincially Significant Wetland
- ANSI, Life Science
- Natural Heritage System
- Municipal Drain
- Quaternary Watershed
- Water Body
- Woodland



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR, TOWN OF TECUMSEH

MAP CREATED BY: GM
MAP CHECKED BY: KM/AB
MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 174938
STATUS: FINAL
DATE: 2017-12-08

6.0 Species at Risk

A review of secondary source information, including the expired MNRF Agreement¹, Natural Heritage Information Centre (NHIC) GIS Database records (i.e. 1 km squares that overlap the Study Area) were reviewed to gather a list of the SAR that have the potential to occur within the Town's boundaries. A total of sixty-six (66) species listed as either endangered or threatened on the SARO list (O.Reg. 230/08) were identified to occur within the Study Area (see **Appendix C**). One Restricted Species Record was also identified in 1988 (NHIC 1 km Square 17LG4478).

The habitat requirements for each of the sixty-six species was cross referenced with habitats identified within the Study Area. A total of Nineteen (19) species listed as endangered or threatened were identified as having potential habitat within the Study Area drains, consisting of Turtles (2 species), Snakes (2 species), Fishes (2 species), Birds (3 species), and Plants (10 species). **Table 2** lists the SAR, preferred habitat type(s) (Forest, Agricultural, Urban or All), need for water presence (requirement for some species), and the dates during the year when the species is likely to be carrying out sensitive life processes, referred to herein as the Restricted Activity Period (RAP).

Four (4) species listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08 were identified as having the potential to occur within the Town of Tecumseh drains, these species include: Pugnose Minnow (*Opsopoeodus emiliae*) (1 fish species), False Hop Sedge (*Carex lupuliformis*), Heart-leaved Plantain (*Plantago cordata*) and Scarlet Ammannia (*Ammannia robusta*) (3 plant species). Since these species are listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08, this mitigation plan cannot be used for these species and as such, they have not been included in **Table 2** below. Permitting related to these species may be required when working in specific drains. More information on these species, their habitat preferences, known distribution within the area and steps that need to be taken to determine whether a permit is required are outlined in **Appendix D**.

Table 2: Species at Risk with Potential to Occur within the Study Area

Scientific Name	Common Name	ESA ¹	Preferred Habitat Type ²	Restricted Activity Period
Turtles (2 species)				
<i>Emydoidea blandingii</i>	Blanding's Turtle	THR	Forest, Water is present	November 1 to April 30 Important to Note: Activities that require water level reduction cannot occur in areas when and where turtles are hibernating (paragraph 6, subsection 13, under Section 23.9 of O.Reg. 242/08).
<i>Apalone spinifera</i>	Spiny Softshell	THR	Forest, Water is present	

¹ Agreement under Section 23 of O.Reg. 242/08 made under the ESA, 2007 (File # AY-23D-010-10)



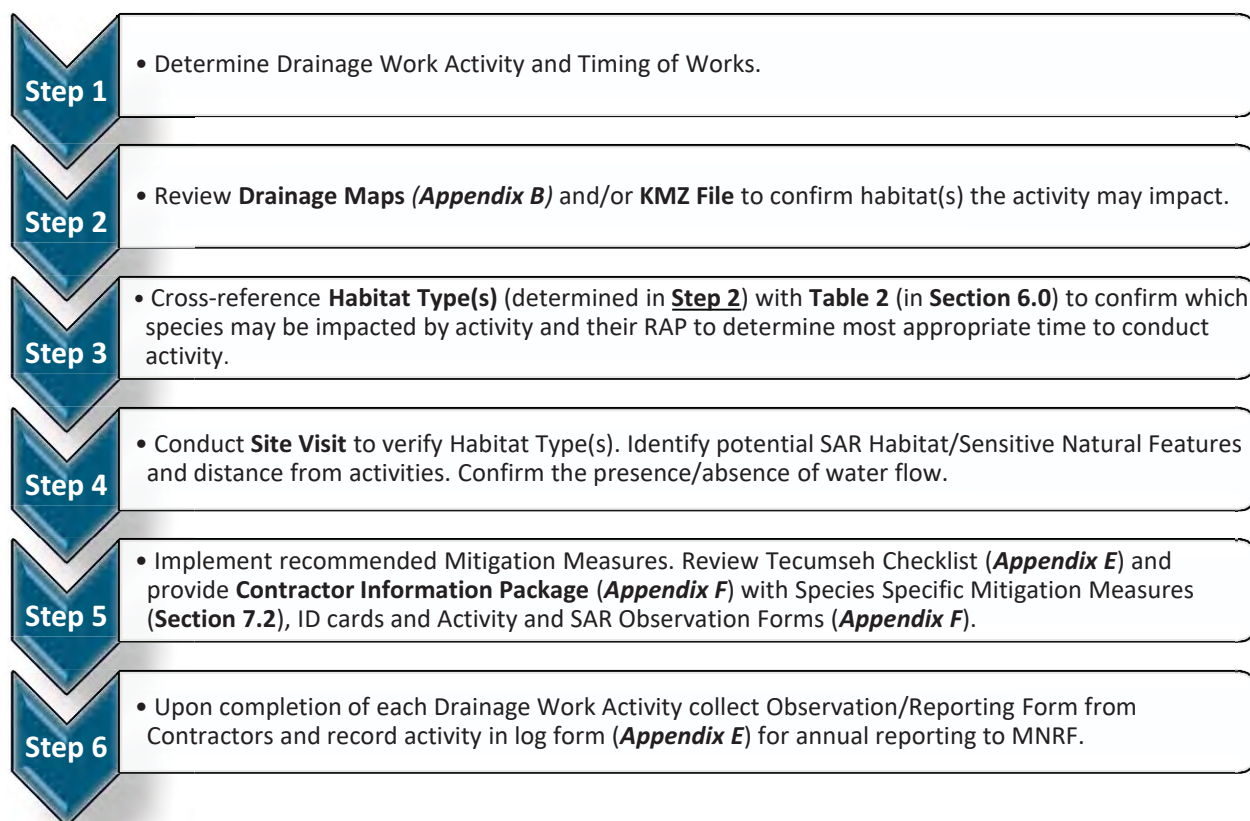
Scientific Name	Common Name	ESA ¹	Preferred Habitat Type ²	Restricted Activity Period
Snakes (2 species)				
<i>Pantherophis gloydi</i>	Eastern Foxsnake (Carolinian population)	END	All ³	September 20 to May 31
<i>Thamnophis butleri</i>	Butler's Gartersnake	END	All ³	
Fishes (2 species)				
<i>Notropis anogenus</i>	Pugnose Shiner	END	Water is present	March 15 to June 30
<i>Lepisosteus oculatus</i>	Spotted Gar	THR		
Birds (3 species)				
<i>Dolichonyx oryzivorus</i>	Bobolink	THR	Agricultural	May 1 to July 15
<i>Sturnella magna</i>	Eastern Meadowlark	THR	Agricultural	
<i>Hirundo rustica</i>	Barn Swallow	THR	All ³	
Vascular Plants (10 species)				
<i>Gymnocladus dioicus</i>	Kentucky Coffee-tree	THR	Forest	Not Applicable
<i>Liparis liliifolia</i>	Purple Twayblade	THR	Forest	
<i>Cornus florida</i>	Eastern Flowering Dogwood	END	Forest	
<i>Castanea dentata</i>	American Chestnut	END	Forest	
<i>Juglans cinerea</i>	Butternut	END	Forest	
<i>Morus rubra</i>	Red Mulberry	END	Forest	
<i>Aletris farinosa</i>	Colicroot	THR	Agricultural, Forest	
<i>Smilax rotundifolia</i>	Round-leaved Greenbrier (Great Lakes Plains population)	THR	Forest	
<i>Liatris spicata</i>	Dense Blazing Star	THR	Agricultural	
<i>Symphyotrichum praealtum</i>	Willowleaf Aster	THR	Forest	

¹Endangered Species Act – status as defined by O.Reg. 242/08 as of April 27, 2017; ²Preferred Habitat Types – The habitat types listed are areas where a SAR has the potential to occur. It should be noted that species have the potential to occur outside of these habitats; ³All – Structures such as culverts and bridges may provide suitable habitat for nesting Barn Swallow. Culverts, rip rap and gabion baskets also have the potential to provide nesting and/or hibernaculum for snake species.



7.0 Mitigation Measures

Based on the types of drainage work activities outlined above (in Section 2.0) and the potential for SAR and SAR habitat within and adjacent to the drainage features, the following best practices and mitigation measures are recommended when conducting drainage works. Prior to starting drainage works, the following steps are recommended to help determine the appropriate mitigation/management measures:



7.1 General Mitigation Measures

The following mitigation measures are recommended to avoid or minimize impacts to the natural environment when conducting drainage works. Following this section species specific mitigation measures are provided.

When planning for drainage works, activities should be planned outside of sensitive timing windows for all wildlife species wherever possible. **Table 2** in Section 6.0 indicates the Restricted Activity Periods for the different SAR having the potential to occur within the Study Area. **Table 3** indicates sensitive timing windows for various types of wildlife (including SAR) based on habitat types.

This information can be used to determine what time(s) of year may be sensitive at a particular site, based on which types of habitat and wildlife are present.

Where possible, activities are recommended to be planned outside of these sensitive time(s); otherwise additional species specific mitigation measures are recommended and/or consultation with the MNRF.

Table 3: Sensitive Timing Windows for other Wildlife Species (including SAR)

Habitat Type	Wildlife	Sensitive Timing Windows
Agricultural (Hayfields and pastures)	Migratory Birds	March through July (breeding season for most species)
Waterbodies	Migratory Birds (including waterfowl)	March through Mid-August
	Turtles and Amphibians	March through Mid-August; and Mid-October through March (for overwintering wildlife, including turtles).
	Mammals	March through mid-August; and Mid-October through March (overwintering wildlife)
	Fish	In-water mining restriction for warmwater fishes March 15 to June 30.
Forest	Migratory Birds	March through mid-August
	Mammals	March through mid-August; and Mid-October through March (overwintering wildlife)
	Snakes	March through mid-August; and Mid-October through March (overwintering wildlife)
Urban	Snakes	March through mid-August; and October through March (overwintering wildlife)
	Mammals	October through March (overwintering wildlife)

The following list provides general measures that are recommended when conducting any drainage work activities:

- **Bats:** The work associated with drainage maintenance covered under this management plan would typically not include the removal of trees. As such, the potential for drainage work activities to impact bat SAR is low. However, if a tree that exhibits a diameter at breast height of 25 cm or greater or a tree that exhibits loose shaggy bark requires removal for drainage works, removal should be completed between November 1 and March 1, outside of the active season for bats. If the tree removal needs to occur during the active season, removal should be completed after dusk.
- Review species specific seasonal timing windows to avoid sensitive periods for species
- Where possible, abide by regulatory timing windows and setback distances and avoid regulated habitat features
- Minimize duration of in-water work (where applicable)



- Any in-stream work should be conducted during periods of low flow
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation
- Conduct wildlife sweeps prior to the commencement of drainage work activities to determine if SAR (or other wildlife) are present at the site and engaged in critical life processes (e.g. nesting, etc.)
- Following the wildlife sweep, the area of activity is to be isolated with silt fencing to keep SAR and other wildlife from entering the work space area.
- Develop and implement an erosion and sediment control plan for the site that minimizes the risk of sedimentation to the drain during all phases of an activity. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resided to the bed of the drain of settling basin and runoff water is clear. Following the DFO's Measures to Avoid Harm (as outlined on DFO's website: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>), an erosion and sediment control plan, where applicable, is to include the following:
 - Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the drain
 - Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the drain
 - Site isolation measures, where required, to contain suspended sediment
 - Measures for containing and stabilizing waste materials generated from activities are stored away from any water bodies and prevent materials from re-entering water bodies
 - Erosion and sediment control measures are inspected and maintained on a regular basis during drainage works
 - Any damages to erosion and control measures are to be repaired immediately
 - Removal of non-biodegradable erosion and sediment control materials once site has been stabilized
- **Phragmites** is a non-native perennial grass species that has been observed throughout much of the province and Tecumseh, developing tall dense stands that degrade wetlands and other features by outcompeting native vegetation and changing habitat. To further prevent the spread and introduction of this unwanted species in the province, the provincial government has regulated invasive *Phragmites* as restricted under the *Invasive Species Act*, 2015. Restricted species under the Act, prohibits i) the transport of species into any provincial park and conservation reserve and ii) the deposit or release of species in Ontario. For further information on the *Invasive Species Act*, 2015 please visit: www.ontario.ca/invasionON. It is recommended that care be taken when working in areas with *Phragmites* and efforts be taken to prevent further spread of species through equipment transfer. Methods to prevent the spread of *Phragmites* while conducting drainage works should include:
 - Inspection of vehicles, equipment and heavy machinery thoroughly inside and out for accumulation of dirt, plant material or snow/ice, including the underside of vehicles, radiators, spare tires, foot wells and bumpers before entering onto a site. Remove any guards, covers, plates or other easy to remove external equipment;



- Inspections should be completed when: moving vehicles out of local area of operation; moving machinery between properties or sites within the same property where invasive species may be present or known to occur; and using machinery along roadsides, in ditches and along watercourses.
- Vehicles, equipment and heavy machinery should be cleaned: before moving out of local area where invasive species has been identified or known to occur; and when accumulations of dirt, plant material or snow/ice has been observed.
- Clean vehicles, equipment and heavy machinery in an area where risk of contamination is low, ideally on a mud free hard surface, at least 30 m away from any watercourse, waterbody, wetland or other natural area, if possible. Where risk of runoff is high, cleaning stations should be contained by sediment fence as per standard erosion and sediment control specifications.
- Remove large accumulations of dirt, using a compressed air device, high pressure hose or other device as necessary. Clean the vehicle starting at the top and working down, with particular attention to the undersides, wheels, wheel arches, guards, chassis, engine bays, grills and other attachments.
- Clean inside vehicles by sweeping, vacuuming or using compressed air device including floor, foot wells, pedals, seats and under the seats.

Additional details on cleaning equipment and/or managing invasive species can be found in the Clean Equipment Protocol for Industry (J. Halloran, et al., 2013) and online at the Government of Ontario's website: <https://www.ontario.ca/page/stop-spread-invasive-species>.

7.2 Species Specific Mitigation Plans

In the event a SAR or SAR habitat has been identified within the proposed area for drainage work activity, the following information should be clearly conveyed to the on-site staff as part of the drainage works protocol, via notes or plans and on-site briefings with construction personnel:

- Schedule for pre-construction activities such as wildlife inspections, silt fencing installation and contractor briefing.
- Description of wildlife mitigation measures to be used during drainage work activities, including:
 - Placement and specifications of required protection measures (e.g. fencing, signage)
 - Phasing and direction of site clearing activities
 - Any recommendations regarding access routes for equipment, vehicle parking, materials, stockpiling, etc.
- Guidance on what to do in the event of a wildlife encounter, including SAR and arrangements for dealing with injured or orphaned animals (as indicated in **Table 5** and **Appendix F**). This guidance should be summarized in a handout suitable for quick reference by on-site staff.
- SAR awareness training should be provided to all on-site staff, including truck drivers.

In the Contractor Information Package (**Appendix F**) Dillon has provided SAR identification sheets for SAR with the potential to occur within the Study Area.



7.2.1 Species Specific Mitigation Measures for Snake Species

Snake species can be found in a variety of habitat types and most of the drainage work activities have the potential to encounter snakes. Particular attention should be given when conducting works on catch basins, culverts, rip rap and crossing structures, as snakes carry out sensitive life processes in structures such as these. **Table 4** shows the sensitive timing windows for snake species when carrying out life processes related to hibernation and staging.

Table 4: Sensitive Timing Windows for Snake Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Hibernation																																				
Staging																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

Table 5 below outlines the recommended mitigation measures to avoid impacts to snake species during and outside of RAP. Photographs of habitat observed within and adjacent to drains that have the potential to support SAR snakes, have been included in **Appendix G** (Photographs #1 - 4).



Table 5: Mitigation Measures for Snake Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Snakes in Study Area
Eastern Foxsnake (Carolinian population) and Butler's Gartersnake	<ul style="list-style-type: none">• Preconstruction planning that includes review for potential habitat.• During site visit, verify if attributes of regulated habitat occur and delineate where possible.• Establish constraints for activities, where possible, that abide by minimum windows and setback distances and avoid regulated habitat features• Narrow construction footprint if possible.• Flag or fence off environmentally sensitive areas prior to drainage work activity. Bury fencing a minimum of 10 – 20 cm and vertical height of at least 60 cm. Note, stakes should be installed on the activity side to prevent snake use of stakes to climb fence.• Complete wildlife sweep within the exclusion area following fence installation to ensure no trapped wildlife.• Staff/workers conducting drainage works should be trained in snake species identification and procedures if encountered (review and sign off form in Contractor Information Package)• One staff member/worker or qualified biologist should be trained in proper snake handling procedures and protocols outlined in Section 2 of the Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders (Included in the Contractor Information Package). This person should be onsite at all times (when required) for the potential capture, temporary holding, transfer and release of any snakes encountered during construction. A minimum of two holding tubs and coon sacks should be onsite at all times.• Prior to commencement of daily drainage work activity, the area should be cleared of snakes through machinery inspections (e.g. wheels, engine compartment) each morning and after machinery is left idle for more than one (1) hour if left on site during the snake active season.• If a nest is uncovered during drainage work activity:<ul style="list-style-type: none">◦ Collect any displaced or damaged eggs and transfer them to a holding tub◦ Capture and transfer all injured dispersing juveniles of that species into a light-coloured drawstring coon sack◦ Place all coon sacks with the captured injured individuals into a holding tub out of direct sunlight◦ Immediately contact the MNRF to seek direction and to arrange for transfer of the injured individuals◦ Immediately stop any disturbance to the nest site and loosely cover exposed portions with soil or organic material to protect the integrity of the remaining individuals◦ Do not drive over the nest site or conduct any activities within 5 m of the nest site◦ Do not place any dredged materials removed from drainage works on top of the nest site◦ Mark out the physical location of the nest site but not by any means that might increase the susceptibility of the nest to predation or poaching◦ Where there are no collected eggs or captured individuals, contact the MNRF within 24 hours to provide information on the location of the nest• Any injured captured snakes should be stored outside of direct sunlight and the MNRF should immediately be contacted to seek direction and to arrange for transfer. MNRF may require transfer to the nearest MNRF authorized Wildlife Rehabilitator. Contact Information for Authorized Wildlife Rehabilitator can be found in SAR Information Sheets (Appendix F).• If conducting drainage works during a species sensitive timing window and one or more individuals belonging to a snake species is encountered or active hibernacula is discovered:<ul style="list-style-type: none">◦ Trained staff/worker or qualified biologist shall capture and transfer all injured and uninjured individual snakes of that species into individual light-coloured, drawstring coon sacks◦ Place coon sacks into a holding tub◦ Ensure that the holding tub with captured individuals is stored at a cool temperature to protect snakes from freezing until the individuals can be retrieved or transferred◦ If an active hibernacula is uncovered cease all work and immediately, contact MNRF to seek advice and arrange for transfer and/or removal• If conducting drainage works outside of a species sensitive timing window and one or more individuals belonging to a snake species is encountered:<ul style="list-style-type: none">◦ Briefly stop the activity for a reasonable period of time to allow any uninjured individual snakes of that species to leave the work area◦ If the individuals do not leave the work area after the activity is briefly stopped, trained staff/worker or qualified biologist shall capture all uninjured individuals and release them in accordance with the methods outlined below◦ Where circumstances do not allow for the immediate release of captured uninjured individuals, they may be transferred into individual, light-coloured, drawstring coon sacks before placing them into a holding tub which shall be stored out of direct sunlight for a maximum of 24 hours before releasing them in accordance with the methods outlined below◦ Capture and transfer any individuals injured as a result of conducting drainage works into a holding tub separate from any holding tub containing uninjured individuals◦ Store all captured injured individuals out of direct sunlight and immediately contact the MNRF to seek direction and to arrange their transfer• Uninjured individuals captured during drainage works, are to be released within 24 hours of capture, in an area immediately adjacent to the drainage works with natural vegetation cover within 50 m and out of harm's way (as per subsections 2.3 and 2.4 of Handling Manual included in the Contractor Information Package; Appendix F).



Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Snakes in Study Area
	<ul style="list-style-type: none">Uninjured individuals captured during drainage works, are to be released within 24 hours of capture, in an area immediately adjacent to the drainage works with natural vegetation cover within 50 m and out of harm’s way (as per subsections 2.3 and 2.4 of Handling Manual included in the Contractor Information Package; Appendix F).Where one or more individuals belonging to a snake species is killed as a result of drainage work activity, or a person finds a deceased individual of a snake species, the following measures should be followed:<ul style="list-style-type: none">Collect and transfer any dead individuals into a holding tub outside of direct sunlight; and,Contact the MNRF within 72 hours to seek direction and to arrange for the transfer of the carcasses of the dead individuals.If the methods of handling snakes outlined in subsection 2.3 and 2.4 of the Handling Manuals are not applicable due to a snake’s injuries, use a shovel or flat object to pick up the snake, ensuring that injured areas are supported and place in a large plastic bin or bucket with a lid with air holes. Immediately transport the turtle to an MNRF authorized veterinarian or wildlife rehabilitator and contact the MNRF. Contact Information for Authorized Wildlife Rehabilitator can be found in Appendix F and on SAR Information Sheets (Appendix F).Complete a SAR Encounter Reporting Form included in Contractor Information Package (Appendix F).

7.2.2 Species Specific Mitigation Measures for Turtle Species

Turtles can generally be found associated with large slow moving water features that have logs or stumps for basking. For nesting, turtles prefer moist well drained, loose soils for digging and on a gradual typically south facing slope. Species such as Blanding's Turtle and Spiny Sposhell hibernate underwater in permanent waterbodies. Sensitive timing windows for turtle species includes the nesting period and has been provided in **Table 6**.

When conducting drainage works where there is potential for turtle species to be hibernating, water level **cannot be reduced** as per Paragraph 6 of subsection 13 of Section 23.9 of O.Reg. 242/08.

Table 6: Restricted Activity Period for Turtle Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Hibernation																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

In **Table 7** below, the recommended mitigation measures to avoid impacts to turtle species during and outside sensitive timing windows and what to do when turtles or turtle nests are encountered is provided. Photographs of habitat observed within and adjacent to drains that have the potential to support SAR Turtles, have been included in **Appendix G** (Photographs #5 - 6).



Table 7: Mitigation Measures for Turtle Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Turtles within the Study Area
Blanding's Turtle	<ul style="list-style-type: none">• Preconstruction planning that includes review for potential habitat.• During site visit, verify if attributes of regulated habitat occur and delineate where possible.• Establish constraints for activities, where possible, that abide by timing windows, setback distances and avoid regulated habitat features.• Narrow construction footprint if possible.• Flag or fence off environmentally sensitive areas prior to drainage work activity. Bury fencing a minimum of 10 – 20cm and vertical height of at least 60 cm.• Complete wildlife sweep within the exclusion/construction area following fence installation to ensure no trapped wildlife.• Staff/workers conducting drainage works should be trained in turtle species identification and procedures if encountered (Review and sign off form in the Contractor Information Package; Appendix F).• One staff member/worker or qualified biologist should be trained in proper turtle handling procedures and protocols outlined in Section 1 of the Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders (provided in the Contractor Information Package; Appendix F). This person should be onsite at all times (when required) for the potential capture, temporary holding, transfer and release of any turtles encountered during construction. A minimum of two holding tubs and coolers should be onsite at all times.• If construction is planned to commence during the turtle nesting period, prior to site preparation a turtle nesting search should be completed to identify turtle nests. If nests are encountered, the MNRF must be consulted immediately. Nests should be relocated to an appropriate facility for incubation with MNRF approval. Contact information for MNRF Authorized Wildlife Rehabilitator can be found in SAR Information Sheets (Appendix F).• Drainage work activity related to excavation of sediment or disturbance to banks should be avoided during the sensitive timing windows for turtles.• During turtle hibernation periods, water in drains or ditches cannot be reduced.• Prior to commencement of daily activity, the area should be cleared of turtles and turtle nests by a specially trained staff member or qualified biologist.
Spiny Softshell	<ul style="list-style-type: none">• Do not disturb a turtle encountered laying eggs and do not conduct activities within 20 m of the turtle while it is laying eggs.• If conducting drainage works during a species sensitive timing window and one or more individuals belonging to a turtle species is encountered:<ul style="list-style-type: none">◦ Trained staff/worker or qualified biologist shall capture and transfer all injured and uninjured individuals of that species to a holding tub◦ Capture and transfer all individuals injured as a result of the drainage work activity into a holding tub separate from any holding tub containing uninjured individuals◦ Ensure that the holding tub with captured individuals is stored at a cool temperature until the individuals can be retrieved or transferred◦ Contact the MNRF immediately to seek advice and arrange for transfer and/or removal• If a nest is uncovered during construction, immediately stop all activity near the nest. Cover the nest with soil or organic material. Do not drive within 5 m of the nest and contact the MNRF within 24 hours if no eggs or individuals were captured/collected.• Isolate material stockpile areas with fencing.• Any injured captured turtles should be stored outside of direct sunlight and the MNRF should immediately be contacted to seek direction and to arrange for transfer.• Machinery should be inspected each morning (e.g. under vehicles) for presence of turtles.• Uninjured individuals captured during drainage works, are to be released within 1 hour of capture, out of harm's way no more than 125 m of where it was found, unless absolutely necessary. If it is not possible to relocate the turtle within 125 m of the capture location, contact the MNRF for further direction. MNRF may require transport of turtle(s) to MNRF Authorized Wildlife Rehabilitator or Veterinarian. Contact information can be found in Appendix F.• If the methods of handling turtles outlined in subsection 1.3 of the Handling Protocol are not possible due to a turtle's injuries, use a shovel or flat object to pick up the turtle, ensuring that injured areas are supported and place in a large plastic bin or bucket with a lid with air holes. Immediately transport the turtle to an MNRF Authorized Wildlife Rehabilitator or Veterinarian and contact the MNRF. Contact Information for Authorized Wildlife Rehabilitator can be found in Appendix F and on SAR Information Sheets (Appendix F). See subsection 1.7 of the Handling Manual (included in the Contractor Information Package; Appendix F) for more details.• Complete a SAR Encounter Reporting Form included in the Contractor Information Package (Appendix F).



7.2.3 Species Specific Mitigation Measures for Aquatic Species

Review of background information including, DFO's Aquatic SAR Mapping (Map 29 of 33), NHIC and MNRF Agreement² identified 10 fish and 10 mollusc species listed as endangered or threatened under the ESA, 2007 with occurrence records within and/or adjacent to the Study Area. Of the 20 aquatic SAR identified only two fish species have been included in the Plan based on the presence of suitable habitat within the Study Area drains.

Although suitable habitat for SAR mussel species was not identified during our background review and site visits, if at any time a mussel species (of any type) are encountered, stop work and contact DFO for direction on how to proceed. A SAR Information Sheet for mussels species found during the background review has been provided in **Appendix F**.

Watercourses and drains identified during the background review and subsequent field investigations found all features to be of warm water thermal regime and to support warm water fish species. **Table 8** below indicates the in-water timing window restriction for warm water fish species. **Table 9** provides a list of recommended measures to follow to avoid impacts to fish species. As previously mentioned, activities that affect a species listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08 still require a permit to conduct drainage works (see **Appendix D** for details). DFO's *Guidance for Maintaining and Repairing Municipal Drains in Ontario version 1.0* (2017) document should be consulted when conducting all drainage works.

Table 8: In-water Timing Window Restriction for Warm Water Fish Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
In-water Restriction																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

² Agreement under Section 23 of O.Reg. 242/08 made under the ESA, 2007 (File # AY-23D-010-10).



Table 9: Mitigation Measures for Aquatic Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Aquatic Species within the Study Area
Pugnose Shiner	<ul style="list-style-type: none"> • Consult with MNRF if in-water working window restrictions cannot be adhered to. • Allow for fish salvage within the isolated work area prior to dewatering. • Limit duration of in-water work as much as possible. • Conduct in-stream work during periods of low flow to reduce the risk to fish and their habitat and to allow work in-water to be isolated from flows. • Schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation. Suspend in-stream work immediately if sedimentation is detected. • Implement water quality monitoring if required. • Ensure equipment is clean and free of leaks. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water. • Alter activities to reduce disturbance to species and habitat and follow current DFO Measures to Avoid Harm
Spotted Gar	<ul style="list-style-type: none"> • If federally listed SAR fish are encountered or have the potential to be present, contact the DFO to review next steps. • If SAR encountered, complete a SAR Encounter Reporting Form that will be included in the annual reporting.



7.2.4 Species Specific Mitigation Measures for Bird Species

Environment and Climate Change Canada (ECCC) identifies general nesting periods for migratory birds in Canada. Essex County is located within nesting zone C1, **Table 10** provides the RAPs for two habitat types: open field habitat and forest habitat. The RAPs provided are based on 61-100% of the migratory bird species predicted to be nesting during the identified time period (as indicated on the ECCC C1 nesting zone table).

Table 10: Restricted Activity Period for Bird Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Open																																				
Forest																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNR Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).



Based on our review of potential SAR birds to occur within the Study Area, the following mitigation measures are recommended while conducting drainage work activities:

Table 11: Mitigation Measures for Bird Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Birds within the Study Area
Bobolink	<ul style="list-style-type: none"> • Planning activities should include review of area for potential habitat (including box culverts and bridges for Barn Swallow nests). • Limit construction footprint where possible. • Conduct work outside of the RAP for birds where possible.
Eastern Meadowlark	<ul style="list-style-type: none"> • Pre-construction activities should include bird nest sweeps if activities occur during migratory bird sensitive timing window identified in Table 10, above. • Protect active nests by flagging or fencing off an appropriate setback distance. • Suspend activity if active habitat is discovered that cannot be adequately setback from.
Barn Swallow	<ul style="list-style-type: none"> • Maintain habitat connections where possible during activities. • Implement measures to restore lost habitat/ habitat connections. • If sensitive habitat is on site, a qualified biologist should be on site daily. • If SAR encountered, complete a SAR Encounter Reporting Form that will be included in the annual submission to the MNRF.



7.2.5 Species Specific Mitigation Measures for Vegetation Communities

Potential impacts to plant SAR may include trampling by personnel or equipment, alteration of growing conditions (e.g. soil compaction, sunlight availability, and moisture regime), disturbance to localized seed bank and introduction of invasive species. Mitigation measures that will be incorporated during drainage work activities to minimize the impacts to adjacent forest communities and SAR vegetation include:

- Planning activities should include review of area for identification of potential SAR vegetation.
- Limit construction footprint where possible to minimize the disturbance to plant species.
- Installing temporary erosion and sediment control measures prior to activity, and maintaining them throughout activity, including routinely inspecting and repairing them, as required. Enhanced sediment and erosion control measures will be implemented for sensitive areas where SAR habitat has been identified within and abutting the work site.
- Vegetation that does not require removal for the purposes of construction will be protected through the installation and maintenance of temporary vegetation protection fencing (e.g. snow fencing or erosion sediment control fencing). This includes protection of any SAR trees identified.
- Equipment, materials and other construction activities will not be permitted in zones delineated for protection.
- If drainage work activity cannot be undertaken without disturbing a SAR plant(s), the Town should contact the MNRF for additional site-specific measures.
- Operational procedures and Best Management Practices for handling material and excess material, and spill prevention will be implemented. Vehicular and equipment maintenance and refuelling will be carried out in a controlled manner, and where applicable, at designated maintenance areas. Refuelling will not be permitted within 30 m of any forest, or watercourse.
- Stabilize and re-vegetate exposed soil surfaces as soon as possible following activities, using native groundcover seed mixes and plantings.



SCHEDULE C

MITIGATION PLAN

The Municipality shall undertake measures to minimize adverse effects on species at risk in accordance with the general conditions described in Part B and taxa-specific conditions described in Part C, and the monitoring and reporting requirements described in Part D of this Mitigation Plan.

PART A. DEFINITIONS

1. Definitions:

1.1. In this Schedule, the following words shall have the following meanings:

"DFO" means Fisheries and Oceans Canada;

"MNR" means the Aylmer District Office of the Ministry of Natural Resources;

"Contact" means to contact the MNR in accordance with the notification/contact schedule provided to the Municipality by the MNR Designated Representative from time to time;

"Holding Tub" means a large, light-coloured container fitted with a non-airtight latchable lid approved by the MNR for the temporary storage of captured snakes, turtles, amphibians, birds or eggs;

"Interagency Notification Form" means the form issued by DFO, available at www.dfo-mpo.gc.ca, which is required to be completed when a drain is being maintained or constructed;

"Monitoring and Reporting Form" means the document that must be completed by the Municipality in accordance with Part D to this Schedule and will be provided to the Municipality;

"Ontario Operational Statement" means one of the documents issued by DFO, available at www.dfo-mpo.gc.ca, that sets out the conditions and measures to be incorporated into a project in order to avoid negative impacts to fish and fish habitat in Ontario, as modified from time to time;

"Process Charts" means the charts attached as Part E to this Schedule which describe the steps set out in this Mitigation Plan;

"Seasonal Timing Windows Chart" means the chart attached as Part G to this schedule which describes the Sensitive Periods applicable to each Taxonomic Group;

"Sensitive Area" means a geographic area in the Municipality where additional mitigation measures are required to be undertaken for one or more Taxonomic Groups;

"Sensitive Areas Map" means any one of the maps attached as Part F to this schedule which sets out the applicable Sensitive Areas;

"Sensitive Period" means a time of year set out in the Seasonal Timing Windows Chart during which taxa-specific mitigation measures are required to be undertaken for a Taxonomic Group because of ambient air/water temperatures, water-levels or important life-history stages;

"Taxonomic Group" means the distinct group comprising one or more Species based on their taxonomic relationship and common approaches to mitigating adverse effects (i.e., fish, mussels, turtles, snakes, amphibians, birds or plants); and

"Work Zone" means the geographic area in the Municipality where an Activity in respect of one of the Drainage Works is being conducted.

- 1.2. For greater certainty, any defined terms that are not defined in section 1.1 have the same meanings as in the Agreement.

PART B. GENERAL MEASURES TO MINIMIZE ADVERSE EFFECTS

2. Process Charts

- 2.1. The general steps set out in this Part B are visually described in the Process Charts (Part E).

3. Review of Documentation

- 3.1. Prior to conducting any Activities in respect of the Drainage Works the Municipality shall determine if conditions apply to the place, time or manner in which the Municipality wishes to pursue them by reviewing:
 - (a) the Sensitive Areas Maps (Part F) to determine if the Work Zone for the proposed Activities will occur within a Sensitive Area;
 - (b) the DFO Reference Guide for Fish and Mussel Species at Risk Distribution Maps: A Referral Review Tool for Projects Affecting Aquatic Species at Risk;
 - (c) the Seasonal Timing Windows Chart (Part G) to determine if the proposed Activities will occur during a Sensitive Period for one or more of the Taxonomic Groups; and
 - (d) the Process Charts to determine if prior notification is required;
 - (e) the mitigation measures for each applicable Taxonomic Group in Part C to determine what additional site-specific mitigation measures, if any, are required.
- 3.2. The Municipality shall document the results of the review undertaken in accordance with section 3.1 using the Monitoring and Reporting Form.

4. Sensitive Areas Maps

- 4.1. The Sensitive Areas Maps contain sensitive information about the distribution of species at risk, are provided for the sole purpose of informing this Agreement and are not to be copied or distributed for any other purposes or to any other party without the prior written authorization of the MNR Designated Representative.

5. Prior Notification to Seek Direction

- 5.1. If, after completing the review of documents described in section 3.1, the Municipality determines that the proposed Activities will be undertaken:
 - (a) in a place;
 - (b) at a time; or
 - (c) in a manner,

that requires prior notification in accordance with the Process Charts, the Municipality shall provide prior notification to the MNR in order for the MNR to determine if the Municipality must undertake additional site-specific or Species-specific mitigation

measures to minimize adverse effects on the Species and, if applicable, to identify such measures.

- 5.2. The prior notification under section 5.1 shall include a completed Interagency Notification Form:
- (a) in respect of maintenance/repair where the proposed Activities are being undertaken pursuant to subsection 3(18) or section 74 of the *Drainage Act*, or
 - (b) in respect of construction/improvement where the proposed Activities are being undertaken pursuant to section 77 or 78 of the *Drainage Act*.
- 5.3. Where an Activity is undertaken in accordance with section 124 of the *Drainage Act* and would otherwise have required prior notification under section 5.1, the Municipality shall Contact the MNR by email prior to the commencement of the Activity, and complete and submit the applicable Interagency Notification Form within one week of the Activity's completion, unless otherwise directed in writing by the MNR Designated Representative.

6. General Mitigation Measures

- 6.1. Notwithstanding that prior notification or additional mitigation measures may be required in accordance with this schedule, in undertaking any Activity at any time in respect of the Drainage Works the Municipality shall:
- (a) undertake the mitigation measures for sediment control and for erosion control and bank stabilization set out in The Drain Primer (Cliff Evanitski 2008) published by DFO (ISBN 978-0-662-48027-3), unless otherwise authorized in writing by the MNR Designated Representative;
 - (b) use net free, 100% biodegradable erosion control blanket for all erosion control or bank stabilization done in conjunction with their Activities or, if authorized in writing by the MNR Designated Representative, alternative erosion control blankets that provide equal or greater protection to individual Species; and
 - (c) where applicable, follow the guidelines set out in the following Ontario Operational Statements:
 - (i) Beaver Dam Removal;
 - (ii) Bridge Maintenance;
 - (iii) Culvert Maintenance;
 - (iv) Isolated Pond Construction;
 - (v) Maintenance of Riparian Vegetation in Existing Right of Ways; and
 - (vi) Temporary Stream Crossing.

PART C. TAXA-SPECIFIC MEASURES TO MINIMIZE ADVERSE EFFECTS

ADDITIONAL MITIGATION MEASURES FOR FISH SPECIES

7. Activities undertaken in Sensitive Areas for Fish

- 7.1. Subject to section 7.2, where a proposed Activity will occur in a Sensitive Area for a fish Species, the Municipality shall Contact the MNR to seek further direction.
- 7.2. Section 7.1 does not apply where the applicable Drainage Works are:
 - (a) in a naturally dry condition;
 - (b) classified as a Class F drain under DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or
 - (c) a closed drain.

ADDITIONAL MITIGATION MEASURES FOR MUSSEL SPECIES

8. Activities undertaken in Sensitive Areas for Mussels

- 8.1. Subject to section 8.2, where a proposed Activity will occur in a Sensitive Area for a mussel Species, the Municipality shall Contact the MNR to seek further direction.
- 8.2. Section 8.1 does not apply where the applicable Drainage Works are:
 - (a) in a naturally dry condition;
 - (b) classified as a Class F drain in DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or
 - (c) a closed drain.

ADDITIONAL MITIGATION MEASURES FOR TURTLE SPECIES

9. Training and Required On Site Materials for Turtles

- 9.1. The Municipality will ensure any person:
 - (a) involved in the capture, temporary holding, transfer and release of any turtle Species has received training in proper turtle handling procedures; and
 - (b) who undertakes an Activity has a minimum of two Holding Tubs and cotton sacks on site at all times.

10. Activities undertaken in Sensitive Areas and Sensitive Periods for Turtles

- 10.1. Subject to section 10.2, where a proposed Activity will occur in a Sensitive Area for any turtle Species and during a Sensitive Period for that Species, the Municipality shall:
 - (a) not undertake any Activities that include the excavation of sediment or disturbance to banks during the applicable Sensitive Period unless otherwise authorized;
 - (b) undertake Activities in accordance with any additional site-specific measures provided in writing by the MNR Designated Representative;
 - (c) avoid draw-down and de-watering of the Sensitive Area during the applicable Sensitive Period; and

- (d) if authorized by the MNR Designated Representative under (a) above to undertake Activities that include excavation of sediment or disturbance of banks, in addition to any other measures required under (b) above, ensure any person undertaking an Activity has at least two Holding Tubs on site at all times.

10.2. Section 10.1 does not apply where the applicable Drainage Works are:

- (a) in a naturally dry condition;
- (b) classified as a Class F drain in DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or
- (c) a closed drain.

11. Measures for Encounters with Turtles During a Sensitive Period

- 11.1. Where one or more individuals belonging to a turtle Species is encountered in the undertaking of an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) during a Sensitive Period for that Species, the Municipality shall:
- (a) capture and transfer all uninjured individuals of that Species into a Holding Tub;
 - (b) capture and transfer all individuals injured as a result of the Activities into a Holding Tub separate from any Holding Tub containing uninjured individuals;
 - (c) ensure that the Holding Tubs with the captured individuals are stored at a cool temperature to prevent freezing until the individuals can be transferred; and
 - (d) immediately Contact the MNR to seek direction and to arrange for the transfer of the individual turtles.

12. Measures for Encounters with Turtles Laying Eggs or Nest Sites

- 12.1. Where one or more individuals belonging to a turtle Species laying eggs, or an active nest site of any turtle Species, is encountered in undertaking an Activity in a Work Zone, the Municipality shall:
- (a) not disturb a turtle encountered laying eggs and not conduct any Activities within 20 metres of the turtle while it is laying eggs;
 - (b) collect any displaced or damaged eggs and capture any injured dispersing juveniles and transfer them to a Holding Tub;
 - (c) store all captured injured individuals and collected eggs out of direct sunlight;
 - (d) immediately Contact the MNR to seek direction and to arrange for the transfer of any injured individuals and eggs;
 - (e) immediately stop any disturbance to the nest site and recover exposed portions with soil or organic material to protect the integrity of the remaining individuals;
 - (f) not drive any equipment over the nest site or conduct any Activities within 5 metres of the nest site;
 - (g) not place any dredged materials removed from the Drainage Works on top of the nest site;
 - (h) mark out the physical location of the nest site for the duration of the project but not by any means that might increase the susceptibility of the nest to predation or poaching; and
 - (i) where there are no collected eggs or captured individuals, record relevant information and Contact the MNR within 72 hours to provide information on the location of the nest site.

13. Measures for Encounters with Turtles Outside of a Sensitive Period

- 13.1. Where one or more individuals belonging to a turtle Species is encountered while undertaking an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) but outside of any Sensitive Period for that Species, the Municipality shall:
- (a) briefly stop the Activity for a reasonable period of time to allow any uninjured individual turtles of that Species to leave the Work Zone;
 - (b) where individuals do not leave the Work Zone after the Activity is briefly stopped in accordance with (a) above, capture all uninjured individuals and release them in accordance with section 14.1;
 - (c) where circumstances do not allow for their immediate release, transfer captured uninjured individuals for a maximum of 24 hours into a Holding Tub which shall be stored out of direct sunlight and then release them in accordance with section 14.1;
 - (d) capture and transfer any individuals that have been injured into a Holding Tub separate from any Holding Tub containing uninjured individuals; and
 - (e) store all captured injured individuals out of direct sunlight and immediately Contact the MNR to seek direction and to arrange for their transfer.

14. Release of Captured Individuals Outside of a Sensitive Period

- 14.1. Where uninjured individuals are captured under section 13.1, they shall be released:
- (a) within 24 hours of capture;
 - (b) in an area immediately adjacent to the Drainage Works;
 - (c) in an area that will not be further impacted by the undertaking of any Activity; and
 - (d) not more than 250 metres from the capture site.
- 14.2. Following a release under section 14.1, the Municipality shall Contact the MNR within 72 hours of the release to provide information on the name of the Drainage Works, the location of the encounter and the location of the release site.

15. Measures for Dead Turtles

- 15.1. Where one or more individuals of a turtle Species is killed as a result of an Activity in a Work Zone, or if a person undertaking an Activity finds a deceased individual of a turtle Species within the Work Zone, the Municipality shall:
- (a) place any dead turtles in a Holding Tub outside of direct sunlight; and
 - (b) Contact the MNR within 72 hours to seek direction and to arrange for the transfer of the dead individuals.

ADDITIONAL MITIGATION MEASURES FOR SNAKE SPECIES

16. Training and Required On Site Materials for Snakes

- 16.1. The Municipality will ensure any person:
- (a) involved in the capture, temporary holding, transfer and release of any snake Species has received training in proper snake handling procedures; and
 - (b) who undertakes an Activity has a minimum of two Holding Tubs and cotton sacks on site at all times.

17. Activities undertaken in Sensitive Areas and Sensitive Periods for Snakes

- 17.1. Where a proposed Activity involves physical infrastructure (e.g., culverts, pump houses, etc.) and will occur in a Sensitive Area for any snake Species and during a *Sensitive Period – Hibernation* for that Species, the Municipality shall undertake the Activity outside of the Sensitive Period, unless otherwise authorized by and in accordance with any site-specific measures provided in writing by the MNR Designated Representative.
- 17.2. Where a proposed Activity will occur at or adjacent to a known hibernacula (as identified by the MNR) for any snake Species and during a *Sensitive Period – Staging* for that Species, the Municipality shall:
 - (a) erect effective temporary snake barriers approved by the MNR that will not pose a risk of entanglement for snakes and that shall be secured so that individual snakes may not pass over or under the barrier or between any openings to enter or re-enter the Work Zone;
 - (b) inspect the temporary snake barriers daily during periods when snakes are active, capture any individuals incidentally encountered within the area bounded by the snake barrier and release the captured individuals in accordance with section 21.1; and
 - (c) remove the temporary snake barriers immediately upon completion of the Activity.
- 17.3. Where a proposed Activity that does not involve physical infrastructure will occur in a Sensitive Area for any snake Species and during a *Sensitive Period – Staging* for that Species, the Municipality shall undertake the Activity outside of the Sensitive Period, unless otherwise authorized by and in accordance with any site-specific measures provided in writing by the MNR Designated Representative.

18. Measures for Encounters with Snakes During a Sensitive Period

- 18.1. Where one or more individuals belonging to a snake Species is encountered, or should an active hibernacula be uncovered, while conducting an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) during a Sensitive Period for that Species, the Municipality shall:
 - (a) capture and transfer all injured and uninjured individual snakes of that Species into individual light-coloured, drawstring cotton sacks;
 - (b) place all cotton sacks filled with the captured individuals into a Holding Tub;
 - (c) ensure that the Holding Tub with the captured individuals is stored at a cool temperature to protect the snakes from freezing until the individuals can be retrieved or transferred;
 - (d) if an active hibernacula is uncovered, cease all Activities at the hibernacula site; and
 - (e) immediately Contact the MNR to seek direction and to arrange for the transfer and/or retrieval.

19. Measures for Encounters with Snake Nests

- 19.1. Where an active nest of any of the snake Species is encountered and disturbed while undertaking an Activity in any part of a Work Zone, the Municipality shall:
 - (a) collect any displaced or damaged eggs and transfer them to a Holding Tub;
 - (b) capture and transfer all injured dispersing juveniles of that Species into a light-coloured drawstring cotton sack;
 - (c) place all cotton sacks with the captured injured individuals into a Holding Tub;

- (d) ensure that the Holding Tub with the captured injured individuals is stored out of direct sunlight;
- (e) immediately Contact the MNR to seek direction and to arrange for the transfer of the injured individuals;
- (f) immediately stop any disturbance to the nest site and loosely cover exposed portions with soil or organic material to protect the integrity of the remaining individuals;
- (g) not drive any equipment over the nest site or conduct any Activities within 5 metres of the nest site;
- (h) not place any dredged materials removed from the Drainage Works on top of the nest site;
- (i) mark out the physical location of the nest site but not by any means that might increase the susceptibility of the nest to predation or poaching; and
- (j) where there are no collected eggs or captured individuals, Contact the MNR within 72 hours to provide information on the location of the nest site.

20. Measures for Encounters with Snakes Outside of a Sensitive Period

- 20.1. Where one or more individuals belonging to a snake Species is encountered while undertaking an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) but outside of any Sensitive Period for that Species, the Municipality shall:
- (a) follow the requirements in section 16;
 - (b) briefly stop the Activity for a reasonable period of time to allow any uninjured individual snakes of that Species to leave the Work Zone;
 - (c) if the individuals do not leave the Work Zone after the Activity is briefly stopped in accordance with (b) above, capture all uninjured individuals and release them in accordance with section 21.1;
 - (d) where circumstances do not allow for the immediate release of captured uninjured individuals, they may be transferred into individual, light-coloured, drawstring cotton sacks before placing them in a Holding Tub which shall be stored out of direct sunlight for a maximum of 24 hours before releasing them in accordance with section 21.1;
 - (e) capture and transfer any individuals injured as a result of conducting the Activities into a Holding Tub separate from any Holding Tub containing uninjured individuals; and
 - (f) store all captured injured individuals out of direct sunlight and immediately Contact the MNR to seek direction and to arrange for their transfer.

21. Release of Captured Individuals Outside of a Sensitive Period

- 21.1. Where uninjured individuals are captured under section 20.1, they shall be released:
- (a) within 24 hours of capture;
 - (b) in an area immediately adjacent to the Drainage Works where there is natural vegetation cover;
 - (c) in an area that will not be further impacted by the undertaking of any Activity; and
 - (d) not more than 250 metres from the capture site.

- 21.2. Following a release under section 21.1, the Municipality shall Contact the MNR within 72 hours of the release to provide information on the name of the Drainage Works, the location of the encounter and the location of the release site.

22. Measures for Dead Snakes

- 22.1. Where one or more individuals belonging to a snake Species is killed as a result of an Activity in a Work Zone, or if a person undertaking an Activity finds a deceased individual of a snake Species within the Work Zone, the Municipality shall:
- (a) collect and transfer any dead individuals into a Holding Tub outside of direct sunlight; and
 - (b) Contact the MNR within 72 hours to seek direction and to arrange for the transfer of the carcasses of the dead individuals.

ADDITIONAL MITIGATION MEASURES FOR HERBACEOUS PLANTS

23. Activities Undertaken in Sensitive Areas for Herbaceous Plants

- 23.1. Where a proposed Activity will occur that involves physical disturbance to vegetated banks or the killing and/or removal of vegetation through chemical or mechanical means in a Sensitive Area for any herbaceous plant Species, the Municipality shall:
- (a) undertake the Activity outside of the Sensitive Period, unless otherwise authorized;
 - (b) limit equipment access and operations to the side of the Drainage Works that will minimize disturbances where any of the plant Species occur;
 - (c) locate temporary storage sites for excavated sediments or bank materials on areas of open soil away from where any of the plant Species are likely to occur;
 - (d) not use any broad spectrum herbicides in Sensitive Areas; and
 - (e) undertake Activities in accordance with any additional site-specific measures provided in writing by the MNR Designated Representative.

ADDITIONAL MITIGATION MEASURES FOR TREE SPECIES

24. Additional Measures for Butternut

- 24.1. Where Butternuts may exist in a Work Zone and may be affected by an Activity, the Municipality shall:
- (a) identify and mark as retainable trees all individual Butternut trees within the Work Zone during work planning site visits unless the individual Butternut has been assessed as a non-retainable tree due to infection by Butternut canker by a person designated by the Minister as a Butternut Health Assessor;
 - (b) retain and avoid disturbance to all individuals identified under (a) above that have been identified as retainable trees or that have not been assessed, unless otherwise authorized in writing by the MNR Designated Representative;
 - (c) conduct Activities by:
 - (i) limiting equipment access and operations to the side of the Drainage Works that will minimize disturbance to where any of the individual Butternut trees occur,
 - (ii) working around trees,

- (iii) avoiding compacting and/or disturbing the soil by keeping excavation and other heavy equipment a minimum of 2 metres away from the main stem of retained individuals to avoid damaging roots and stems,
- (iv) placing excavated materials on areas not within 2 metres of the main stem of retained individuals, and
- (v) where branches are required to be removed to allow for safe operation of equipment, removing them using appropriate equipment, such as pruning saws, chain saws or lopping shears, in accordance with good forestry practices.

25. Measures for Other Trees

- 25.1. Where Kentucky Coffee-tree may exist in a Work Zone and may be affected by an Activity, the Municipality shall:
- (a) identify and mark all individual Kentucky Coffee-tree within the Work Zone during work planning site visits;
 - (b) avoid disturbance to all individuals identified under (a) above, unless otherwise authorized in writing by the MNR Designated Representative;
 - (c) conduct Activities by:
 - (i) limiting equipment access and operations to the side of the Drainage Works that will minimize disturbance where any of the individuals occur,
 - (ii) working around trees,
 - (iii) avoiding compacting and/or disturbing the soil by keeping excavation and other heavy equipment a minimum of 2 metres away from the main stem of retained individuals to avoid damaging roots and stems, and
 - (iv) placing excavated materials on areas not within 2 metres of the main stem of retained individuals; and
 - (d) where branches are required to be removed to allow for safe operation of equipment, remove them using appropriate equipment, such as pruning saws, chain saws or lopping shears, in accordance with good forestry practices.

PART D. MONITORING AND REPORTING REQUIREMENTS

26. Compliance Monitoring.

- 26.1. The Municipality shall inspect the undertaking of the Activities at the locations described in Part F of this Schedule C, and shall record the results of the inspections in the Monitoring and Reporting Form.
- 26.2. The Municipality shall record all encounters with Species and the resulting mitigation measures taken by the Municipality in the Monitoring and Reporting Form.

27. Reporting

- 27.1. Prior to March 31 of each year the Mitigation Plan is in effect, the Municipality shall submit a completed Monitoring and Reporting Form containing all of the information collected under sections 26.1 and 26.2 during the previous twelve months to the MNR Designated Representative.

28. Review

- 28.1. Within six months of the expiry of this Mitigation Plan but no later than three months from the time of its expiry, the Parties shall meet to review the measures and actions taken and the Activities undertaken during its term and to discuss the terms and conditions of the next Mitigation Plan.

APPENDIX "REI-C"

STANDARD SPECIFICATIONS **FOR ACCESS BRIDGE CONSTRUCTION**

1. PRECAST CONCRETE BLOCK & CONCRETE FILLED JUTE BAG HEADWALLS

After the Contractor has set the endwall foundations and the new pipe in place, it shall completely backfill same and install new precast concrete blocks or concrete filled jute bag headwalls at the locations and parameters indicated on the drawing. All concrete used for headwalls shall be a minimum of 30 mPa at 28 days and include 6% +/- 1% air entrainment.

Precast concrete blocks shall be interlocking and have a minimum size of 600mmX600mmX1200mm. Half blocks shall be used to offset vertical joints. Cap blocks shall be a minimum of 300mm thick. A foundation comprising minimum 300mm thick poured concrete or precast blocks the depth of the wall and the full bottom width of the drain plus 450mm embedment into each drain bank shall be provided and placed on a firm foundation as noted below. The Contractor shall provide a levelling course comprising a minimum thickness of 150mm Granular "A" compacted to 100% Standard Proctor Density or 20mm clear stone, or a lean concrete as the base for the foundation. The base shall be constructed level and flat to improve the speed of installation. Equipment shall be provided as required and recommended by the block supplier for placing the blocks such as a swift lift device for the blocks and a 75mm eye bolt to place the concrete caps,. The headwall shall extend a minimum of 150mm below the invert of the access bridge culvert with the top of the headwall set to match the finished driveway grade, unless a 150mm high curb is specified at the edge of the driveway. To achieve the required top elevation, the bottom course of blocks and footing may require additional embedment into the drain bottom. The Contractor shall provide shop drawings of the proposed wall for approval by the Drainage Superintendent or Engineer prior to construction.

Blocks shall be placed so that all vertical joints are staggered. Excavation voids on the ends of each block course shall be backfilled with 20mm clear stone to support the next course of blocks above. Walls that are more than 3 courses in height shall be battered a minimum of 1 unit horizontal for every 5 units of vertical height. The batter shall be achieved by careful grading of the footing and foundation base, or use of pre-battered base course blocks. Filter cloth as specified below shall be placed behind the blocks to prevent the migration of any fill material through the joints. Backfill material shall be granular as specified below. Where the wall height exceeds 1.8 metres in height, a uni-axial geogrid SG350 or equivalent shall be used to tie back the walls and be installed in accordance with the manufacturer's recommendations. The wall face shall not extend beyond the end of the access bridge pipe. Non-shrink grout shall be used to fill any gaps between the blocks and the access bridge pipe for the full depth of the wall. The grout face shall be finished to match the precast concrete block walls as closely as possible.

When constructing the concrete filled jute bag headwalls, the Contractor shall place the bags so that the completed headwall will have a slope inward from the bottom of the pipe to the top of the finished headwall. The slope of the headwall shall be one unit horizontal to five units vertical. The Contractor shall completely backfill behind the new concrete filled jute bag headwalls with Granular "B" and Granular "A" material as per O.P.S.S. Form 1010 and the granular material shall be compacted in place to a Standard Proctor Density of 100%. The placing of the jute bag headwalls and the backfilling shall be performed in lifts simultaneously. The granular backfill shall be placed and compacted in lifts not to exceed 305mm (12") in thickness.

The concrete filled jute bag headwalls shall be constructed by filling jute bags with concrete. All concrete used to fill the jute bags shall have a minimum compressive strength of 25 MPa in 28 days and shall be provided and placed only as a wet mix. Under no circumstance shall the concrete to be used for filling the jute bags be placed as a dry mix. The jute bags, before being filled with concrete, shall have a dimension of 460mm (18") x 660mm (26"). The jute bags shall be filled with concrete so that when they are laid flat, they will be approximately 100mm (4") thick, 305mm (12") to 380mm (15") wide and 460mm (18") long.

The concrete jute bag headwall to be provided at the end of the bridge pipe shall be a single or double bag wall construction as set out in the specifications. The concrete filled bags shall be laid so that the 460mm (18") dimension is parallel with the length of the new pipe. The concrete filled jute bags shall be laid on a footing of plain concrete being 460mm (18") wide, and extending for the full length of the wall, and 305mm (12") thick extending below the bottom of the culvert pipe.

All concrete used for the footing, cap and bags shall have a minimum compressive strength of 30 mPa at 28 days and shall include 6% ± 1% air entrainment.

Upon completion of the jute bag headwall the Contractor shall cap the top row of concrete filled bags with a layer of plain concrete, minimum 100mm (4") thick, and hand trowelled to obtain a pleasing appearance. If the cap is made more than 100mm thick, the Contractor shall provide two (2) continuous 15M reinforcing bars set at mid-depth and equally spaced in

the cap. The Contractor shall fill all voids between the concrete filled jute bags and the corrugated steel pipe with concrete, particular care being taken underneath the pipe haunches to fill all voids.

The completed jute bag headwalls shall be securely embedded into the drain bank a minimum of 450mm (18") measured perpendicular to the sideslopes of the drain.

As an alternate to constructing a concrete filled jute bag headwall, the Contractor may construct a grouted concrete rip rap headwall. The specifications for the installation of a concrete filled jute bag headwall shall be followed with the exception that broken pieces of concrete may be substituted for the jute bags. The concrete rip rap shall be approximately 460mm (18") square and 100mm (4") thick and shall have two (2) flat parallel sides. The concrete rip rap shall be fully mortared in place using a mixture composed of three (3) parts of clean sharp sand and one (1) part of Portland cement.

The complete placement and backfilling of the headwalls shall be performed to the full satisfaction of the Drainage Superintendent and the Engineer.

2. QUARRIED LIMESTONE ENDWALLS

The backfill over the ends of the corrugated steel pipe shall be set on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each end slope and between the drain banks. The top 305mm (12") in thickness of the backfill over the ends of the corrugated steel pipe shall be quarried limestone. The quarried limestone shall also be placed on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each bank of the drain adjacent each end slope. The quarried limestone shall have a minimum dimension of 100mm (4") and a maximum dimension of 250mm (10"). The end slope protection shall be placed with the quarried limestone pieces carefully tamped into place with the use of a shovel bucket so that, when complete, the end protection shall be consistent, uniform, and tightly laid in place.

Prior to placing the quarried limestone end protection over the granular backfill and on the drain banks, the Contractor shall lay non-woven geotextile filter fabric "GMN160" conforming to O.P.S.S. 1860 Class I or approved equal. The geotextile filter fabric shall extend from the bottom of the corrugated steel pipe to the top of each end slope of the bridge and along both banks of the drain to a point opposite the ends of the pipe.

The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried limestone on top of the filter fabric.

3. BRIDGE BACKFILL

After the corrugated steel pipe has been set in place, the Contractor shall backfill the pipe with Granular "B" material, O.P.S.S. Form 1010 with the exception of the top 305mm (12") of the backfill. The top 305mm (12") of the backfill for the full width of the excavated area (between each bank of the drain) and for the top width of the driveway, shall be Granular "A" material, O.P.S.S. Form 1010. The granular backfill shall be compacted in place to a Standard Proctor Density of 100% by means of mechanical compactors. All of the backfill material, equipment used, and method of compacting the backfill material shall be inspected and approved and meet with the full satisfaction of the Drainage Superintendent and Engineer.

4. GENERAL

Prior to the work commencing, the Drainage Superintendent and Engineer must be notified, and under no circumstances shall work begin without one of them being at the site. Furthermore, the grade setting of the pipe must be checked, confirmed, and approved by the Drainage Superintendent or Engineer prior to continuing on with the bridge installation.

The alignment of the new bridge culvert pipe shall be in the centreline of the existing drain, and the placing of same must be performed totally in the dry.

Prior to the installation of the new access bridge culvert, the existing sediment build-up in the drain bottom must be excavated and completely removed. This must be done not only along the drain where the bridge culvert pipe is to be installed, but also for a distance of 3.05 metres (10 ft.) both upstream and downstream of said new access bridge culvert. When setting the new bridge culvert pipe in place it must be founded on a good undisturbed base. If unsound soil is encountered, it must be totally removed and replaced with 20mm (3/4") clear stone, satisfactorily compacted in place.

When doing the excavation work or any other portion of the work relative to the bridge installation, care should be taken not to interfere with, plug up, or damage any existing surface drains, swales, and lateral or main tile ends. Where damage is encountered, repairs to correct same must be performed immediately as part of the work.

The Contractor and/or landowner performing the bridge installation shall satisfy themselves as to the exact location, nature and extent of any existing structure, utility or other object that they may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town, or the Municipality, the Engineer, and their staff from any damages which it may cause or sustain during the progress of the work. It shall not hold them liable for any legal action arising out of any claims brought about by such damage caused by it.

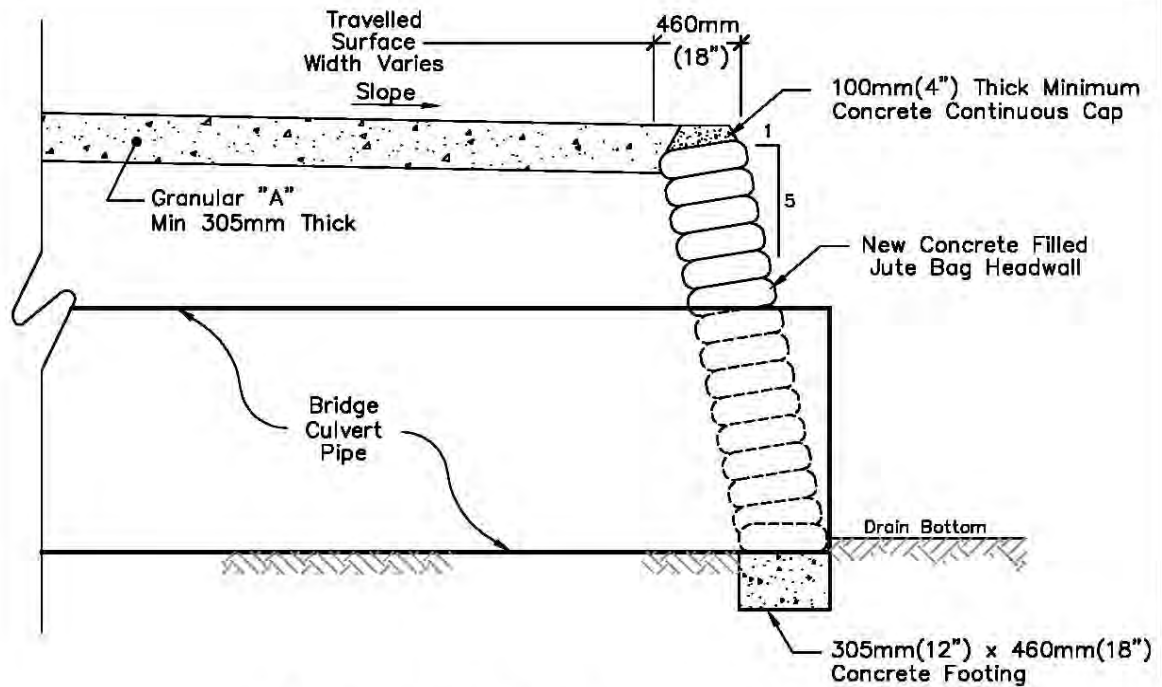
Where applicable, the Contractor and/or landowner constructing the new bridge shall be responsible for any damage caused by them to any portion of the Town road right-of-way. They shall take whatever precautions are necessary to cause a minimum of damage to same and must restore the roadway to its original condition upon completion of the works.

When working along a municipal roadway, the Contractor shall provide all necessary lights, signs, barricades and flagpersons as required to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, it is to comply with the M.T.O. Traffic Control Manual for Roadway Work Operations and Ontario Traffic Manual Book 7.

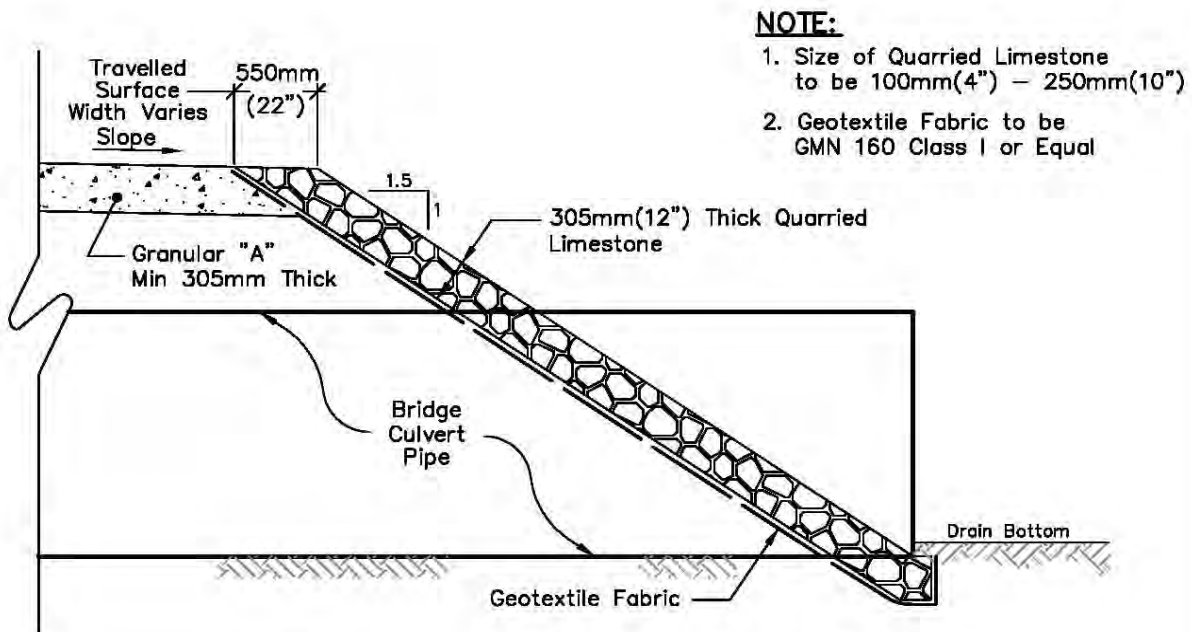
Once the bridge installation has been completed, the drain sideslopes directly adjacent the new headwalls and/or endwalls are to be completely restored including revegetation, where necessary.

All of the work required towards the installation of the bridge shall be performed in a neat and workmanlike manner. The general site shall be restored to its' original condition, and the general area shall be cleaned of all debris and junk, etc. caused by the work

All of the excavation, installation procedures, and parameters as above mentioned are to be carried out and performed to the full satisfaction of the Drainage Superintendent and Engineer.



Typical Jute Bag Headwall

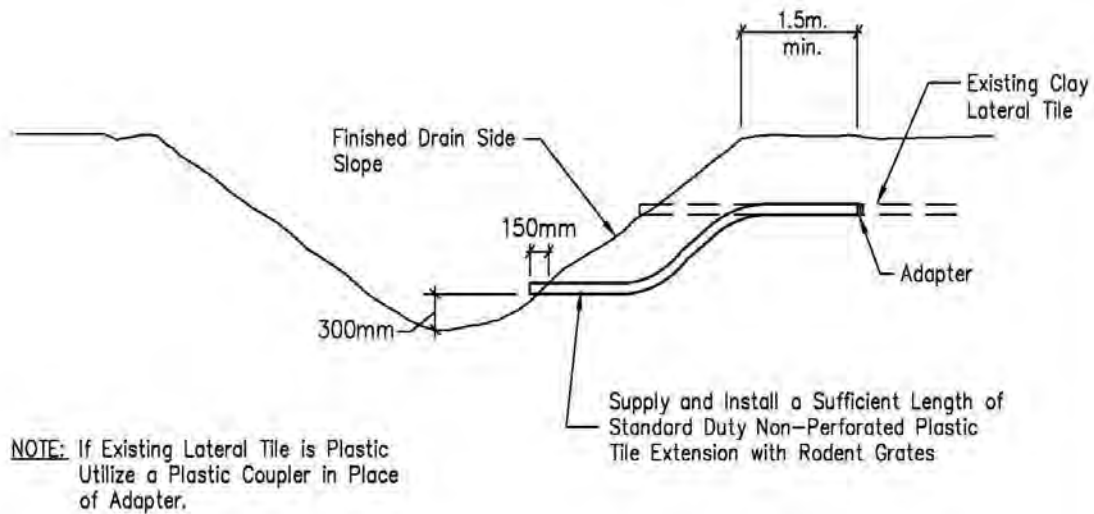


NOTE:

1. Size of Quarried Limestone to be 100mm(4") – 250mm(10")
2. Geotextile Fabric to be GMN 160 Class I or Equal

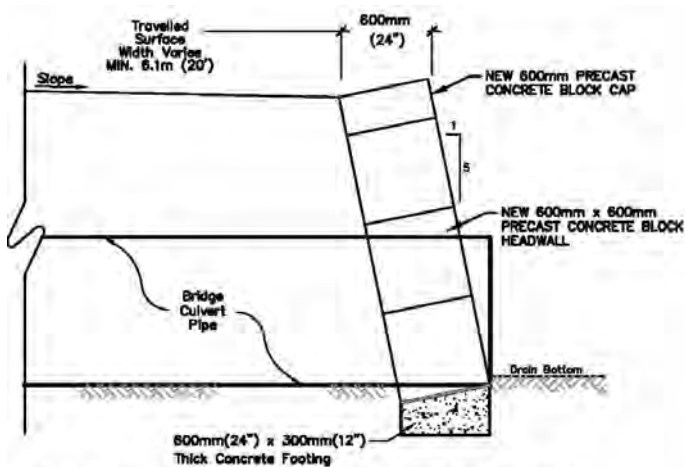
Typical Quarried Limestone End Protection

Rood Engineering Inc.
Consulting Engineers
 9 Nelson Street
 Leamington, Ontario N8H 1G6
 519-322-1621



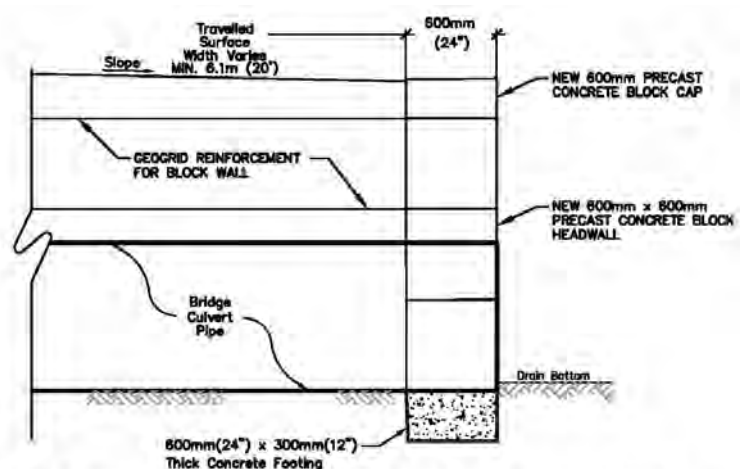
STANDARD LATERAL TILE DETAIL

N.T.S.



TYPICAL PRECAST CONCRETE BLOCK END PROTECTION

Scale = N.T.S.



TYPICAL VERTICAL PRECAST CONCRETE BLOCK END PROTECTION

Scale = N.T.S.

Block Headwall Installation Instructions for Culverts

1. A swift lift device will be required to place the blocks. A 75mm eye bolt will be required to place the caps.
2. The bottom course of blocks shall be founded on a firm solid base. The contractor shall provide a minimum levelling course of 150mm of compacted 3/4" Clear Stone, or a 100% compacted granular A, or lean concrete as a foundation base.
3. Ensure that the base is level and flat as this will greatly improve speed of installation.
4. On new culverts a minimum of 150mm of block wall will extend below the culvert to prevent scouring under the culvert.
5. The bottom course of blocks shall be embedded into the drain bottom to achieve the desired top elevation of the wall.
6. Blocks shall extend from the pipe invert across the full height and width of the drain and be imbedded a minimum of 300mm into the drain banks. Where possible the top of the block wall will match the height of the completed driveway.
7. Blocks shall be placed such that all joints are staggered.
8. Any excavation voids on the ends of block walls below subsequent block layers shall be filled with 3/4" Clear Stone.
9. Where block walls extend beyond three blocks in height, they should be battered a minimum of 1 unit horizontal for every 10 units vertical throughout the wall's full height and width. This can be achieved using pre-battered base blocks, or by careful preparation of the base.
10. Filter cloth (270R or equivalent) should be placed behind the wall to prevent the migration of fill material through the joints.
11. The walls should be backfilled with a free draining granular fill.
12. A uni-axial geogrid (SG350 or equivalent) should be used to tie back the headwalls where walls extend beyond 1.8m in height.
13. The face of the block wall shall not extend beyond the end of the pipe culvert.
14. Any gaps between the blocks and culvert shall be sealed with non-shrink grout for the full depth of the block.

APPENDIX "REI-D"

THE CORPORATION OF THE TOWN OF TECUMSEH

BY-LAW NO. 2007-51

Being a by-law to amend By-law No. 2007-41 to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh.

WHEREAS Council considers excessive smoke, smell, airborne sparks or embers to be or could become or cause public nuisances by creating negative health effects on neighbouring residents, increasing fire exposure hazards, infringing the enjoyment of the use of neighbouring properties and generating false or nuisance alarms;

AND WHEREAS Council is empowered under Section 128 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, to pass by-laws to prohibit and regulate public nuisances, including matters that, in the opinion of Council are, or could become or cause public nuisances;

AND WHEREAS in accordance with Section 425 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, a municipality may pass by-laws providing that a person who contravenes a by-law of the municipality passed under this Act is guilty of an offence;

AND WHEREAS Section 444 of the *Municipal Act* 2001, c. 25 states if a municipality is satisfied that a contravention of a by-law of the municipality passed under this Act has occurred, the municipality may make an order requiring the person who contravened the by-law or who caused or permitted the contravention or the owner or occupier of the land on which the contravention occurred to discontinue the contravening activity;

AND WHEREAS the Council of The Corporation of the Town of Tecumseh enacted By-law No. 2007-41 on the 26th day of June, 2007 to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh;

AND WHEREAS the Council of The Corporation of the Town of Tecumseh is desirous of amending By-law No. 2007-41;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWN OF TECUMSEH ENACTS AS FOLLOWS:

1. **That** paragraph 4.9 be deleted and replaced with the following paragraph:
 - 4.9 Permitted fires, except those described in Section 4.4, shall,
 - a) be kept to manageable size that shall not be greater than one (1) square metre with flames no higher than one (1) metre in height; and,
 - b) in residentially zoned areas, be completely extinguished by 2:00 a.m.
2. **That** paragraph 5.2 be deleted and replaced with the following paragraph:
 - 5.2 An application for a Permit must be completed on the form/forms provided by the Tecumseh Fire/Rescue Services.

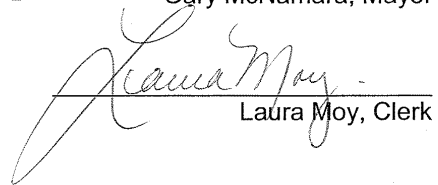
3. **That** paragraph 5.3 be deleted and replaced with the following paragraph:

5.3 An application must be filed with the Chief Fire Official of the Tecumseh Fire/Rescue Services. Approved permits must be retained and presented to an attending fire official in the event that there is a need for a fire official to attend at the burn location due to complaint.

4. **That** this by-law shall take full force and effect on the third and final reading.

READ a first, second, third time and finally passed this 11th day of September, 2007.


Gary McNamara, Mayor


Laura Moy, Clerk

THE CORPORATION OF THE TOWN OF TECUMSEH

BY-LAW NUMBER 2007-41

A by-law to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh.

WHEREAS Council considers excessive smoke, smell, airborne sparks or embers to be or could become or cause public nuisances by creating negative health effects on neighbouring residents, increasing fire exposure hazards, infringing on the enjoyment of the use of neighbouring properties and generating false or nuisance alarms;

AND WHEREAS Council is empowered under Section 128 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, to pass bylaws to prohibit and regulate public nuisances, including matters that, in the opinion of Council are, or could become or cause public nuisances;

AND WHEREAS in accordance with Section 425 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, a municipality may pass by-laws providing that a person who contravenes a by-law of the municipality passed under this Act is guilty of an offence;

AND WHEREAS Section 444 of the *Municipal Act* 2001 c. 25 states if a municipality is satisfied that a contravention of a by-law of the municipality passed under this Act has occurred, the municipality may make an order requiring the person who contravened the by-law or who caused or permitted the contravention or the owner or occupier of the land on which the contravention occurred to discontinue the contravening activity;

AND WHEREAS Section 446(1) of the *Municipal Act* 2001 c.25 states that if a municipality has the authority under this or any other Act or under a by-law under this or any other Act to direct or require a person to do a matter or thing, the municipality may:

- provide that, in default of it being done by the person directed or required to do it, the matter or thing shall be done at the person's expense;
- enter upon land at any reasonable time;
- recover the costs of doing a matter or thing from the person directed or required to do it by action or by adding the costs to the tax roll and collecting them in the same manner as property taxes; and
- that costs include interest calculated at a rate of 15 per cent or such lesser rate as may be determined by the municipality, calculated for the period commencing on the day the municipality incurs the costs;
- the costs, including interest, constitutes a lien on the land upon the registration in the proper land registry office of a notice of lien;

AND WHEREAS Section 390 of the *Municipal Act* 2001 c.25 provides that a "person" includes a municipality and a local board and the Crown;

AND WHEREAS Section 426 of the *Municipal Act* 2001 c. 25 provides that no person shall hinder or obstruct, or attempt to hinder or obstruct any person exercising a power or performing a duty under this Act or a by-law under this Act and that any person who contravenes subsection (1) is guilty of an offence;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWN OF TECUMSEH ENACTS AS FOLLOWS:

1. DEFINITIONS

In this By-law:

- 1.1 "Burning Appliance" means any device designed or engineered to have a fire set within a contained area and totally enclosed by various means of screening and/or other methods.
- 1.2 "By-law Enforcement Officer" means the municipal person appointed by the Town of Tecumseh who shall be responsible for the enforcement of the provisions of this by-law.
- 1.3 "Chief Fire Official" means the Fire Chief of the Tecumseh Fire/ Rescue Services or designate.
- 1.4 "Competent Adult" means any person (18 years of age or older) who, in the opinion of those charged with enforcement of this By-Law, is capable of exercising the required judgement and capable of performing the necessary actions to control and prevent its unwanted spread.
- 1.5 "Farmer" means the owner or operator of an agricultural operation within an area zoned for agricultural pursuant to the *Farming & Food Protection Act*, 1998.
- 1.6 "Farmlands" means land designated "agricultural".
- 1.7 "Firefighter" means any person or any rank of person employed in, or appointed to the Tecumseh Fire/Rescue Services and assigned to undertake fire protection or fire prevention services.
- 1.8 "Full Cost Recovery Basis" has the meaning as described in Schedule "A" attached hereto.
- 1.9 "Open Air" means any open place, yard, field, lot, part lot or construction area which is not enclosed by a building or structure.
- 1.10 "Open Air Burning" means any fire set in the Open Air.
- 1.11 "Owner" means the registered owner or any person, firm or corporation having control over, or possession, of any portion of the building or property under consideration and includes the persons in the building or on the property.
- 1.12 "Permit" means a permit issued by the Chief Fire Official to set a fire in the Open Air for a specified date and period of time.
- 1.13 "Person" means an individual, business, a partnership or a corporation.
- 1.14 "Pit" means an area dug into the ground and/or surrounded by materials designed to contain the fire and prevent its spread to areas beyond the Pit.
- 1.15 "Police Officer" means any member of the Ontario Provincial Police.
- 1.16 "Tenant" means the occupant having possession or Person having control of a property or premises.
- 1.17 "Town" means The Corporation of the Town of Tecumseh.

2. ADMINISTRATION AND ENFORCEMENT

- 2.1 The Chief Fire Official shall be responsible for the administration of this by-law.
- 2.2 Enforcement of this by-law is the responsibility of the Chief Fire Official, any Fire-fighter, any Police Officer or any By-law Enforcement Officer.
- 2.3 The Chief Fire Official may refuse to issue a Permit or revoke any or all issued Permits.
- 2.4 The Fire Chief, Firefighters or Police Officers may, at all times enter and inspect any property or premises in order to ascertain whether the provisions of this by-law are complied with and to enforce or carry into effect the by-law.
- 2.5 Any person who fails to comply with the provisions of this by-law or fails to extinguish a fire once notification to do so has been given to him by the Chief Fire Official, a Police Officer or a Firefighter shall, in addition to any penalty provided herein, be liable to the municipality for all expenses incurred for the purposes of controlling and extinguishing of any fire so set or left to burn and such expenses may be recovered by court action or in a like manner as municipal taxes.

3. ENVIRONMENT

- 3.1 All Open Air Burning shall comply with the provisions of the *Environmental Protection Act*, R.S.O. 1990. c. E19.
- 3.2 No Open Air Burning shall be permitted when a smog alert has been issued for the region of Essex County, which includes the Town.
- 3.3 No Open Fire shall be started or maintained when wind condition is in such direction or intensity so as to cause any or all of the following:
 - (a) decrease in visibility on any highway or roadway;
 - (b) threaten a rapid spread of fire through a grass or brush area;
 - (c) smoke which causes annoyance or irritation to adjacent persons, properties or premises.

4. GENERAL PROVISIONS

- 4.1 No Person being the Owner or Tenant in possession of lands within the Town shall allow a fire to be set or burn on such lands unless a Permit has been obtained.
- 4.2 No Person shall allow a fire to be set or burned exceeding the requirements of Sections 4.8 and 4.9.
- 4.3 Notwithstanding any provisions herein, no Person shall set or maintain a fire,
 - (a) in contravention of the *Ontario Fire Code*, the *Environmental Protection Act* or any other statutory requirements of the Province of Ontario or the Government of Canada;
 - (b) where the consumption of material or size and area of the fire will exceed the limits set by the Chief Fire Official and/or listed within this by-law in Sections 4.8 and 4.9.

- 4.4 (a) No Permit shall be required for domestic barbeques or permanent outdoor fireplaces used solely for the cooking of food on a grill and extinguished immediately upon completion of the cooking process or any Burning Appliance, or a Pit or open area where the requirements of Sections 4.8 and 4.9 are not exceeded;
- (b) installation and location of Burning Appliances must meet the manufacturer's specifications.
- 4.5 (a) A farmer who intends to set or maintain a fire in the Open Air on a specified day for disposal of vegetable matter or vegetation on Farmlands which is normal and incidental for farming purposes shall obtain a Permit to cover the period of the proposed Open Air fire, and will be required to notify the Tecumseh Fire/Rescue Services for each day that the proposed Open Air fire will take place;
- (b) an Open Air fire shall be supervised by a Competent Adult equipped with sufficient equipment to control and contain the Open Air fire to prevent the spread of the Open Air fire that would endanger or put at risk other properties or premises;
- (c) an Open Air fire shall be restricted to daylight hours only;
- (d) an Open Air fire shall be surrounded by a tilled area wide enough to prevent an Open Air fire from jumping across the tilled area and to maintain the area of the burn to be no greater than one (1) hectare in size;
- (e) the leading edge of the flame of an Open Air fire shall not exceed thirty (30) metres in length.
- 4.6 No Person shall set any fire in the Open Air to burn asphalt products, tires, treated wood, construction materials or rubble, kitchen garbage or any garbage or trash, rubber plastics and like items.
- 4.7 No Person shall set any fire in the Open Air except where permitted and only in the presence of a Competent Adult. The Competent Adult shall not leave the burning operation until such time as the fire has been completely extinguished and there is no threat of re-ignition or spreading of the fire.
- 4.8 Every Person that starts a fire in the Open Air shall ensure that there are adequate tools and/or water on hand to contain or extinguish the fire.
- 4.9 Permitted fires, except those described in Section 4.4, shall be kept to manageable size that shall not be greater than one (1) square metre with flames no higher than one (1) metre in height.
- 4.10 Every Person who sets an Open Air fire in the Town of Tecumseh shall be:
- (a) responsible and liable for any damage to property or injury to person occasioned by said fire;
- (b) liable for all costs incurred by the Town of Tecumseh, including but not limited to, the Fire/Rescue Services, including personnel and other agencies called to control and extinguish said fire on a Full Cost Recovery Basis. All fees and charges to be paid under this subsection shall be payable in the manner and subject any interest and penalties set forth in paragraph 5 and 6 of the Administrative Fees and Charges By-law 2007-12, as may be amended or repealed from time to time;

- (c) the fees and charges under this section shall not be payable by that class of persons which have obtained a permit for an Open Air fire and complied with the terms of such permit.

- 4.11 Notwithstanding the aforementioned sections listed herein, the Fire Chief may issue a Permit upon application and approve the setting of any fire subject to the fire being adequately supervised and controlled through special conditions addressed by the Chief Fire Official.
- 4.12 No fire shall be set to dispose of commercial, industrial or construction waste or other like materials in areas zoned for commercial or industrial occupancies and such aforementioned materials shall not be transported to residential or agricultural areas for burning purposes.
- 4.13 No fires shall be set at construction and/or demolition sites for the purpose of disposing of waste, building material or rubble.

5. FIRES REQUIRING PERMITS

- 5.1 Except as provided in section 4.3 of this by-law, no Person shall set, maintain or cause to be set or maintained, a fire in the Open Air unless a Permit has been issued by the Chief Fire Official.
- 5.2 An application for a Permit must be completed on the form/forms provided by the Tecumseh Fire/Rescue Services. Such forms are available to fill out by telephone call to Tecumseh Fire Station No. 1, Monday to Friday from 08:30 hr to 16:30 hr.
- 5.3 Each completed application for a Permit must be filed with the Chief Fire Official of the Tecumseh Fire/Rescue Services, at the administration offices located at 985 Lesperance Road, Tecumseh, Ontario.
- 5.4 In issuing a Permit under this part for Open Air Burning, the Chief Fire Official may impose any additional requirements or conditions as may be deemed necessary.

6. OFFENCES

- 6.1 (a) Any person who contravenes any of the provisions of this by-law is guilty of an Offence;
- (b) any person who hinders or obstructs a person lawfully carrying out the enforcement of this by-law is guilty of an Offence.

7. FINES

- 7.1 Every Person who is convicted of an Offence is liable to a Fine of not more than Five Thousand (\$5,000.00) Dollars as provided for in the *Provincial Offences Act*, R. S.O. 1990, Chap. P.33.

8. SEVERABILITY

- 8.1 If any section or sections of this by-law or parts thereof are found in any court to be illegal or beyond the power of Council to enact, such section or sections or parts thereof shall be deemed severable and all other sections or parts of this by-law shall be deemed separate and independent there from and enacted as such.

9. **SHORT TITLE**

9.1 The short title of this by-law shall be TECUMSEH OPEN AIR BURNING BY-LAW.

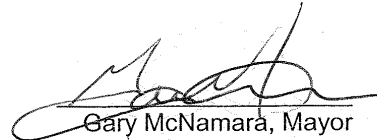
10. **EFFECTIVE DATE**

10.1 This by-law shall come into full force and take effect on the 1st day of July, 2007.

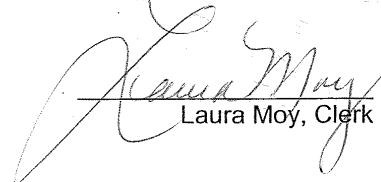
11. **REPEAL**

11.1 By-law No. 2005-57 is hereby repealed.

READ a first, second, third time and finally passed this 26th day of June, 2007.



Gary McNamara, Mayor



Laura Moy, Clerk

SCHEDULE "A"
By-law Number 2007-41

**THE CORPORATION OF THE TOWN OF TECUMSEH
TECUMSEH FIRE/RESCUE SERVICES EQUIPMENT SERVICES RATES**

"Full Cost Recovery Basis" includes any and all charges and costs howsoever incurred by the Town directly or indirectly in controlling and extinguishing the Open Air fire and shall include without limitations:

Emergency Services Rendered:

- (a) \$350.00 first hour or part thereof per piece of equipment;
- (b) \$175.00 each additional half-hour or part thereof per piece of equipment;
- (c) \$42.00 first hour or part thereof per firefighter who responds to the call;
- (d) \$27.50 for each additional hour or part thereof per firefighter until all equipment is cleaned, checked and returned to service;
- (e) the cost of all extinguishing agents required to extinguish the fire.

No Emergency Services Rendered:

- (a) \$350.00 flat rate per piece of equipment where services are not required nor provided;
- (b) \$42.00 flat rate per firefighter who responds to the call for service.

APPENDIX "REI-E"

WATERSHED PLAN
OF THE
SHUTTLEWORTH DRAIN

New & Replacement Bridges, Enclosures & Maintenance
IN THE
(Geographic Township of Sandwich South)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



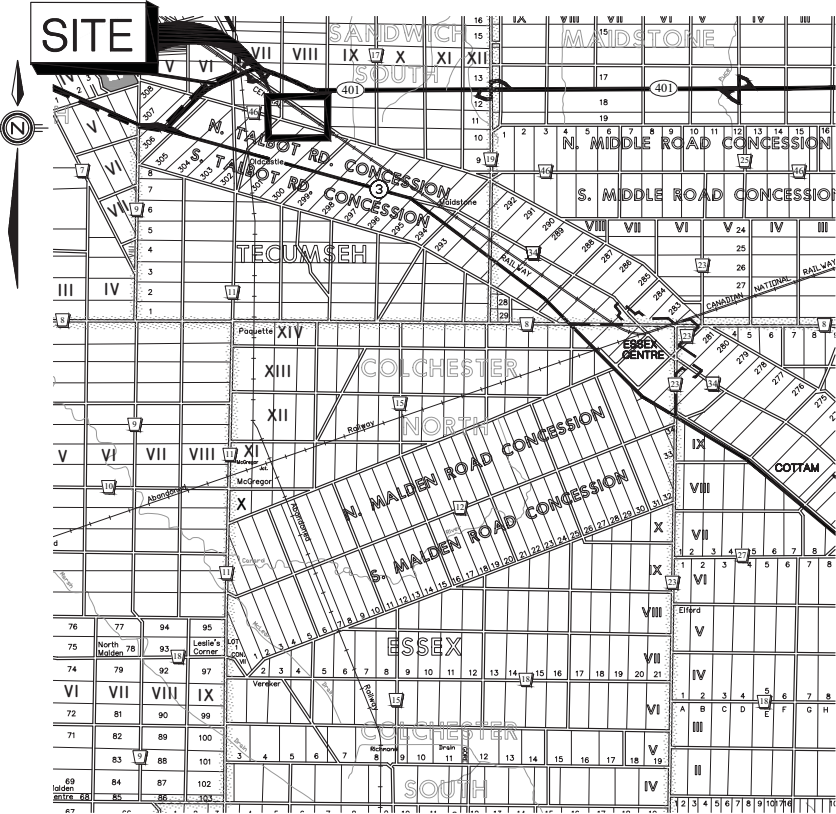
**ROOD
ENGINEERING
INC.**
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: March 21st, 2022 Revised Report 2022-12-14

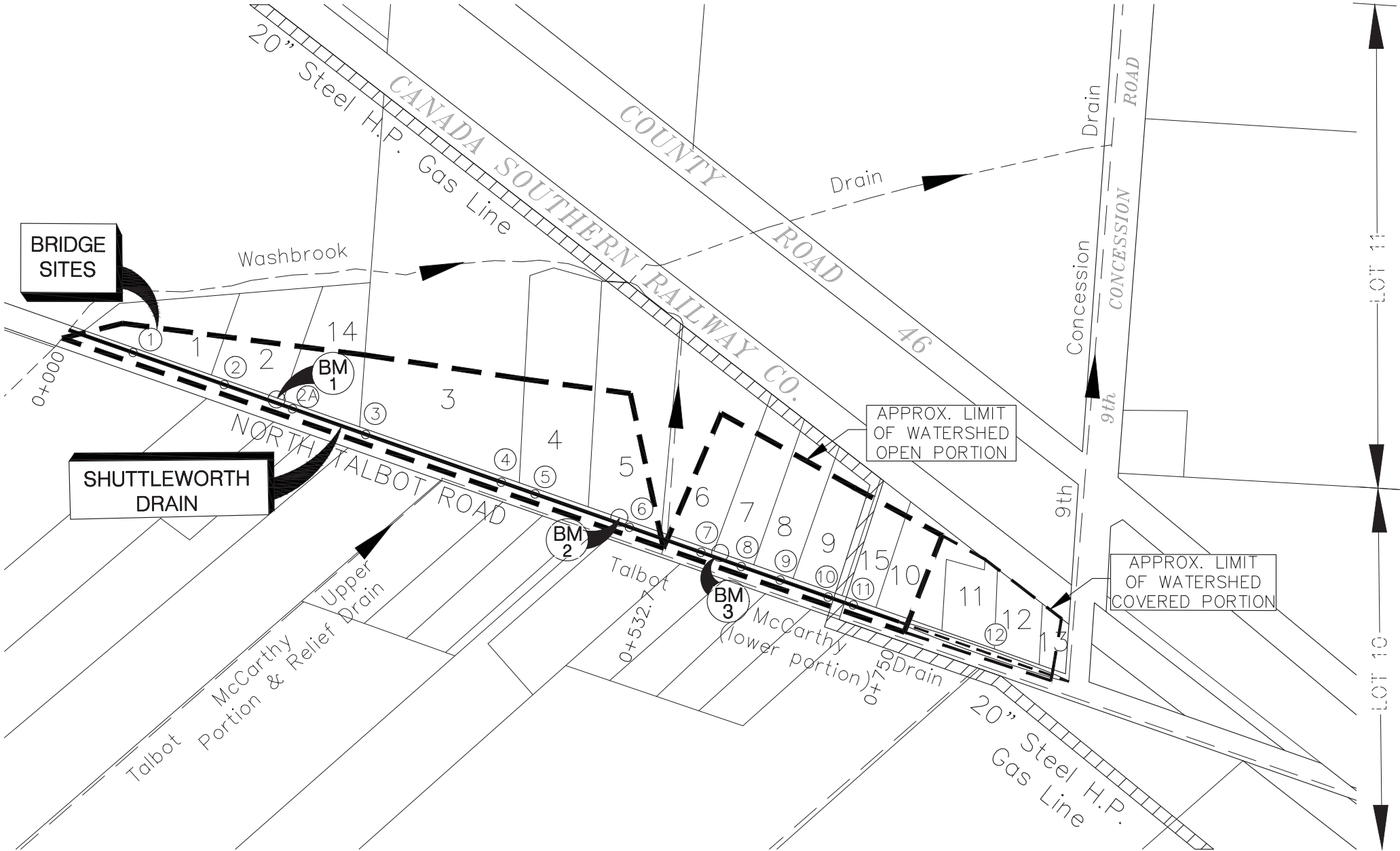
TOWN OF TECUMSEH
MAYOR: Gary McNamara
CLERK: Laura Moy
DRAINAGE
SUPERINTENDENT: Sam Paglia, P.Eng.

BENCHMARKS:

- 1) TOP NUT OF HYDRANT LOCATED APPROX. 17.5 METRES EAST
OF THE EAST END OF PROPOSED BRIDGE FRONTING MN 5074 ON
THE NORTH SIDE OF NORTH TALBOT ROAD
ELEV: 188.722m
- 2) TOP NUT OF FH ON NORTH SIDE OF NORTH TALBOT ROAD
DIRECTLY IN FRONT OF MN.5410
ELEV: 188.632m
- 3) TOP NUT OF FH ON NORTH SIDE OF NORTH TALBOT ROAD
ACROSS THE ROAD OF MN.5475 AND IN FRONT OF MN.5480
ELEV: 188.673m



KEY PLAN
Scale = 1:100,000



SHUTTLEWORTH DRAIN WATERSHED PLAN
Scale = 1:2,000

- | | | | |
|---|---|---|---|
| 1. Fabio Pace & Giselle Rossi
(540-00800), MN 4976 | 5. Robert Weston
(540-00500), MN 5410 | 9. Adam & Vittoria Fortier
(540-00320), MN 5520 | 13. Mark & Linda Shafer
(540-00100), MN 5790 |
| 2. Gary & Linda Deneau
(540-00701), MN 5074 | 6. Amelia Conciatori
(540-00400), MN 5466 | 10. John White
(540-00301), MN 5648 | 14. Gary & Linda Deneau
(540-00701 Severance), MN 5078 |
| 3. Town of Tecumseh
(540-00700), MN 5284 | 7. Emile & Marisa Nabbout
(540-00360), MN 5480 | 11. Ian Bristow
(540-00300), MN 5700 | 15. Timothy Kuhn & Sandra Vasquez
(540-003?? Severance), MN 5630 |
| 4. Theresa Gates
(540-00600), MN 5330 | 8. Ronnie & Rosa Dowhan
(540-00340), MN 5500 | 12. Thomas & Debra McGuinness
(540-00200), MN 5760 | |

NOTE:
PIPE 12 IS AN ENCLOSURE THAT INCLUDES PRIMARY
ACCESSES TO THE ADJUTING PARCELS
PARCELS 7, 8 & 9 HAVE NEW ENCLOSURES AND
CATCH BASINS

THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

DRAWN BY: K.D.
PLOT CODE: 1:1
COMPUTER FILE: REI2017D020.DWG
FILE No.:
SHEET No.:
REI2017D020
1 OF 9

OF THE

New & Replacement Bridges, Enclosures & Maintenance

IN THE

IN THE

COUNTY OF ESSEX • ONTARIO

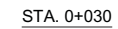
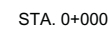
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ELEV: 188.722m

2) TOP NUT OF FH ON NORTH SIDE OF NORTH TALBOT ROAD
DIRECTLY IN FRONT OF MN.5410

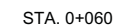
3) TOP NUT OF FH ON NORTH SIDE OF NORTH TALBOT ROAD
ACROSS THE ROAD OF MN.5475 AND IN FRONT OF MN.5480
ELEV: 188.673m



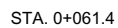
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1:50 vert.



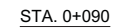
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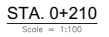
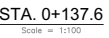
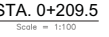
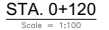
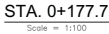
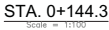
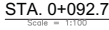
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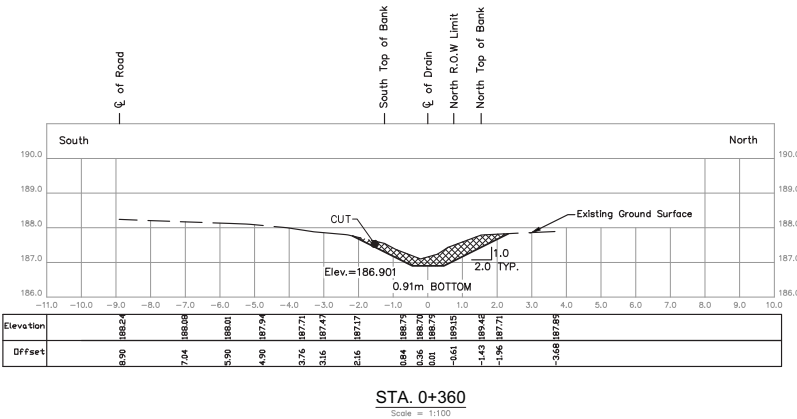
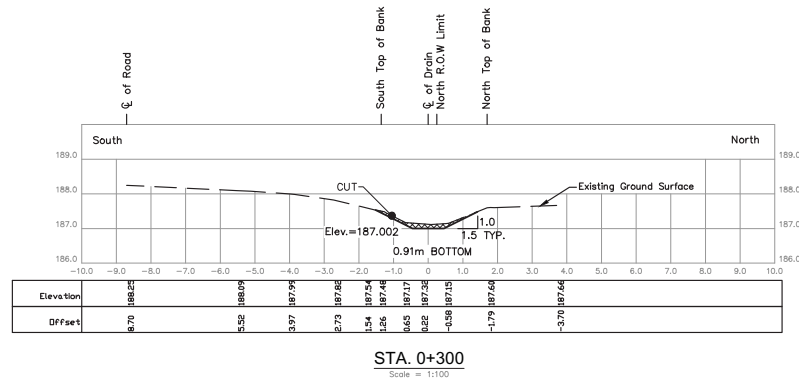
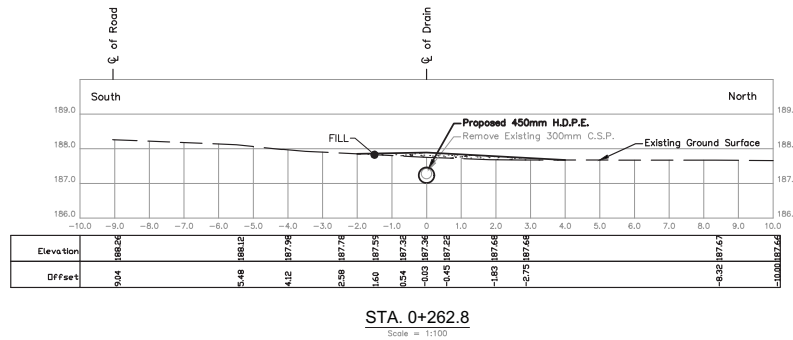
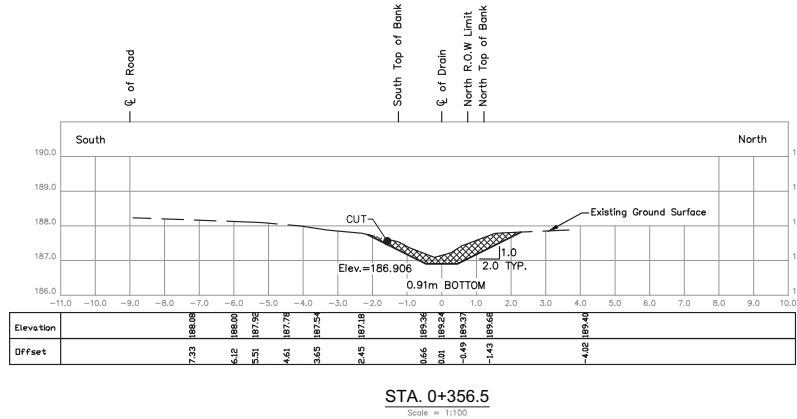
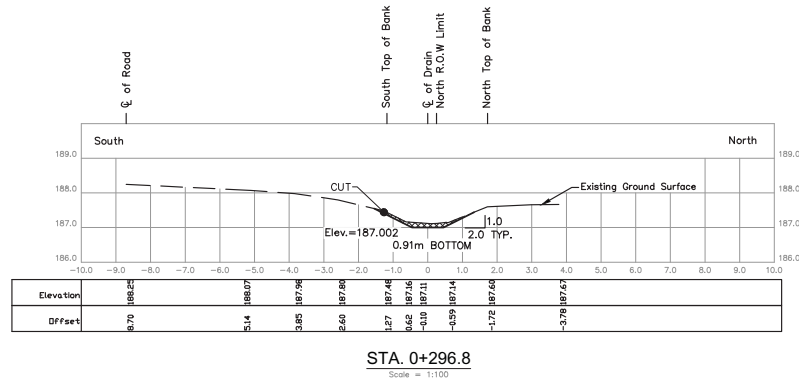
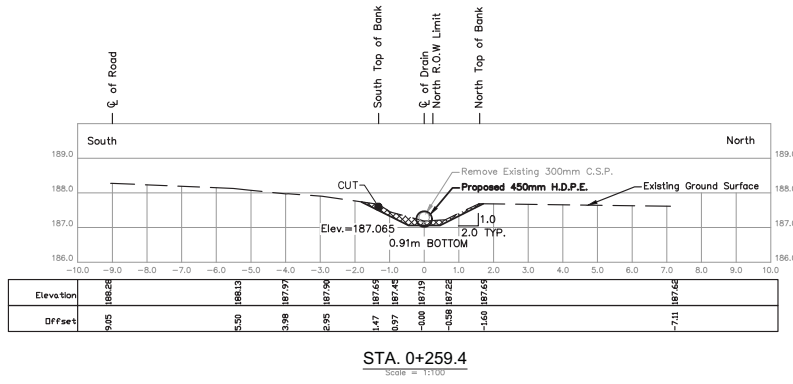
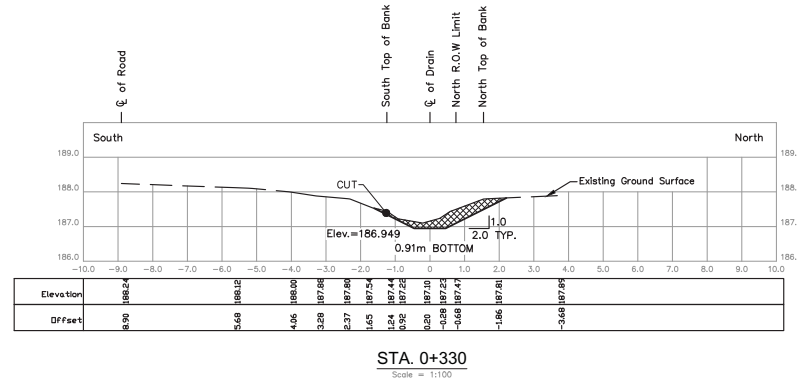
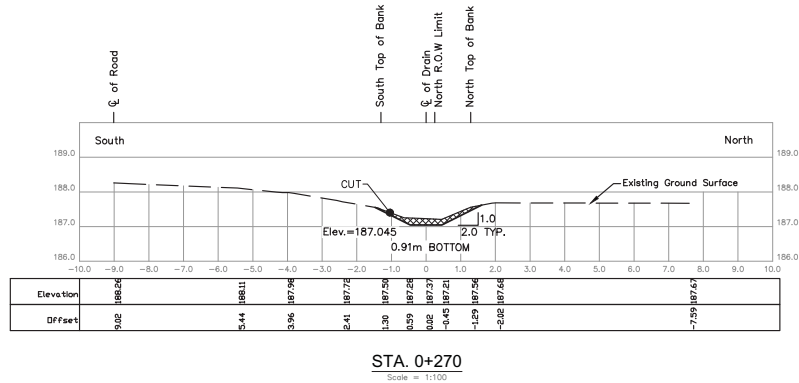
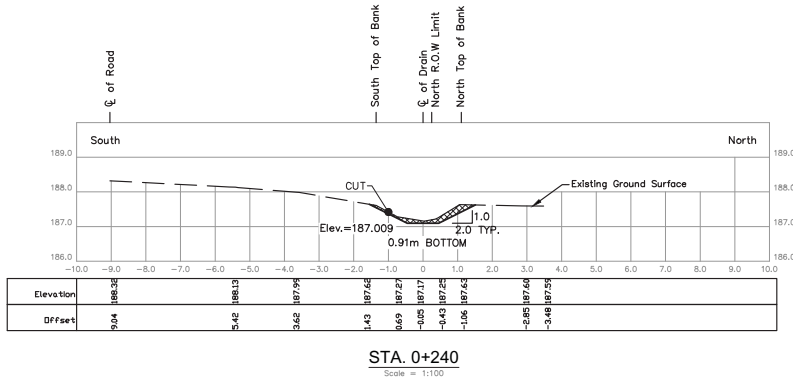
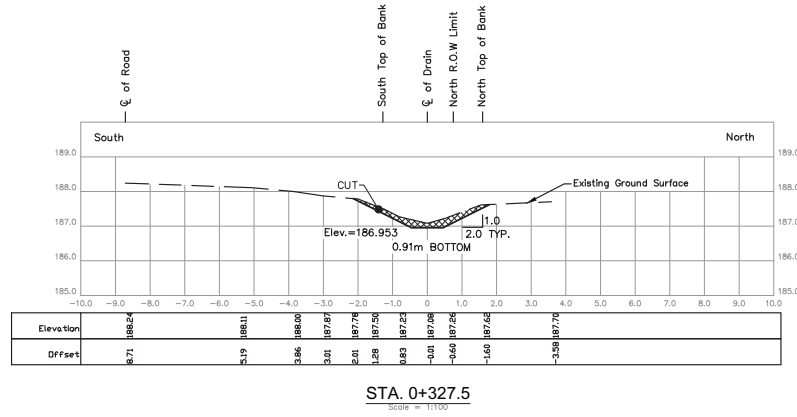
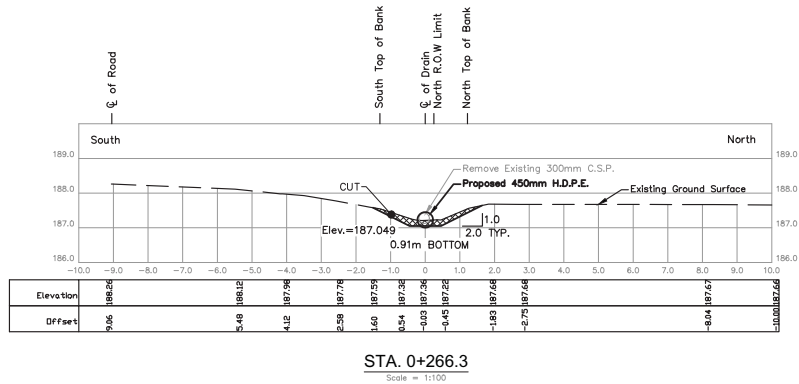
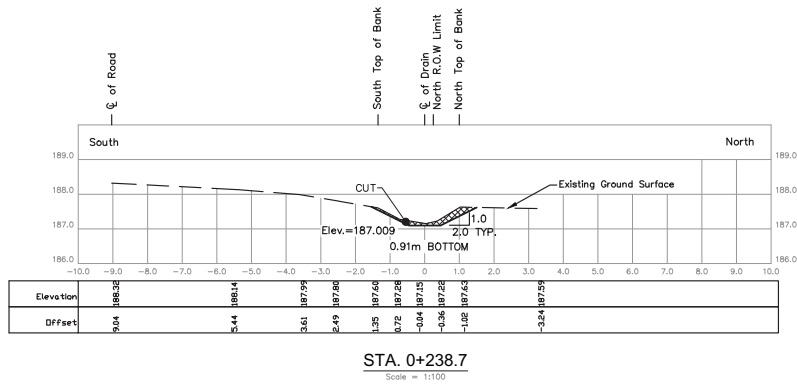
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REI2017D020	2 OF 9



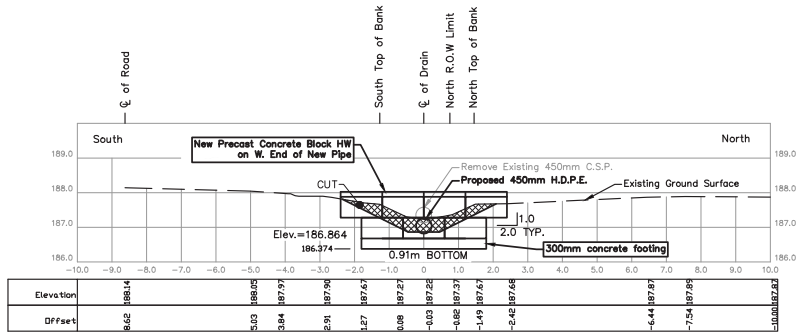
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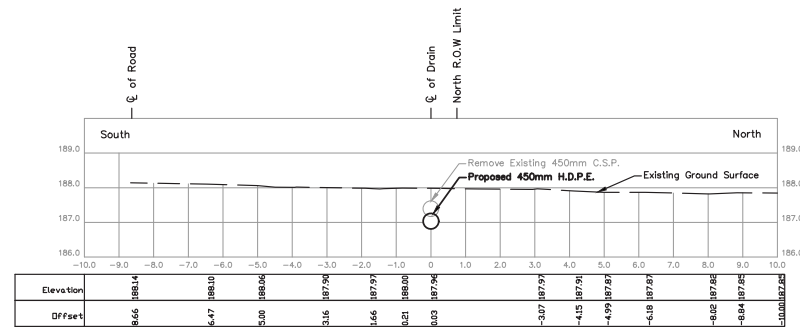


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FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

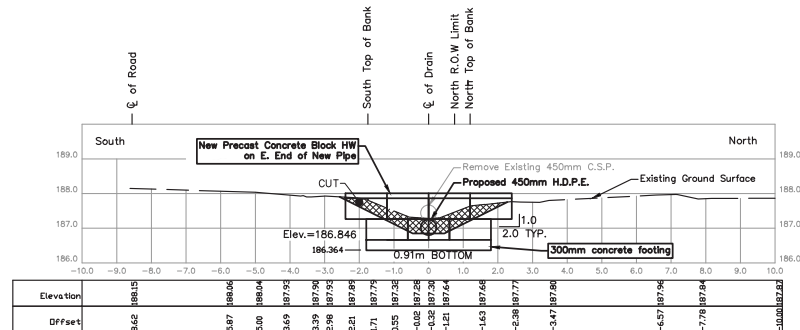
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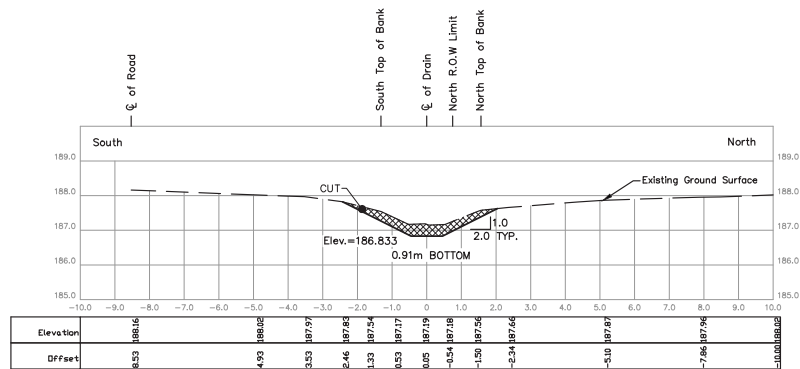
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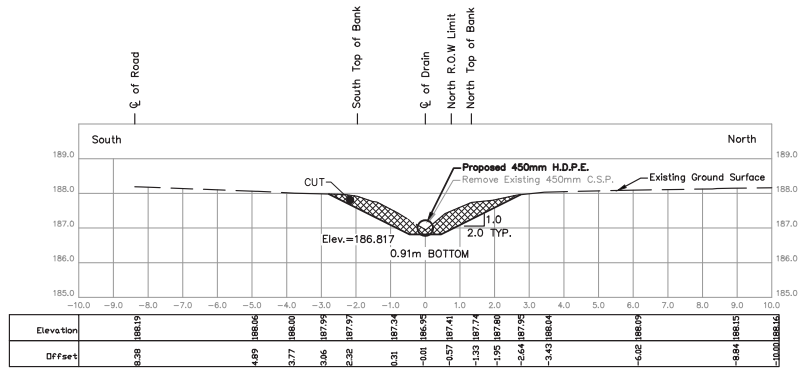
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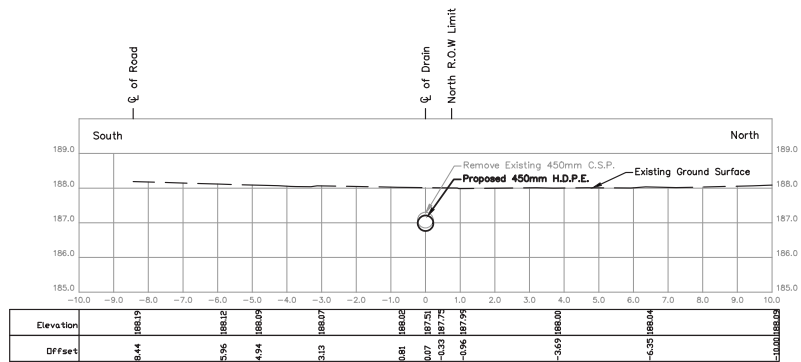
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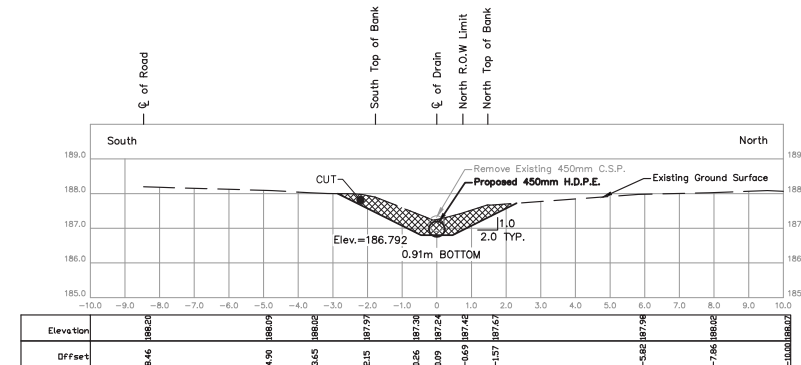
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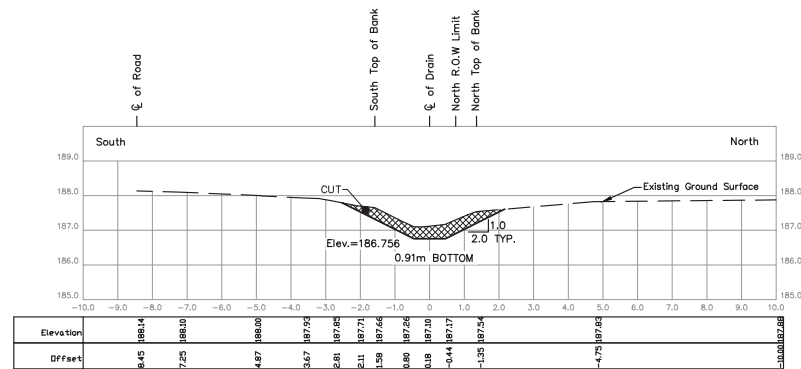
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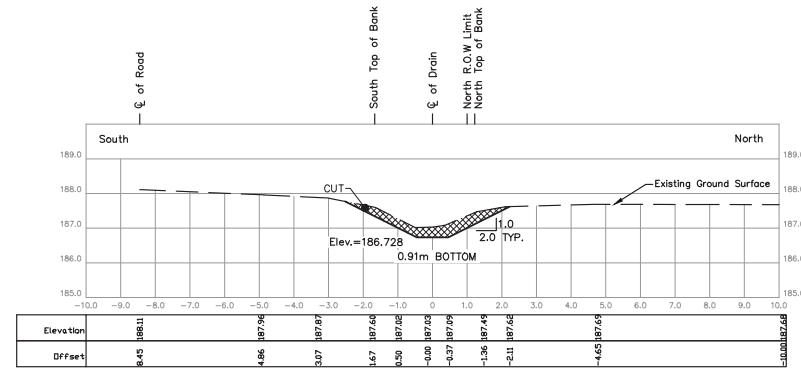
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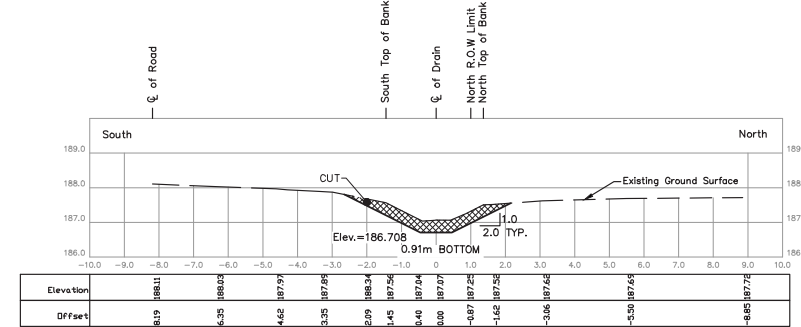
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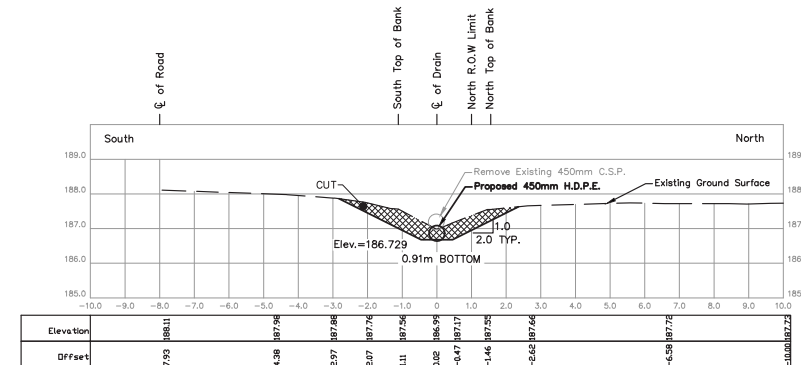
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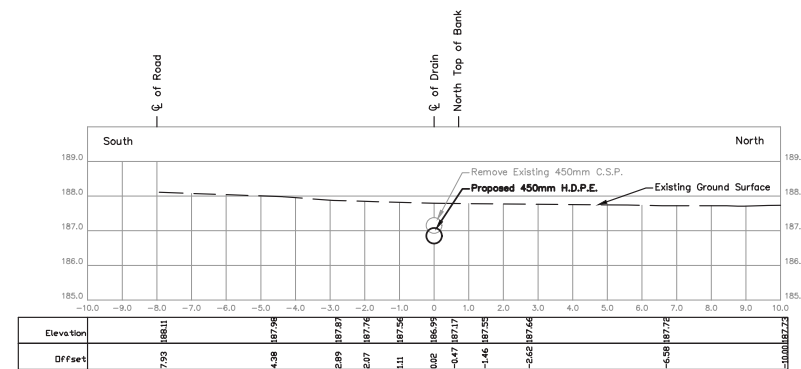
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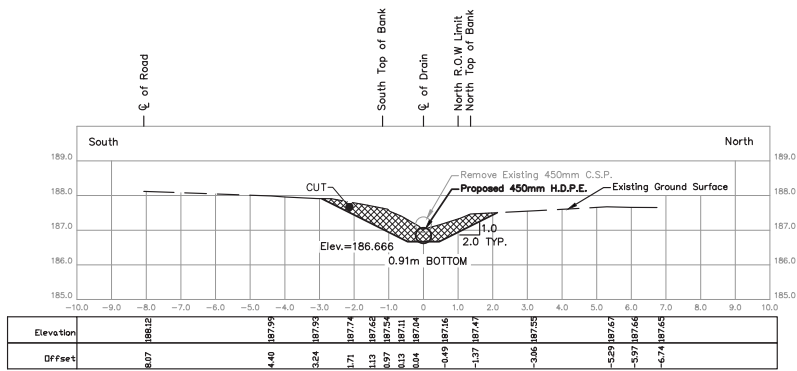


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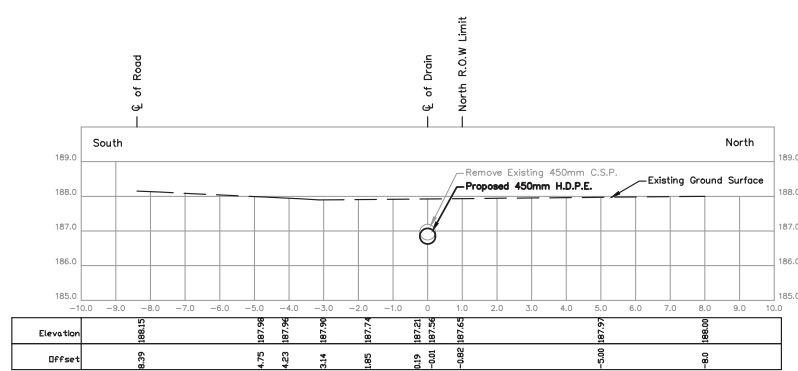


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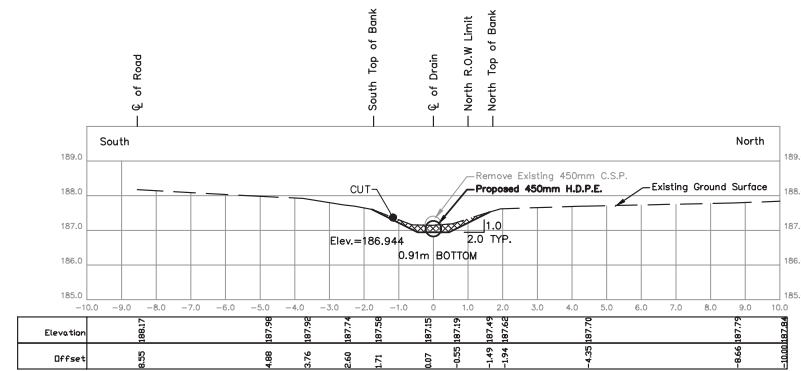
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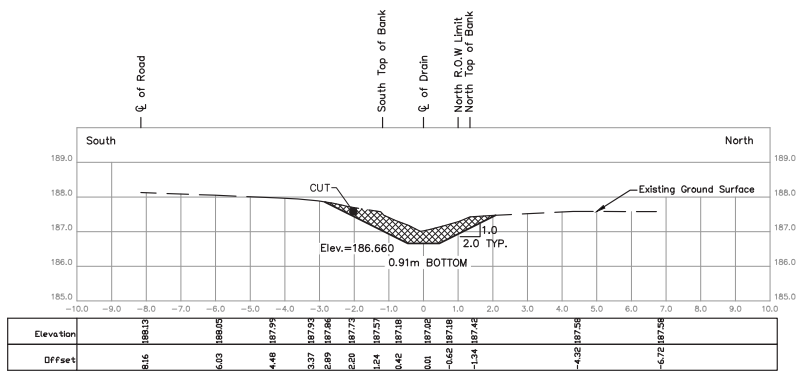
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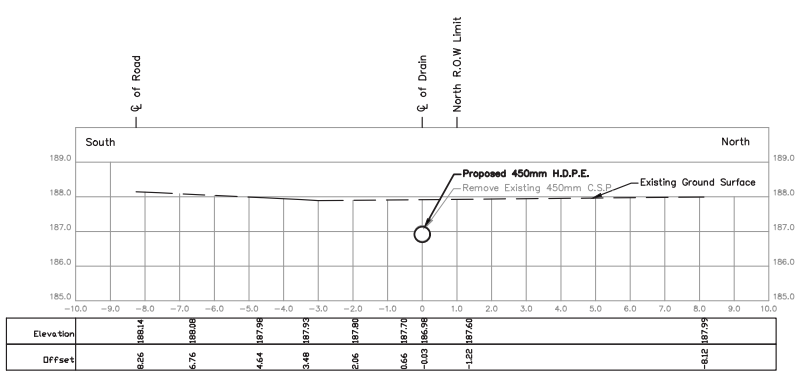
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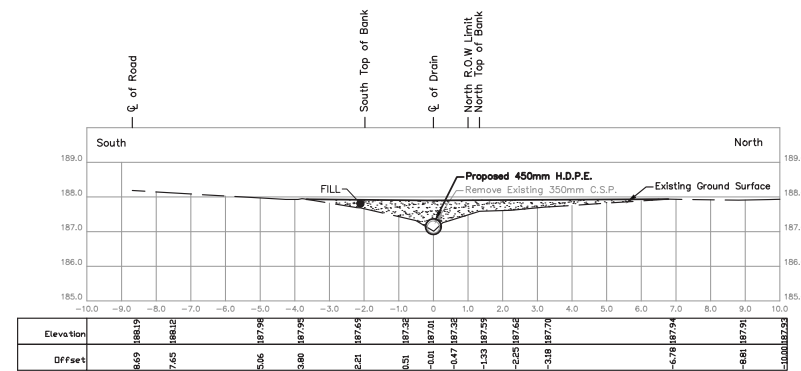
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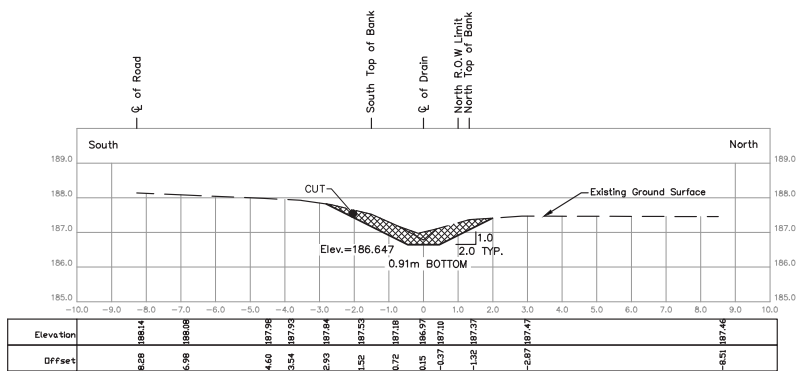
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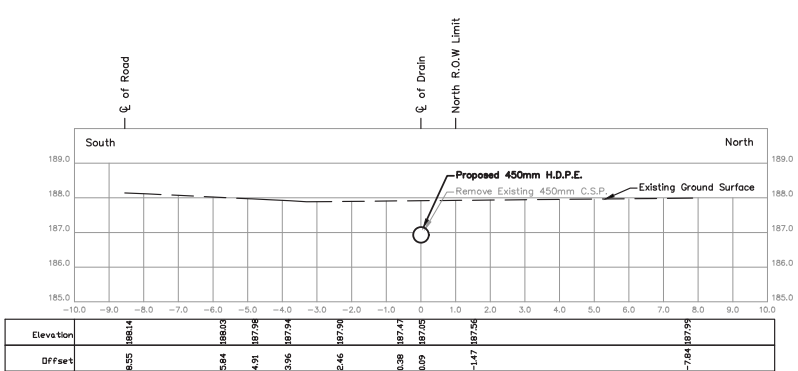
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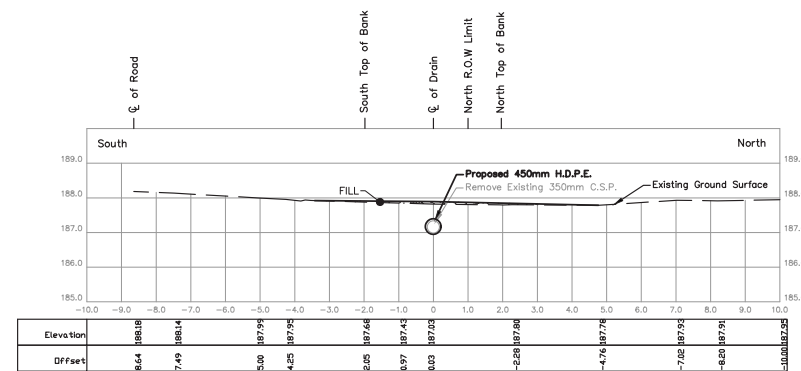
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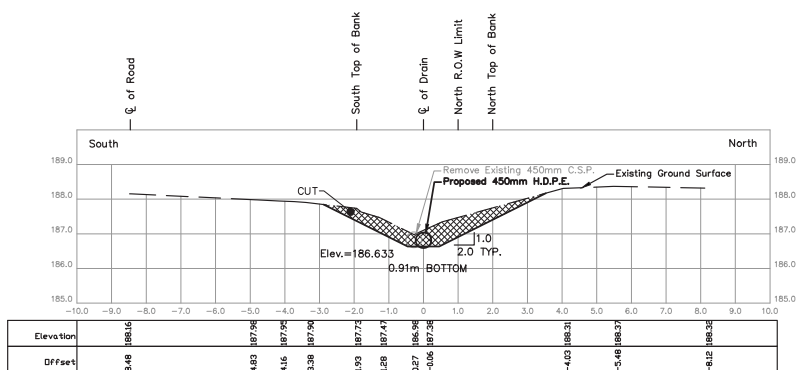
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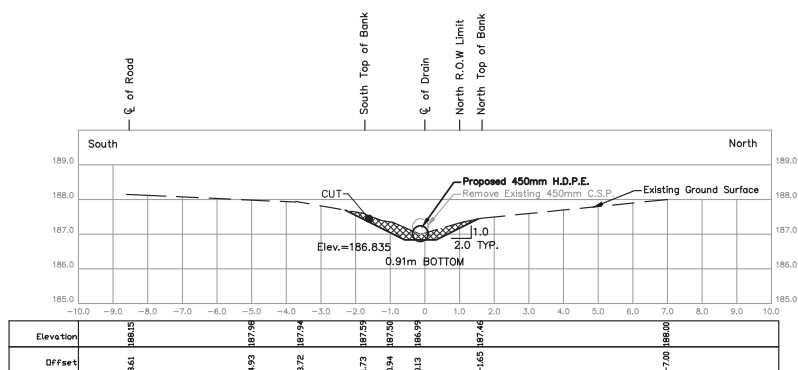
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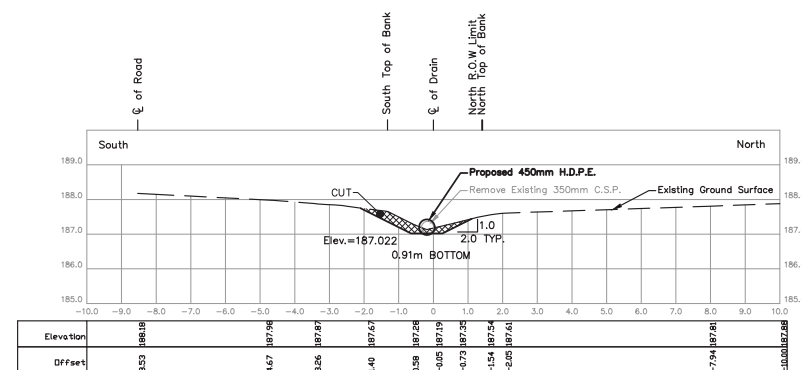
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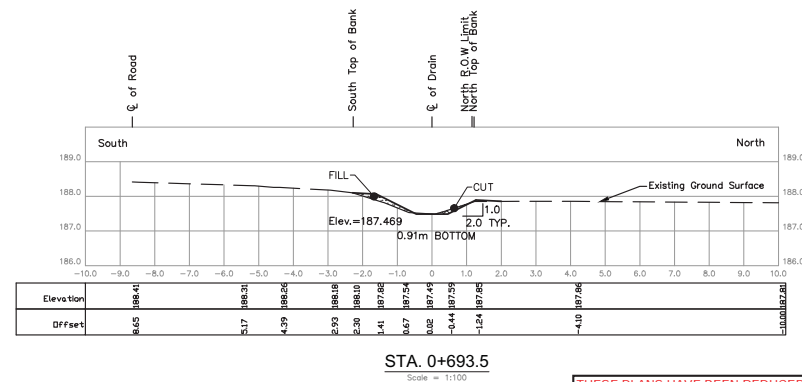
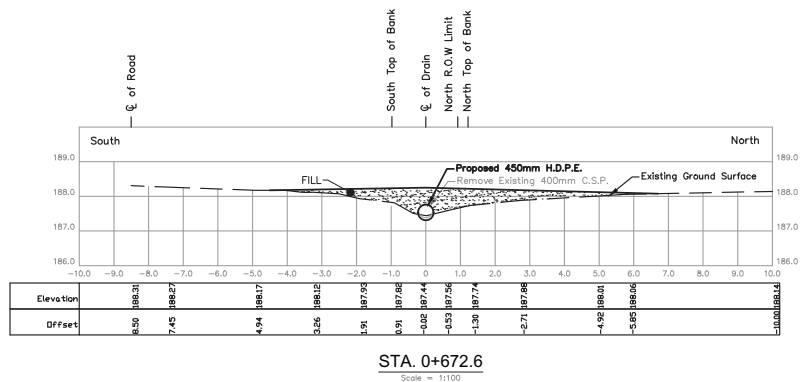
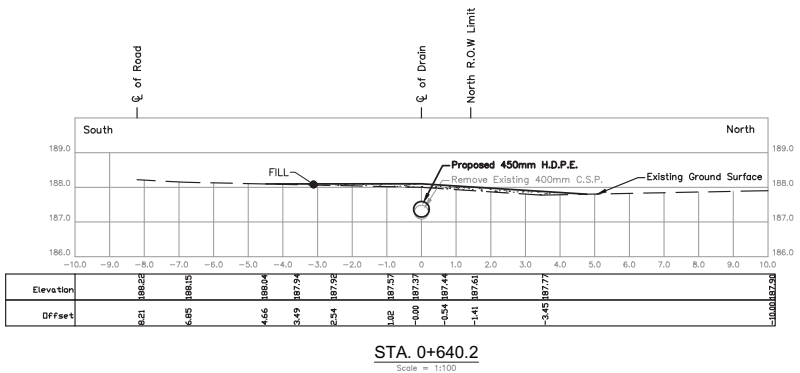
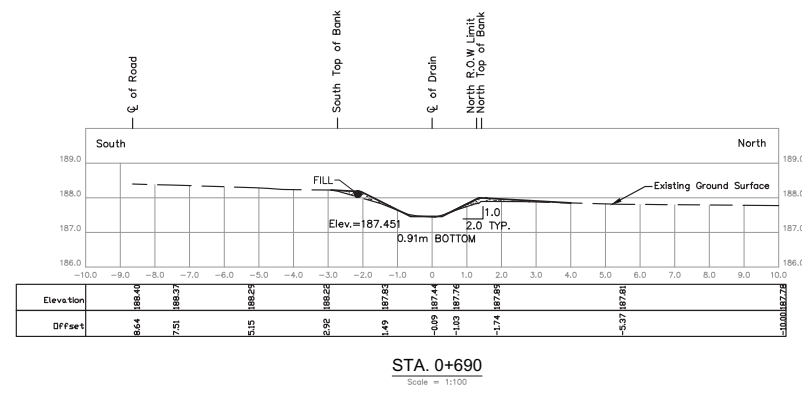
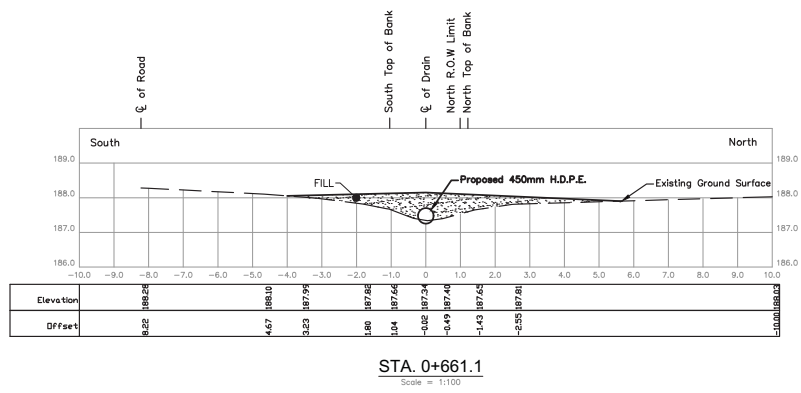
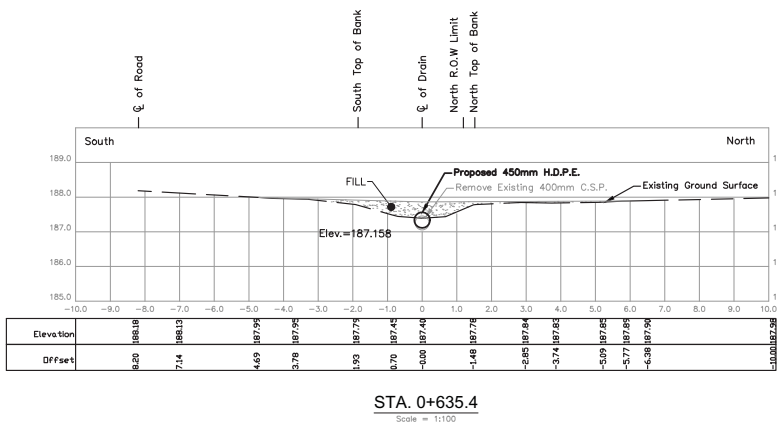
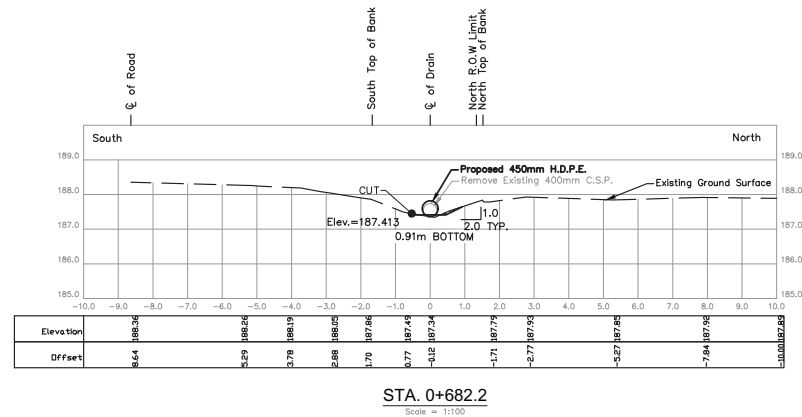
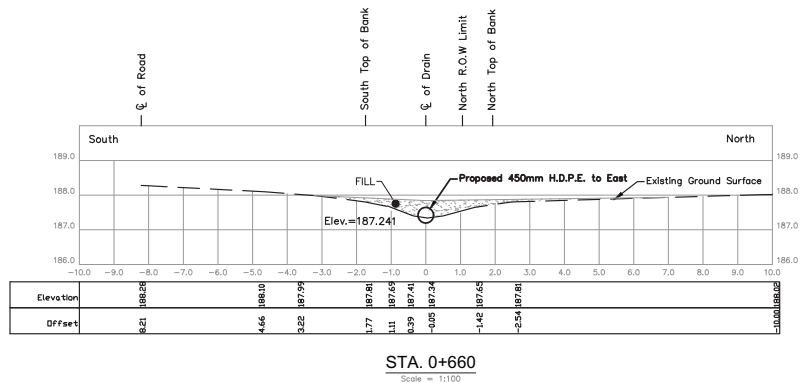
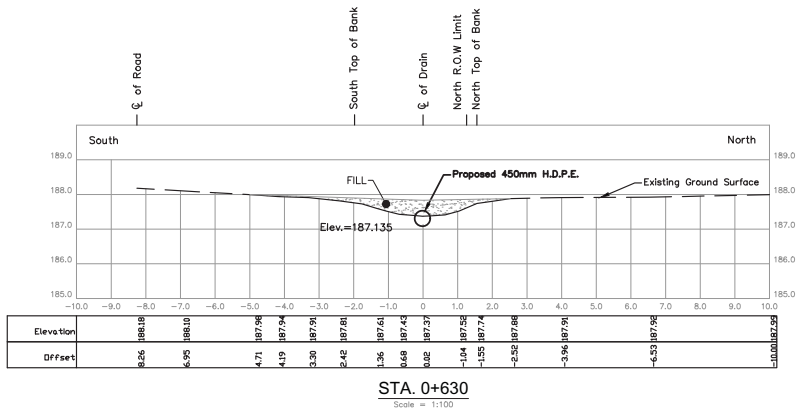
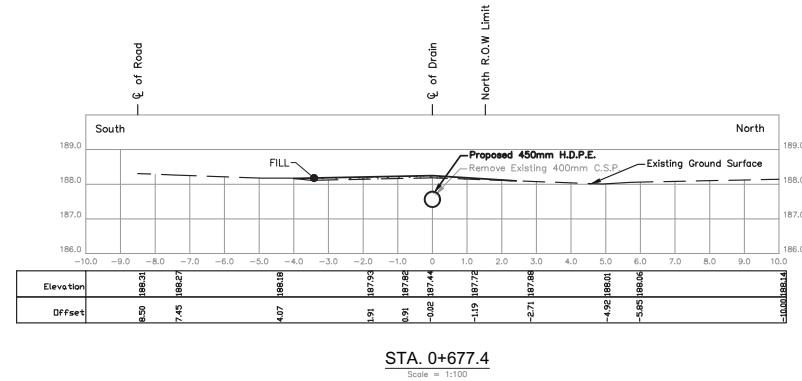
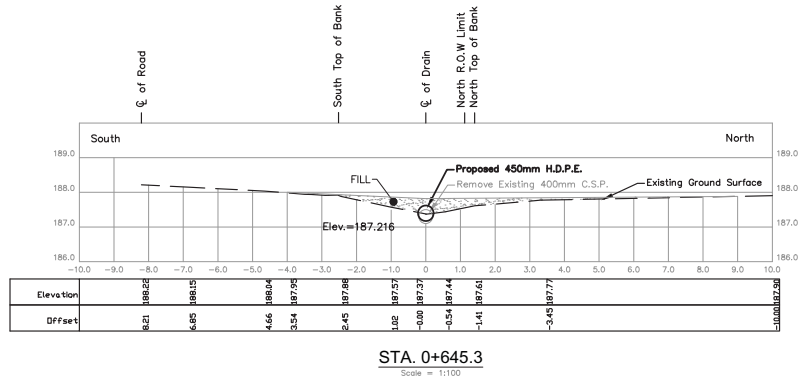
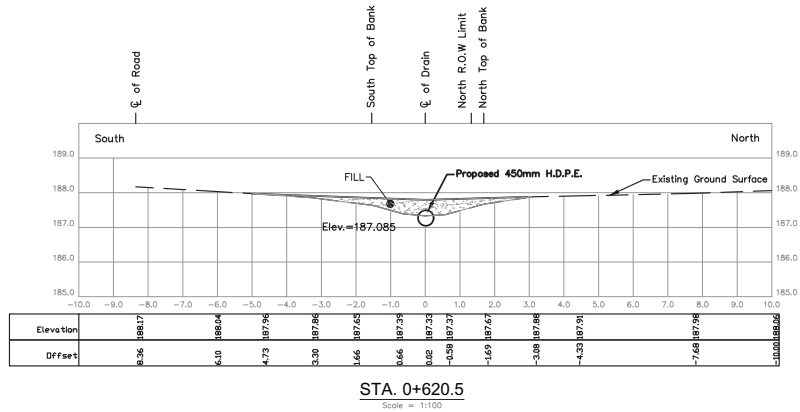


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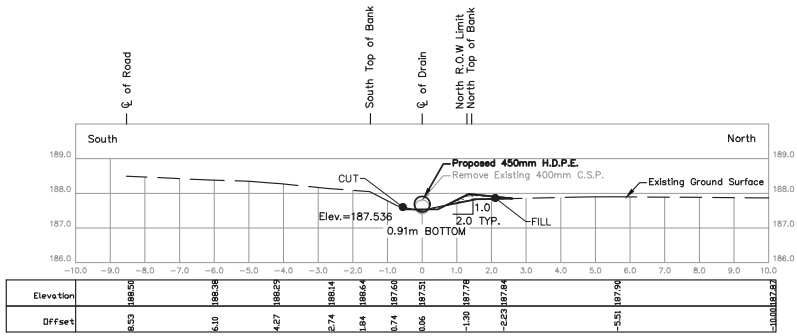


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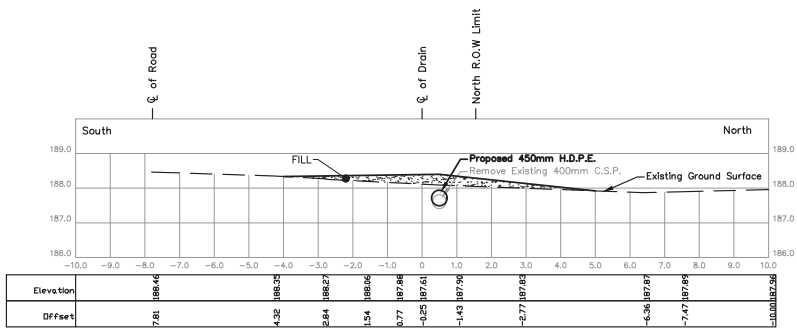
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AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.



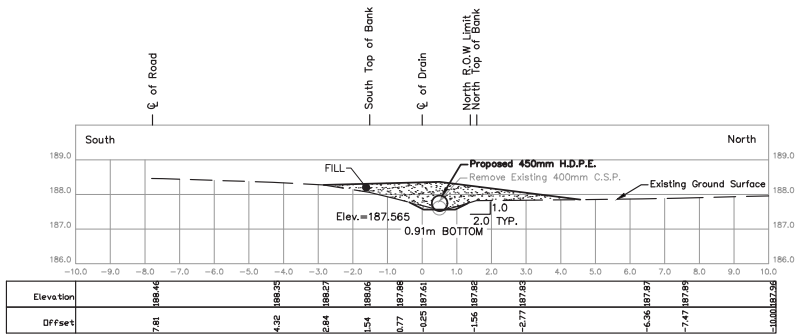
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FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.



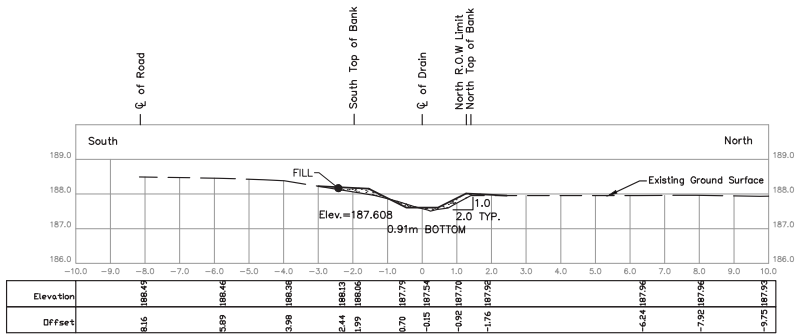
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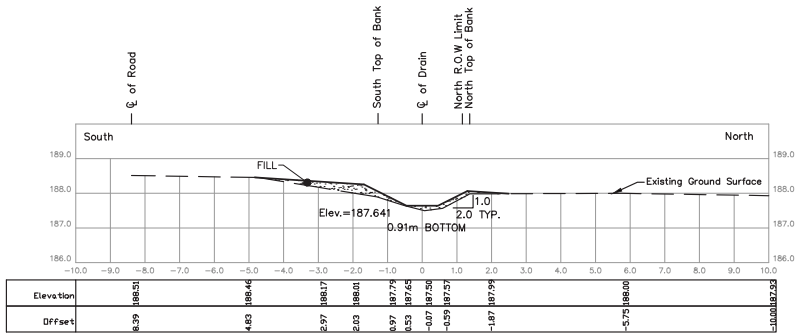
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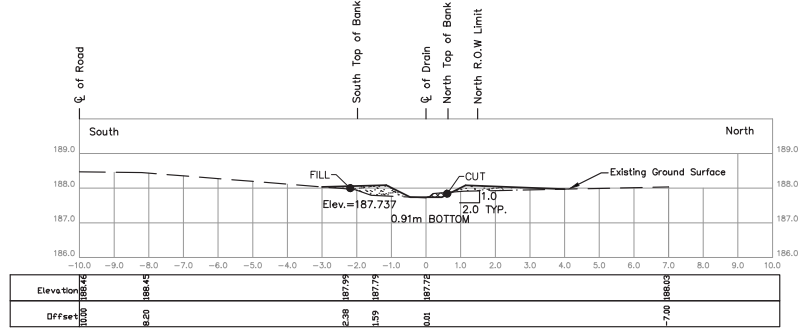
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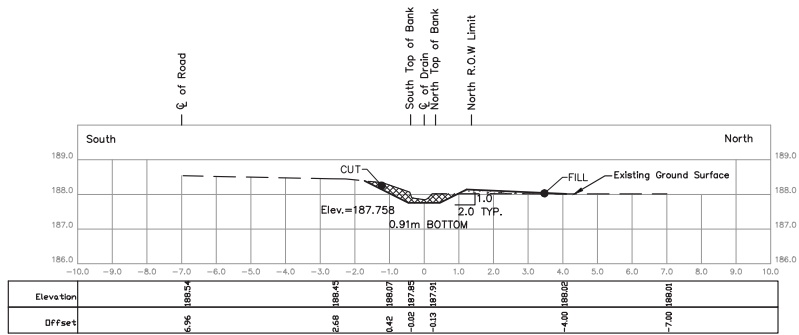
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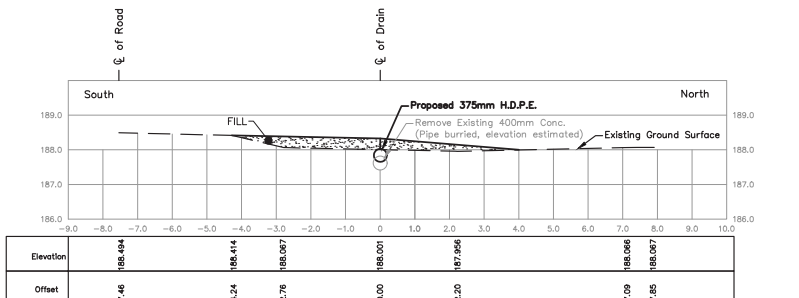
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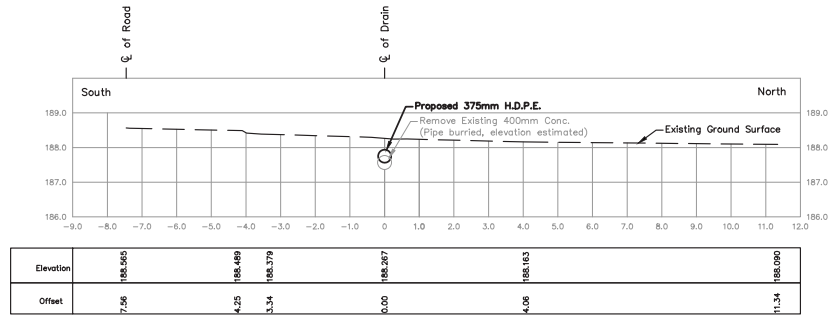
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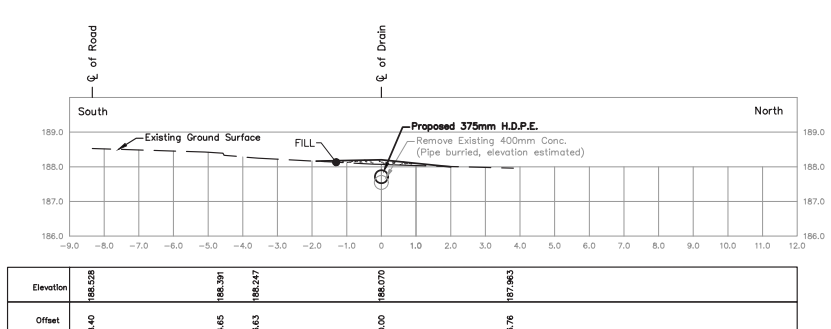
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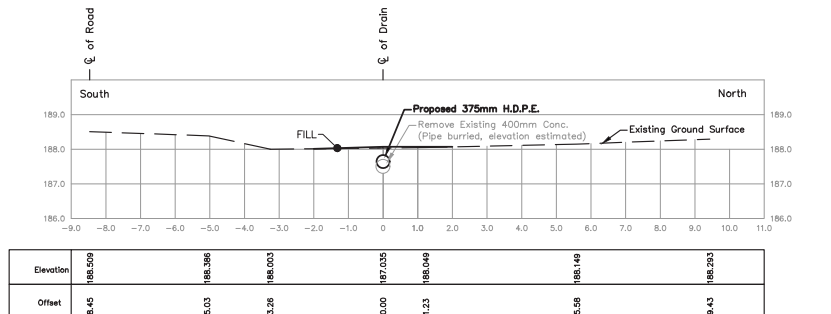
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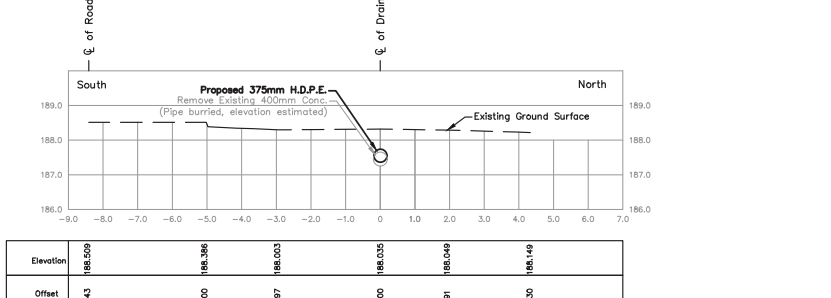
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STA. 0+780.8
Scale = 1:100

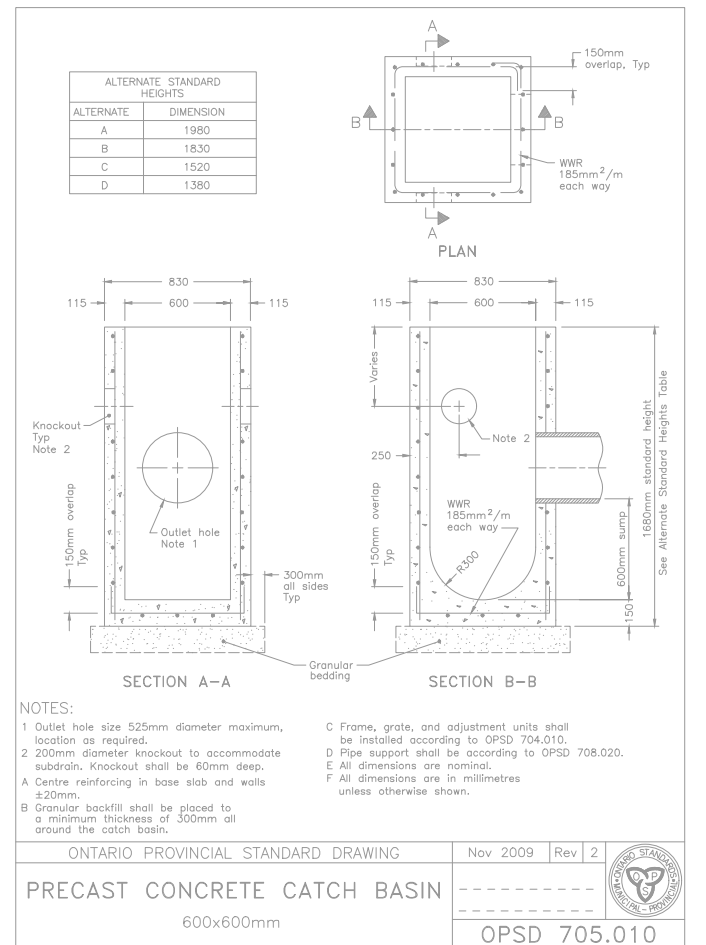
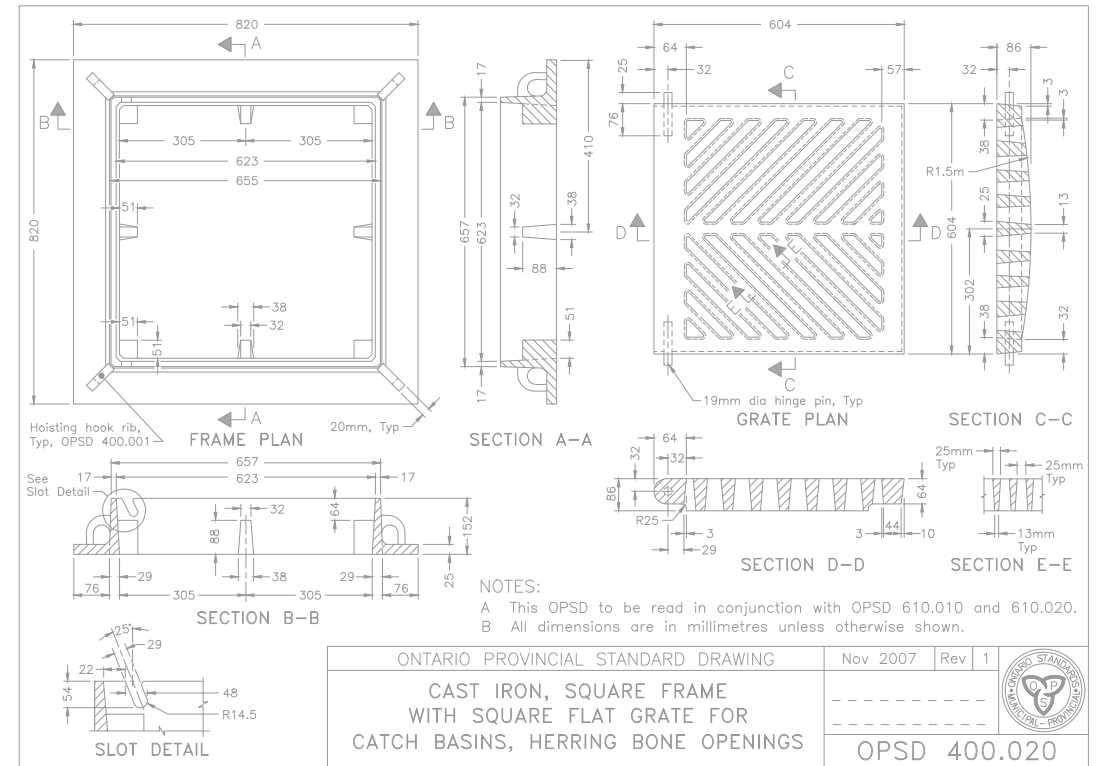
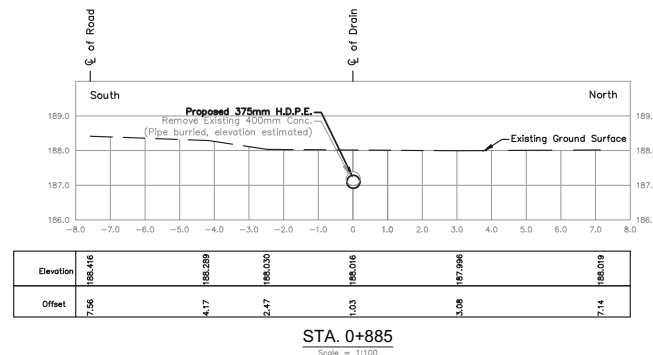
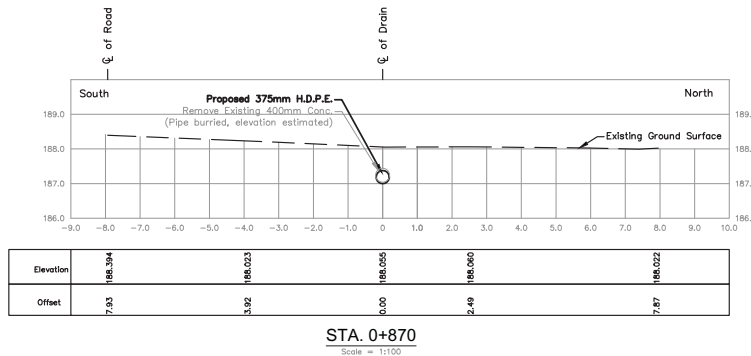
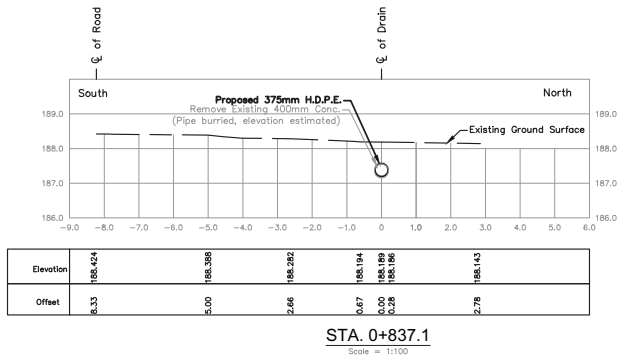
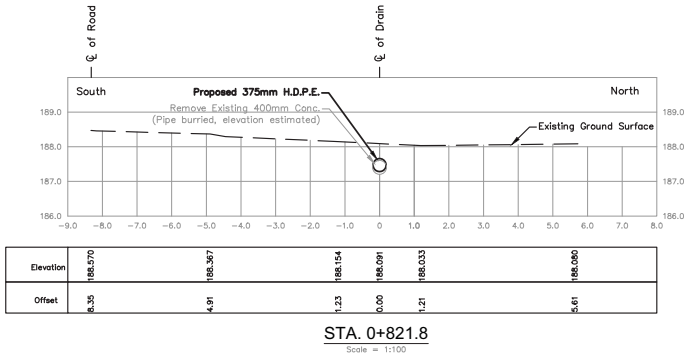


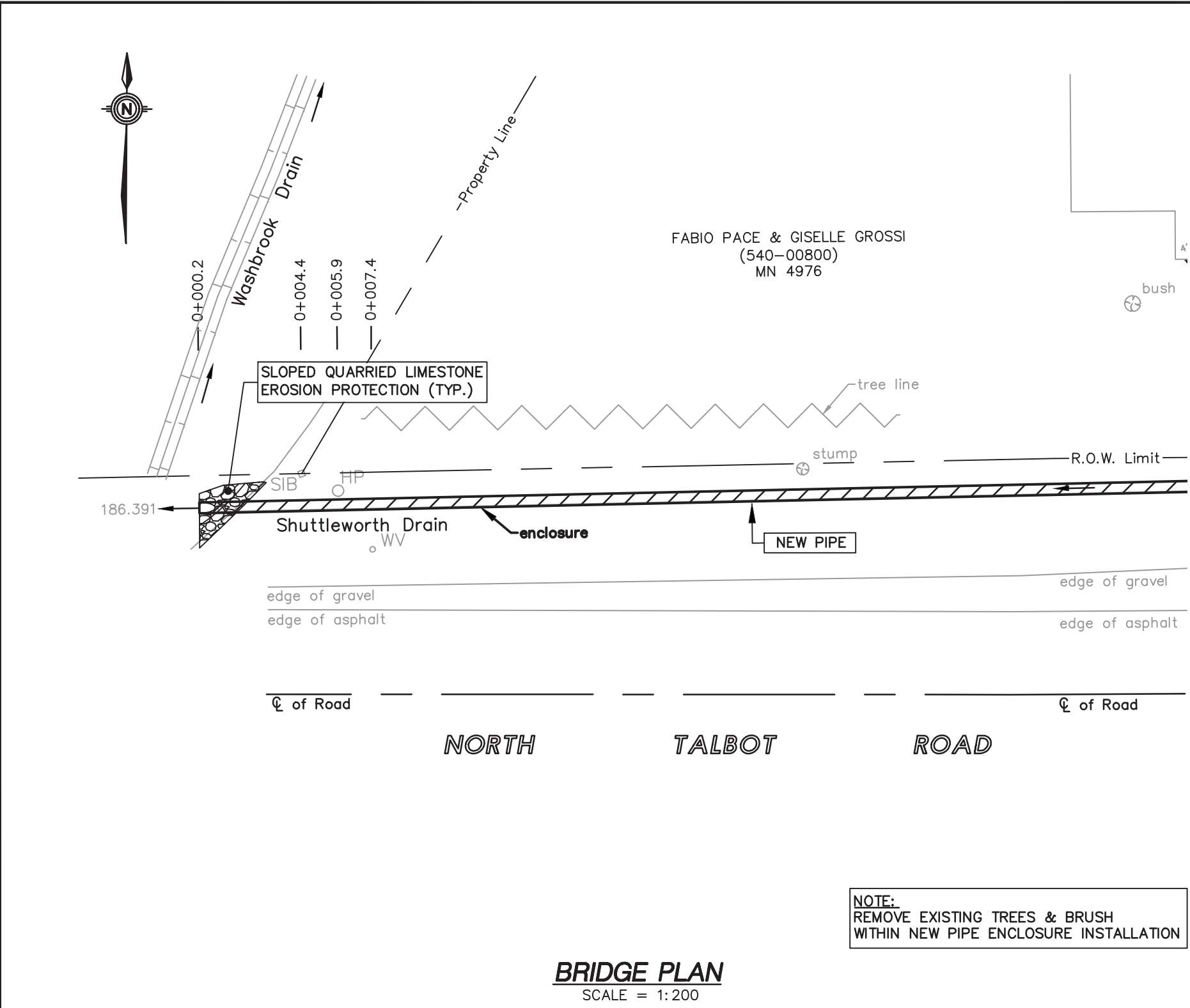
STA. 0+792.6
Scale = 1:100



STA. 0+808.1
Scale = 1:100

THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

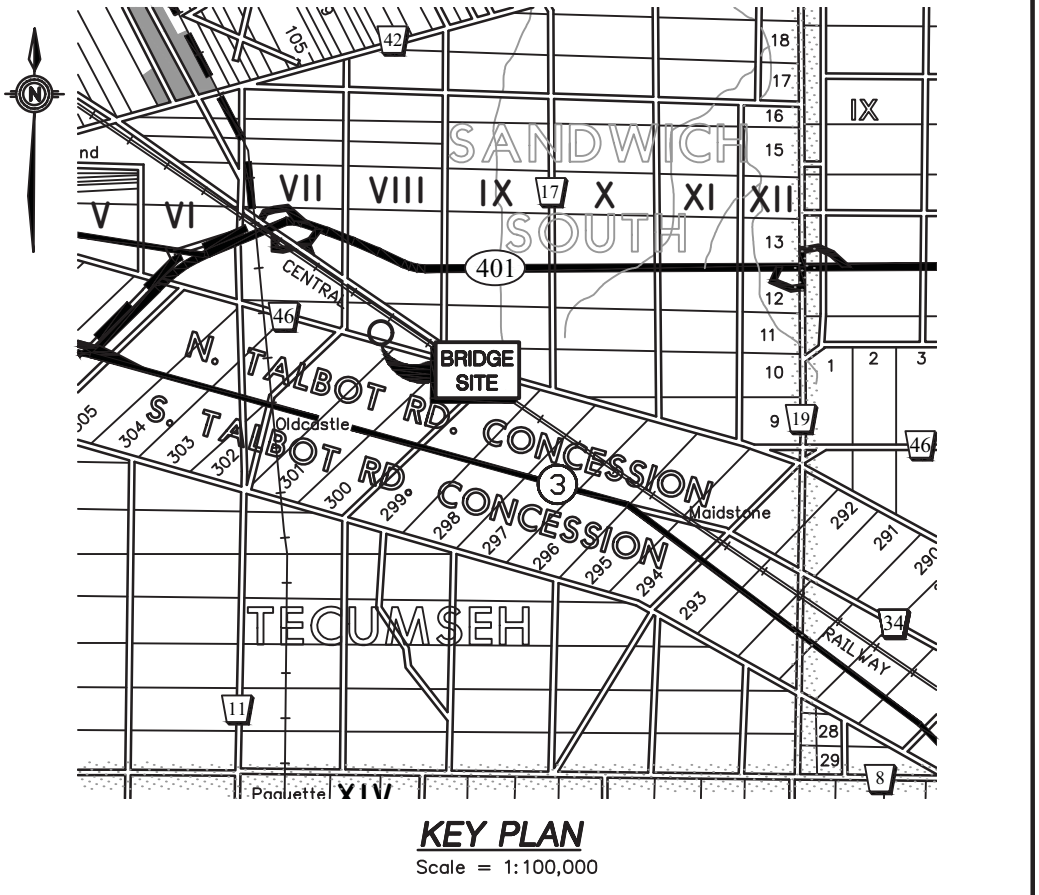
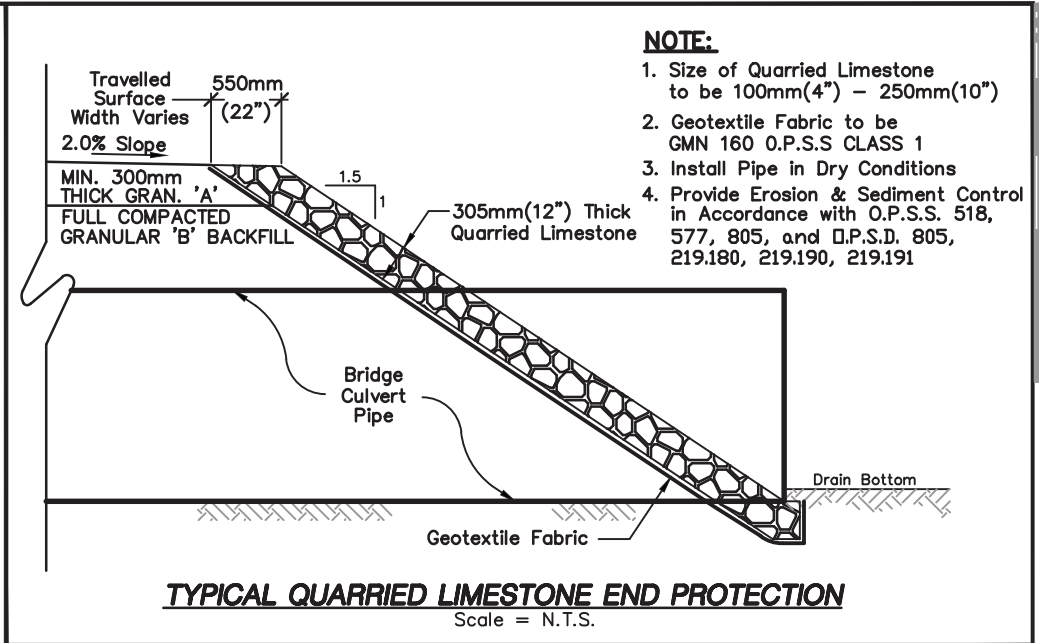




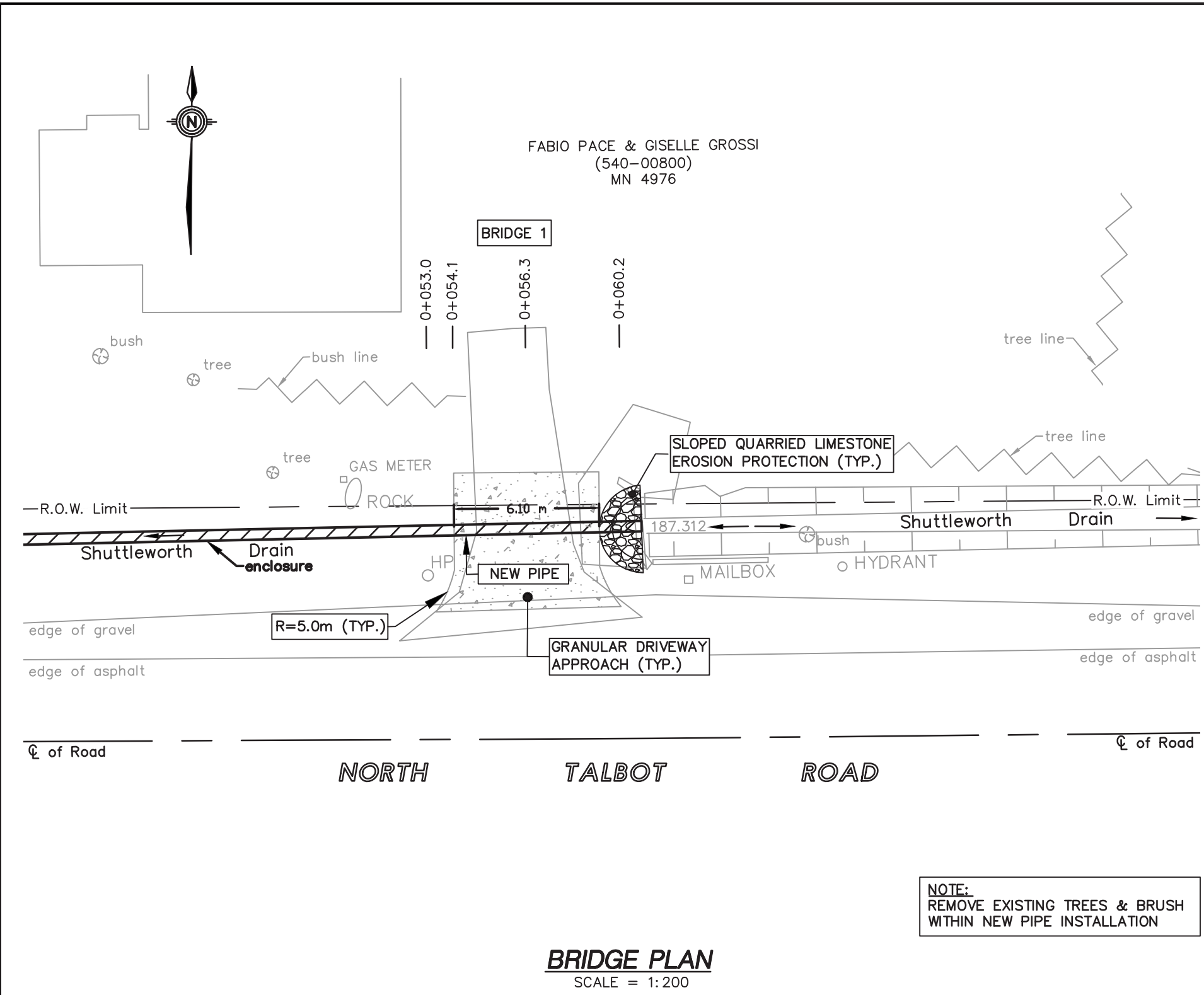
BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES
EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN
5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	60.0m (196.85 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.330m DOWNSTREAM INV. (W) = 187.030m CL TOP OF DRIVEWAY = 188.144m DRAIN GRADE = 0.50%

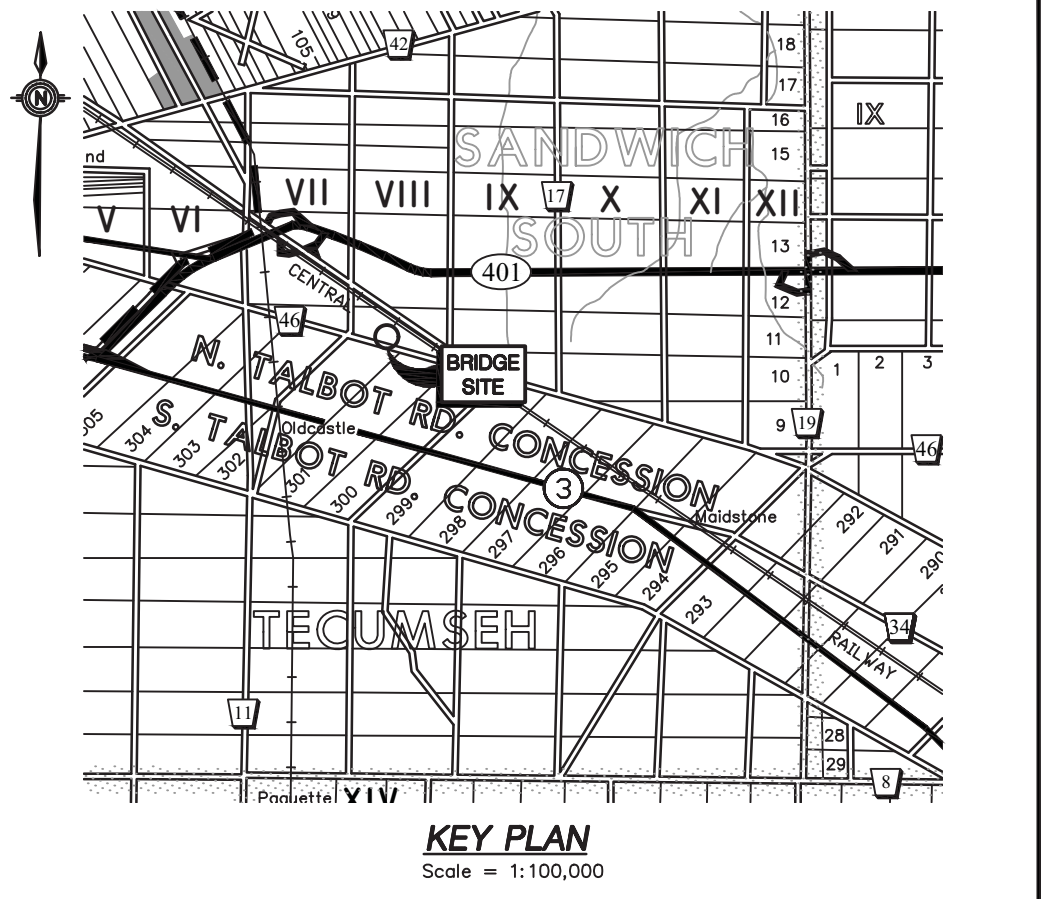
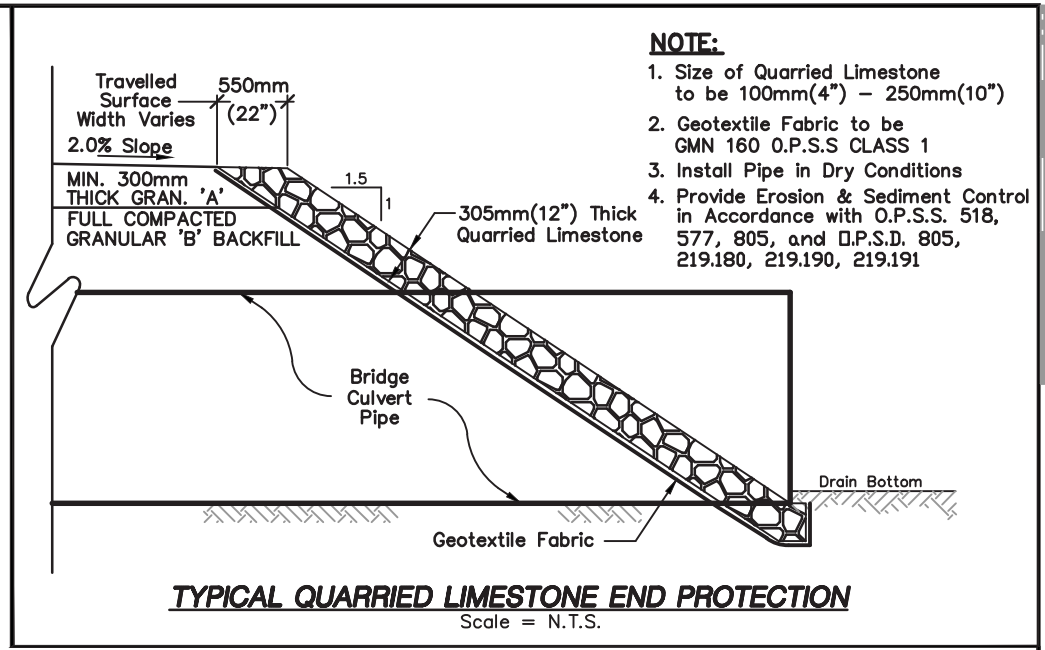
SHUTTLEWORTH DRAIN
BRIDGE WEST PORTION FOR FABIO PACE & GISELLE GROSSI (540-00800)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



ROOD ENGINEERING INC. CONSULTING ENGINEERS Leamington, Ontario 519-322-1621		
FILE No.: 2017D020	DRAWN BY: K.D. PLOT CODE: 1:1 FILE: REI2017D020.DWG	DATE: 2022-03-21
APPENDIX 'E' 1 OF 17		



BRIDGE PLAN
SCALE = 1:200



KEY PLAN
Scale = 1:100,000

BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN 5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	60.0m (196.85 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.330m DOWNSTREAM INV. (W) = 187.030m ℄ TOP OF DRIVEWAY = 188.144m DRAIN GRADE = 0.50%

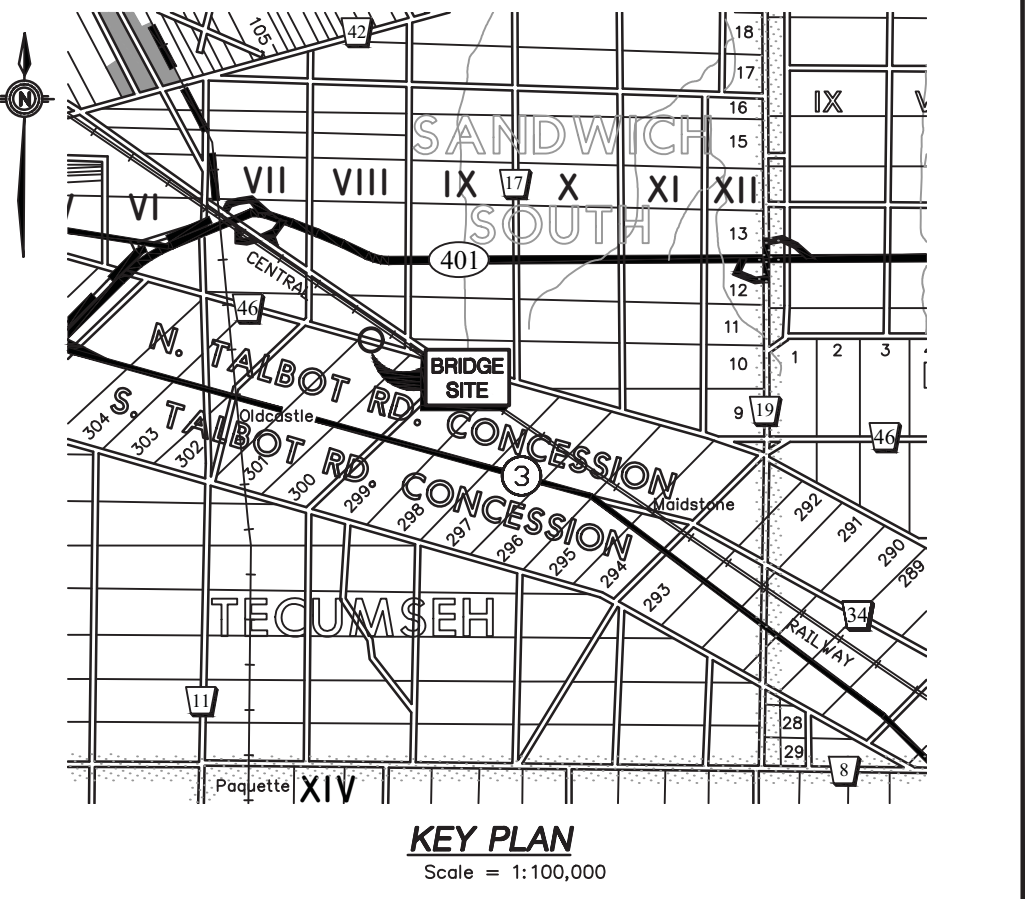
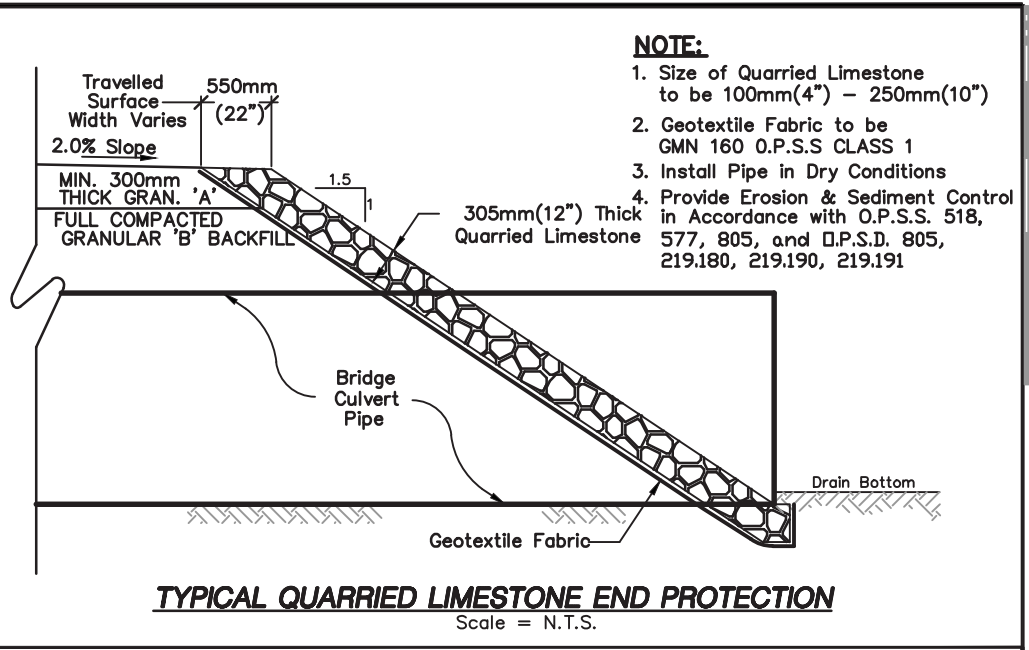
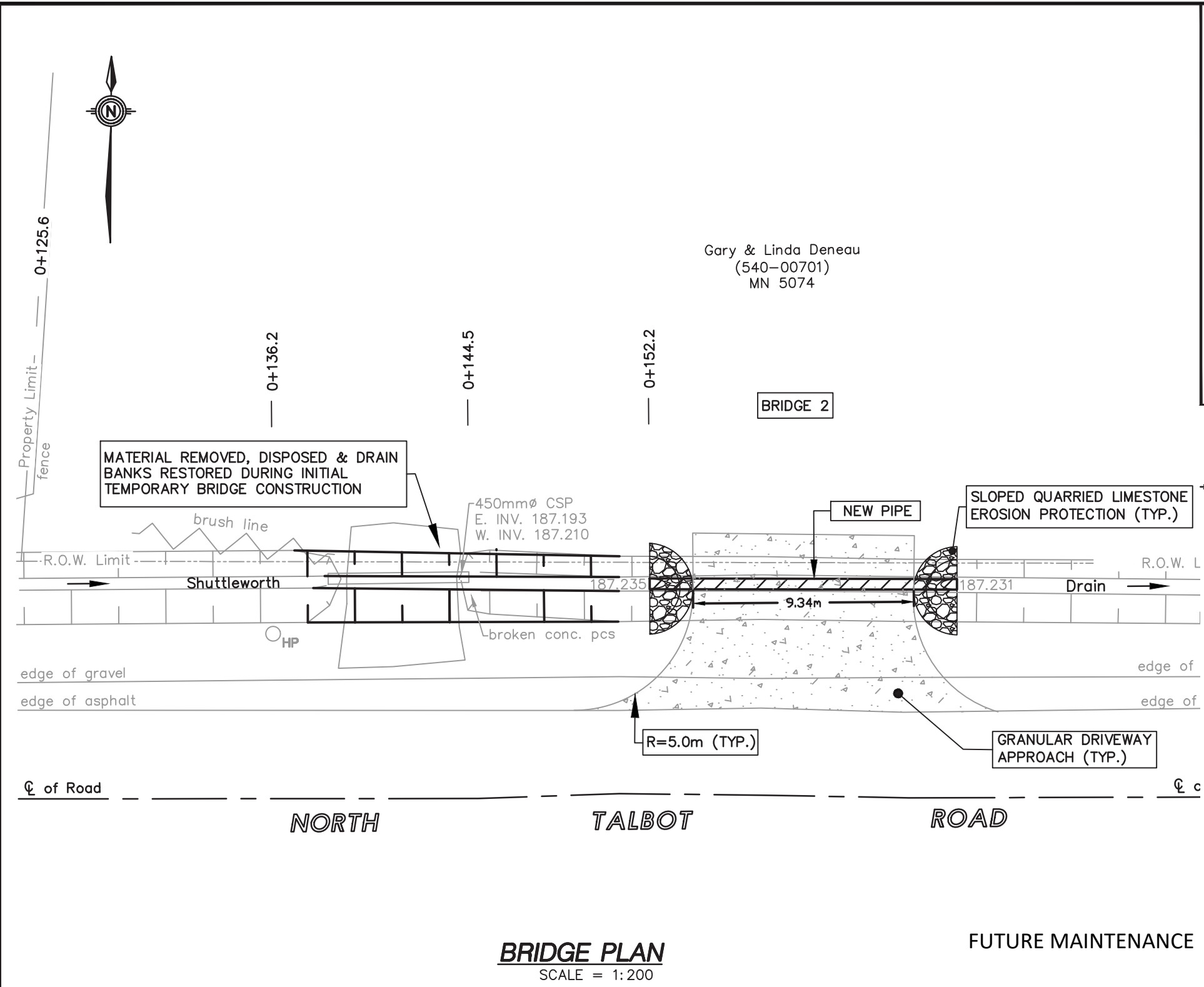
SHUTTLEWORTH DRAIN
BRIDGE EAST PORTION FOR FABIO PACE & GISELLE GROSSI (540-00800)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: 2022-03-21

FILE No.: 2017D020	DRAWN BY: K.D. PLOT CODE: 1:1 FILE: REI2017D020.DWG	APPENDIX 'E' 2 OF 17
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BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN 5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmØ	13.0m (42.65 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.190m DOWNSTREAM INV. (E) = 187.170m ℄ TOP OF DRIVEWAY = 188.020m DRAIN GRADE = 0.16%

SHUTTLEWORTH DRAIN
BRIDGE FOR GARY & LINDA DENEAU (540-00701)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

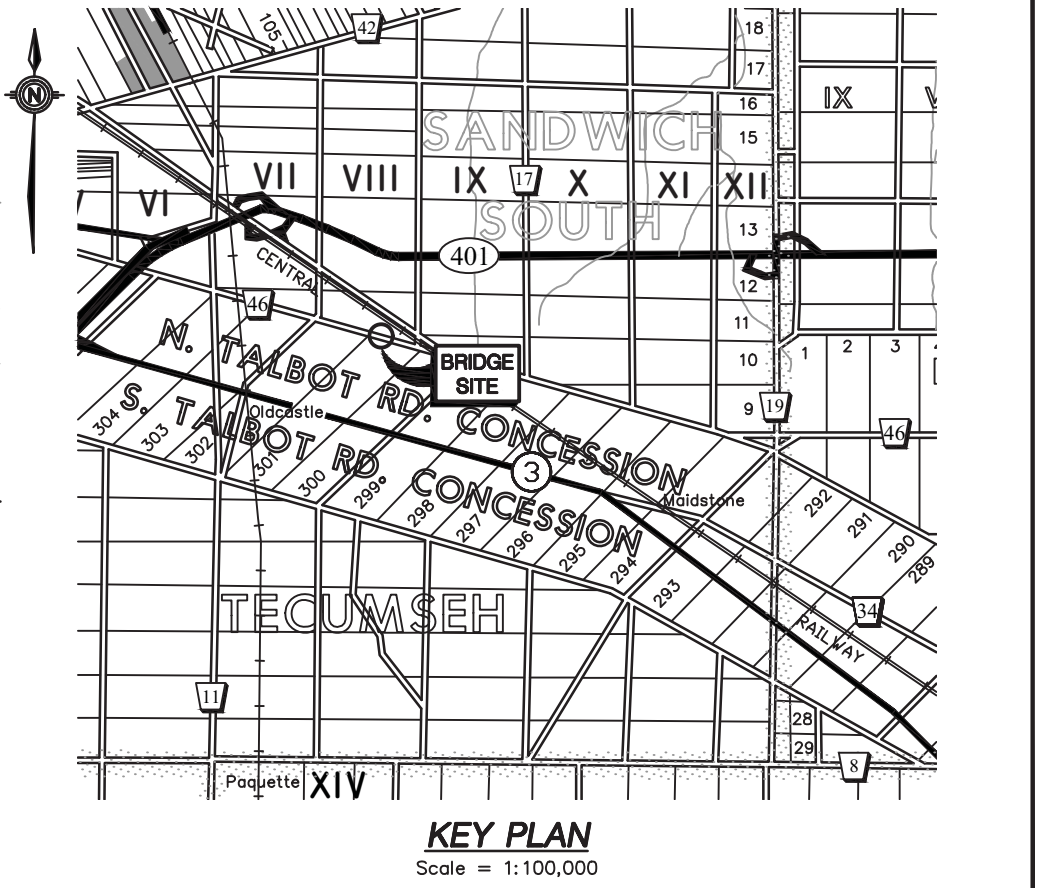
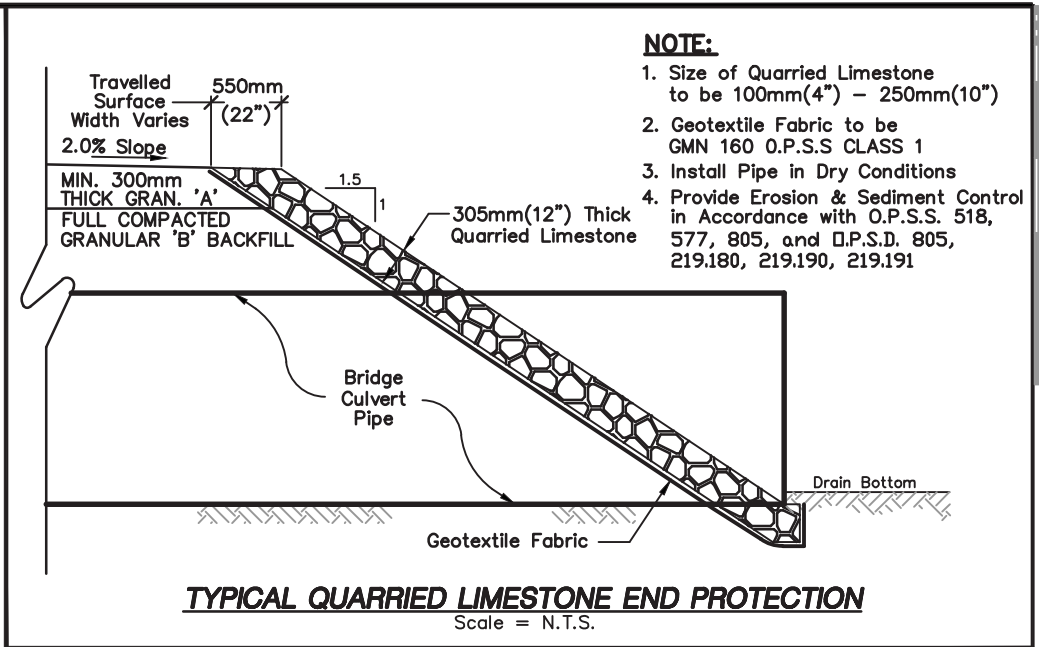
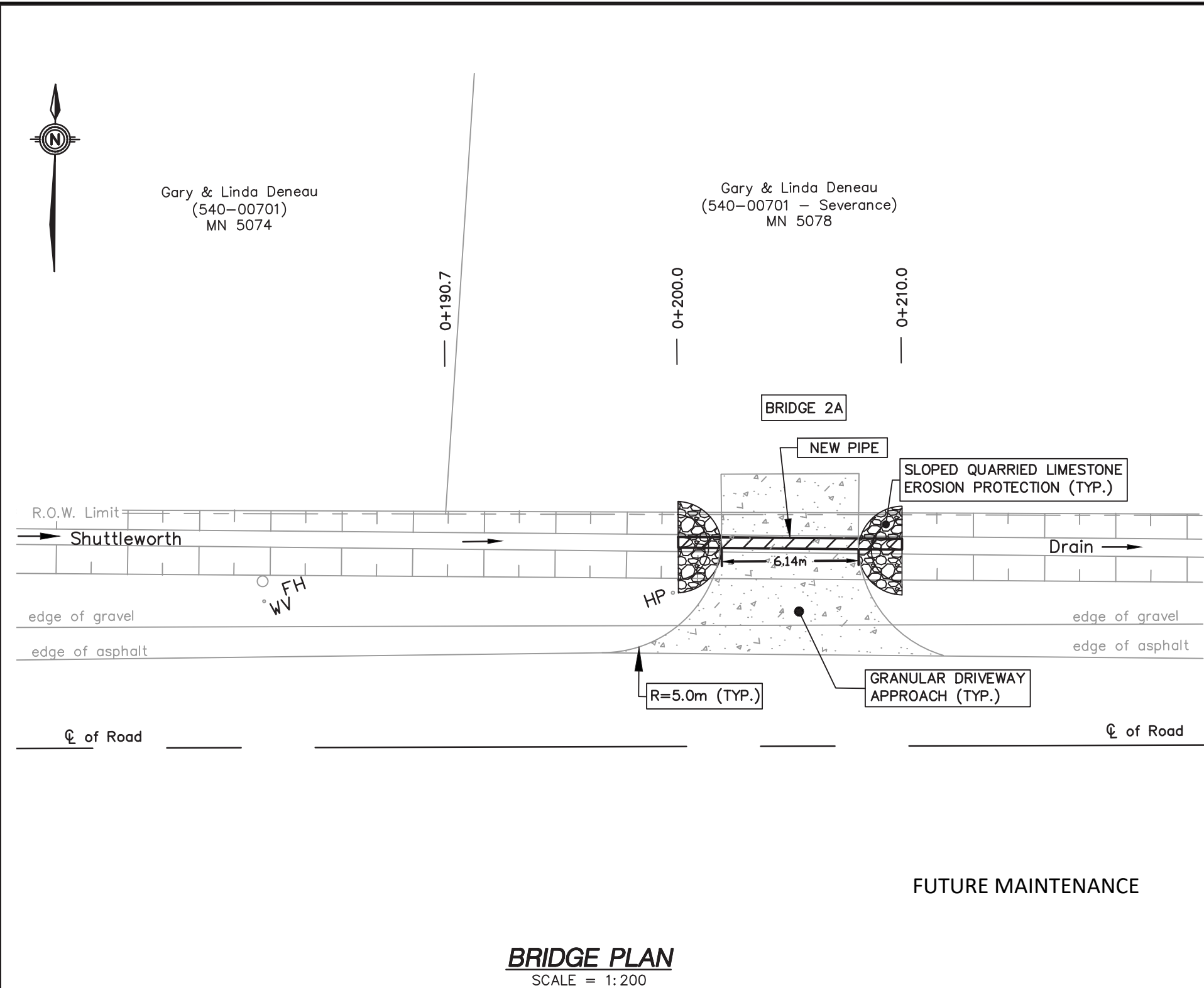
ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

FILE No.: **2017D020**

DRAWN BY: K.S.
PLOT CODE: 1:1
FILE: REI2017D020.DWG

DATE: 2022-03-21

APPENDIX 'E'
3 OF 17



BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES
EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN
5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	10.0m (32.8 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.115m DOWNSTREAM INV. (E) = 187.099m CL TOP OF DRIVEWAY = 188.020m DRAIN GRADE = 0.16%

SHUTTLEWORTH DRAIN
BRIDGE FOR GARY & LINDA DENEAU (540-00701 - SEVERANCE)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

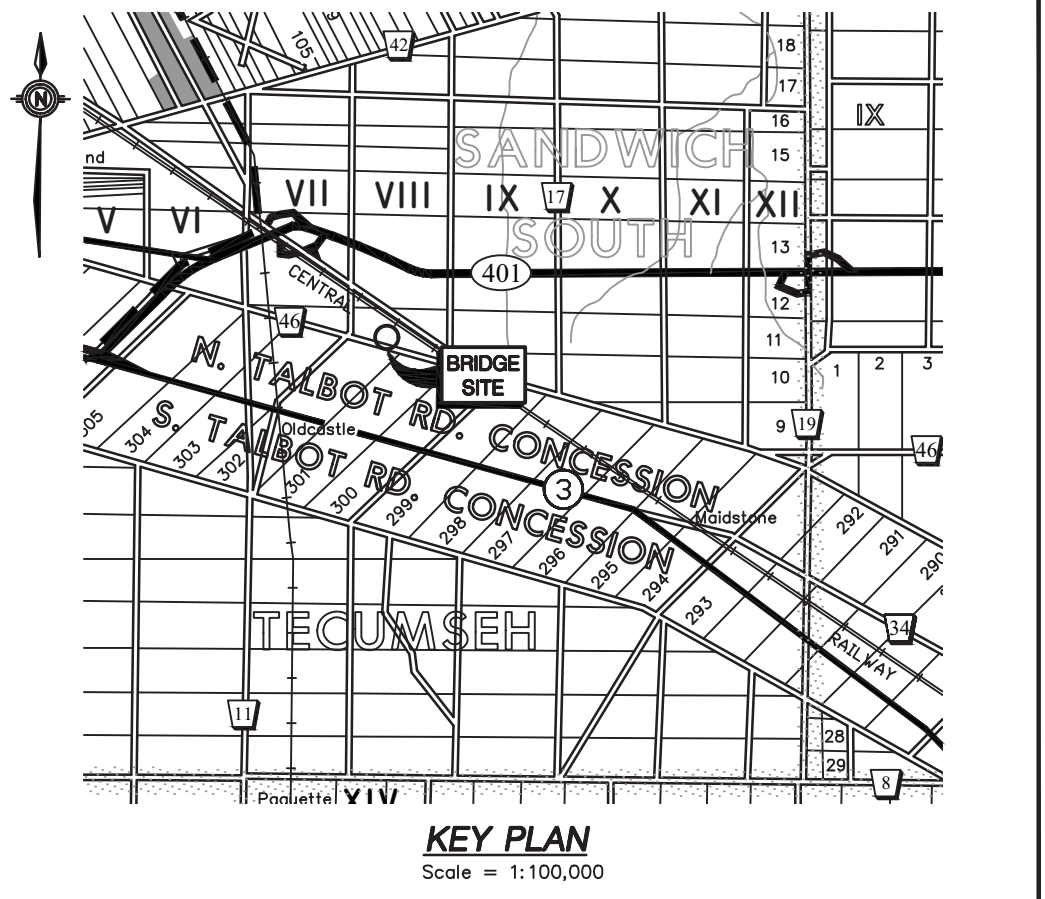
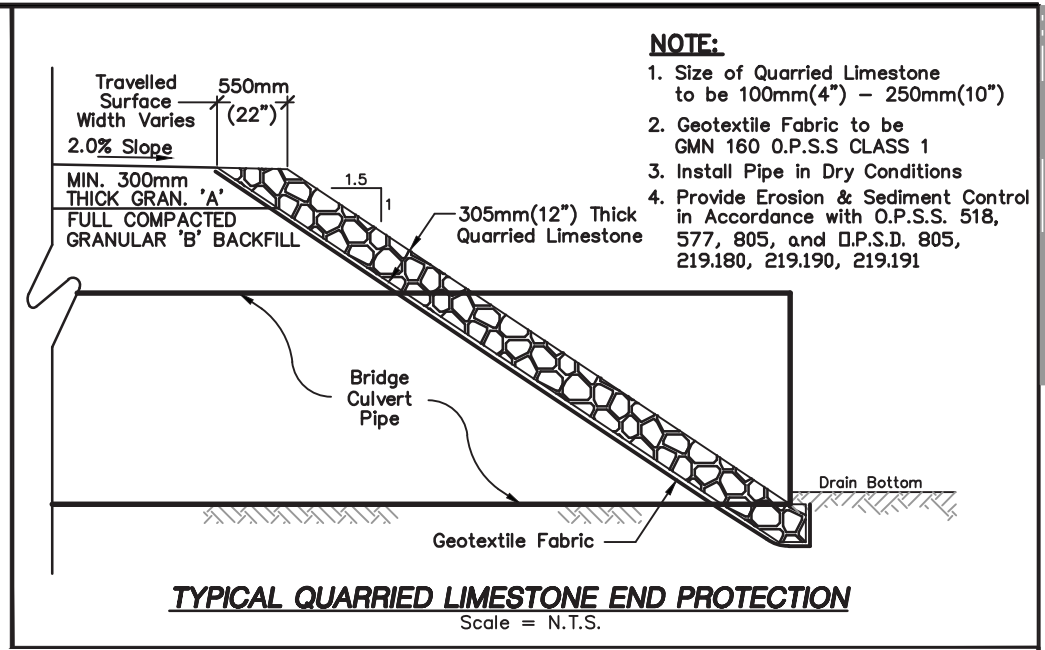
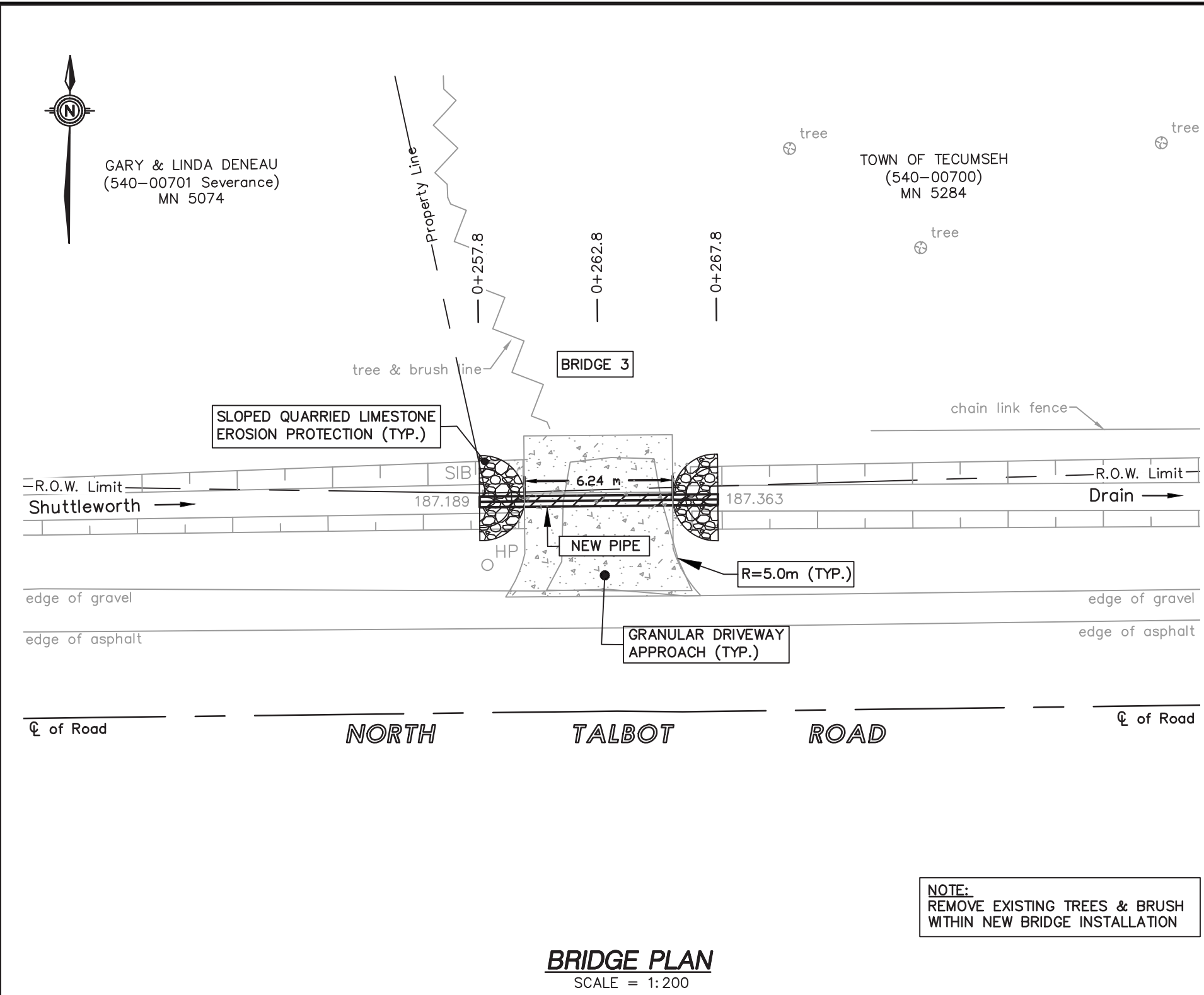
ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

FILE No.: **2017D020**

DRAWN BY: K.S. & G.R.
PLOT CODE: 1:1
FILE: REI2017D020.DWG

DATE: 2022-03-21

APPENDIX 'E'
4 OF 17



BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN 5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	10.0m (32.80 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.020m DOWNSTREAM INV. (E) = 187.004m CL TOP OF DRIVEWAY = 187.891m DRAIN GRADE = 0.16%

SHUTTLEWORTH DRAIN
BRIDGE FOR TOWN OF TECUMSEH (540-00700) (WEST ENTRANCE)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

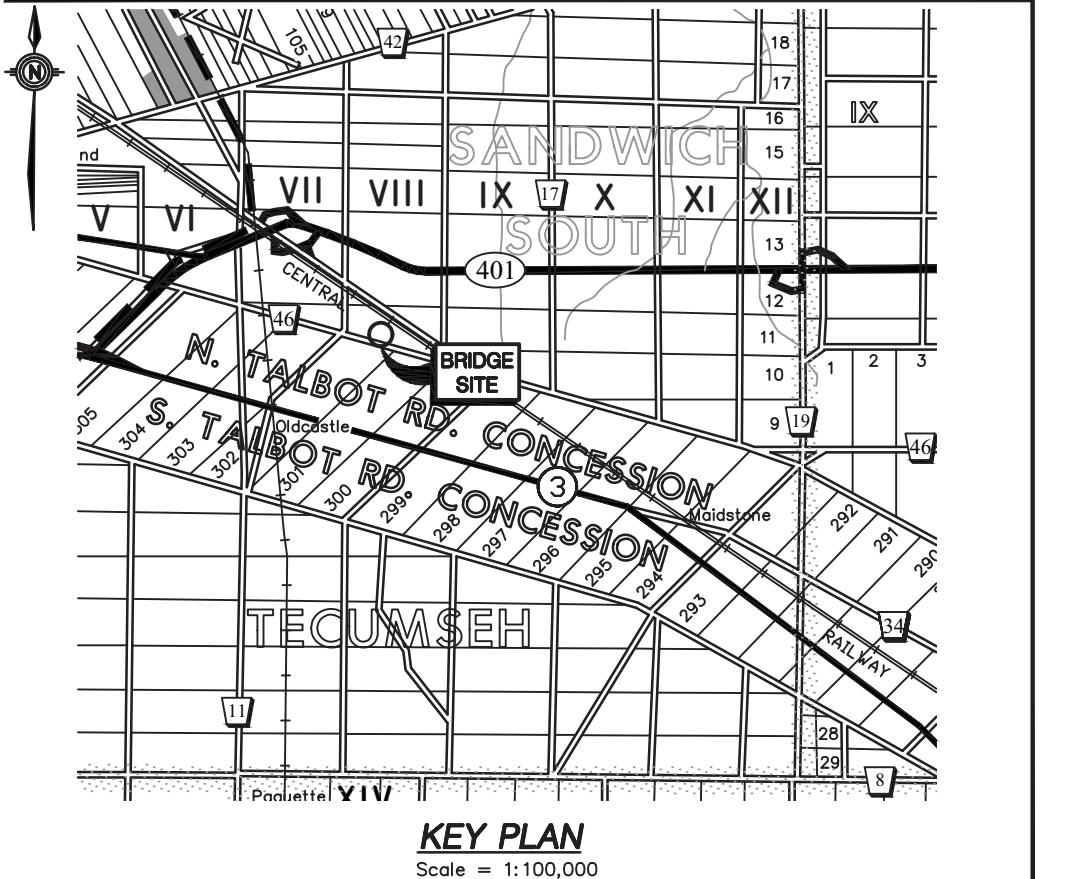
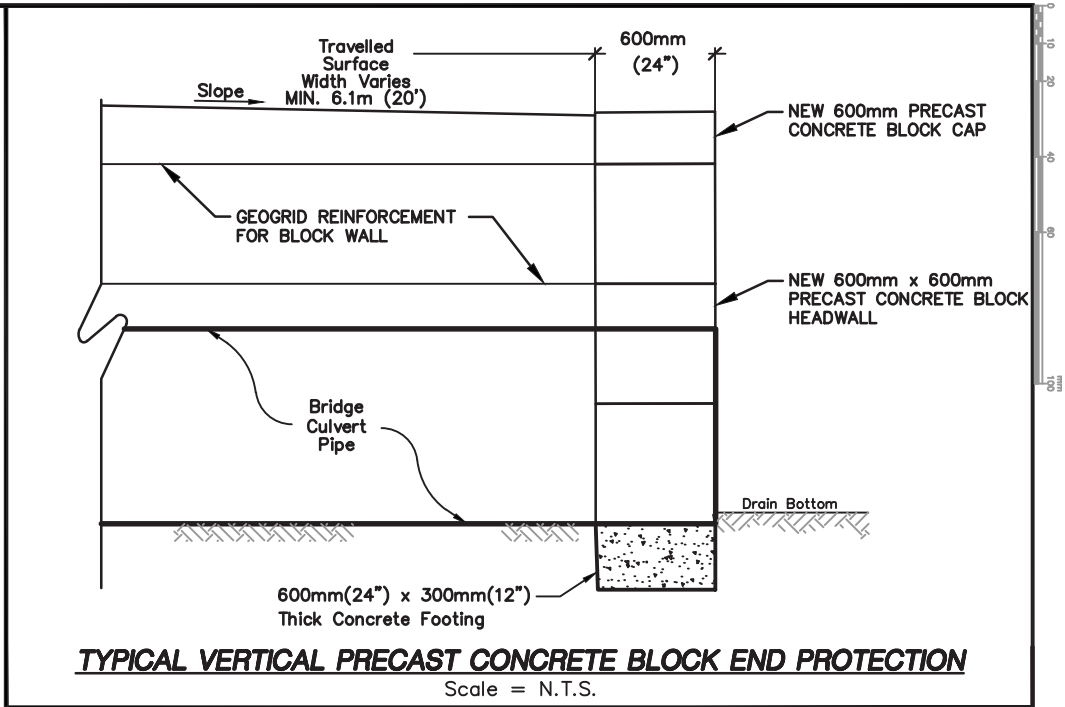
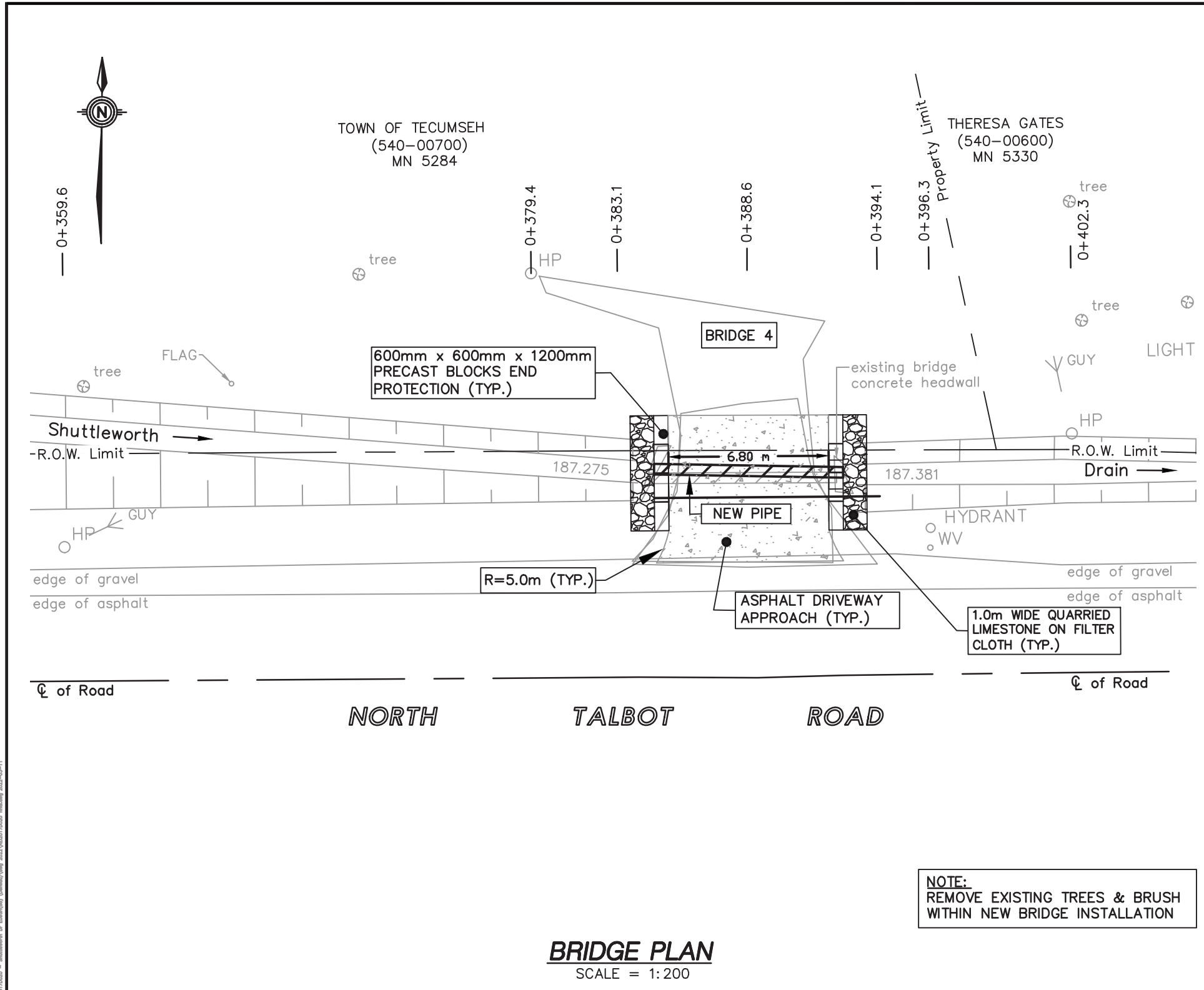
ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

FILE No.: **2017D020**

DRAWN BY: K.D.
PLOT CODE: 1:1
FILE: REI2017D020.DWG

DATE: 2022-03-21

APPENDIX 'E'
5 OF 17



BENCHMARK:
TOP NUT OF FIRE HYDRANT LOCATED APPROX. 17.5 METRES
EAST OF THE EAST END OF PROPOSED BRIDGE FRONTING MN
5074 ON THE NORTH SIDE OF NORTH TALBOT ROAD **ELEV. = 188.722m**

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	8.0m (26.25 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 186.816m DOWNSTREAM INV. (E) = 186.804m CL TOP OF DRIVEWAY = 187.983m DRAIN GRADE = 0.16%

SHUTTLEWORTH DRAIN
BRIDGE FOR TOWN OF TECUMSEH (540-00700) (EAST ENTRANCE)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

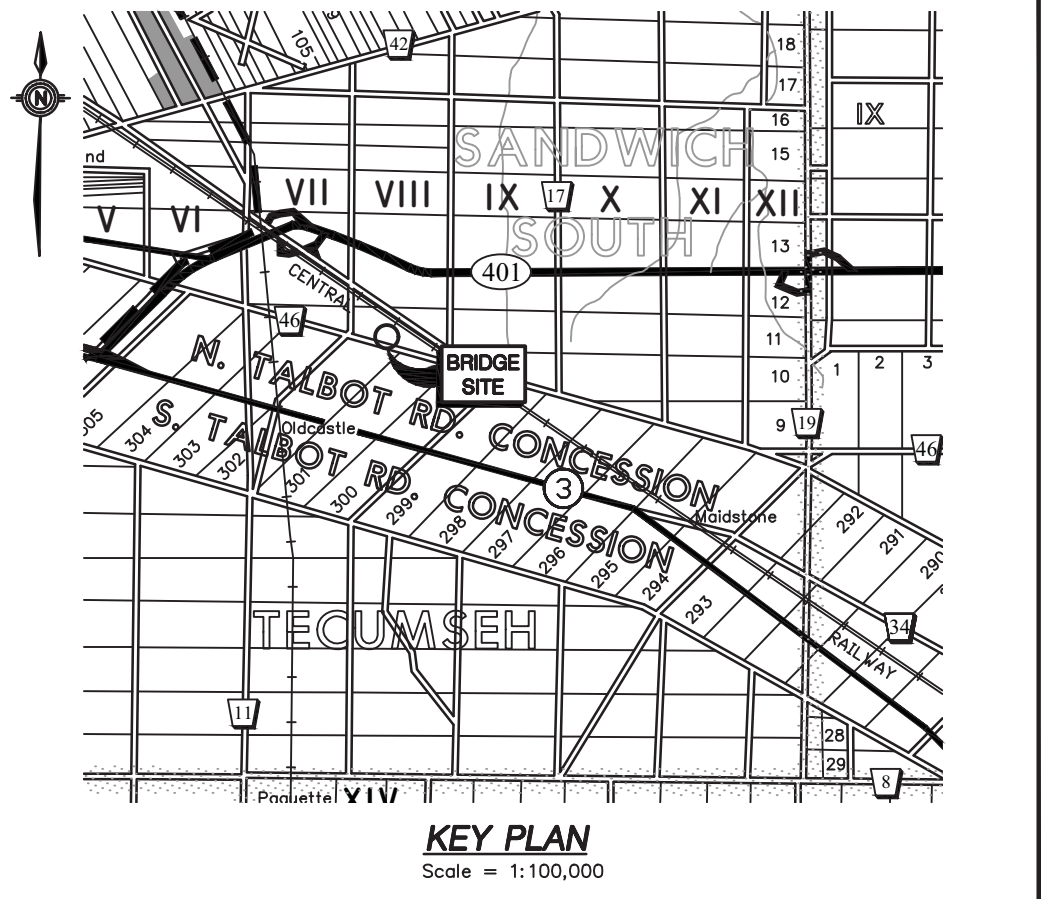
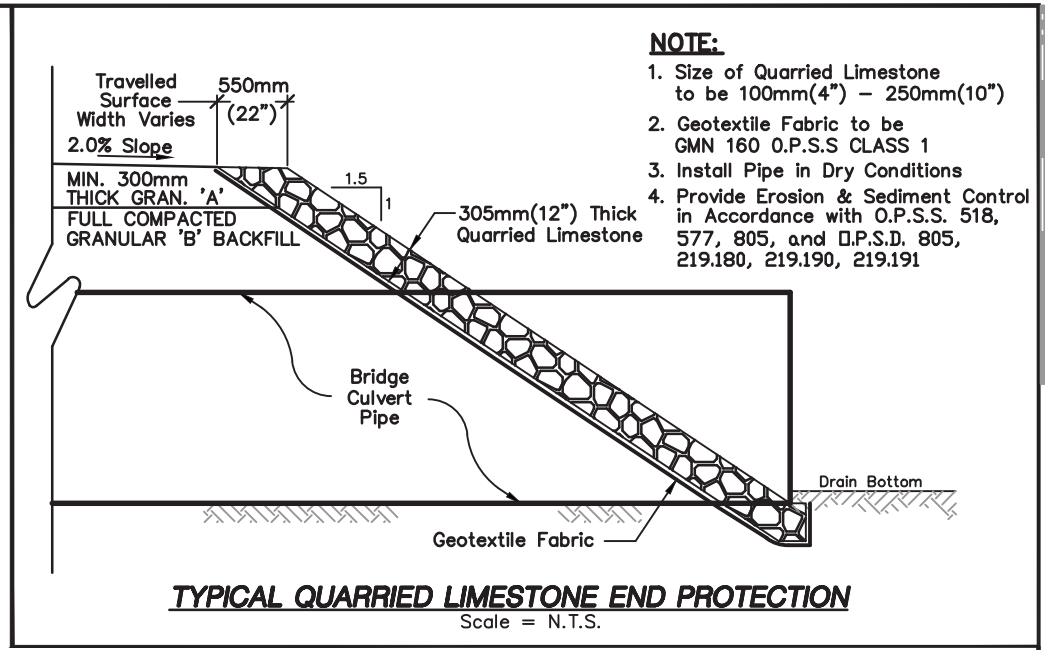
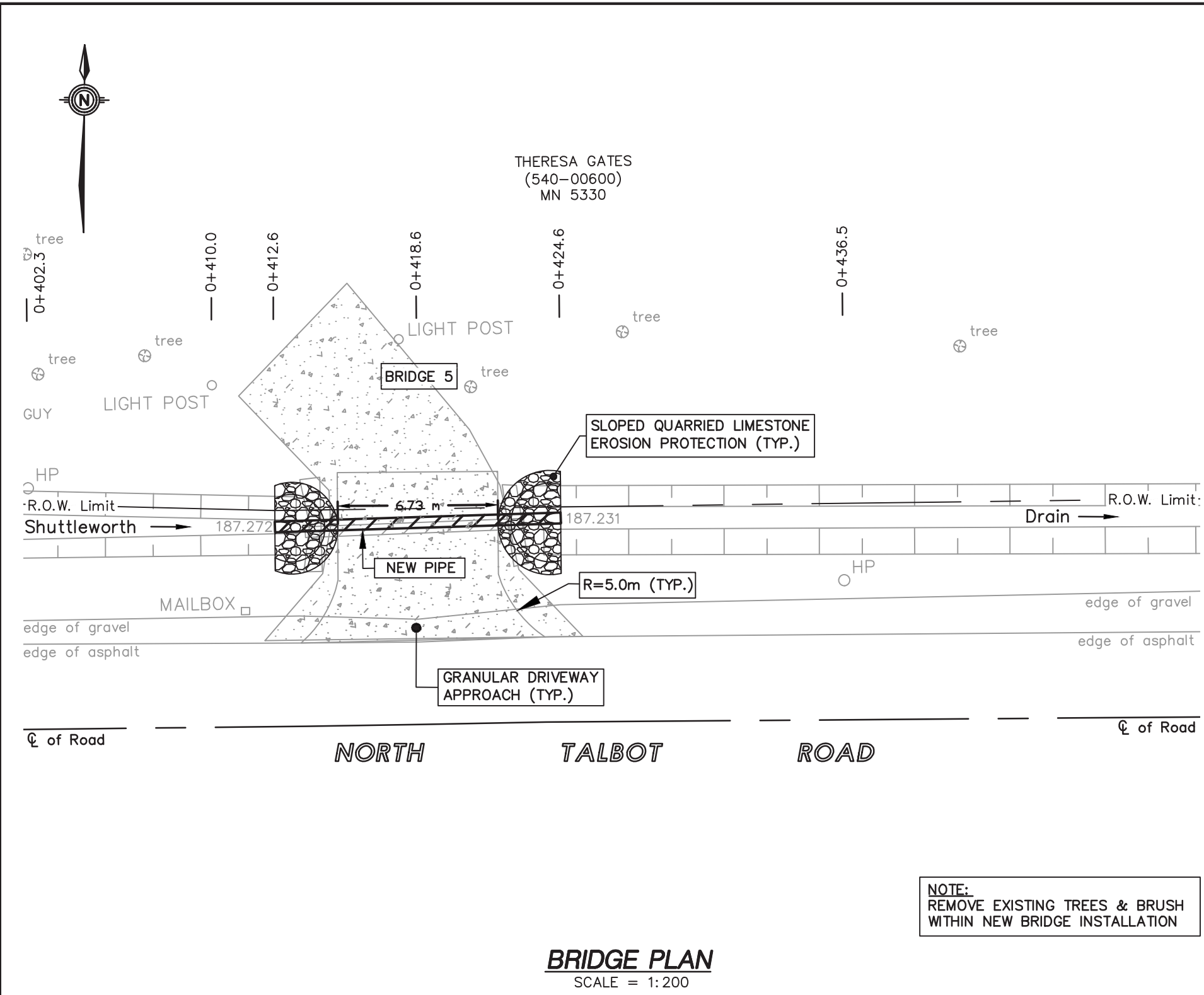
ROOD
ENGINEERING
INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

FILE No.:
2017D020

DRAWN BY: K.D.
PLOT CODE: 1:1
FILE: REI2017D020.DWG

DATE: 2022-03-21

APPENDIX 'E'
6 OF 17



BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD DIRECTLY IN FRONT OF MUNICIPAL NUMBER (M.N.) 5410
ELEV. = 188.632m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	12.0m (39.37 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 186.772m DOWNSTREAM INV. (E) = 186.752m ℄ TOP OF DRIVEWAY = 188.142m DRAIN GRADE = 0.16%

SHUTTLEWORTH DRAIN
 BRIDGE FOR THERESA GATES (540-00600)
 (GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
 IN THE
TOWN OF TECUMSEH
 IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

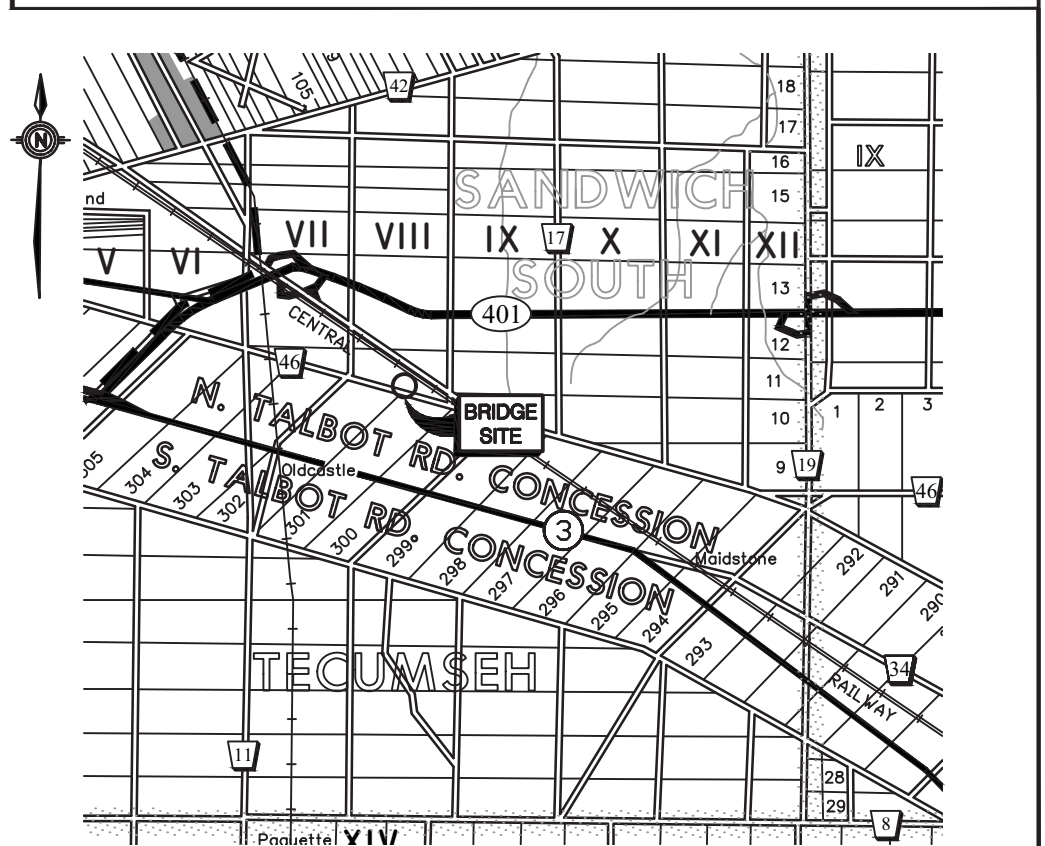
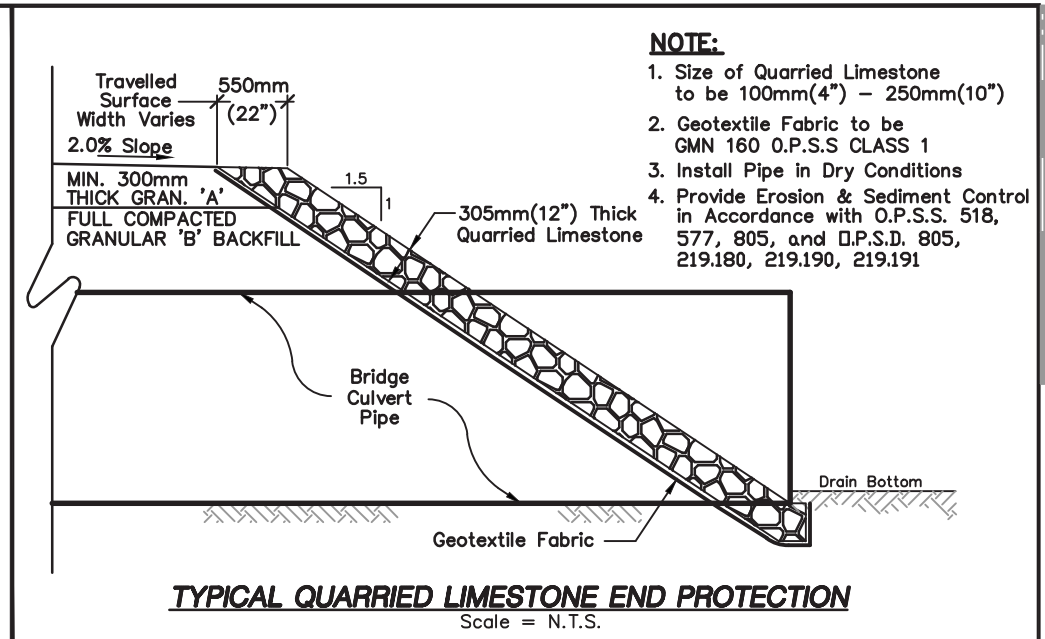
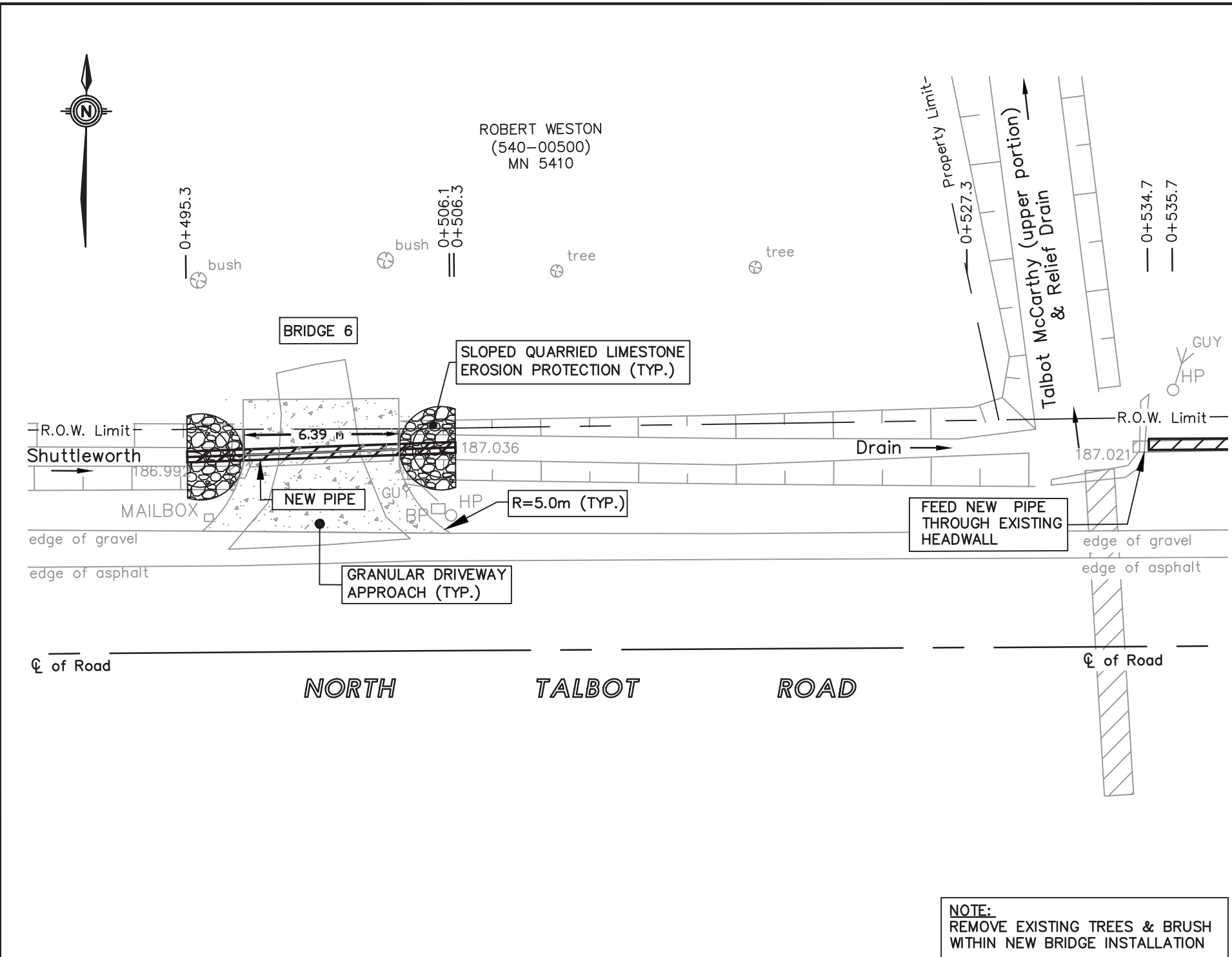
ROOD ENGINEERING INC.
 CONSULTING ENGINEERS
 Leamington, Ontario
 519-322-1621

FILE No.:
2017D020

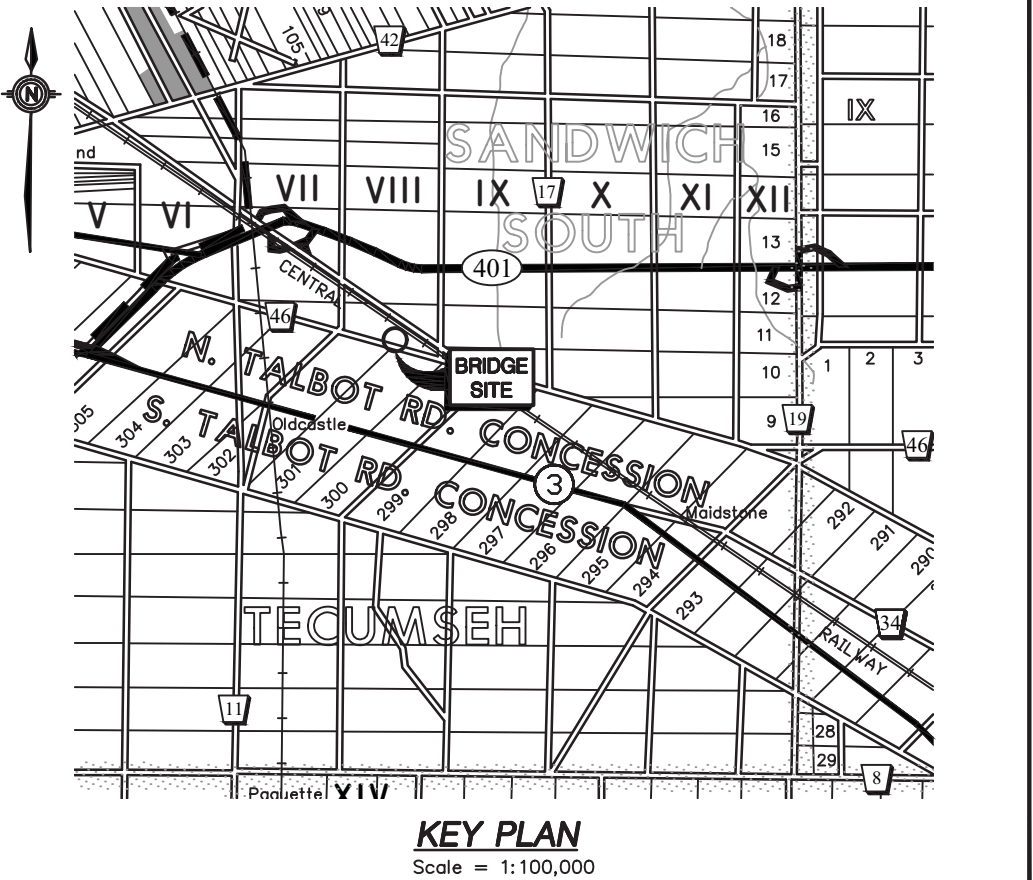
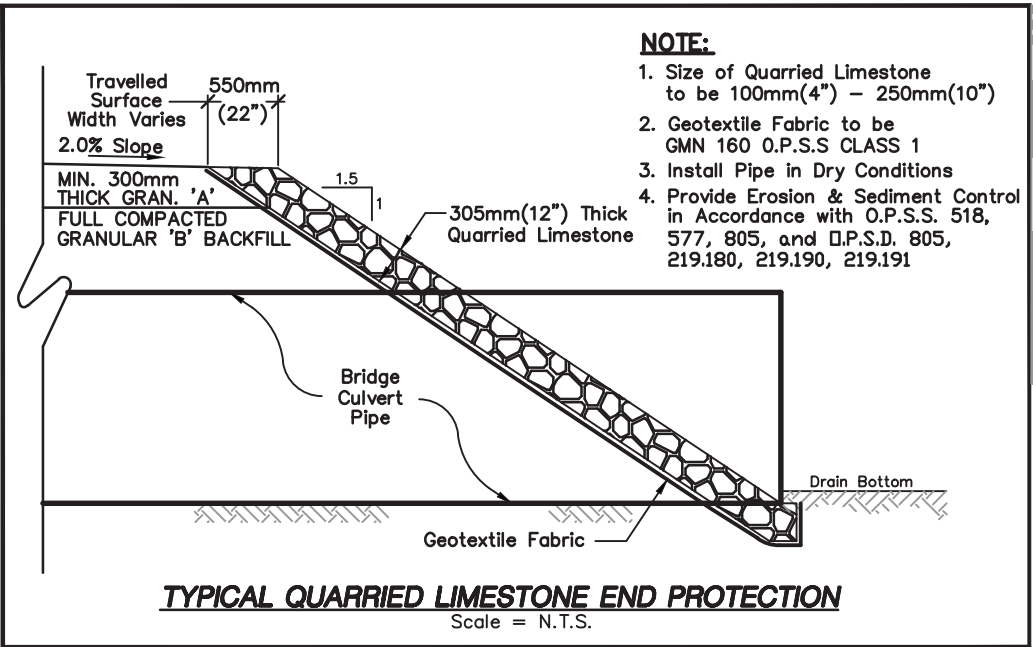
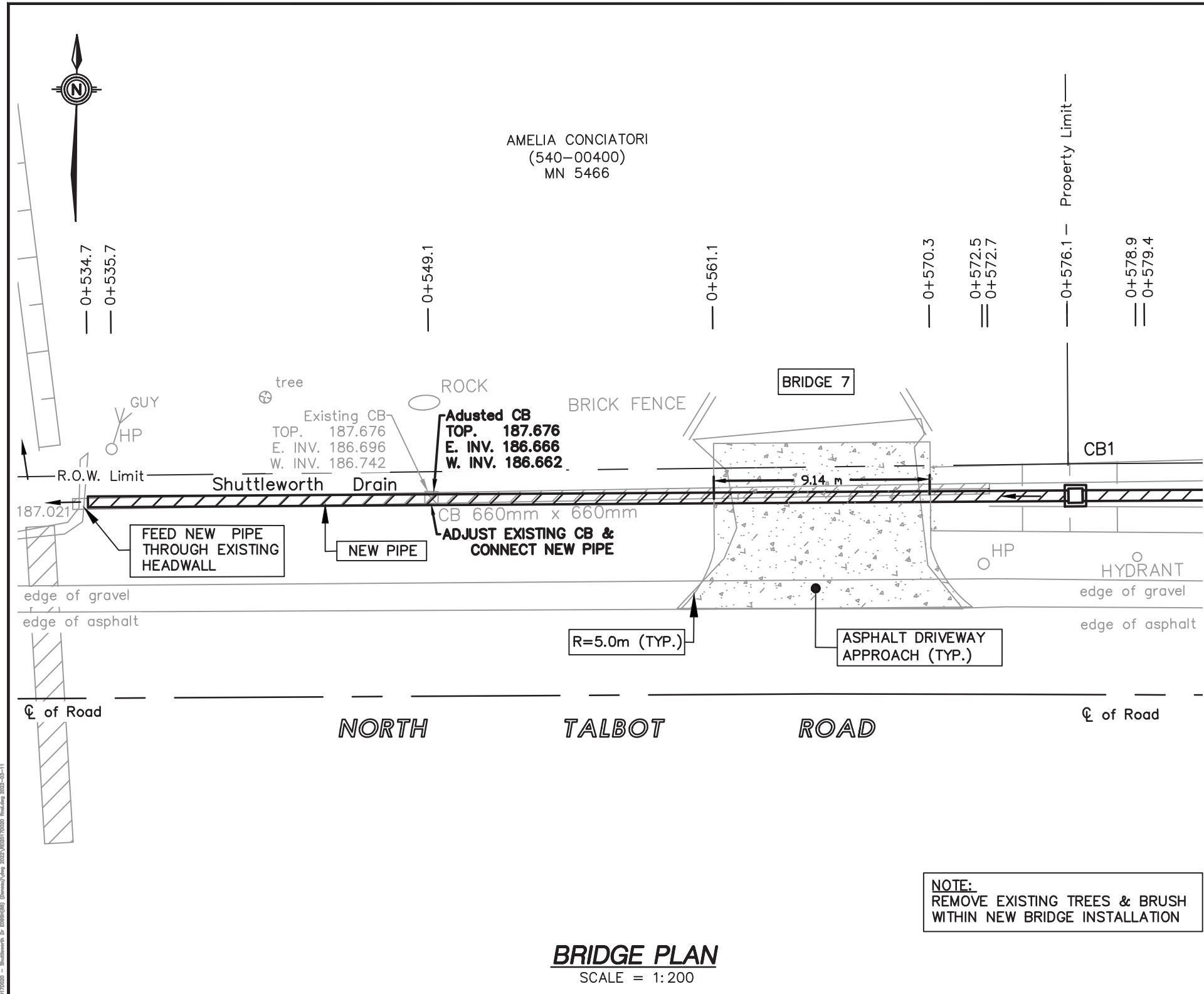
DRAWN BY: K.D.
PLOT CODE: 1:1
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DATE: 2022-03-21

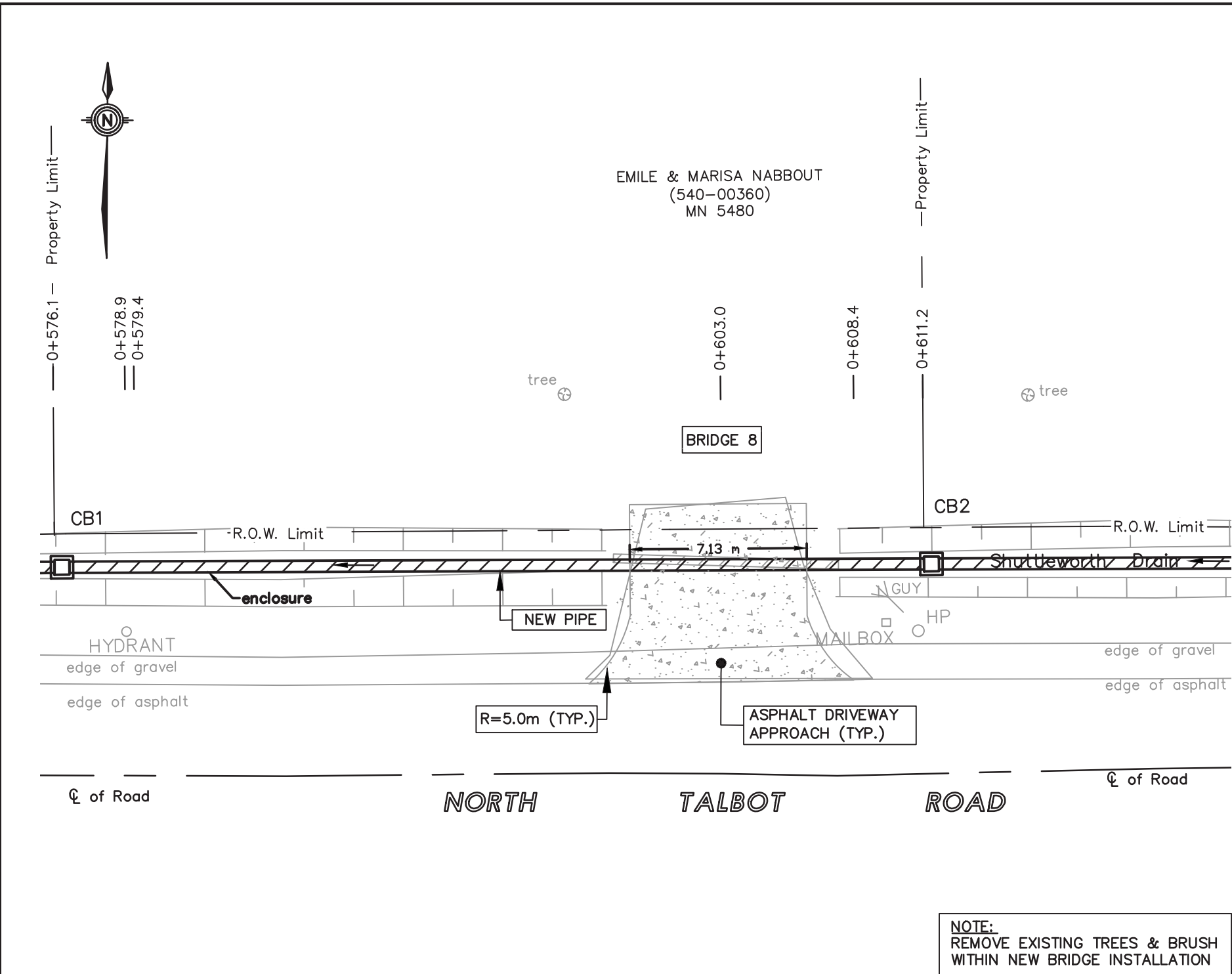
APPENDIX 'E'
7 OF 17



<div>BRIDGE PLAN</div> <div>SCALE = 1:200</div>						<div>KEY PLAN</div> <div>Scale = 1:100,000</div>																	
<div>BENCHMARK:</div> <div>TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD DIRECTLY IN FRONT OF MUNICIPAL NUMBER (M.N.) 5410</div> <div>ELEV. = 188.632m</div>						<div>SHUTTLEWORTH DRAIN</div> <div>BRIDGE FOR ROBERT WESTON (540-00500)</div> <div>(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)</div> <div>IN THE</div> <div>TOWN OF TECUMSEH</div> <div>IN THE</div> <div>COUNTY OF ESSEX • ONTARIO</div>						<div><div><div><div>REGISTERED PROFESSIONAL ENGINEER</div><div>G.ROOD</div><div>2022-03-18</div><div>PROVINCE OF ONTARIO</div></div></div><div><div>Rood</div><div>ENGINEERING</div><div>INC.</div><div>CONSULTING ENGINEERS</div><div>Leamington, Ontario</div><div>519-322-1621</div></div></div>						<div>DATE: 2022-03-21</div>					
<div>PIPE SIZE:</div> <div>450mmø</div>		<div>PIPE LENGTH:</div> <div>11.0m</div> <div>(36.09 FT.)</div>		<div>PIPE GAUGE:</div> <div>320 kPa</div>		<div>CORRUGATIONS:</div> <div>STANDARD</div>		<div>TYPE OF PIPE:</div> <div>SMOOTH WALL</div> <div>H.D.P.E. PIPE</div>		<div>DESIGN ELEVATIONS:</div> <div>UPSTREAM INV. (W) = 186.639m</div> <div>DOWNSTREAM INV. (E) = 186.621m</div> <div>CL TOP OF DRIVEWAY = 187.792m</div> <div>DRAIN GRADE = 0.16%</div>				<div>FILE No.:</div> <div>2017D020</div>		<div>DRAWN BY: K.D.</div> <div>PLOT CODE: 1:1</div> <div>FILE: REI2017D020.DWG</div>		<div>APPENDIX 'E'</div> <div>8 OF 17</div>					

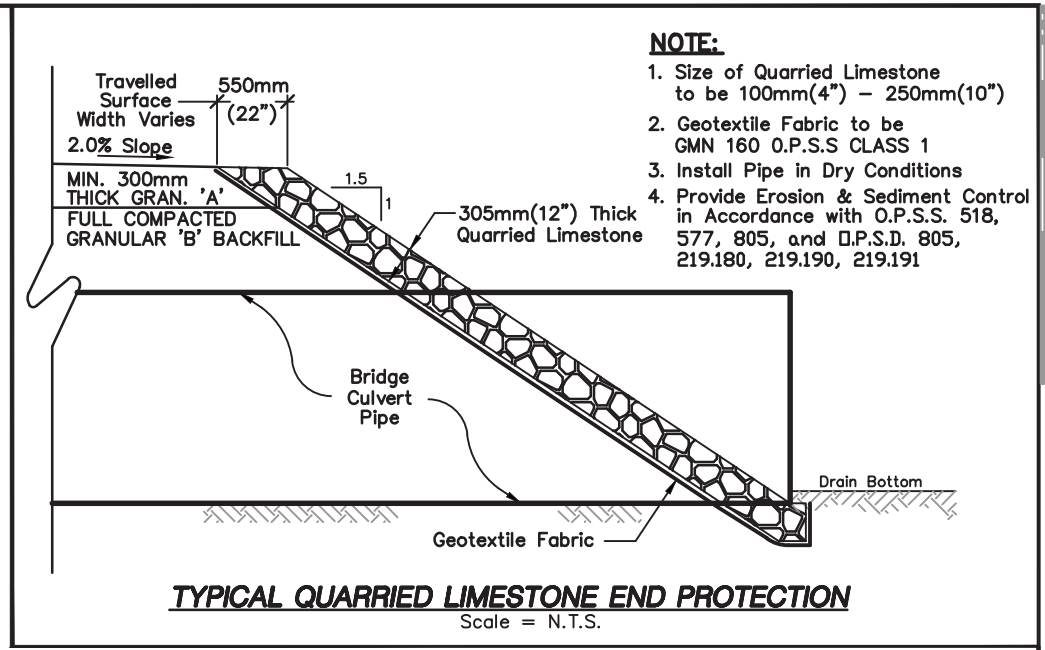


BENCHMARK: TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD DIRECTLY IN FRONT OF MUNICIPAL NUMBER (M.N.) 5410 ELEV. = 188.632m						SHUTTLEWORTH DRAIN BRIDGE ENCLOSURE FOR AMELIA CONCIATORI (540-00400) (GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH) IN THE TOWN OF TECUMSEH IN THE COUNTY OF ESSEX • ONTARIO				ROOD ENGINEERING INC. CONSULTING ENGINEERS Leamington, Ontario 519-322-1621		DATE: 2022-03-21	
PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:								
450mmØ	41.0m (134.5 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 186.804m DOWNSTREAM INV. (W) = 186.588m CL TOP OF DRIVEWAY = 187.925m DRAIN GRADE = 0.53%								
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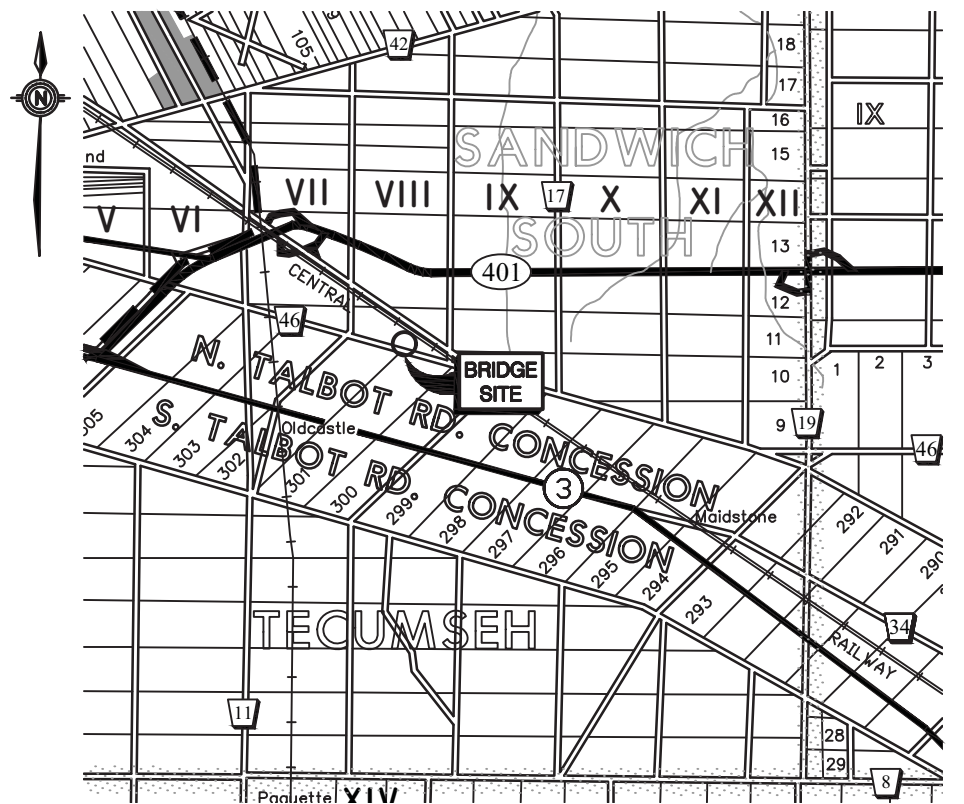


BRIDGE PLAN
SCALE = 1:200

NOTE:
REMOVE EXISTING TREES & BRUSH
WITHIN NEW BRIDGE INSTALLATION



- NOTE:**
1. Size of Quarried Limestone to be 100mm(4") - 250mm(10")
 2. Geotextile Fabric to be GMN 160 O.P.S.S CLASS 1
 3. Install Pipe in Dry Conditions
 4. Provide Erosion & Sediment Control in Accordance with O.P.S.S. 518, 577, 805, and O.P.S.D. 805, 219.180, 219.190, 219.191



KEY PLAN
Scale = 1:100,000

BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480
ELEV. = 188.673m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	35.1m (115.2 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.000m DOWNSTREAM INV. (W) = 186.804m CL TOP OF DRIVEWAY = 187.900m DRAIN GRADE = 0.53%

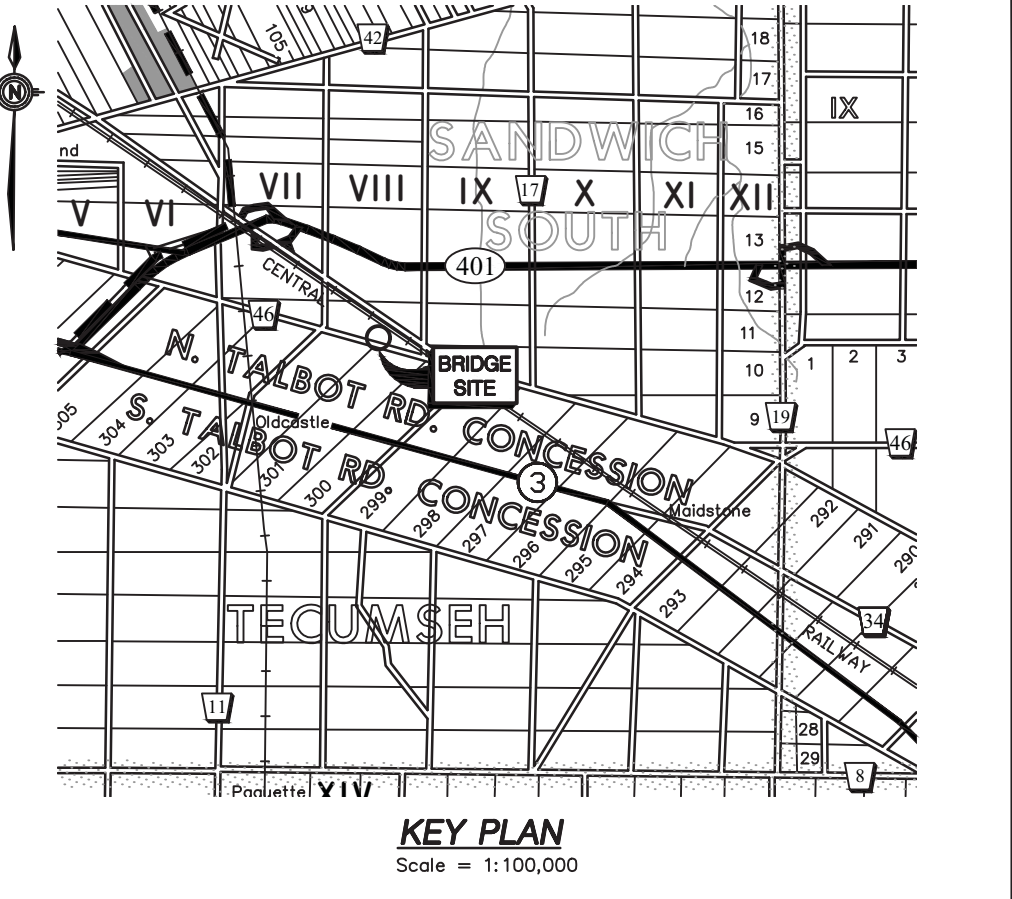
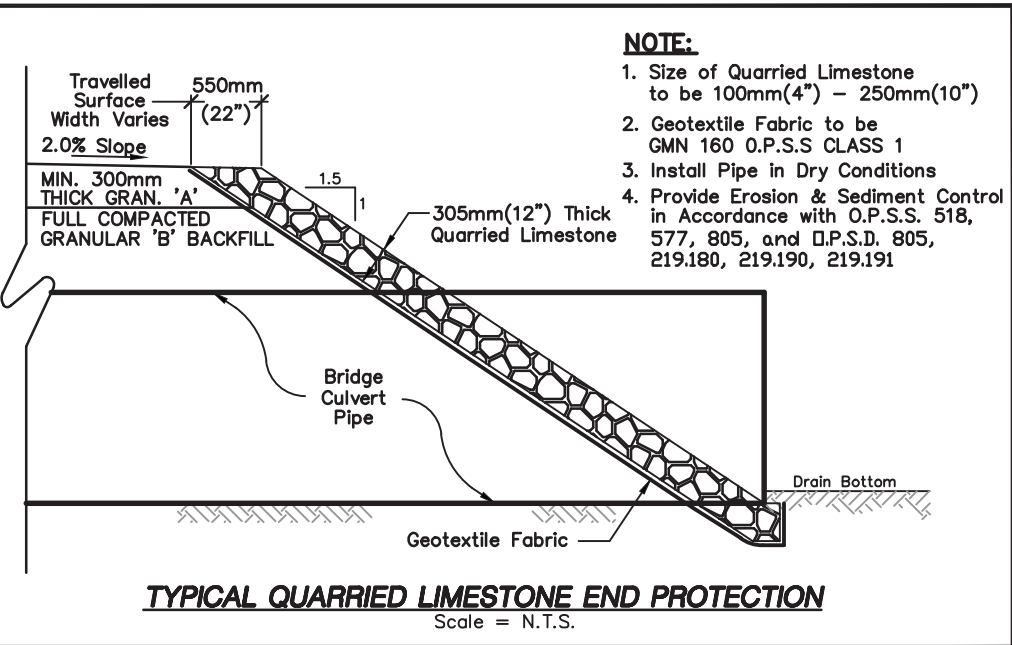
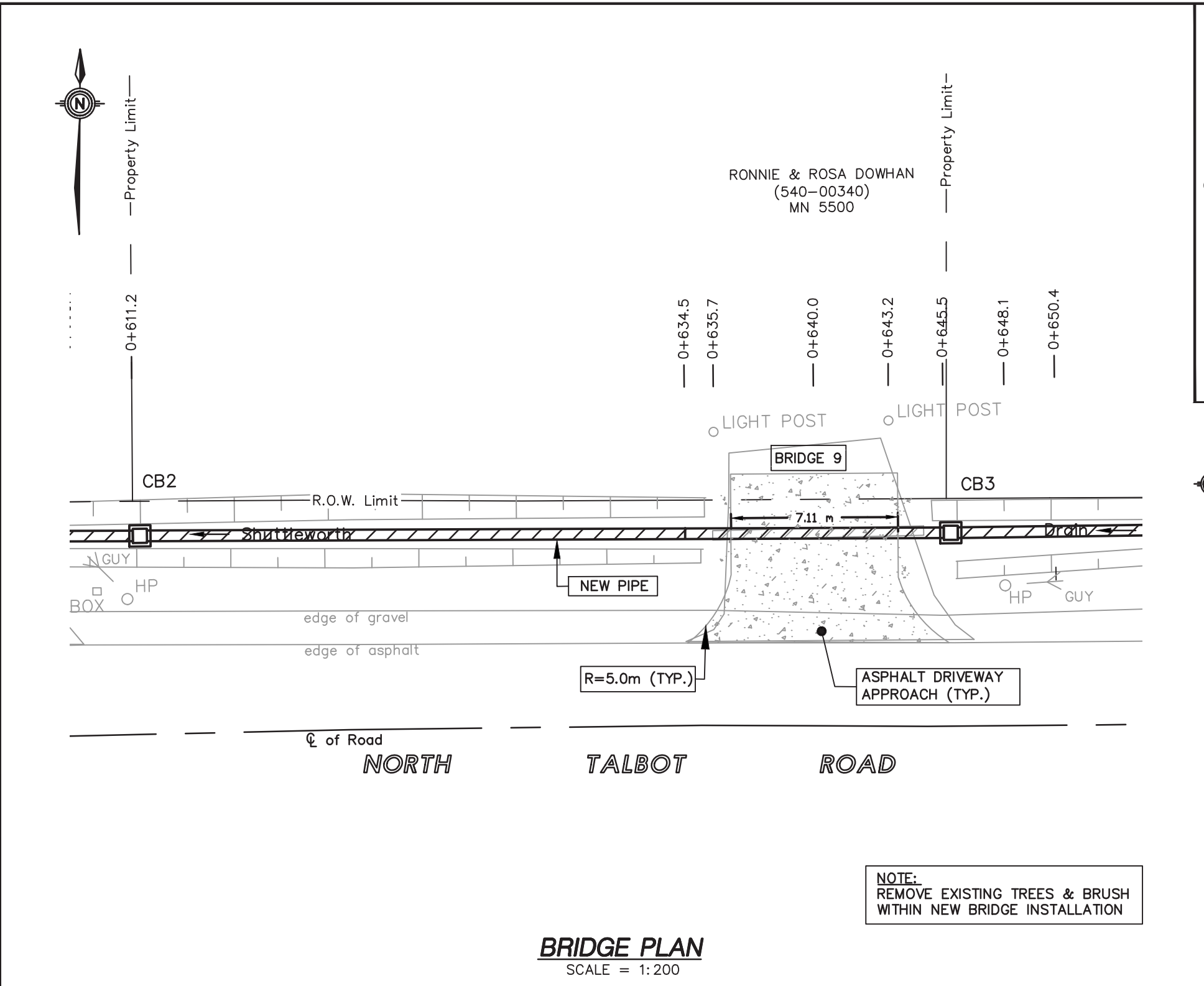
SHUTTLEWORTH DRAIN
BRIDGE ENCLOSURE FOR EMILE & MARISA NABBOUT (540-00360)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: 2022-03-21

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BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480
ELEV. = 188.673m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmø	34.3m (112.5 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.175m DOWNSTREAM INV. (W) = 187.000m CL TOP OF DRIVEWAY = 188.100m DRAIN GRADE = 0.53%

SHUTTLEWORTH DRAIN
BRIDGE FOR RONNIE & ROSA DOWHAN (540-00340)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

G.ROOD
2022-03-18
PROVINCE OF ONTARIO

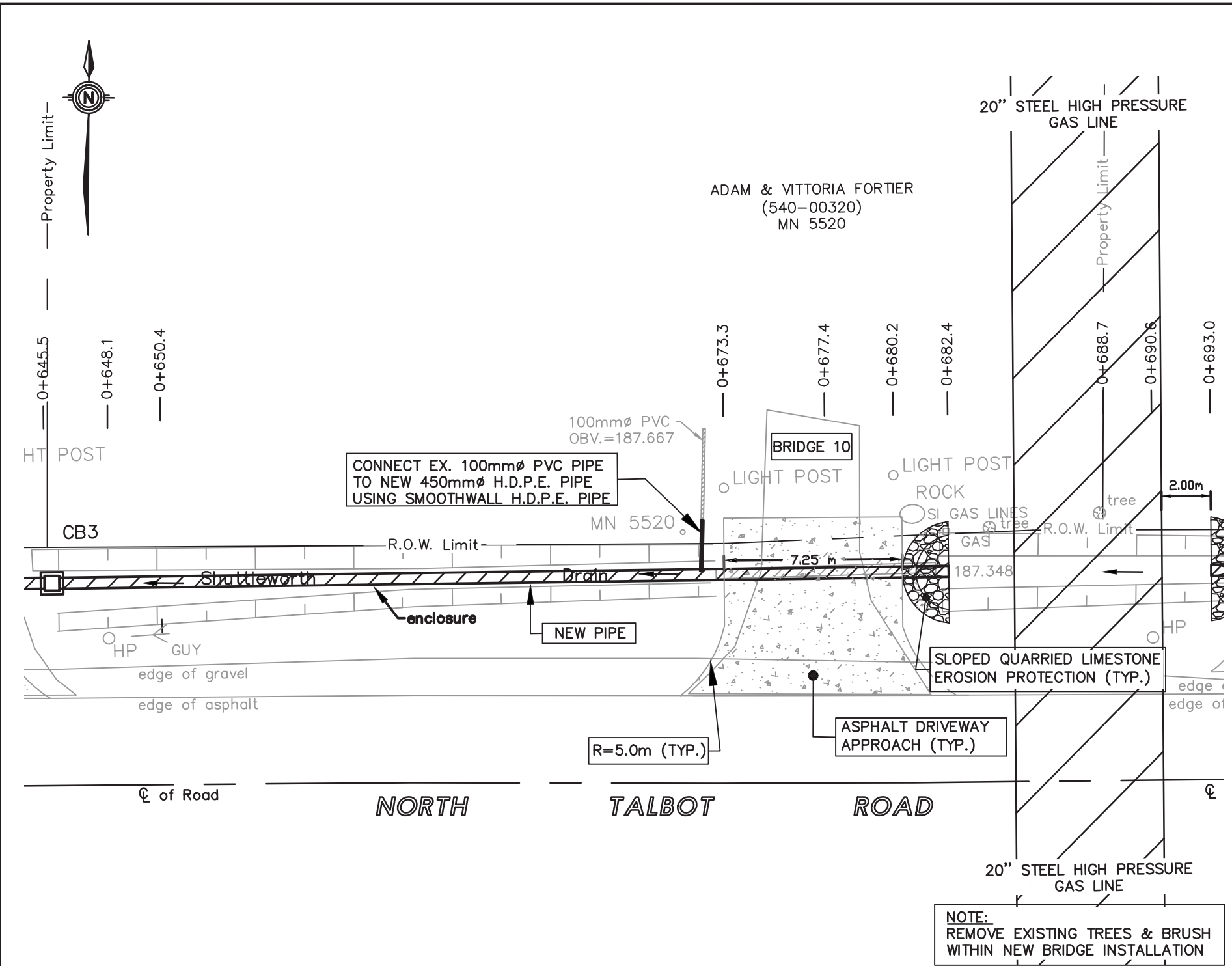
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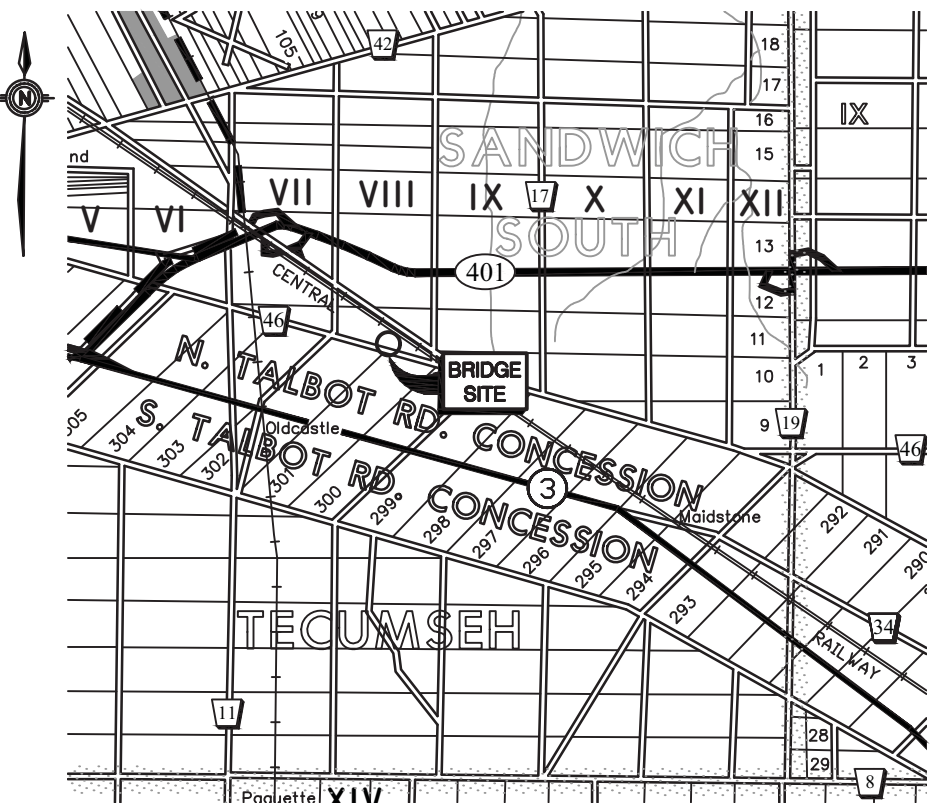
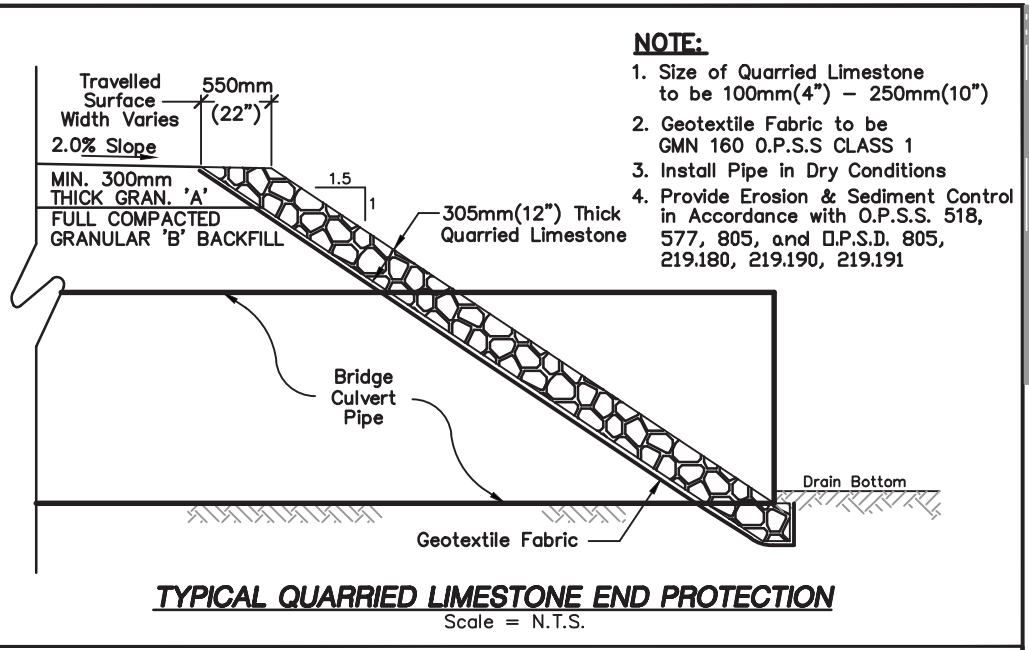
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BRIDGE PLAN
SCALE = 1:200

BENCHMARK: TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480 ELEV. = 188.673m					
PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmØ	35.6m (116.8 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.366m DOWNSTREAM INV. (W) = 187.175m CL TOP OF DRIVEWAY = 188.250m DRAIN GRADE = 0.53%

SHUTTLEWORTH DRAIN
 BRIDGE ENCLOSURE FOR ADAM & VITTORIA FORTIER (540-00320)
 (GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
 IN THE
TOWN OF TECUMSEH
 IN THE
COUNTY OF ESSEX • ONTARIO



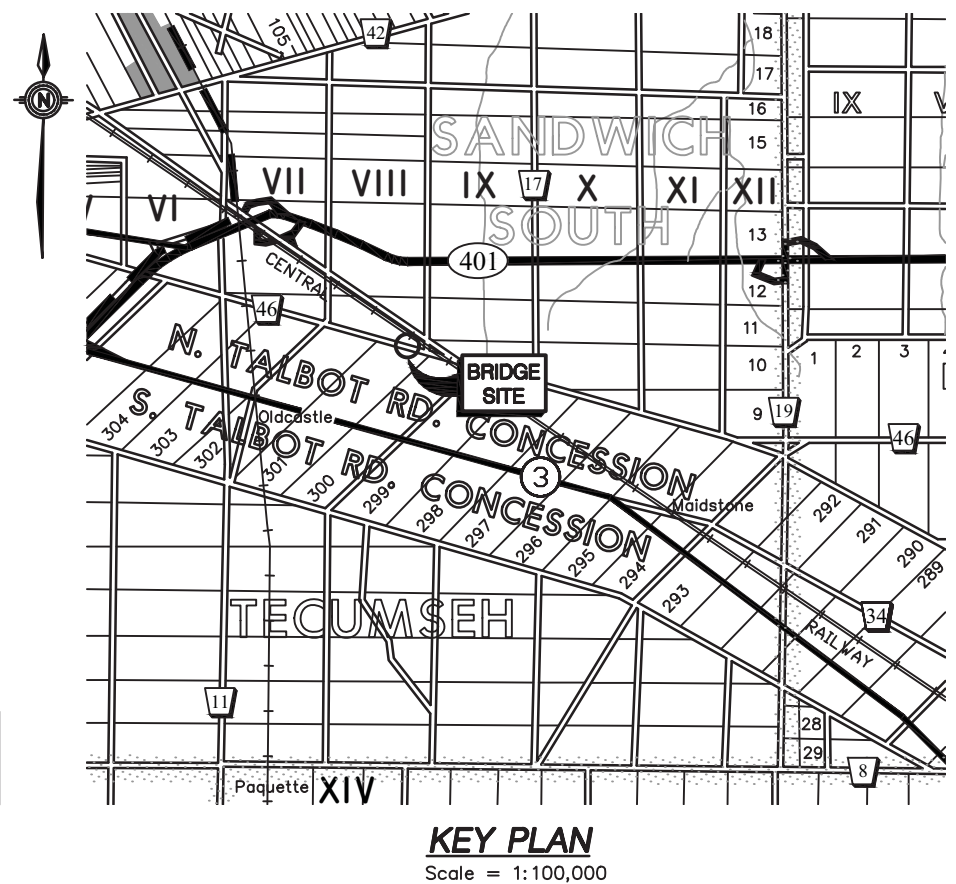
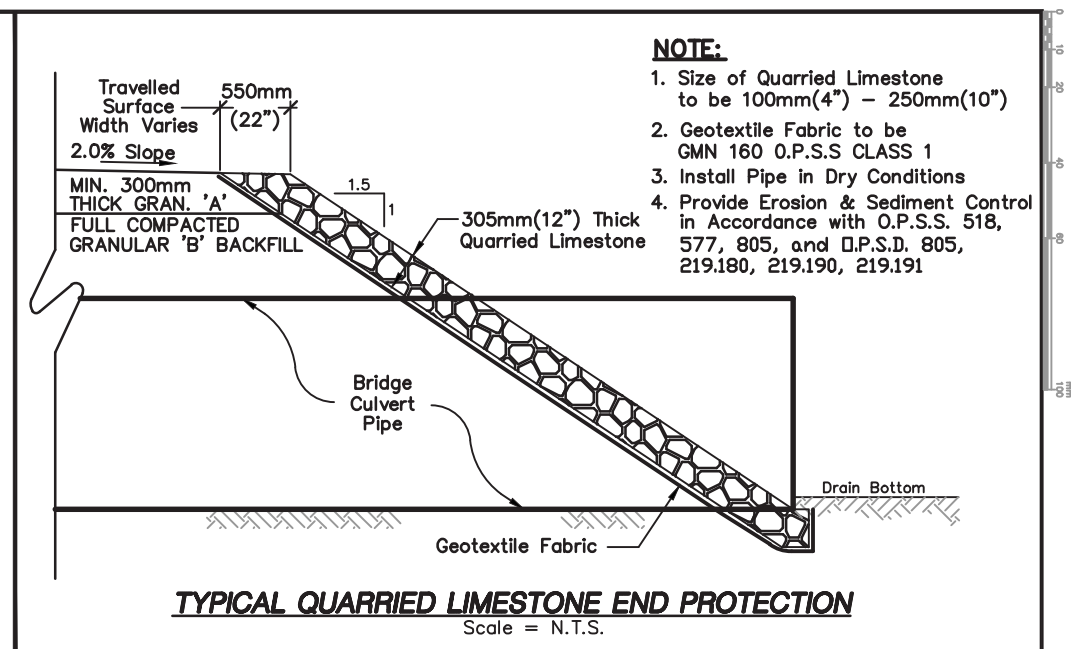
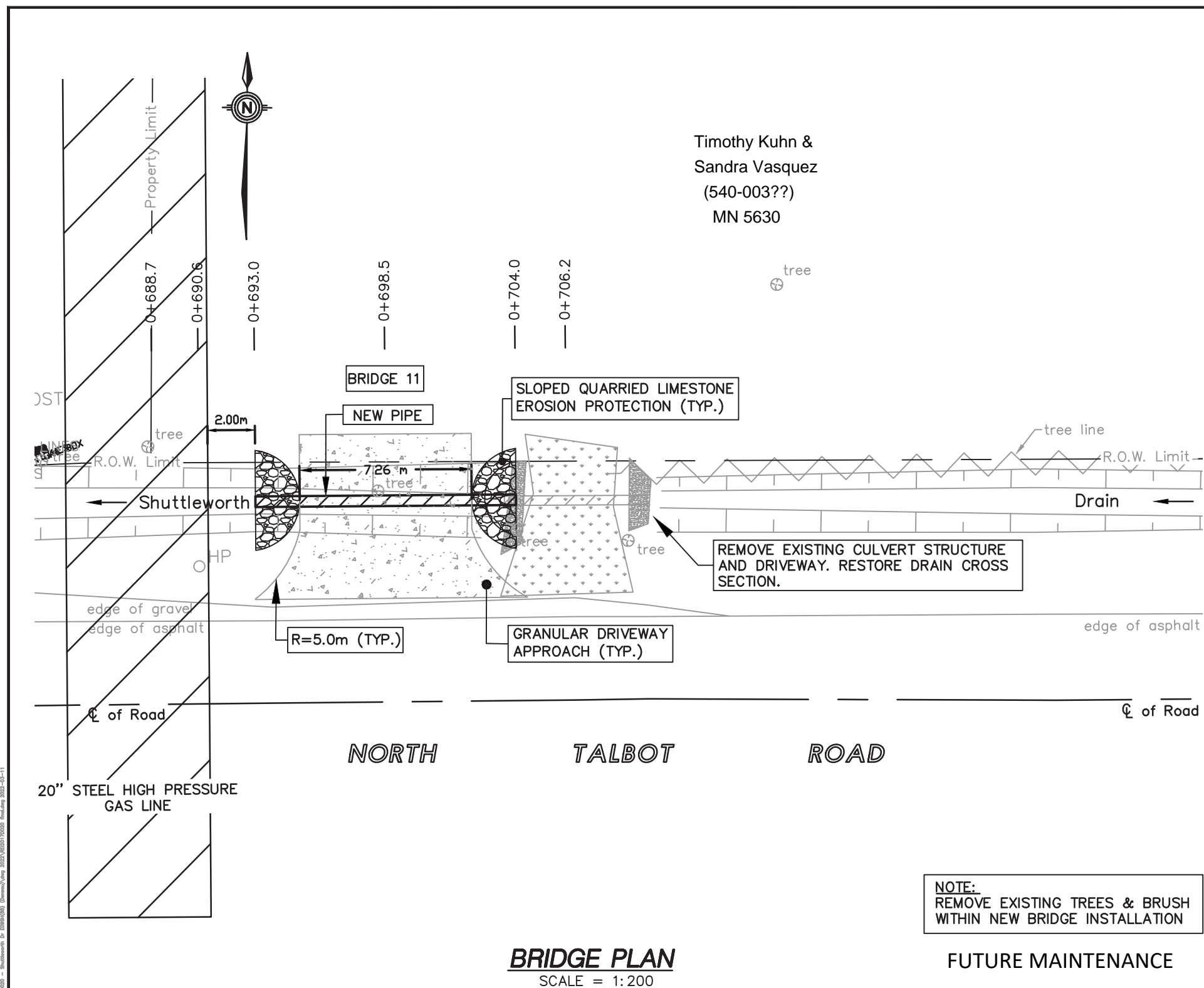
KEY PLAN
Scale = 1:100,000



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DATE: 2022-03-21

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BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT
ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475
AND IN FRONT OF M.N 5480
ELEV. = 188.673m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
450mmØ	11.0m (36.09 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (E) = 187.479m DOWNSTREAM INV. (W) = 187.421m ℄ TOP OF DRIVEWAY = 188.400m DRAIN GRADE = 0.53%

SHUTTLEWORTH DRAIN
BRIDGE FOR JOHN WHITE (540-00301) (WEST BRIDGE)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
 IN THE
TOWN OF TECUMSEH
 IN THE
COUNTY OF ESSEX • ONTARIO



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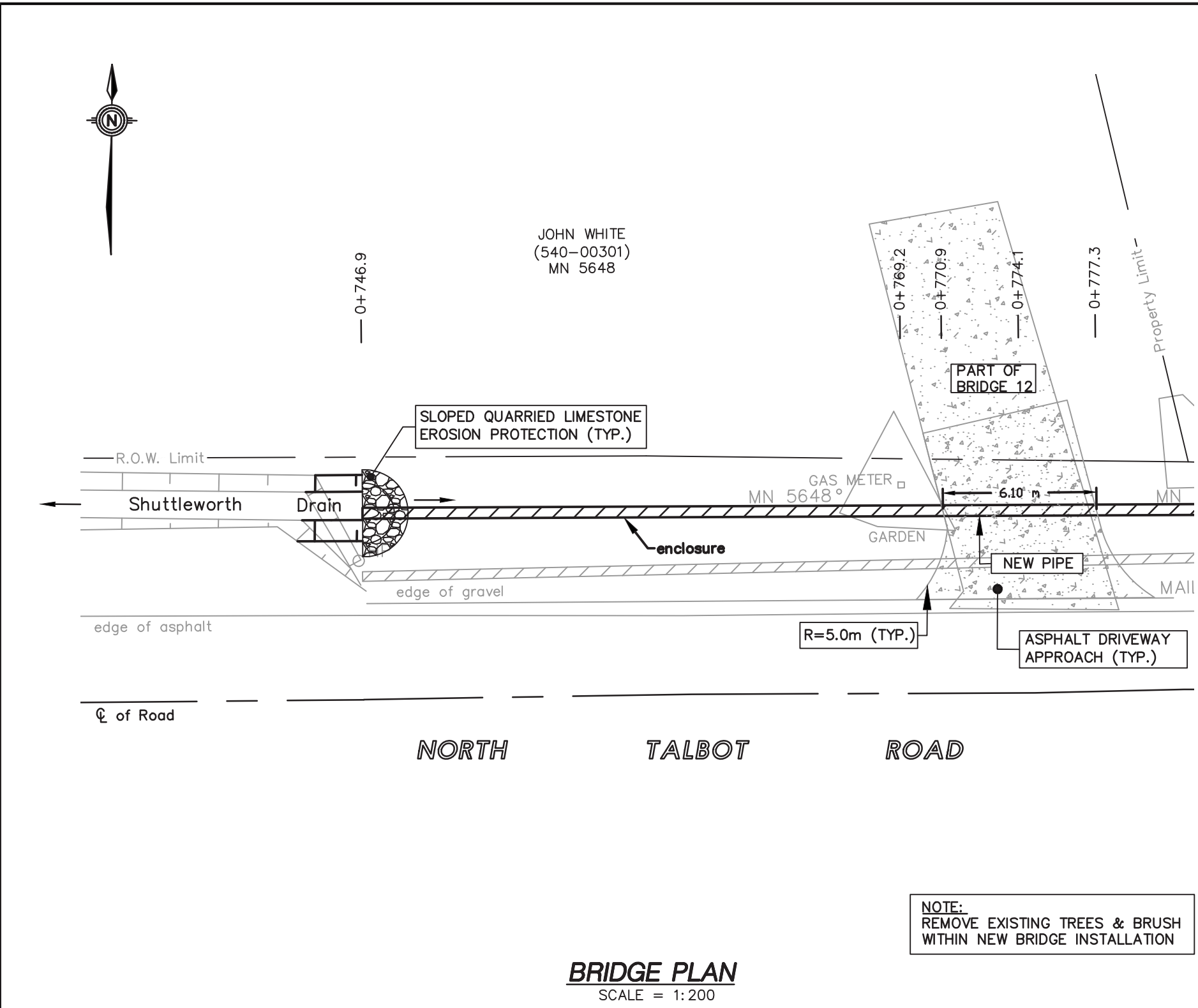
Addendum: 2022-04-12

DATE: 2022-03-21

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13 OF 17

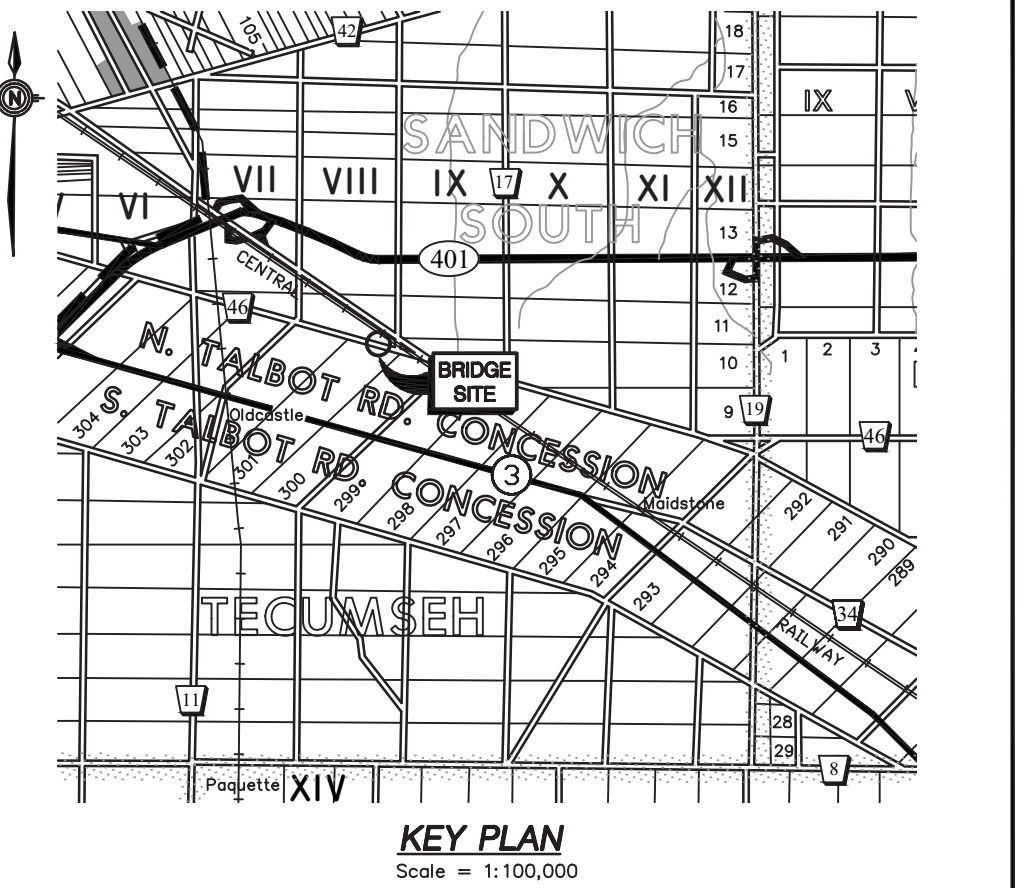
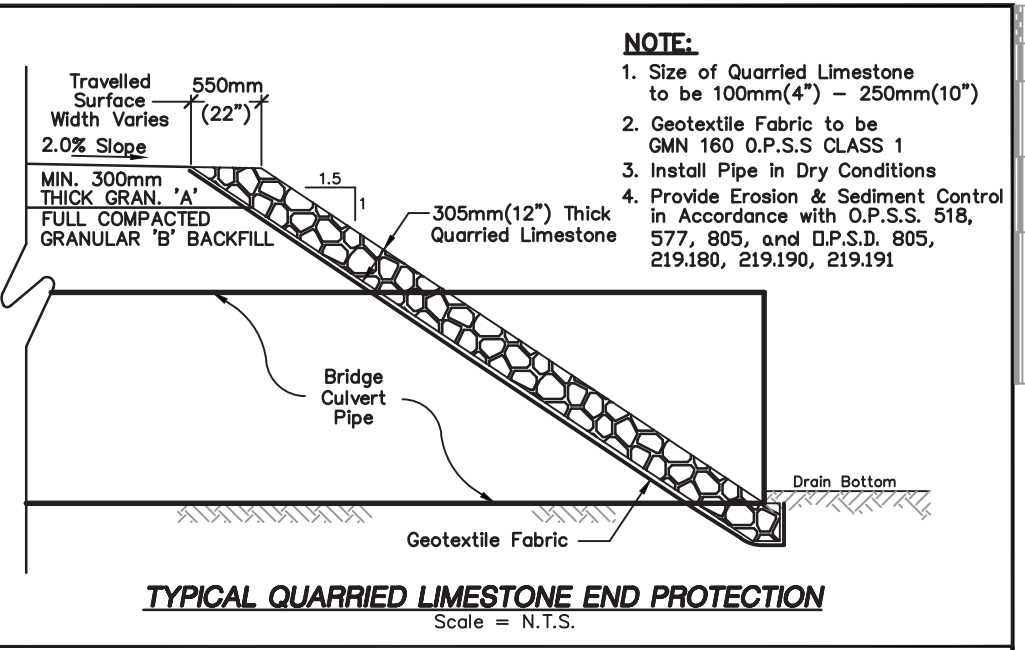


BRIDGE PLAN
SCALE = 1:200

BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480
ELEV. = 188.673m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
375mmø	144.0m (472.44 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.710m DOWNSTREAM INV. (E) = 186.861m CL TOP OF DRIVEWAY = 188.267m DRAIN GRADE = 0.59%

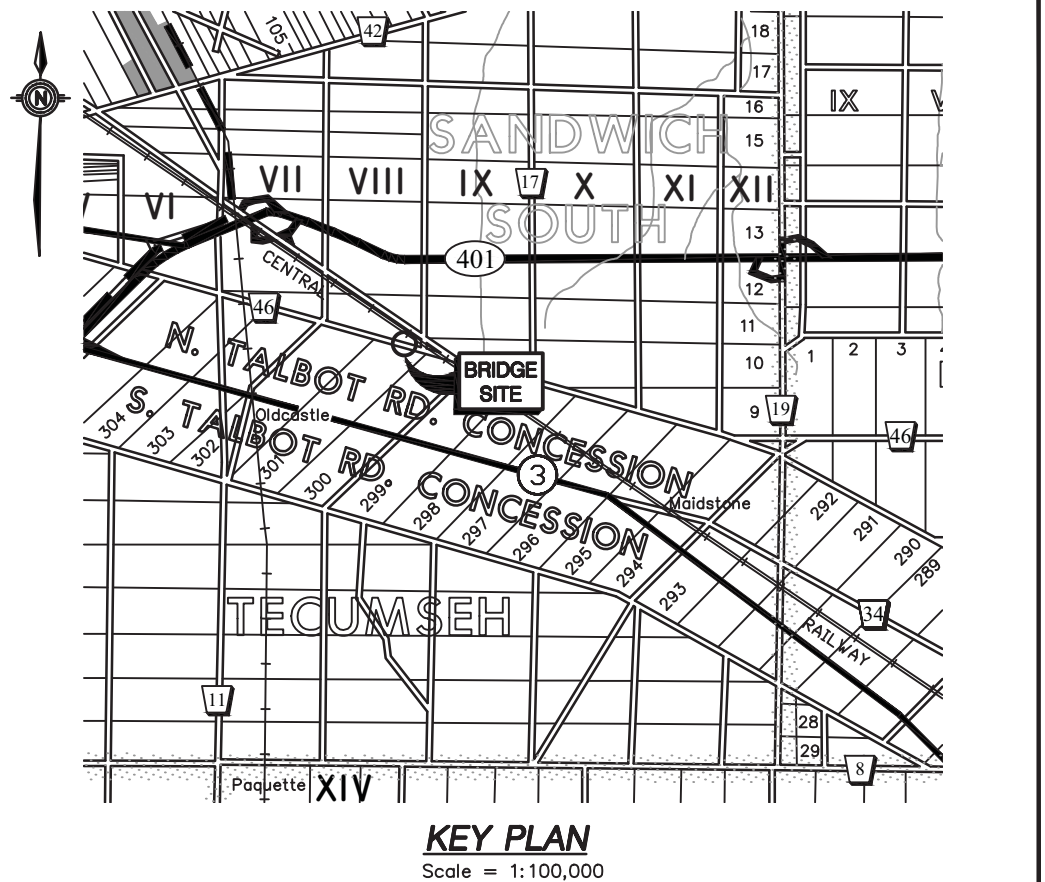
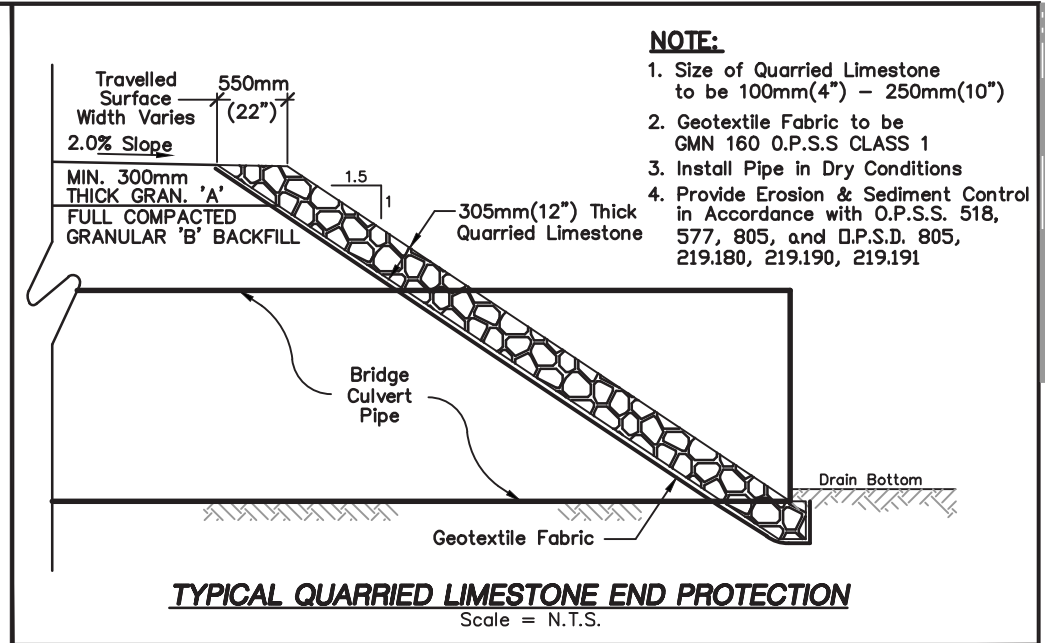
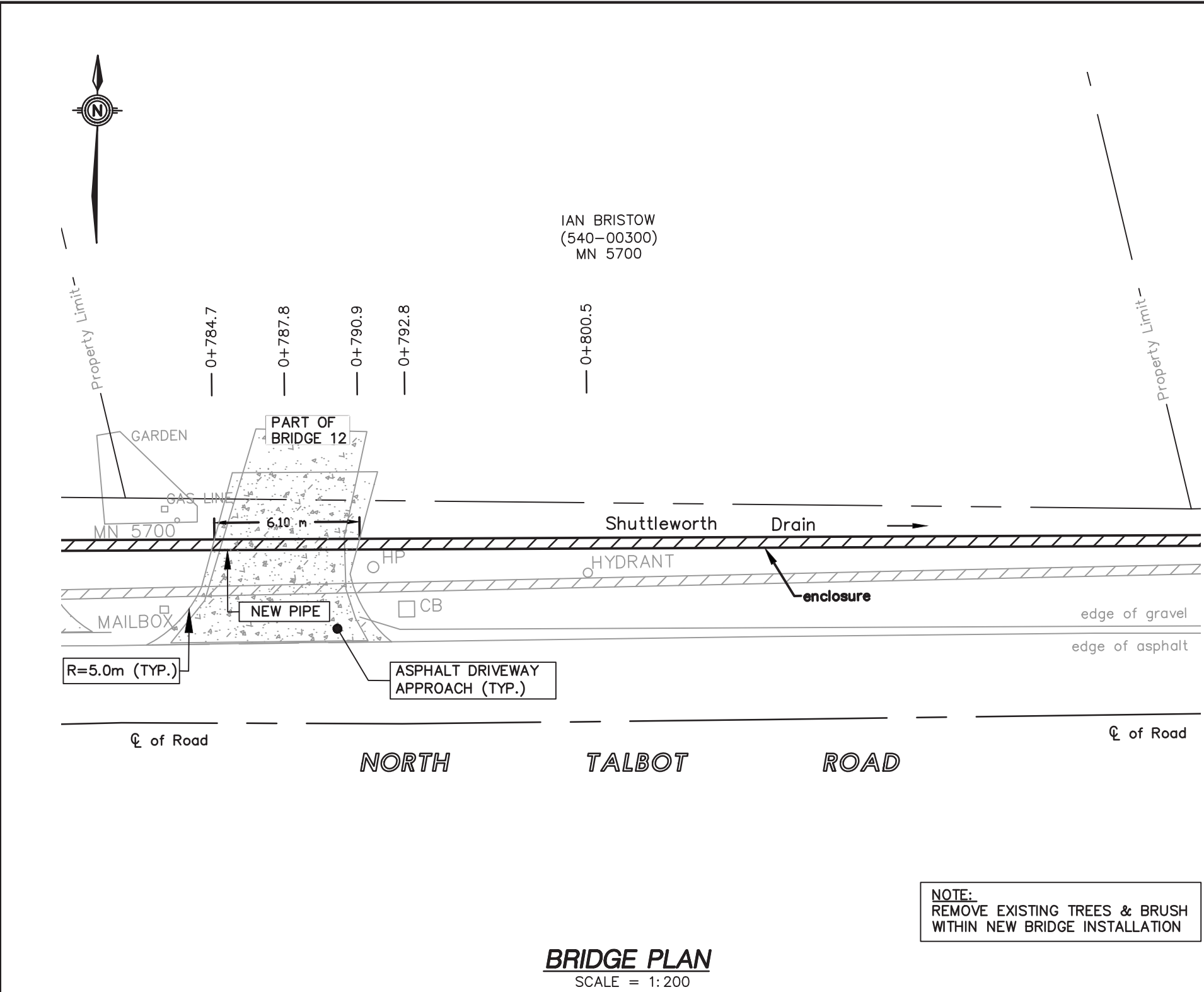
SHUTTLEWORTH DRAIN
BRIDGE FOR JOHN WHITE (540-00301) (EAST BRIDGE ENCLOSURE)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



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CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: 2022-03-21

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BENCHMARK:
TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480
ELEV. = 188.673m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
375mmø	144.0m (472.44 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.710m DOWNSTREAM INV. (E) = 186.861m CL TOP OF DRIVEWAY = 188.072m DRAIN GRADE = 0.59%

SHUTTLEWORTH DRAIN
BRIDGE ENCLOSURE FOR IAN BRISTOW (540-00300)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO

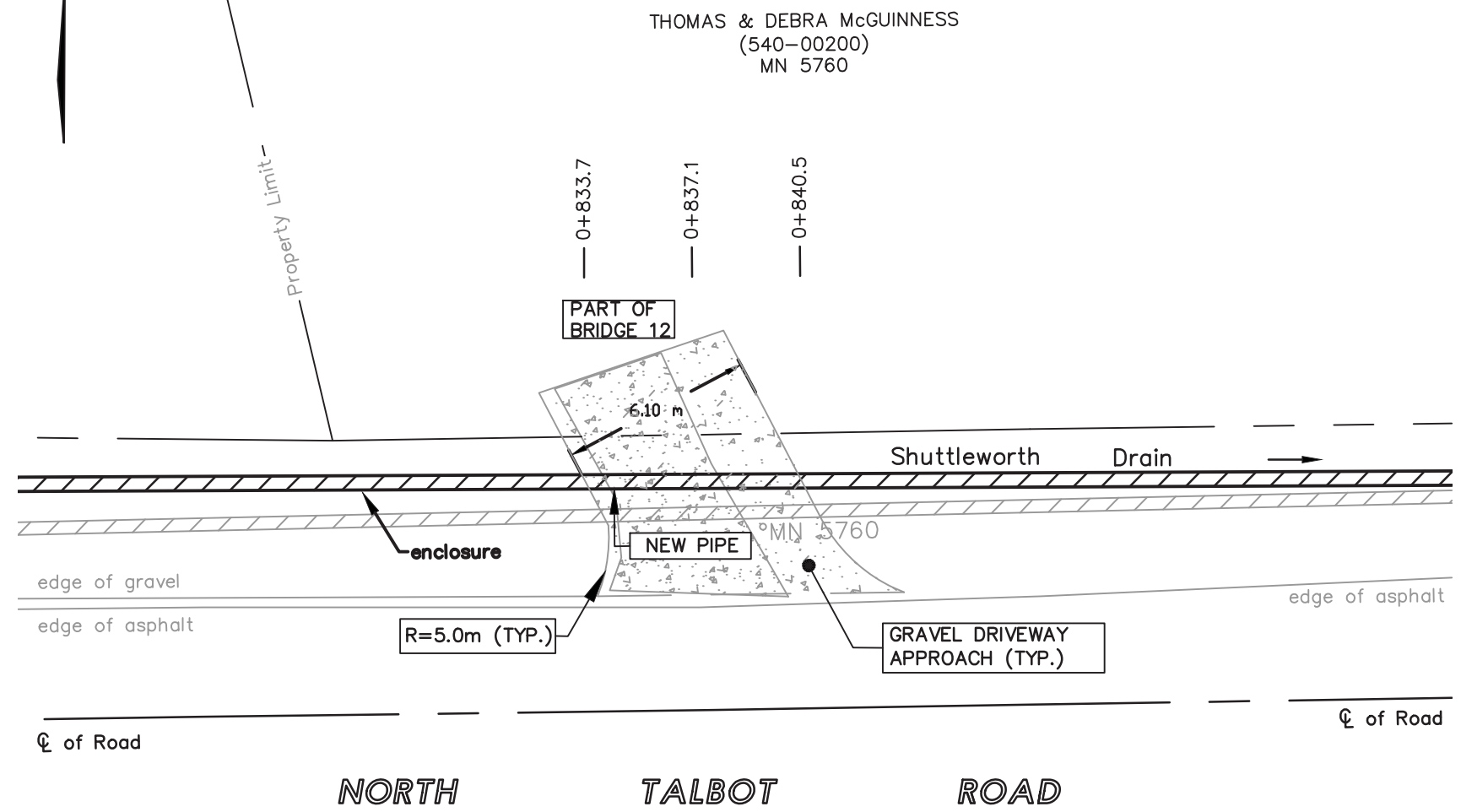


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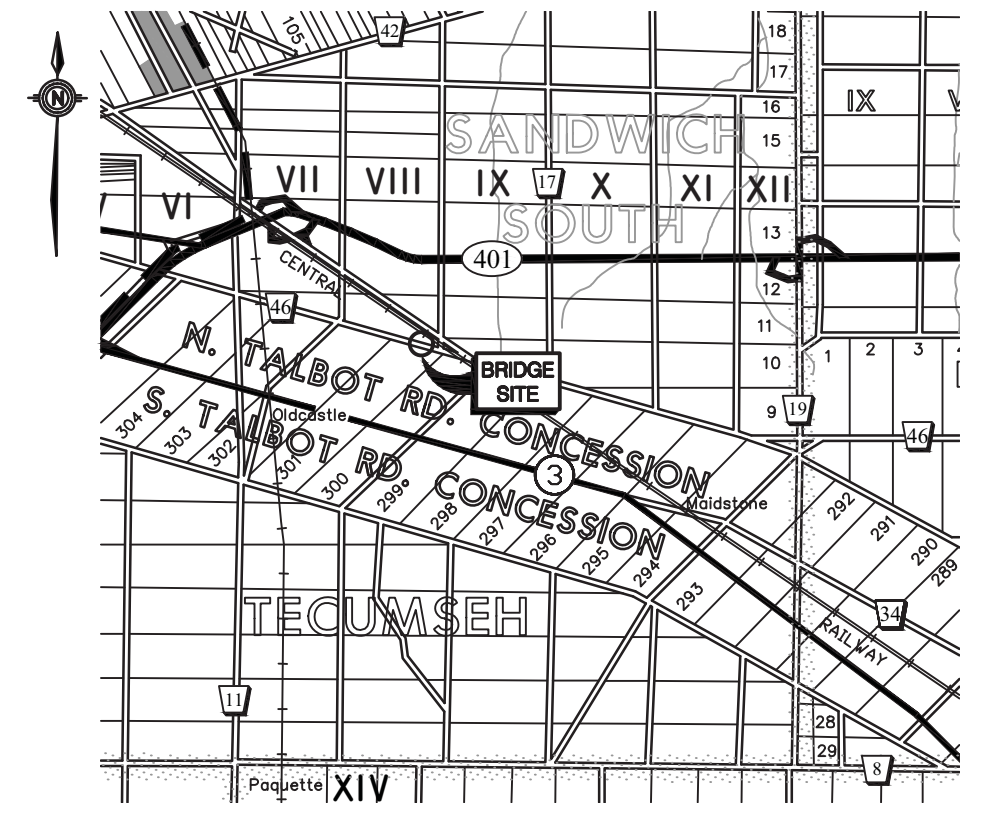
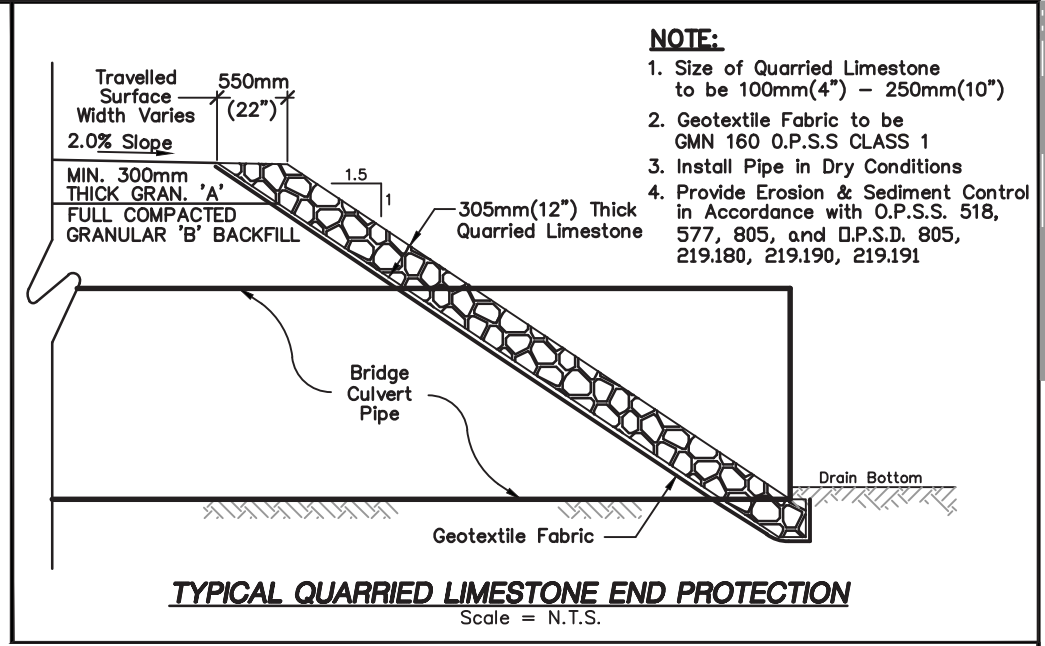
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BRIDGE PLAN
SCALE = 1:200

NOTE:
REMOVE EXISTING TREES & BRUSH
WITHIN NEW BRIDGE INSTALLATION



KEY PLAN
Scale = 1:100,000

BENCHMARK: TOP NUT OF FIRE HYDRANT ON NORTH SIDE OF NORTH TALBOT ROAD ACROSS THE ROAD OF MUNICIPAL NUMBER (M.N.) 5475 AND IN FRONT OF M.N 5480 ELEV. = 188.673m					
PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
375mmø	144.0m (472.44 FT.)	320 kPa	STANDARD	SMOOTH WALL H.D.P.E. PIPE	UPSTREAM INV. (W) = 187.710m DOWNSTREAM INV. (E) = 186.861m CL TOP OF DRIVEWAY = 188.188m DRAIN GRADE = 0.59%

SHUTTLEWORTH DRAIN
BRIDGE ENCLOSURE FOR THOMAS & DEBRA McGUINNESS (540-00200)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
IN THE
TOWN OF TECUMSEH
IN THE
COUNTY OF ESSEX • ONTARIO



ROOD ENGINEERING INC.

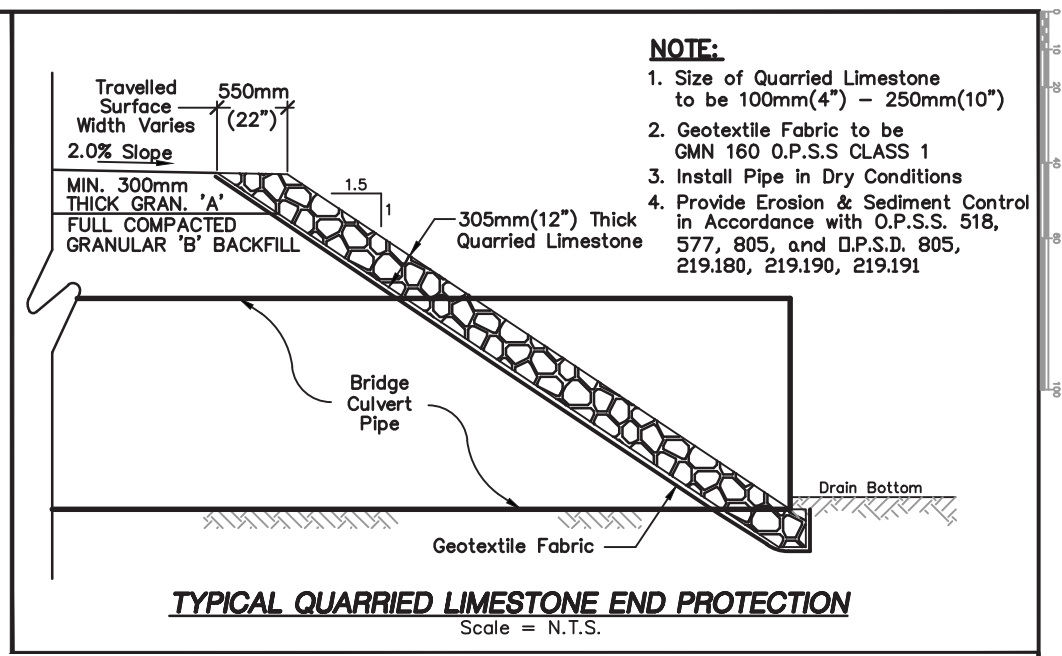
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519-322-1621

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FILE: REI2017D020.DWG

DATE: 2022-03-21

APPENDIX 'E'
16 OF 17



KEY PLAN
Scale = 1:100,000

SHUTTLEWORTH DRAIN
BRIDGE ENCLOSURE FOR MARK & LINDA SHAFER (540-00100)
(GEOGRAPHIC TOWNSHIP OF SANDWICH SOUTH)
 IN THE

DATE: 2022-03-21

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17 OF 17

APPENDIX “REI-F”

ROOD ENGINEERING INC.

FINAL SOIL CHARACTERIZATION REPORT SHUTTLEWORTH DRAIN

OESAW2232
December 2022





FINAL SOIL CHARACTERIZATION REPORT

SHUTTLEWORTH DRAIN

ROOD ENGINEERING INC.

OESAW2232
DECEMBER 2022

Prepared for:
Rood Engineering Inc.
9 Nelson Street
Leamington, Ontario, N8H 1G6

Prepared by:
WSP E&I Canada Limited
11865 County Road 42
Tecumseh, ON N8N 2M1
Canada
T: 519-735-2499

WSP.com

“Effective September 21, 2022, Wood Environment & Infrastructure Solutions Canada Limited is now operating as WSP E&I Canada Limited. No other aspects of our legal entity, contractual terms or capabilities have changed in relation to this report submission.”



Date: 14 December 2022

Project number: OESAW2232

Mr. Gerard Rood, P.Eng.
Rood Engineering Inc.
9 Nelson Street
Leamington, Ontario, N8H 1G6

Dear Mr. Rood:

**Subject: Final Report – Soil Characterization Report
Shuttleworth Drain
North Side of North Talbot Road, Tecumseh, Ontario**

Please find enclosed one (1) electronic copy, in PDF format, of our final report entitled “Soil Characterization Report, Shuttleworth Drain, North Side of North Talbot Road, Tecumseh, Ontario.”

We thank you for entrusting us with this assignment and look forward to future opportunities with your firm. In the meantime, should you have any questions or require any additional information, please do not hesitate to contact the undersigned.

Yours sincerely,
WSP E&I Canada Limited

A handwritten signature in blue ink, appearing to read 'Terry Glendenning', written over a light blue grid background.

Terry Glendenning, B.Sc.
Environmental Scientist

WSP E&I Canada Limited prepared this report solely for the use of the intended recipient, Rood Engineering Inc. in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP E&I Canada Limited at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP E&I Canada Limited does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

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EXECUTIVE SUMMARY

WSP E&I Canada Limited (WSP), was retained by Rood Engineering (the Client) to conduct a Soil Characterization Report (SCR) of the Shuttleworth Drain located on the North Side of North Talbot Road, Tecumseh, Ontario (hereinafter referred to as the "Project Area"). A key plan showing the location of the Project Area is provided on Figure 1. Soil sample locations are shown on Figure 2.

As the volume of excess soil to be generated at the Project Area is estimated to be less than 2,000 m³, the planning requirements of Ontario Regulation 406/19, On-Site and Excess Soil Management (O. Reg. 406/19) O. Reg. 406/19 are not required if the soil is not related to an enhanced investigation project area (gas station, garage, used for the operation of dry-cleaning equipment, or industrial use) or for projects for which the primary purpose is to remediate contaminated lands. It is WSP's current understanding that this project meets the O. Reg. 406/19 planning exemption requirements as the Project Area is in a residential setting, has a volume of less than 2,000 m³ and the roadway is not an enhanced investigation site. The planning requirements under O. Reg. 406/19 are described as, Soil Registry, an Assessment of Past Uses (APU), a Sampling and Analysis Plan (SAP), a Soil Characterization Report (SCR), and an Excess Soil Destination Assessment Report (ESDAR). To determine the potential presence of contaminants in the soil and to satisfy the testing requirements for potential excess soil receiver sites analytical testing of the soil in accordance with O. Reg. 406/19 is recommended. The Project Area includes Shuttleworth Drain and this SCR report was prepared.

This SCR was conducted in general accordance with the requirements of clause 12 (4) (c) of Ontario Regulation 406/19 – *On-Site and Excess Soil Management* (O. Reg. 406/19). The SCR was conducted in accordance with the proposed scope of work and Terms of Reference provided in WSP's proposal / work agreement POESASW22363 dated 20 October 2022 and subsequent amendments.

Based on the results of the SCR, soil within the Project Area has been categorized into three zones (Zones 1, 2, and 3). The identified soil zones will be subject to specific requirements in terms of destination locations and/or on-site reuse. The requirements for each soil zone is provided below:

Excess Soil Zone 1 – Soil meeting Table 3 SCS (Excluding EC and SAR) for On-Site Reuse

Soils with concentrations below the Table 3 SCS were identified across the entirety of the Project Area.

The soil designated as Excess Soil Zone 1 can be reused on-site.

Excess Soil Zone 2 – Soil meeting Table 3.1 ESQS/LSL (Excluding EC and SAR) for Beneficial Off-Site Reuse

Soils with concentrations below the Table 3.1 ESQS were identified across the entirety of the Project Area.

The soil designated as Zone 2 can be reused at beneficial reuse sites where Table 3.1 ESQS for I/C/C property use apply.

Excess Soil Zone 3 – Soil exceeding Table 3.1 ESQS/LSL for Off-Site Disposal

Impacted soils exceeding the Table 3.1 ESQS/LSL were not identified at the Project Area. As such, none of the excess soil requires off-site disposal at a licenced landfill facility.

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Figure 2	Project Area Plan View

APPENDICES

Appendix A	Laboratory Certificates of Analysis
Appendix B	Limitations

LIST OF ACRONYMS AND ABBREVIATIONS

ABNs	Acid, Base, Neutral Extractables
APEC	Area of Potential Environmental Concern
APU	Assessment of Past Uses
AST	Aboveground Storage Tank
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CALA	Canadian Association for Laboratory Accreditation
C of A	Certificate of Approval
CN	Cyanide
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
COV	Combustible Organic Vapour
CPs	Chlorophenols
CSM	Conceptual Site Model
DNAPL	Dense Non-aqueous Phase Liquid
DO	Dissolved Oxygen
EC	Electrical Conductivity
EPA	Environmental Protection Act
ESA	Environmental Site Assessment
ESQS	Excess Soil Quality Standards
I/C/C	Industrial/Commercial/Community
LNAPL	Light Non-aqueous Phase Liquid
LSL	Leachate Screening Level
mASL	Metres Above Sea Level
mbgs	Metres Below Ground Surface
MECP	Ministry of the Environment, Conservation and Parks
MOE	Ministry of the Environment
MOECC	Ministry of the Environment and Climate Change
MOEE	Ministry of the Environment and Energy
MTM	Modified Transverse Mercator
MW	Monitoring Well
NAPL	Non-aqueous Phase Liquid
PCA	Potentially Contaminating Activity
OCs	Organochlorine Pesticides
ORP	Oxidation Reduction Potential
PCBs	Polychlorinated Biphenyls
PCDDs/PCDFs	Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (Dioxins and Furans)

PHCs	Petroleum Hydrocarbons
PAHs	Polycyclic Aromatic Hydrocarbons
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RDL	Reporting Detection Limit
RL	Reporting Limit
RPD	Relative Percent Difference
R/P/I	Residential/Parkland/Institutional
RSC	Record of Site Condition
SAP	Sampling and Analysis Plan
SAR	Sodium Adsorption Ratio
SCC	Standards Council of Canada
SCS	Site Condition Standard
SOA	Standing Offer Agreement
SPLP	Synthetic Precipitate Leachate Procedure
TCLP	Toxicity Characteristic Leaching Procedure
THM	Trihalomethanes
TP	Test Pit
µg/g	Micrograms per Gram
USCS	Unified Soil Classification System
UTM	Universal Transverse Mercator
TOV	Total Organic Vapour
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1 INTRODUCTION

WSP E&I Canada Limited (“WSP”), was retained by Rood Engineering Inc. (“Client”) to conduct a Soil Characterization Report (SCR) of the Shuttleworth Drain located on the north side of North Talbot Road, Tecumseh, Ontario (hereinafter referred to as the “Project Area”). A key plan showing the location of the Project Area is provided on Figure 1.

As the volume of excess soil to be generated at the Project Area is estimated to be less than 2,000 m³, the planning requirements of Ontario Regulation 406/19, On-Site and Excess Soil Management (O. Reg. 406/19) O. Reg. 406/19 are not required if the soil is not related to an enhanced investigation project area (gas station, garage, used for the operation of dry-cleaning equipment, or industrial use) or for projects for which the primary purpose is to remediate contaminated lands. It is WSP’s current understanding that this project meets the O. Reg. 406/19 planning exemption requirements as the Project Area is in a residential setting, has a volume of less than 2,000 m³ and the roadway is not an enhanced investigation site. The planning requirements under O. Reg. 406/19 are described as, Soil Registry, an Assessment of Past Uses (APU), a Sampling and Analysis Plan (SAP), a Soil Characterization Report (SCR), and an Excess Soil Destination Assessment Report (ESDAR). To determine the potential presence of contaminants in the soil and to satisfy the testing requirements for potential excess soil receiver sites analytical testing of the soil in accordance with O. Reg. 406/19 is recommended. The Project Area includes Shuttleworth Drain and this SCR report was prepared.

The SCR was conducted in accordance with the proposed scope of work and Terms of Reference provided in WSP’s proposal / work agreement POESASW22363 dated 20 October 2022 and subsequent amendments.

1.1 PROJECT AREA INFORMATION

General information concerning the Project Area is provided in Table 1.1 below.

Table 1.1: Property Information

Municipal Address	North side of North Talbot Road					
Current Project Area Use	Active Drain					
Proposed Project Area Use	Active Drain					
UTM (NAD 83)	Zone:	17T	Easting:	340328	Northing:	4677333
Estimated Excess Soil Volume	340 m ³					
Project Area Dimensions	Length:	Approximately 900 m				
	Width:	To be determined based on construction (clearing of bottom of drain)				
	Depth:	Approximately 0.3 m				

Contact information for the Project Area Owner, Project Leader and Qualified Person are provided in Table 1.2 below.

Table 1.2: Project Area Owner, Project Leader and Qualified Person Information

Project Area Owner	Town of Tecumseh	519-735-2184 917 Lesperance Road Tecumseh, Ontario N8N 1W9
Project Leader	Rood Engineering Inc.	Gerard Rood, P.Eng. gerard.reinc@gmail.com 519-322-1621 9 Nelson Street Leamington, Ontario, L8R 2K3
Qualified Person	WSP E&I Canada Limited	Cindy McKee, P.Geo., QP _{ESA} , Senior Environmental Scientist cindy.mckee@wsp.com 519-735-2499 11865 County Road 42, Tecumseh, ON N8N 0H1

2 BACKGROUND INFORMATION

2.1 ASSESSMENT OF PAST USES SUMMARY

As noted in Section 1.0, this project is exempt from the reporting requirements, and as such an APU was not completed. However, WSP completed a preliminary historical review of the Project Area and study area to identify any potential PCAs. The study area was developed for residential use and included some parkland properties. No PCAs were identified were beyond the roadway itself, as outlined in the table below.

Table 2.1: Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern
APEC-1: Shuttleworth Drain Construction	Entire Project Area	PCA 1: 30. Importation of Fill Material of Unknown Quality	On-Site: Entire Project Area	M&I, VOCs, PHCs, PAHs
APEC-2: Salt Application on North Talbot Road	Entire Project Area	PCA 2: Other. Salt Application	On-Site: Entire Project Area	EC, SAR

No other environmental, geological or geotechnical reports for the Project Area were provided to or reviewed by WSP.

2.2 SAMPLING AND ANALYSIS PLAN

Based at the volume of soil at each APEC and following the in-situ sampling protocol provided in Section 2 (3) (15) of the Excess Soil Rules Document, the sampling requirements for the Project Area and within each APEC are listed in Table 2.2 below.

Table 2.2: Summary of Required Number of Samples, Applicable Standards and Leachate Screening Levels

APEC	Approximate Soil Volume (m ³)	Associated Sample Location	Required Number of Bulk Samples	Applicable Standards	Required Number of Leachate Samples	Applicable LSL
APEC-1	340	All Sample Locations	3	Table 3.1 ESQS	0	n/a
APEC-2	340	All Sample Locations	3	Table 3.1 ESQS	0	n/a

Table 3.1 ESQS – Table 3.1 Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for Industrial/Commercial/Community Property Use
n/a – Not applicable

Sampling locations have been assessed to address APECs identified in the APU, see Figure 2 for the soil sample locations. Table 2.3 below outlines the bulk soil sampling requirements at each soil sample location to characterize the excess soil within each APEC.

Table 2.3: Summary of Required Bulk Soil Chemical Analysis Per Soil Sample

Soil Sample Identification	M&I	PHCs	BTEX	PAHs
BH-SD1	0	0	0	0
BH-SD2	1	1	1	1
BH-SD3	0	0	0	0
BH-SD4	0	0	0	0
BH-SD5	1	1	1	1
BH-SD6	0	0	0	0
BH-SD7	0	0	0	0
BH-SD8	1	1	1	1
Total	3	3	3	3
Duplicates	1	1	1	1
Duplicate samples should be collected at a rate of one (1) in ten (10) bulk samples and identified with the naming convention "DUP1, DUP2" etc.				

3 SOIL CHARACTERIZATION SCOPE OF WORK

3.1 OVERVIEW OF SITE INVESTIGATION

The investigations documented in this report were carried out to characterize the subsurface soil conditions within the Project Area with respect to the previously noted APECs and to provide an SCR compliant with the requirements of O. Reg. 406/19. This report is not intended to be a Phase Two Environmental Site Assessment and it is understood that a Record of Site Condition (RSC) filing is not required for the Project Area at this time.

The SCR was conducted in and involved the advancement of eight (8) shallow surface samples at the Project Area, identified as BH-SD1, BH-SD2, BH-SD3, BH-SD4, BH-SD5, BH-SD6, BH-SD7, and BH-SD8 to facilitate the collection of representative soil samples for laboratory analyses.

This SCR was conducted in accordance with the requirements set forth under O. Reg. 406/19 and related supporting documents established there under. The sampling methods employed in carrying out the investigations complied with the requirements established by the MECP in the document entitled *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (MOEE, 1996). The scope of work for the SCR included of the following tasks:

- Developing a site-specific Health & Safety Plan (HASP) for the intrusive work at the Project Area;
- Arranging for the locations of public and private underground and overhead;
- A subsurface soil sampling program including the sampling of eight (8) screening level surface soil samples for field screening for evidence of negative impact including the presence of “free flowing product”, using visual, olfactory and sample headspace screening methods;
- Submitting select bulk soil samples for laboratory analysis as per Table 2.2 above, suspect contaminants of potential concern (COPC) include: metals & inorganics (metals, hydrides, EC, SAR, pH, hot water soluble boron (HWS-B), hexavalent chromium (Cr(VI)), mercury (Hg) and cyanide (CN⁻); polycyclic aromatic hydrocarbons (PAHs); benzene, toluene, ethylbenzene, and xylenes (BTEX); and petroleum hydrocarbons (PHCs) F1-F4;
- Soil samples should be collected using professionally accepted methods, minimizing the potential of cross contamination, under the supervision of a qualified person;
- Comparing the analytical results reported for the bulk soil samples to the appropriate generic Site Condition Standards (SCS) established by the Ministry of the Environment, Conservation and Parks (MECP) as provided in “*Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act*” dated April 15, 2011 in order to determine on-Site reuse options;
- Comparing the analytical results reported for the bulk and leachate soil samples to the appropriate generic Excess Soil Quality Standards (ESQS) and leachate screening levels (LSL) established by the MECP as provided in “*Rules for Soil Management and Excess Soil Quantity Standards*” dated December 8, 2020 (Excess Soil Rules Document) in order to determine beneficial reuse options; and,

- Preparing a SCR, inclusive of figures, tables, stratigraphic and instrumentation logs and certificates of analysis, documenting the methodology and findings of the investigations and conclusions and recommendations regarding soil quality and the need for additional investigation and/or remedial activities, and determining the classification of potential receiver sites.

It should be noted that based on the low volume, synthetic precipitate leaching procedure (SPLP) laboratory analysis was not required. Additionally, toxic characteristic leachate procedure (TCLP) laboratory analysis was not required based on the absence of exceedances of Table 3.1 ESQS/LSL.

3.2 DEVIATIONS FROM SAMPLING AND ANALYSIS PLANS

No significant deviations were made from WSP's proposal.

4 INVESTIGATION METHODS

4.1 GENERAL

The SCR was carried out in accordance with the SAP, with the deviations listed on Section 3.2, and in accordance with the WSP Standard Operating Procedures (SOP) cited therein.

4.2 DRILLING AND EXCAVATING

The locations of all buried and overhead services were obtained prior to Initiating any of the subsurface investigations.

4.2.1 SOIL SAMPLING

The shallow soil investigation was completed by WSP utilizing a hand auger. The shallow soil samples were advanced to depth of 0.3 metres below ground surface (mbgs) on 7 November 2022. Sampling tools were washed with phosphate free soap and rinsed with distilled water between samples.

4.2.2 SHALLOW SOIL SAMPLE LOCATIONS

The shallow soil sample locations are provided in the table below and shown on Figure 2,

Table 4.1: Soil Sample Locations

Sample Identification	Station ID	Soil Location Description	Soil Description	COVs
BH-SD1	West of Station 0+004	West of Property line of 4976 North Talbot Road	Brown sand fill with clay	0 ppm
BH-SD2	Station 0+144.3	East of Driveway of 5074 North Talbot Road	Brown-grey mottled silty clay fill with trace sand and gravel	5 ppm
BH-SD3	Station 0+257.8	West Property Line of Weston Park	Brown-grey mottled silty clay fill with trace sand and gravel	0 ppm
BH-SD4	Station 0+398.5	East of Driveway of Weston Park	Brown sand fill with clay	0 ppm
BH-SD5	Station 0+528.2	West Property Line of 5466 North Talbot Road	Brown sand fill with clay	5 ppm
BH-SD6	Station 0+610.7	East of Driveway to 5480 North Talbot Road	Brown silty clay fill with organics	0 ppm
BH-SD7	Station 0+688.6	East of Driveway of 5520 North Talbot Road	Brown sand fill with organics	5 ppm
BH-SD8	Station 0+821.7	East of Driveway of 5700 North Talbot Road	Brown sand fill with clay and organics	0 ppm

4.3 SOIL SAMPLING

4.3.1 SAMPLING METHOD

The soil samples retrieved during the shallow soil sampling program were examined, classified, and logged according to soil type, moisture content, colour, consistency, and presence of visual and/or olfactory indicators of negative impact. The soil samples recovered at the Project Area were subsampled based on visual observations including fill/soil type and visual/olfactory evidence of suspected impact.

Soil samples were split into duplicate fractions upon recovery at the surface. The primary sample fractions were placed in laboratory supplied glass sample jars and stored in coolers with ice for potential laboratory analysis. Samples selected for analysis of volatile parameters including VOC (including BTEX) and PHC F1 were micro-cored and field preserved using methanol charged vials supplied by the analytical laboratory to minimize potential losses due to volatilization. The duplicate sample fractions were placed in “Ziploc” sample bags and stored at ambient temperature for subsequent field vapour screening purposes.

All soil samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. Disposable nitrile gloves were used and replaced between the handling of successive samples. All soil sampling equipment (stainless steel trowels, spatulas, etc.) was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination. Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in “Alconox” soap solution;
- Distilled water rinse;
- Methanol rinse; and
- Air dry.

Soil samples considered to be representative of “worst-case” environmental conditions were selected for chemical analysis based on visual and olfactory observations made in the field and on field screening results.

4.4 FIELD SCREENING METHODS

All soil samples were screened in the field for gross evidence of negative environmental impact including staining and odours. Soil sample headspace screening was also performed to facilitate sample selections for laboratory analysis and to provide a semi-quantitative assessment of the vertical contaminant distributions at each soil sample location. The duplicate soil sample fractions were screened for COV concentrations using the sample headspace method. COV concentrations were measured using an RKI Eagle 2 combined combustible gas analyzer (CGA). Where COV measurements were made, the instrument was operated in the methane elimination mode. The RKI Eagle 2 was calibrated at the start of the field sampling programs using hexane reference gas (1650 ppm). The resolution of the instrument is 5 ppm hexane equivalent. The instrument response is compound specific. The measured soil vapour concentrations for COV are included in the stratigraphic and instrument logs in Appendix A and discussed in Section 5.2.2.

4.5 ANALYTICAL TESTING

Representative soil samples collected during the investigation were submitted for laboratory analysis of suspect parameters of concern. All laboratory chemical analyses were conducted by Paracel Laboratories Ltd. of Hamilton, Ontario. Paracel is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) in accordance with ISO/IEC 17025:2017 – “General Requirements for the Competence of Testing and Calibration Laboratories” for the tested parameters set out in the Soil, Ground Water and Sediment Standards.

4.6 RESIDUE MANAGEMENT PROCEDURES

Investigation-derived wastes including soil cuttings generated during the investigation were placed back into the shallow soil sampling location.

4.7 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

A strict Quality Control (QA/QC) program was implemented and maintained throughout the project to ensure that the Project Area data are representative of the actual Project Area conditions. The QA/QC program provides a method of documented checks to assess the precision and accuracy of collected data. The QA/QC program includes a set of standard procedures or protocols to be followed throughout the investigations. To this end, WSP field and QA/QC protocols have been developed to meet or exceed those defined in the Ministry of the Environment (MOE) documents entitled “*Guideline for Phase II Environmental Site Assessments in Ontario*” (Draft, March 2006) and “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*” (1996) and Canadian Council of Ministers of the Environment (CCME) “*Guidance Manual Sampling, Analysis, and Data Management for Contaminated Sites*” (1993). The field QC program included the following components:

- 1 The use of personnel protective equipment including hard hats, safety glasses, safety work boots and chemically resistant latex/nitrile gloves for sample handling;
- 2 Thorough documentation of all field activities and sample handling practices including field notes, chain of custody forms, memos to file, etc.;
- 3 Thorough decontamination of non-dedicated sampling equipment employed in all investigation phases;
- 4 The use of laboratory analytical protocols and method detection limits that have been established in accordance with regulatory requirements for the Province of Ontario.

The “*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*”, 09 March 2004, amended as of 01 July 2011 (the “Analytical Protocol”), establishes performance criteria for use when assessing the reliability of data reported by analytical laboratories. These include maximum hold times for the storage of samples/sample extracts between collection and analysis, specified/approved analytical methods, required laboratory quality assurance samples such as blanks and field and laboratory duplicates, specified recovery ranges for spiked samples and surrogates (compounds added to samples in known concentrations for quality assurance purposes), Reporting Limits (RLs) and specified precision required when analyzing laboratory duplicate and spike/controlled reference material samples.

5 REVIEW AND EVALUATION

5.1 GEOLOGY

The subsurface conditions encountered at the Project Area are described in the provided in Table 4.1. In general, the soil conditions at the Project Area consisted of surficial fill consisting of sand and clay with some organics.

5.2 SOIL: FIELD SCREENING

5.2.1 STAINING AND ODOURS

No odours or staining suggestive of petroleum hydrocarbon impacts were detected in any of the soil and/or sediment samples collected at the Project Area.

5.2.2 COV/TOV CONCENTRATIONS

COV concentration headspace measurements recorded in the soil samples collected at the Project Area were all between 0 (non-detectable) and 5 ppm. These concentrations are not indicative of impact by petroleum hydrocarbons. The COV results are semi-quantitative at best and are generally only used for relative sample comparison purposes when selecting samples for laboratory analysis. The COV concentrations headspace measurements are summarized in Table 4.1.

6 REGULATORY FRAMEWORK

6.1 ONTARIO REGULATION 406/19 – GENERIC EXCESS SOIL QUALITY STANDARDS

The analytical results were compared to the criteria presented in the MECP document titled “*Rules for Soil Management and Excess Soil Quality Standards*” dated December 8, 2020. Based on the proposed volume of excess soil to be generated at the project area (340 m³), the volume independent ESQS (applicable for excess soil quantities greater than 350 m³) were applied.

Based on the requirements of the Client and the intended reuse of the excess soil, the ESQS for industrial/commercial/community (ICC) property use in potable groundwater conditions were selected for assessment purposes. The soil analytical results were assessed using the Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for ICC property Use (Table 3.1 ESQS).

6.2 ONTARIO REGULATION 406/19 – GENERIC LEACHATE SCREENING LEVEL

As the volumes of the soil being removed from the Project Area were less than 350 m³, mSPLP analysis was not required in accordance with O. Reg. 406/19.

6.3 ONTARIO REGULATION 153/04 - SOIL, GROUND WATER AND SEDIMENT STANDARDS

In order to determine suitability of soil for on Site reuse, the analytical data has been compared to O. Reg 153/04 Site Condition Standards (SCS) as described in the “*Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act*” dated 15 April 2011. In order to determine the applicable SCS, WSP reviewed the existing Project Area use and site specific conditions including: 1) the existing/proposed property use; 2) the existing/potential ground water use; 3) depth of clean-up; 4) soil texture; 5) depth to bedrock; 6) proximity to a water body; and 7) soil pH.

The SCS applicable to the Project Area have been evaluated based on the following rationale:

- There are no known areas of natural significance¹ or conditions in the vicinity of the Project Area, which would cause the Project Area to be classified as potentially sensitive according to the Ministry of Natural Resources’ Natural Heritage Information Centre web site;

¹ An “Area of Natural Significance” means any of the following: 1) An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006; 2) An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance; 3) A wetland identified by the Ministry of Natural Resources as having provincial significance; 4) An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant; 5) An area

- Based on knowledge of the area, the depth of the soil on the Project Area is greater than 2.0 mbgs;
- The Project Area is not considered a “shallow soil property” as defined by O. Reg. 153/04;
- The Project Area is in an area of non-potable ground water and the Project Area and surrounding properties are supplied with municipal water system;
- The Project Area does not include, is not adjacent to, and does not include land that is within 30 m of a water body. The Shuttleworth Drain is not considered a permanent water body. The nearest waterbody is the Detroit River located approximately 12.5 kilometers north of the Project Area. Regional ground water flow on the Project Area is anticipated to flow to the north (towards the Detroit River);
- The existing and intended future use of the Project Area is roadway (ICC);
- Soil pH values measured at the Project Area were within the required range of 5 – 9 for surface soils and 5 to 11 for subsurface soils; and,
- Based soils, subsurface soil conditions across the Project Area are likely fine, however due to no grain size being completed for the Project Area, the soils are classified to the more stringent standard (coarse textured soil) for the purposes of this assessment.

Based on the Project Area characteristics and the continued use as a municipal drain, the Table 3 SCS for I/C/C property use and coarse textured soils in a non-potable ground water condition as provided in *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act* (MECP, April 15, 2011) have been applied in assessing the soil quality at the Project Area.

designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act; 6) An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species; 7) An area which is habitat of a species that is classified under section 7 of the Endangered Species Act, 2007 as a threatened or endangered species; 8) Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies; and 9) An area set apart as a wilderness area under the Wilderness Areas Act.

7 LABORATORY ANALYSES

The results of the soil sample analyses carried out as part of this investigation are summarized in Table 1 (attached). Copies of the laboratory Certificates of Analysis are provided in Appendix A.

7.1 SOIL ANALYSIS

The results of the soil sample analyses in the context of the applicable ESQS and SCS are shown in Table 7.1 below,

Table 7.1: Soil Analysis

APEC	Approximate Soil Volume (m ³)	Table 3.1 ESQS Exceedances	Table 3 SCS Exceedances
APEC-1	340	BH-SD2 – Sodium Adsorption Ratio	BH-SD2 – Sodium Adsorption Ratio
APEC-2	340	BH-SD2 – Sodium Adsorption Ratio	BH-SD2 – Sodium Adsorption Ratio

7.2 QUALITY ASSURANCE PROGRAM

Duplicate samples are analyzed to assess the precision of the field sampling and laboratory analytical processes. Relative percent difference (RPD) acceptance limits only apply where the average of the results for the sample and its duplicate is greater than five times the laboratory reportable detection limit (RDL).

The soil field QA/QC program consisted of analyzing blind field duplicate samples for PHC F1 to F4, BTEX, PAHs, and metals and inorganics. The RPD values could not be calculated for analyzed chemical parameters with measured concentrations less than five (5) times their respective RDLs. RPDs for those parameters with measured concentrations/values greater than five (5) times their RDLs were within acceptable limits.

All samples/sample extracts were analyzed within their applicable hold times using approved analytical methods. The RLs were met for all tested parameters. No parameters were detected in any laboratory method blank. Surrogate recoveries were within acceptable ranges in all cases for all samples. Agreement between the corresponding datasets for the reference material samples where applicable and recoveries reported for spiked samples/blanks, where applicable, is acceptable. Agreement between the corresponding datasets for the laboratory duplicate samples is considered acceptable. The overall quality control for this analysis meets acceptability criteria. In summary, the analytical results reported for samples collected during this investigation are considered to have met the performance criteria of the Analytical Protocol.

8 SOIL REUSE PROTOCOL

Based on the results of the SCR, soil within the project area has been categorized into three zones (Zones 1, 2 and 3). The identified soil zones will be subject to specific requirements in terms of destination locations and/or on-Site reuse. The approximate extent of the Excess Soil Zones has been delineated to soil sample locations advanced as part of this investigation and the limits of the Project Area. The requirements for each soil zone is provided below:

8.1 EXCESS SOIL ZONE 1 – SOIL MEETING TABLE 3 SCS (EXCLUDING EC AND SAR) FOR ON-SITE REUSE

Soils with concentrations below the Table 3 SCS were identified across the entirety of the Project Area.

The soil designated as Zone 1 can be reused on-site.

8.2 EXCESS SOIL ZONE 2 – SOIL MEETING TABLE 3.1 ESQS / LSLs (EXCLUDING EC AND SAR) FOR OFF-SITE BENEFICIAL REUSE

Soils with concentrations below the Table 3.1 ESQS were identified across the entirety of the Project Area.

The soil designated as Zone 2 can be reused at beneficial reuse sites where Table 3.1 ESQS for I/C/C property use apply.

8.3 EXCESS SOIL ZONE 3 – SOIL EXCEEDING TABLE 3.1 ESQS/LSL FOR OFF-SITE DISPOSAL

Impacted soils exceeding the Table 3.1 ESQS/LSL were not identified at the Project Area. As such, none of the excess soil requires off-site disposal at a licenced landfill facility.

9 SIGNATURES

I, Terry Glendenning, B.Sc., by the signature provided below, certify that I conducted or supervised the carrying out of this SCR and the findings and conclusions of the report. I Cindy McKee, P. Geo., QP_{ESA}, by the signature provided below, certify that I completed a technical review of this SCR and concur with the findings and conclusions of the report.

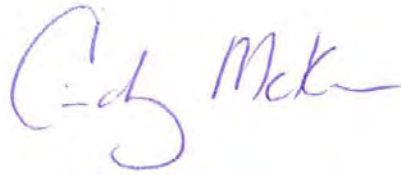
Respectfully Submitted,
WSP E&I Canada Limited

Prepared by:



Terry Glendenning, B.Sc.
Environmental Scientist
terry.glendenning@wsp.com

Reviewed by:

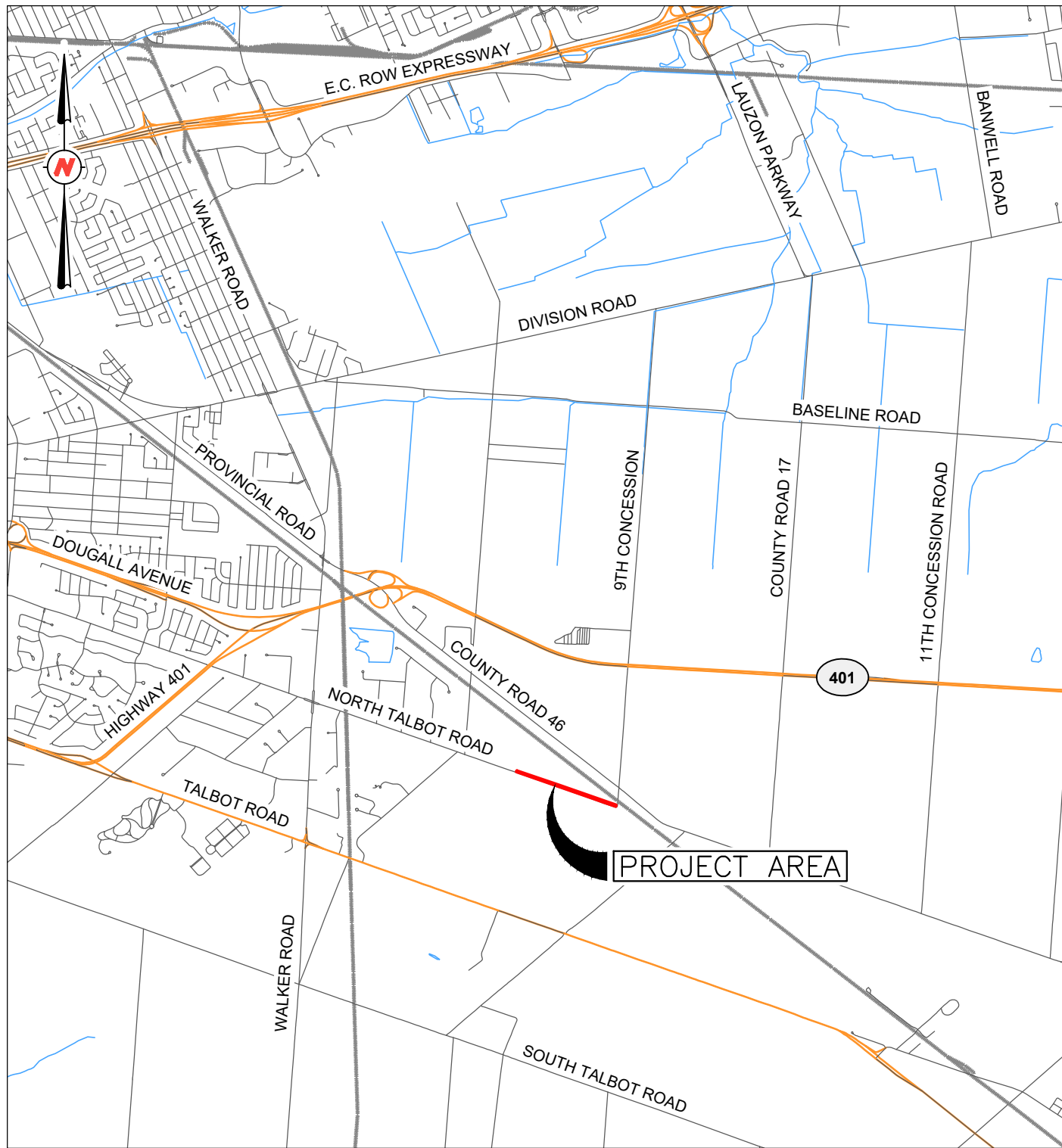


Cindy McKee, B.Sc., P.Geo., QP_{ESA}
Senior Environmental Scientist
cindy.mckee@wsp.com

10 REFERENCES

- Ontario Geologic Survey, 2007. "Paleozoic Geology of Southern Ontario (MRD219)".
- Ontario Geologic Survey, 2010. "Surficial Geology of Southern Ontario (MRD128)".
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- Ontario Ministry of Environment, Conservation and Parks., 1990. "Ontario Regulation 347/90 – General – Waste Management".
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- Ontario Ministry of the Environment and Energy, December 1996. "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario".


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NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WSP E&I CANADA LIMITED
REPORT No. OESAW2232. ALL LOCATIONS ARE APPROXIMATE.

REFERENCES:
CANMAP STREETFILES V2008.4.






ORIGINAL PAPER SIZE: 8½ x 11.

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		CHK'D BY: TG		PROJECT No: OESAW2232	
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499		DATUM: NAD83	TITLE: KEY PLAN	REV No: 0	
		PROJECTION: UTM Zone 17		FIGURE No: 1	
		SCALE: 1:50,000			

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LEGEND:

-  APPROXIMATE PROJECT AREA BOUNDARY
-  BOREHOLE LOCATION
-  EXCESS SOIL ZONE 1 – SOIL MEETING TABLE 3 SCS FOR ON-SITE REUSE (EXCLUDING EC AND SAR)
-  EXCESS SOIL ZONE 2 – SOIL MEETING TABLE 3.1 ESQS (EXCLUDING EC AND SAR) FOR BENEFICIAL OFF-SITE REUSE
-  EXCESS SOIL ZONE 3 – SOIL EXCEEDING TABLE 3.1 ESQS FOR OFF-SITE DISPOSAL


LOCATIONS (FROM APPENDIX E1 R2):
BH-SD1 - WEST OF STATION 0+004 (WEST SIDE OF WASHBROOK DRAIN)
BH-SD2 - STATION 0+144.3
BH-SD3 - STATION 0+257.8
BH-SD4 - STATION 0+398.5
BH-SD5 - STATION 0+528.2
BH-SD6 - STATION 0+610.7
BH-SD7 - STATION 0+688.6
BH-SD7 - STATION 0+821.7

NOTES:
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ALL LOCATIONS ARE APPROXIMATE.

ORIGINAL PAPER SIZE: 11 x 17

REFERENCES:
2022 AERIAL PHOTOGRAPHS BY THE COUNTY OF ESSEX.

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		CHK'D BY: TG			PROJECT No: OESAW2232	
		DATUM: NAD83			REV No: 0	
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499				TITLE: PROJECT AREA PLAN VIEW	FIGURE No: 2	

Notes on Excess Soil Analytical Summary Tables

All Units in Micrograms per Gram (µg/g) Except Where Indicated Otherwise.

RDL = Laboratory Analytical Reporting Detection Limit.

RL = MOE 2011 Analytical Protocol Reporting Limit.

- = Not Analyzed or No Published Value.

DUP = Quality Assurance/Quality Control Duplicate Sample.

RPD = Relative Percent Difference (Between Primary and Duplicate Samples).

* Denotes RPD Exceeds Recommended Alert Criterion Exceeded, However, Parameter Concentration Less than 5 Times Laboratory RDL.

< = Less Than Laboratory Analytical Reporting Detection Limit.

(a) The Boron Standards are for Hot Water Soluble Extract for All Surface Soils. For Subsurface Soils the Standards are for Total Boron (Mixed Strong Acid Digest), Since Plant Protection for Soils Below the Root Zone is not a Significant Concern.

(b) Analysis for Methyl Mercury Only Applies When Mercury (Total) Standard is Exceeded.

(c) F1 Fraction Does Not Include BTEX; However, the Proponent has the Choice as to Whether or not to Subtract BTEX from the Analytical Result.

(d) The Methylnaphthalene Standards are Applicable to Both 1-Methyl Naphthalene and 2-Methyl Naphthalene, with the Provision that if Both are Detected the Sum of the Two Must not Exceed the Standard.

55	Parameter Concentration May Exceed Applicable Standard Due to Elevated Method Detection Limit.
183	Parameter Concentration Exceeds MECP Table 3.1 Full Depth Excess Soil Standard for Industrial/Commercial/Community (I/C/C) Property Use.
797	Parameter Concentration Exceeds MECP Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for Industrial/Commercail/Community (I/C/C) Property Use.

Excess Soil Standards = Rules for Soil Management and Excess Soil Quality Standards, Ontario Ministry of the Environment, Conservation and Parks, 2019.

Inputted by: CM

Reviewed by: TG

Table 1. Summary of Excess Soil Analyses

Parameters	Sample Location				Excess Soil ESQS	EPA Standard Full Depth	BH-SD2 BH-SD2 Silty Clay 0.3 Paracel 2246133-01 11/7/2022 11/11/2022	DUP-SD3 (BH-SD2) Silty Clay 0.3 Paracel 2246133-04 11/7/2022 11/11/2022	Averag	RPD	BH-SD5 BH-SD5 Sandy Clay Fill 0.3 Paracel 2246133-02 11/7/2022 11/11/2022	BH-SD8 BH-SD8 Sandy Clay Fill 0.3 Paracel 2246133-03 11/7/2022 11/11/2022
	ATG	Units	RDL	RL								
Metals												
Antimony	Metal	µg/g	0.8	1	40	40	<	<	NC	NC	<	<
Arsenic	Metal	µg/g	1	1	18	18	9.9	10.4	10.15	4.9	6.6	4.5
Barium	Metal	µg/g	2.0	5	670	670	75.2	75.4	75.3	0.3	100	81.9
Beryllium	Metal	µg/g	0.4	2	8	8	0.8	0.8	0.8	0.0	0.6	<
Boron, available	Metal	µg/g	0.5	0.5	2	2	0.7	0.6	0.65	15.4	1.0	0.9
Boron (total)	Metal	µg/g	5	5	120	120	8.7	11.6	10.15	28.6	6.9	<
Cadmium	Metal	µg/g	0.5	1	1.9	1.9	<	<	NC	NC	0.6	<
Chromium VI	Metal	µg/g	0.2	0.2	8	10	0.2	<	NC	NC	<	<
Chromium Total	Metal	µg/g	5	5	160	160	23.7	24.5	24.1	3.3	25.0	10.6
Cobalt	Metal	µg/g	0.5	2	80	80	10.8	10.7	10.75	0.9	6.9	3.8
Copper	Metal	µg/g	1.0	5	230	230	18.8	19.1	18.95	1.6	30.0	13.6
Lead	Metal	µg/g	1	10	120	120	11.5	11.4	11.45	0.9	28.5	13.2
Mercury	Metal	µg/g	0.1	0.1	0.27	20	<	<	NC	NC	<	<
Molybdenum	Metal	µg/g	0.5	2	40	40	1.9	2	1.95	5.1	1.5	1.9
Nickel	Metal	µg/g	1	5	270	270	30.2	29	29.6	4.1	20.4	11.1
Selenium	Metal	µg/g	0.8	1	5.5	5.5	<	<	NC	NC	<	<
Silver	Metal	µg/g	0.5	0.5	40	40	<	<	NC	NC	<	<
Thallium	Metal	µg/g	0.5	1	3.3	3.3	<	<	NC	NC	<	<
Uranium	Metal	µg/g	0.50	1	33	33	1.0	1.1	1.05	9.5	<	<
Vanadium	Metal	µg/g	0.4	10	86	86	40.4	43.7	42.05	7.8	31.4	18.6
Zinc	Metal	µg/g	5	30	340	340	58.4	58.5	58.45	0.2	191	54.7
Other Regulated Parameters												
Sodium Adsorption Ratio	ORP	-	n/a	5	12	12	13.2	11.2	12.2	16.4	3.1	8
Electrical Conductivity (mS/cm)	ORP	mS/cm	0.005	0.7	1.4	1.4	1.04	1.13	1.085	8.3	0.396	0.758
Cyanide, free	ORP	µg/g	0.03	0.03	0.051	0.051	<	<	<	<	<	<
pH	ORP	-	n/a	0.1	12	12	6.78	7.32	7.05	7.7	7.08	7.3
Petroleum Hydrocarbons												
Petroleum Hydrocarbons F1 ^a	PHC	µg/g	7	10	25	55	<	<	NC	NC	<	<
Petroleum Hydrocarbons F2	PHC	µg/g	4	10	26	230	<	<	NC	NC	<	<
Petroleum Hydrocarbons F3	PHC	µg/g	8	50	1700	1700	<	16	NC	NC	134	137
Petroleum Hydrocarbons F4	PHC	µg/g	6	50	3300	3300	<	<	NC	NC	248	439
Volatile Organic Compounds												
Benzene	VOC	µg/g	0.02	0.02	0.034	0.32	<	<	NC	NC	<	<
Toluene	VOC	µg/g	0.05	0.2	7.8	9.5	<	<	NC	NC	<	<
Ethylbenzene	VOC	µg/g	0.05	0.05	1.9	68	<	<	NC	NC	<	<
Xylenes, m,p-	VOC	µg/g	0.05	-	-	-	<	<	NC	NC	<	<
Xylene, o-	VOC	µg/g	0.05	-	-	-	<	<	NC	NC	<	<
Xylene Mixture	VOC	µg/g	0.05	0.05	3	26	<	<	NC	NC	<	<
Semi-Volatiles												
Acenaphthene	sVOC	µg/g	0.02	0.02	15	96	<	<	NC	NC	<	<
Acenaphthylene	sVOC	µg/g	0.02	0.02	0.093	0.15	<	<	NC	NC	<	<
Anthracene	sVOC	µg/g	0.02	0.02	0.16	0.67	<	<	NC	NC	<	<
Benzo[a]anthracene	sVOC	µg/g	0.02	0.02	1	0.96	<	<	NC	NC	0.03	0.04
Benzo[a]pyrene	sVOC	µg/g	0.02	0.02	0.7	0.3	<	<	NC	NC	0.04	0.04
Benzo[b]fluoranthene	sVOC	µg/g	0.02	0.02	7	0.96	<	<	NC	NC	0.04	0.04
Benzo[g,h,i]perylene	sVOC	µg/g	0.02	0.02	13	9.6	<	<	NC	NC	0.04	0.03
Benzo[k]fluoranthene	sVOC	µg/g	0.02	0.02	7	0.96	<	<	NC	NC	<	<
Chrysene	sVOC	µg/g	0.02	0.02	14	9.6	<	<	NC	NC	0.03	0.03
Dibenzo[a,h]anthracene	sVOC	µg/g	0.02	0.02	0.7	0.1	<	<	NC	NC	<	<
Fluoranthene	sVOC	µg/g	0.02	0.02	70	9.6	<	<	NC	NC	0.07	0.07
Fluorene	sVOC	µg/g	0.02	0.02	6.8	62	<	<	NC	NC	<	<
Indeno [1,2,3-cd] pyrene	sVOC	µg/g	0.02	0.02	0.76	0.76	<	<	NC	NC	0.04	0.04
1-Methylnaphthalene	sVOC	µg/g	0.02	0.02	8.7	76	<	<	NC	NC	<	<
2-Methylnaphthalene	sVOC	µg/g	0.02	0.02	8.7	76	<	<	NC	NC	<	<
Methylnaphthalene (1&2)	sVOC	µg/g	0.04	0.04	8.7	76	<	<	NC	NC	<	<
Naphthalene	sVOC	µg/g	0.01	0.01	1.8	9.6	<	<	NC	NC	<	<
Phenanthrene	sVOC	µg/g	0.02	0.02	12	12	<	<	NC	NC	0.03	0.02
Pyrene	sVOC	µg/g	0.02	0.02	70	96	<	<	NC	NC	0.04	0.05

Appendix A

Laboratory Certificates of Analysis

Certificate of Analysis

WSP E&I Canada Limited (Windsor)

11865 County Road 42
Tecumseh, ON N8N 2M1
Attn: Cindy McKee

Client PO: OESAW2232.****.****.5120.573000

Project: OESAW2232.****.****.5120.573000

Custody:

Report Date: 11-Nov-2022

Order Date: 7-Nov-2022

Order #: 2246133

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2246133-01	BH-SD2
2246133-02	BH-SD5
2246133-03	BH-SD8
2246133-04	DUP-SD3

Approved By:



Milan Ralitsch, PhD

Senior Technical Manager

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.8 - ICP-MS	10-Nov-22	10-Nov-22
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	9-Nov-22	11-Nov-22
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	9-Nov-22	11-Nov-22
Conductivity	MOE E3138 - probe @25 °C, water ext	10-Nov-22	10-Nov-22
Cyanide, free	MOE E3015 - Auto Colour, water extraction	9-Nov-22	9-Nov-22
Mercury by CVAA	EPA 7471B - CVAA, digestion	10-Nov-22	11-Nov-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	8-Nov-22	9-Nov-22
PHC F1	CWS Tier 1 - P&T GC-FID	9-Nov-22	11-Nov-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Nov-22	11-Nov-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	10-Nov-22	10-Nov-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	9-Nov-22	10-Nov-22
SAR	Calculated	10-Nov-22	11-Nov-22
Solids, %	CWS Tier 1 - Gravimetric	9-Nov-22	9-Nov-22

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Summary of Criteria Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances.

Sample	Analyte	MDL / Units	Result	-	-
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Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Client ID:	BH-SD2	BH-SD5	BH-SD8	DUP-SD3		
Sample Date:	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	-	-
Sample ID:	2246133-01	2246133-02	2246133-03	2246133-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	82.1	89.6	83.6	81.3	-	-
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General Inorganics

SAR	0.01 N/A	13.2	3.10	8.00	11.2	-	-
Conductivity	5 uS/cm	1040	369	758	1130	-	-
Cyanide, free	0.03 ug/g	<0.03	<0.03	<0.03	<0.03	-	-
pH	0.05 pH Units	6.78	7.08	7.30	7.32	-	-

Metals

Antimony	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1 ug/g	9.9	6.6	4.5	10.4	-	-
Barium	1 ug/g	75.2	100	81.9	75.4	-	-
Beryllium	0.5 ug/g	0.8	0.6	<0.5	0.8	-	-
Boron	5 ug/g	8.7	6.9	<5.0	11.6	-	-
Boron, available	0.5 ug/g	0.7	1.0	0.9	0.6	-	-
Cadmium	0.5 ug/g	<0.5	0.6	<0.5	<0.5	-	-
Chromium (VI)	0.2 ug/g	0.2	<0.2	<0.2	<0.2	-	-
Chromium	5 ug/g	23.7	25.0	10.6	24.5	-	-
Cobalt	1 ug/g	10.8	6.9	3.8	10.7	-	-
Copper	5 ug/g	18.8	30.0	13.6	19.1	-	-
Lead	1 ug/g	11.5	28.5	13.2	11.4	-	-
Mercury	0.1 ug/g	<0.1	<0.1	<0.1	<0.1	-	-
Molybdenum	1 ug/g	1.9	1.5	1.9	2.0	-	-
Nickel	5 ug/g	30.2	20.4	11.1	29.0	-	-
Selenium	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Client ID:	BH-SD2	BH-SD5	BH-SD8	DUP-SD3		
Sample Date:	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	-	-
Sample ID:	2246133-01	2246133-02	2246133-03	2246133-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Metals

Uranium	1 ug/g	1.0	<1.0	<1.0	1.1	-	-
Vanadium	10 ug/g	40.4	31.4	18.6	43.7	-	-
Zinc	20 ug/g	58.4	191	54.7	58.5	-	-

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene-d8	Surrogate	91.3%	96.2%	94.2%	93.1%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g	<8	134	137	16	-	-
F4 PHCs (C34-C50)	6 ug/g	<6	248	439	<6	-	-

Semi-Volatiles

Acenaphthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Benzo [a] anthracene	0.02 ug/g	<0.02	0.03	0.04	<0.02	-	-
Benzo [a] pyrene	0.02 ug/g	<0.02	0.04	0.04	<0.02	-	-
Benzo [b] fluoranthene	0.02 ug/g	<0.02	0.04	0.04	<0.02	-	-
Benzo [g,h,i] perylene	0.02 ug/g	<0.02	0.04	0.03	<0.02	-	-
Benzo [k] fluoranthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Client ID:	BH-SD2	BH-SD5	BH-SD8	DUP-SD3		
Sample Date:	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	07-Nov-22 00:00	-	-
Sample ID:	2246133-01	2246133-02	2246133-03	2246133-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Semi-Volatiles

Chrysene	0.02 ug/g	<0.02	0.03	0.03	<0.02	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Fluoranthene	0.02 ug/g	<0.02	0.07	0.07	<0.02	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	<0.02	0.04	0.04	<0.02	-	-
1-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Methylnaphthalene (1&2)	0.03 ug/g	<0.03	<0.03	<0.03	<0.03	-	-
Naphthalene	0.01 ug/g	<0.01	<0.01	<0.01	<0.01	-	-
Phenanthrene	0.02 ug/g	<0.02	0.03	0.02	<0.02	-	-
Pyrene	0.02 ug/g	<0.02	0.04	0.05	<0.02	-	-
2-Fluorobiphenyl	Surrogate	62.8%	55.3%	68.3%	81.4%	-	-
Terphenyl-d14	Surrogate	73.0%	50.8%	63.5%	73.8%	-	-

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics								
SAR	ND	0.01	N/A					
Conductivity	ND	5	uS/cm					
Cyanide, free	ND	0.03	ug/g					
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron, available	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium (VI)	ND	0.2	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Mercury	ND	0.1	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					

Certificate of Analysis

Report Date: 11-Nov-2022

Client: **WSP E&I Canada Limited (Windsor)**

Order Date: 7-Nov-2022

Client PO: **OESAW2232.****.5120.573000**

Project Description: **OESAW2232.****.5120.573000**

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					
Benzo [g,h,i] perylene	ND	0.02	ug/g					
Benzo [k] fluoranthene	ND	0.02	ug/g					
Chrysene	ND	0.02	ug/g					
Dibenzo [a,h] anthracene	ND	0.02	ug/g					
Fluoranthene	ND	0.02	ug/g					
Fluorene	ND	0.02	ug/g					
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g					
1-Methylnaphthalene	ND	0.02	ug/g					
2-Methylnaphthalene	ND	0.02	ug/g					
Methylnaphthalene (1&2)	ND	0.03	ug/g					
Naphthalene	ND	0.01	ug/g					
Phenanthrene	ND	0.02	ug/g					
Pyrene	ND	0.02	ug/g					
Surrogate: 2-Fluorobiphenyl	0.363		ug/g	72.6	50-140			
Surrogate: Terphenyl-d14	0.371		ug/g	74.1	50-140			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	7.37		ug/g	92.1	50-140			

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.5120.573000

Project Description: OESAW2232.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	2.51	0.01	N/A	2.39			4.9	30	
Conductivity	1240	5	uS/cm	1230			0.4	5	
Cyanide, free	ND	0.03	ug/g	ND			NC	35	
pH	7.79	0.05	pH Units	7.79			0.0	10	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	161	8	ug/g	153			5.1	30	
F4 PHCs (C34-C50)	148	6	ug/g	189			24.3	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	5.9	1.0	ug/g	5.6			5.3	30	
Barium	51.9	1.0	ug/g	57.3			9.8	30	
Beryllium	0.9	0.5	ug/g	0.8			6.4	30	
Boron, available	1.68	0.5	ug/g	1.38			19.6	35	
Boron	12.5	5.0	ug/g	10.9			13.7	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium (VI)	ND	0.2	ug/g	0.2			NC	35	
Chromium	23.5	5.0	ug/g	25.1			6.5	30	
Cobalt	11.7	1.0	ug/g	12.3			5.2	30	
Copper	28.8	5.0	ug/g	30.0			4.0	30	
Lead	12.4	1.0	ug/g	12.9			4.0	30	
Mercury	ND	0.1	ug/g	ND			NC	30	
Molybdenum	3.2	1.0	ug/g	ND			NC	30	
Nickel	22.9	5.0	ug/g	24.1			5.1	30	
Selenium	2.0	1.0	ug/g	ND			NC	30	
Silver	0.4	0.3	ug/g	ND			NC	30	
Thallium	1.1	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	31.9	10.0	ug/g	35.1			9.5	30	

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.5120.573000

Project Description: OESAW2232.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Zinc	79.7	20.0	ug/g	75.0			6.1	30	
Physical Characteristics									
% Solids	81.5	0.1	% by Wt.	82.1			0.7	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	0.346		ug/g		56.9	50-140			
Surrogate: Terphenyl-d14	0.420		ug/g		69.2	50-140			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	8.20		ug/g		92.6	50-140			

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
Cyanide, free	0.887	0.03	ug/g	ND	88.7	70-130			
Hydrocarbons									
F1 PHCs (C6-C10)	60	7	ug/g	ND	84.2	80-120			
F2 PHCs (C10-C16)	87	4	ug/g	ND	93.4	60-140			
F3 PHCs (C16-C34)	378	8	ug/g	153	108	60-140			
F4 PHCs (C34-C50)	463	6	ug/g	189	182	60-140			QM-4X
Metals									
Antimony	135	1.0	ug/g	ND	108	70-130			
Arsenic	134	1.0	ug/g	5.6	103	70-130			
Barium	192	1.0	ug/g	57.3	108	70-130			
Beryllium	115	0.5	ug/g	0.8	91.3	70-130			
Boron, available	6.03	0.5	ug/g	1.38	93.0	70-122			
Boron	123	5.0	ug/g	10.9	89.6	70-130			
Cadmium	126	0.5	ug/g	ND	101	70-130			
Chromium (VI)	4.7	0.2	ug/g	0.2	74.0	70-130			
Chromium	151	5.0	ug/g	25.1	101	70-130			
Cobalt	134	1.0	ug/g	12.3	97.7	70-130			
Copper	155	5.0	ug/g	30.0	99.7	70-130			
Lead	132	1.0	ug/g	12.9	95.4	70-130			
Mercury	1.54	0.1	ug/g	ND	103	70-130			
Molybdenum	133	1.0	ug/g	ND	107	70-130			
Nickel	153	5.0	ug/g	24.1	103	70-130			
Selenium	131	1.0	ug/g	ND	105	70-130			
Silver	101	0.3	ug/g	ND	80.8	70-130			
Thallium	122	1.0	ug/g	ND	97.3	70-130			
Uranium	129	1.0	ug/g	ND	103	70-130			
Vanadium	160	10.0	ug/g	35.1	100	70-130			
Zinc	210	20.0	ug/g	75.0	108	70-130			
Semi-Volatiles									
Acenaphthene	0.461	0.02	ug/g	ND	75.8	50-140			

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Acenaphthylene	0.465	0.02	ug/g	ND	76.6	50-140			
Anthracene	0.464	0.02	ug/g	ND	76.3	50-140			
Benzo [a] anthracene	0.461	0.02	ug/g	ND	75.8	50-140			
Benzo [a] pyrene	0.443	0.02	ug/g	ND	72.8	50-140			
Benzo [b] fluoranthene	0.405	0.02	ug/g	ND	66.7	50-140			
Benzo [g,h,i] perylene	0.418	0.02	ug/g	ND	68.7	50-140			
Benzo [k] fluoranthene	0.403	0.02	ug/g	ND	66.3	50-140			
Chrysene	0.418	0.02	ug/g	ND	68.8	50-140			
Dibenzo [a,h] anthracene	0.505	0.02	ug/g	ND	83.1	50-140			
Fluoranthene	0.492	0.02	ug/g	ND	80.9	50-140			
Fluorene	0.522	0.02	ug/g	ND	85.8	50-140			
Indeno [1,2,3-cd] pyrene	0.456	0.02	ug/g	ND	75.1	50-140			
1-Methylnaphthalene	0.406	0.02	ug/g	ND	66.9	50-140			
2-Methylnaphthalene	0.406	0.02	ug/g	ND	66.8	50-140			
Naphthalene	0.441	0.01	ug/g	ND	72.5	50-140			
Phenanthrene	0.453	0.02	ug/g	ND	74.5	50-140			
Pyrene	0.383	0.02	ug/g	ND	63.0	50-140			
Surrogate: 2-Fluorobiphenyl	0.441		ug/g		72.6	50-140			
Surrogate: Terphenyl-d14	0.436		ug/g		71.7	50-140			
Volatiles									
Benzene	4.20	0.02	ug/g	ND	105	60-130			
Ethylbenzene	3.89	0.05	ug/g	ND	97.4	60-130			
Toluene	4.32	0.05	ug/g	ND	108	60-130			
m,p-Xylenes	7.52	0.05	ug/g	ND	93.7	60-130			
o-Xylene	3.84	0.05	ug/g	ND	95.9	60-130			
Surrogate: Toluene-d8	8.29		ug/g		104	50-140			

Certificate of Analysis

Report Date: 11-Nov-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 7-Nov-2022

Client PO: OESAW2232.****.****.5120.573000

Project Description: OESAW2232.****.****.5120.573000

Qualifier Notes:**QC Qualifiers:**

QM-4X The spike recovery was outside of QC acceptance limits due to elevated analyte concentration.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Client Name: Wood E&I Solutions	Project Reference: OESAW2232 ****.5120.573000	TAT: <input checked="" type="checkbox"/> Regular <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day Date Required: _____
Contact Name: Cindy McKee	Quote #: 21-332	
Address: 11865 County Road 42, Tecumseh, Ontario, N8N 2M1	PO #: No PO, use project reference	
Telephone: 519-735-2499	Email Address: cindy.mckee@woodplc.com terry.glendenning@woodplc.com	
Criteria: <input type="checkbox"/> O. Reg. 153/04 (As Amended) Table <input type="checkbox"/> RSC Filing <input type="checkbox"/> O. Reg. 558/00 <input type="checkbox"/> WQO <input type="checkbox"/> CCME <input type="checkbox"/> SUB (Storm) <input type="checkbox"/> SUB (Sanitary) Municipality: _____ <input checked="" type="checkbox"/> Other: O. Reg. 406/19		

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)							Required Analyses														
Parcel Order Number:			Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	O.Reg. 153 M&I						
						Date	Time														
Sample ID/Location Name																					
1	BH-SD2		S		3	7-Nov-22	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	BH-SD5		S		3	7-Nov-22	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	BH-SD8		S		3	7-Nov-22	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	DUP-SD3		S		3	7-Nov-22	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments: Use COC sample ID if difference between COC and soil jar Compare to Table 1 SCS and Table 3.1				Method of Delivery: <u>Work in</u>	
Relinquished By (Sign):	Received by Driver/Depot: <u>K. Jakobson</u>	Received at Lab: <u>C-Plu</u>	Verified By: <u>C-Plu</u>		
Relinquished By (Print): Terry Glendenning	Date/Time: <u>Nov 7/22 14:50</u>	Date/Time: <u>Nov 8/22 9:59</u>	Date/Time: <u>Nov 9/22 12:44</u>		
Date/Time: Nov 7, 2022 at 3 pm	Temperature: <u>18.0</u> °C	Temperature: <u>7.6</u> °C	pH Verified [] By: _____		

Appendix B

Limitations

LIMITATIONS

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
 - a. The Standard Terms and Conditions which form a part of our Professional Services Contract;
 - b. The Scope of Services;
 - c. Time and Budgetary limitations as described in our Contract; and
 - d. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in WSP's opinion, for direct observation.
4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal bylaws, orders-in-council, legislative enactments and regulations was not performed.
5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on-site and may be revealed by different or other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, WSP must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of WSP's services during the implementation of any remedial measures will allow WSP to observe compliance with the conclusions and recommendations contained in the report. WSP's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. WSP accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of WSP.
11. Provided that the report is still reliable, and less than 12 months old, WSP will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on WSP's report, by such reliance agree to be bound by our proposal and WSP's standard reliance letter. WSP's standard reliance letter indicates that in no event shall WSP be liable for any damages, howsoever arising, relating to third-party reliance on WSP's report. No reliance by any party is permitted without such agreement.

The Corporation of the Town of Tecumseh

By-Law Number 2023 - 028

Being a bylaw to provide for the repair and improvements to the Sullivan Creek Drain

Whereas the Council of The Corporation of the Town of Tecumseh (hereafter “Town”) has been requested to provide for the repair and improvement of the Sullivan Creek Drain;

And Whereas the Town procured a Drainage Report for the Sullivan Creek Drain and specifications from the consulting engineering firm of Gerard Rood of Rood Engineering Inc., dated January 9, 2023 (hereafter “Drainage Report”);

And Whereas notice of a Public Meeting to hear comments from the affected property owners was given on Tuesday, February 14, 2023;

And Whereas a Public Meeting of Council was held on Tuesday, February 28, 2023, at 6:30 pm to hear from any affected property owners on the Drainage Report;

And Whereas the Council of The Corporation of the Town of Tecumseh is of the opinion that the repair and improvement of the Sullivan Creek Drain is desirable;

Now Therefore the Council of The Corporation of The Town of Tecumseh Enacts as follows:

1. **That** the Drainage Report providing for the repair and improvement of the Sullivan Creek Drain, dated January 9, 2023, as prepared by the consulting engineering firm Rood Engineering Inc. and attached hereto as Schedule “A” to this by-law, is hereby adopted and the drainage works as therein indicated and set forth is hereby approved and shall be completed in accordance therewith.
2. **That** the Treasurer, subject to the approval of Council, may agree with any bank or person for temporary advances of money to meet the costs of construction pending the completion of the drain and grants and computed payments are received.
3. **That** the Town may issue debentures for the amount borrowed and the amount of such debentures shall be reduced to the total amount of:
 - a) Grants received under Section 85 of the said Act;
 - b) Commuted payments made in respect of land and roads assessed.

4. **That** such debentures shall be made payable within five (5) years from the date of the debenture and shall bear interest at a rate as approved by resolution of Council.
5. **That** the specifications and General Specifications as established are adopted as set out in the Drainage Report which forms part of this by-law.
6. **That** the Mayor and Clerk are authorized to cause a contract for the construction of the works to be made and entered into with some person or persons, firm or corporations, subject to the approval of the Council to be declared by resolution.
7. **That** this by-law shall come into force upon and after the final passing thereof.

Read a first and second time this 28th day of February, 2023.

Gary McNamara, Mayor

Robert Auger, Clerk

Read a third and final time this **Choose an item.** day of **Choose an item.**, 2023.

Gary McNamara, Mayor

Robert Auger, Clerk

SULLIVAN CREEK DRAIN
E09SU(102)

Repair and Improvement
Geographic Township of Sandwich South
TOWN OF TECUMSEH



Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario N8N 1W9
519-735-2184

Rood Engineering Inc.
Consulting Engineers
9 Nelson Street
Leamington, Ontario N8H 1G6
519-322-1621

REI Project 2015D010
January 9th, 2023

January 9th, 2023

Mayor and Municipal Council
Corporation of the Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario
N8N 1W9

Mayor McNamara and Members of Council:

**SULLIVAN CREEK DRAIN
E09SU(102)
Repair and Improvement
(Geographic Twp. of Sandwich South)
Project REI2015D010
Town of Tecumseh, County of Essex**

I. INTRODUCTION

In accordance with the instructions provided at your April 28th, 2015 meeting and received from the Town by letter dated May 27th, 2015, from your Director Corporate Services and Clerk, Laura Moy, we have prepared the following report that provides for repair and improvements of the open drain, along with inspection of the bridges located along the drain. The Sullivan Creek Drain comprises of an open drain generally located approximately 740 metres east of Sexton Road and 400 metres south of County Road 46. It meanders north easterly for approximately 5 km where it outlets to the Pike Creek Drain at a point approximately 760 metres north of Baseline Road and 480 metres west of County Road 19 (Manning Road) respectively, in the geographic Township of Sandwich South, Town of Tecumseh. A plan showing the Sullivan Creek Drain, as well as the general location of the bridges along the drain, is included herein as part of the report.

Our appointment and the works relative to the improvements to the Sullivan Creek Drain, proposed under this report, is in accordance with Section 78 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2010". We have performed all of the necessary survey, investigations, etcetera, for the proposed bridge and drain improvements, and we report thereon as follows.

II. BACKGROUND

From our review of the information provided from the Municipality's drainage files we have established the following reports that we utilized as reference for carrying out this project:

- | | | | |
|----|--------------------|--------------------------------------|---------------------------|
| 1) | October 24th, 1977 | Sullivan Creek Drain (upper portion) | Maurice Armstrong, P.Eng. |
| 2) | May 24th, 1983 | Sullivan Creek Drain (lower portion) | Maurice Armstrong, P.Eng. |

Report - Sullivan Creek Drain
(Geographic Township of Sandwich South)
Town of Tecumseh - REI2015D010

2023-01-09

3) December 9th, 1966 Sullivan Creek Drain C.G.R. Armstrong, P.Eng.

The 1983 Report by Maurice Armstrong, P.Eng., provided for maintenance of the lower portion of Sullivan Creek Drain and has the latest profile for the grading of the drain for that section.

The 1977 Report by Maurice Armstrong, P.Eng., provided for maintenance of the upper portion of Sullivan Creek Drain and has a profile with the grading of the drain for that section.

We arranged with the Town to provide us with the updated assessment roll information for the affected parcels. We also reviewed reports for the abutting drains to help in establishing the current watershed limit for the Sullivan Creek Drain.

III. PRELIMINARY EXAMINATION AND ON-SITE MEETING

After reviewing all of the drainage information provided by the Town, we arranged with the Town Drainage Superintendent Sam Paglia, P.Eng., to schedule an on-site meeting for October 21st, 2015. The following people were in attendance at said meeting: John Wilson, Joseph and Brenda Gagnon, Leo Labbee, Joset Dworatscheu, Gerald Lavin, Richard Lafreniere, John Walton for Carl Battersby, Rosanne St. Louis, Steno Novelletto, Ken and Barb McCarthy, Joe McCarthy, Guy Robertson, Karyn Templin (County of Essex), Sam Paglia (Town Drainage Superintendent), Kory Snelgrove (Rood Engineering) and Gerard Rood (Rood Engineering).

Mr. Paglia introduced himself and reviewed some of the history of the drain. The Town had received a request for maintenance, and because of the age of the last report and the poor condition of the drain, the Town is proceeding with an engineer's report under Section 78 of the Drainage Act. The on-site meeting is the initial step in the process. The Town then asks the engineer for a draft report, and they schedule an information meeting and open house (Public Information Centre meeting) with the owners and engineer to discuss the report and plans. A final report is then prepared and submitted to Council and goes through the Drainage Act process of a Consideration meeting and Court of Revision meeting.

Mr. Rood noted that there has been some maintenance work in 1983 based on Town records, but the drain is now badly overgrown with trees and brush and appears to have a significant accumulation of sediment in some portions of the drain as per the investigations by the Town.

Mr. Rood asked the owners to provide information on any drainage changes that they might be aware of. The owners told us that there was a bridge at the O'Neil property. They were advised that the bridge will be picked up as part of the survey and inspected for its condition. The condition of the O'Neil bridge was found to be very poor, so the bridge will be replaced as part of the works.

The owners were advised that trees may be left on the top of the bank for environmental purposes. All trees within the drain cross section from top of bank to top of bank will be removed to prevent obstruction of drainage. The west side will be basically cleared for access to carry out the work and dispose of material; however, some mature trees may be able to be saved if the Contractor can work around them.

IV. FIELD SURVEY AND INVESTIGATIONS

Subsequent to the on-site meeting we arranged for a topographic survey of the drain and bridges to be completed. We further arranged to get updated assessment roll information from the

Municipality and obtained information on the tax class of each of the properties affected by the Municipal Drain. We were able to contact Jay O'Neil and discuss his bridge.

We also made initial submissions to the Essex Region Conservation Authority regarding their requirements or any D.F.O. requirements for work that would be proposed to be carried out on the access bridges within the Sullivan Creek Drain open channel. A response from the Conservation Authority was received by email on March 31st, 2015 and indicated that the proposed works cannot change the 1:100 year flood elevations. The Town must also perform a self assessment through the D.F.O. website. A copy of the concerns and requirements to satisfy E.R.C.A. and D.F.O. is included in **Appendix "REI-A"** of this report.

We also arranged to review the "Ministry of Natural Resources & Forestry (M.N.R.F.) Species at Risk (S.A.R.) Mitigation Plan for Drainage Works (March 2018-17-4938)" that the Town has prepared to address the Endangered Species Act, 2007. Section 6.0 of the Mitigation Plan indicates that snake species are a concern for this work area and although turtles are not indicated, they are mobile and could be encountered. The Mitigation Plan includes measures to be followed as outlined in "Section 7.0 Mitigation Measures" of the document and a copy of same as it relates to turtles and snakes is included in **Appendix "REI-B"**. Providing mitigation requirements are implemented, it was concluded that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007 that is administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.). Based on this information we find that the Town can proceed with the eligible repairs, maintenance, and improvements to the drain as they are exempt under Sections 9 and 10 of the Act, provided that they follow the rules within Ontario Regulation 242/08 and the Mitigation Measures in their S.A.R. Mitigation Plan. To address these requirements the Town has established comprehensive mitigation measures as well as species identification guides for reference. Copies of the measures and guides shall be provided to the successful Tenderer for use during construction, and these documents are available for viewing by any interested parties at the Town office.

V. BRIDGES REVIEW

As part of our investigations, we made detailed inspections of each of the bridges along the open drain. Their condition and proposed work if any are summarized as follows:

1. This bridge serves parcel 460-01000 owned by Michael Lutsch. The 6.4m long 400mm diameter C.S.P. (corrugated steel pipe) was found to be in poor condition with the bottom beginning to rust out and will need to be replaced under maintenance in the near future.
2. This bridge serves parcel 460-01100 owned by Thomas Halford. This 27.2m long 500mm diameter C.S.P. bridge is in fair condition but has significant dirt accumulation almost halfway up the pipe and will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
3. This bridge serves parcel 460-01200 owned by Thomas and Linda Halford providing access to the residence. The east part of this 39.8m long 600mm diameter C.S.P. bridge serves the east portion of a shared access to the property and is in fair condition but has significant dirt accumulation in the pipe that will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
4. This bridge serves parcel 460-01200 owned by Thomas and Linda Halford providing access to the farm land portion. The west part of this 39.8m long 600mm diameter C.S.P. bridge serves the west portion of a shared access to the property and is in fair condition but has

- significant dirt accumulation in the pipe that will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
5. This bridge serves parcel 460-01300 owned by Rosemary Halford. This 6.7m long 600mm diameter C.S.P. is in fair condition but has fill accumulation to almost the mid point of the pipe that will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 6. This bridge serves parcel 460-01400 owned by Thomas Halford. This 6.1m long 700mm diameter C.S.P. is in fair condition but has fill accumulation to almost the mid point of the pipe that will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 7. This bridge serves parcel 460-01500 owned by Michael and Helen Lavin. This 10.4m long 700mm C.S.P. is in fair condition but has fill accumulation to almost the mid point of the pipe that will require cleaning under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 8. This bridge serves King's Highway No. 3 and is a concrete structure with a 1.3m X 2.4m opening that is relatively new and in good condition.
 9. This bridge serves parcel 480-08410 owned by Gerald and Agnes Lavin. This 7.7m long 1200mm diameter C.S.P. is in fair condition with wood beam headwalls requiring some repairs as provided for under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 10. This bridge serves parcel 520-01000 owned by Canada Southern Railway Company. This 13m long concrete span bridge with a 1.2m X 1.54m opening is in good condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 11. This bridge serves parcel 480-08400 owned by Gerald and Agnes Lavin. The structure is a deteriorated steel beam and wood structure with a 3m top width located just north of the former railroad bridge and this structure will be removed under this report. We recommend that the bridge be abandoned pursuant to Section 19 of the Drainage Act.
 12. This bridge serves parcel 480-08400 owned by Gerald and Agnes Lavin and is the primary access serving the parcel. This 6.1m long 1700mm diameter C.S.P. bridge is narrow by today's standards but is in fair condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 13. This bridge serves County Road 46 and comprises two (2) corrugated steel pipes of 2000mm diameter with concrete headwalls. The bridge is in fair condition. The report and plans will provide the Town and County of Essex with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 14. This bridge serves County Road 17. The 20.6m long 1.45m X 3.65m concrete structure appears to be in good condition. The report and plans will provide the Town and County of Essex with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
 15. This bridge serves parcel 520-01300 owned by Kenneth & Barbara McCarthy. This 6.0m long 2100mm X 1555mm C.S.P. arch appears to be in fair condition, but the broken concrete pieces headwalls are in need of repair, and this will be provided for in this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.

16. This bridge serves parcel 520-04700 owned by Gerald and Agnes Lavin. Deterioration of the bridge in 2018 required emergency replacement with a “temporary” bridge. We recommend that the 14.0m long 2230mm X 1700mm C.S.P. arch “temporary” bridge become part of the drainage works pursuant to this report as it meets the design standards required. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
17. This bridge serves King’s Highway 401. The 2.0m X 3.6m concrete bridge is in good condition. The report and plans will provide the Town and Ministry of Transportation Ontario with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
18. This bridge serves parcel 520-04500 owned by Sandwich South Farms Ltd. The 4.25m long open bottom 1.3m X 3.7m concrete span culvert appears to be in good condition. Some washouts of the drain banks at the corners of the bridge will be repaired under this report with quarried limestone on filter cloth. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
19. This bridge serves the County Road 43. The 1.58m X 4.6m concrete box bridge was recently replaced and is in good condition. The report and plans will provide the Town and County of Essex with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
20. This bridge serves as an access for parcel 510-01550 owned by Rose Jobin. The 4.8m top width 1.9m X 3.8m concrete span bridge appears to be in fair condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
21. This pipe arch bridge serves parcel 510-01800 owned by Wilfred O’Neil. The bridge was collapsing and replaced with a new “temporary” bridge in 2015 including precast concrete block headwalls. We recommend that the 11.0m long 3.3m X 2.08m C.S.P. arch “temporary” bridge become part of the drainage works pursuant to this report as it meets the design standards required. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
22. This concrete span bridge serves parcel 510-02000 owned by Ruth Battersby. The 4.5m long 1.9m X 4.3m concrete bridge appears to be in reasonable condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
23. This is a 2.5m X 5.2m concrete bridge that is 10.5m long and that was newly installed in 2015 for the Town Baseline Road. The bridge is in excellent condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
24. This 6.2m long 2900mm X 2080mm C.S.P. arch bridge with broken concrete pieces headwalls serves parcel 560-08100 owned by 507822 Ontario Inc. & 494112 Ontario Ltd. The bridge is in fair condition. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.
25. This 13.85m long concrete bridge serves the 12th Concession Road of the Town. The 2.55m X 4.25m bridge is in good condition with some scouring of the footing noted at the northeast headwall that will be addressed under this report. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act.

We prepared preliminary designs and estimates for improvement of those bridges in the future and for those that require work at this time. We contacted some of the bridge owners to discuss their bridge replacement or repairs with them and to determine if there were any concerns that the owner was aware of that should be addressed as part of the report. Preliminary details of the proposed work and cost estimates for work on the bridge were discussed with Mr. O'Neil, along with cost sharing. The owner was reminded that they would also share in the cost of the work along the downstream portions of the drain. Mr. O'Neil indicated that the pipe at the rear of their property was in poor condition and needs replacement and requested a new access across the Sullivan Creek Drain.

VI. PUBLIC INFORMATION CENTRE REVIEW

Arrangements were made for a virtual meeting on August 19th, 2021, with the Engineer, the Drainage Superintendent and interested owners to discuss the Draft drainage report dated June 16th, 2021, for this project. The procedures under the Drainage Act were reviewed and the next steps were detailed. There will be Town, County of Essex, and Ministry of Transportation contributions to cost for this project because the project is a Municipal drain and public roads, or lands are affected. The owners were advised that snow blockage can occur, but the Drainage Act does not require this to be addressed. The Town did however do some removal in the past to alleviate flooding problems that arose and is expected to address this again in the future if the need arises. Owners are advised that there is the opportunity to debenture the costs for 5 years and pay the assessment with their taxes. Owners are advised that they only pay a share of the cost for work adjacent to their lands and for downstream to the outlet. Once the Town is aware of concerns, they are obliged to act in accordance with the requirements of the Drainage Act.

Benefit and Outlet liability assessments are discussed as defined below. Establishment of pipe lengths is based on the minimum standard top width of 6.1m (20'), the depth of the drain, and the type of end treatment provided. The cost of additional top width requested by an owner is fully borne by that owner. The drainage report provides estimates of costs, and the owners will only pay the actual cost shared on the basis of the assessment schedule. Lands eligible for the farm property tax class will be eligible for a grant in the amount of 1/3 of their total cost assessment.

If the work is not started before March 15th, it will likely be completed in the summer or fall. If any delay occurs, the fish protection timing window from March 15 to June 30th will come into effect and the work will have to be done after June 30th. Bridge cost sharing was reviewed with the owners at the P.I.C. meeting. Existing pipes are normally cleaned by flushing them with a high pressure nozzle and the material is removed at the end of the pipe. The owners are advised that they can have their tile ends repaired by a qualified contractor. The tiles are inspected during the course of the work and only those in disrepair will be fixed up as part of the work.

It should be noted that the Public Information Centre (P.I.C.) meeting is not a requirement under the Drainage Act but the Town holds these meetings to address questions and concerns and to solicit comments from the affected owners. Feedback during and after the meeting was utilized to establish the final requirements for the drainage report.

Owners are reminded that they have the opportunity to present their concerns to Council regarding the report details at the Consideration meeting and assessment questions at the Court of Revision meeting, along with appeal rights to the Ontario Ministry of Agriculture, Food and Rural Affairs (O.M.A.F.R.A.) Appeals Tribunal and to the Drainage Referee as provided for in the Drainage Act.

Clarification is provided on the two (2) types of assessments included within the report. The Drainage Act definitions and applicable clauses are as follows:

“Benefit” means the advantages to any lands, roads, buildings or other structures from the construction, improvement, repair, or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures.

“Outlet liability” means the part of the cost of the construction, improvement or maintenance of a drainage works that is required to provide such outlet or improved outlet. Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek, or watercourse, may be assessed for outlet liability. The assessment for outlet liability shall be based upon the volume and rate of flow of the water artificially caused to flow upon the injured land or road or into the drainage works from the lands and roads liable for such assessments. Every drainage works constructed under this Act shall be continued to a sufficient outlet.

Owners are advised that they have a legal responsibility to convey their drainage to a sufficient outlet. For this reason, they have a share in the cost for upkeep of the drain downstream of their lands and this obligation is reflected in the assessment for Outlet. There were concerns raised that some owners maintain the drain banks along their properties, and they should therefore not be assessed or assessed less. They are reminded that the responsibility for carrying out maintenance on a Municipal drain rests with the Town as set out in the Drainage Act. Any owner can notify the Town that the drain requires maintenance, and the Town has to take action pursuant to the Act. This system is generally reactive and requires the property owners to raise their concerns and issues to the Town. Owners are reminded that keeping brush clear along their portion of the drain and having buffer strips provides them with a direct benefit of improved crop yield and preservation of topsoil on their lands. It was suggested that they were being penalized for the work that they had done, but it was pointed out that sediment in their portion of the drain has to be removed and they still have an Outlet Liability for the downstream portion of the drain. The owners are reminded that Municipal drainage is a communal project and basically a user pay system. As an example, when work is carried out on the Pike Creek Drain downstream of the Sullivan Creek Drain outlet, the owners in the Sullivan watershed would be responsible for a portion of the cost, along with the other owners in the Pike Creek Drain watershed. Owners are advised of the 1/3 grant available to agricultural lands that qualify, and that the Town administers the grant process and reflects any available grant on the final billing to each owner.

It was indicated that some owners may appeal their assessment as set out in the drainage report. They are advised that they should submit their appeal to the Court of Revision 10 days before the scheduled date of the meeting; however, the Court of Revision can agree to hear appeals presented at the meeting. If owners are still dissatisfied with the report after that meeting, they may submit an appeal to the O.M.A.F.R.A. Appeals Tribunal through the Town Clerk within 21 days of the closing of the Court of Revision pursuant to Section 54 of the Drainage Act.

The cost sharing for bridges was discussed with some owners feeling that the bridge owner should bear all the cost. It was explained that an owner has the right for one access across each Municipal drain. The owner generally pays 100% of the cost for the first bridge installation and it becomes part of the drain when included in an engineer’s report and is then to be maintained by the drain. The Engineer explained that he determines the cost sharing, and it generally relates to a bridge, that is part of the drain, and located at the mid length of the drain, being shared 50%-

50%. The ratio to the bridge owner diminishes as you proceed downstream or increases as you proceed upstream from that point.

The time required to initiate the project was discussed. It was pointed out that the Town has 45 days under Section 79 of the Act to take action or could be liable for damages. An owner would have to quantify any damages experienced and could try to sue the Town. The Act does provide for the owners to make appeals if the Town fails to take action on certain matters prescribed in the legislation.

There was some discussion of the disposal of excavated materials on the abutting lands. The Engineer confirmed that existing grass buffers and accesses would be protected and maintained. Allowances as set out in the report were reviewed and access provisions that are set out in the report Specifications was referenced. Owners were advised that the Contractor is responsible to remove any sticks and rocks (cobbles) etcetera from the spread materials and the Contractor is responsible for one (1) year after the work is completed.

There were questions about assessment for cost when an owner's property does not drain to the Municipal drain. We explained that lands may be assessed for a "cutoff" benefit in the case where the construction of a drain prevents overland flows from going across their lands. Being relieved of these flows results in less damage to their lands and crops and is therefore considered as a benefit and an assessment is provided for same. It was pointed out that the lands that do not drain into the Municipal drain are only assessed Benefit, and there is no assessment for Outlet if they do not direct any flows into the drain. Further questions included assessment for lands that are completely tiled to the drain, the limits of the watershed relative to the Little 10th Concession Drain at the northwest corner of the watershed, and adjustments for area and runoff for the Lutsch lands at the upstream end of the drain.

There was a question about removal of dead and overhanging trees on the top of the banks. We advised the owner that the specifications would provide more detail directing the Contractor to include for this work as part of the brushing on the drain so that the risk of said materials falling in and blocking off or damaging the drain is minimized.

Owners have the right to ask Council questions at the Consideration meeting and Court of Revision meeting.

VII. FINDINGS AND RECOMMENDATIONS

We find that the profiles included in the 1983 and 1987 report plans by Maurice Armstrong, P.Eng. provide a good fit to the existing profile of the drain. Said reports provided for improvements to the open drain and we have used the grades and other drain parameters to establish the design and work included for in this report.

Based on our detailed survey, investigations, examinations, and discussions with the affected Owners and governing Authorities, we would recommend that drain improvement works be carried out as follows:

- a) Bridge 11 be completely removed from the drain and the drain cross section be restored in accordance with the information on the profiles and cross sections. We recommend that the bridge be abandoned pursuant to Section 19 of the Drainage Act.
- b) We recommend that all drain improvements, including the removal of the farm bridge and bridge repairs and improvements, be carried out in accordance with the

requirements established by E.R.C.A. and D.F.O. as set out in the documents within **Appendix "REI-A"** attached to this report.

- c) As this is an existing Municipal drain, and conditions have not changed and there is no information to indicate any new species concerns, the construction can be carried out based on the provisions included within the Mitigation Plan for Drainage Works (March 2018-17-4938) that the Town has prepared to address the Endangered Species Act, 2007 now administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.). Providing mitigation requirements are implemented, we find that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007. Based on this information we find that the Town can proceed with the eligible repairs, maintenance, and improvements to the drain as they are exempt under Sections 9 and 10 of the Act, provided that they follow the rules within Ontario Regulation 242/08 and the Mitigation Measures in their S.A.R. Mitigation Plan. A copy of said mitigation measures is included in **Appendix "REI-B"** within this report. We recommend that any work being completed shall be carried out in accordance with Town mitigation measures as included in **Appendix "REI-B"** for reference by the land owners, the Town of Tecumseh, and the Contractor who will be conducting the works.
- d) We find that portions of the open drain have significant accumulation of silt and debris and we recommend that these be cleaned out as set out further in this report.
- e) The existing drain has some buffer strips and grass accesses along the Municipal drain that reduce the amount of erosion and the sediment entering the drain and enhance water quality. We recommend that the existing buffer strips be protected as part of this project and suggest that new buffer strips be constructed by the owners in all areas where no current grass buffer exists.
- f) As provided for by Section 18 of the Drainage Act, we recommend that any future new access bridge culvert or replacement be constructed as outlined further in this report including the specifications and the plans that form part of the report. All existing bridges and access pipes that are in fair or good condition shall be flushed and cleaned out to restore the drain bottom profile.
- g) Near the drain outlet northeasterly of 12th Concession Road any excavated materials shall be hauled away as required by E.R.C.A. This area will generally extend from the east side of 12th Concession Road to the outlet in Pike Creek Drain.
- h) M.E.C.P. requires proper handling of excess soils in accordance with Ontario Reg 406/19 pursuant to the Environmental Protection Act, R.S.O. 1990, c. E.19 and any subsequent amendments to same. In liaison with the Town Drainage Department, we arranged for the necessary investigations and testing by WSP E&I Canada Limited for the section of drain from the former railroad downstream in a northerly direction to the south side of County Road 46. Their report and findings are included in **Appendix "REI-F"** attached to this report. We recommend that handling of all excess soil excavated materials from this area including disposal be carried out in accordance with the requirements set out in the WSP report. Material from Zone 1 can be disposed of on the site. Zone 3 materials are to be loaded up and hauled away to the County landfill site.

We further find and recommend as follows:

i) **Bridge No. 1** – Michael Lutsch (460-01000)

This corrugated steel pipe access is badly rusted with poor bottom on the east end. We recommend that the existing 400mm diameter pipe be replaced as set out further in this report under maintenance when the need arises.

j) **Bridge No. 2** – Thomas Halford (460-01100)

The east broken concrete pieces endwall has been repaired subsequent to our field survey. We recommend that the materials be salvaged, and the headwall be reconstructed utilizing grout and additional pieces, or concrete filled jute bags as needed to create a stable headwall when the pipe is replaced in the future.

k) **Bridge No. 9** – Gerald & Agnes Lavin (480-08410)

The wooden beam headwalls on this bridge are in very poor condition and in need of repair. We recommend that new pressure treated timber be provided to replace unsuitable materials and restore the headwalls to a stable condition including any tie-backs needed.

l) **Bridge No. 11** – Gerald & Agnes Lavin (480-08400)

This bridge is unsuitable for rehabilitation, and we recommend that the existing rotted timber top, rusted steel beams, and concrete abutments be removed and disposed of and that the drain be restored to its design cross section as shown on the profile and cross sections of the plans. As noted above, the bridge is recommended to be abandoned pursuant to Section 19 of the Drainage Act.

m) **Bridge No. 15** – Kenneth & Barbara McCarthy (520-01300)

The broken concrete pieces endwalls are collapsed and in need of repair. We recommend that the materials be salvaged, and the headwalls be reconstructed utilizing grout and additional pieces, or concrete filled jute bags as needed to create stable headwalls.

n) **Bridge No. 16** – Gerald & Agnes Lavin (520-04700)

This bridge was collapsing at the time of the drain survey. A “temporary” new replacement bridge was installed in accordance with the plans and report dated May 3rd, 2018, that were used to obtain the permit from E.R.C.A. We recommend that the “temporary” bridge that was installed pursuant to the E.R.C.A. permit become a part of the Sullivan Creek Drain under this report and be kept up and maintained by the Town as part of the drainage works in accordance with the details and specifications provided in this report.

o) **Bridge No. 18** – Sandwich South Farms Ltd. (520-04500)

This concrete span bridge is in good condition but some washouts of the drain banks at the corners of the bridge were observed. We recommend that the drain banks be restored with compacted clay fill and that quarried limestone rip rap on filter cloth be installed on

the banks adjacent to the bridge corners to protect the newly placed fill and minimize the risk of future erosion.

p) **Bridge No. 21** – Wilfred O’Neil (510-01700 & 510-01800)

The existing bridge near the north limit of Parcel 510-01700 was collapsing and replaced with a new “temporary” bridge just north of the existing bridge and constructed on Parcel 510-01800. The new replacement bridge was installed in accordance with the plans and report dated November 3rd, 2015, utilized for the permit application to the E.R.C.A. for the pipe arch including precast concrete block headwalls. HEC-RAS modeling was carried out to compare existing to final conditions with the new bridge installation. The modeling results were submitted to E.R.C.A. on January 5th, 2016 and showed that no significant impact occurred to the drainage works. We recommend that the “temporary” bridge become part of the drainage works pursuant to this report as it meets the design standards required. The report and plans will provide the Town with the details needed for future work on the bridge pursuant to the maintenance provisions of the Drainage Act. The bridge will provide both parcels with access across the drain.

q) **Bridge No. 25** – 12th Concession Road – Town of Tecumseh

This concrete bridge appears to be in good condition with some scouring noted around the footing on the east end of the bridge. We recommend that the drain be restored with compacted clay fill and that quarried limestone rip rap on filter cloth be installed on the newly placed fill to minimize the risk of future erosion.

We have investigated the watershed boundaries as per the Public Information Centre meeting and made adjustments to the drainage report to reflect the updated findings and the input from affected owners that was provided. This drainage report provides for the Sullivan Creek Drain to be restored to its past design standards to restore its original level of service with none of the works that are provided for with having any negative or adverse impacts to the drain or level of service. Information that was provided to E.R.C.A. for the “temporary” bridges that needed to be constructed under emergency requirements demonstrated that no significant impact was caused to the drainage works by the new bridges being installed. We recommend that the Sullivan Creek Drain be repaired and improved, including the bridge removal as outlined, in accordance with this report, the attached specifications and the accompanying drawings, and that all works associated with same be carried out pursuant to Section 78 of the “Drainage Act, R.S.O. 1990, Chapter D.17 as amended 2010”.

VIII. ALLOWANCES

We have provided that all of the work will generally be completed from the north and west side of the drain. Between Bridge 19 and Bridge 20 the drain cleaning will be carried out from the east side of the drain with the materials spread to the east. From Highway No. 3 to County Road 46 the work will be carried out from the east side of the drain to protect mature trees and plantings conducted with E.R.C.A. support. The Contractor will be required to restore any existing grassed buffer and driveway areas damaged by the work. We recommend that any materials removed from the open drain or existing bridges, be spread on the adjacent open agricultural lands to the north, east, and west of the drain for disposal by the Contractor, beyond the limits of any existing grass buffer or driveway access. Based on all of the above we find that allowances for damages are payable pursuant to Sections 29 and 30 of the Drainage Act.

Report - Sullivan Creek Drain
(Geographic Township of Sandwich South)
Town of Tecumseh - REI2015D010

2023-01-09

We find that the provision of access along the drain as noted above and disposal of excavated material on the abutting agricultural lands requires payment for the land necessary to carry out same. Where there are lawn areas along the drain, work may be carried out from the road side of the drain and the excavated material will be loaded up and hauled away for disposal and any damage to the lawn will need to be restored by the Contractor, so no allowance is required for those areas. We therefore recommend that the following owners be compensated where values are shown for all work areas that will be impacted, including for the access to the drain and for damages to lands and crops, if any, as follows, namely:

1)	Michael Lutsch, (460-01000),	Owner,	Part of Lot 297, S.T.R. Concession,	\$	450.00
2)	Thomas Halford, (460-01100),	Owner,	Part of Lot 298, S.T.R. Concession,	\$	lawn
3)	Thomas & Linda Halford, (460-01200),	Owners,	Part of Lot 298, S.T.R. Concession,	\$	401.00
4)	Rosemary Halford, (460-01300),	Owner,	Part of Lot 298, S.T.R. Concession,	\$	lawn
5)	Thomas Halford, (460-01400),	Owner,	Part of Lot 298, S.T.R. Concession,	\$	433.00
6)	Michael & Helen Lavin, (460-01500),	Owners,	Part of Lot 298, S.T.R. Concession,	\$	665.00
7)	John Lafferty, (460-09200),	Owner,	Part of Lot 299, S.T.R. Concession,	\$	1,621.00
14)	Catherine Lafferty & Mary Thompson, (460-02000),	Owners,	Part of Lot 299, S.T.R. Concession,	\$	1,577.00
23)	Gerald & Agnes Lavin, (480-08410),	Owners,	Part of Lot 298, N.T.R. Concession,	\$	2,794.00
22)	Gerald & Agnes Lavin, (480-08400),	Owners,	Part of Lot 298, N.T.R. Concession,	\$	1,349.00
80)	Diklich Capital Corp., (530-00100),	Owner,	Part of Lot 10, Concession 9,	\$	1,288.00
82)	Edward Chittle Jr., (530-04775),	Owner,	Part of Lot 11, Concession 9,	\$	lawn
58)	Kenneth & Barbara McCarthy, (520-01300),	Owners,	Part of Lots 11 & 12, Concession 10,	\$	3,089.00
76)	Gerald & Agnes Lavin, (520-04700),	Owners,	Part of Lot 12, Concession 10,	\$	964.00

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73)	Sandwich South Farms Limited, (520-04500),	Owner,	Part of Lot 13, Concession 10,	\$	1,253.00
41)	Rose Jobin, (510-01550),	Owner,	Part of Lots 13 & 14, Concession 11,	\$	840.00
43)	Paul & Rose Jobin, (510-01600),	Owners,	Part Lot 14, Concession 11,	\$	554.00
45)	Wilfred O'Neil, (510-01700),	Owner,	Part Lot 14, Concession 11,	\$	639.00
46)	Wilfred O'Neil, (510-01800),	Owner,	Part Lot 15, Concession 11,	\$	441.00
47)	Wilfred O'Neil, (510-01900),	Owner,	Part Lot 15, Concession 11,	\$	521.00
48)	Ruth Battersby, (510-02000),	Owner,	Part Lot 15, Concession 11,	\$	2,541.00
51)	Helene Battersby, (510-02100),	Owner,	Part Lot 16, Concession 11,	\$	3,877.00
91)	Philip, Rose & Paul Jobin, (560-04000),	Owners,	Part Lot 17, Concession 11,	\$	2,885.00
94)	507822 Ontario Inc. & 494112 Ontario Limited, (560-08100),	Owners,	Part Lot 17, Concession 11,	\$	2,389.00
93)	Mary McGraw, (560-08000),	Owner,	Part Lot 18, Concession 11,	\$	677.00
79)	Mario & Deana Liburdi, (560-08500),	Owners,	Part of Lot 18, Concession 12,	\$	1,113.00
TOTAL FOR ALLOWANCES AND DAMAGES					\$ 32,361.00

These values for allowances and damages are based on a strip of land parallel to and immediately adjacent to the drain or grassed buffer and driveway, for the parcels generally abutting the north and west side of the Municipal drain and south side from Bridge 19 to Bridge 20 and are based on a value of \$1,225.00 per acre (\$3,027.00 per hectare) for the affected lands and crops, if any. These allowances provide for a spread depth of 100mm and are calculated using a rate per acre of \$700.00 for year one, \$350.00 for year two and \$175.00 for the third year. The impact after 3 years is considered negligible.

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We have provided for this in our estimate as is provided for under Sections 29 and 30 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2010".

IX. ESTIMATE OF COST

Our estimate of the Total Cost of this work, including all incidental expenses, is the sum of **EIGHT HUNDRED AND THIRTY TWO THOUSAND DOLLARS (\$832,000.00)**, made up as follows:

CONSTRUCTION

Item 1)	<u>Station 0+000 to Station 9+963</u> ; Carry out excavation of the drain to remove accumulated sediment and restore the drain to the profile grade shown on the plans, including all loading, hauling, and disposal where required, and leveling of material, approximately <u>9,963</u> lineal metres (approximately 9,360 cubic metres).	Lump Sum	\$	315,000.00
Item 2)	<u>Bridge No. 2</u> ; Provide all material, equipment and labour to salvage the existing broken concrete endwall pieces and reconstruct the headwalls utilizing concrete grout and additional pieces or concrete filled jute bags as needed to create stable headwalls, complete. (Thomas Halford)	Lump Sum	\$	3,750.00
Item 3)	<u>Bridge No. 9</u> ; Provide all material, equipment and labour to repair the existing timber headwalls with pressure treated lumber, anchors, and tiebacks as needed to create stable headwalls, complete. (Gerald & Agnes Lavin)	Lump Sum	\$	3,750.00
Item 4)	<u>Bridge No. 11</u> ; Provide all material, equipment and labour to remove and dispose of the existing steel beam and timber structure and concrete abutments and restore the drain to its design cross section, including all loading, hauling, disposal, topsoil placement, seed, and mulch, complete. (Gerald & Agnes Lavin)	Lump Sum	\$	2,250.00
Item 5)	<u>Bridge No. 15</u> ; Provide all material, equipment and labour to salvage the existing broken concrete endwall pieces and reconstruct the headwalls utilizing concrete grout and additional pieces or concrete filled jute bags as needed to create stable headwalls, complete. (Kenneth & Barbara McCarthy)	Lump Sum	\$	3,750.00
Item 6)	<u>Bridge No. 16</u> ; Provide all material, equipment and labour to excavate the drain, completely remove and dispose of the existing pipe and any endwall materials, including any other deleterious material encountered; supply and install 14.0 metres of 2230mm X 1700mm, 2.8mm thick aluminized corrugated steel pipe arch with 125X26mm corrugations including Granular 'B' backfill, Granular 'A'			

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	travel surface; excavation, placement, compaction, grading; 305mm thick quarried limestone on filter cloth sloped end protection; topsoil placement, seeding and mulching, and restoration and clean up, complete. (Gerald & Agnes Lavin)	Lump Sum	\$	20,155.00
Item 7)	Bridge No. 18; Provide all material, equipment and labour to repair the drain banks adjacent to the bridge corners including placement of clay fill, compaction, and installation of approximately 20 tonnes of quarried limestone rip rap on filter cloth to protect the banks from erosion, complete. (Sandwich South Farms Ltd.)	Lump Sum	\$	1,800.00
Item 8)	Bridge No. 21; Provide all material, equipment and labour to excavate the drain, completely remove and dispose of the existing pipe and any endwall materials, including any other deleterious material encountered; supply and install 11.0 metres of 3300mm X 2080mm, 3.5mm thick aluminized corrugated steel pipe arch with 125X26mm corrugations including Granular 'B' backfill, Granular 'A' travel surface; excavation, placement, compaction, grading; precast concrete block headwalls; topsoil placement, seeding and mulching, and restoration and clean up, complete. (Wilfred O'Neil)	Lump Sum	\$	44,100.00
Item 9)	Bridge No. 25; Provide all material, equipment and labour to repair the drain bank adjacent to the northeast bridge footing at the east side including placement of clay fill, compaction, and installation of approximately 10 tonnes of quarried limestone rip rap on filter cloth to protect the bank from erosion at the footing, complete. (Town of Tecumseh)	Lump Sum	\$	900.00
Item 10)	Station 0+000 to Station 9+963; Supply and install new heavy duty H.D.P.E. plastic tile main extensions, including connections, rodent grate, removal of any deleterious materials, excavation, backfill, compaction and restoration, complete:			
	a) 3.0 metres (10') of 150mm (6") diameter pipe for 150mm diameter tiles: <u>7</u> required at <u>\$250.00</u> each		\$	1,750.00
	b) 3.0 metres (10') of 200mm (8") diameter pipe for 200mm diameter tiles: <u>19</u> required at <u>\$300.00</u> each		\$	5,700.00
	c) 3.0 metres (10') of 250mm (10") diameter pipe for 250mm diameter tiles: <u>9</u> required at <u>\$350.00</u> each		\$	3,150.00
	d) 3.0 metres (10') of 300mm (12") diameter pipe for 300mm diameter tiles: <u>7</u> required at <u>\$550.00</u> each		\$	3,850.00
Item 11)	Station 0+000 to Station 9+963; Supply and install approximately <u>222</u> lateral tile drain extensions to outlet			

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	end of damaged existing 100mm diameter lateral tiles entering the drain, including excavation, rodent grate, backfill, compaction, topsoil placement and seed and mulch, complete at \$ <u>75.00</u> each.	\$	16,650.00
Item 12)	<u>Station 0+000 to Station 9+963;</u> Supply and install approximately <u>360</u> tonnes of quarried limestone rip rap for rock chute spillways and general erosion protection, complete at \$ <u>75.00</u> per tonne.	\$	27,000.00
Item 13)	<u>Station 0+000 to Station 9+963;</u> Supply and install approximately <u>720</u> square metres of synthetic filter mat for rock chute spillways and general erosion protection, complete at \$ <u>7.00</u> per square metre.	\$	5,040.00
Item 14)	Brushing and grubbing including all disposal and clean up (approximately 9,963 lineal metres), removing and reinstalling fences, complete. Lump Sum	\$	99,650.00
Item 15)	Spread scavenged topsoil; carry out seeding and mulching on all newly excavated side slopes (approximately 9,963 lineal metres), including all harrowing, raking, preparation and clean up, complete. Lump Sum	\$	69,750.00
Item 16)	<u>Station 3+310 to Station 3+761.1;</u> Carry out all loading, hauling and disposal of the excess soil materials in accordance with Appendix "REI-F", approximately <u>236</u> cubic metres, complete. Lump Sum	\$	5,000.00
Item 17)	Estimated net Harmonized Sales Tax (1.76% H.S.T.) on construction items above. Lump Sum	\$	11,140.00
TOTAL FOR CONSTRUCTION		\$	644,135.00

INCIDENTALS

1)	Report, Estimate, & Specifications	\$	24,900.00
2)	Survey, Assistants, Expenses, and Drawings	\$	90,750.00
3)	Duplication Cost of Report and Drawings	\$	2,000.00
4)	Estimated Cost of Letting Contract	\$	1,500.00
5)	Estimated Cost of Layout and Staking	\$	2,000.00
6)	Estimated Cost of Part-Time Supervision and Inspection During Construction (based on 2 week duration)	\$	6,000.00

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7)	Estimated Net H.S.T. on Incidental Items Above (1.76%)	\$	2,238.00
8)	Estimated Cost for Excess Soils Consultant	\$	12,600.00
9)	Estimated Cost of Interim Financing	\$	1,500.00
10)	Estimated Cost of E.R.C.A. Permit	\$	1,500.00
11)	Contingency Allowance	\$	10,516.00
TOTAL FOR INCIDENTALS		\$	155,504.00
TOTAL FOR ALLOWANCES (brought forward)		\$	32,361.00
TOTAL FOR CONSTRUCTION (brought forward)		\$	644,135.00
TOTAL ESTIMATE		\$	832,000.00

X. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached design drawings for the construction of the drain improvements and farm bridge improvements. The design drawings show the subject bridges and improvement locations and the details of the work, as well as the approximate location within the watershed area. The design drawings are attached to the back of this report and are labelled **Appendix "REI-E"**.

Also attached, we have prepared Specifications which set out the required construction details for the bridge improvements and drain repair and improvements, which also include Standard Specifications labelled therein as **Appendix "REI-C"**.

XI. SCHEDULE OF ASSESSMENT

We would recommend that the Total Cost for construction of this project, including incidental costs, be charged against the lands affected in accordance with the attached Construction Schedule of Assessment. On September 22nd, 2005, the Ontario Ministry of Agriculture, Food and Rural Affairs (O.M.A.F.R.A.) issued Administrative Policies for the Agricultural Drainage Infrastructure Program (A.D.I.P.). This program has re-instated financial assistance for eligible costs and assessed lands pursuant to the Drainage Act. Sections 85 to 90 of the Drainage Act allow the Minister to provide grants for various activities under said Act. Sections 85 and 87 make it very clear that grants are provided at the discretion of the Minister. Based on the current A.D.I.P., "lands used for agricultural purposes" may be eligible for a grant in the amount of 1/3 of their total assessment. The new policies define "lands used for agricultural purposes" as those lands eligible for the "Farm Property Class Tax Rate", "Managed Forest Tax Incentive Program", or the "Conservation Land Tax Incentive Program". The Municipal Clerk provides this information to the Engineer from the current property tax roll. Properties that do not meet the criteria are not eligible for grants. In accordance with same we expect that this project will be qualified for the grant normally available for agricultural lands. The Ministry, however, is continually reviewing their policy for grants, and we recommend that the Municipality monitor the policies, and make application to the Ministry for any grant should same become available through the A.D.I.P. program or other available funds.

When maintenance work is carried out in the future on the open drain portion, the cost for said future maintenance shall be assessed in accordance with the attached "Schedule of Assessment" excluding any Special Benefit. This Schedule shall be used for all future drain work with actual future maintenance cost shared on a pro-rata basis with the values shown in this assessment schedule.

XII. FUTURE MAINTENANCE

When maintenance work is carried out in the future on the open drain portion, the cost for said future maintenance shall be assessed in accordance with the attached Schedule of Assessment excluding any Special Benefit. When future maintenance work is carried out, the assessment to the affected Owners shall be based on the actual future maintenance cost shared on a pro-rata basis with the values shown in this assessment schedule.

When maintenance work is carried out on any bridges in the future, we recommend that part of the cost be assessed as a Benefit to the abutting parcel served by the access bridge, and the remainder shall be assessed to the upstream lands and roads based on their affected area and outlet assessments as set out in the attached Schedule of Assessment. The share for Benefit and Outlet Liability shall be as set out in the Bridge Cost Sharing table below.

BRIDGE COST SHARING

<u>Bridge</u>	<u>Owners</u>	<u>Benefit to Owner</u>	<u>Outlet Upstream</u>
1	Michael Lutsch, (460-01000),	84.9%	15.1%
2	Thomas Halford, (460-01100),	91.5%	8.5%
3 & 4	Thomas & Linda Halford, (460-01200),	93.8%	6.2%
5	Rosemary Halford, (460-01300),	82.3%	17.7%
6	Thomas Halford, (460-01400),	81.0%	19.0%
7	Michael & Helen Lavin, (460-01500),	81.8%	18.2%
8	Ministry of Transportation, Ontario, (King's Highway No. 3),	98.0%	2.0%
9	Gerald & Agnes Lavin, (480-08410),	63.4%	36.6%

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10	Canada Southern Railway, (590-01000),	98.8%	2.0%
11	Removed and Abandoned	0.0%	0.0%
12	Gerald & Agnes Lavin, (480-08400),	61.4%	38.6%
13	Count of Essex, (County Road 46),	98.0%	2.0%
14	County of Essex, (County Road 17),	98.0%	2.0%
15	Kenneth & Barbara McCarthy, (520-01300),	51.9%	48.1%
16	Gerald & Agnes Lavin, (520-04700),	54.5%	45.5%
17	Ministry of Transportation, Ontario, (King's Highway No. 401),	98.0%	2.0%
18	Sandwich South Farms Ltd., (520-04500),	44.2%	55.8%
19	County of Essex, (County Road 43),	98.0%	2.0%
20	Rose Jobin, (510-01550),	43.2%	56.8%
21	Wilfred O'Neil, (510-01800),	48.7%	51.3%
22	Ruth Battersby, (510-02000),	38.0%	62.0%
23	Town of Tecumseh, (Baseline Road),	98.0%	2.0%
24	507822 Ontario Inc. & 494112 Ontario Ltd., (560-08100),	31.4%	68.6%
25	Town of Tecumseh, (12th Concession Road),	98.0%	2.0%

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We recommend that the bridge structures as identified herein, be maintained in the future as part of the drainage works. We would also recommend that the access bridges in the drain, for which the future maintenance costs are to be borne by the abutting affected landowners and upstream lands and roads, be maintained by the Town and that said maintenance would include works to the bridge culvert, bedding, backfill and end treatment. Where concrete, asphalt or other decorative driveway surfaces over the bridge culverts require removal as part of the maintenance works, these surfaces should also be repaired or replaced as part of the works. Likewise, if any fencing, gate, decorative walls, guard rails or other special features exist that will be impacted by the maintenance work, they are also to be removed and restored or replaced as part of the bridge maintenance work. However, the cost of the supply and installation of any surface material other than Granular "A" material, and the cost of removal and restoration or replacement, if necessary, of any special features, shall be totally assessed to the benefiting adjoining parcel served by said access bridge.

Where a bridge has a top width beyond the standard 6.1 metres (20 feet), all of the increased cost for providing the extra top width shall be assessed as a Benefit to the parcel served by the access bridge. Upstream lands and roads shall only be responsible for sharing in the cost of a standard top width access bridge.

The concrete bridge serving the Canada Southern Railway Parcel 590-0100 can be replaced by a single 1800mm diameter aluminized C.S.P. with 125X25 corrugations if desired by the owner. The pipe will need to be 24 metres long with sloped ends and quarried limestone on filter cloth protection and its invert embedded 10% of its diameter below the existing drain bottom or design bottom, whichever is lower. Should the Railway decide to proceed with doing the work themselves, the cost of construction will be borne by them, and they will only be responsible for any incidental costs that are incurred to ensure that the works are completed to the satisfaction of the Town Drainage Superintendent and in accordance with the requirements of this drainage report and bridge details set out in the Specifications and Appendices. If the maintenance of the bridge pipes is carried out by the Town, the cost sharing shall be as set out in the Bridge Cost Sharing table as noted above.

We further recommend that the maintenance cost sharing as set out above shall remain as aforesaid until otherwise determined and re-established under the provisions of the "Drainage Act, R.S.O. 1990, Chapter D.17".

All of which is respectfully submitted.

Rood Engineering Inc.



Gerard Rood, P.Eng.



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att.

ROOD ENGINEERING INC.

Consulting Engineers
9 Nelson Street
LEAMINGTON, Ontario N8H 1G6

SCHEDULE OF ASSESSMENT
SULLIVAN CREEK DRAIN
(Geographic Township of Sandwich South)
TOWN OF TECUMSEH

2. ONTARIO LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
King's Highway 401			12.08	29.86	Ministry of Transportation Ontario	\$ 2,911.00	\$ 17,437.00	\$ 3,436.00	\$ 23,784.00
King's Highway #3			5.70	14.08	Ministry of Transportation Ontario	\$ 1,020.00	\$ 8,221.00	\$ 3,394.00	\$ 12,635.00
Total on Ontario Lands.....						\$ 3,931.00	\$ 25,658.00	\$ 6,830.00	\$ 36,419.00

3. MUNICIPAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
County Road 46			2.75	6.79	County of Essex	\$ 1,020.00	\$ 3,964.00	\$ 1,995.00	\$ 6,979.00
County Road 17			3.17	7.83	County of Essex	\$ 728.00	\$ 4,571.00	\$ 1,941.00	\$ 7,240.00
County Road 43			5.67	14.00	County of Essex	\$ 58.00	\$ 8,174.00	\$ 1,496.00	\$ 9,728.00
Sexton Sideroad			2.22	5.49	Town of Tecumseh	\$ 583.00	\$ 3,205.00	\$ 726.00	\$ 4,514.00
Baseline Road			4.88	12.06	Town of Tecumseh	\$ 2,010.00	\$ 7,041.00	\$ 1,185.00	\$ 10,236.00
South Talbot Road			2.86	7.07	Town of Tecumseh	\$ 364.00	\$ 4,128.00	\$ 1,438.00	\$ 5,930.00
12th Concession Road			0.14	0.34	Town of Tecumseh	\$ 1,850.00	\$ 199.00	\$ 1,049.00	\$ 3,098.00
Total on Municipal Lands.....						\$ 6,613.00	\$ 31,282.00	\$ 9,830.00	\$ 47,725.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
460-01100	STR	298	0.190	0.47	Thomas Halford	\$ 277.00	\$ 367.00	\$ 4,166.00	\$ 4,810.00
460-01300	STR	298	0.465	1.15	Rosemary Halford	\$ 68.00	\$ 720.00	\$ 1,108.00	\$ 1,896.00
460-01800	STR	299	0.518	1.28	Frank Lafferty In Trust	\$ -	\$ 646.00	\$ 108.00	\$ 754.00
460-01801	STR	299	0.595	1.47	Ministry of Transportation	\$ -	\$ 714.00	\$ 121.00	\$ 835.00

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Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
480-08200	NTR	298	0.502	1.24	Alexander Chevalier & Jessie Darmon	\$ -	\$ 665.00	\$ 105.00	\$ 770.00
480-08250	NTR	298	0.178	0.44	Ali Khafaja	\$ -	\$ 323.00	\$ 51.00	\$ 374.00
480-08500	NTR	299	26.382	65.19	Joseph McCarthy	\$ 10,003.00	\$ 12,788.00	\$ 4,636.00	\$ 27,427.00
480-08611	STR	292	0.259	0.64	Ministry of Transportation	\$ -	\$ 395.00	\$ 51.00	\$ 446.00
480-08700	NTR	299	0.190	0.47	David & Margaret Pringle	\$ -	\$ 316.00	\$ 41.00	\$ 357.00
480-08750	NTR	299	0.299	0.74	Joseph & Marilyn McCarthy	\$ -	\$ 442.00	\$ 57.00	\$ 499.00
480-08801	NTR	299	4.395	10.86	Josef Dworatschek	\$ -	\$ 2,029.00	\$ 262.00	\$ 2,291.00
480-08803	NTR	299	0.405	1.00	Kevin & Melissa McCarthy	\$ -	\$ 560.00	\$ 72.00	\$ 632.00
480-08900	NTR	299	15.722	38.85	Ravinder & Mavi Singh	\$ 1,769.00	\$ 7,258.00	\$ 940.00	\$ 9,967.00
480-09010	NTR	298	0.498	1.23	Tammy & John Flood	\$ -	\$ 617.00	\$ 79.00	\$ 696.00
480-09100	NTR	298	0.210	0.52	Jason & Wendy Hill	\$ -	\$ 328.00	\$ 43.00	\$ 371.00
480-09110	NTR	298	0.210	0.52	Jacqueline Mailloux	\$ -	\$ 328.00	\$ 43.00	\$ 371.00
490-00100	NTR	300	0.401	0.99	Khmer Buddhist Santivararam Windsor 2016	\$ -	\$ 555.00	\$ 71.00	\$ 626.00
510-01590	11	13	0.680	1.68	Philip Jobin	\$ 99.00	\$ 662.00	\$ 59.00	\$ 820.00
510-02010	11	16	0.409	1.01	Laurie Knight	\$ 12.00	\$ 424.00	\$ 1.00	\$ 437.00
520-00900	10	9 & 10	0.405	1.00	Hardershan Brar	\$ -	\$ 557.00	\$ 72.00	\$ 629.00
520-01000	10	10	0.045	0.11	Union Gas Limited	\$ 3.00	\$ 108.00	\$ 13.00	\$ 124.00
520-01100	10	10	0.405	1.00	Guy & Tina Robertson	\$ 18.00	\$ 546.00	\$ 72.00	\$ 636.00
520-01210	10	11	0.421	1.04	Charles Matthews	\$ 61.00	\$ 542.00	\$ 72.00	\$ 675.00
520-01301	10	12	0.773	1.91	Barbara McCarthy	\$ 34.00	\$ 728.00	\$ 66.00	\$ 828.00
520-01350	10	12	0.469	1.16	Roger Lemmon	\$ 7.00	\$ 558.00	\$ 49.00	\$ 614.00
520-03400	10	16	0.089	0.22	Joseph & Helen Diesbourg	\$ -	\$ 136.00	\$ -	\$ 136.00
520-03800	10	16	0.101	0.25	Jacob Carlesimo	\$ -	\$ 151.00	\$ -	\$ 151.00
520-03901	10	16	0.405	1.00	Clifford & Connie Campeau	\$ -	\$ 420.00	\$ 1.00	\$ 421.00
520-03920	10	15	0.271	0.67	Herbert Henricks & Marianne Scarpelli	\$ 4.00	\$ 310.00	\$ 1.00	\$ 315.00
520-04250	10	15	0.502	1.24	Jeremy Knezev	\$ 7.00	\$ 469.00	\$ 1.00	\$ 477.00
520-04300	10	15	0.405	1.00	Luigina Gobbo	\$ 6.00	\$ 420.00	\$ 1.00	\$ 427.00
520-04550	10	13	0.251	0.62	Brian Chittle	\$ 37.00	\$ 325.00	\$ 30.00	\$ 392.00
520-04600	10	13	0.656	1.62	Steno Novelletto & Rosanne St.Louis	\$ 48.00	\$ 648.00	\$ 56.00	\$ 752.00
520-04750	10	12	0.506	1.25	Thomas & Mary Moore	\$ -	\$ 556.00	\$ 50.00	\$ 606.00

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Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
530-04800	9	10	0.405	1.00	Lee Simpson	\$ 29.00	\$ 553.00	\$ 72.00	\$ 654.00
560-08500	18	12	0.405	1.00	Mario & Deana Liburdi	\$ 775.00	\$ 231.00	\$ -	\$ 1,006.00
560-00300	10	17	1.012	2.50	Crossway Church	\$ -	\$ 771.00	\$ 2.00	\$ 773.00
560-04000	11	17	15.929	39.36	Norman, Rose, Philip & Paul Jobin	\$ 12,165.00	\$ 5,423.00	\$ 12.00	\$ 17,600.00
560-04010	11	17	0.490	1.21	Derek Battersby & Brittney Brown	\$ -	\$ 458.00	\$ 1.00	\$ 459.00
Windsor									
030-06300	10	16	0.409	1.01	Robert & Judy-Ann Coupe	\$ -	\$ 410.00	\$ 1.00	\$ 411.00
030-06400	1351	45 & 46	0.134	0.33	Thomas Crouchman	\$ -	\$ 180.00	\$ -	\$ 180.00
030-06500	1351	47	0.235	0.58	Gregory Maxwell	\$ -	\$ 276.00	\$ 1.00	\$ 277.00
030-06700	10	16	0.138	0.34	Rousian Rakhoutine & Lilia Demeneva	\$ -	\$ 186.00	\$ -	\$ 186.00
Total on Privately Owned - Non-Agricultural Lands.....						\$ 25,422.00	\$ 45,099.00	\$ 12,587.00	\$ 83,108.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable):

460-01000	STR	297	8.09	20.00	Michael Lutsch	\$ 3,260.00	\$ 3,951.00	\$ 1,257.00	\$ 8,468.00
460-01200	STR	298	13.58	33.55	Thomas & Linda Halford	\$ 2,991.00	\$ 7,287.00	\$ 2,124.00	\$ 12,402.00
460-01400	STR	298	10.52	26.00	Thomas Halford	\$ 2,813.00	\$ 5,586.00	\$ 1,902.00	\$ 10,301.00
460-01500	STR	298	16.19	40.00	Michael & Helen Lavin	\$ 10,277.00	\$ 8,407.00	\$ 2,294.00	\$ 20,978.00
460-01600	STR	299	20.23	50.00	John Lafferty	\$ 10,277.00	\$ 10,392.00	\$ 1,597.00	\$ 22,266.00
460-01601	STR	299	0.17	0.43	Frank & Catherine Lafferty	\$ -	\$ 297.00	\$ 51.00	\$ 348.00
460-01700	STR	299	0.43	1.07	Frank Lafferty Limited	\$ -	\$ 580.00	\$ 99.00	\$ 679.00
460-01900	STR	299	14.08	34.78	Catherine Lafferty	\$ -	\$ 6,498.00	\$ 1,108.00	\$ 7,606.00
460-01901	STR	299	11.85	29.27	538073 Ontario Inc.	\$ 1,512.00	\$ 5,844.00	\$ 934.00	\$ 8,290.00
460-02000	STR	299	11.74	29.00	Catherine Lafferty & Mary Thompson	\$ 9,071.00	\$ 5,892.00	\$ 927.00	\$ 15,890.00
460-02100	STR	298	9.71	24.00	538073 Ontario Inc.	\$ 9,941.00	\$ 8,229.00	\$ 767.00	\$ 18,937.00
480-08300	NTR	298	41.68	102.98	Sandwich South Farms Inc.	\$ 3,878.00	\$ 19,120.00	\$ 3,122.00	\$ 26,120.00
480-08400	NTR	298	7.52	18.58	Gerald & Agnes Lavin	\$ 8,375.00	\$ 3,493.00	\$ 1,186.00	\$ 13,054.00
480-08410	NTR	298	18.47	45.65	Gerald & Agnes Lavin	\$ 13,551.00	\$ 8,849.00	\$ 1,457.00	\$ 23,857.00

Schedule of Assessment - Sullivan Creek Drain
(Geographic Township of Sandwich South)
Town of Tecumseh

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2023-01-09

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
480-08600	NTR	299	12.61	31.15	Richard McCarthy	\$ 243.00	\$ 5,820.00	\$ 866.00	\$ 6,929.00
480-08800	NTR	299	19.83	49.00	538073 Ontario Inc.	\$ 3,802.00	\$ 9,441.00	\$ 1,379.00	\$ 14,622.00
480-09000	NTR	298	10.32	25.51	Rose M, Philip N, & Paul J. Jobin & Joie Reyner	\$ -	\$ 4,736.00	\$ 616.00	\$ 5,352.00
490-10200	NTR	300	1.62	4.00	538073 Ontario Inc.	\$ -	\$ 1,345.00	\$ 174.00	\$ 1,519.00
490-10300	NTR	300	19.49	48.16	Robert & Richard McCarthy	\$ -	\$ 8,998.00	\$ 1,165.00	\$ 10,163.00
510-01500	11	13	16.41	40.54	Norman, Rose, Philip, Paul, Joie & Joslyne Jobin	\$ 1,993.00	\$ 6,438.00	\$ 576.00	\$ 9,007.00
510-01550	11	13	6.37	15.75	Rose Jobin	\$ 4,598.00	\$ 2,464.00	\$ 729.00	\$ 7,791.00
510-01600	11	14	16.42	40.57	Paul & Rose Jobin	\$ 6,333.00	\$ 6,253.00	\$ 561.00	\$ 13,147.00
510-01610	11	14	0.40	0.99	Philip Jobin	\$ 72.00	\$ 465.00	\$ 41.00	\$ 578.00
510-01700	11	14	8.09	20.00	Wilfred O'Neil	\$ 5,317.00	\$ 3,059.00	\$ 277.00	\$ 8,653.00
510-01800	11	15	8.09	20.00	Wilfred O'Neil	\$ 5,133.00	\$ 3,013.00	\$ 25,500.00	\$ 33,646.00
510-01900	11	15	8.09	20.00	Wilfred O'Neil	\$ 4,794.00	\$ 2,989.00	\$ 13.00	\$ 7,796.00
510-02000	11	15	15.99	39.50	Ruth Battersby	\$ 12,148.00	\$ 5,812.00	\$ 476.00	\$ 18,436.00
510-02005	11	15	0.20	0.50	James Battersby	\$ 9.00	\$ 255.00	\$ 1.00	\$ 265.00
510-02100	11	16	22.26	55.00	Helene Battersby	\$ 17,170.00	\$ 7,835.00	\$ 18.00	\$ 25,023.00
520-00700	10	10	21.19	52.36	Rose Jobin	\$ 1,680.00	\$ 9,538.00	\$ 1,262.00	\$ 12,480.00
520-00750	10	10	20.29	50.13	Rose, Philip & Paul Jobin & Jobin Farms Inc.	\$ 1,596.00	\$ 9,249.00	\$ 1,209.00	\$ 12,054.00
520-01300	10	11 & 12	48.39	119.56	Kenneth & Barbara McCarthy	\$ 34,771.00	\$ 20,383.00	\$ 5,026.00	\$ 60,180.00
520-03500	10	16	8.50	21.00	Clifford & Connie Campeau	\$ -	\$ 2,943.00	\$ 6.00	\$ 2,949.00
520-03900	10	16	11.01	27.20	Clifford & Connie Campeau	\$ -	\$ 3,811.00	\$ 8.00	\$ 3,819.00
520-04000	10	15	9.85	24.33	Susanna MacKenzie-Russell	\$ 92.00	\$ 3,409.00	\$ 7.00	\$ 3,508.00
520-04100	10	15	9.92	24.50	Sanward Enterprises Inc.	\$ 111.00	\$ 3,433.00	\$ 7.00	\$ 3,551.00
520-04200	10	15	19.33	47.76	Edward Chittle Jr.	\$ 144.00	\$ 6,692.00	\$ 14.00	\$ 6,850.00
520-04400	10	14	40.47	100.00	Norman Jobin	\$ 722.00	\$ 15,297.00	\$ 1,387.00	\$ 17,406.00
520-04500	10	12 & 13	40.41	99.85	Sandwich South Farms Ltd.	\$ 15,126.00	\$ 16,090.00	\$ 2,387.00	\$ 33,603.00
520-04700	10	12	63.13	156.00	Gerald & Agnes Lavin	\$ 10,994.00	\$ 25,867.00	\$ 16,384.00	\$ 53,245.00
520-04800	10	11	30.35	75.00	Wayne & Carol O'Neil	\$ 67.00	\$ 12,611.00	\$ 1,673.00	\$ 14,351.00
530-00100	9	10	25.90	64.00	Diklich Capital Corp	\$ 12,584.00	\$ 11,658.00	\$ 1,545.00	\$ 25,787.00
560-03900	10	17	2.41	5.95	Susanna Mackenzie	\$ -	\$ 834.00	\$ 2.00	\$ 836.00
530-04770	9	11	0.27	0.66	Sanward Enterprises Inc.	\$ 19.00	\$ 389.00	\$ 54.00	\$ 462.00

Schedule of Assessment - Sullivan Creek Drain
(Geographic Township of Sandwich South)
Town of Tecumseh

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2023-01-09

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Afft'd	Acres Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
530-04775	9	11	0.30	0.74	Edward Chittle Jr.	\$ 44.00	\$ 426.00	\$ 57.00	\$ 527.00
560-08000	11	18	0.40	1.00	Mary McGraw	\$ 1,336.00	\$ 131.00	\$ -	\$ 1,467.00
560-08100	11	17	16.19	40.00	507822 Ontario Inc. & 494112 Ontario Limited	\$ 8,966.00	\$ 5,418.00	\$ 383.00	\$ 14,767.00
560-08200	11	17	8.09	20.00	Phyllis Battersby, Wendy Philips & Cindy Walton	\$ 3,744.00	\$ 2,709.00	\$ -	\$ 6,453.00
Windsor									
030-04700	10	12	2.19	5.40	Sandwich South Farms Ltd.	\$ 211.00	\$ 1,135.00	\$ 2.00	\$ 1,348.00
030-04800	10	12 & 13	6.59	16.28	1027414 Ontario Inc.	\$ -	\$ 2,281.00	\$ 5.00	\$ 2,286.00
030-05000	10	13	16.19	40.00	Paul & Philip Jobin	\$ -	\$ 5,605.00	\$ 12.00	\$ 5,617.00
030-05200	10	13	8.09	20.00	John Wilson	\$ -	\$ 2,802.00	\$ 6.00	\$ 2,808.00
030-05400	10	14	15.38	38.00	Norbert St.Louis	\$ -	\$ 5,325.00	\$ 11.00	\$ 5,336.00
030-05600	10	14	11.74	29.00	Gerald Lavin	\$ -	\$ 4,064.00	\$ 9.00	\$ 4,073.00
030-05850	10	15	6.07	15.00	2017345 Ontario Limited	\$ -	\$ 2,102.00	\$ 5.00	\$ 2,107.00
030-06000	10	15	6.07	15.00	2017345 Ontario Inc.	\$ -	\$ 2,102.00	\$ 5.00	\$ 2,107.00
030-06110	10	15	11.41	28.20	5040815 Ontario Limited	\$ -	\$ 3,951.00	\$ 9.00	\$ 3,960.00
030-06200	10	16	2.01	4.96	2187065 Ontario Ltd.	\$ -	\$ 695.00	\$ 1.00	\$ 696.00
030-06600	1351	48	10.36	25.59	Joseph & Brenda Gagnon	\$ -	\$ 3,586.00	\$ 8.00	\$ 3,594.00
Total on Privately Owned - Agricultural Lands (grantable).....						\$ 229,765.00	\$ 347,884.00	\$ 82,701.00	\$ 660,350.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (non-grantable):

590-01000	STR	298, 299, 300	2.83	7.00	Canada Southern Railway Co.	\$ 1,137.00	\$ 1,324.00	\$ 1,376.00	\$ 3,837.00
590-01200	NTR	298	0.70	1.74	Town of Tecumseh	\$ 41.00	\$ 461.00	\$ 59.00	\$ 561.00
Total on Privately Owned - Agricultural Lands (non-grantable).....						\$ 1,178.00	\$ 1,785.00	\$ 1,435.00	\$ 4,398.00
TOTAL ASSESSMENT			943.29	2330.88		\$ 266,909.00	\$ 451,708.00	\$ 113,383.00	\$ 832,000.00

1 Hectare = 2.471 Acres
Project No. REI2015D010
January 9th, 2023

SPECIFICATIONS

SULLIVAN CREEK DRAIN

(Geographic Township of Sandwich South)

TOWN OF TECUMSEH

I. GENERAL SCOPE OF WORK

The Sullivan Creek Drain currently comprises of an open drain with the upper end generally located approximately 740 metres east of Sexton Road and 400 metres south of County Road 46, it meanders northeasterly for approximately 5 km where it outlets to the Pike Creek Drain at a point approximately 760 metres north of Baseline Road and 480 metres west of County Road 19 respectively, in the geographic township of Sandwich South, Town of Tecumseh. The work on the drain will extend from the outlet as noted on the plans and proceed southerly to the upstream end of the open drain. The work under this project generally comprises of improvements to the open drain to provide a suitable cross section for conveyance of flows, along with removal of a farm bridge along the course of the drain. The installation of two new replacement bridges has already been completed due to emergency needs. The work on the bridge being taken out includes the removal and disposal of all existing deck structure including the poured concrete abutment walls and the removal of any other materials to allow for the drain open cross section to be restored. Work on the drain includes supply and installation of quarried limestone on filter cloth general erosion protection and rock chute inlets. The proposed work is intended to address the repair and improvement of the open drain, tile end improvements, bridge repairs and improvements including headwall work and erosion protection in accordance with current standards.

All work shall be carried out in accordance with these specifications, the plans forming part of this drainage project, as well as the Standard Details included in **Appendix "REI-C"**. The excess soil to be loaded up and hauled away for disposal shall be carried out in accordance with the requirements set out in the WSP report included in **Appendix "REI-F"**. All work carried out under this project shall be completed to the full satisfaction of the Town Drainage Superintendent and the Consulting Engineer.

II. E.R.C.A. AND D.F.O. CONSIDERATIONS

The Contractor will be required to implement stringent erosion and sedimentation controls during the course of the work to help minimize the amount of silt and sediment being carried downstream into the Pike Creek Drain. It is intended that work on this project be carried out during relatively dry weather to ensure proper site and drain conditions and to avoid conflicts with sediment being deposited into the outlet drainage systems. All disturbed areas shall be restored as quickly as possible with grass seeding and mulching installed to ensure a protective cover and to minimize any erosion from the work sites subsequent to construction. The Contractor may be required to provide temporary silt fencing and straw bales as outlined further in these specifications.

All of the work shall be carried out in accordance with any permits or authorizations issued by the Essex Region Conservation Authority (E.R.C.A.) or the Department of Fisheries and Oceans (D.F.O.), copies of which will be provided, if available, and the notes in **Appendix "REI-A"**. The Contractor is advised that **no work** may be carried out in the existing drain **from March 15th to July 15th** of any given year because the drain is directly connected to a downstream drain that is classified as sensitive to impacts on aquatic life and habitat by E.R.C.A. and D.F.O. and Largemouth Bass may be present as advised by D.F.O.

As part of its work, the Contractor will implement the following measures that will ensure that any potential adverse effects on fish and fish habitat will be mitigated:

- a) As per standard requirements, work will not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work will be done in the dry.
- b) All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition to what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.
- c) To prevent sediment entry into the Drain, in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with related Ontario Provincial Standards. It is incumbent on the proponent and their Contractors to ensure that sediment and erosion control measures are functioning properly and are maintained and upgraded as required.
- d) Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.
- e) All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.
- f) The Contractor shall construct six (6) sediment/refugia pools along the lower portion of the drain located near Stations 3+360, 4+360, 5+360, 6+360, 7+360 and 8+360. Each pool shall be centred in the drain and be 3 metres long and 300mm deep with 1:1 side slopes with a minimum bottom width of 600mm for drain design bottom width of 1.2m, and 800mm for drain design bottom width of 1.4m.

III. M.N.R.F. – M.E.C.P. CONSIDERATIONS

The Contractor is to note that this project has gone through the Ministry of Natural Resources and Forestry (M.N.R.F.) screening process by way of a Species at Risk (S.A.R.) review of the Mitigation Plan for Drainage Works (March 2018-17-4938) that the Town has prepared to address the Endangered Species Act, 2007, that is now administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.). Section 6.0 of the Mitigation Plan indicates that snake species are a concern for this work area and although turtles are not indicated, they are mobile and could be encountered. The Mitigation Plan includes measures to be followed as outlined in “Section 7.0 Mitigation Measures” of the document and a copy of same as it relates to turtles and snakes is included in **Appendix “REI-B”**. Providing mitigation requirements are implemented, it was concluded that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007. Based on this information we find that the Town can proceed with the eligible repairs, maintenance, and improvements to the drain as they are exempt under Sections 9 and 10 of the Act, provided that they follow the rules within Ontario Regulation 242/08 and the Mitigation Measures in their S.A.R. Mitigation Plan. To address these requirements the Town has established comprehensive mitigation measures as well as species identification guides for reference. The results of the review will be provided to the Contractor and copies of the mitigation measures, habitat protection and identification sheets will be included within **Appendix “REI-B”**.

The Contractor is to review **Appendix “REI-B”** in detail and is required to comply, in all regards, with the contents of said M.N.R.F. information, or any future requirements, and follow the special

requirements therein included, during construction. The Drainage Superintendent has reviewed the endangered species maps and any concerns will be provided in **Appendix “REI-B”**. Certain species such as turtles and snakes are mobile and may be encountered during construction. Therefore, the Mitigation Measures in Section 7.0 of the Town Plan has been included in **Appendix “REI-B”** in its entirety along with timing window charts for further information and use by the Contractor.

The Contractor shall contact the Drainage Superintendent if an endangered species is encountered during construction. The Contractor shall be responsible for providing the necessary equipment and materials outlined in the **“MITIGATION PLAN”** to address the handling of any endangered species encountered during the course of the construction work. The Contractor shall cooperate fully and assist the Drainage Superintendent or M.N.R.F. – M.E.C.P. staff in the proper handling of the endangered species as outlined in the **“MITIGATION PLAN”**, and as may be further directed by the Drainage Superintendent or the M.N.R.F. – M.E.C.P. staff and shall govern all its operations accordingly.

IV. ACCESS TO WORK

The Contractor is advised that the majority of the work to be carried out on this project extends along the north and west side of the Sullivan Creek Drain except for the portion between Bridge 19 and 20 that will be completed from the east side and from Highway No. 3 to County Road 46 along the easterly side. For the lawn areas in front of MN 5580, 5660 and 5680, the Contractor shall carry out its work from the roadside and load up and haul away and dispose of the excavated material and any material from cleaning out the culverts located in the drain. Where lands on both sides of the drain belong to the same landowner, the landowner may request work to be done from the other side of the drain and the Contractor shall coordinate this with the landowner. The Contractor shall have access for a minimum width of 8 metres (26 feet) abutting the proposed drainage works. The Contractor may utilize the work area as necessary, to permit the completion of all of the work required to be carried out for this project along with an area sufficient to spread the excavated material to a maximum depth of 100mm on the adjacent lands beyond any grass buffer or driveway access. The Contractor shall also have access through the driveways from the roads along the works as necessary to access the open drain and carry out the replacement and removal and repair of the existing access bridges as set out on the plans and in these specifications, along with a sufficient area in the vicinity of the bridges to carry out the improvements of the structure and ancillary work.

The Contractor shall ensure that the traveling public is protected at all times while utilizing the roadway for its access. The Contractor shall provide traffic control, including flag persons when required.

Throughout the course of the work, it is imperative that the Contractor protect as much landscaping and vegetation as possible when accessing along the drain. This will be of particular concern along the grass buffer and driveway areas abutting the drain. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor at its cost, including topsoil placement and lawn restoration as directed by the Town Drainage Superintendent and the Consulting Engineer. Restoration shall include but not be limited to all necessary levelling, grading, shaping, topsoil placement, seeding, mulching, and granular placement required to make good any damage caused.

V. REMOVAL OF BRUSH, TREES AND RUBBISH

Where there is any brush, trees or rubbish along the course of the drainage works from top of bank to top of bank, including the full width of the work access, all such brush, trees or rubbish shall be close cut and grubbed out, and the whole shall be chipped up for recycling, burned or

otherwise satisfactorily disposed of by the Contractor. The brush and trees removed along the course of the work are to be cut as close to the ground as practicable and within the drain banks parallel to the side slopes. Except as noted herein, stumps shall be left in place and shall be sprayed with a single application of stump killer (Diphenoprop BK700 or approved equal). Dead trees on the top of each bank and any trees or tree branches that overhang the drain shall be removed and trimmed. All removed materials shall be put into piles by the Contractor in locations adjacent to the drain and within the working corridors, where they can be safely chipped and disposed of, or burned by it, or hauled away and disposed of by the Contractor to a site to be obtained by it at its expense. In all cases, trees and brush shall be stockpiled on the property on which they were cut. Prior to and during the course of any burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment and shall ensure that the Environmental Protection Act is not violated. The Contractor shall assume all responsibility for control of the burn, obtaining all utility locates in the area of each burn site, all responsibility for liabilities related to the burning of the brush and smoke generated, and will be required to notify the local fire authorities to obtain any permits and co-operate with them in the carrying out of any work. The removal of brush and trees shall be carried out in close consultation with the Town Drainage Superintendent or Consulting Engineer to ensure that no decorative trees or shrubs are disturbed by the operations of the Contractor that can be saved. It is the intent of this project to save as many trees and bushes as practical on private lands adjacent to the drain and within the working corridors, especially mature trees beyond the drain sideslopes.

The Contractor shall protect all other trees, bushes, and shrubs located along the length of the drainage works except for those trees that are established, in consultation with the Town Drainage Superintendent, the Consulting Engineer, and the Owners, to be removed as part of the works. The Contractor shall note that protecting and saving the trees may require the Contractor to carry out hand work around the trees, bushes, and shrubs to complete the necessary final site grading and restoration.

Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

The Contractor shall remove all deleterious materials and rubbish along the course of the open drain and any such materials located in the bridge culverts and enclosures while carrying out its cleaning of same. All such deleterious materials and rubbish shall be loaded up and hauled away by the Contractor to a site to be obtained by it at its cost in accordance with excess materials regulations.

VI. FENCING

Where it is necessary to take down any fence to proceed with the work, the same shall be done by the Contractor across or along that portion of the work where such fence is located. The Contractor will be required to exercise extreme care in the removal of any fencing so as to cause a minimum of damage to same. The Contractor will be required to reinstall any fence that is taken down in order to proceed with the work, and the fence shall be reinstated in a neat and workmanlike manner. The Contractor will not be required to procure any new materials for rebuilding the fence provided that it has used reasonable care in the removal and replacement of same. When any fence is removed by the Contractor, and the Owner thereof deems it advisable and procures new material for replacing the fence so removed, the Contractor shall replace the fence using the new materials and the materials from the present fence shall remain the property of the Owner.

VII. DETAILS OF OPEN DRAIN WORK

The open drain shall be excavated to the lines, levels, grades, and cross-sections as shown on the accompanying drawings, or as may be further established by the Town Drainage Superintendent

or the Engineer at the time of the work. The drain shall be carefully excavated so as not to disturb the existing banks, rock protection and vegetation, except for those portions of the drain where widening or restoration of a stable drain bank configuration is required. The bottom width of the drain and the sideslopes of the excavation shall conform to the dimensions given on the drawings.

The Contractor is advised that there is a high pressure gas line crossing under the drain just south of County Road 46 and this will require the Contractor to coordinate with Enbridge Gas for 3rd party inspection when working within 30m (100') of the gas line crossing. The Contractor will be responsible to arrange for the necessary locates of all utilities in the vicinity of the drain along its complete length and shall take appropriate steps to protect them during the course of its works on the drain.

The drain shall be of the size, type, depth, etcetera as shown on the accompanying drawings. When completed, the drain shall have a uniform and even bottom and in no case shall such bottom project above the grade line, as shown on the accompanying drawings, and as determined from the Benchmarks. The finished side slopes of the drain shall be 1.5 metres horizontal to 1.0 metre vertical.

The excavated material to be cast onto the adjoining lands shall be well and evenly spread over a sufficient area so that no portion of the excavated earth is more than 100mm in depth. The material shall be kept at least 1.2 metres clear from the finished edge of the drain, care being taken not to fill up any existing tiles, ditches, furrows or drains with the excavated material. The excavated material to be spread upon the lands shall be free from rocks, cobbles, boulders, stumps, rubble, rubbish or other similar material and these materials, if encountered, shall be hauled away by the Contractor and disposed of at a site to be obtained by it at its expense.

Where the drain crosses any lawn, garden, orchard, parking, roadway or driveway areas, the excavated material for the full width of the above-mentioned areas shall be hauled away by the Contractor and disposed of to a site to be obtained by the Contractor at its expense. All work at the disposal site shall be established between the Contractor and the site owner. The Contractor shall be responsible for any permits required and shall provide copies of same to the Town and Consulting Engineer when requested. The handling of these excess soils shall be conducted in accordance with the requirements set out in **Appendix "REI-F"**. Materials from Zone 1 can be placed on the adjacent lands. Material from Zone 3 will be loaded up and hauled away for disposal at the County landfill site.

Where there is any brush or rubbish in the course of the drain, including both side slopes of the drain, all such brush or rubbish shall be close cut and grubbed out. Where there is any brush or rubbish where the earth is to be spread, or on that strip of land between where the earth is to be spread and the edge of the drain, all such brush or rubbish shall be close cut and grubbed out. The whole is to be burned, chipped, or otherwise satisfactorily disposed of by the Contractor.

VIII. DETAILS OF BRIDGE WORK

The Contractor shall completely remove and dispose of Bridge 11 at the north side of the former railway property. The Contractor shall load up and haul away all deleterious material from the bridge site as set out further in these specifications. The drain cross section in the location of the bridge shall be restored in accordance with the profile and the new exposed banks restored as noted in these specifications.

For future works the existing concrete, steel or H.D.P.E. pipes shall be removed and disposed of by the Contractor, along with any other deleterious materials that are encountered. The bridge shall be replaced in accordance with the profile and detail plans including the 10% embedment and the new exposed banks restored as noted in these specifications.

The Contractor will be responsible to restore any damage caused to the roadways at its cost. All damaged hard surface roadway areas shall be neatly saw cut and the damaged materials

removed and disposed of by the Contractor prior to carrying out any restoration work. The extent of the repairs shall be established in consultation with the Town Drainage Superintendent, the Road Authority, and the Consulting Engineer and the repairs shall be completed to their full satisfaction.

The Contractor is to note that any intercepted tiles or pipes along the length of the future replacement culverts are to be extended and connected through rock protection at its cost unless otherwise noted in the accompanying drawings.

IX. CORRUGATED STEEL PIPE INSTALLATION

The new corrugated steel pipes (CSP) to be installed on this project are required to be provided in the longest lengths that are available and shall not be less than 3.0 metres. Where the overall access pipe length exceeds the standard pipe lengths, the Contractor shall connect the pipe sections together by use of a manufactured 9-C bolted coupler installed in accordance with the manufacturer's recommendations. All coupler joints shall be wrapped with a layer of filter cloth around the complete circumference so that it extends a minimum of 100mm beyond the coupler on each end, to ensure a positive seal against soil migration through the joints.

The Contractor shall note that the placement of any new culvert pipe shall be performed totally in the dry and it shall be prepared to take whatever steps are necessary to ensure same, all to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. As part of the work, the Contractor will be required to clean out the drain along the full length of the pipe and for a distance of 3.05 metres (10 ft.) upstream and downstream of the pipe. The Contractor shall note that the pipe inverts are set at least 10% of the pipe diameter (or the pipe rise) below the drain bottom to provide the embedment required by E.R.C.A. and D.F.O. and to meet the minimum cover requirements for the pipe.

The installation of the complete length of the new culvert pipe, including all appurtenances, shall be completely inspected by the Town Drainage Superintendent or the Consulting Engineer's Inspector prior to backfilling any portions of same. Under no circumstance shall the Contractor commence the construction or backfill of the new culvert pipe without the site presence of the Town Drainage Superintendent or the Consulting Engineer's Inspector to inspect and approve said installation. The Contractor shall provide a minimum of two (2) working days' notice to the Town Drainage Superintendent or the Consulting Engineer prior to commencement of the work. The installation of the new culvert structure is to be performed during normal working hours of the Town Drainage Superintendent and the Consulting Engineer from Monday to Friday unless written authorization is provided by them to amend said working hours.

For the access bridge installation, once the new aluminized steel type II corrugated pipe has been satisfactorily set in place, the Contractor shall completely backfill same with granular material M.T.O. Type "B" O.P.S.S. Form 1010 with the following exception. The top 305mm (12") of the backfill material for the full top width of the access, and the full top width of the drain or the excavated trench, and any approaches to the south and transitions to the north shall be granular material M.T.O. Type "A" O.P.S.S. Form 1010. All of the driveway approach areas extending from the Town roadway to the south face of the new bridge culvert shall be backfilled with compacted granular material M.T.O. Type "A" O.P.S.S. Form 1010, but only after all topsoil material has been completely removed and disposed of, and the minimum thickness of this granular material shall be 305mm (12"). All areas outside of the access driveway shall be backfilled with native material compacted to 96% of Standard Proctor Density and topped with a minimum of 50mm of topsoil and shall be seeded and mulched.

For hard surface driveway crossings, the top 305mm (12") of the backfill over the pipe below the hard surface treatment shall comprise granular material M.T.O. Type "A" O.P.S.S. Form 1010 compacted to a minimum of 100% Standard Proctor Density. The Contractor shall at all times be very careful when performing its backfilling and compaction operations so that no damage is caused to the pipe. To ensure that no damage is caused to the proposed pipe, alternative methods of achieving the required backfill compaction shall be submitted to the Consulting Engineer or the

Town Drainage Superintendent for their approval prior to the commencement of this work. The Contractor shall restore the asphalt surface by placing a minimum of the existing thickness or a 90mm minimum thickness of Type HL-4 hot mix asphalt. The asphalt shall be supplied and placed in two (2) approximately equal lifts compacted to a value ranging from 92% to 96% of maximum relative density as per O.P.S.S. 310. For existing concrete driveways, the Contractor shall carefully remove the concrete to the nearest expansion joint. The concrete driveway shall be restored to the original length and width that was removed and include 150mm thick, 30MPa concrete, with 6% \pm 1% air entrainment and 6x6-6/6 welded wire fabric reinforcing installed at the midpoint of the slab. All slab surfaces shall be finished to provide an appearance approximating the finish on the existing concrete driveway abutting the replacement.

The Contractor will be responsible to restore any damage caused to the roadways at its cost. All damaged hard surface roadway areas shall be neatly saw cut and the damaged materials removed and disposed of by the Contractor prior to carrying out any restoration work. The extent of the repairs shall be established in consultation with the Town Drainage Superintendent, the Road Authority, and the Consulting Engineer and the repairs shall be completed to their full satisfaction.

The Contractor is to note that any intercepted pipes or tiles along the length of the proposed culvert are to be extended and connected at its cost to the open drain at the end of the new culvert unless otherwise noted in the accompanying drawings.

The Contractor shall also note that the placing of the new access bridge culvert shall be completed so that it totally complies with the parameters established and noted in the Bridge Details and Tables for the culvert replacement. The culvert shall be set on an even grade and the placement shall be performed totally in the dry, and the Contractor should be prepared to take whatever steps are necessary to ensure same, all to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. The Contractor shall also be required to supply a minimum of 100mm (4") of 20mm (3/4") clear stone bedding underneath the culvert pipe extending from the bottom of the drain to the culvert invert grade, all to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. Furthermore, if an unsound base is encountered, it must be removed and replaced with 20mm (3/4") clear stone satisfactorily compacted in place to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. The Contractor is to note that when replacing an access bridge or enclosure culvert, it shall be required to excavate a trench having a width not less than the new pipe outside diameter plus a 600mm working width on both sides of the new pipe to allow for proper installation of granular backfill and compaction of same. The Contractor shall also note that all culvert pipe installations are to be carried out with a minimum of 10% of their diameter or rise embedded below the drain design bottom, as shown and noted on the plan for each of the access bridge installations.

X. REMOVALS

Where existing access bridges and enclosures are to be completely removed and replaced, the Contractor shall be required to excavate and completely extract the existing concrete structure or culvert pipe and the existing endwalls in their entirety, as well as any other deleterious materials that may be encountered in removing same, excluding poured concrete headwalls that are to be reused. The Contractor shall neatly saw cut any concrete or asphalt surfaces over the pipes for a sufficient width to allow for the safe removal of same or go to the nearest expansion joint panel of the concrete driveways. The Contractor shall also be required to completely dispose of all removed materials to a site to be obtained by it at its own expense in accordance with the excess soil handling requirements in **Appendix "REI-F"**. The Contractor shall note that when headwalls are shown to be left in place, the Contractor shall protect same and carry out its work for the pipe replacement as noted above and dispose of any debris resulting from the work.

All unsuitable and deleterious materials from the excavation and removal of the existing bridge and enclosure culverts and drain cleaning shall be hauled away and disposed of by the Contractor to a site to be obtained by it at its expense. Likewise, any material excavated to allow for the

granular approaches to the bridge, driveway transitions, or installation of new headwalls shall also be hauled away and disposed of by the Contractor in accordance with the excess soil requirements in **Appendix "REI-F"**.

XI. CONCRETE FILLED JUTE BAG, PRECAST CONCRETE BLOCK OR SLOPED END PROTECTION

Unless otherwise shown or noted, the Contractor is to provide new concrete filled jute bag headwalls, precast concrete block, or sloped quarried limestone on non-woven filter cloth end protection for the access bridges and enclosures being replaced or constructed on this drain.

The concrete filled jute bags are to be provided and laid out as is shown and detailed in the drawings provided by the Town and as noted in the Standard Specifications in **Appendix "REI-C"**. In all cases, the concrete filled jute bag headwalls shall be topped with a minimum 100mm (4") thick continuous concrete cap comprising 30mPa concrete with 6% \pm 1% air entrainment for the entire length of the headwalls. The headwalls shall be installed on an inward batter to be not less than 1 horizontal to 5 vertical, and under no circumstances shall this batter, which is measured from the top of the headwall to the projection of the end of the pipe, be less than 305mm (12"). From the midpoint of the pipe height down to the concrete footing, the wall shall be a double concrete filled jute bag installation. On the road side the walls shall be deflected as shown to provide daylighting and a better approach across the new bridge.

The installation of the concrete filled jute bag headwalls, unless otherwise specified, shall be provided in total compliance with the Items 1, 3, and 4 included in the **"STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION"**. These are attached to the back of these specifications and labelled **Appendix "REI-C"**. The Contractor shall comply in all respects with the General Conditions included in Item 4 and the **"Typical Concrete Filled Jute Bag Headwall End Protection"** detail also shown therein.

The Contractor shall install interlocking precast concrete blocks with filter cloth backing for walls on both ends of the bridges requiring same. The blocks shall be minimum 600X600X1200mm in size as available from Underground Specialties - Wolseley, Windsor, Ontario, or equal, and installed as set out in **Appendix "REI-C"**. Vertical joints shall be staggered by use of half blocks where needed and wingwall deflections when required shall employ 45-degree angled blocks. Voids between the blocks and the pipe shall be grouted with 30mPa concrete having 6% \pm 1% air entrainment and extend for the full thickness of the wall and have a smooth uniform finish on the face that blends with the precast blocks. The installation of the endwalls, as well as the backfilling of the pipe where applicable, shall be provided in compliance with Items 1), 3), and 4) of the **"Standard Specifications for Access Bridge Construction"** attached within **Appendix "REI-C"** and in total compliance and in all respects with the General Conditions included in said Appendix. The Contractor shall submit shop drawings for approval of the wall installation that includes details for a minimum 300mm thick concrete footing that extends from the pipe invert downward. The footing shall extend into the drain banks each side for the required embedment of the blocks and be constructed to ensure that the completed wall will be completely vertical or tipped slightly back towards the driveway. Where the block walls extend more than 1.8 metres in height, the supplier shall provide the Contractor with uni-axial geogrid (SG350 or equivalent) reinforcement for installation to tie the wall back into the granular backfill. The Contractor, in all cases, shall comply with these specifications and upon completion of the stacked precast concrete end protection installation shall restore the adjacent areas to their original conditions. The Contractor shall supply quarried limestone on filter cloth rock protection adjacent to the headwalls at each corner of the bridge. All rock protection shall be 1.0 metres wide and 305mm (12") thick, installed on non-woven filter cloth, and shall be installed in accordance with Item 2) of the **"Standard Specifications for Access Bridge Construction"**. The synthetic filter mat to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products through Underground Specialties - Wolseley in Windsor, Ontario or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Industries Amherst Quarries, in Amherstburg, Ontario, or equal.

Where sloped end protection is specified, the top 305mm (12") of backfill material over the ends of the access pipe, from the invert of said pipe to the top of the driveway elevation of the access bridge or enclosure, shall be quarried limestone. The quarried limestone shall be provided as shown and detailed on the plans or as indicated in the Standard Specifications in **Appendix "REI-C"** and shall be graded in size from a minimum of 100mm (4") to a maximum of 250mm (10"). The quarried limestone to be placed on the sloped ends of an access bridge or enclosure shall be underlain with a synthetic non-woven geotextile filter fabric. The sloped quarried limestone protection is to be rounded as shown on the plan details and shall also extend along the drain side slopes to a point directly in line with the ends of the culvert pipe. The road side approach to the entrance shall be provided with a minimum 5.0m radius at each end of the driveway entrance. All work shall be completed to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer.

The installation of the sloped quarried limestone end protection, unless otherwise specified herein, shall be provided in total compliance with Item 2), 3), and 4) of the **"STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION"**. These are attached to the back of these specifications and labelled **Appendix "REI-C"**. The Contractor shall comply in all respects with the General Conditions included in Item 4 and the **"Typical Quarried Limestone End Protection Detail"** also in **Appendix "REI-C"**.

The quarried limestone erosion protection shall be embedded into the sideslopes of the drain a minimum thickness of 305mm and shall be underlain in all cases with non-woven synthetic filter mat. The filter mat shall not only be laid along the flat portion of the erosion protection, but also contoured to the exterior limits of the quarried limestone and the unprotected slope. The width of the erosion protection shall be as established in the accompanying drawings or as otherwise directed by the Town Drainage Superintendent or the Consulting Engineer during construction. In placing the erosion protection, the Contractor shall carefully tamp the quarried limestone pieces into place with the use of the excavator bucket so that the erosion protection when completed will be consistent, uniform and tightly laid. In no instance shall the quarried limestone protrude beyond the exterior contour of the unprotected drain sideslopes along either side of said protection. The synthetic filter mat fabric to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products, or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Aggregates Amherst Quarries, in Amherstburg, Ontario, or equal.

XII. GENERAL QUARRIED LIMESTONE EROSION PROTECTION

At all of the swale and furrow locations entering the drain from the either side, it is required that general quarried limestone erosion protection and rock chutes be provided on the drain slopes, at the locations indicated or established due to erosion, and to the widths generally shown within the details and notes included in the accompanying drawings. The rock chutes shall be V-shaped and constructed to direct all flows through the centre portion of the rock chute. Where the drain banks are showing erosion or slumping and distress, the Contractor shall provide quarried limestone on filter cloth general erosion protection as outlined below. Protection locations shall be as established in consultation with the Town Drainage Superintendent and Consulting Engineer and shall include the areas noted on the profiles.

The quarried limestone erosion protection shall be embedded into the sideslopes of the drain a minimum thickness of 305mm and shall be underlain in all cases with non-woven synthetic filter mat. The filter mat shall not only be laid along the flat portion of the erosion protection, but also contoured to the exterior limits of the quarried limestone and the unprotected slope. The width of the general erosion protection shall be as established in the accompanying drawings or as otherwise directed by the Town Drainage Superintendent or the Consulting Engineer during construction. In placing the erosion protection, the Contractor shall carefully tamp the quarried limestone pieces into place with the use of the equipment bucket so that the erosion protection

when completed will be consistent, uniform and tightly laid. In no instance shall the quarried limestone protrude beyond the exterior contour of the unprotected drain sideslopes along either side of said protection. The synthetic filter mat to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products, or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Aggregates Amherst Quarries, in Amherstburg, Ontario, or equal.

XIII. BENCHMARKS

Also, for use by the Contractor, we have established Benchmarks along the course of the work and especially at the location where the existing bridges are located. The Contractor shall work with the Drainage Superintendent or Inspector to transfer the benchmark from any object being removed to a temporary site benchmark such as a nail in a tree or top of a tile that is not being disturbed. This temporary site benchmark is to be used in setting the drain design grades.

For the bridge removals, the plans include details illustrating the work to be carried out. For each bridge detail a Benchmark has been indicated and the elevation has been shown and may be utilized by the Contractor in carrying out its work. In all cases, the Contractor is to utilize the specified drain grade to control its work. The Contractor shall ensure that it takes note of the direction of flow and sets all grades to assure that all flows go from south to north to match the direction of flow within the drain.

XIV. ANCILLARY WORK

During the course of any work to the bridges along the course of the work, the Contractor will be required to protect or extend any existing tile ends or swales and connect them to the drainage works to maintain the drainage from the adjacent lands. All existing tiles shall be extended utilizing solid Big 'O' "standard tile ends" or equal plastic pipe of the same diameter as the existing tile and shall be installed in accordance with the "**Standard Lateral Tile Detail**" included in the plans, unless otherwise noted. Connections shall be made using a manufactured coupling where possible. For other connections, the Contractor shall utilize a grouted connection. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland cement with just sufficient water added to provide a stiff plastic mix, and the mortar connection shall be performed to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer. The mortar joint shall be of a sufficient mass around the full circumference of the joint on the exterior side to ensure a tight, solid seal. The Contractor is to note that any intercepted pipes along the length of the existing culverts are to be extended and connected to the open drain unless otherwise noted in the accompanying drawings.

The Contractor shall re-grade the existing swales to allow for the surface flows to freely enter the drain. Any disturbed grass areas shall be fully restored with topsoil, seed and mulch.

Although it is anticipated that the bridge removal at each site shall be undertaken in the dry, the Contractor shall supply and install a temporary straw bale check dam in the drain bottom immediately downstream of each bridge site during the time of construction. The straw bale check dam shall be to the satisfaction of the Town Drainage Superintendent or Consulting Engineer and must be removed upon completion of the construction. The straw bales may be reused at each site subject to their condition. All costs associated with the supply and installation of this straw bale check dam shall be included in the cost bid for the bridge removal.

XV. TOPSOIL, SEED AND MULCH

The Contractor will be required to protect grass buffers and driveway accesses along the top of the drain bank where they currently exist. Where any of these are damaged, they shall be fully

restored including placement of topsoil. The topsoil shall be prepared for seeding as noted further in these specifications. Should the existing topsoil be treated to prevent grass growth, the Contractor shall strip the existing topsoil material back and spread it on the adjacent field and supply 50mm thick imported topsoil, or topsoil material scavenged from the drain banks at rock protection locations, that is suitable for growing grass.

The Contractor shall be required to restore all existing grassed areas and drain side slopes damaged by the construction and cutting of the drain cross-section by placing topsoil, and then seed and mulch over said areas including any specific areas noted on the bridge details. The Contractor shall be required to provide all the material and to cover the above mentioned surfaces with approximately 50mm of good, clean, dry topsoil on slopes and 100mm of good, clean, dry topsoil on horizontal surfaces, fine graded and spread in place ready for seeding and mulching. The placing and grading of all topsoil shall be carefully carried out according to Ontario Provincial Standard Specifications, Form 570, dated November 2007, or as subsequently amended or as amended by these Specifications. Once the topsoil has been properly placed and fine graded, the Contractor shall seed and mulch the area. Seeding and mulching operations shall be carried out in accordance with Ontario Provincial Standard Specifications, Form 572, dated November 2003, or as subsequently amended or as amended by these Specifications. The seeding mixture shall be OSECO Lawn Seed Mixture Canada No. 1 or equal as available from Morse Growers Supply, Leamington or equal. As part of the seeding and mulching operation, the Contractor will be required to provide either a hydraulic mulch mix or straw mulch with adhesive binder in accordance with O.P.S.S. 1103.05.03 dated November 2007, or as subsequently amended, to ensure that the grass seed will be protected during germination and provide a thick, uniform cover to minimize erosion, where necessary. All work shall be completed to the full satisfaction of the Town Drainage Superintendent and the Consulting Engineer.

All of the work relative to the placement of topsoil and the seeding and mulching operation shall be meticulously done and completed in a good and workmanlike manner all to the full satisfaction of the Town Drainage Superintendent and Consulting Engineer.

XVI. GENERAL CONDITIONS

- a) The Town Drainage Superintendent or Consulting Engineer shall have authority to carry out minor changes to the work where such changes do not lessen the efficiency of the work.
- b) The Contractor shall satisfy itself as to the exact location, nature and extent of any existing structure, utility, or other object which it may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town of Tecumseh and the Consulting Engineer and their representatives for any damages which it may cause or sustain during the progress of the work. It shall not hold the Town of Tecumseh or the Consulting Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.
- c) The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and Consulting Engineer can review same and check that the work will generally conform to the design and project intent.
- d) The Contractor will be responsible for any damage caused by it to any portion of the Town road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of the road, the travelled portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If any part of the travelled portion of the road is damaged by the Contractor, the Town shall have the right to have the necessary repair work done by its' employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the Town. The Contractor, upon completing the works, shall clean all debris and junk, etcetera, from the roadside of the

- drain, and leave the site in a neat and workmanlike manner. The Contractor shall be responsible for keeping all public roadways utilized for hauling materials free and clear of mud and debris.
- e) The Contractor shall provide all necessary lights, signs, and barricades to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, signing is to comply with the M.T.O. Manual of Uniform Traffic Control Devices (M.U.T.C.D.) for Roadway Work Operations and Ontario Traffic Manual Book 7.
 - f) During the course of the work the Contractor shall be required to connect existing drainage pipes to the Municipal Drain. In the event that polluted flows are discovered, the Contractor shall delay the connection of the pipe and leave the end exposed and alert the Town, the Drainage Superintendent, and the Consulting Engineer so that steps can be taken by the Town to address the concern with the owner and the appropriate authorities. Where necessary the Contractor shall cooperate with the Town in providing temporary measures to divert the drain or safely barricade same. Should the connection be found acceptable by the authorities, the Contractor shall complete the connection of the drain as provided for in the specifications, at no extra cost to the project.
 - g) Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.
 - h) The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no work shall be left in any untidy or incomplete state before subsequent portions are undertaken.
 - i) During the course of the project the Contractor shall deal with any excess soil management from the project in accordance with Ontario Reg 406/19 pursuant to the Environmental Protection Act, R.S.O. 1990, c. E.19 and any subsequent amendments to same, and the provisions included in **Appendix "REI-F"**.
 - j) All driveways, laneways and access bridges, or any other means of access on to the job site shall be fully restored to their former condition at the Contractor's expense. Before authorizing Final Payment, the Town Drainage Superintendent and the Consulting Engineer shall inspect the work in order to be sure that the proper restoration has been performed. In the event that the Contractor fails to satisfactorily clean up any portion of these accesses, the Consulting Engineer shall order such cleanup to be carried out by others and the cost of same be deducted from any monies owing to the Contractor.
 - k) The Contractor will be required to submit to the Town, a Certificate of Good Standing from the Workplace Safety and Insurance Board prior to the commencement of the work and the Contractor will be required to submit to the Town, a Certificate of Clearance for the project from the Workplace Safety and Insurance Board before Final Payment is made to the Contractor.
 - l) The Contractor shall furnish a Performance and Maintenance Bond along with a separate Labour and Material Payment Bond within ten (10) days after notification of the execution of the Agreement by the Town. One copy of said bonds shall be bound into each of the executed sets of the Contract. Each Performance and Maintenance Bond and Labour and Material Payment Bond shall be in the amount of 100% of the total Tender Price. All Bonds shall be executed under corporate seal by the Contractor and a surety company, authorized by law to carry out business in the Province of Ontario. The Bonds shall be acceptable to the Town in every way and shall guarantee faithful performance of the contract during the period of the contract, including the period of guaranteed maintenance which will be in effect for twelve (12) months after substantial completion of the works.

The Tenderer shall include the cost of bonds in the unit price of the Tender items as no additional payment will be made in this regard.

- m) The Contractor shall be required, as part of this Contract, to provide Comprehensive Liability Insurance coverage for not less than \$5,000,000.00 on this project; and shall name the Town of Tecumseh and its' officials and the Consulting Engineer and their staff as additional insured under the policy. The Contractor must submit a copy of this policy to both the Town Clerk and the Consulting Engineer prior to the commencement of work.
- n) Monthly progress orders for payment shall be furnished the Contractor by the Town Drainage Superintendent. Said orders shall be for not more than 90% of the value of the work done and the materials furnished on the site. The paying of the full 90% does not imply that any portion of the work has been accepted. The remaining 10% will be paid 60 days after the final acceptance and completion of the work and payment shall not be authorized until the Contractor provides the following:
 - i) a Certificate of Clearance for the project from the Workplace Safety and Insurance Board
 - ii) proof of advertising

The Contractor shall satisfy the Consulting Engineer or Town that there are no liens or claims against the work and that all of the requirements as per the Construction Act, 2018 and its' subsequent amendments have been adhered to by the Contractor.

- o) In the event that the Specifications, Information to Tenderers, or the Form of Agreement do not apply to a specific condition or circumstance with respect to this project, the applicable section, or sections from the Canadian Construction Documents Committee C.C.D.C.2 shall govern and be used to establish the requirements of the work.
- p) Should extra work be required by the Town Drainage Superintendent or Consulting Engineer, and it is done on a time and material basis, the actual cost of the work will be paid to the Contractor with a 15% markup on the total actual cost of labour, equipment and materials needed to complete the extra work.

APPENDIX “REI-A”

STANDARD E.R.C.A. AND D.F.O.
MITIGATION REQUIREMENTS

As part of its work, the Contractor will implement the following measures that will ensure that any potential adverse effects on fish and fish habitat will be mitigated:

1. As per standard requirements, work will not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work will be done in the dry.
2. All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition to what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site, or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.
3. To prevent sediment entry into the drain in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with the related Ontario Provincial Standards. It is incumbent on the proponent and Contractors to ensure that sediment and erosion control measures are functioning properly and maintained/upgraded as required.
4. Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.
5. All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.
6. Any drain banks trimmed outside of the July 1st to September 15th timing window will require bio-degradable erosion control blankets to be installed to promote re-vegetation and to protect the slope from erosion in the interim.

Measures to Avoid Causing Harm to Fish and Fish Habitat

If you are conducting a project near water, it is your responsibility to ensure you avoid causing [serious harm to fish](#) in compliance with the *Fisheries Act*. The following advice will help you avoid causing harm and comply with the *Act*.

PLEASE NOTE: This advice applies to all project types and replaces all “Operational Statements” previously produced by DFO for different project types in all regions.

Measures

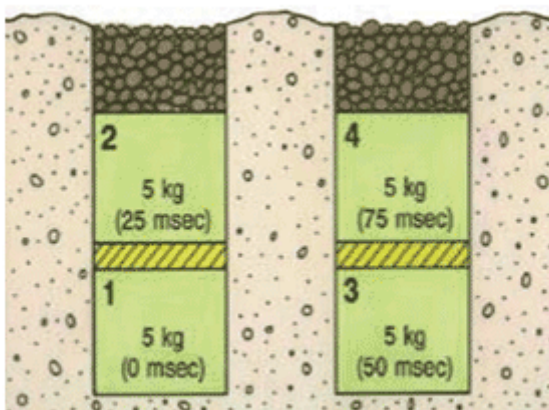
- Time work in water to respect [timing windows](#) to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.
- Minimize duration of in-water work.
- Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.
- Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.
- Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
- Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.
- Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.
- Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse.
- Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site.
- Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

- Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include:
 - Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
 - Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
 - Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation).
 - Measures for containing and stabilizing waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry.
 - Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
 - Repairs to erosion and sediment control measures and structures if damage occurs.
 - Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
- Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.
- Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.
- Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.
- Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
- If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.
- Remove all construction materials from site upon project completion.

- Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
- Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
- Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
 - In freshwater, follow these measures for design and installation of intake end of pipe fish screens to protect fish where water is extracted from fish-bearing waters:
 - Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
 - Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
 - The screen face should be oriented in the same direction as the flow.
 - Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
 - Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
 - Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
 - Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
 - Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.
 - Provision should be made for the removal, inspection, and cleaning of screens.
 - Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
 - Pumps should be shut down when fish screens are removed for inspection and cleaning.
- Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
 - If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a dam or water intake), the potential for impacts to fish and fish habitat should be minimized by implementing the following measures:

- Time in-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries [timing windows](#).
- Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
- Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting
- Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).
- Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
- Place blasting mats over top of holes to minimize scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.
- Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: Sample Blasting Arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes; and decking of charges within holes.

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

- Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
- Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
- Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

Date modified:
2013-11-25

APPENDIX “REI-B”

5.0 Location

Located along the southern shores of Lake St. Clair in Essex County and in the Essex Region Watershed, the Town of Tecumseh (Study Area) encompasses a geographic area of 9,538.60 hectares (ha) that is bordered by the City of Windsor and the Town of LaSalle on its western side and the Town of Lakeshore to the east and shown on **Figure 1** (Essex Region Conservation Authority (ERCA), 2013). There are four (4) subwatersheds (total area): Pike Creek subwatershed (8,993 ha), Canard River subwatershed (34,776 ha), Tecumseh Area Drainage subwatershed (1,150 ha), Turkey Creek subwatershed (6,112 ha), and Little River subwatershed (6,490 ha) that traverse the lands within the Town's boundaries (ERCA, 2011). Approximately 95.15% (9,079.38 ha) of the landscape consists of anthropogenic features (residential, commercial, agricultural, etc.) while the remaining 4.81% (459.22 ha) is made up of natural areas (terrestrial (4.49%) and other terrestrial (0.32%)) (ERCA, 2013).

There are one hundred and twenty (120) municipal drains measuring 221 kilometers (km) within the Town of Tecumseh (Town of Tecumseh, 2014). Through our background review we identified 3 dominant habitat types surrounding/within the drains that have potential to provide habitat for SAR. Habitats consist of:

Existing Natural Features:

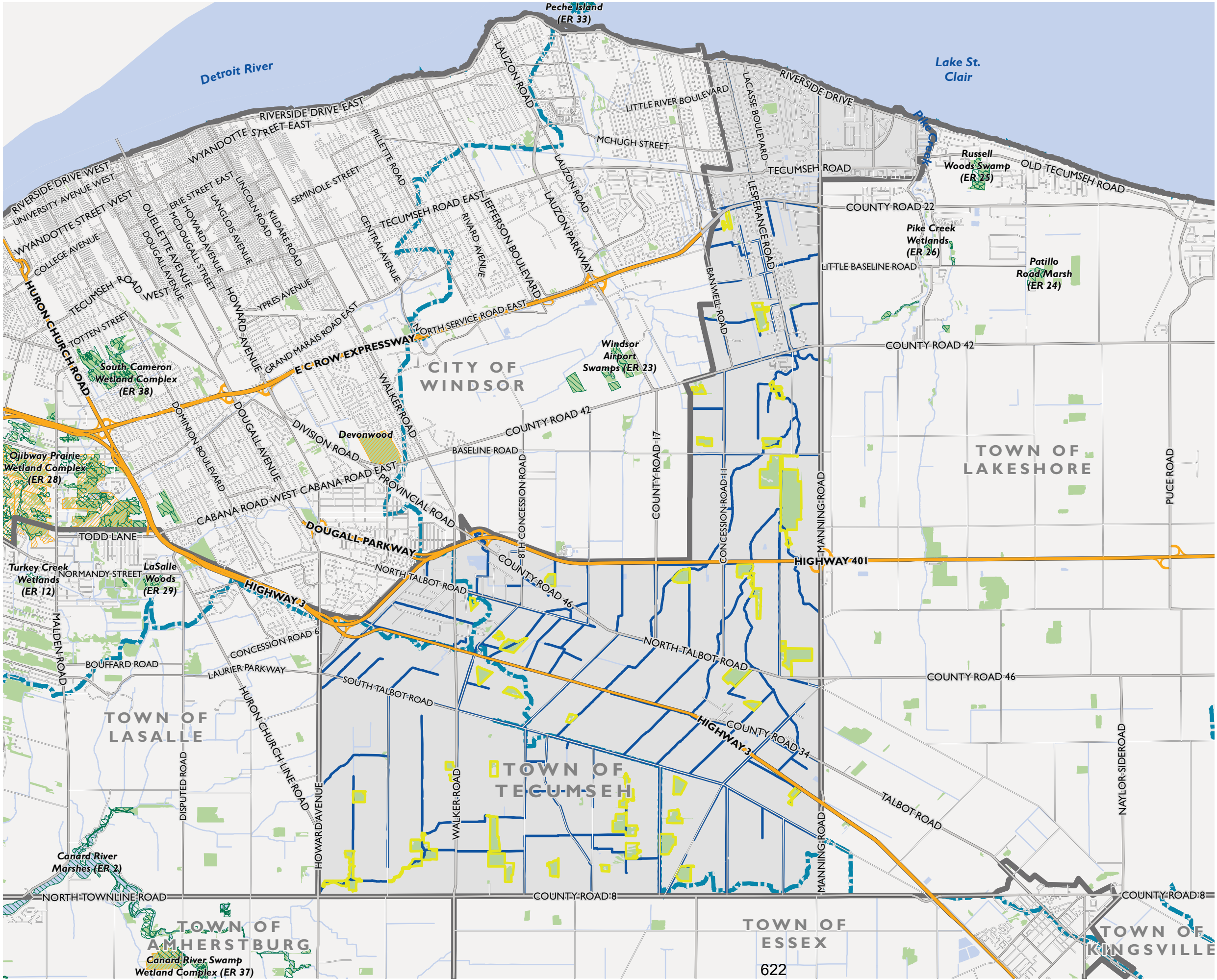
- Forest

Existing Anthropogenic Features:

- Urban (residential, commercial, recreational, right-of-ways)
- Agricultural (row crop, hayfield, old abandoned fields)

Within the Town, there are no forest patches greater than 100 ha in size with the largest being Fairplay Woods (an Environmentally Significant Area (ESA)) which spans a total area of 52.9 ha (ERCA, 2013). There are 2 forest patches that contain 200 m interior forest and 16 patches that contain 100 m interior forest (ERCA, 2013). In accordance with subparagraph i, of paragraph 2, of subsection 6 under Section 23.9 of O.Reg. 242/08, **Drainage Maps** have been prepared that show drain locations, surrounding land use types, proximity to sensitive natural features (e.g. Forest) and potential SAR habitat that exists within the Town's jurisdiction (see **Appendix B**). A list of all the drains and adjacent habitat type(s) has been provided in **Appendix B** following the Drainage Maps. In addition, a **Tecumseh Drain Database** (provided electronically) contains the drain names, adjacent habitat types, and relevant information found during our background review from the MNRF and ERCA.



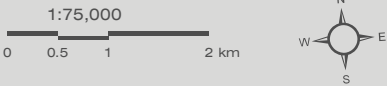


FILE LOCATION: I:\GIS\174938 - Tecumseh Drain\mxd\Figure 1 Natural Features.mxd

TOWN OF TECUMSEH

NATURAL FEATURES
FIGURE 1

- Mainland
- Provincially Significant Wetland
- ANSI, Life Science
- Natural Heritage System
- Municipal Drain
- Quaternary Watershed
- Water Body
- Woodland



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR, TOWN OF TECUMSEH

MAP CREATED BY: GM
MAP CHECKED BY: KM/AB
MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 174938
STATUS: FINAL
DATE: 2017-12-08

6.0 Species at Risk

A review of secondary source information, including the expired MNRF Agreement¹, Natural Heritage Information Centre (NHIC) GIS Database records (i.e. 1 km squares that overlap the Study Area) were reviewed to gather a list of the SAR that have the potential to occur within the Town's boundaries. A total of sixty-six (66) species listed as either endangered or threatened on the SARO list (O.Reg. 230/08) were identified to occur within the Study Area (see **Appendix C**). One Restricted Species Record was also identified in 1988 (NHIC 1 km Square 17LG4478).

The habitat requirements for each of the sixty-six species was crossed referenced with habitats identified within the Study Area. A total of Nineteen (19) species listed as endangered or threatened were identified as having potential habitat within the Study Area drains, consisting of Turtles (2 species), Snakes (2 species), Fishes (2 species), Birds (3 species), and Plants (10 species). **Table 2** lists the SAR, preferred habitat type(s) (Forest, Agricultural, Urban or All), need for water presence (requirement for some species), and the dates during the year when the species is likely to be carrying out sensitive life processes, referred to herein as the Restricted Activity Period (RAP).

Four (4) species listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08 were identified as having the potential to occur within the Town of Tecumseh drains, these species include: Pugnose Minnow (*Opsopoeodus emiliae*) (1 fish species), False Hop Sedge (*Carex lupuliformis*), Heart-leaved Plantain (*Plantago cordata*) and Scarlet Ammannia (*Ammannia robusta*) (3 plant species). Since these species are listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08, this mitigation plan cannot be used for these species and as such, they have not been included in **Table 2** below. Permitting related to these species may be required when working in specific drains. More information on these species, their habitat preferences, known distribution within the area and steps that need to be taken to determine whether a permit is required are outlined in **Appendix D**.

Table 2: Species at Risk with Potential to Occur within the Study Area

Scientific Name	Common Name	ESA ¹	Preferred Habitat Type ²	Restricted Activity Period
Turtles (2 species)				
<i>Emydoidea blandingii</i>	Blanding's Turtle	THR	Forest, Water is present	November 1 to April 30 Important to Note: Activities that require water level reduction cannot occur in areas when and where turtles are hibernating (paragraph 6, subsection 13, under Section 23.9 of O.Reg. 242/08).
<i>Apalone spinifera</i>	Spiny Softshell	THR	Forest, Water is present	

¹ Agreement under Section 23 of O.Reg. 242/08 made under the ESA, 2007 (File # AY-23D-010-10)



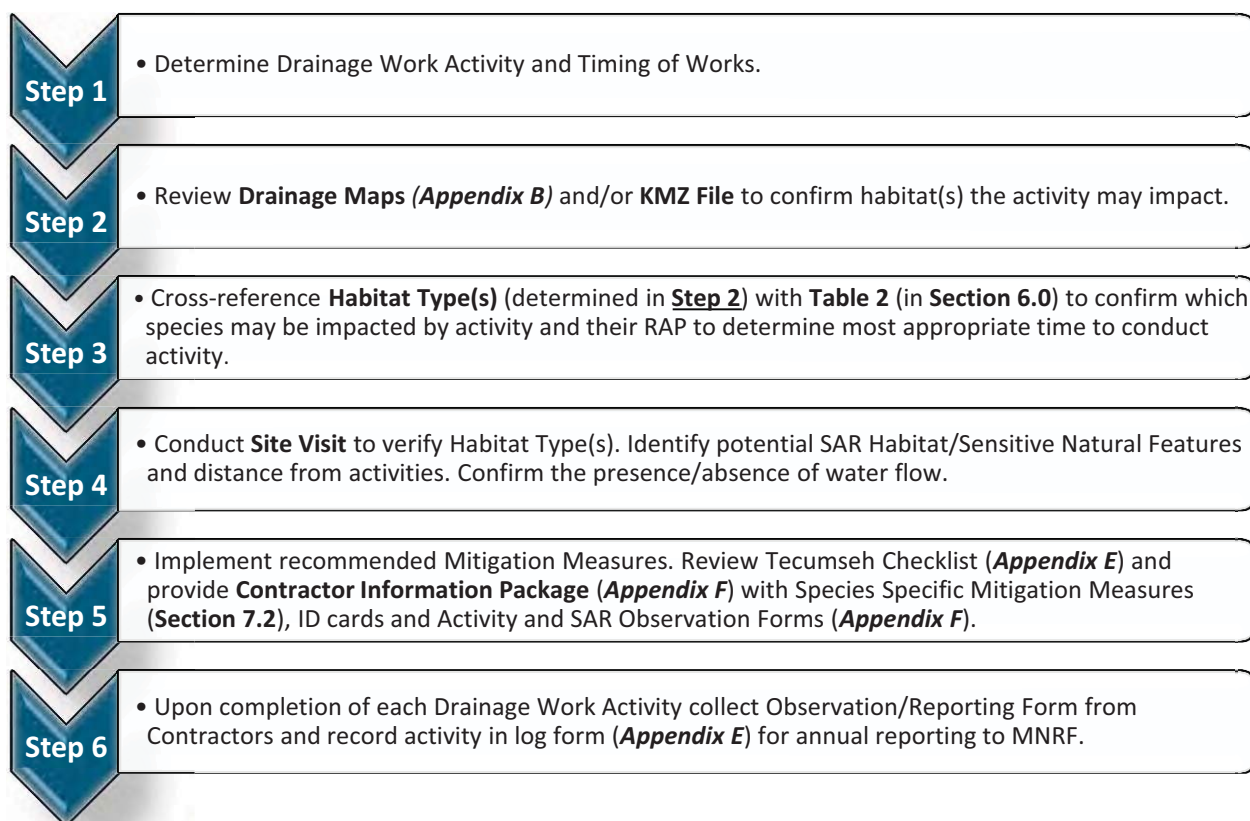
Scientific Name	Common Name	ESA ¹	Preferred Habitat Type ²	Restricted Activity Period
Snakes (2 species)				
<i>Pantherophis gloydi</i>	Eastern Foxsnake (Carolinian population)	END	All ³	September 20 to May 31
<i>Thamnophis butleri</i>	Butler's Gartersnake	END	All ³	
Fishes (2 species)				
<i>Notropis anogenus</i>	Pugnose Shiner	END	Water is present	March 15 to June 30
<i>Lepisosteus oculatus</i>	Spotted Gar	THR		
Birds (3 species)				
<i>Dolichonyx oryzivorus</i>	Bobolink	THR	Agricultural	May 1 to July 15
<i>Sturnella magna</i>	Eastern Meadowlark	THR	Agricultural	
<i>Hirundo rustica</i>	Barn Swallow	THR	All ³	
Vascular Plants (10 species)				
<i>Gymnocladus dioicus</i>	Kentucky Coffee-tree	THR	Forest	Not Applicable
<i>Liparis liliifolia</i>	Purple Twayblade	THR	Forest	
<i>Cornus florida</i>	Eastern Flowering Dogwood	END	Forest	
<i>Castanea dentata</i>	American Chestnut	END	Forest	
<i>Juglans cinerea</i>	Butternut	END	Forest	
<i>Morus rubra</i>	Red Mulberry	END	Forest	
<i>Aletris farinosa</i>	Colicroot	THR	Agricultural, Forest	
<i>Smilax rotundifolia</i>	Round-leaved Greenbrier (Great Lakes Plains population)	THR	Forest	
<i>Liatris spicata</i>	Dense Blazing Star	THR	Agricultural	
<i>Symphotrichum praealtum</i>	Willowleaf Aster	THR	Forest	

¹Endangered Species Act – status as defined by O.Reg. 242/08 as of April 27, 2017; ²Preferred Habitat Types – The habitat types listed are areas where a SAR has the potential to occur. It should be noted that species have the potential to occur outside of these habitats; ³All – Structures such as culverts and bridges may provide suitable habitat for nesting Barn Swallow. Culverts, rip rap and gabion baskets also have the potential to provide nesting and/or hibernaculum for snake species.



7.0 Mitigation Measures

Based on the types of drainage work activities outlined above (in Section 2.0) and the potential for SAR and SAR habitat within and adjacent to the drainage features, the following best practices and mitigation measures are recommended when conducting drainage works. Prior to starting drainage works, the following steps are recommended to help determine the appropriate mitigation/management measures:



7.1 General Mitigation Measures

The following mitigation measures are recommended to avoid or minimize impacts to the natural environment when conducting drainage works. Following this section species specific mitigation measures are provided.

When planning for drainage works, activities should be planned outside of sensitive timing windows for all wildlife species wherever possible. **Table 2** in Section 6.0 indicates the Restricted Activity Periods for the different SAR having the potential to occur within the Study Area. **Table 3** indicates sensitive timing windows for various types of wildlife (including SAR) based on habitat types.



This information can be used to determine what time(s) of year may be sensitive at a particular site, based on which types of habitat and wildlife are present.

Where possible, activities are recommended to be planned outside of these sensitive time(s); otherwise additional species specific mitigation measures are recommended and/or consultation with the MNRF.

Table 3: Sensitive Timing Windows for other Wildlife Species (including SAR)

Habitat Type	Wildlife	Sensitive Timing Windows
Agricultural (Hayfields and pastures)	Migratory Birds	March through July (breeding season for most species)
Waterbodies	Migratory Birds (including waterfowl)	March through Mid-August
	Turtles and Amphibians	March through Mid-August; and Mid-October through March (for overwintering wildlife, including turtles).
	Mammals	March through mid-August; and Mid-October through March (overwintering wildlife)
	Fish	In-water timing restriction for warmwater fishes March 15 to June 30.
Forest	Migratory Birds	March through mid-August
	Mammals	March through mid-August; and Mid-October through March (overwintering wildlife)
	Snakes	March through mid-August; and Mid-October through March (overwintering wildlife)
Urban	Snakes	March through mid-August; and October through March (overwintering wildlife)
	Mammals	October through March (overwintering wildlife)

The following list provides general measures that are recommended when conducting any drainage work activities:

- **Bats:** The work associated with drainage maintenance covered under this management plan would typically not include the removal of trees. As such, the potential for drainage work activities to impact bat SAR is low. However, if a tree that exhibits a diameter at breast height of 25 cm or greater or a tree that exhibits loose shaggy bark requires removal for drainage works, removal should be completed between November 1 and March 1, outside of the active season for bats. If the tree removal needs to occur during the active season, removal should be completed after dusk.
- Review species specific seasonal timing windows to avoid sensitive periods for species
- Where possible, abide by regulatory timing windows and setback distances and avoid regulated habitat features
- Minimize duration of in-water work (where applicable)



- Any in-stream work should be conducted during periods of low flow
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation
- Conduct wildlife sweeps prior to the commencement of drainage work activities to determine if SAR (or other wildlife) are present at the site and engaged in critical life processes (e.g. nesting, etc.)
- Following the wildlife sweep, the area of activity is to be isolated with silt fencing to keep SAR and other wildlife from entering the work space area.
- Develop and implement an erosion and sediment control plan for the site that minimizes the risk of sedimentation to the drain during all phases of an activity. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the drain of settling basin and runoff water is clear. Following the DFO's Measures to Avoid Harm (as outlined on DFO's website: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>), an erosion and sediment control plan, where applicable, is to include the following:
 - Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the drain
 - Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the drain
 - Site isolation measures, where required, to contain suspended sediment
 - Measures for containing and stabilizing waste materials generated from activities are stored away from any water bodies and prevent materials from re-entering water bodies
 - Erosion and sediment control measures are inspected and maintained on a regular basis during drainage works
 - Any damages to erosion and control measures are to be repaired immediately
 - Removal of non-biodegradable erosion and sediment control materials once site has been stabilized
- ***Phragmites*** is a non-native perennial grass species that has been observed throughout much of the province and Tecumseh, developing tall dense stands that degrade wetlands and other features by outcompeting native vegetation and changing habitat. To further prevent the spread and introduction of this unwanted species in the province, the provincial government has regulated invasive *Phragmites* as restricted under the *Invasive Species Act*, 2015. Restricted species under the Act, prohibits i) the transport of species into any provincial park and conservation reserve and ii) the deposit or release of species in Ontario. For further information on the *Invasive Species Act*, 2015 please visit: www.ontario.ca/invasionON. It is recommended that care be taken when working in areas with *Phragmites* and efforts be taken to prevent further spread of species through equipment transfer. Methods to prevent the spread of *Phragmites* while conducting drainage works should include:
 - Inspection of vehicles, equipment and heavy machinery thoroughly inside and out for accumulation of dirt, plant material or snow/ice, including the underside of vehicles, radiators, spare tires, foot wells and bumpers before entering onto a site. Remove any guards, covers, plates or other easy to remove external equipment;



- Inspections should be completed when: moving vehicles out of local area of operation; moving machinery between properties or sites within the same property where invasive species may be present or known to occur; and using machinery along roadsides, in ditches and along watercourses.
- Vehicles, equipment and heavy machinery should be cleaned: before moving out of local area where invasive species has been identified or known to occur; and when accumulations of dirt, plant material or snow/ice has been observed.
- Clean vehicles, equipment and heavy machinery in an area where risk of contamination is low, ideally on a mud free hard surface, at least 30 m away from any watercourse, waterbody, wetland or other natural area, if possible. Where risk of runoff is high, cleaning stations should be contained by sediment fence as per standard erosion and sediment control specifications.
- Remove large accumulations of dirt, using a compressed air device, high pressure hose or other device as necessary. Clean the vehicle starting at the top and working down, with particular attention to the undersides, wheels, wheel arches, guards, chassis, engine bays, grills and other attachments.
- Clean inside vehicles by sweeping, vacuuming or using compressed air device including floor, foot wells, pedals, seats and under the seats.

Additional details on cleaning equipment and/or managing invasive species can be found in the Clean Equipment Protocol for Industry (J. Halloran, et al., 2013) and online at the Government of Ontario's website: <https://www.ontario.ca/page/stop-spread-invasive-species>.

7.2 Species Specific Mitigation Plans

In the event a SAR or SAR habitat has been identified within the proposed area for drainage work activity, the following information should be clearly conveyed to the on-site staff as part of the drainage works protocol, via notes or plans and on-site briefings with construction/personnel:

- Schedule for pre-construction activities such as wildlife inspections, silt fencing installation and contractor briefing.
- Description of wildlife mitigation measures to be used during drainage work activities, including:
 - Placement and specifications of required protection measures (e.g. fencing, signage)
 - Phasing and direction of site clearing activities
 - Any recommendations regarding access routes for equipment, vehicle parking, materials, stockpiling, etc.
- Guidance on what to do in the event of a wildlife encounter, including SAR and arrangements for dealing with injured or orphaned animals (as indicated in **Table 5** and **Appendix F**). This guidance should be summarized in a handout suitable for quick reference by on-site staff.
- SAR awareness training should be provided to all on-site staff, including truck drivers.

In the Contractor Information Package (**Appendix F**) Dillon has provided SAR identification sheets for SAR with the potential to occur within the Study Area.



7.2.1 Species Specific Mitigation Measures for Snake Species

Snake species can be found in a variety of habitat types and most of the drainage work activities have the potential to encounter snakes. Particular attention should be given when conducting works on catch basins, culverts, rip rap and crossing structures, as snakes carry out sensitive life processes in structures such as these. **Table 4** shows the sensitive timing windows for snake species when carrying out life processes related to hibernation and staging.

Table 4: Sensitive Timing Windows for Snake Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Hibernation																																				
Staging																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

Table 5 below outlines the recommended mitigation measures to avoid impacts to snake species during and outside of RAP. Photographs of habitat observed within and adjacent to drains that have the potential to support SAR snakes, have been included in **Appendix G** (Photographs #1 - 4).



Table 5: Mitigation Measures for Snake Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Snakes in Study Area
Eastern Foxsnake (Carolinian population) and Butler's Gartersnake	<ul style="list-style-type: none">• Preconstruction planning that includes review for potential habitat.• During site visit, verify if attributes of regulated habitat occur and delineate where possible.• Establish constraints for activities, where possible, that abide by timing windows and setback distances and avoid regulated habitat features• Narrow construction footprint if possible.• Flag or fence off environmentally sensitive areas prior to drainage work activity. Bury fencing a minimum of 10 – 20 cm and vertical height of at least 60 cm. Note, stakes should be installed on the activity side to prevent snake use of stakes to climb fence.• Complete wildlife sweep within the exclusion area following fence installation to ensure no trapped wildlife.• Staff/workers conducting drainage works should be trained in snake species identification and procedures if encountered (review and sign off form in Contractor Information Package)• One staff member/worker or qualified biologist should be trained in proper snake handling procedures and protocols outlined in Section 2 of the Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders (Included in the Contractor Information Package). This person should be onsite at all times (when required) for the potential capture, temporary holding, transfer and release of any snakes encountered during construction. A minimum of two holding tubs and cotton sacks should be onsite at all times.• Prior to commencement of daily drainage work activity, the area should be cleared of snakes through machinery inspections (e.g. wheels, engine compartment) each morning and after machinery is left idle for more than one (1) hour if left on site during the snake active season.• If a nest is uncovered during drainage work activity:<ul style="list-style-type: none">◦ Collect any displaced or damaged eggs and transfer them to a holding tub◦ Capture and transfer all injured dispersing juveniles of that species into a light-coloured drawstring cotton sack◦ Place all cotton sacks with the captured injured individuals into a holding tub out of direct sunlight◦ Immediately contact the MNRF to seek direction and to arrange for transfer of the injured individuals◦ Immediately stop any disturbance to the nest site and loosely cover exposed portions with soil or organic material to protect the integrity of the remaining individuals◦ Do not drive over the nest site or conduct any activities within 5 m of the nest site◦ Do not place any dredged materials removed from drainage works on top of the nest site◦ Mark out the physical location of the nest site but not by any means that might increase the susceptibility of the nest to predation or poaching◦ Where there are no collected eggs or captured individuals, contact the MNRF within 24 hours to provide information on the location of the nest• Any injured captured snakes should be stored outside of direct sunlight and the MNRF should immediately be contacted to seek direction and to arrange for transfer. MNRF may require transfer to the nearest MNRF authorized Wildlife Rehabilitator. Contact Information for Authorized Wildlife Rehabilitator can be found in SAR Information Sheets (Appendix F).• If conducting drainage works during a species sensitive timing window and one or more individuals belonging to a snake species is encountered or active hibernacula is discovered:<ul style="list-style-type: none">◦ Trained staff/worker or qualified biologist shall capture and transfer all injured and uninjured individual snakes of that species into individual light-coloured, drawstring cotton sacks◦ Place cotton sacks into a holding tub◦ Ensure that the holding tub with captured individuals is stored at a cool temperature to protect snakes from freezing until the individuals can be retrieved or transferred◦ If an active hibernacula is uncovered cease all work and immediately, contact MNRF to seek advice and arrange for transfer and/or removal• If conducting drainage works outside of a species sensitive timing window and one or more individuals belonging to a snake species is encountered:<ul style="list-style-type: none">◦ Briefly stop the activity for a reasonable period of time to allow any uninjured individual snakes of that species to leave the work area◦ If the individuals do not leave the work area after the activity is briefly stopped, trained staff/worker or qualified biologist shall capture all uninjured individuals and release them in accordance with the methods outlined below◦ Where circumstances do not allow for the immediate release of captured uninjured individuals, they may be transferred into individual, light-coloured, drawstring cotton sacks before placing them into a holding tub which shall be stored out of direct sunlight for a maximum of 24 hours before releasing them in accordance with the methods outlined below◦ Capture and transfer any individuals injured as a result of conducting drainage works into a holding tub separate from any holding tub containing uninjured individuals◦ Store all captured injured individuals out of direct sunlight and immediately contact the MNRF to seek direction and to arrange their transfer• Uninjured individuals captured during drainage works, are to be released within 24 hours of capture, in an area immediately adjacent to the drainage works with natural vegetation cover within 50 m and out of harm’s way (as per subsections 2.3 and 2.4 of Handling Manual included in the Contractor Information Package; Appendix F).



Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Snakes in Study Area
	<ul style="list-style-type: none">Uninjured individuals captured during drainage works, are to be released within 24 hours of capture, in an area immediately adjacent to the drainage works with natural vegetation cover within 50 m and out of harm’s way (as per subsections 2.3 and 2.4 of Handling Manual included in the Contractor Information Package; Appendix F).Where one or more individuals belonging to a snake species is killed as a result of drainage work activity, or a person finds a deceased individual of a snake species, the following measures should be followed:<ul style="list-style-type: none">Collect and transfer any dead individuals into a holding tub outside of direct sunlight; and,Contact the MNRF within 72 hours to seek direction and to arrange for the transfer of the carcasses of the dead individuals.If the methods of handling snakes outlined in subsection 2.3 and 2.4 of the Handling Manuals are not applicable due to a snake’s injuries, use a shovel or flat object to pick up the snake, ensuring that injured areas are supported and place in a large plastic bin or bucket with a lid with air holes. Immediately transport the turtle to an MNRF authorized veterinarian or wildlife rehabilitator and contact the MNRF. Contact Information for Authorized Wildlife Rehabilitator can be found in Appendix F and on SAR Information Sheets (Appendix F).Complete a SAR Encounter Reporting Form included in Contractor Information Package (Appendix F).



7.2.2 Species Specific Mitigation Measures for Turtle Species

Turtles can generally be found associated with large slow moving water features that have logs or stumps for basking. For nesting, turtles prefer moist well drained, loose soils for digging and on a gradual typically south facing slope. Species such as Blanding's Turtle and Spiny Softshell hibernate underwater in permanent waterbodies. Sensitive timing windows for turtle species includes the nesting period and has been provided in **Table 6**.

When conducting drainage works where there is potential for turtle species to be hibernating, water level **cannot be reduced** as per Paragraph 6 of subsection 13 of Section 23.9 of O.Reg. 242/08.

Table 6: Restricted Activity Period for Turtle Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Hibernation																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

In **Table 7** below, the recommended mitigation measures to avoid impacts to turtle species during and outside sensitive timing windows and what to do when turtles or turtle nests are encountered is provided. Photographs of habitat observed within and adjacent to drains that have the potential to support SAR Turtles, have been included in **Appendix G** (Photographs #5 - 6).



Table 7: Mitigation Measures for Turtle Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Turtles within the Study Area
Blanding's Turtle	<ul style="list-style-type: none">• Preconstruction planning that includes review for potential habitat.• During site visit, verify if attributes of regulated habitat occur and delineate where possible.• Establish constraints for activities, where possible, that abide by timing windows, setback distances and avoid regulated habitat features.• Narrow construction footprint if possible.• Flag or fence off environmentally sensitive areas prior to drainage work activity. Bury fencing a minimum of 10 – 20cm and vertical height of at least 60 cm.• Complete wildlife sweep within the exclusion/construction area following fence installation to ensure no trapped wildlife.• Staff/workers conducting drainage works should be trained in turtle species identification and procedures if encountered (Review and sign off form in the Contractor Information Package; Appendix F).• One staff member/worker or qualified biologist should be trained in proper turtle handling procedures and protocols outlined in Section 1 of the Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders (provided in the Contractor Information Package; Appendix F). This person should be onsite at all times (when required) for the potential capture, temporary holding, transfer and release of any turtles encountered during construction. A minimum of two holding tubs and cotton sacks should be onsite at all times.• If construction is planned to commence during the turtle nesting period, prior to site preparation a turtle nesting search should be completed to identify turtle nests. If nests are encountered, the MNRF must be consulted immediately. Nests should be relocated to an appropriate facility for incubation with MNRF approval. Contact information for MNRF Authorized Wildlife Rehabilitator can be found in SAR Information Sheets (Appendix F).• Drainage work activity related to excavation of sediment or disturbance to banks should be avoided during the sensitive timing windows for turtles.• During turtle hibernation periods, water in drains or ditches cannot be reduced.• Prior to commencement of daily activity, the area should be cleared of turtles and turtle nests by a specially trained staff member or qualified biologist.
Spiny Softshell	<ul style="list-style-type: none">• Do not disturb a turtle encountered laying eggs and do not conduct activities within 20 m of the turtle while it is laying eggs.• If conducting drainage works during a species sensitive timing window and one or more individuals belonging to a turtle species is encountered:<ul style="list-style-type: none">◦ Trained staff/worker or qualified biologist shall capture and transfer all injured and uninjured individuals of that species to a holding tub◦ Capture and transfer all individuals injured as a result of the drainage work activity into a holding tub separate from any holding tub containing uninjured individuals◦ Ensure that the holding tub with captured individuals is stored at a cool temperature until the individuals can be retrieved or transferred◦ Contact the MNRF immediately to seek advice and arrange for transfer and/or removal• If a nest is uncovered during construction, immediately stop all activity near the nest. Cover the nest with soil or organic material. Do not drive within 5 m of the nest and contact the MNRF within 24 hours if no eggs or individuals were captured/collected.• Isolate material stockpile areas with fencing.• Any injured captured turtles should be stored outside of direct sunlight and the MNRF should immediately be contacted to seek direction and to arrange for transfer.• Machinery should be inspected each morning (e.g. under vehicles) for presence of turtles.• Uninjured individuals captured during drainage works, are to be released within 1 hour of capture, out of harm’s way no more than 125 m of where it was found, unless absolutely necessary. If it is not possible to relocate the turtle within 125 m of the capture location, contact the MNRF for further direction. MNRF may require transport of turtle(s) to MNRF Authorized Wildlife Rehabilitator or Veterinarian. Contact information can be found in Appendix F.• If the methods of handling turtles outlined in subsection 1.3 of the Handling Protocol are not possible due to a turtle’s injuries, use a shovel or flat object to pick up the turtle, ensuring that injured areas are supported and place in a large plastic bin or bucket with a lid with air holes. Immediately transport the turtle to an MNRF Authorized Wildlife Rehabilitator or Veterinarian and contact the MNRF. Contact Information for Authorized Wildlife Rehabilitator can be found in Appendix F and on SAR Information Sheets (Appendix F). See subsection 1.7 of the Handling Manual (included in the Contractor Information Package; Appendix F) for more details.• Complete a SAR Encounter Reporting Form included in the Contractor Information Package (Appendix F).



7.2.3 Species Specific Mitigation Measures for Aquatic Species

Review of background information including, DFO's Aquatic SAR Mapping (Map 29 of 33), NHIC and MNRF Agreement² identified 10 fish and 10 mollusc species listed as endangered or threatened under the ESA, 2007 with occurrence records within and/or adjacent to the Study Area. Of the 20 aquatic SAR identified only two fish species have been included in the Plan based on the presence of suitable habitat within the Study Area drains.

Although suitable habitat for SAR mussel species was not identified during our background review and site visits, if at any time a mussel species (of any type) are encountered, stop work and contact DFO for direction on how to proceed. A SAR Information Sheet for mussels species found during the background review has been provided in **Appendix F**.

Watercourses and drains identified during the background review and subsequent field investigations found all features to be of warm water thermal regime and to support warm water fish species. **Table 8** below indicates the in-water timing window restriction for warm water fish species. **Table 9** provides a list of recommended measures to follow to avoid impacts to fish species. As previously mentioned, activities that affect a species listed in Table 1, subsection 2, Section 23.9 of O. Reg. 242/08 still require a permit to conduct drainage works (see **Appendix D** for details). DFO's *Guidance for Maintaining and Repairing Municipal Drains in Ontario version 1.0* (2017) document should be consulted when conducting all drainage works.

Table 8: In-water Timing Window Restriction for Warm Water Fish Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
In-water Restriction																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNRF Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).

² Agreement under Section 23 of O.Reg. 242/08 made under the ESA, 2007 (File # AY-23D-010-10).



Table 9: Mitigation Measures for Aquatic Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Aquatic Species within the Study Area
Pugnose Shiner	<ul style="list-style-type: none"> • Consult with MNRF if in-water timing window restrictions cannot be adhered to. • Allow for fish salvage within the isolated work area prior to dewatering. • Limit duration of in-water work as much as possible. • Conduct in-stream work during periods of low flow to reduce the risk to fish and their habitat and to allow work in-water to be isolated from flows. • Schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation. Suspend in-stream work immediately if sedimentation is detected. • Implement water quality monitoring if required. • Ensure equipment is clean and free of leaks. Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water. • Alter activities to reduce disturbance to species and habitat and follow current DFO Measures to Avoid Harm
Spotted Gar	<ul style="list-style-type: none"> • If federally listed SAR fish are encountered or have the potential to be present, contact the DFO to review next steps. • If SAR encountered, complete a SAR Encounter Reporting Form that will be included in the annual reporting.



7.2.4 Species Specific Mitigation Measures for Bird Species

Environment and Climate Change Canada (ECCC) identifies general nesting periods for migratory birds in Canada. Essex County is located within nesting zone C1, **Table 10** provides the RAPs for two habitat types: open field habitat and forest habitat. The RAPs provided are based on 61-100% of the migratory bird species predicted to be nesting during the identified time period (as indicated on the ECCC C1 nesting zone table).

Table 10: Restricted Activity Period for Bird Species

Month	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
Date Codes ¹	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Open																																				
Forest																																				

¹Monthly intervals: E = Early (days 1-10); M = Middle (days 11-20); L = Late (days 21-31). Adapted from the Seasonal Timing Windows Chart in the MNR Agreement under Section 23 of O.Reg. 242/08 made under ESA, 2007 (File #: AY-23D-010-10).



Based on our review of potential SAR birds to occur within the Study Area, the following mitigation measures are recommended while conducting drainage work activities:

Table 11: Mitigation Measures for Bird Species

Common Name	Recommended Mitigation Measures to Avoid Impacts to SAR Birds within the Study Area
Bobolink	<ul style="list-style-type: none"> • Planning activities should include review of area for potential habitat (including box culverts and bridges for Barn Swallow nests). • Limit construction footprint where possible. • Conduct work outside of the RAP for birds where possible.
Eastern Meadowlark	<ul style="list-style-type: none"> • Pre-construction activities should include bird nest sweeps if activities occur during migratory bird sensitive timing window identified in Table 10, above. • Protect active nests by flagging or fencing off an appropriate setback distance. • Suspend activity if active habitat is discovered that cannot be adequately setback from.
Barn Swallow	<ul style="list-style-type: none"> • Maintain habitat connections where possible during activities. • Implement measures to restore lost habitat/ habitat connections. • If sensitive habitat is on site, a qualified biologist should be on site daily. • If SAR encountered, complete a SAR Encounter Reporting Form that will be included in the annual submission to the MNRF.



7.2.5 Species Specific Mitigation Measures for Vegetation Communities

Potential impacts to plant SAR may include trampling by personnel or equipment, alteration of growing conditions (e.g. soil compaction, sunlight availability, and moisture regime), disturbance to localized seed bank and introduction of invasive species. Mitigation measures that will be incorporated during drainage work activities to minimize the impacts to adjacent forest communities and SAR vegetation include:

- Planning activities should include review of area for identification of potential SAR vegetation.
- Limit construction footprint where possible to minimize the disturbance to plant species.
- Installing temporary erosion and sediment control measures prior to activity, and maintaining them throughout activity, including routinely inspecting and repairing them, as required. Enhanced sediment and erosion control measures will be implemented for sensitive areas where SAR habitat has been identified within and abutting the work site.
- Vegetation that does not require removal for the purposes of construction will be protected through the installation and maintenance of temporary vegetation protection fencing (e.g. snow fencing or erosion sediment control fencing). This includes protection of any SAR trees identified.
- Equipment, materials and other construction activities will not be permitted in zones delineated for protection.
- If drainage work activity cannot be undertaken without disturbing a SAR plant(s), the Town should contact the MNRF for additional site-specific measures.
- Operational procedures and Best Management Practices for handling material and excess material, and spill prevention will be implemented. Vehicular and equipment maintenance and refuelling will be carried out in a controlled manner, and where applicable, at designated maintenance areas. Refuelling will not be permitted within 30 m of any forest, or watercourse.
- Stabilize and re-vegetate exposed soil surfaces as soon as possible following activities, using native groundcover seed mixes and plantings.



APPENDIX “REI-C”

STANDARD SPECIFICATIONS **FOR ACCESS BRIDGE CONSTRUCTION**

1. PRECAST CONCRETE BLOCK & CONCRETE FILLED JUTE BAG HEADWALLS

After the Contractor has set the endwall foundations and the new pipe in place, it shall completely backfill same and install new precast concrete blocks or concrete filled jute bag headwalls at the locations and parameters indicated on the drawing. All concrete used for headwalls shall be a minimum of 30 mPa at 28 days and include 6% +/- 1% air entrainment.

Precast concrete blocks shall be interlocking and have a minimum size of 600mmX600mmX1200mm. Half blocks shall be used to offset vertical joints. Cap blocks shall be a minimum of 300mm thick. A foundation comprising minimum 300mm thick poured concrete or precast blocks the depth of the wall and the full bottom width of the drain plus 450mm embedment into each drain bank shall be provided and placed on a firm foundation as noted below. The Contractor shall provide a levelling course comprising a minimum thickness of 150mm Granular "A" compacted to 100% Standard Proctor Density or 20mm clear stone, or a lean concrete as the base for the foundation. The base shall be constructed level and flat to improve the speed of installation. Equipment shall be provided as required and recommended by the block supplier for placing the blocks such as a swift lift device for the blocks and a 75mm eye bolt to place the concrete caps,. The headwall shall extend a minimum of 150mm below the invert of the access bridge culvert with the top of the headwall set to match the finished driveway grade, unless a 150mm high curb is specified at the edge of the driveway. To achieve the required top elevation, the bottom course of blocks and footing may require additional embedment into the drain bottom. The Contractor shall provide shop drawings of the proposed wall for approval by the Drainage Superintendent or Engineer prior to construction.

Blocks shall be placed so that all vertical joints are staggered. Excavation voids on the ends of each block course shall be backfilled with 20mm clear stone to support the next course of blocks above. Walls that are more than 3 courses in height shall be battered a minimum of 1 unit horizontal for every 5 units of vertical height. The batter shall be achieved by careful grading of the footing and foundation base, or use of pre-battered base course blocks. Filter cloth as specified below shall be placed behind the blocks to prevent the migration of any fill material through the joints. Backfill material shall be granular as specified below. Where the wall height exceeds 1.8 metres in height, a uni-axial geogrid SG350 or equivalent shall be used to tie back the walls and be installed in accordance with the manufacturer's recommendations. The wall face shall not extend beyond the end of the access bridge pipe. Non-shrink grout shall be used to fill any gaps between the blocks and the access bridge pipe for the full depth of the wall. The grout face shall be finished to match the precast concrete block walls as closely as possible.

When constructing the concrete filled jute bag headwalls, the Contractor shall place the bags so that the completed headwall will have a slope inward from the bottom of the pipe to the top of the finished headwall. The slope of the headwall shall be one unit horizontal to five units vertical. The Contractor shall completely backfill behind the new concrete filled jute bag headwalls with Granular "B" and Granular "A" material as per O.P.S.S. Form 1010 and the granular material shall be compacted in place to a Standard Proctor Density of 100%. The placing of the jute bag headwalls and the backfilling shall be performed in lifts simultaneously. The granular backfill shall be placed and compacted in lifts not to exceed 305mm (12") in thickness.

The concrete filled jute bag headwalls shall be constructed by filling jute bags with concrete. All concrete used to fill the jute bags shall have a minimum compressive strength of 25 MPa in 28 days and shall be provided and placed only as a wet mix. Under no circumstance shall the concrete to be used for filling the jute bags be placed as a dry mix. The jute bags, before being filled with concrete, shall have a dimension of 460mm (18") x 660mm (26"). The jute bags shall be filled with concrete so that when they are laid flat, they will be approximately 100mm (4") thick, 305mm (12") to 380mm (15") wide and 460mm (18") long.

The concrete jute bag headwall to be provided at the end of the bridge pipe shall be a single or double bag wall construction as set out in the specifications. The concrete filled bags shall be laid so that the 460mm (18") dimension is parallel with the length of the new pipe. The concrete filled jute bags shall be laid on a footing of plain concrete being 460mm (18") wide, and extending for the full length of the wall, and 305mm (12") thick extending below the bottom of the culvert pipe.

All concrete used for the footing, cap and bags shall have a minimum compressive strength of 30 mPa at 28 days and shall include 6% ± 1% air entrainment.

Upon completion of the jute bag headwall the Contractor shall cap the top row of concrete filled bags with a layer of plain concrete, minimum 100mm (4") thick, and hand trowelled to obtain a pleasing appearance. If the cap is made more than 100mm thick, the Contractor shall provide two (2) continuous 15M reinforcing bars set at mid-depth and equally spaced in

the cap. The Contractor shall fill all voids between the concrete filled jute bags and the corrugated steel pipe with concrete, particular care being taken underneath the pipe haunches to fill all voids.

The completed jute bag headwalls shall be securely embedded into the drain bank a minimum of 450mm (18") measured perpendicular to the sideslopes of the drain.

As an alternate to constructing a concrete filled jute bag headwall, the Contractor may construct a grouted concrete rip rap headwall. The specifications for the installation of a concrete filled jute bag headwall shall be followed with the exception that broken pieces of concrete may be substituted for the jute bags. The concrete rip rap shall be approximately 460mm (18") square and 100mm (4") thick and shall have two (2) flat parallel sides. The concrete rip rap shall be fully mortared in place using a mixture composed of three (3) parts of clean sharp sand and one (1) part of Portland cement.

The complete placement and backfilling of the headwalls shall be performed to the full satisfaction of the Drainage Superintendent and the Engineer.

2. QUARRIED LIMESTONE ENDWALLS

The backfill over the ends of the corrugated steel pipe shall be set on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each end slope and between the drain banks. The top 305mm (12") in thickness of the backfill over the ends of the corrugated steel pipe shall be quarried limestone. The quarried limestone shall also be placed on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each bank of the drain adjacent each end slope. The quarried limestone shall have a minimum dimension of 100mm (4") and a maximum dimension of 250mm (10"). The end slope protection shall be placed with the quarried limestone pieces carefully tamped into place with the use of a shovel bucket so that, when complete, the end protection shall be consistent, uniform, and tightly laid in place.

Prior to placing the quarried limestone end protection over the granular backfill and on the drain banks, the Contractor shall lay non-woven geotextile filter fabric "GMN160" conforming to O.P.S.S. 1860 Class I or approved equal. The geotextile filter fabric shall extend from the bottom of the corrugated steel pipe to the top of each end slope of the bridge and along both banks of the drain to a point opposite the ends of the pipe.

The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried limestone on top of the filter fabric.

3. BRIDGE BACKFILL

After the corrugated steel pipe has been set in place, the Contractor shall backfill the pipe with Granular "B" material, O.P.S.S. Form 1010 with the exception of the top 305mm (12") of the backfill. The top 305mm (12") of the backfill for the full width of the excavated area (between each bank of the drain) and for the top width of the driveway, shall be Granular "A" material, O.P.S.S. Form 1010. The granular backfill shall be compacted in place to a Standard Proctor Density of 100% by means of mechanical compactors. All of the backfill material, equipment used, and method of compacting the backfill material shall be inspected and approved and meet with the full satisfaction of the Drainage Superintendent and Engineer.

4. GENERAL

Prior to the work commencing, the Drainage Superintendent and Engineer must be notified, and under no circumstances shall work begin without one of them being at the site. Furthermore, the grade setting of the pipe must be checked, confirmed, and approved by the Drainage Superintendent or Engineer prior to continuing on with the bridge installation.

The alignment of the new bridge culvert pipe shall be in the centreline of the existing drain, and the placing of same must be performed totally in the dry.

Prior to the installation of the new access bridge culvert, the existing sediment build-up in the drain bottom must be excavated and completely removed. This must be done not only along the drain where the bridge culvert pipe is to be installed, but also for a distance of 3.05 metres (10 ft.) both upstream and downstream of said new access bridge culvert. When setting the new bridge culvert pipe in place it must be founded on a good undisturbed base. If unsound soil is encountered, it must be totally removed and replaced with 20mm (¾") clear stone, satisfactorily compacted in place.

When doing the excavation work or any other portion of the work relative to the bridge installation, care should be taken not to interfere with, plug up, or damage any existing surface drains, swales, and lateral or main tile ends. Where damage is encountered, repairs to correct same must be performed immediately as part of the work.

The Contractor and/or landowner performing the bridge installation shall satisfy themselves as to the exact location, nature and extent of any existing structure, utility or other object that they may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town, or the Municipality, the Engineer, and their staff from any damages which it may cause or sustain during the progress of the work. It shall not hold them liable for any legal action arising out of any claims brought about by such damage caused by it.

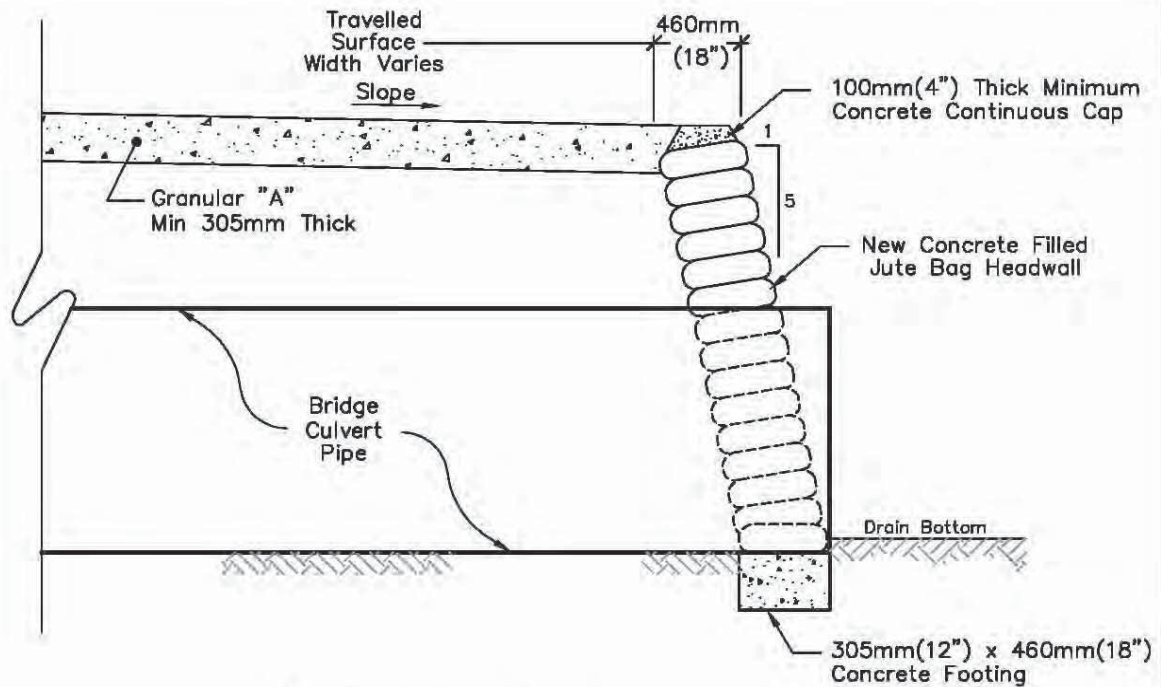
Where applicable, the Contractor and/or landowner constructing the new bridge shall be responsible for any damage caused by them to any portion of the Town road right-of-way. They shall take whatever precautions are necessary to cause a minimum of damage to same and must restore the roadway to its original condition upon completion of the works.

When working along a municipal roadway, the Contractor shall provide all necessary lights, signs, barricades and flagpersons as required to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, it is to comply with the M.T.O. Traffic Control Manual for Roadway Work Operations and Ontario Traffic Manual Book 7.

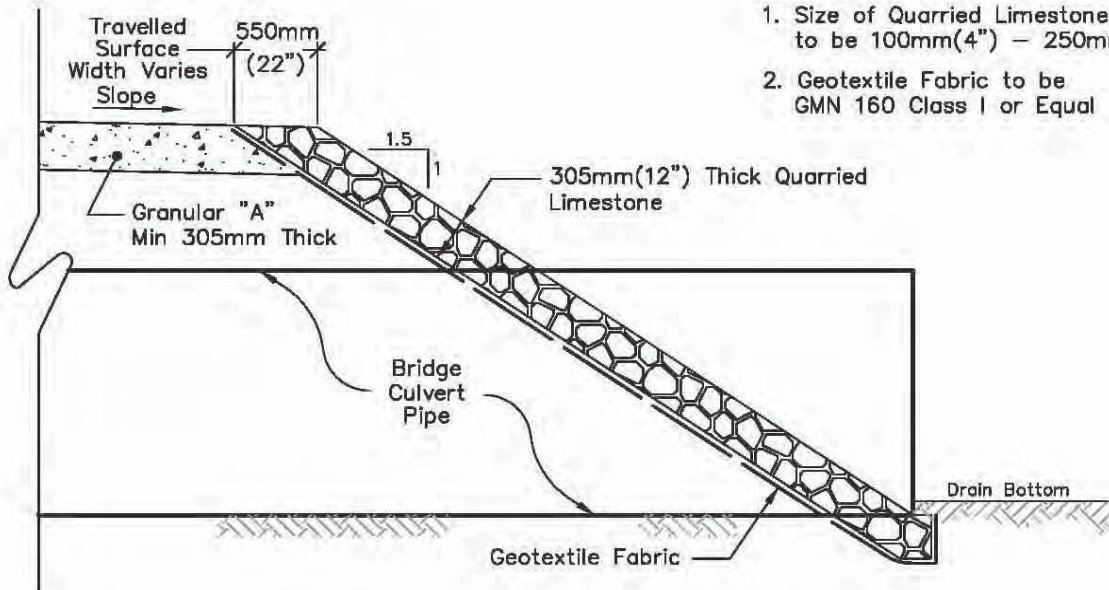
Once the bridge installation has been completed, the drain sideslopes directly adjacent the new headwalls and/or endwalls are to be completely restored including revegetation, where necessary.

All of the work required towards the installation of the bridge shall be performed in a neat and workmanlike manner. The general site shall be restored to its' original condition, and the general area shall be cleaned of all debris and junk, etc. caused by the work

All of the excavation, installation procedures, and parameters as above mentioned are to be carried out and performed to the full satisfaction of the Drainage Superintendent and Engineer.



Typical Jute Bag Headwall



NOTE:

1. Size of Quarried Limestone to be 100mm(4") – 250mm(10")
2. Geotextile Fabric to be GMN 160 Class I or Equal

Typical Quarried Limestone End Protection

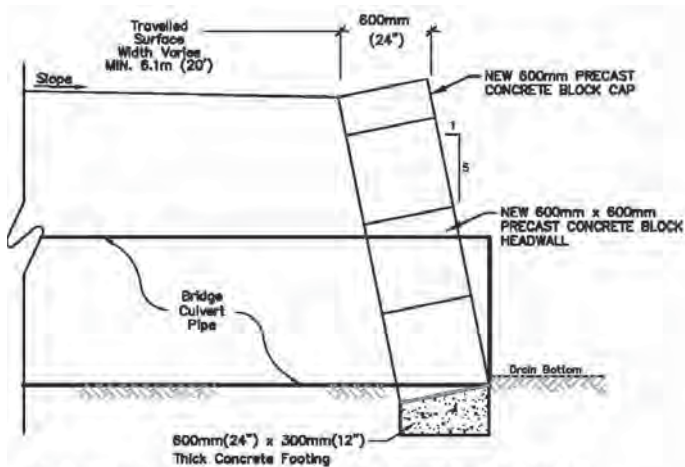
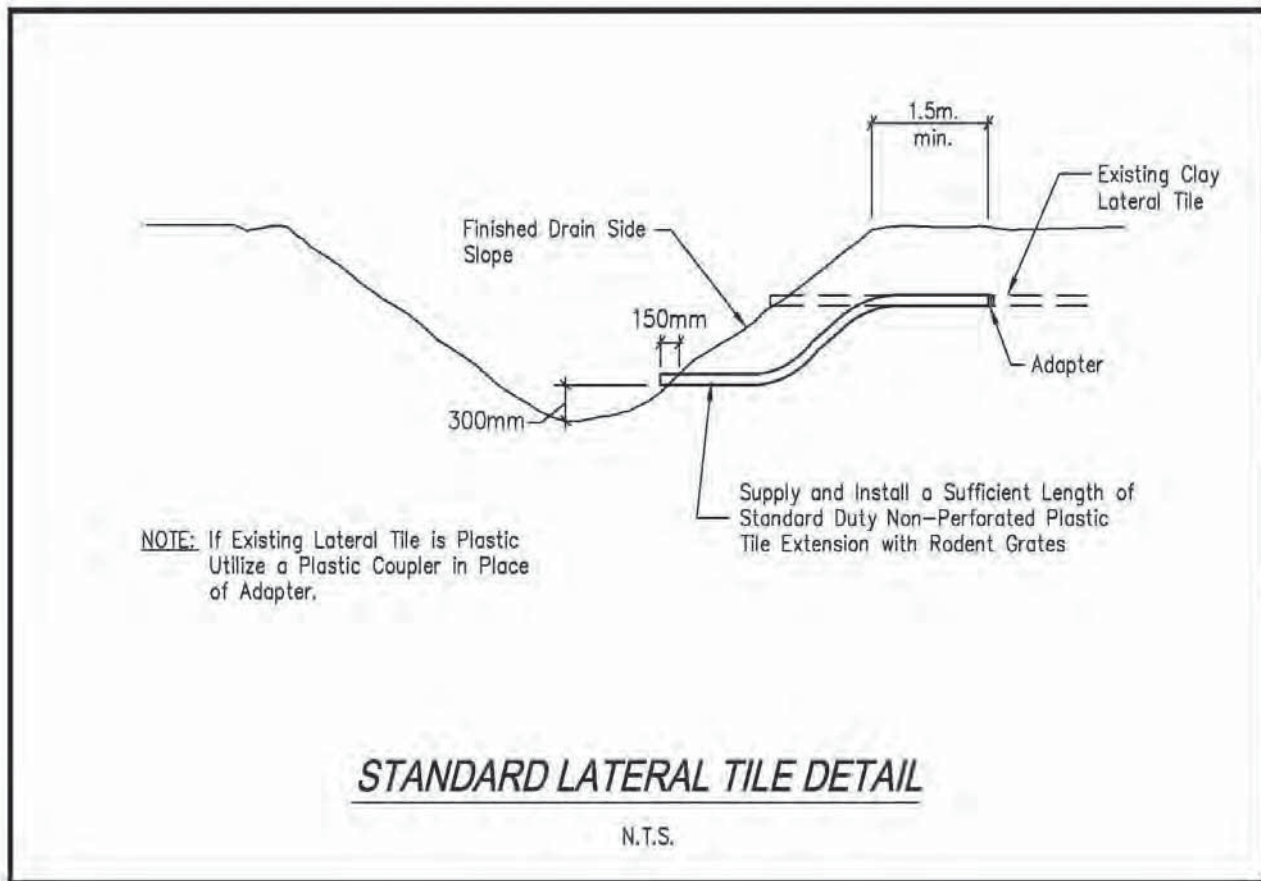
Rood Engineering Inc.

Consulting Engineers

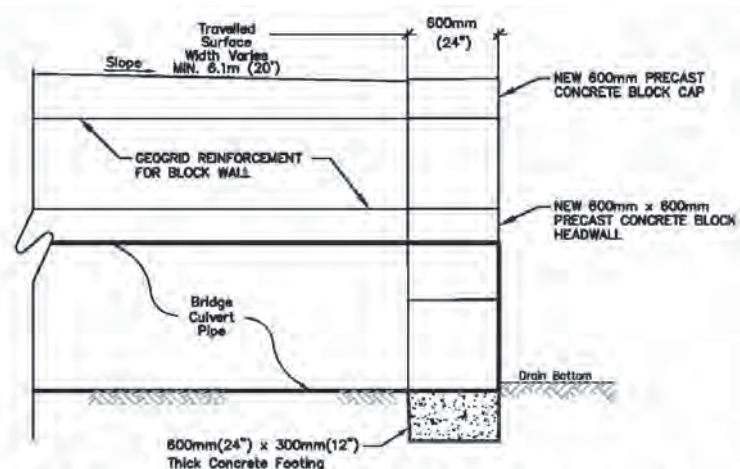
9 Nelson Street

Leamington, Ontario N8H 1G6

519-322-1621



TYPICAL PRECAST CONCRETE BLOCK END PROTECTION
Scale = N.T.S.



TYPICAL VERTICAL PRECAST CONCRETE BLOCK END PROTECTION
Scale = N.T.S.

APPENDIX “REI-D”

THE CORPORATION OF THE TOWN OF TECUMSEH

BY-LAW NO. 2007-51

Being a by-law to amend By-law No. 2007-41 to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh.

WHEREAS Council considers excessive smoke, smell, airborne sparks or embers to be or could become or cause public nuisances by creating negative health effects on neighbouring residents, increasing fire exposure hazards, infringing the enjoyment of the use of neighbouring properties and generating false or nuisance alarms;

AND WHEREAS Council is empowered under Section 128 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, to pass by-laws to prohibit and regulate public nuisances, including matters that, in the opinion of Council are, or could become or cause public nuisances;

AND WHEREAS in accordance with Section 425 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, a municipality may pass by-laws providing that a person who contravenes a by-law of the municipality passed under this Act is guilty of an offence;

AND WHEREAS Section 444 of the *Municipal Act* 2001, c. 25 states if a municipality is satisfied that a contravention of a by-law of the municipality passed under this Act has occurred, the municipality may make an order requiring the person who contravened the by-law or who caused or permitted the contravention or the owner or occupier of the land on which the contravention occurred to discontinue the contravening activity;

AND WHEREAS the Council of The Corporation of the Town of Tecumseh enacted By-law No. 2007-41 on the 26th day of June, 2007 to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh;

AND WHEREAS the Council of The Corporation of the Town of Tecumseh is desirous of amending By-law No. 2007-41;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWN OF TECUMSEH ENACTS AS FOLLOWS:

1. **That** paragraph 4.9 be deleted and replaced with the following paragraph:
 - 4.9 Permitted fires, except those described in Section 4.4, shall,
 - a) be kept to manageable size that shall not be greater than one (1) square metre with flames no higher than one (1) metre in height; and,
 - b) in residentially zoned areas, be completely extinguished by 2:00 a.m.
2. **That** paragraph 5.2 be deleted and replaced with the following paragraph:
 - 5.2 An application for a Permit must be completed on the form/forms provided by the Tecumseh Fire/Rescue Services.

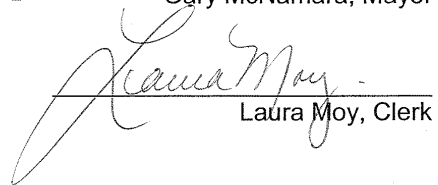
3. **That** paragraph 5.3 be deleted and replaced with the following paragraph:

5.3 An application must be filed with the Chief Fire Official of the Tecumseh Fire/Rescue Services. Approved permits must be retained and presented to an attending fire official in the event that there is a need for a fire official to attend at the burn location due to complaint.

4. **That** this by-law shall take full force and effect on the third and final reading.

READ a first, second, third time and finally passed this 11th day of September, 2007.


Gary McNamara, Mayor


Laura Moy, Clerk

THE CORPORATION OF THE TOWN OF TECUMSEH

BY-LAW NUMBER 2007-41

A by-law to regulate the setting of open air fires and identify the precautions and conditions to be observed for such fires within The Corporation of the Town of Tecumseh.

WHEREAS Council considers excessive smoke, smell, airborne sparks or embers to be or could become or cause public nuisances by creating negative health effects on neighbouring residents, increasing fire exposure hazards, infringing on the enjoyment of the use of neighbouring properties and generating false or nuisance alarms;

AND WHEREAS Council is empowered under Section 128 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, to pass bylaws to prohibit and regulate public nuisances, including matters that, in the opinion of Council are, or could become or cause public nuisances;

AND WHEREAS in accordance with Section 425 of the *Municipal Act* 2001, S.O. 2001, c. 25 as amended, a municipality may pass by-laws providing that a person who contravenes a by-law of the municipality passed under this Act is guilty of an offence;

AND WHEREAS Section 444 of the *Municipal Act* 2001 c. 25 states if a municipality is satisfied that a contravention of a by-law of the municipality passed under this Act has occurred, the municipality may make an order requiring the person who contravened the by-law or who caused or permitted the contravention or the owner or occupier of the land on which the contravention occurred to discontinue the contravening activity;

AND WHEREAS Section 446(1) of the *Municipal Act* 2001 c.25 states that if a municipality has the authority under this or any other Act or under a by-law under this or any other Act to direct or require a person to do a matter or thing, the municipality may:

- provide that, in default of it being done by the person directed or required to do it, the matter or thing shall be done at the person's expense;
- enter upon land at any reasonable time;
- recover the costs of doing a matter or thing from the person directed or required to do it by action or by adding the costs to the tax roll and collecting them in the same manner as property taxes; and
- that costs include interest calculated at a rate of 15 per cent or such lesser rate as may be determined by the municipality, calculated for the period commencing on the day the municipality incurs the costs;
- the costs, including interest, constitutes a lien on the land upon the registration in the proper land registry office of a notice of lien;

AND WHEREAS Section 390 of the *Municipal Act* 2001 c.25 provides that a "person" includes a municipality and a local board and the Crown;

AND WHEREAS Section 426 of the *Municipal Act* 2001 c. 25 provides that no person shall hinder or obstruct, or attempt to hinder or obstruct any person exercising a power or performing a duty under this Act or a by-law under this Act and that any person who contravenes subsection (1) is guilty of an offence;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWN OF TECUMSEH ENACTS AS FOLLOWS:

1. DEFINITIONS

In this By-law:

- 1.1 "Burning Appliance" means any device designed or engineered to have a fire set within a contained area and totally enclosed by various means of screening and/or other methods.
- 1.2 "By-law Enforcement Officer" means the municipal person appointed by the Town of Tecumseh who shall be responsible for the enforcement of the provisions of this by-law.
- 1.3 "Chief Fire Official" means the Fire Chief of the Tecumseh Fire/ Rescue Services or designate.
- 1.4 "Competent Adult" means any person (18 years of age or older) who, in the opinion of those charged with enforcement of this By-Law, is capable of exercising the required judgement and capable of performing the necessary actions to control and prevent its unwanted spread.
- 1.5 "Farmer" means the owner or operator of an agricultural operation within an area zoned for agricultural pursuant to the *Farming & Food Protection Act*, 1998.
- 1.6 "Farmlands" means land designated "agricultural".
- 1.7 "Firefighter" means any person or any rank of person employed in, or appointed to the Tecumseh Fire/Rescue Services and assigned to undertake fire protection or fire prevention services.
- 1.8 "Full Cost Recovery Basis" has the meaning as described in Schedule "A" attached hereto.
- 1.9 "Open Air" means any open place, yard, field, lot, part lot or construction area which is not enclosed by a building or structure.
- 1.10 "Open Air Burning" means any fire set in the Open Air.
- 1.11 "Owner" means the registered owner or any person, firm or corporation having control over, or possession, of any portion of the building or property under consideration and includes the persons in the building or on the property.
- 1.12 "Permit" means a permit issued by the Chief Fire Official to set a fire in the Open Air for a specified date and period of time.
- 1.13 "Person" means an individual, business, a partnership or a corporation.
- 1.14 "Pit" means an area dug into the ground and/or surrounded by materials designed to contain the fire and prevent its spread to areas beyond the Pit.
- 1.15 "Police Officer" means any member of the Ontario Provincial Police.
- 1.16 "Tenant" means the occupant having possession or Person having control of a property or premises.
- 1.17 "Town" means The Corporation of the Town of Tecumseh.

2. ADMINISTRATION AND ENFORCEMENT

- 2.1 The Chief Fire Official shall be responsible for the administration of this by-law.
- 2.2 Enforcement of this by-law is the responsibility of the Chief Fire Official, any Fire-fighter, any Police Officer or any By-law Enforcement Officer.
- 2.3 The Chief Fire Official may refuse to issue a Permit or revoke any or all issued Permits.
- 2.4 The Fire Chief, Firefighters or Police Officers may, at all times enter and inspect any property or premises in order to ascertain whether the provisions of this by-law are complied with and to enforce or carry into effect the by-law.
- 2.5 Any person who fails to comply with the provisions of this by-law or fails to extinguish a fire once notification to do so has been given to him by the Chief Fire Official, a Police Officer or a Firefighter shall, in addition to any penalty provided herein, be liable to the municipality for all expenses incurred for the purposes of controlling and extinguishing of any fire so set or left to burn and such expenses may be recovered by court action or in a like manner as municipal taxes.

3. ENVIRONMENT

- 3.1 All Open Air Burning shall comply with the provisions of the *Environmental Protection Act*, R.S.O. 1990. c. E19.
- 3.2 No Open Air Burning shall be permitted when a smog alert has been issued for the region of Essex County, which includes the Town.
- 3.3 No Open Fire shall be started or maintained when wind condition is in such direction or intensity so as to cause any or all of the following:
 - (a) decrease in visibility on any highway or roadway;
 - (b) threaten a rapid spread of fire through a grass or brush area;
 - (c) smoke which causes annoyance or irritation to adjacent persons, properties or premises.

4. GENERAL PROVISIONS

- 4.1 No Person being the Owner or Tenant in possession of lands within the Town shall allow a fire to be set or burn on such lands unless a Permit has been obtained.
- 4.2 No Person shall allow a fire to be set or burned exceeding the requirements of Sections 4.8 and 4.9.
- 4.3 Notwithstanding any provisions herein, no Person shall set or maintain a fire,
 - (a) in contravention of the *Ontario Fire Code*, the *Environmental Protection Act* or any other statutory requirements of the Province of Ontario or the Government of Canada;
 - (b) where the consumption of material or size and area of the fire will exceed the limits set by the Chief Fire Official and/or listed within this by-law in Sections 4.8 and 4.9.

- 4.4 (a) No Permit shall be required for domestic barbeques or permanent outdoor fireplaces used solely for the cooking of food on a grill and extinguished immediately upon completion of the cooking process or any Burning Appliance, or a Pit or open area where the requirements of Sections 4.8 and 4.9 are not exceeded;
- (b) installation and location of Burning Appliances must meet the manufacturer's specifications.
- 4.5 (a) A farmer who intends to set or maintain a fire in the Open Air on a specified day for disposal of vegetable matter or vegetation on Farmlands which is normal and incidental for farming purposes shall obtain a Permit to cover the period of the proposed Open Air fire, and will be required to notify the Tecumseh Fire/Rescue Services for each day that the proposed Open Air fire will take place;
- (b) an Open Air fire shall be supervised by a Competent Adult equipped with sufficient equipment to control and contain the Open Air fire to prevent the spread of the Open Air fire that would endanger or put at risk other properties or premises;
- (c) an Open Air fire shall be restricted to daylight hours only;
- (d) an Open Air fire shall be surrounded by a tilled area wide enough to prevent an Open Air fire from jumping across the tilled area and to maintain the area of the burn to be no greater than one (1) hectare in size;
- (e) the leading edge of the flame of an Open Air fire shall not exceed thirty (30) metres in length.
- 4.6 No Person shall set any fire in the Open Air to burn asphalt products, tires, treated wood, construction materials or rubble, kitchen garbage or any garbage or trash, rubber plastics and like items.
- 4.7 No Person shall set any fire in the Open Air except where permitted and only in the presence of a Competent Adult. The Competent Adult shall not leave the burning operation until such time as the fire has been completely extinguished and there is no threat of re-ignition or spreading of the fire.
- 4.8 Every Person that starts a fire in the Open Air shall ensure that there are adequate tools and/or water on hand to contain or extinguish the fire.
- 4.9 Permitted fires, except those described in Section 4.4, shall be kept to manageable size that shall not be greater than one (1) square metre with flames no higher than one (1) metre in height.
- 4.10 Every Person who sets an Open Air fire in the Town of Tecumseh shall be:
- (a) responsible and liable for any damage to property or injury to person occasioned by said fire;
- (b) liable for all costs incurred by the Town of Tecumseh, including but not limited to, the Fire/Rescue Services, including personnel and other agencies called to control and extinguish said fire on a Full Cost Recovery Basis. All fees and charges to be paid under this subsection shall be payable in the manner and subject any interest and penalties set forth in paragraph 5 and 6 of the Administrative Fees and Charges By-law 2007-12, as may be amended or repealed from time to time;

- (c) the fees and charges under this section shall not be payable by that class of persons which have obtained a permit for an Open Air fire and complied with the terms of such permit.

- 4.11 Notwithstanding the aforementioned sections listed herein, the Fire Chief may issue a Permit upon application and approve the setting of any fire subject to the fire being adequately supervised and controlled through special conditions addressed by the Chief Fire Official.
- 4.12 No fire shall be set to dispose of commercial, industrial or construction waste or other like materials in areas zoned for commercial or industrial occupancies and such aforementioned materials shall not be transported to residential or agricultural areas for burning purposes.
- 4.13 No fires shall be set at construction and/or demolition sites for the purpose of disposing of waste, building material or rubble.

5. FIRES REQUIRING PERMITS

- 5.1 Except as provided in section 4.3 of this by-law, no Person shall set, maintain or cause to be set or maintained, a fire in the Open Air unless a Permit has been issued by the Chief Fire Official.
- 5.2 An application for a Permit must be completed on the form/forms provided by the Tecumseh Fire/Rescue Services. Such forms are available to fill out by telephone call to Tecumseh Fire Station No. 1, Monday to Friday from 08:30 hr to 16:30 hr.
- 5.3 Each completed application for a Permit must be filed with the Chief Fire Official of the Tecumseh Fire/Rescue Services, at the administration offices located at 985 Lesperance Road, Tecumseh, Ontario.
- 5.4 In issuing a Permit under this part for Open Air Burning, the Chief Fire Official may impose any additional requirements or conditions as may be deemed necessary.

6. OFFENCES

- 6.1 (a) Any person who contravenes any of the provisions of this by-law is guilty of an Offence;
- (b) any person who hinders or obstructs a person lawfully carrying out the enforcement of this by-law is guilty of an Offence.

7. FINES

- 7.1 Every Person who is convicted of an Offence is liable to a Fine of not more than Five Thousand (\$5,000.00) Dollars as provided for in the *Provincial Offences Act*, R. S.O. 1990, Chap. P.33.

8. SEVERABILITY

- 8.1 If any section or sections of this by-law or parts thereof are found in any court to be illegal or beyond the power of Council to enact, such section or sections or parts thereof shall be deemed severable and all other sections or parts of this by-law shall be deemed separate and independent there from and enacted as such.

9. **SHORT TITLE**

9.1 The short title of this by-law shall be TECUMSEH OPEN AIR BURNING BY-LAW.

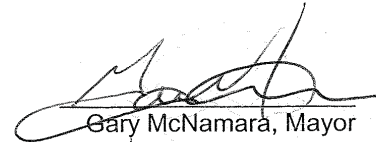
10. **EFFECTIVE DATE**

10.1 This by-law shall come into full force and take effect on the 1st day of July, 2007.

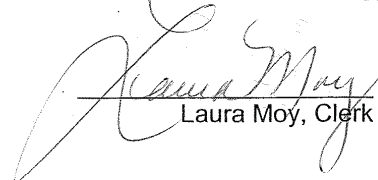
11. **REPEAL**

11.1 By-law No. 2005-57 is hereby repealed.

READ a first, second, third time and finally passed this 26th day of June, 2007.



Gary McNamara, Mayor



Laura Moy, Clerk

SCHEDULE "A"
By-law Number 2007-41

**THE CORPORATION OF THE TOWN OF TECUMSEH
TECUMSEH FIRE/RESCUE SERVICES EQUIPMENT SERVICES RATES**

"Full Cost Recovery Basis" includes any and all charges and costs howsoever incurred by the Town directly or indirectly in controlling and extinguishing the Open Air fire and shall include without limitations:

Emergency Services Rendered:

- (a) \$350.00 first hour or part thereof per piece of equipment;
- (b) \$175.00 each additional half-hour or part thereof per piece of equipment;
- (c) \$42.00 first hour or part thereof per firefighter who responds to the call;
- (d) \$27.50 for each additional hour or part thereof per firefighter until all equipment is cleaned, checked and returned to service;
- (e) the cost of all extinguishing agents required to extinguish the fire.

No Emergency Services Rendered:

- (a) \$350.00 flat rate per piece of equipment where services are not required nor provided;
- (b) \$42.00 flat rate per firefighter who responds to the call for service.

APPENDIX “REI-E”

WATERSHED PLAN, PROFILE, SECTIONS, & BRIDGE PLANS

OF THE

SULLIVAN CREEK DRAIN

(Geographic Township of Sandwich South)

IN THE

TOWN OF TECUMSEH

IN THE

COUNTY OF ESSEX • ONTARIO

GERARD ROAD, P.ENG.

ROOD
ENGINEERING
INC.

CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: January 9th, 2023

TOWN OF TECUMSEH

MAYOR: Gary McNamara
CLERK: Laura May
DRAINAGE SUPERINTENDENT: Alessia Mussio

ROLL INFORMATION:

TOWN OF TECUMSEH:

- Michael Lutsch
460-01000 MN 6098
- Thomas Halford
460-01100 MN 5680
- Thomas & Linda Halford
460-01200 MN 5660
- Rosemary Halford
460-01300 MN 5580
- Thomas Halford
460-01400
- Michael & Helen Lavin
460-01500 MN 5580
- John Lafferty
460-01600
- Frank & Catherine Lafferty
460-01601
- Frank Lafferty Limited
460-01700
- Frank Lafferty
460-01800 MN 5369
- Transportation Ministry
460-01801
- Catherine Lafferty
460-01900 MN 5395
- 538073 Ontario Inc.
460-01901
- Catherine Lafferty & Mary Thompson
460-02000
- 538073 Ontario Inc.
460-02100 MN 6615
- Empty placeholder; skip ID No. 16
- Empty placeholder; skip ID No. 17
- Alexander Chevalier & Jessie Darmon
480-08200 MN 6840
- Ali Khafaja
480-08250 MN 6812
- Sandwich South Farms Inc.
480-08300
- Sandwich South Farms Inc.
480-08300
- Gerald & Agnes Lavin
480-08400 MN 6420
- Gerald & Agnes Lavin
480-08410 MN 6420
- Joseph McCarthy
480-08500 MN 6084
- Richard McCarthy
480-08600 MN 5676
- Transportation Ministry
480-08611
- David & Margaret Pringle
480-08700 MN 5412
- Joseph & Marilyn McCarthy
480-08750 MN 5550
- 538073 Ontario Inc.
480-08800
- Josef Dworatschek
480-08801 MN 5450

- Kevin & Melissa McCarthy
480-08803 MN 5500
- Ravinder & Mavi Singh
480-08900 MN 6703
- Rose Jobin & Jole Reynr
480-09000 MN 8639
- Tammy & John Flood
480-09010 MN 8559
- Jason Hill & Wendy Ouellette-Hill
480-09100 MN 8639
- Jacqueline Mailoux
480-09110 MN 8719
- Khmer Buddhist Santivararam Windsor
490-00100 MN 5300
- 538073 Ontario Inc.
490-10200
- Robert & Richard McCarthy
490-10300
- Rose, Philip, Paul, Jole & Joslyne Jobin
510-01500
- Rose Jobin
510-01550
- Philip Jobin
510-01590 MN 4780
- Paul & Rose Jobin
510-01600 MN 4710
- Philip Jobin
510-01610
- Wilfred O'Neil
510-01700 MN 4640
- Wilfred O'Neil
510-01800
- Wilfred O'Neil
510-01900
- Ruth Battersby
510-02000 MN 4428
- James Battersby
510-02005
- Laurie Knight
510-02010 MN 4372
- Helene Battersby
510-02100 MN 4320
- Rose Jobin
520-00700
- Rose, Philip & Paul Jobin, &
Jobin Farms Inc.
520-00750
- Hardershan Brar
520-00900 MN 8280
- Union Gas Limited
520-01000
- Guy & Tina Robertson
520-01100 MN 5372
- Charles Matthews
520-01210 MN 5296
- Kenneth & Barbara McCarthy
520-01300 MN 5056
- Barbara McCarthy
520-01301 MN 5056
- Roger Lemmon
520-01350 MN 5000

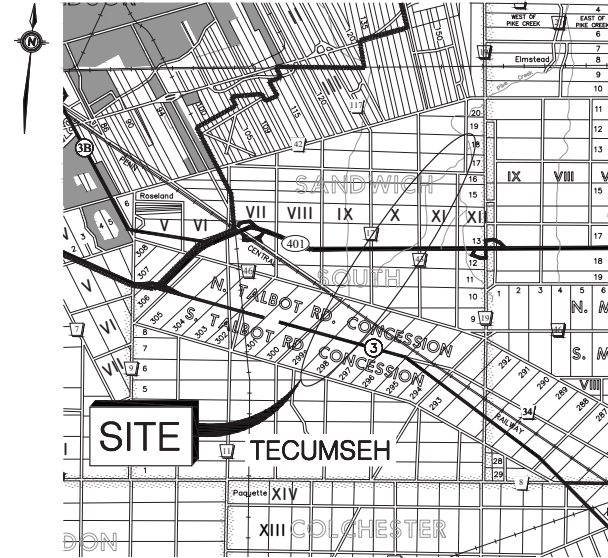
- Joseph & Helen Diesbourg
520-03400 MN 9209
- Clifford & Connie Campeau
520-03500
- Jacob Carlesimo
520-03800 MN 9801
- Clifford & Connie Campeau
520-03900 MN 4327
- Clifford & Connie Campeau
520-03901 MN 4311
- Herbert Henricks & Marianne Scarpelli
520-03920 MN 4357
- Susanna Mackenzie-Russell
520-04000 MN 4397
- Sanward Enterprises Inc.
520-04100
- Edward Chittle Jr.
520-04200
- Jeremy Knezev
520-04250 MN 4505
- Luigina Gobbo
520-04300 MN 4529
- Philip Jobin
520-04400 MN 4707
- Sandwich South Farms Limited
520-04500 MN 4831
- Brian Chittle
520-04550 MN 4831
- Steno Novelletta & Rosanne St. Louis
520-04600 MN 4835
- Gerald & Agnes Lavin
520-04700 MN 4995
- Thomas & Mary Moore
520-04750 MN 5015
- Wayne & Carol O'Neil
520-04800 MN 5235
- Deana & Mario Liburdi
560-08500 MN 3572
- Diklich Capital Corp.
530-00100 MN 7254
- Sanward Enterprises Inc.
530-04770
- Edward Chittle Jr.
530-04775
- Lee Simpson
530-04800 MN 5427
- Crossway Church
560-00300 MN 4215
- Susanna Mackenzie
560-03900 MN 4127

CITY OF WINDSOR:

- Sandwich South Farms Limited
090-030-04700
- 1027414 Ontario Inc.
090-030-04800
- Rose Jobin
090-030-05000 MN 4856
- John Wilson
090-030-05200 MN 4800
- Norbert St. Louis
090-030-05400 MN 4732
- Gerald Lavin
090-030-05600
- 2017345 Ontario Limited
090-030-05850
- 1741077 Ontario Inc.
090-030-06000
- 1583925 Ontario Limited
090-030-06110
- 2187065 Ontario Limited
090-030-06200 MN 4310
- Robert Coupe
090-030-06300 MN 8355
- Thomas Crouchman
090-030-06400 MN 8475
- Gregory Maxwell
090-030-06500 MN 8515
- 106 Joseph Gagnon
090-030-06600 MN 9039
- Rouslan Rakhoutine
090-030-06700 MN 9129

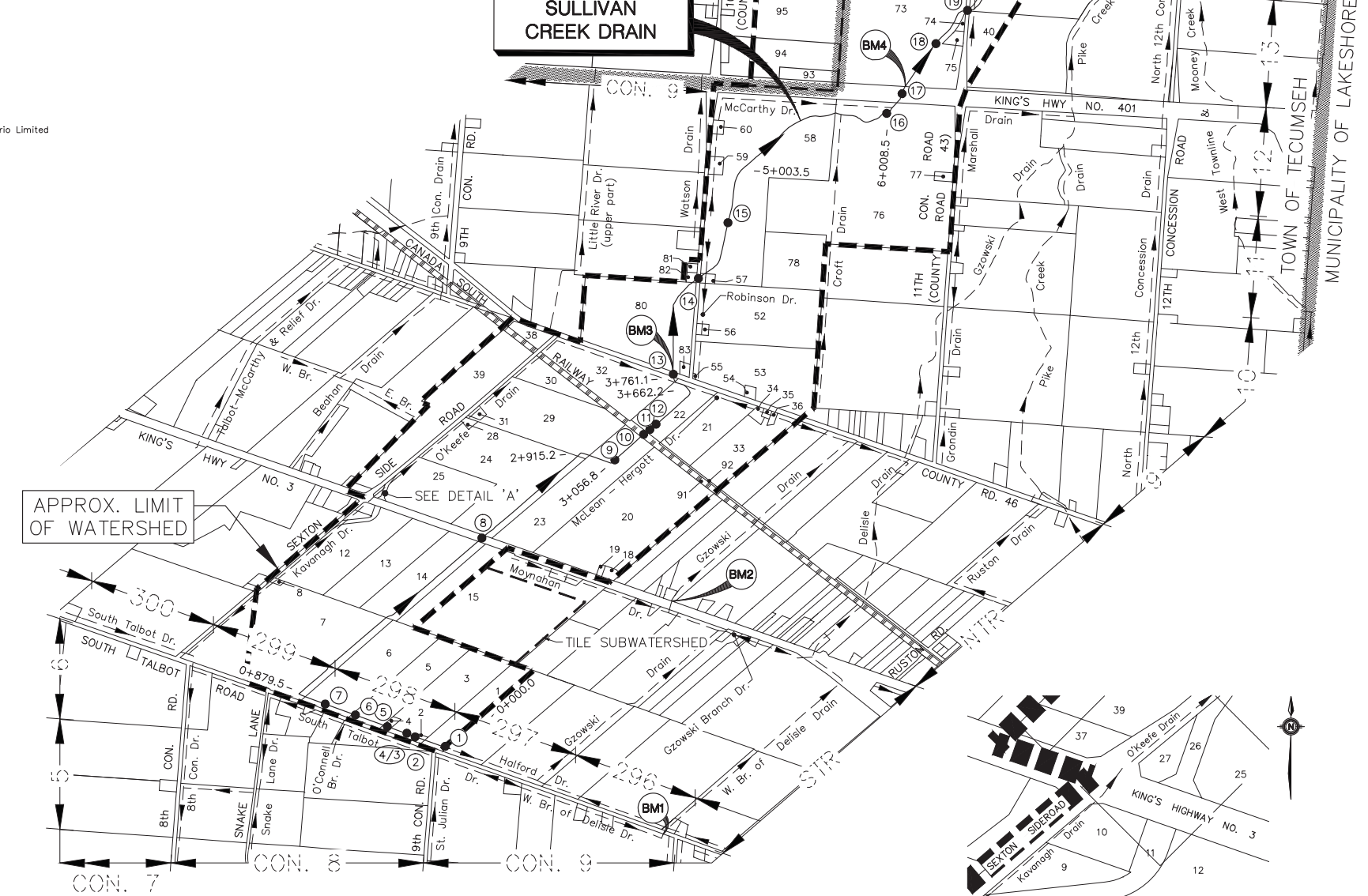
BENCHMARKS:

- TOP MIDDLE OF SOUTH HEADWALL OF CONCRETE BRIDGE AT SOUTH TALBOT ROAD & WEST BRANCH OF DELISLE DRAIN
ELEV. = 191.812m
- CUT CROSS AT TOP NORTHEAST CORNER OF HEADWALL OF CONCRETE BRIDGE AT GZOWSKI DRAIN & NORTH SIDE OF HIGHWAY NO. 3
ELEV. = 189.897m
- TOP MIDDLE OF SOUTH HEADWALL OF CONCRETE BRIDGE AT COUNTY ROAD 46 & SULLIVAN CREEK DRAIN.
ELEV. = 189.301m
- TOP MIDDLE OF NORTH DECK OF CONCRETE BRIDGE AT HIGHWAY 401 & SULLIVAN CREEK DRAIN.
ELEV. = 186.113m
- TOP NORTHWEST CORNER OF NORTH DECK OF CONCRETE BRIDGE AT BASELINE ROAD & SULLIVAN CREEK DRAIN.
ELEV. = 183.557m
- TOP MIDDLE OF WEST HEADWALL OF CONCRETE BRIDGE AT 12TH CONCESSION ROAD & SULLIVAN CREEK DRAIN.
ELEV. = 182.943m



KEY MAP

SCALE=1:100,000



WATERSHED PLAN

SCALE=1:15,000

DETAIL 'A'

SCALE=1:3,000

THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
SHEET No.: 1 OF 51

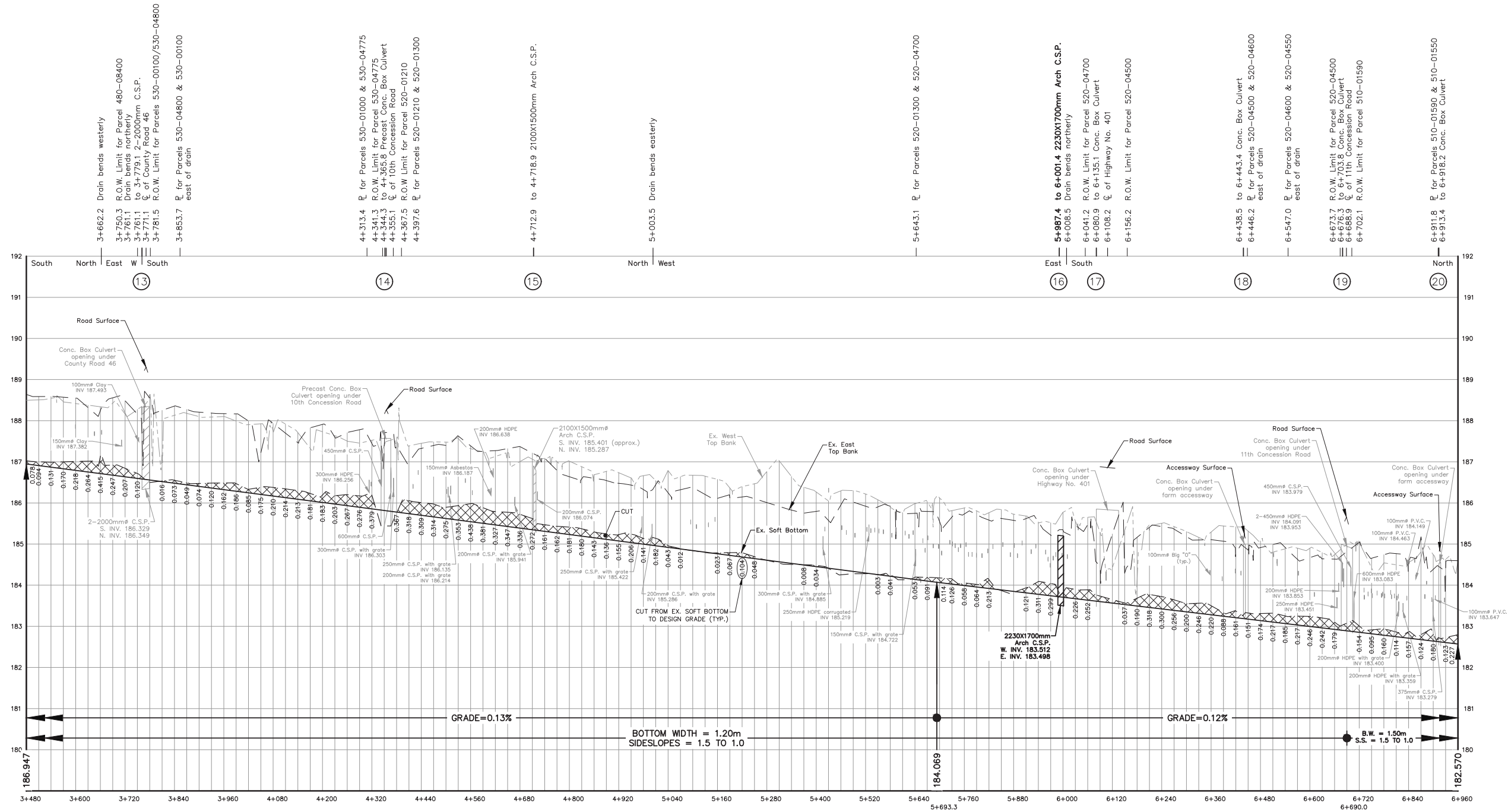


SCALE=1:5000 hor.
1:50 vert.

REFER TO SHEET 3 FOR PROFILE OF SULLIVAN CREEK DRAIN- STA 3+480 TO 6+960.
REFER TO SHEET 4 FOR PROFILE OF SULLIVAN CREEK DRAIN- STA 6+960 TO 9+962.9.

KING'S HIGHWAY NO. 3, STA 2+225.2	<u>ELEV: 191.200m</u>
CANADA SOUTH RAILWAY, STA 3+316.4	<u>ELEV: 190.901m</u>
COUNTY ROAD 46, STA 3+771.1	<u>ELEV: 189.300m</u>
10TH CONCESSION ROAD, STA 4+355.1	<u>ELEV: 188.245m</u>
KING'S HIGHWAY NO. 401, STA 6+108.2	<u>ELEV: 186.853m (approx.)</u>
11TH CONCESSION ROAD, STA 6+688.9	<u>ELEV: 185.655m</u>
BASILINE ROAD, STA 8+795.3	<u>ELEV: 183.907m</u>
12TH CONCESSION ROAD, STA 9+839.5	<u>ELEV: 182.537m</u>

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PLOT CODE: 1:1	
COMPUTER FILE: REJ2015D010.DWG	
FILE No.:	SHEET No.:
2015D010	2 OF 51



PROFILE OF SULLIVAN CREEK DRAIN— STA. 3+480 TO STA. 6+960

SCALE=1:5000 hor.
1:50 vert.

BENCHMARKS:

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ELEV. = 183.557m
- TOP MIDDLE OF WEST HEADWALL OF CONCRETE BRIDGE AT 12TH CONCESSION ROAD & SULLIVAN CREEK DRAIN.
ELEV. = 182.581m

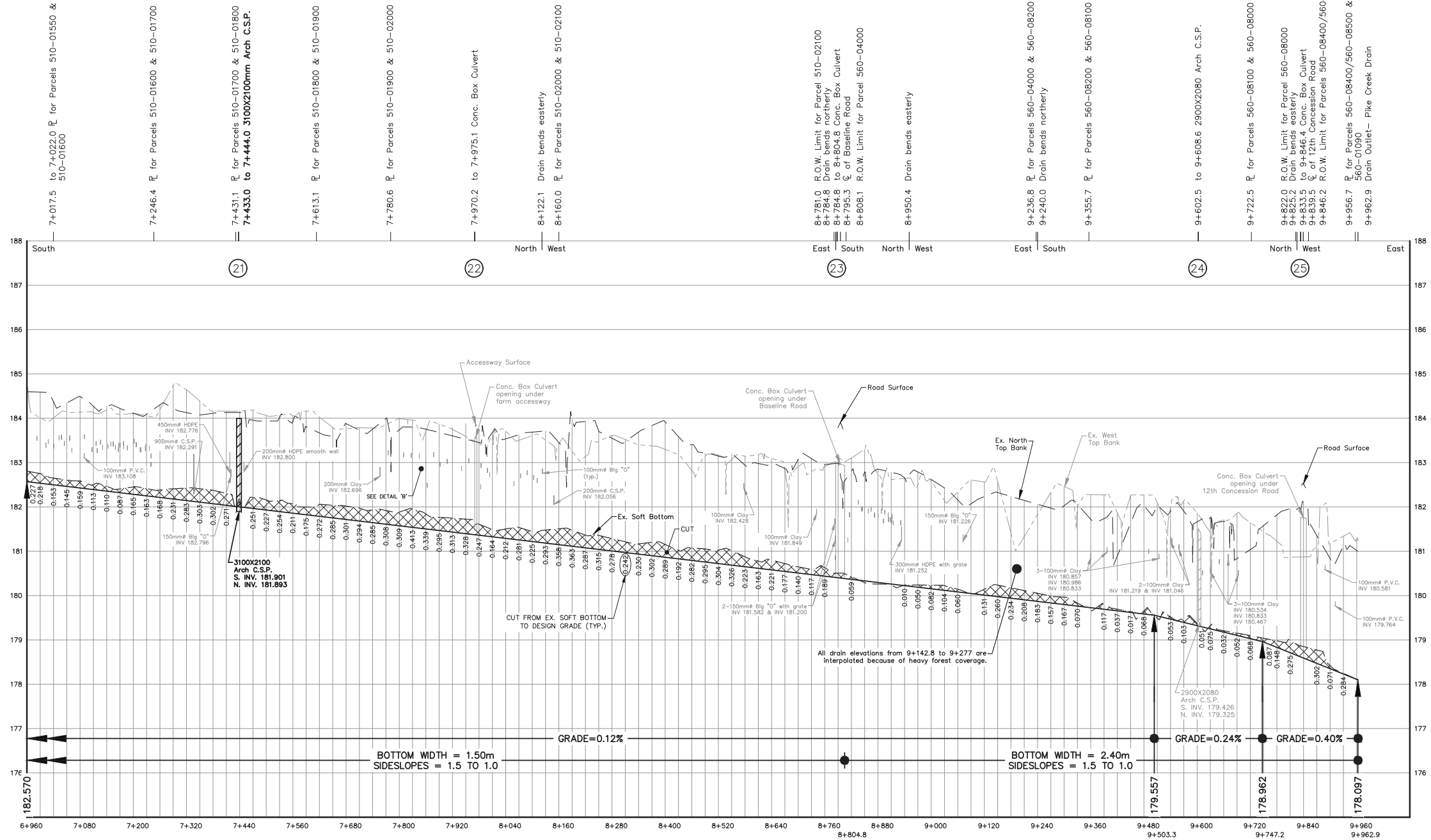
REFER TO SHEET 2 FOR PROFILE OF SULLIVAN CREEK DRAIN— STA 0+000 TO 3+480.
REFER TO SHEET 4 FOR PROFILE OF SULLIVAN CREEK DRAIN— STA 6+960 TO 9+962.9.

ROAD & RAILWAY C CROSSINGS:

KING'S HIGHWAY NO. 3, STA 2+225.2	ELEV: 191.200m
CANADA SOUTH RAILWAY, STA 3+316.4	ELEV: 190.901m
COUNTY ROAD 46, STA 3+771.1	ELEV: 189.300m
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KING'S HIGHWAY NO. 401, STA 6+108.2	ELEV: 186.853m (approx.)
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BASELINE ROAD, STA 8+795.3	ELEV: 183.907m
12TH CONCESSION ROAD, STA 9+839.5	ELEV: 182.537m

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AND THE SCALE THEREFORE VARIES.
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DRAWN BY: G.S. & S.H.	COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010	SHEET No.: 3 OF 51



PROFILE OF SULLIVAN CREEK DRAIN- STA. 6+960 TO STA. 9+962.9

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1:50 vert.

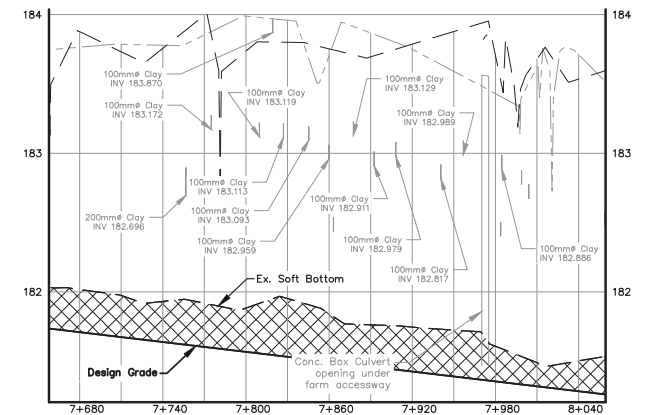
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ELEV. = 182.581m

ROAD & RAILWAY C CROSSINGS:

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CANADA SOUTH RAILWAY, STA 3+316.4	ELEV. 190.901m
COUNTY ROAD 46, STA 3+771.1	ELEV. 189.300m
10TH CONCESSION ROAD, STA 4+355.1	ELEV. 188.245m
KING'S HIGHWAY NO. 401, STA 6+108.2	ELEV. 186.853m (approx.)
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REFER TO SHEET 2 FOR PROFILE OF SULLIVAN CREEK DRAIN- STA 0+000 TO 3+480.
REFER TO SHEET 3 FOR PROFILE OF SULLIVAN CREEK DRAIN- STA 3+480 TO 6+960.



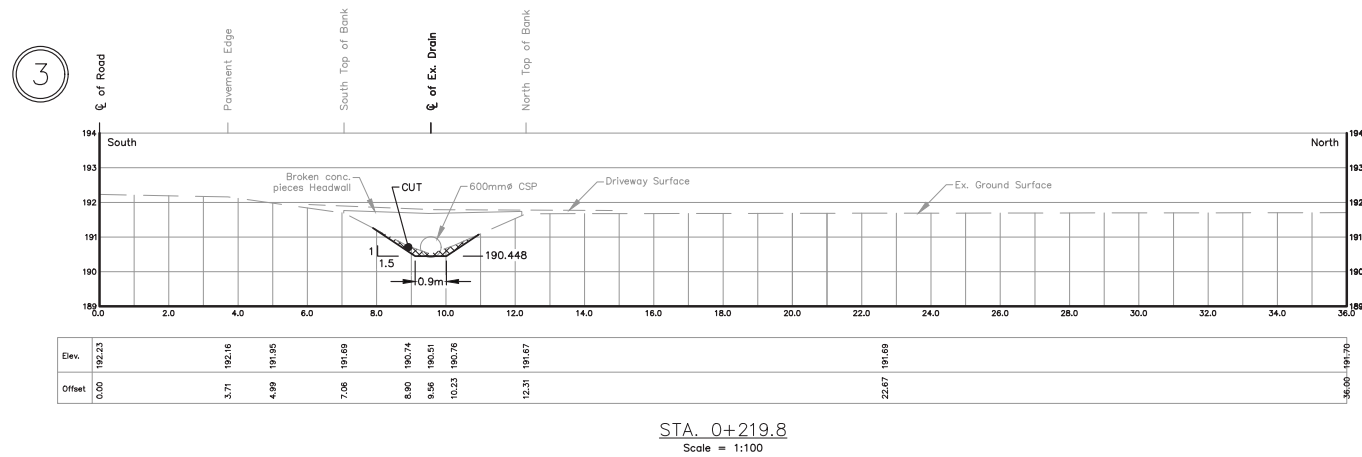
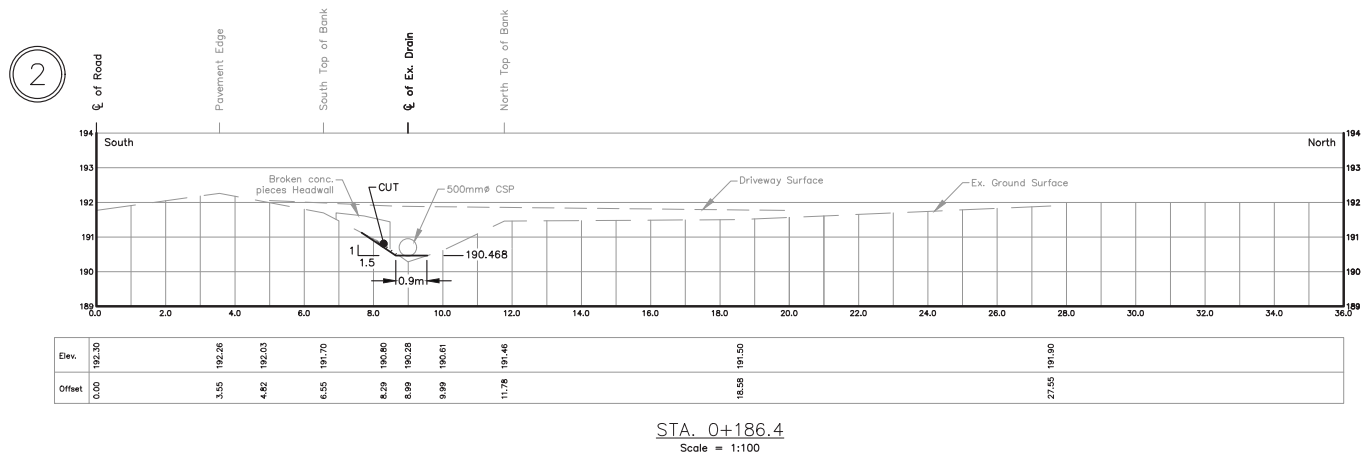
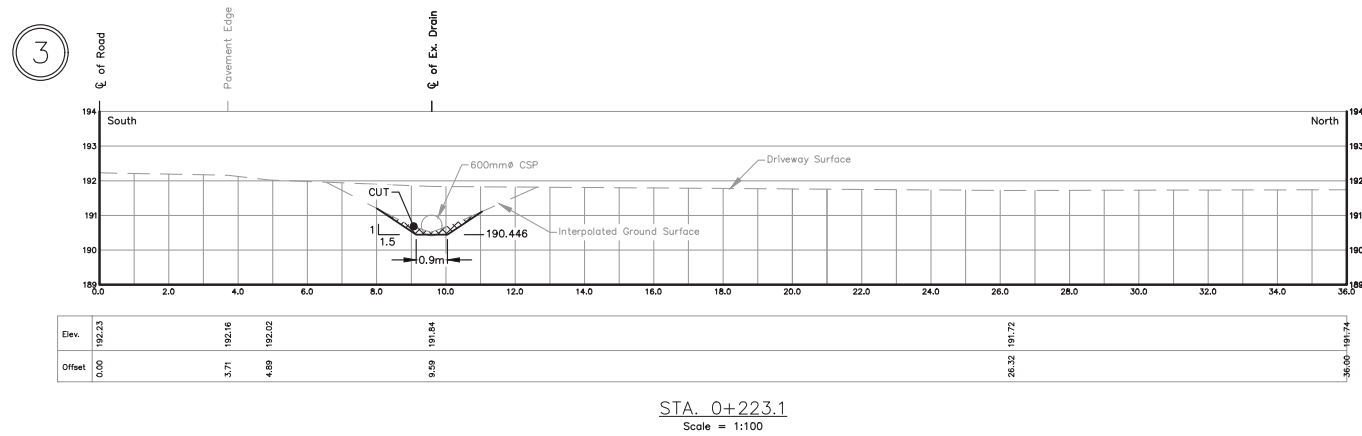
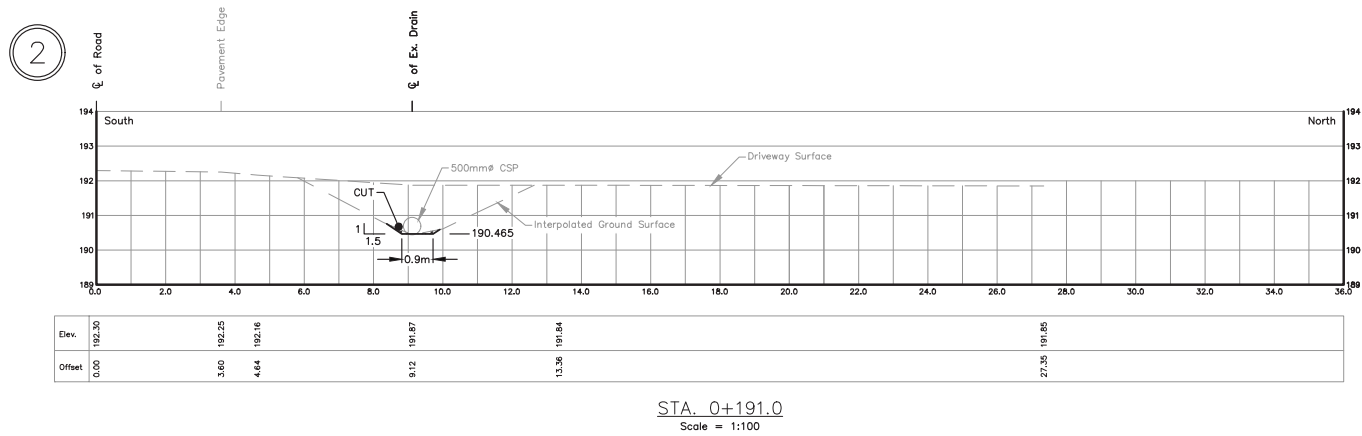
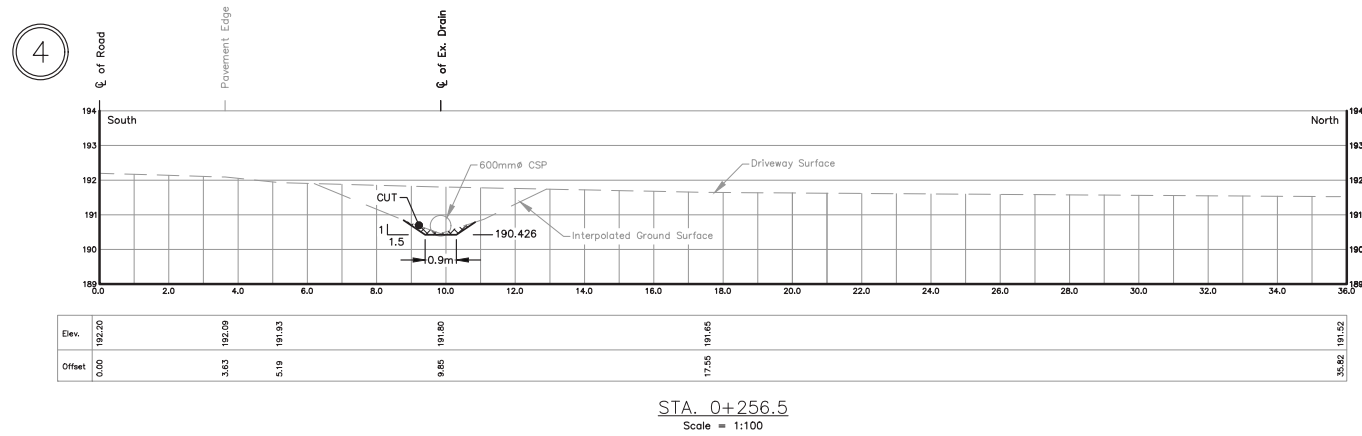
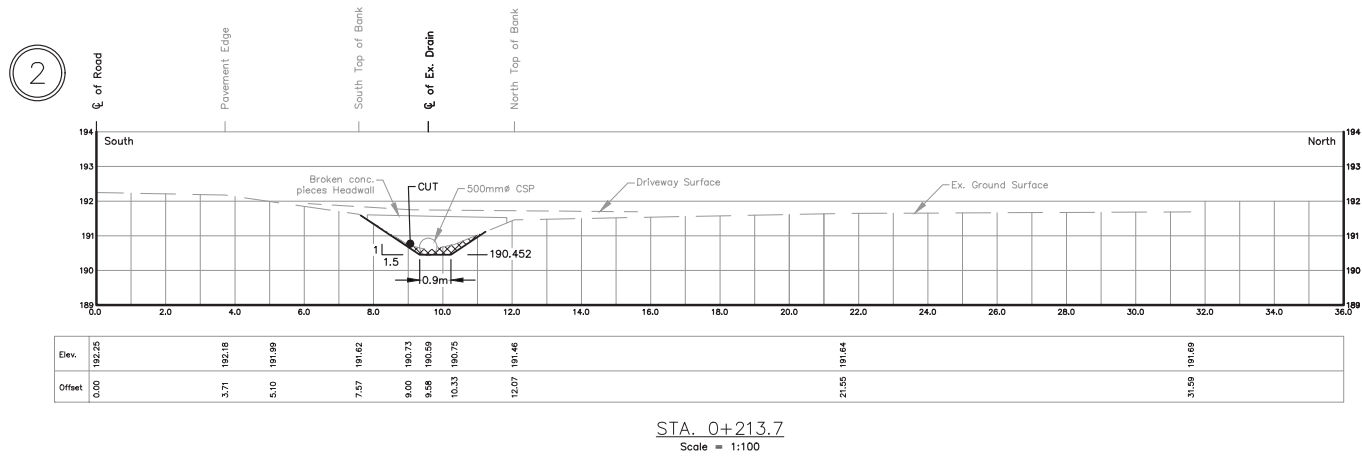
DETAIL 'B'

SCALE=1:2500 hor.
1:25 vert.

THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
SHEET No.: 4 OF 51

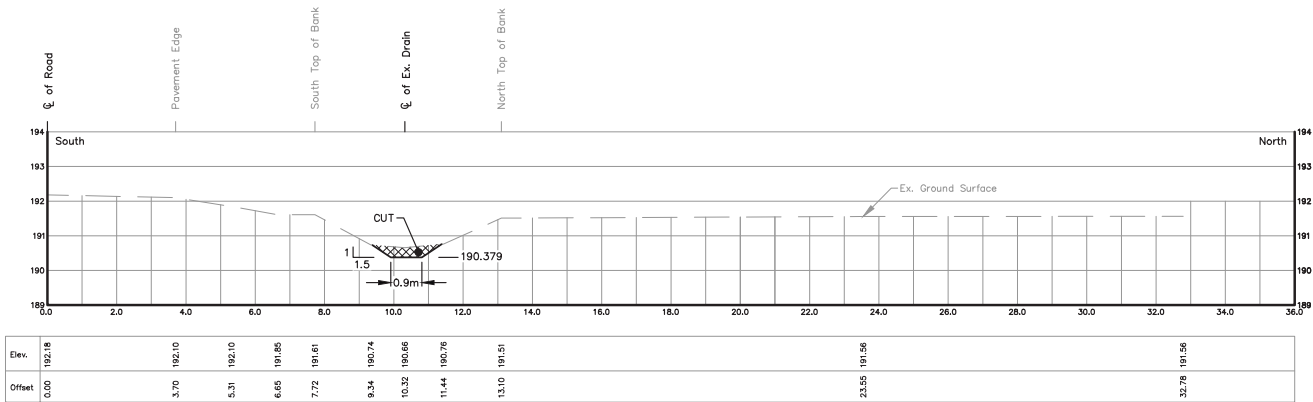
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections A.dwg 2021-05-16



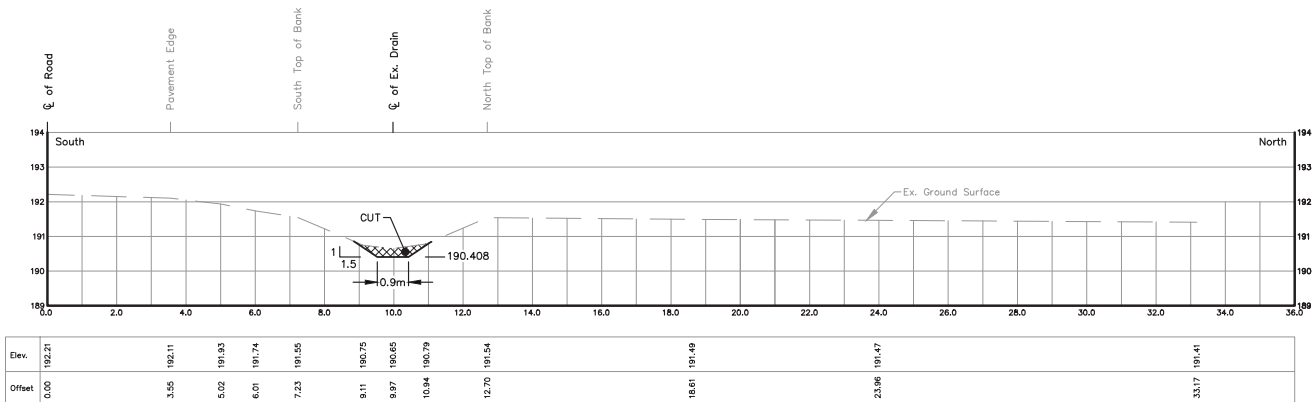
THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
SHEET No.: 6 OF 51

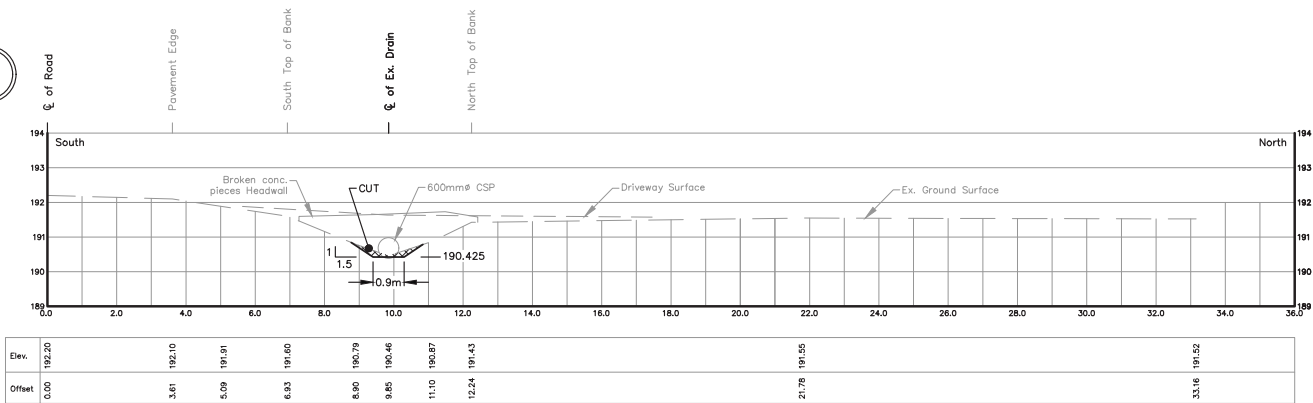
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections A.dwg 2021-05-16



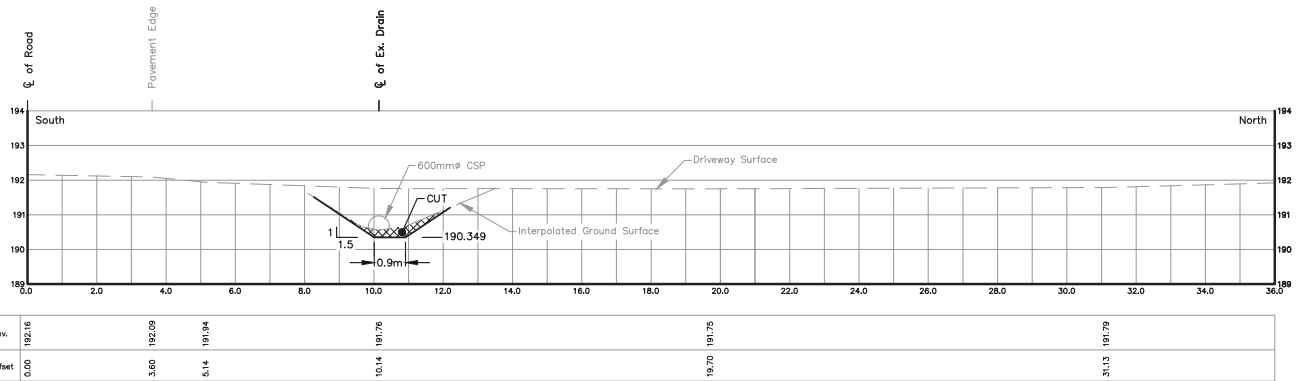
STA. 0+336.1
Scale = 1:100



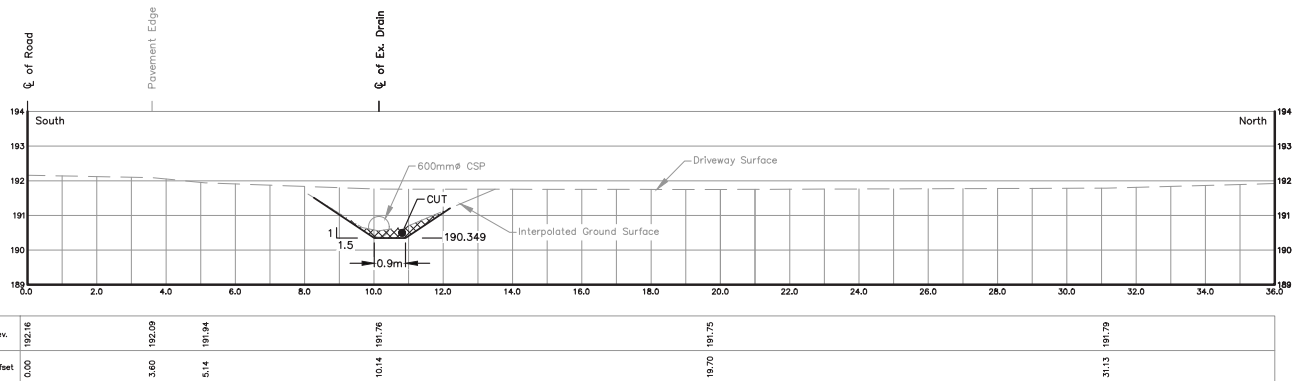
STA. 0+286.6
Scale = 1:100



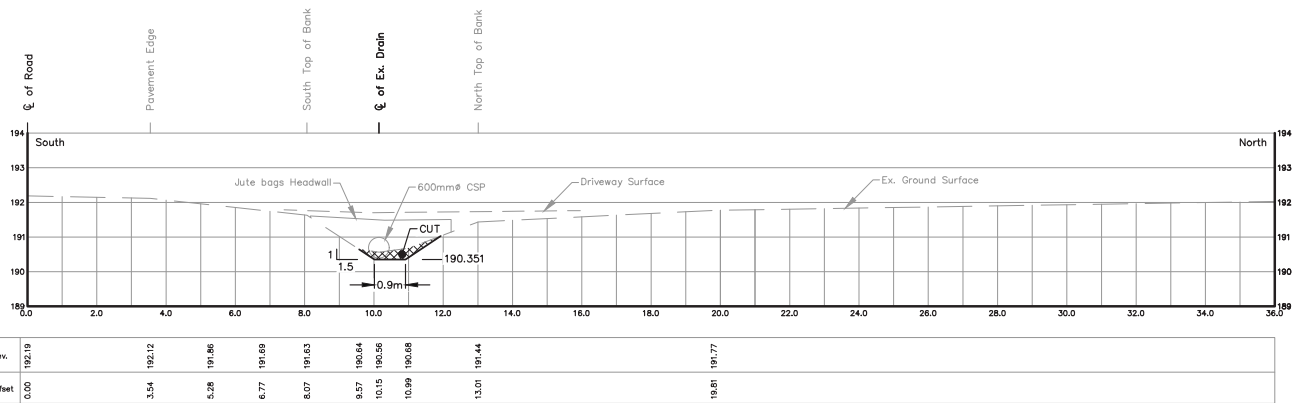
STA. 0+259.6
Scale = 1:100



STA. 0+387.2
Scale = 1:100



STA. 0+387.2
Scale = 1:100

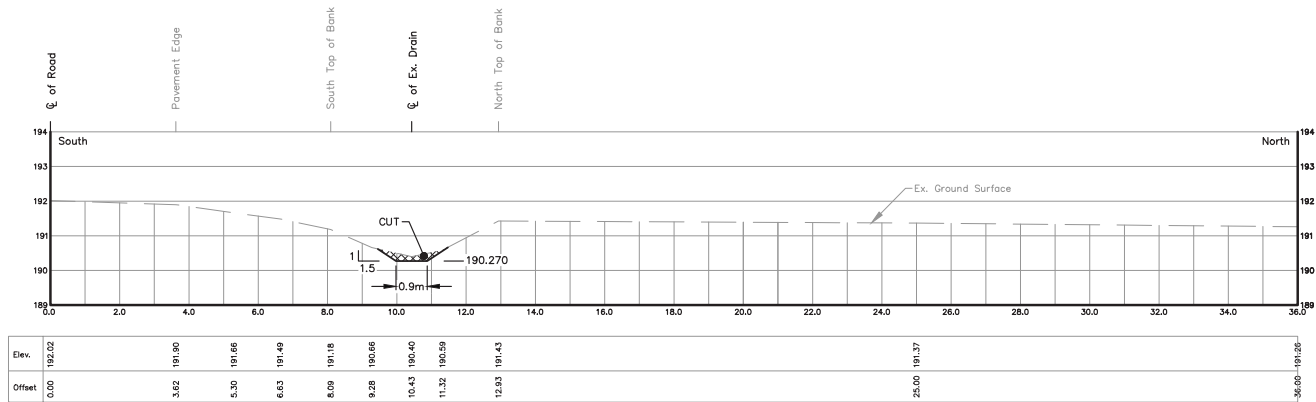


STA. 0+383.9
Scale = 1:100

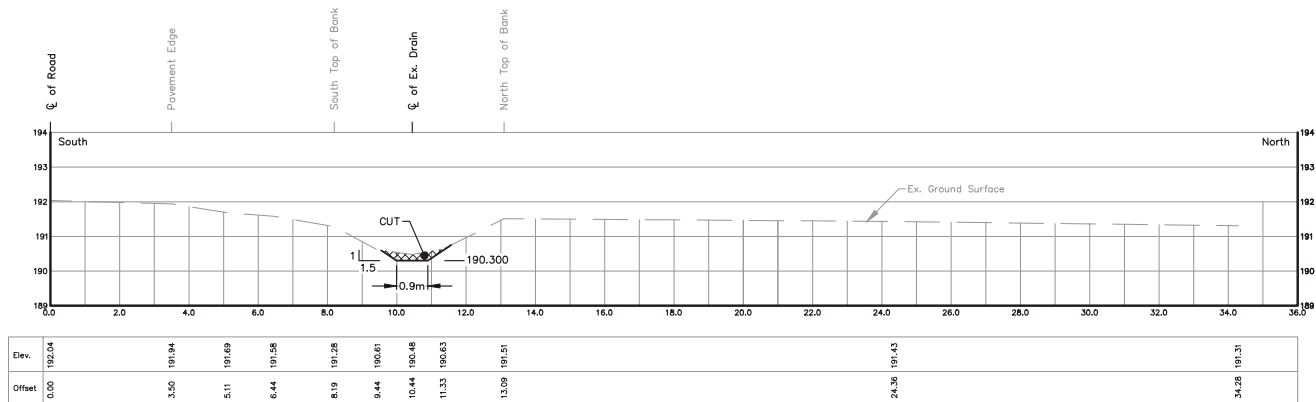
THESE PLANS HAVE BEEN REDUCED
AND THE SCALE THEREFORE VARIES.
FULL SCALE PLANS MAY BE VIEWED
AT THE MUNICIPAL OFFICE.

DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
SHEET No.: 7 OF 51

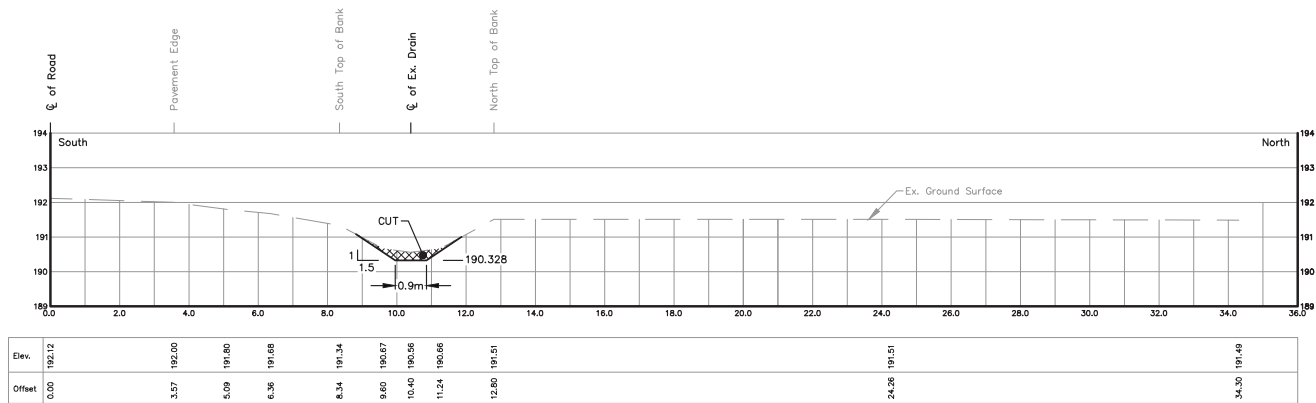
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



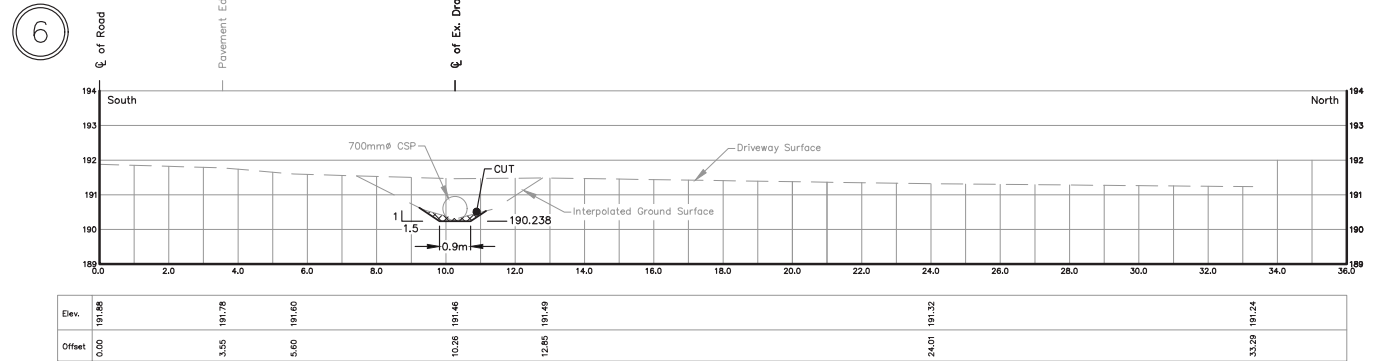
STA. 0+519.7
Scale = 1:100



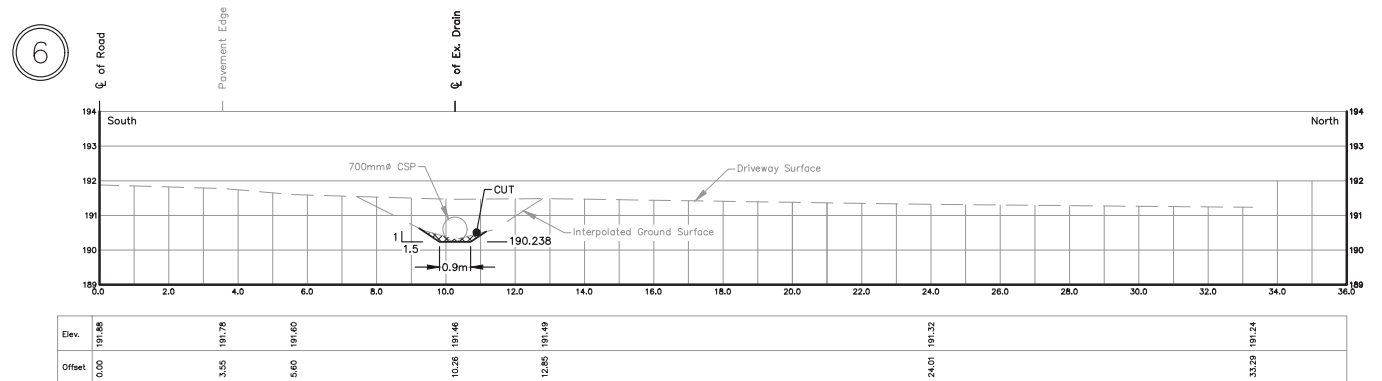
STA. 0+469.1
Scale = 1:100



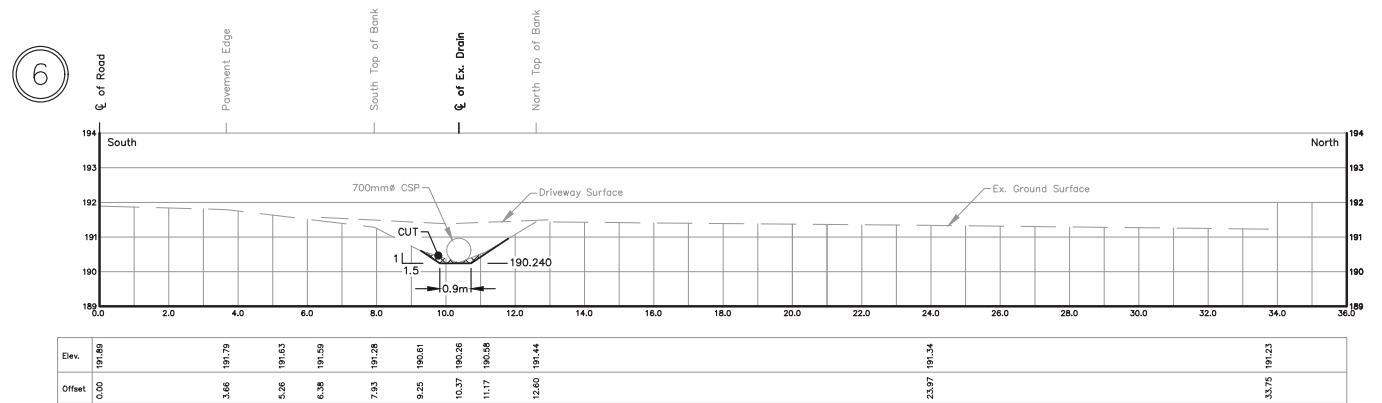
STA. 0+421.5
Scale = 1:100



STA. 0+573.0
Scale = 1:100



STA. 0+573.0
Scale = 1:100

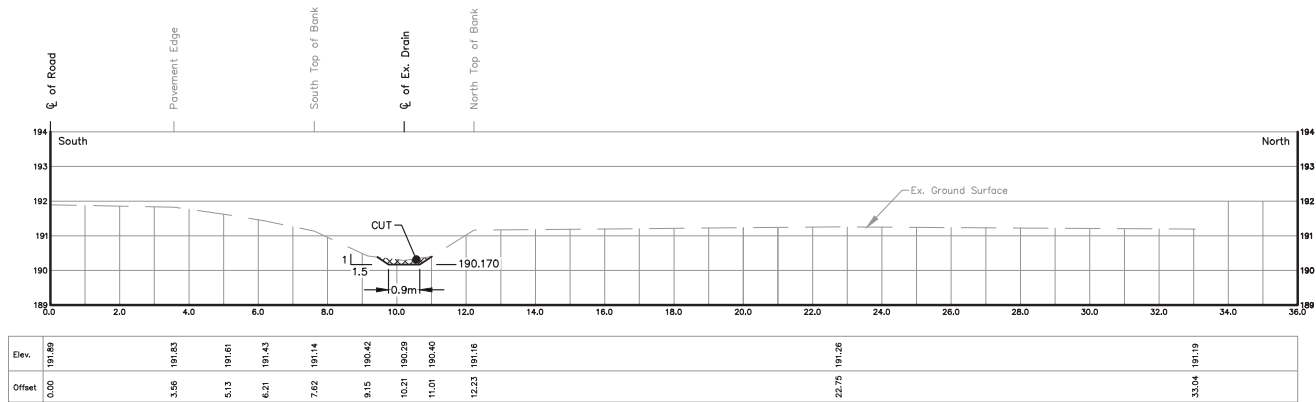


STA. 0+570.2
Scale = 1:100

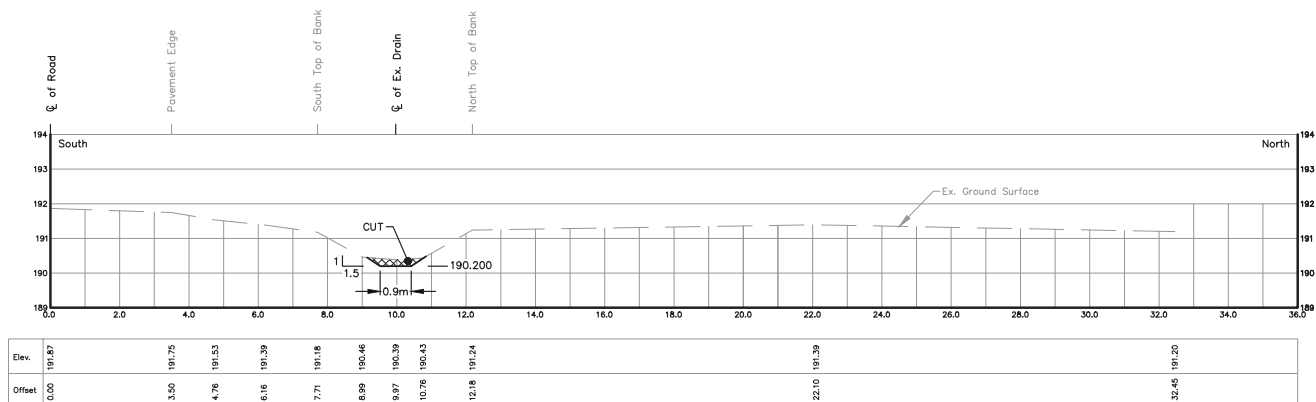
THESE PLANS HAVE BEEN REDUCED
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AT THE MUNICIPAL OFFICE.

DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
SHEET No.: 8 OF 51

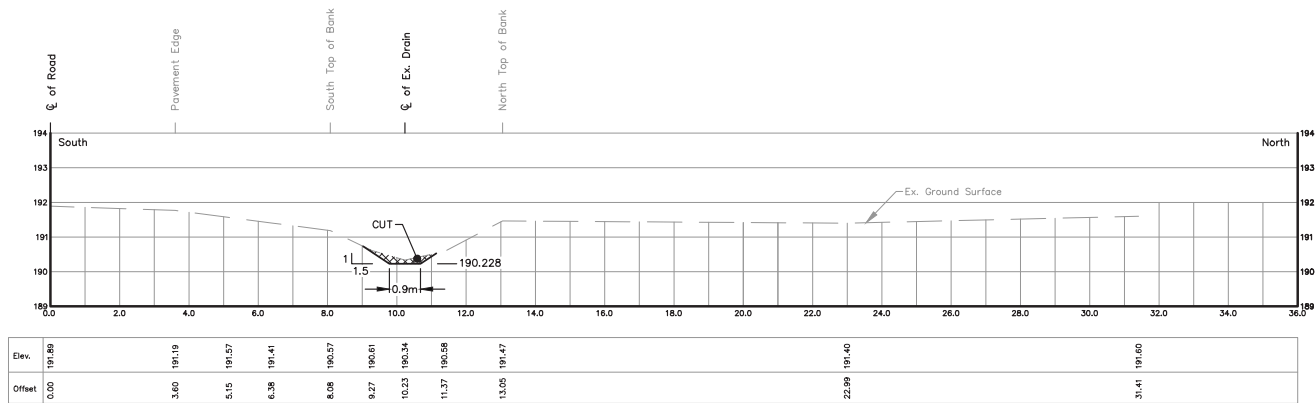
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



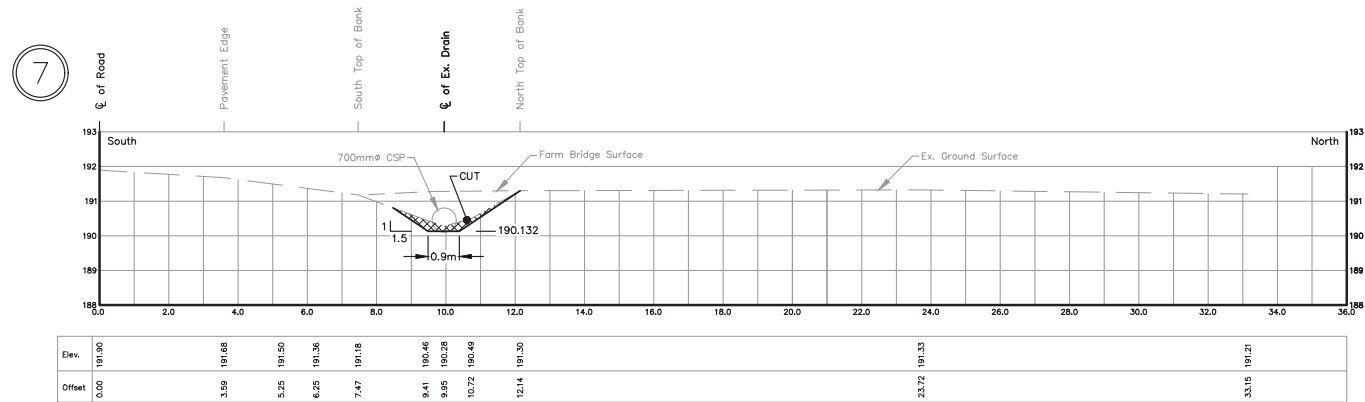
STA. 0+687.4
Scale = 1:100



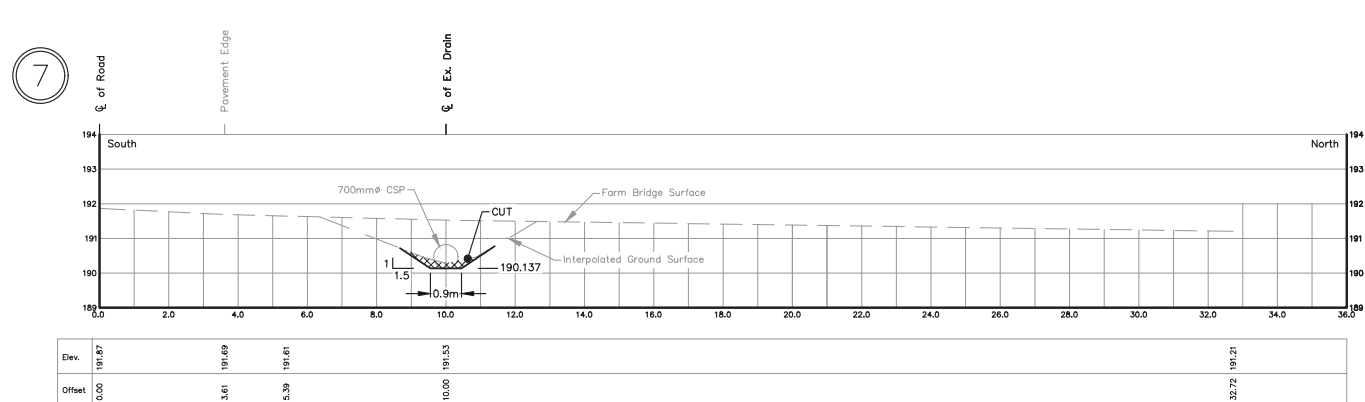
STA. 0+638.0
Scale = 1:100



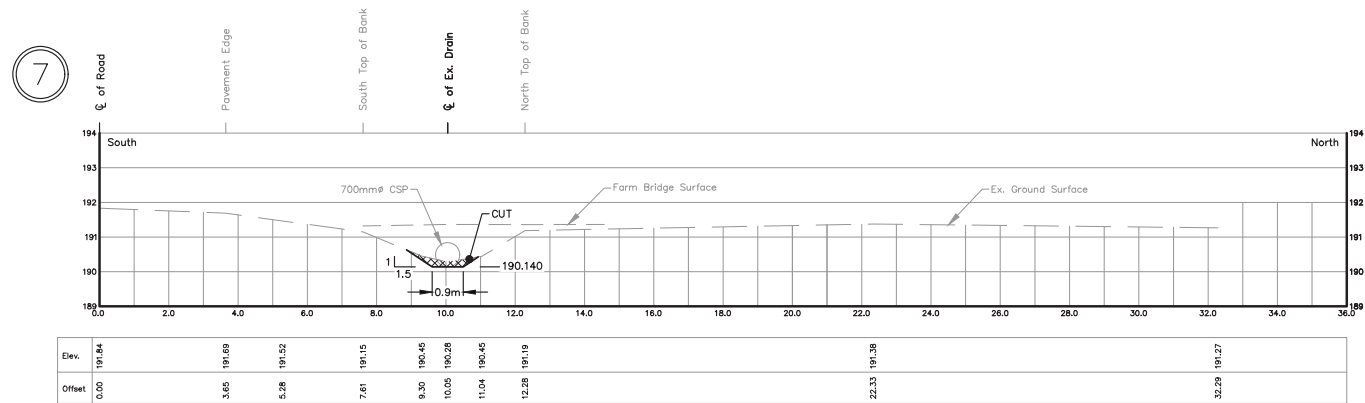
STA. 0+589.7
Scale = 1:100



STA. 0+747.6
Scale = 1:100



STA. 0+742.5
Scale = 1:100

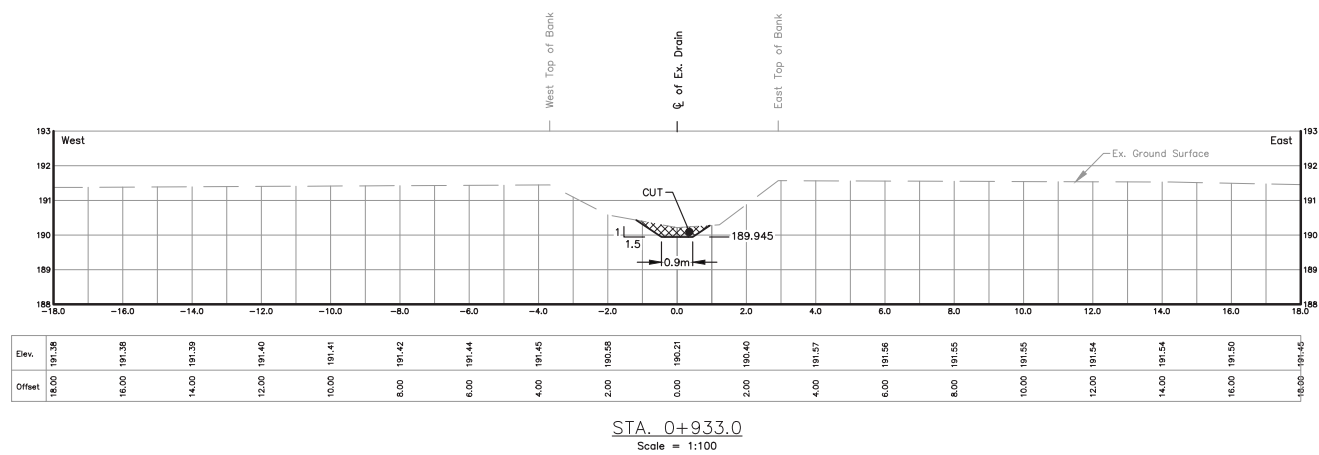
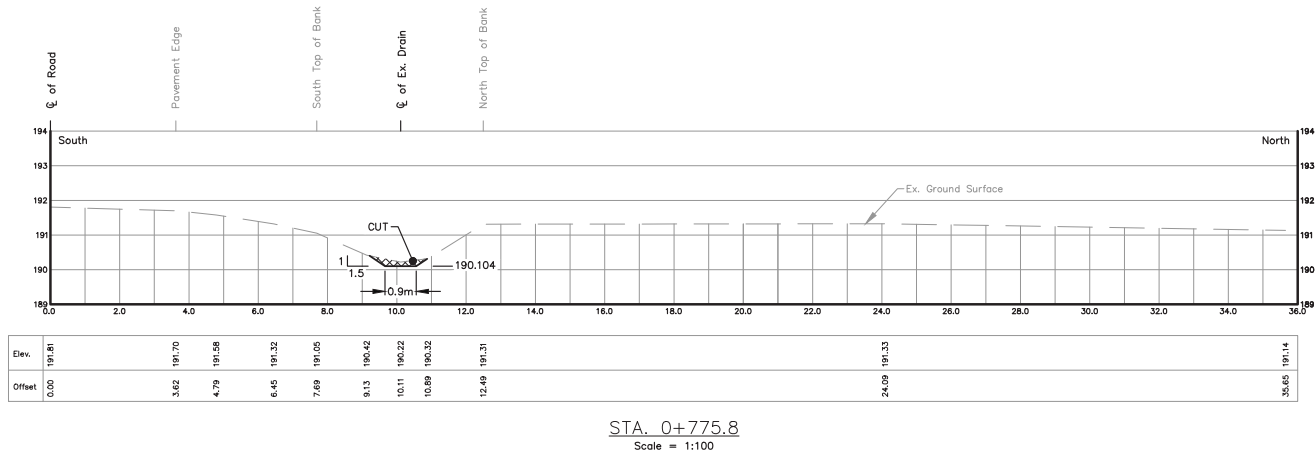
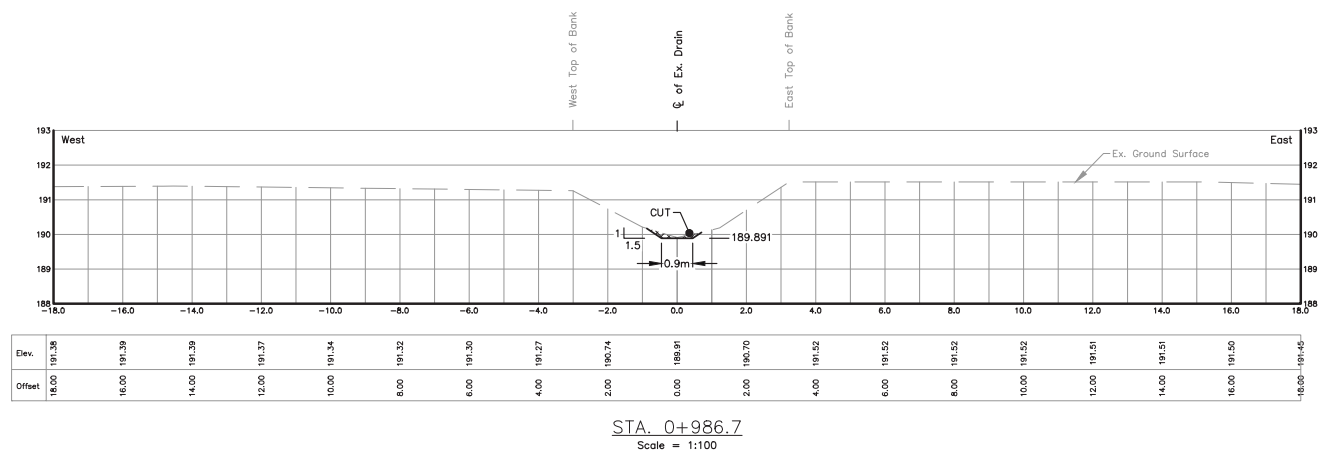
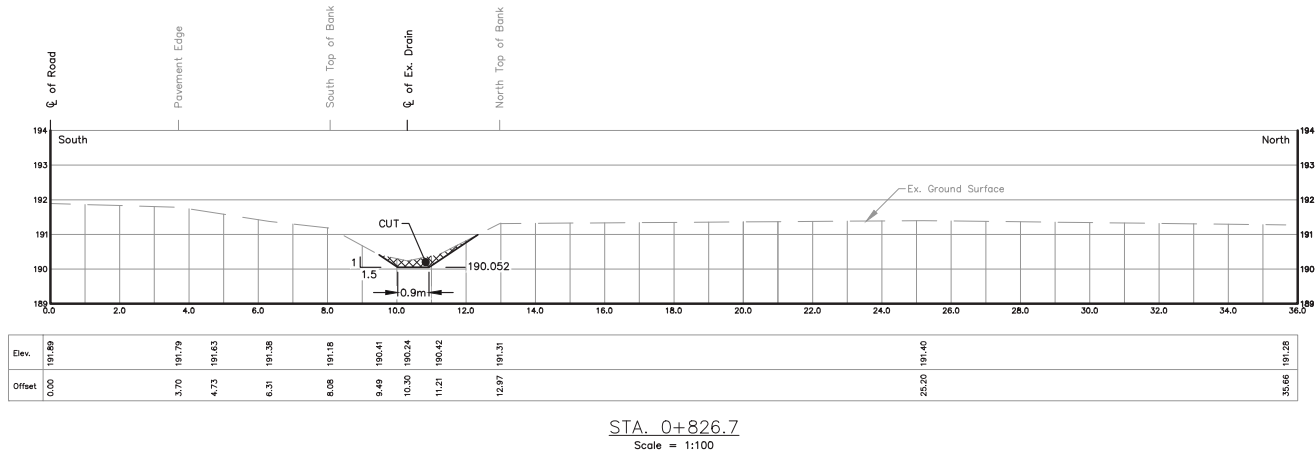
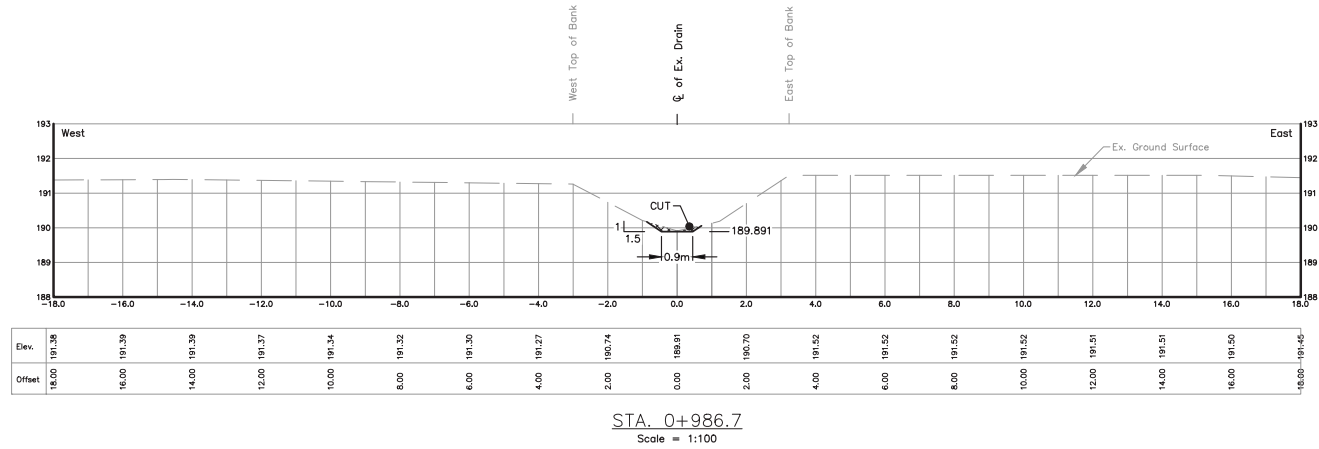
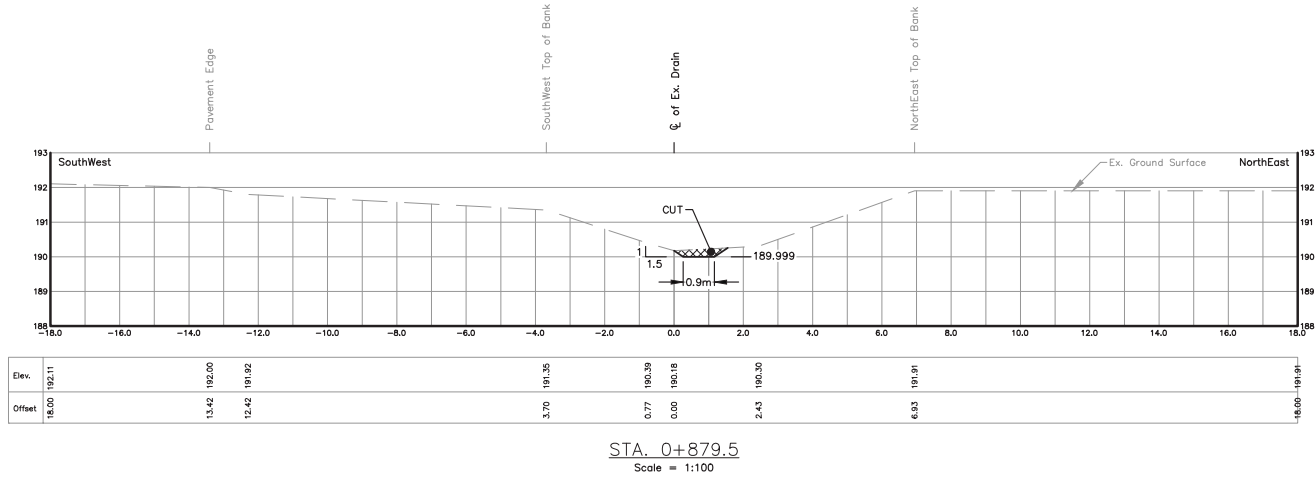


STA. 0+737.3
Scale = 1:100

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DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 9 OF 51

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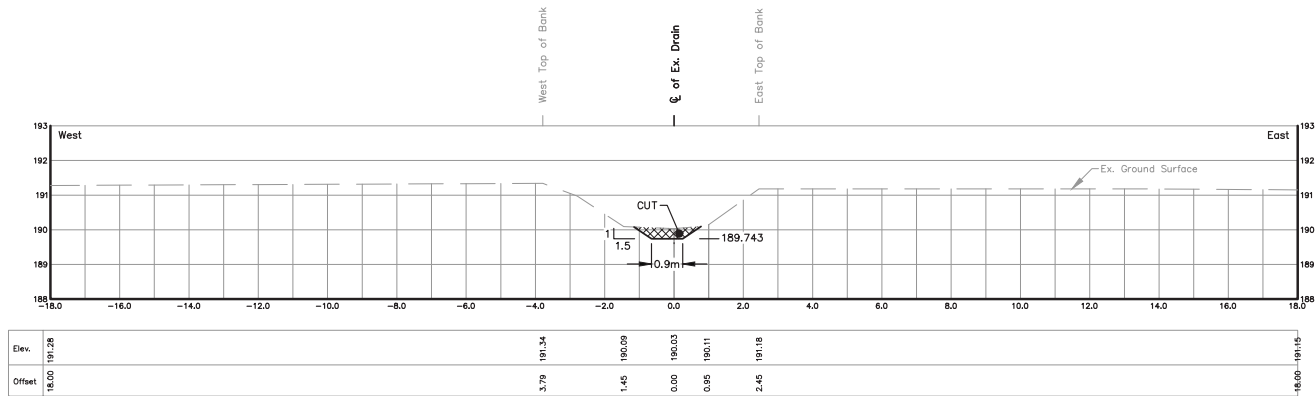
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DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG

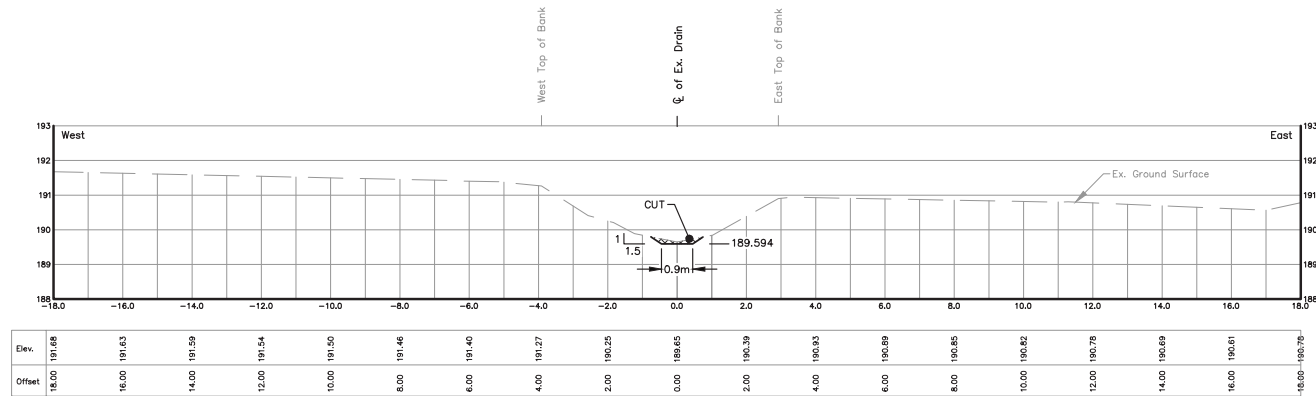
FILE No.: SHEET No.:

2015D010 10 OF 51

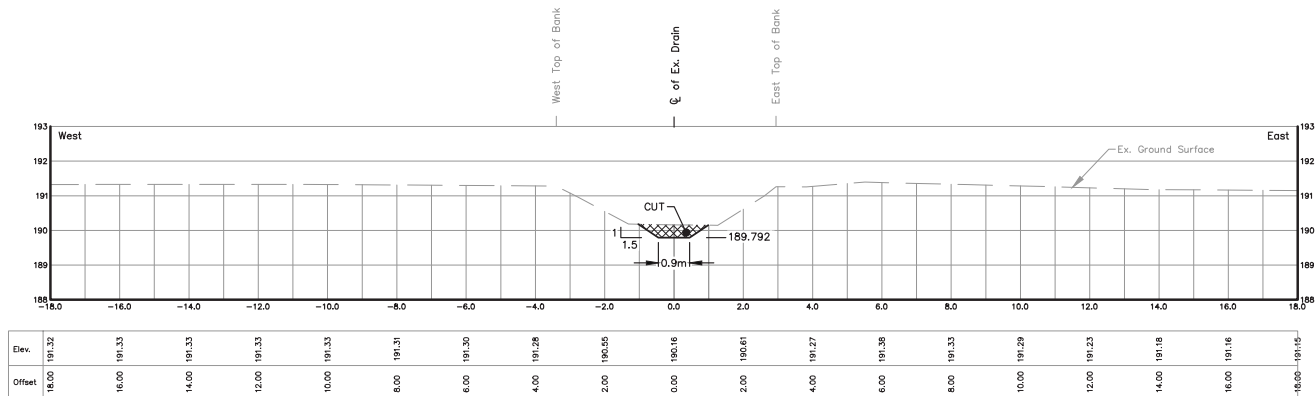
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



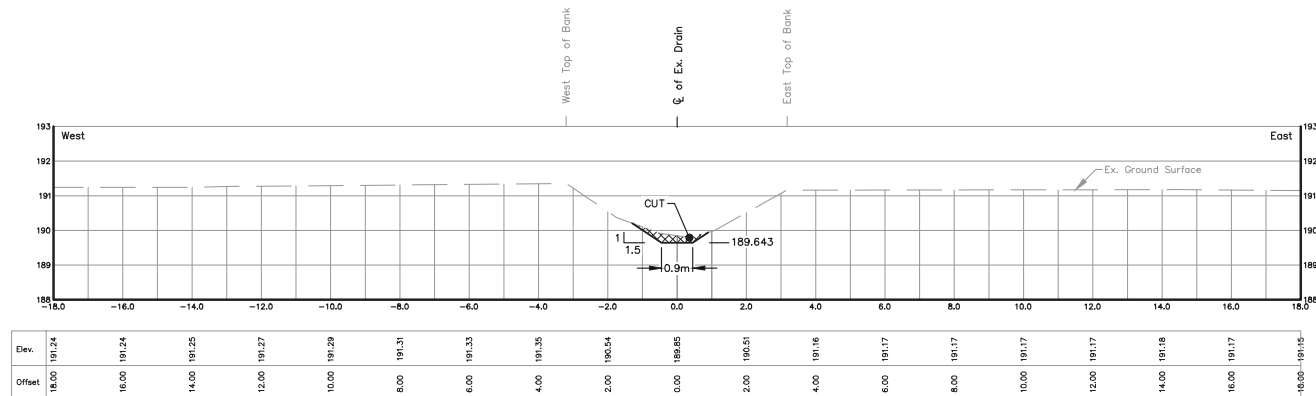
STA. 1+132.7
Scale = 1:100



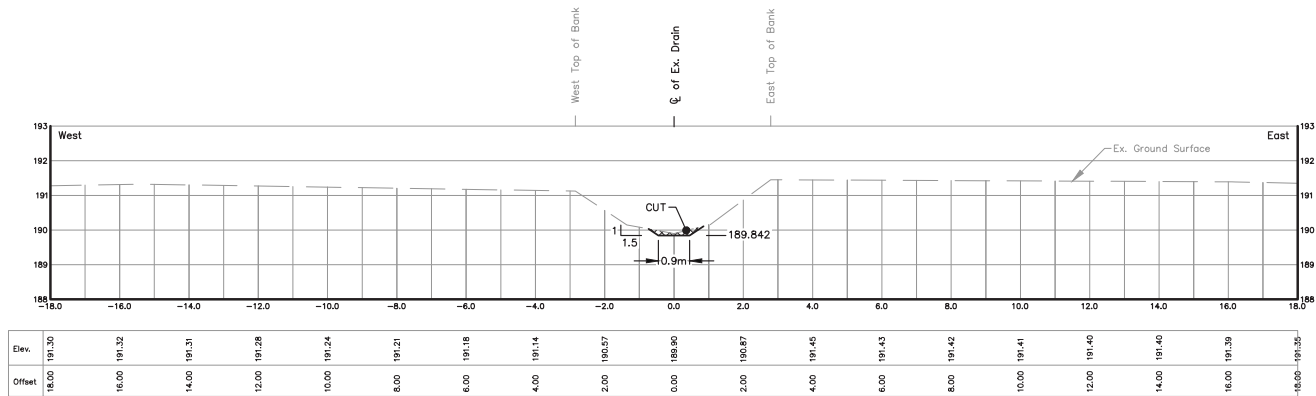
STA. 1+280.7
Scale = 1:100



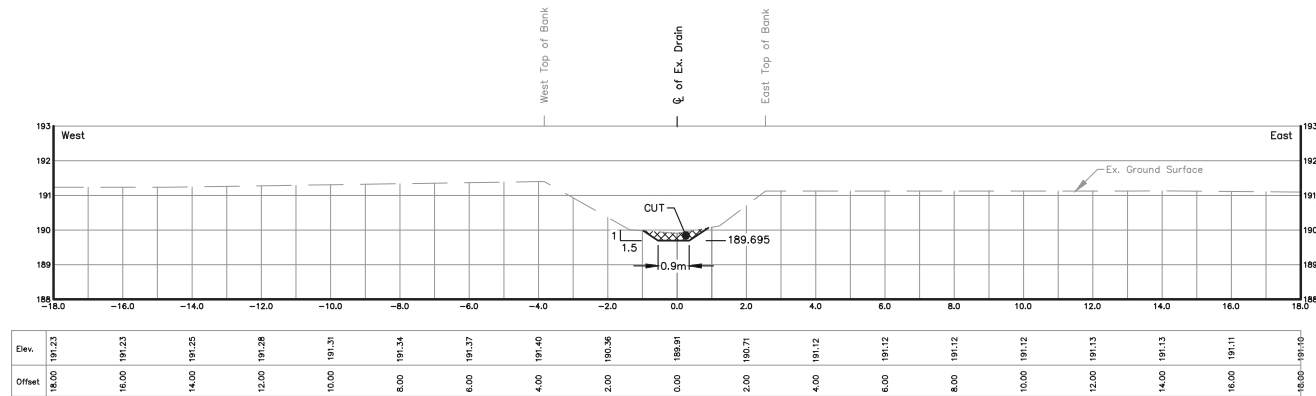
STA. 1+089
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STA. 1+231.4
Scale = 1:100



STA. 1+034.4
Scale = 1:100



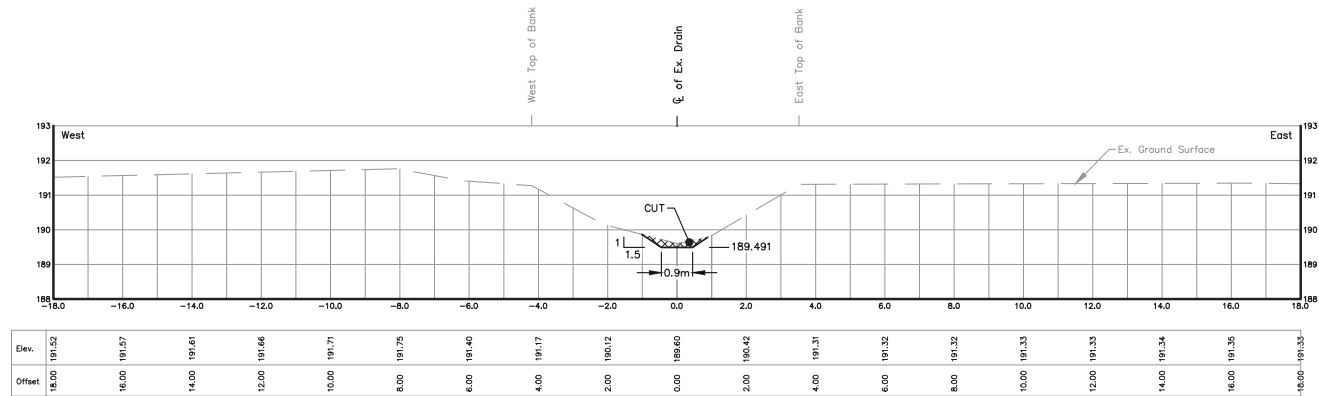
STA. 1+180.0
Scale = 1:100

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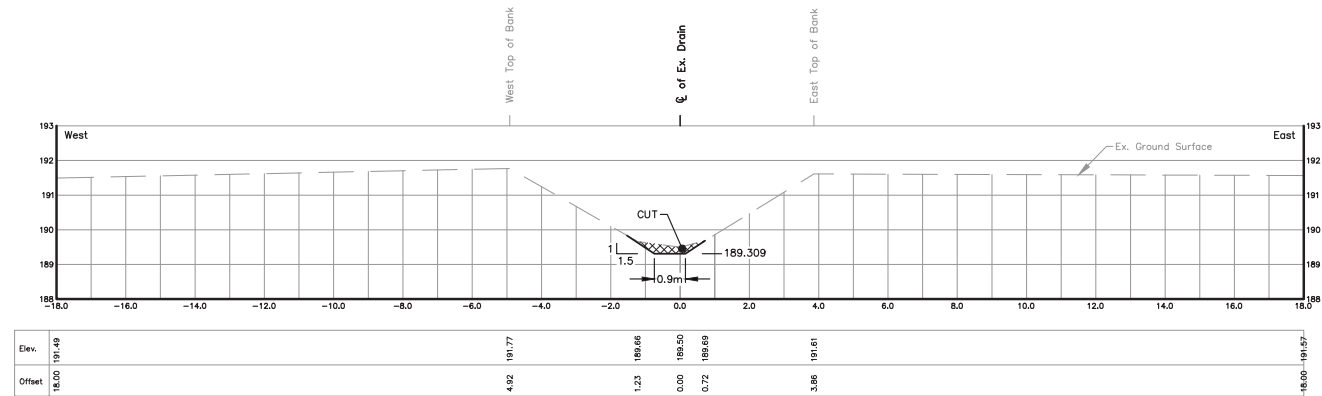
DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG

FILE No.: SHEET No.:
2015D010 11 OF 51

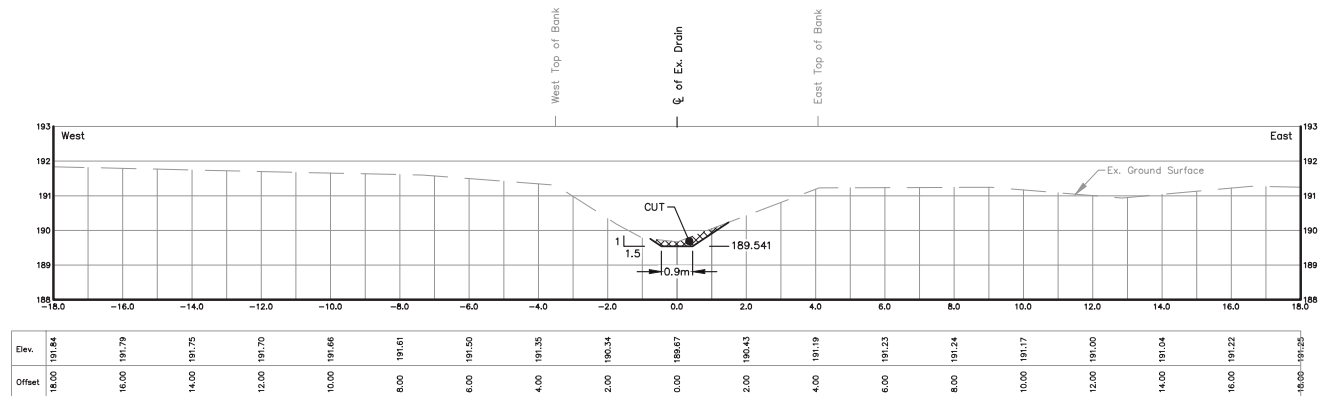
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



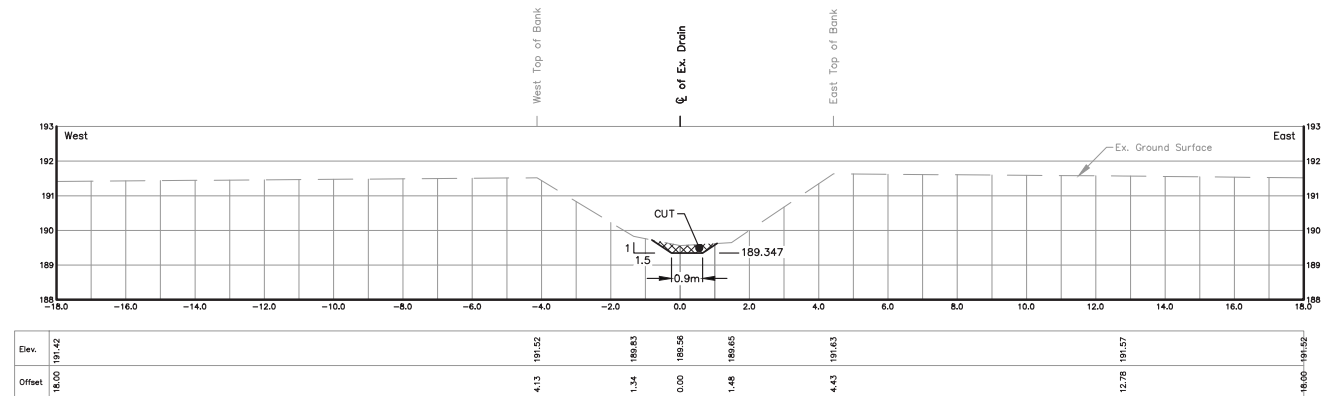
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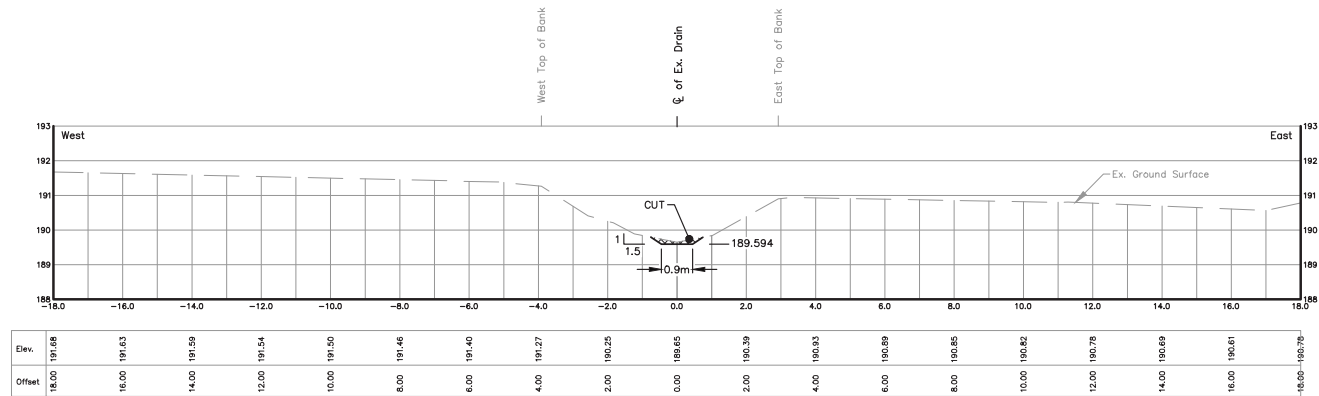
STA. 1+561.2
Scale = 1:100



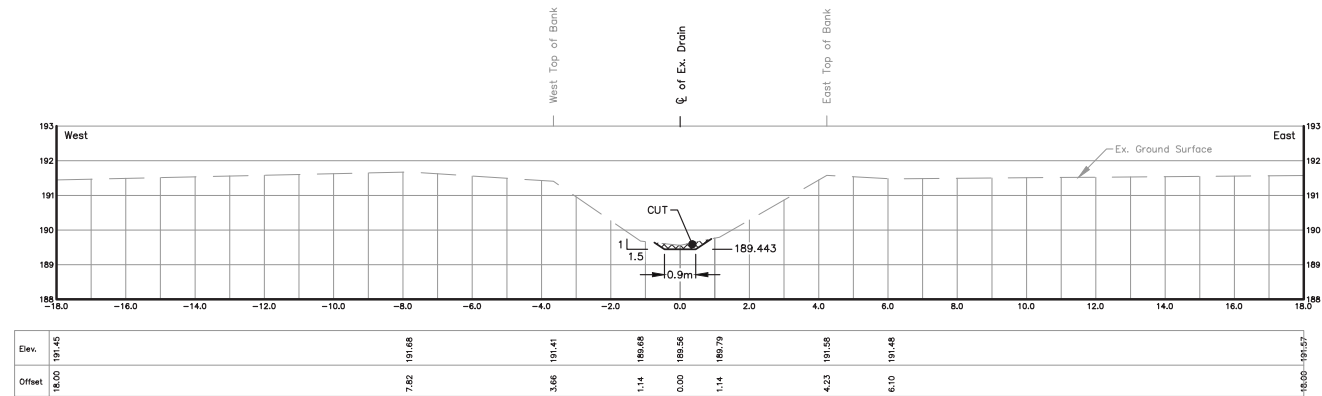
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STA. 1+524.1
Scale = 1:100



STA. 1+280.7
Scale = 1:100

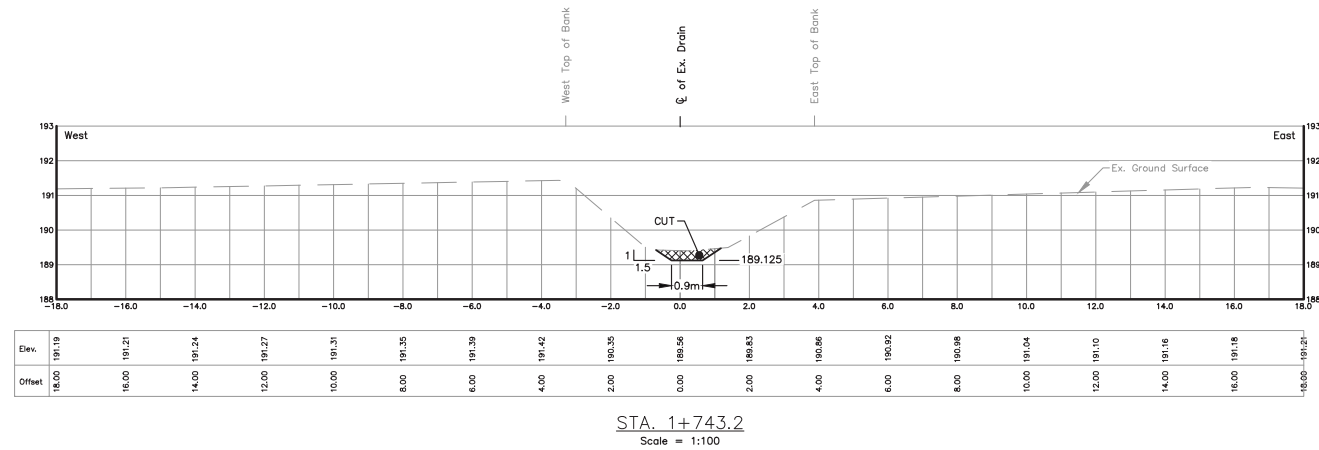
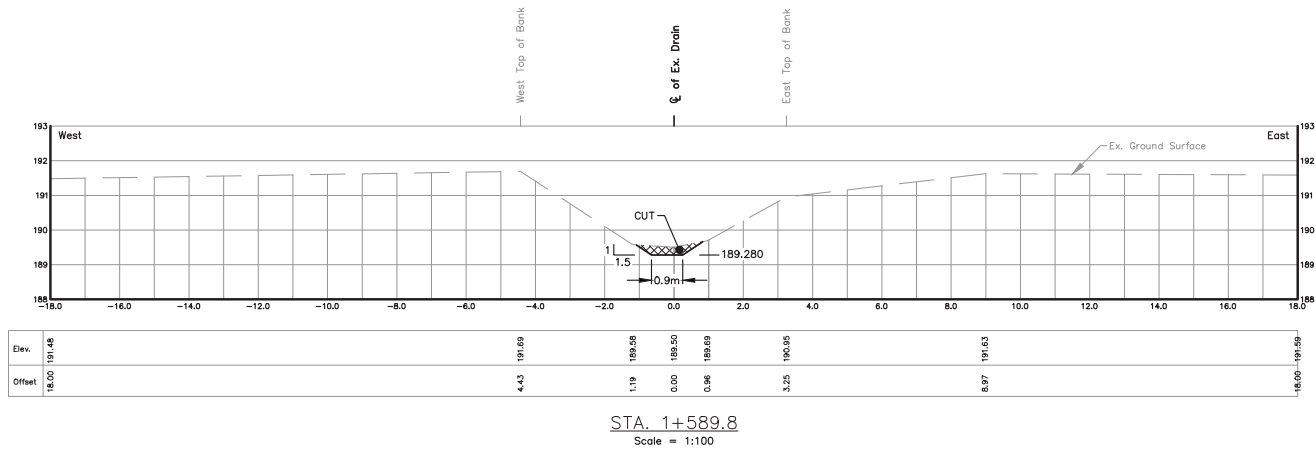
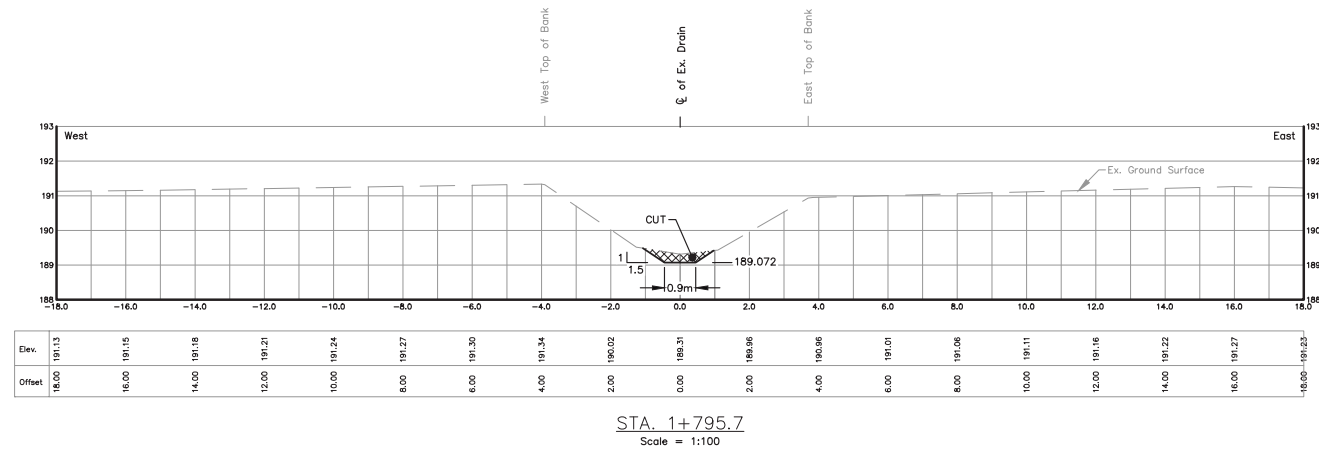
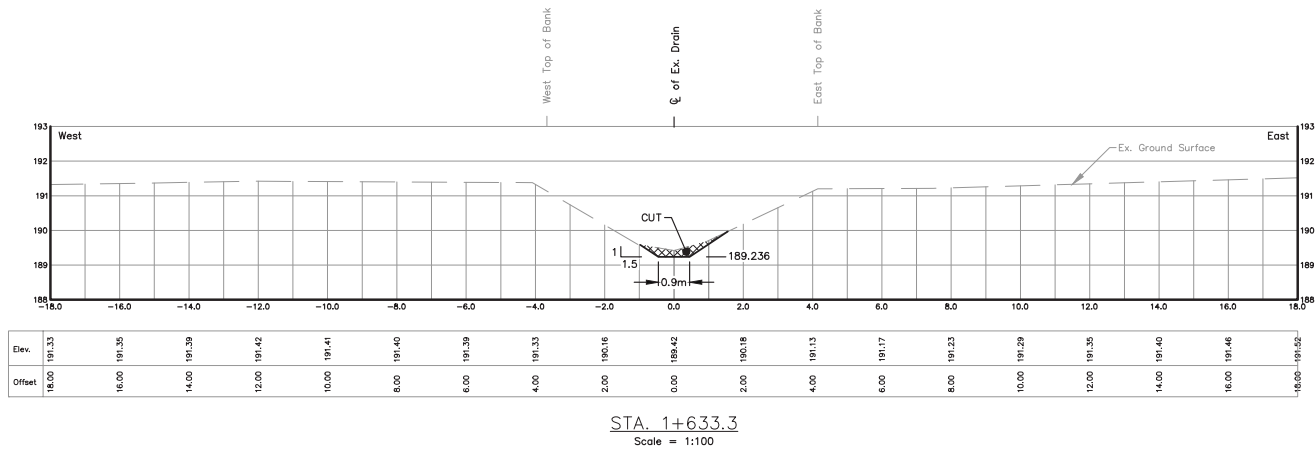
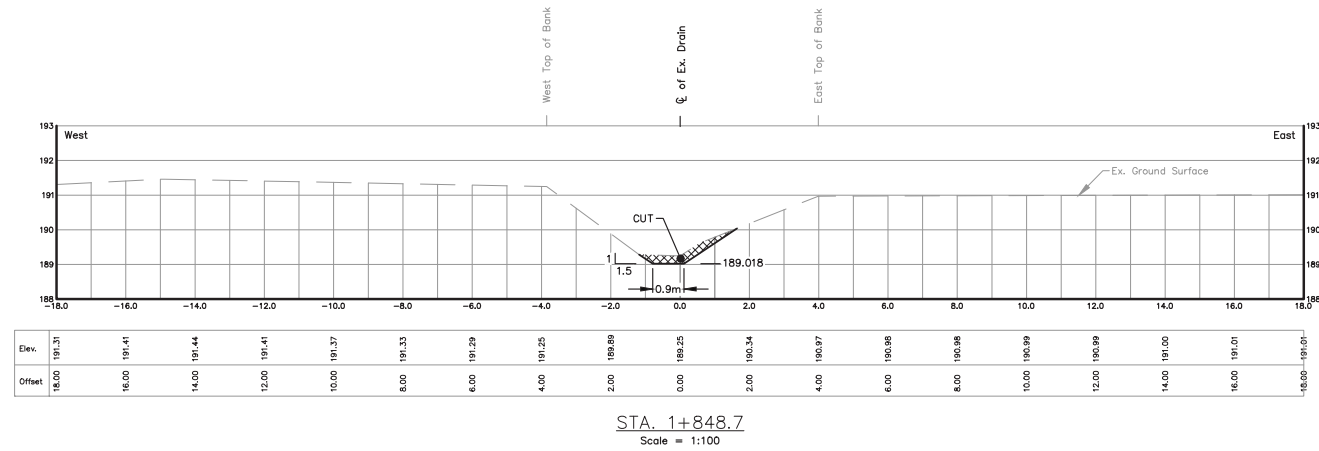
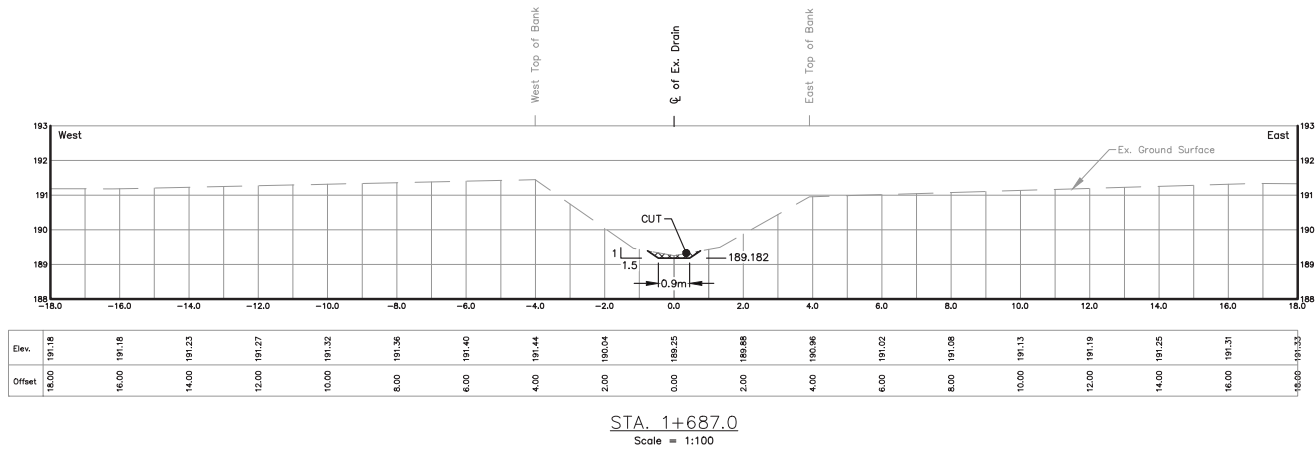


STA. 1+428.8
Scale = 1:100

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DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 12 OF 51

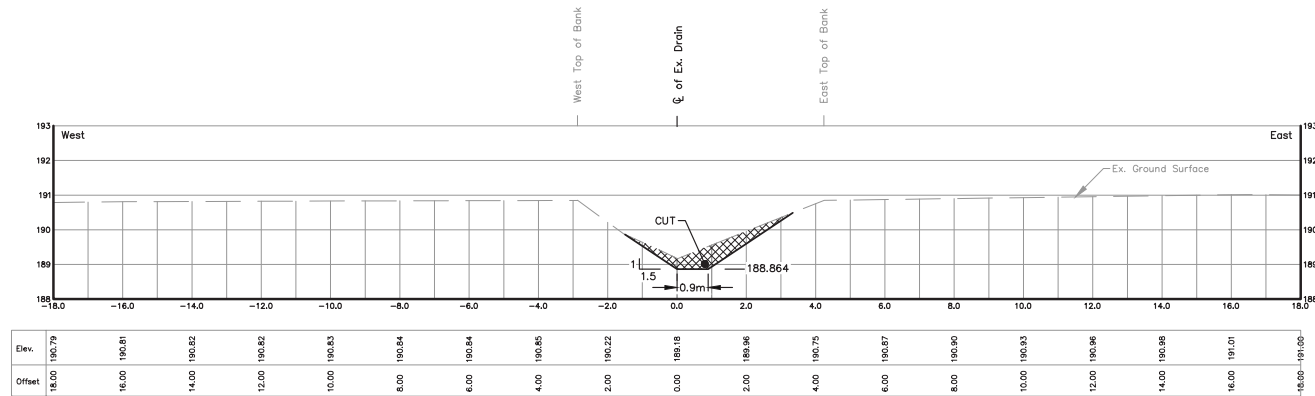
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



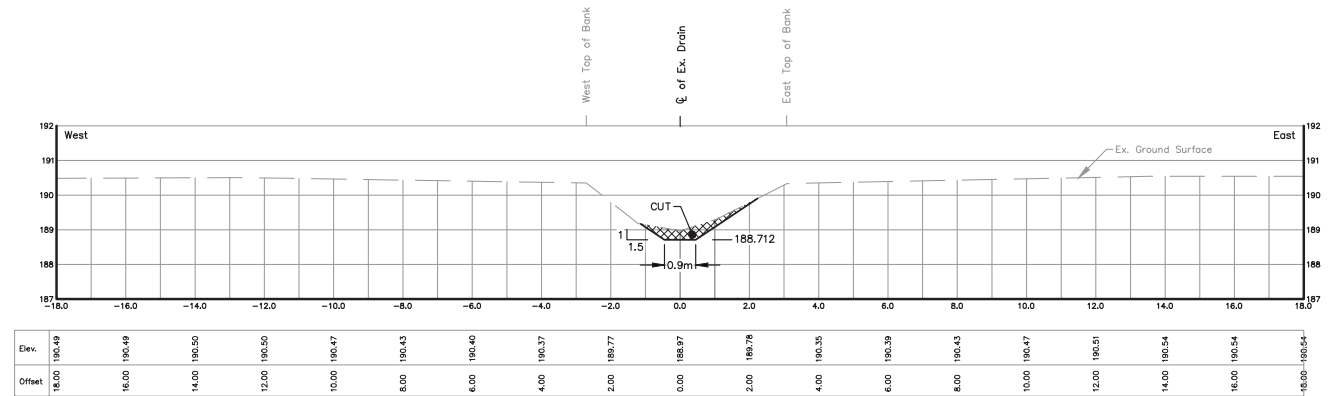
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DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 13 OF 51

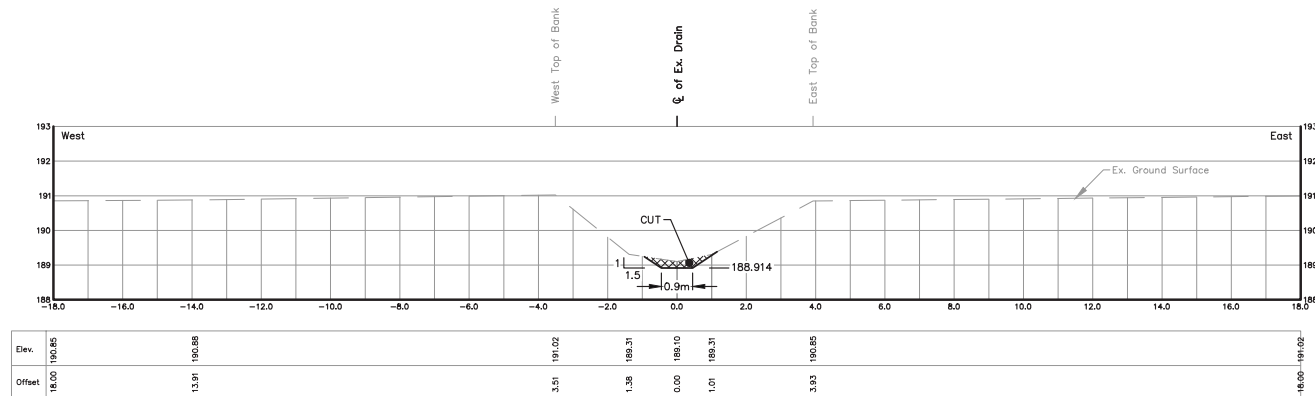
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections.dwg 2021-05-16



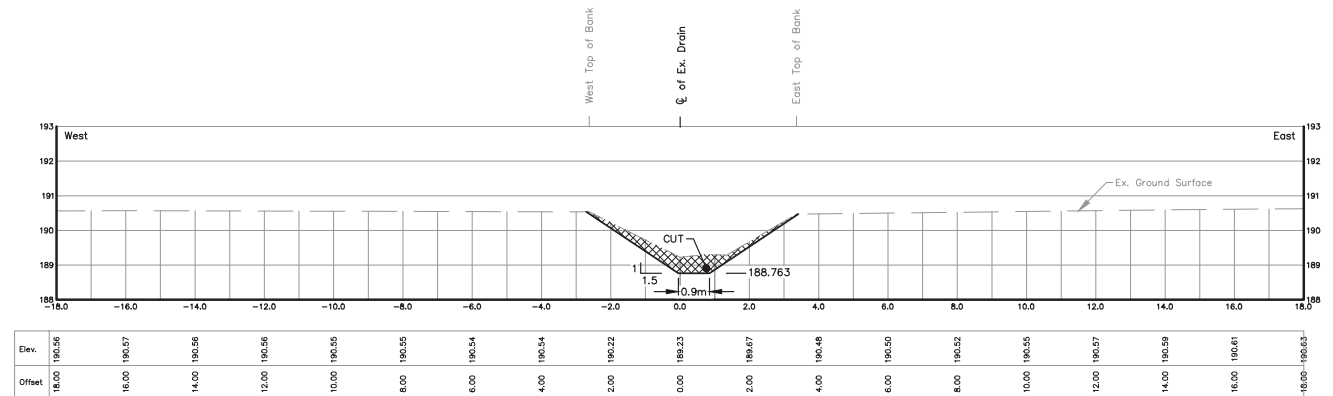
STA. 2+001.1
Scale = 1:100



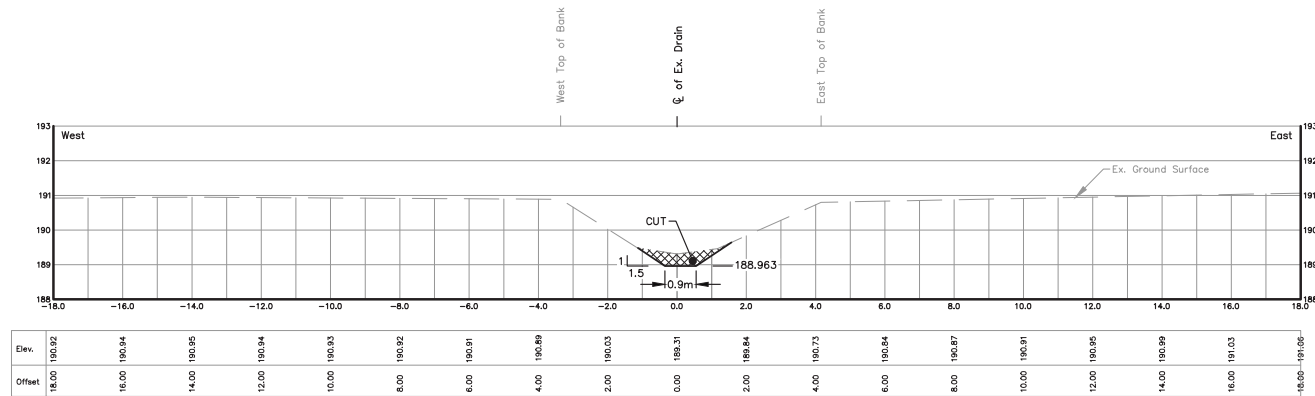
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Scale = 1:100



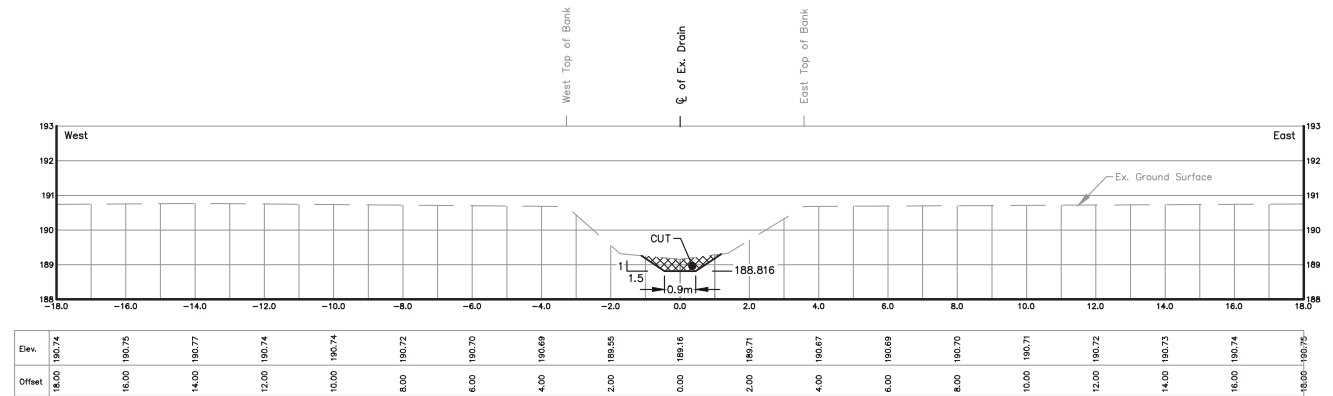
STA. 1+952.0
Scale = 1:100



STA. 2+100.5
Scale = 1:100



STA. 1+903.2
Scale = 1:100

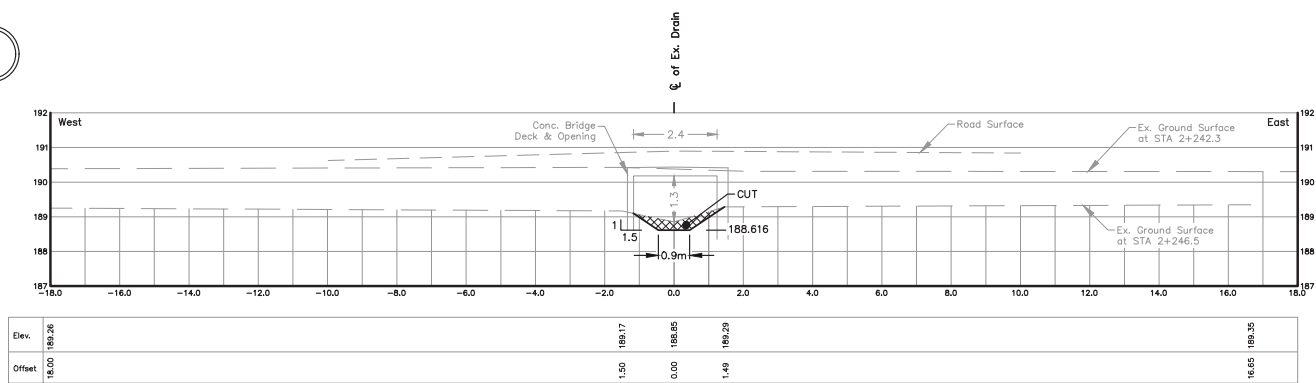


STA. 2+048.8
Scale = 1:100

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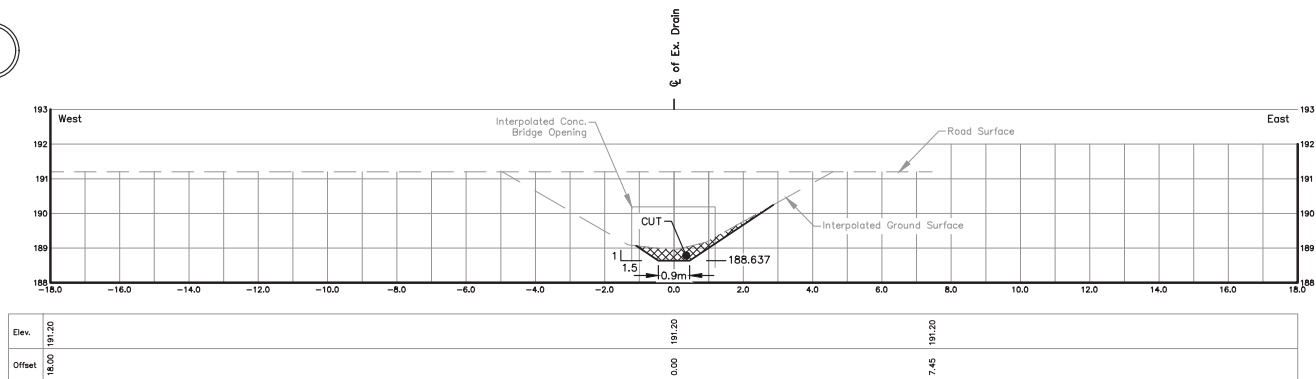
DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 14 OF 51

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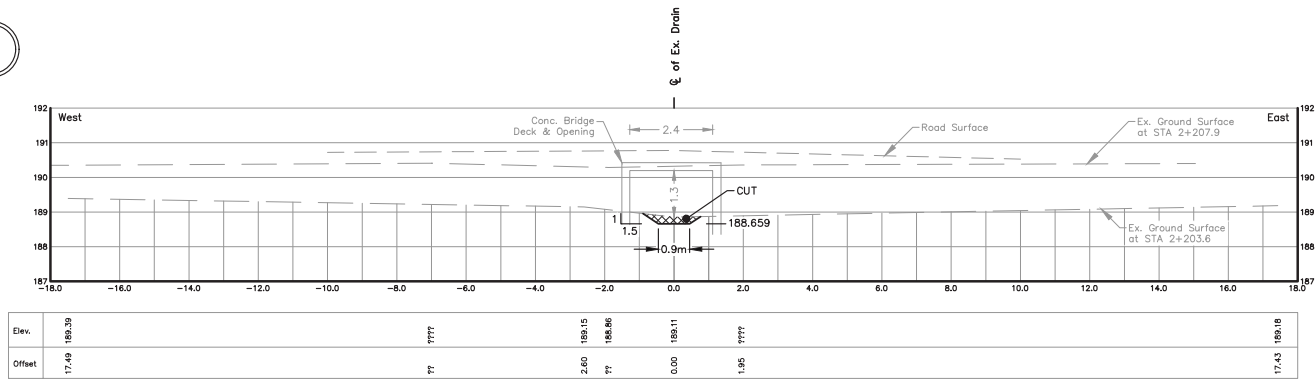
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Scale = 1:100

8

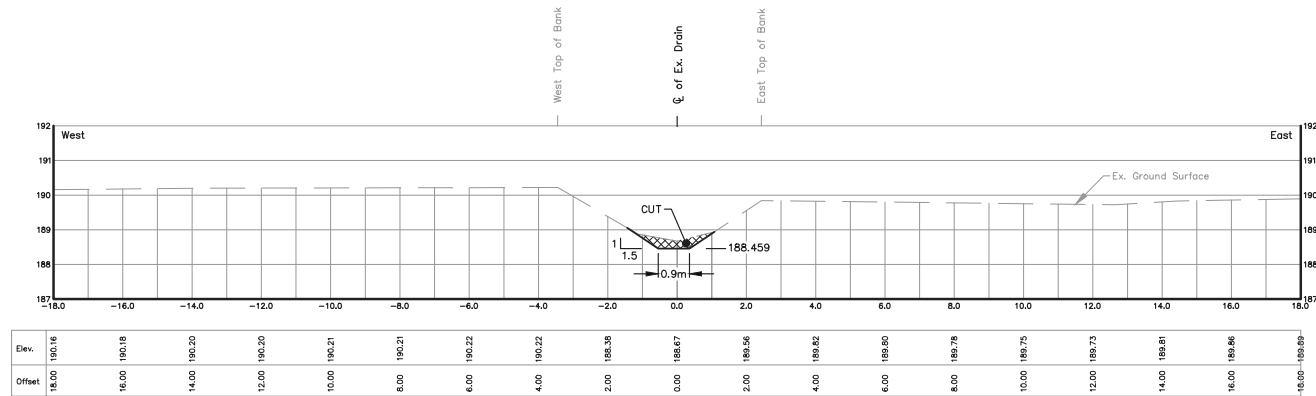


STA. 2+225.2
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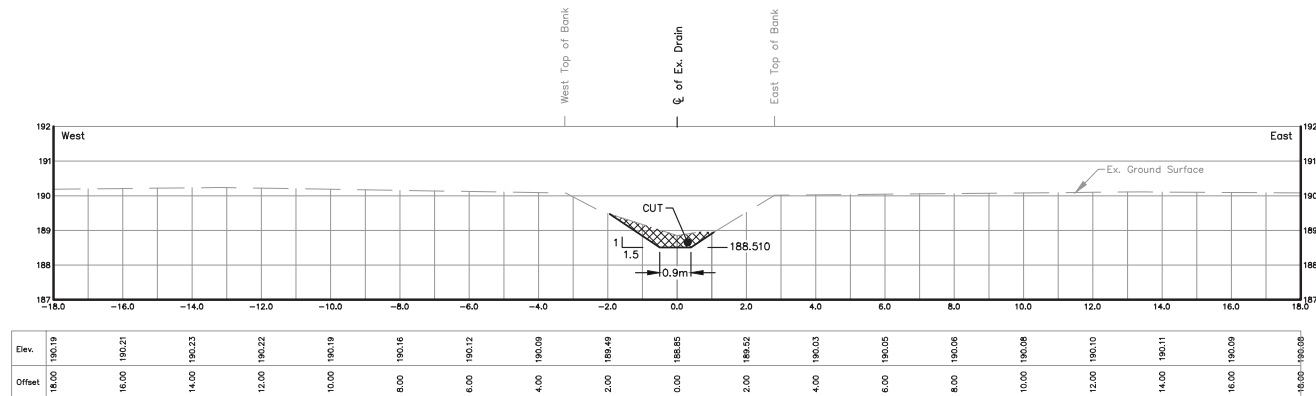
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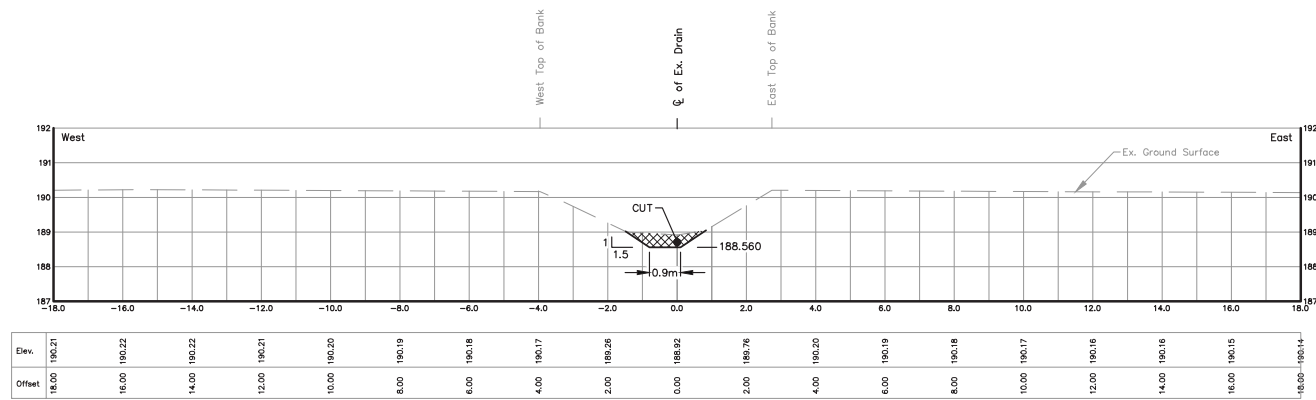
STA. 2+203.6
Scale = 1:100



STA. 2+401.4
Scale = 1:100



STA. 2+350.4
Scale = 1:100

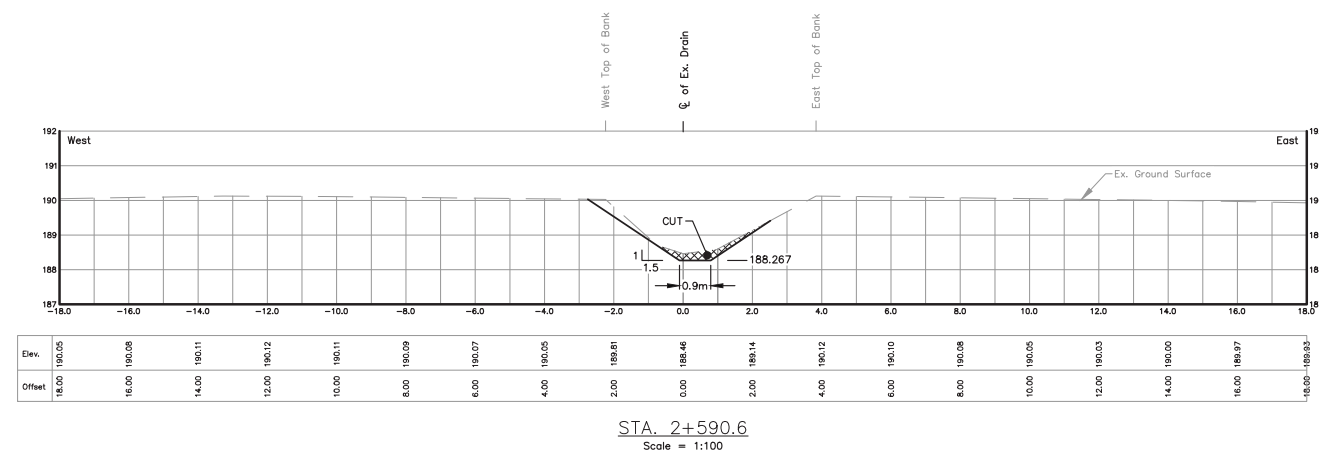
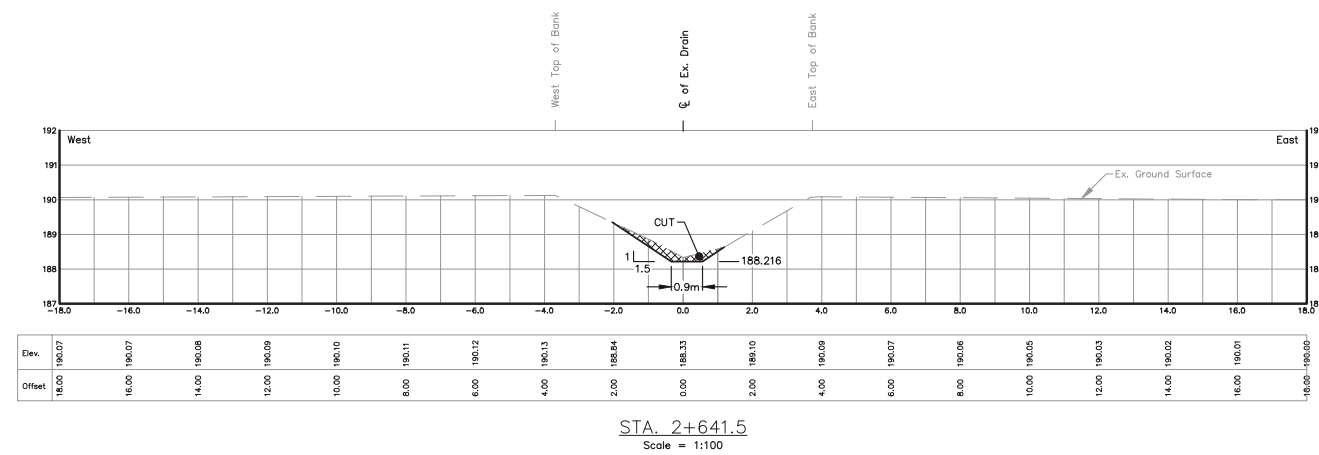
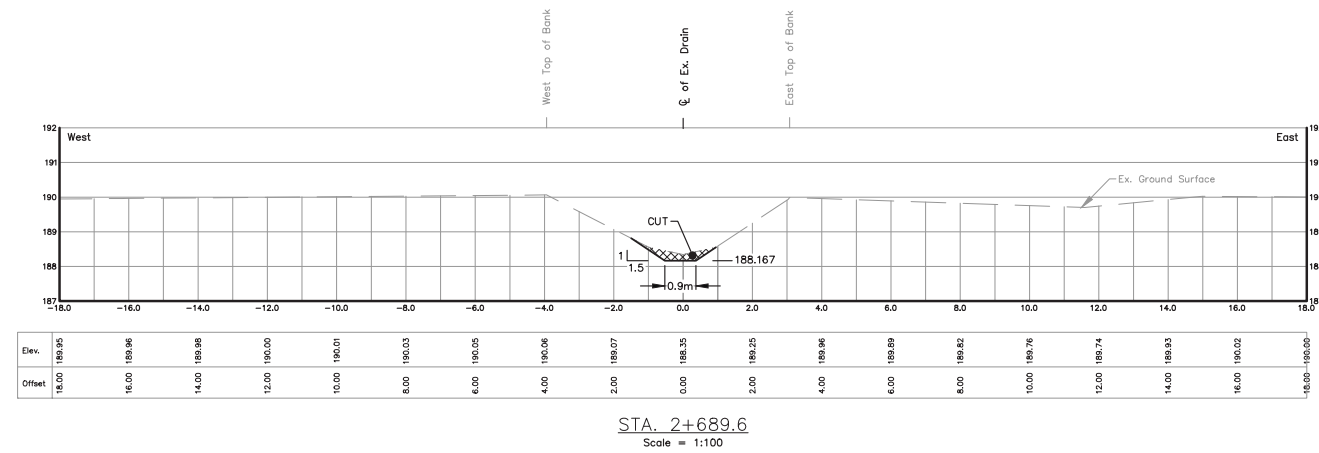


STA. 2+301.9
Scale = 1:100

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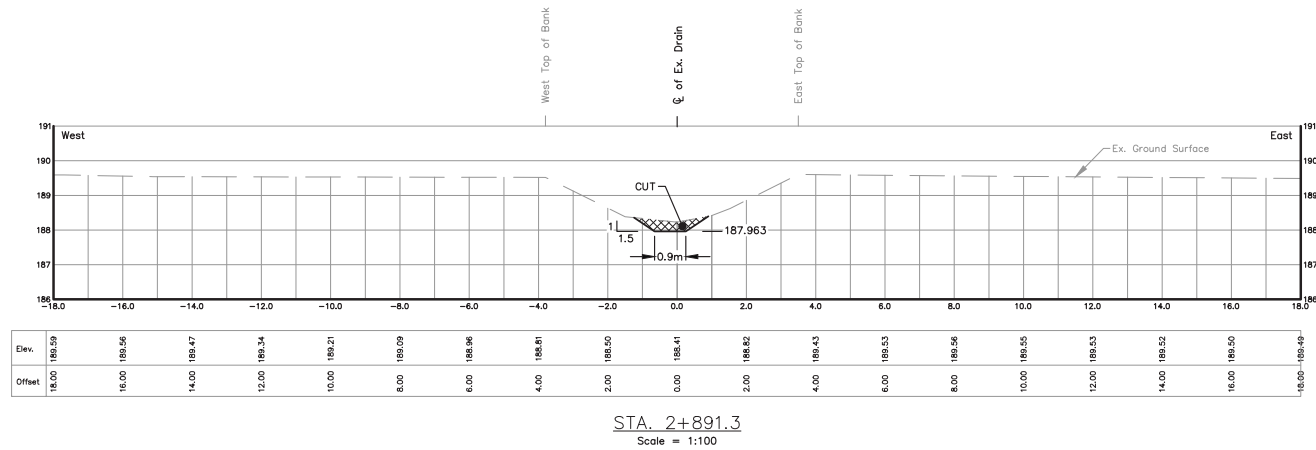
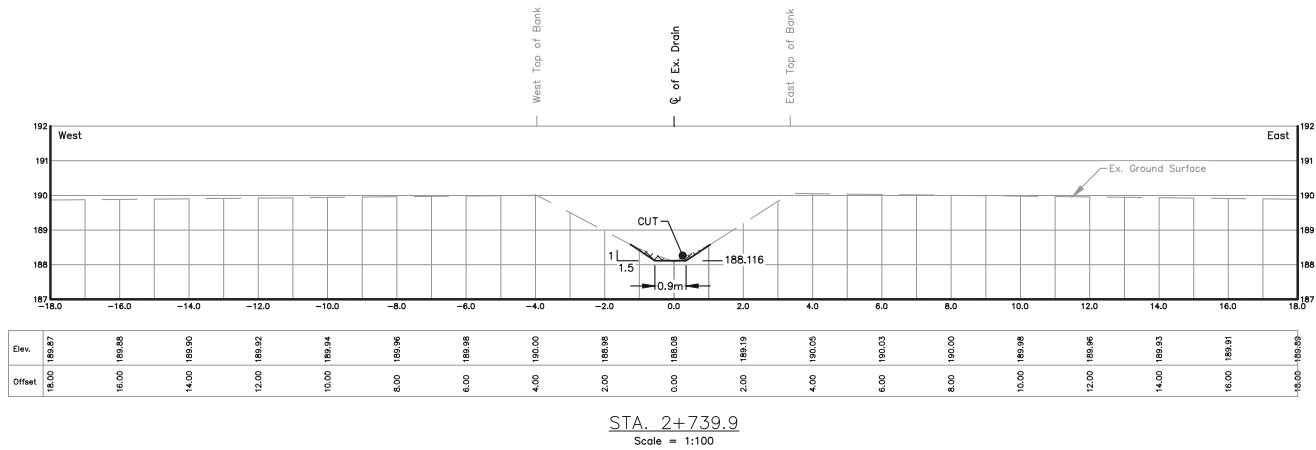
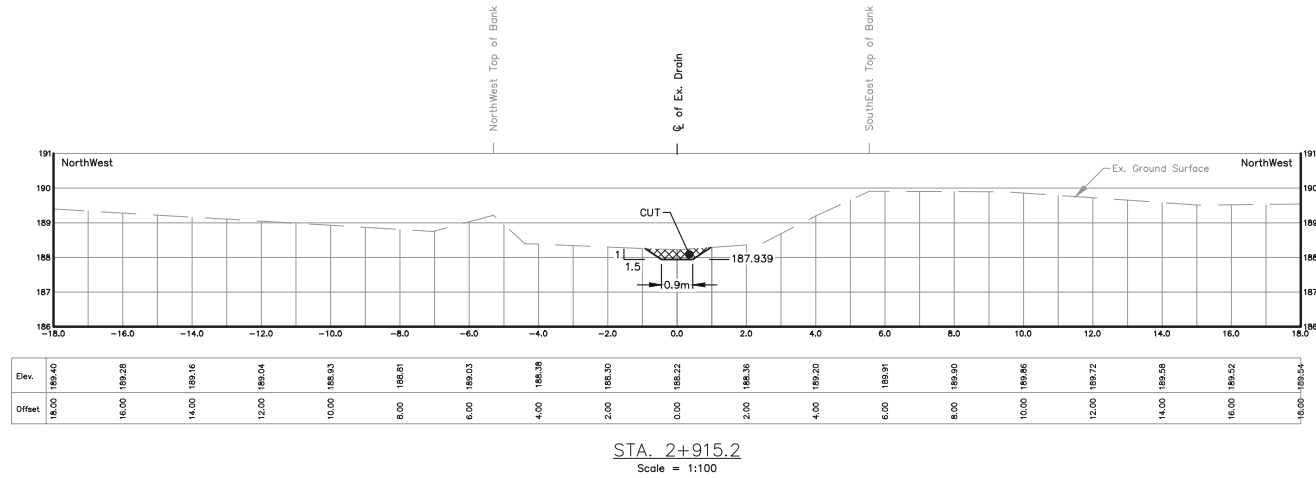
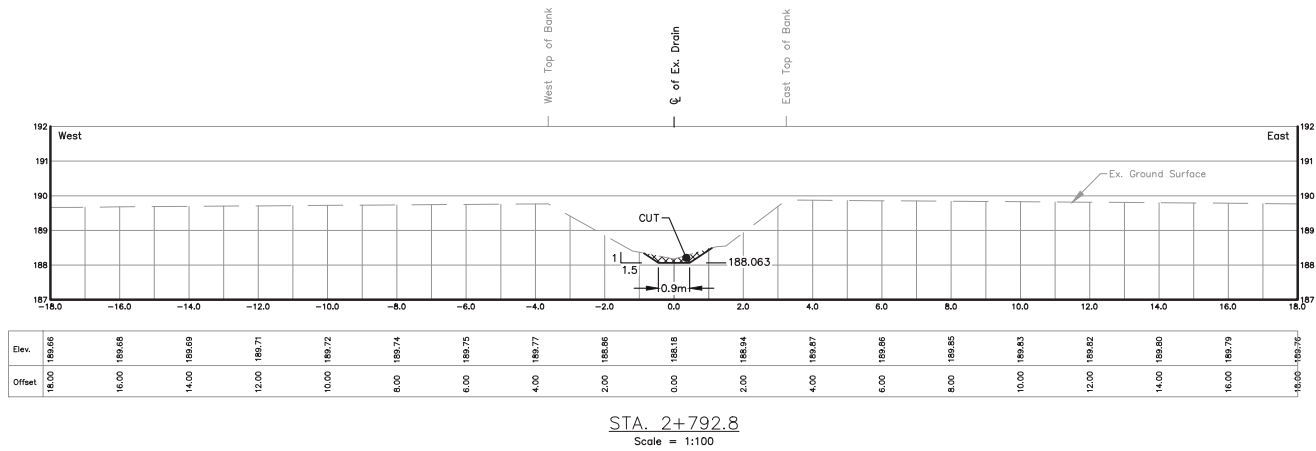
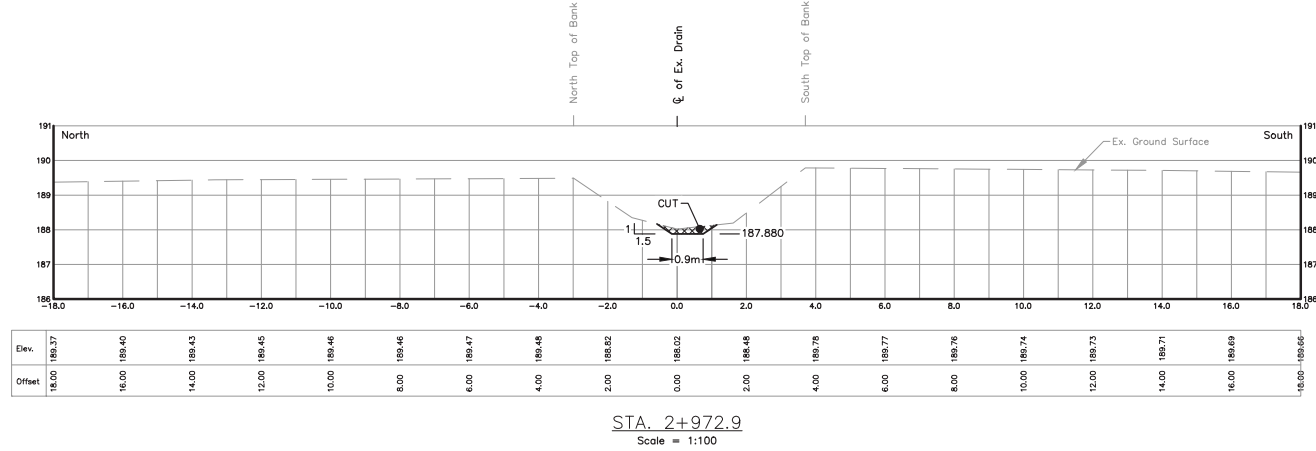
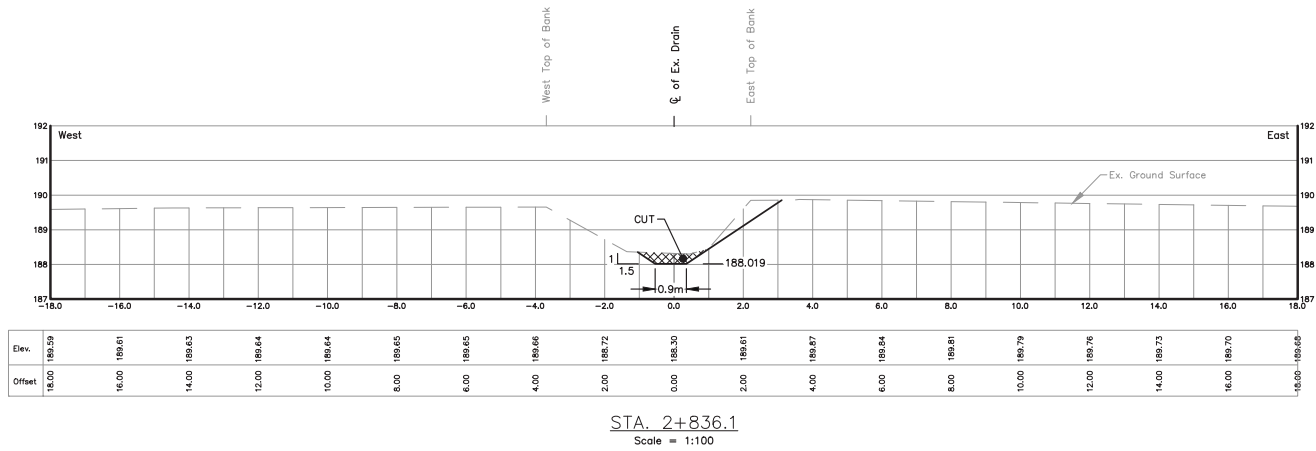
DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG

FILE No.: SHEET No.:
2015D010 15 OF 51



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PLOT CODE: 1:1	
COMPUTER FILE: REI2015D010.DWG	
FILE No.:	SHEET No.:
2015D010	16 OF 51

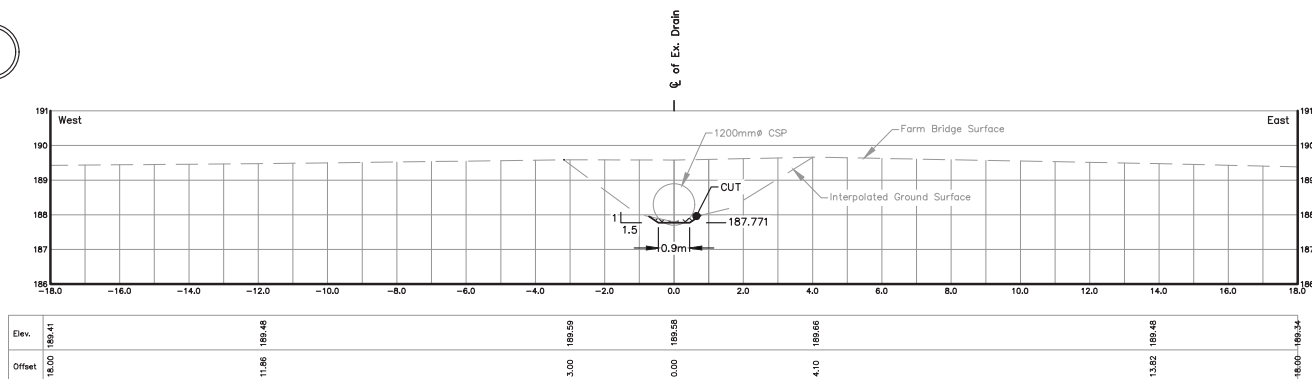
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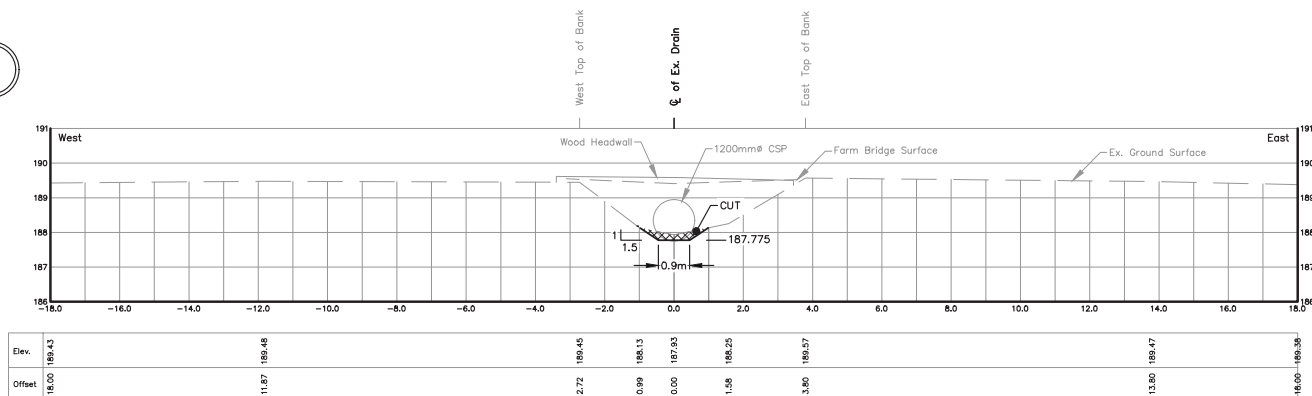
DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 17 OF 51

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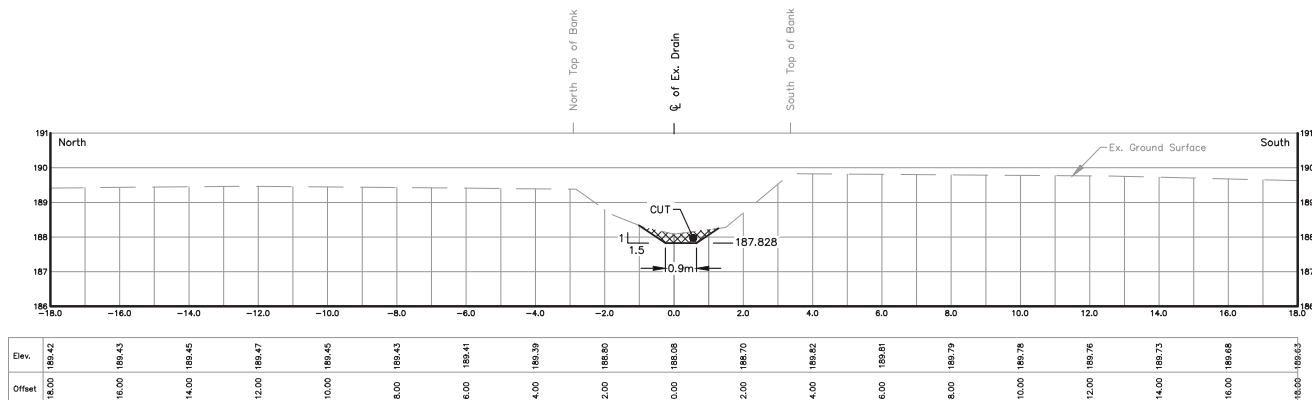


STA. 3+081.2
Scale = 1:100

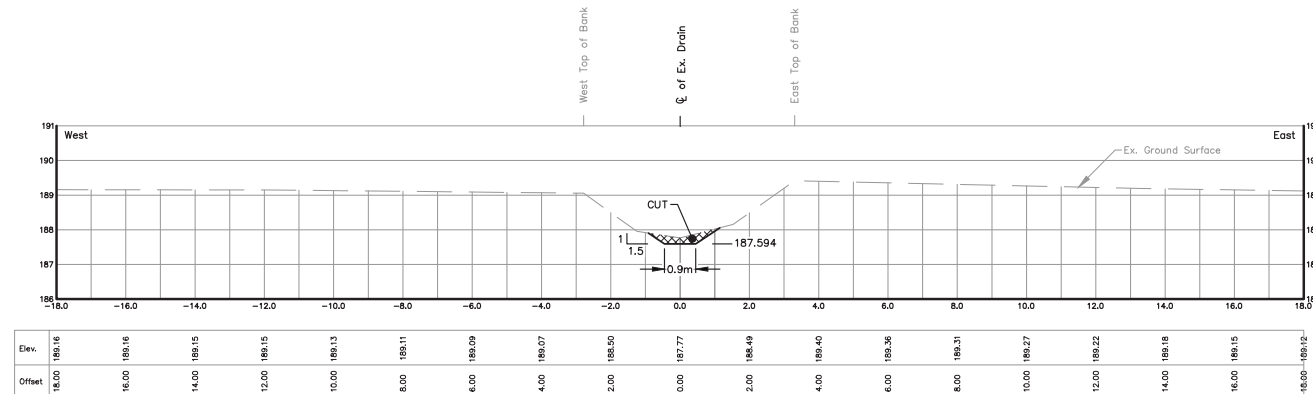
9



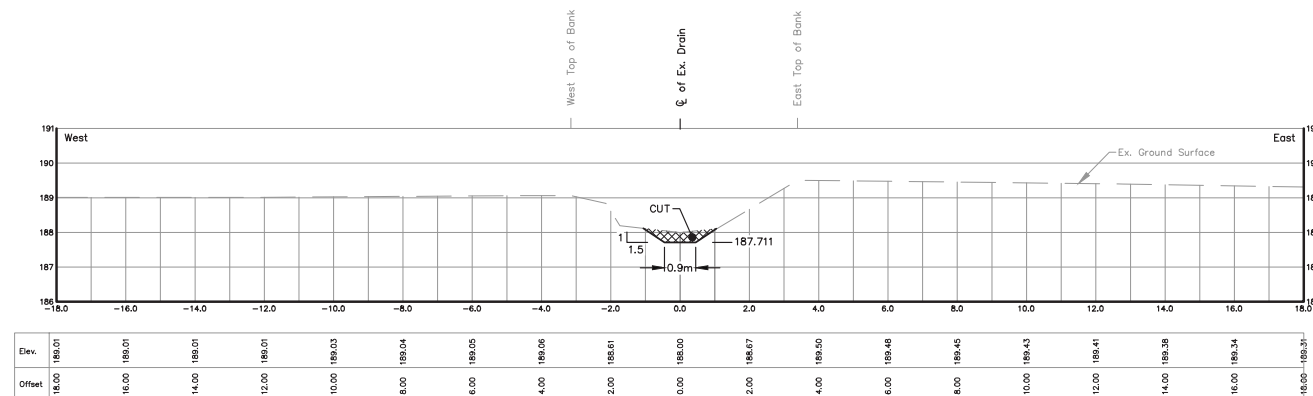
STA. 3+077.4
Scale = 1:100



STA. 3+024.4
Scale = 1:100

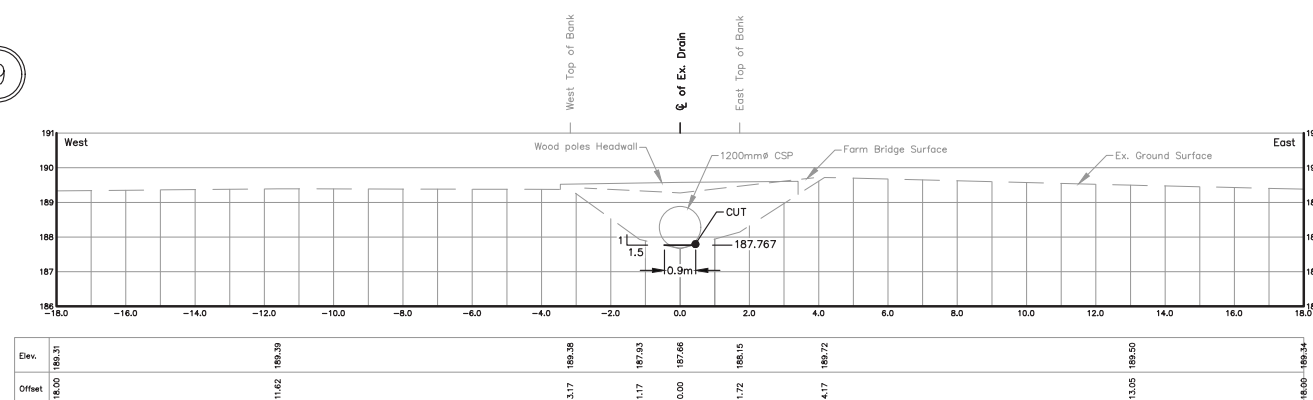


STA. 3+159.6
Scale = 1:100



STA. 3+111.0
Scale = 1:100

9

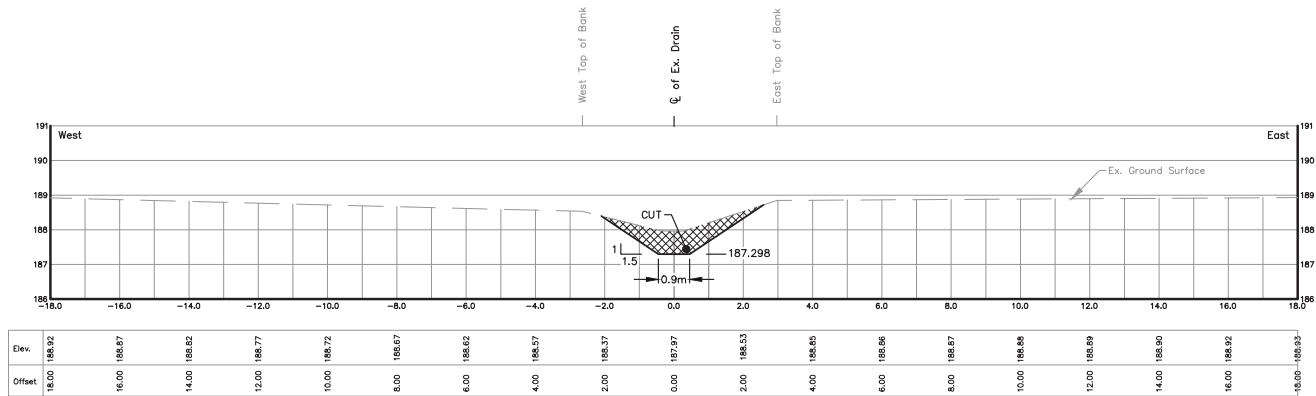


STA. 3+085.0
Scale = 1:100

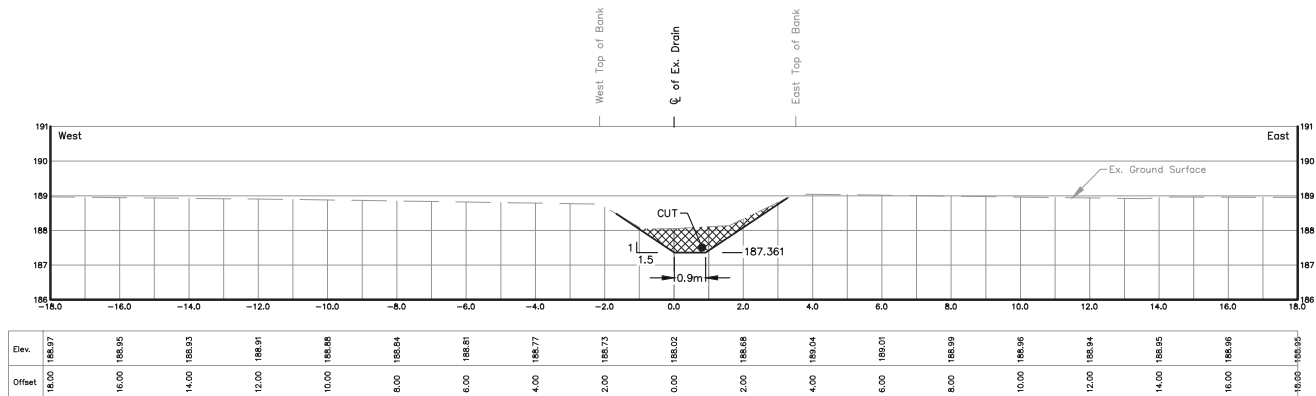
THESE PLANS HAVE BEEN REDUCED
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DRAWN BY: G.S. & S.H.
PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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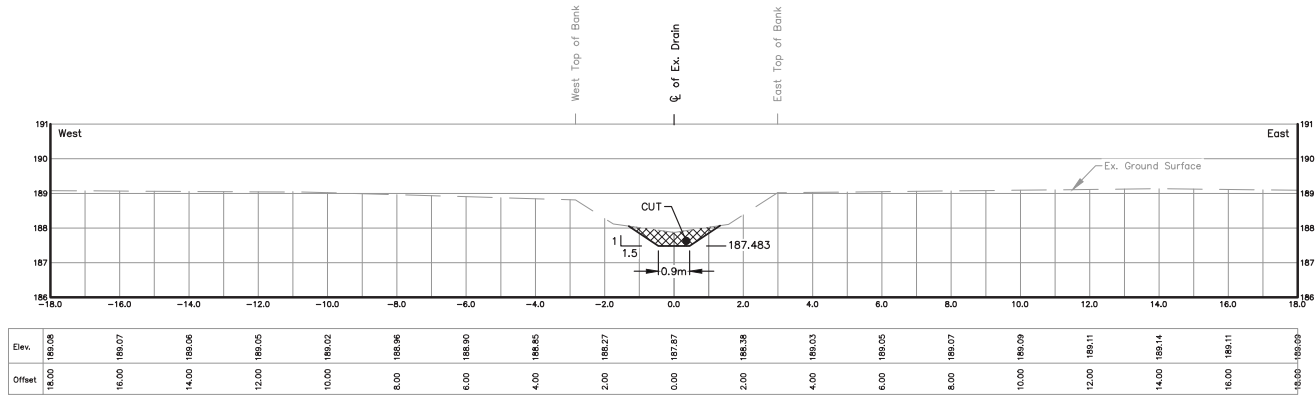
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections A.dwg 2021-05-16



STA. 3+281.7
Scale = 1:100

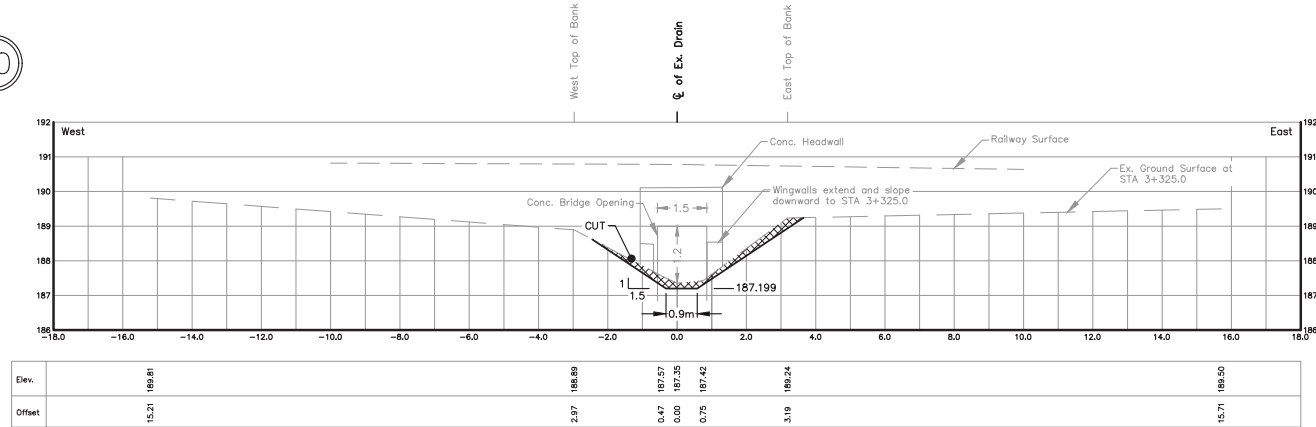


STA. 3+255.5
Scale = 1:100



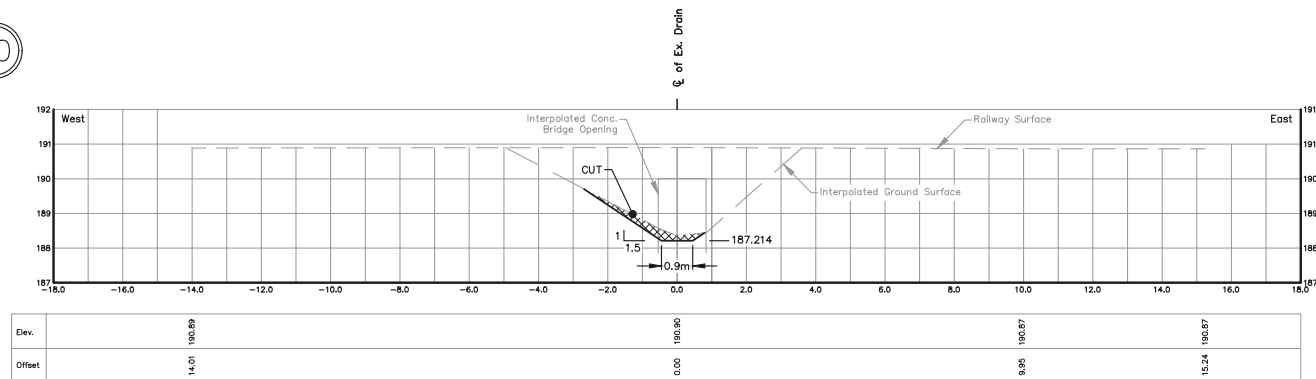
STA. 3+205.2
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10



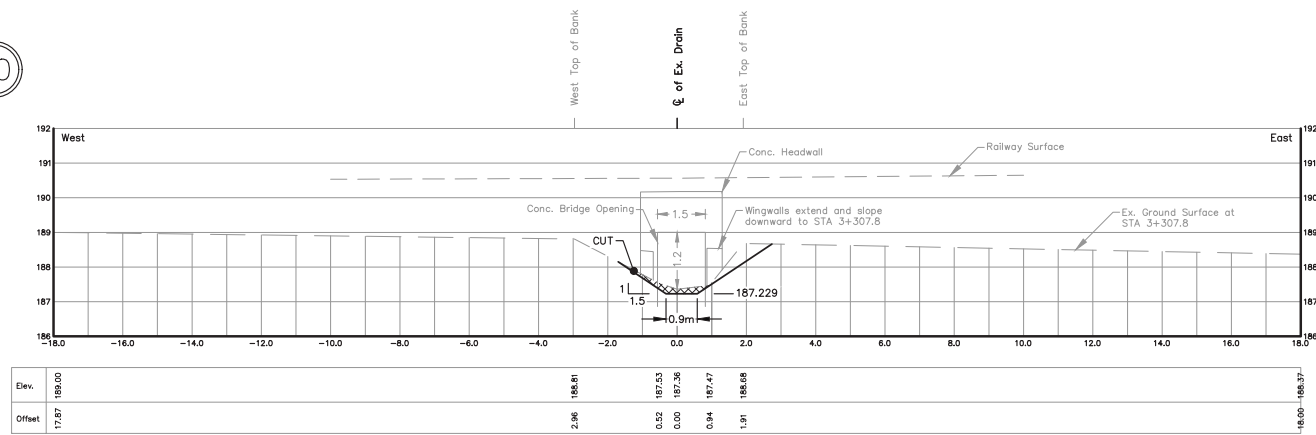
STA. 3+322.7
Scale = 1:100

10



STA. 3+316.4
Scale = 1:100

10

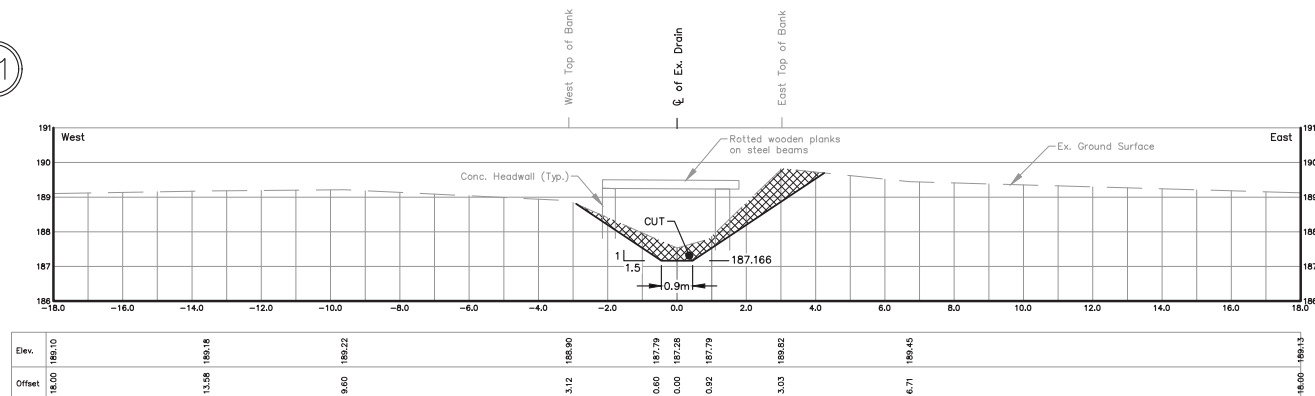


STA. 3+310.0
Scale = 1:100

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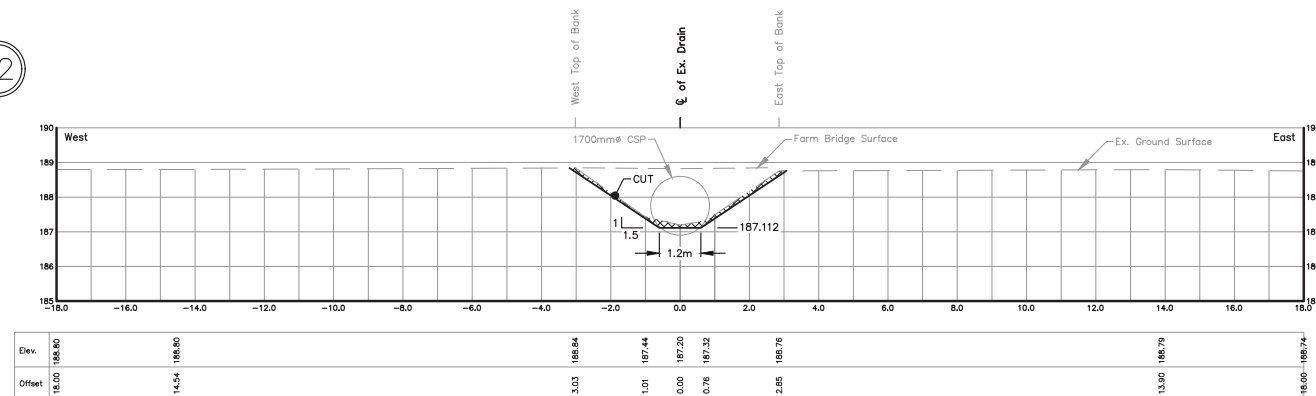
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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11



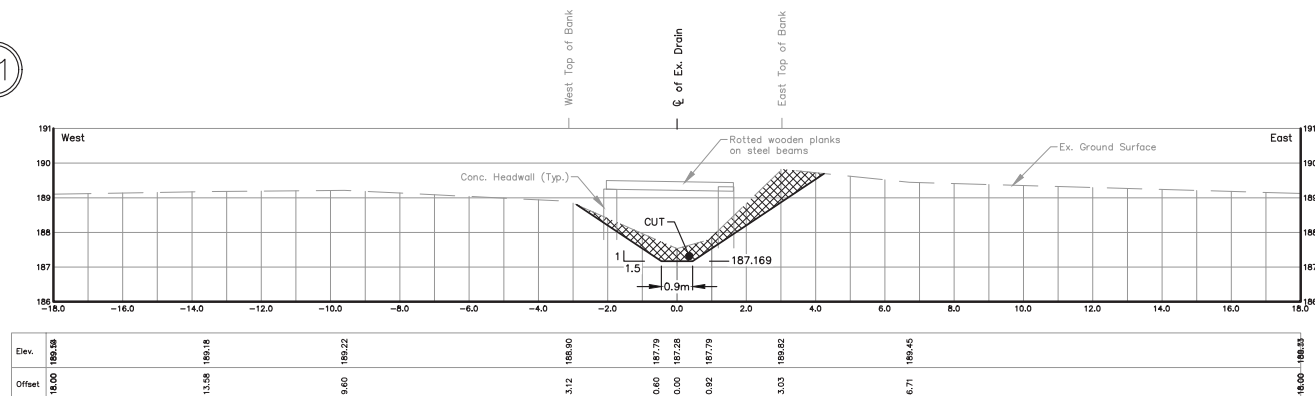
STA. 3+336.0
Scale = 1:100

12



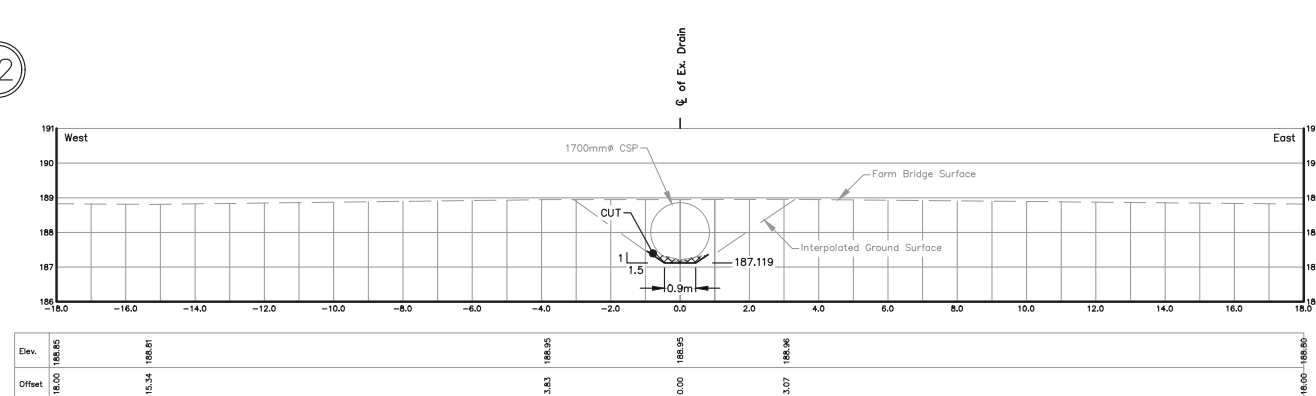
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11



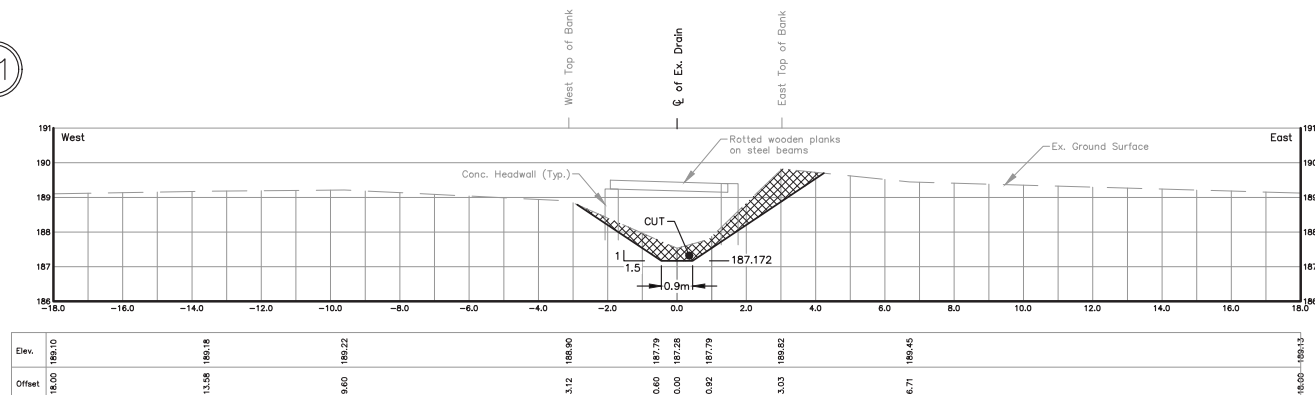
STA. 3+334.9
Scale = 1:100

12



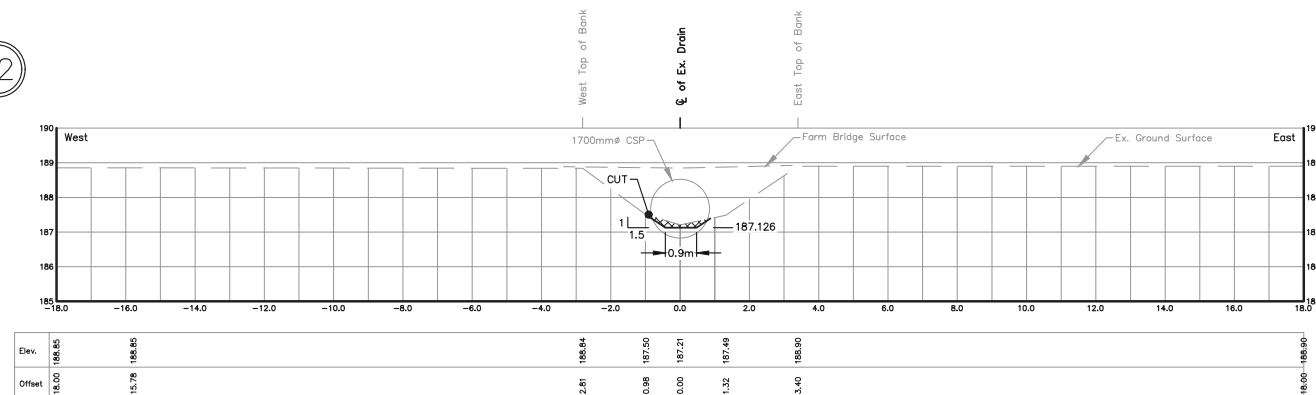
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Scale = 1:100

11



STA. 3+333.7
Scale = 1:100

12

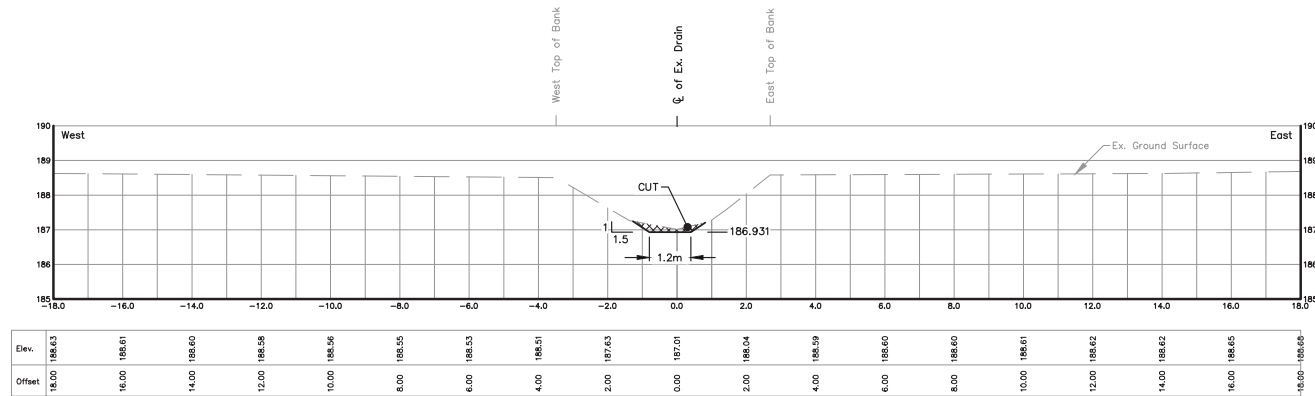


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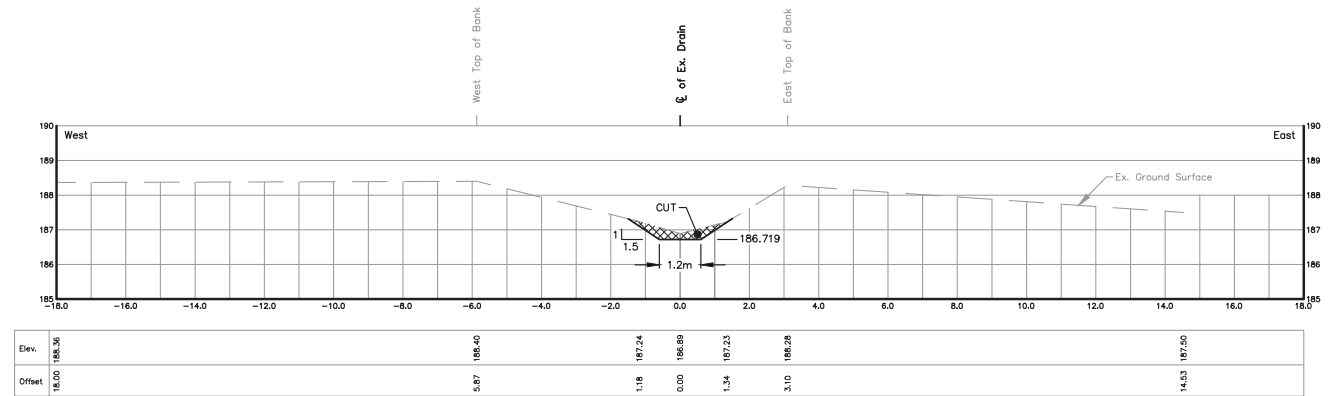
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 20 OF 51

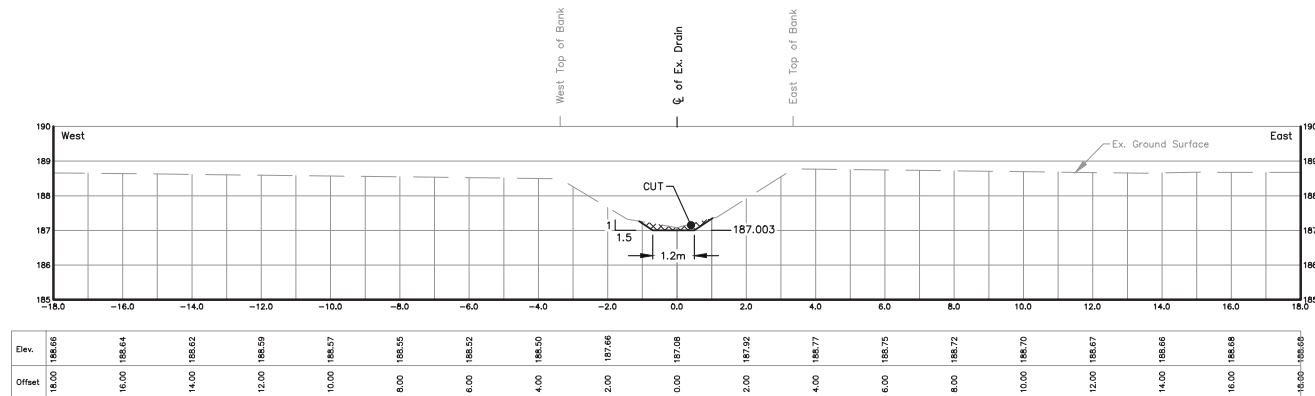
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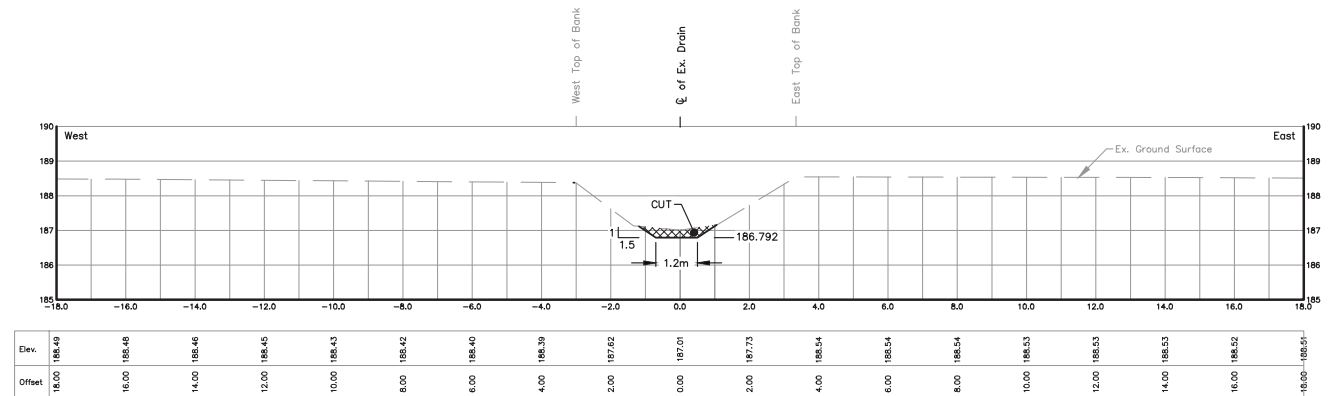
STA. 3+492.6
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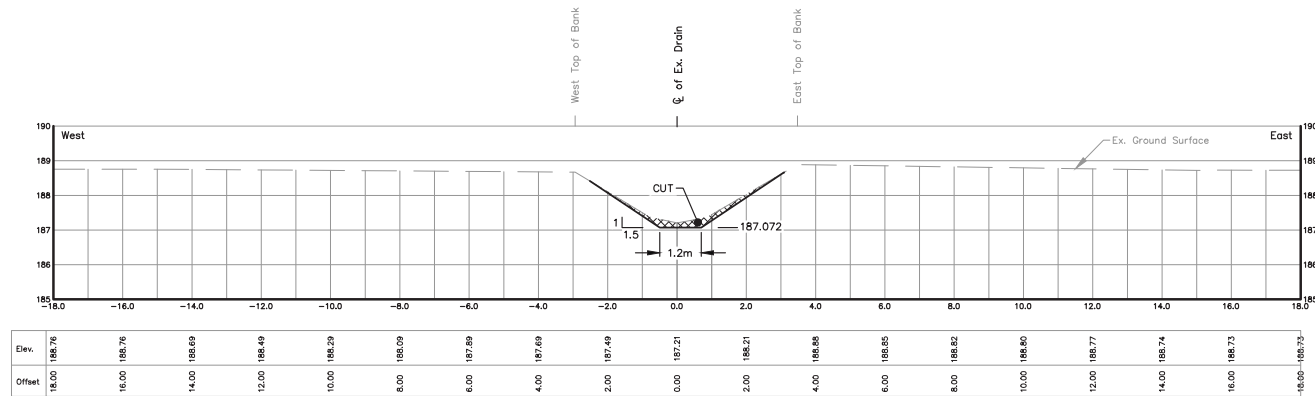
STA. 3+655.6
Scale = 1:100



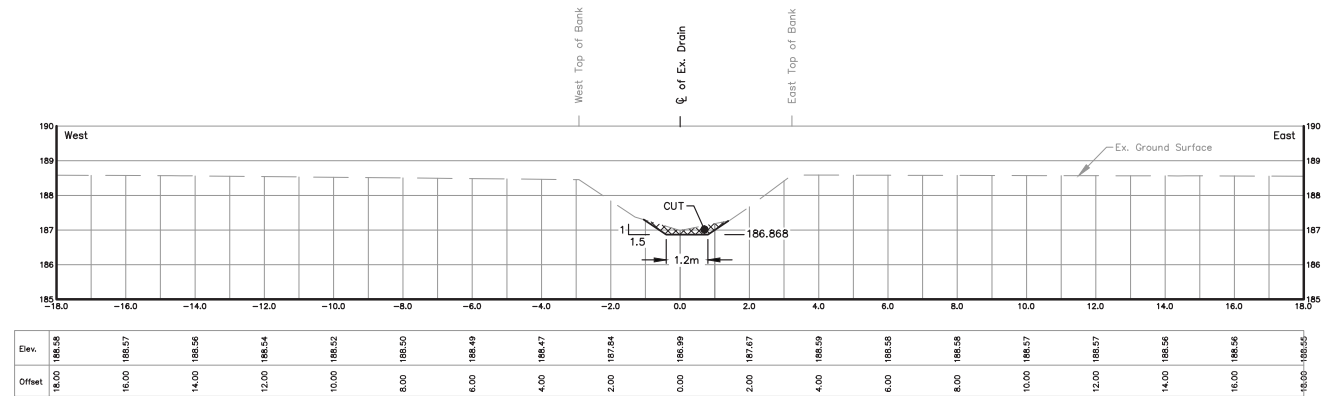
STA. 3+436.9
Scale = 1:100



STA. 3+599.6
Scale = 1:100



STA. 3+384.2
Scale = 1:100

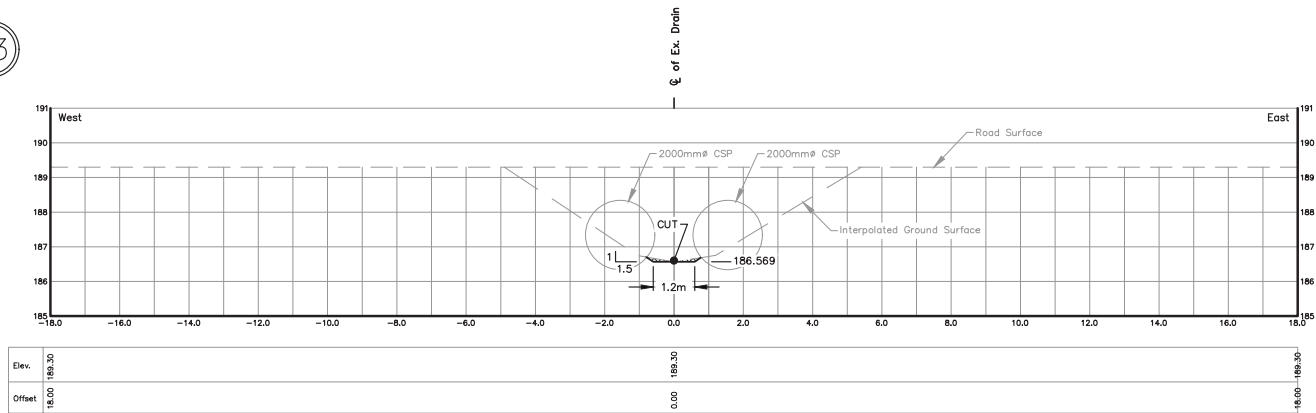


STA. 3+541.3
Scale = 1:100

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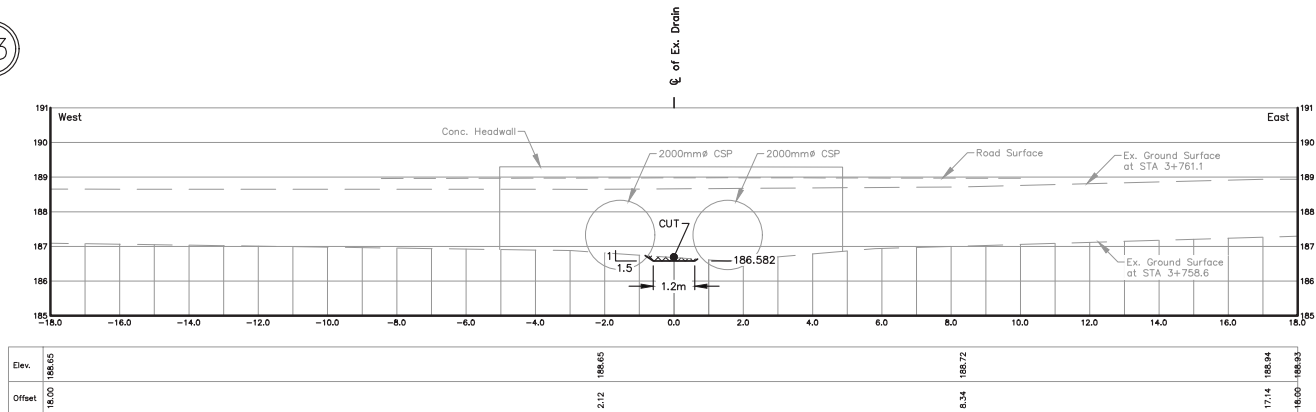
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 21 OF 51

13

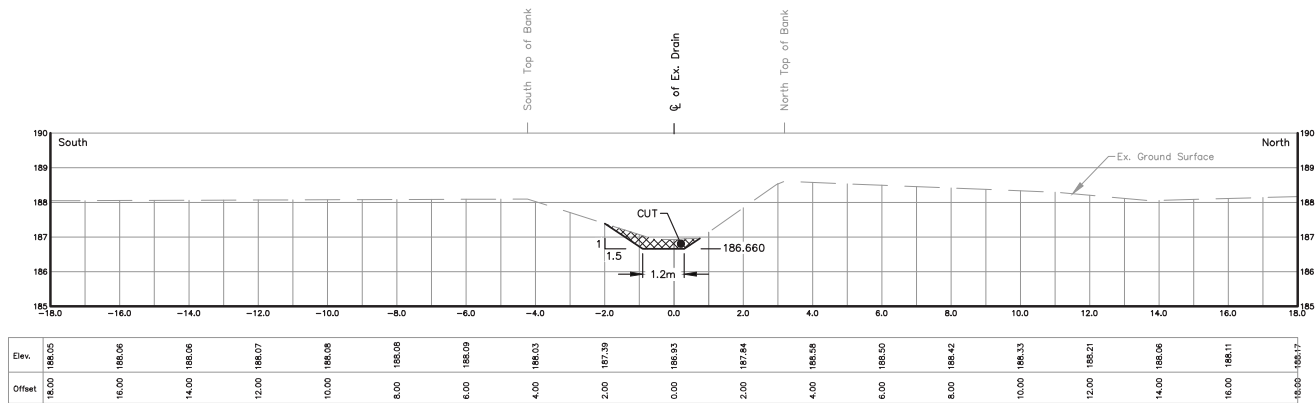


STA. 3+771.1
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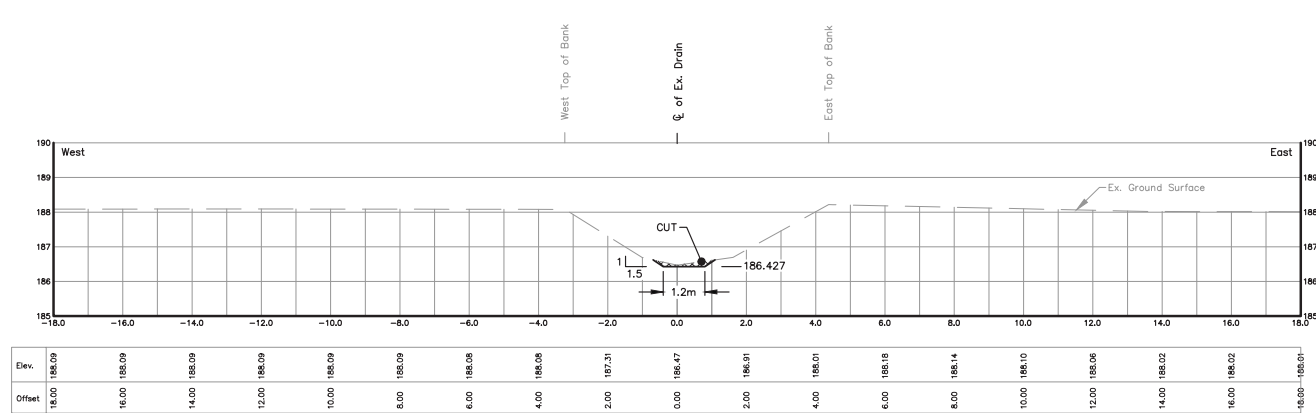
13



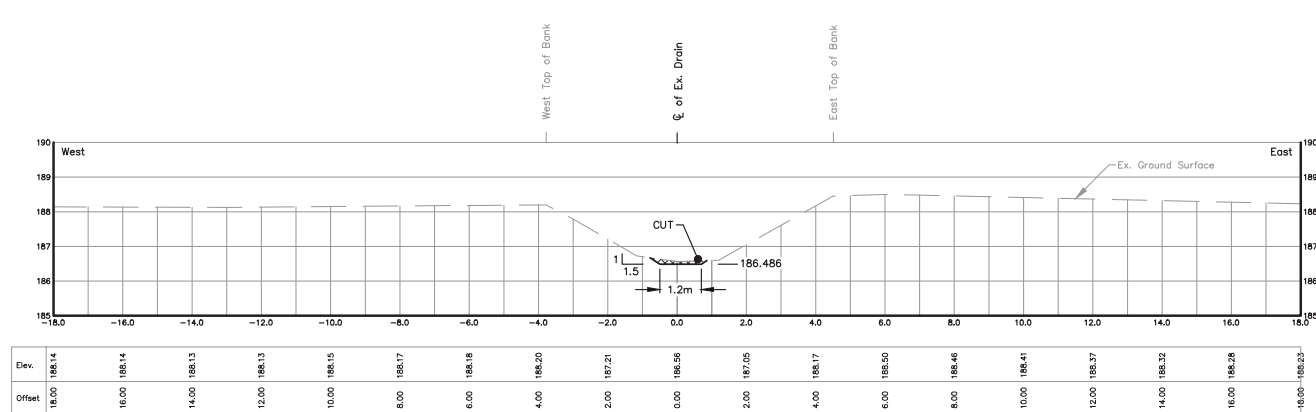
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STA. 3+700.8
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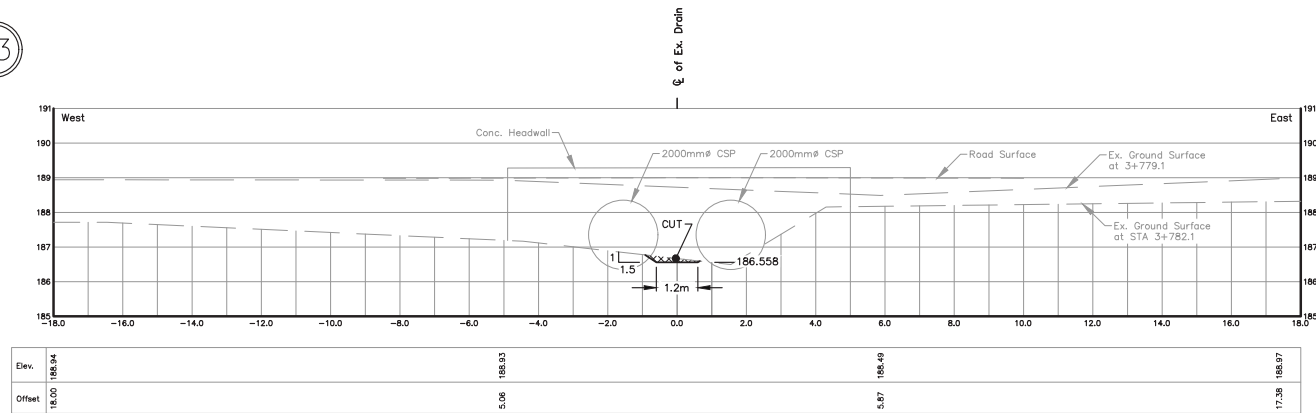


STA. 3+879.9
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STA. 3+835.2
Scale = 1:100

13

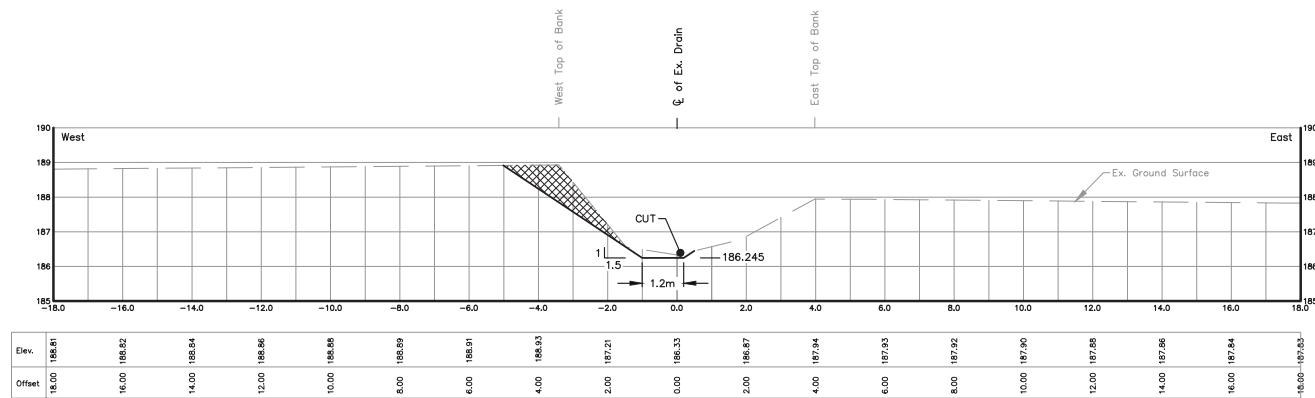


STA. 3+779.1
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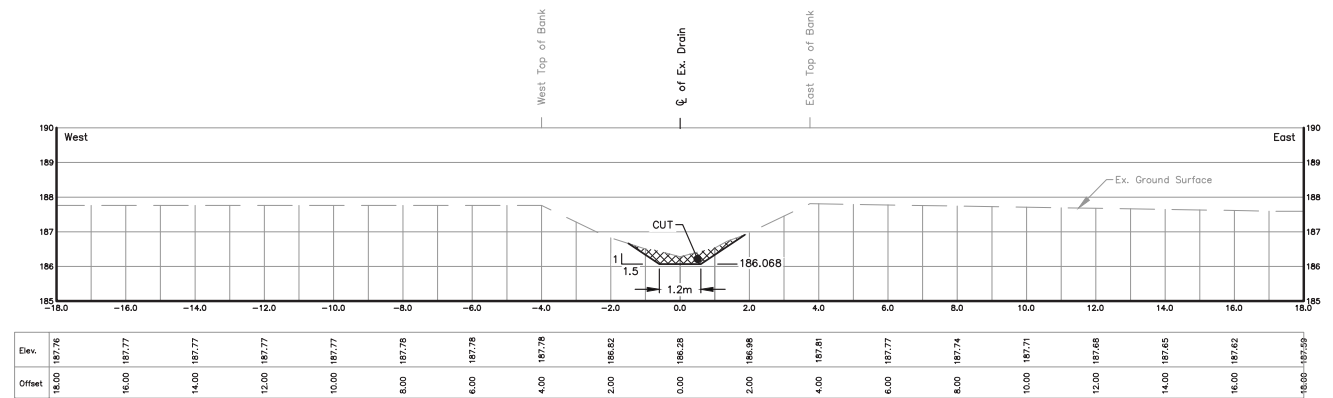
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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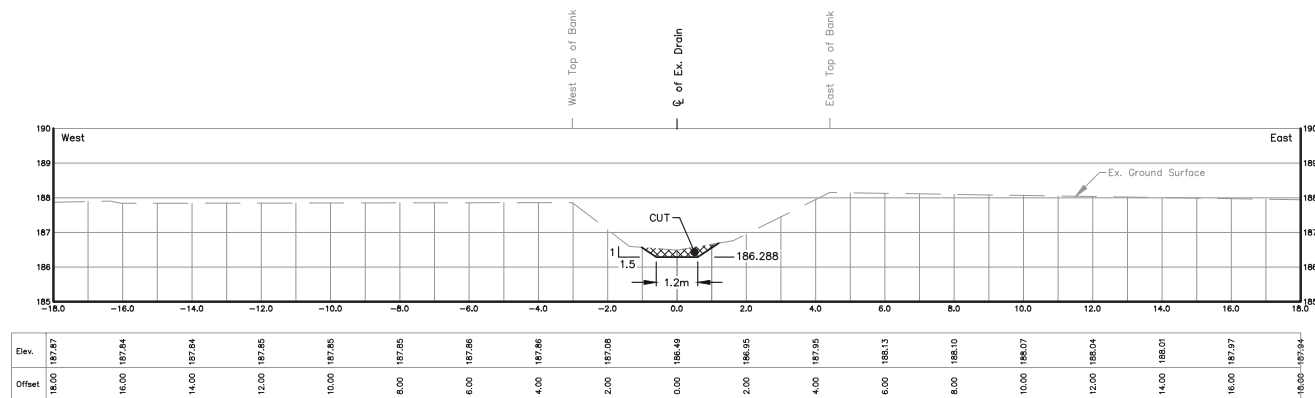
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections Aug 2021-05-16



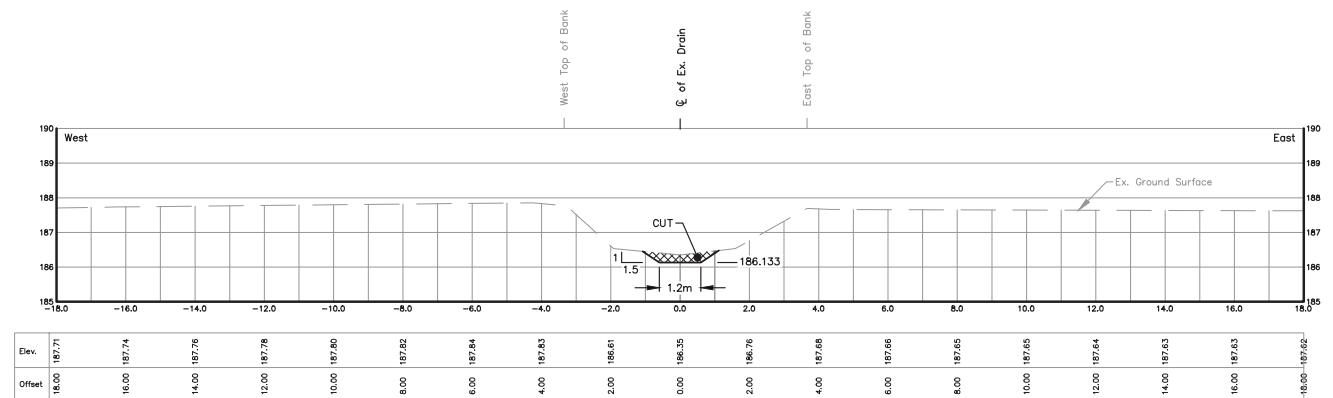
STA. 4+020.2
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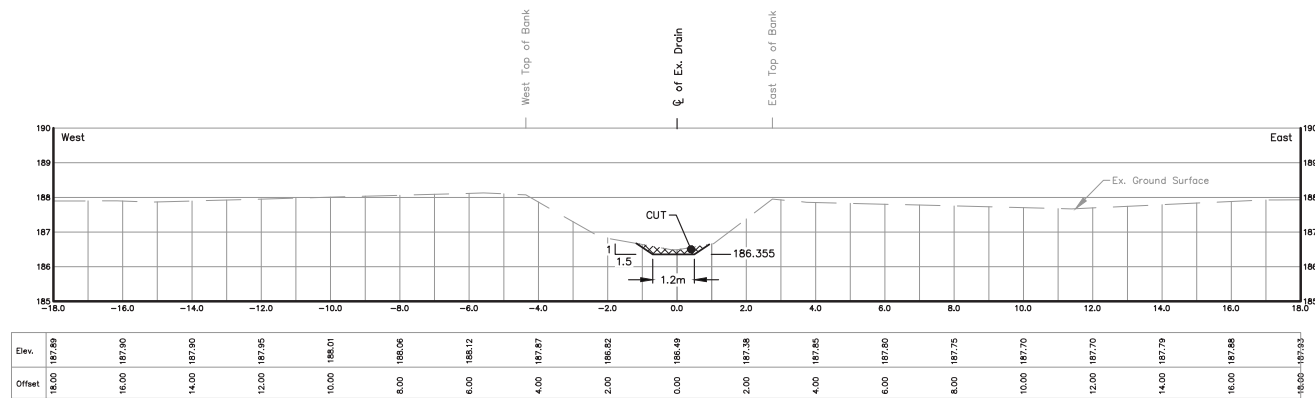
STA. 4+156.3
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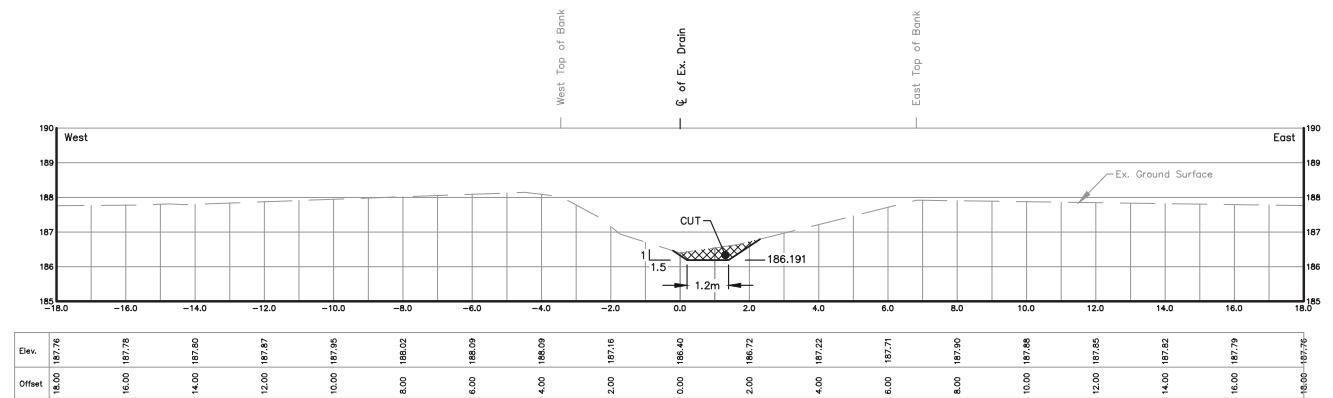
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STA. 4+106.0
Scale = 1:100



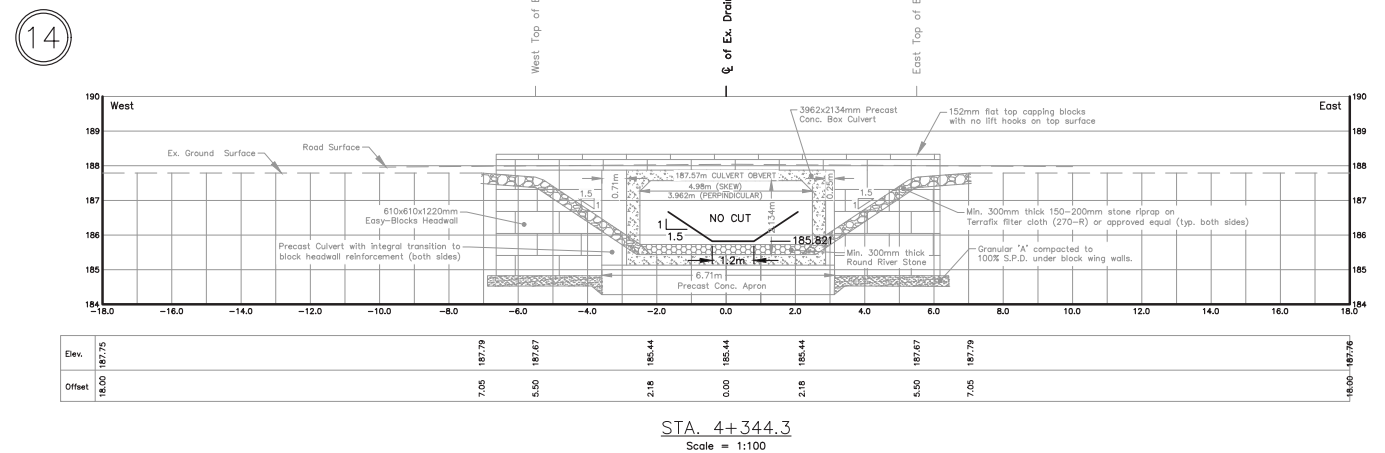
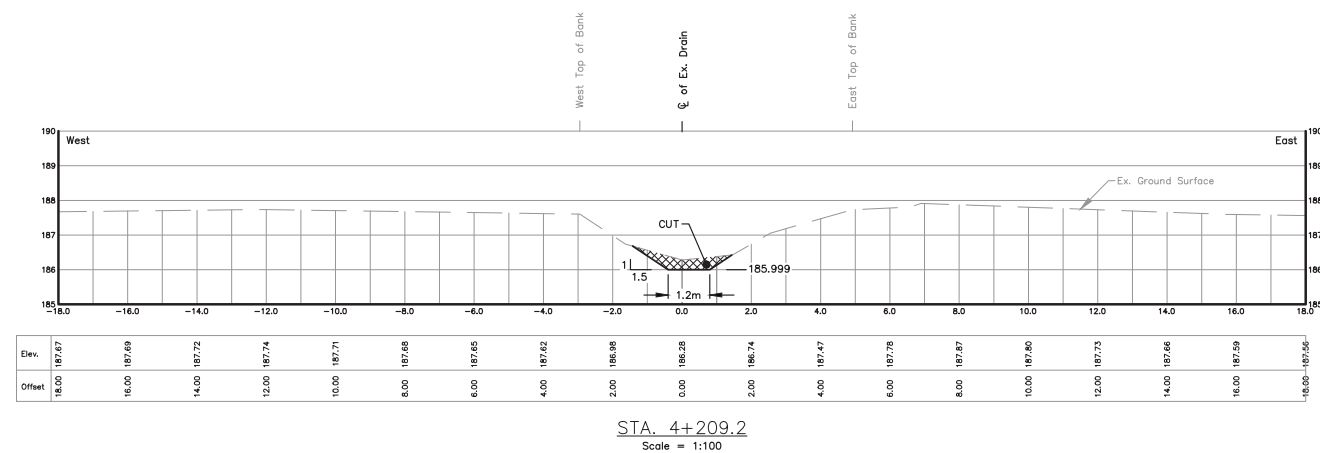
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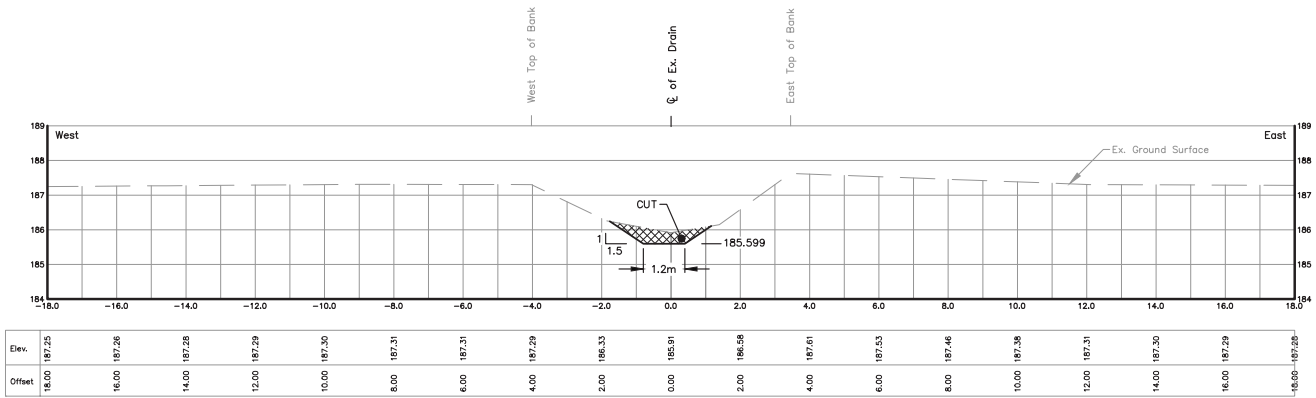


STA. 4+061.5
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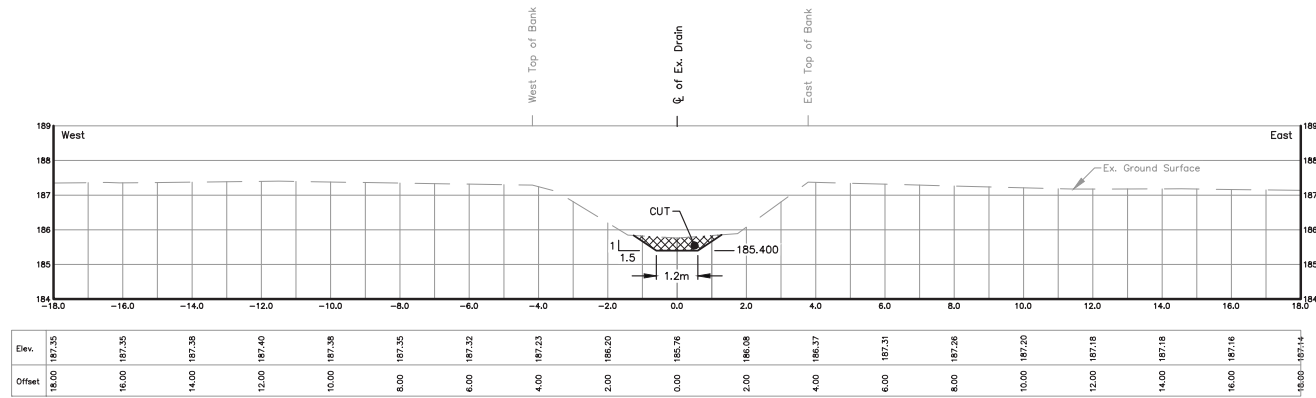
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 23 OF 51

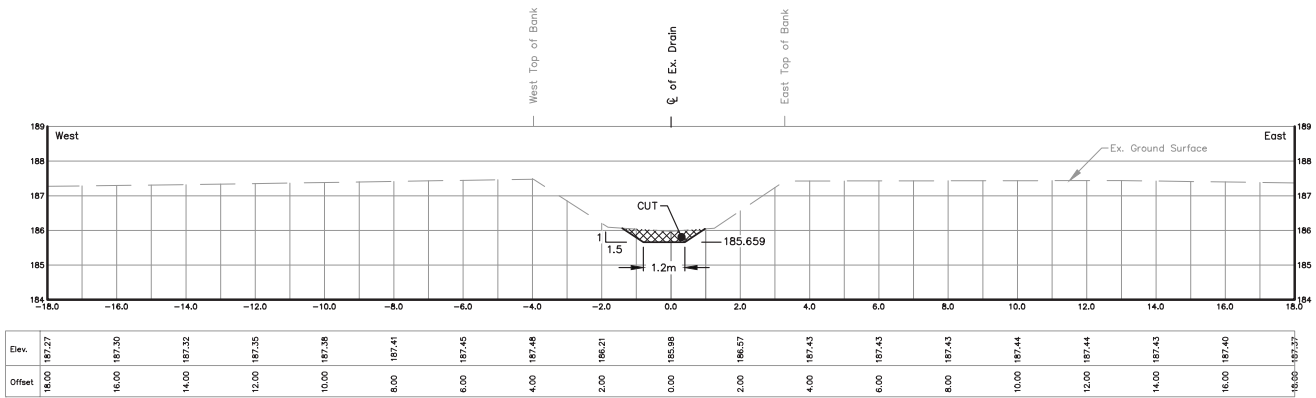




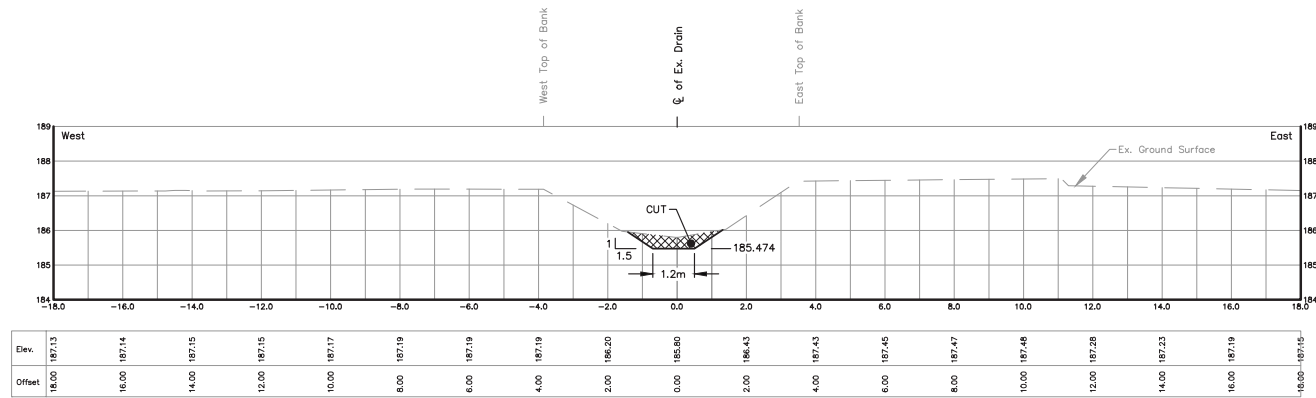
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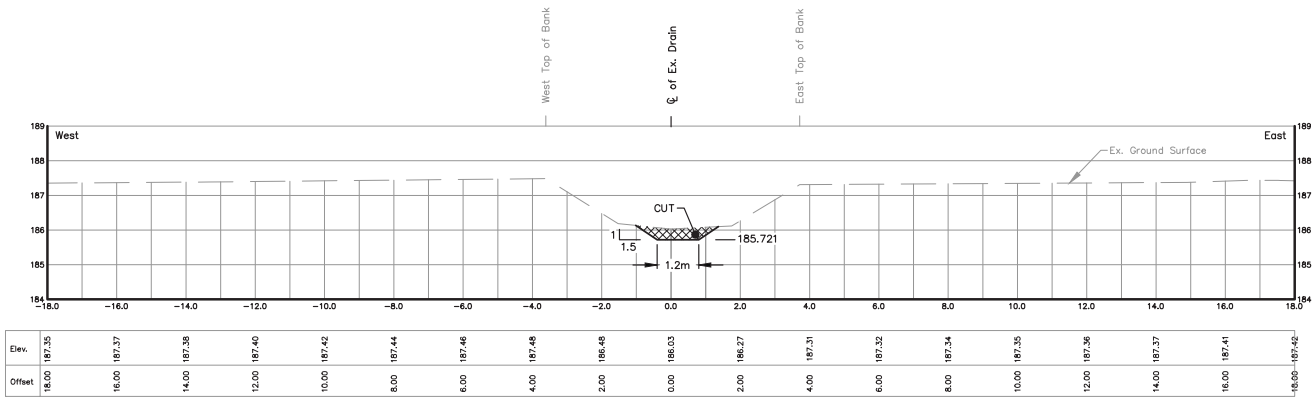
STA. 4+669.7
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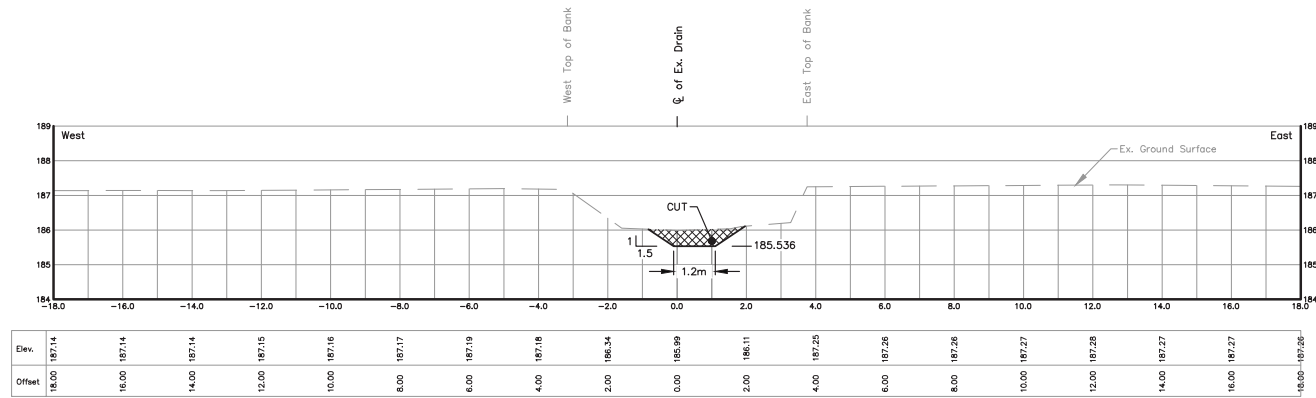
STA. 4+470.8
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STA. 4+612.7
Scale = 1:100



STA. 4+423.0
Scale = 1:100



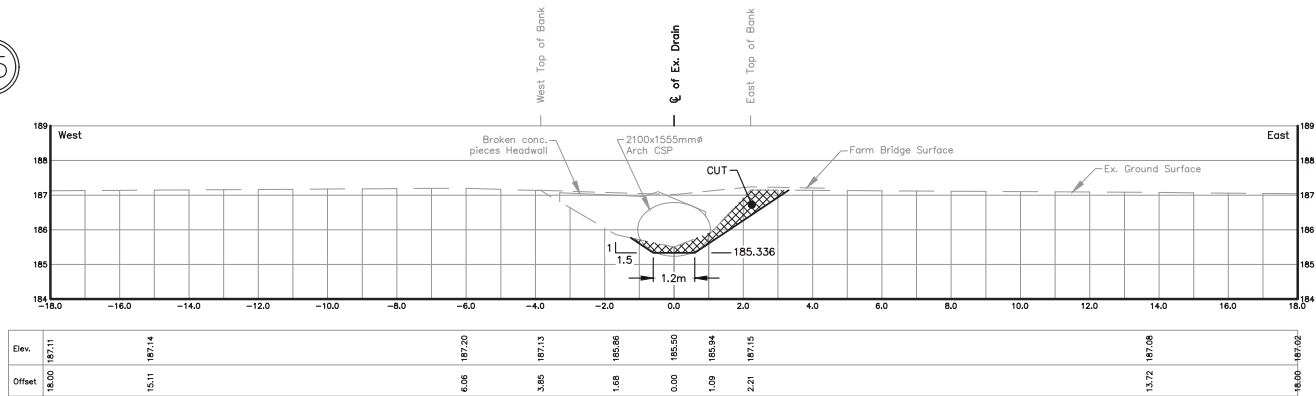
STA. 4+565.3
Scale = 1:100

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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG

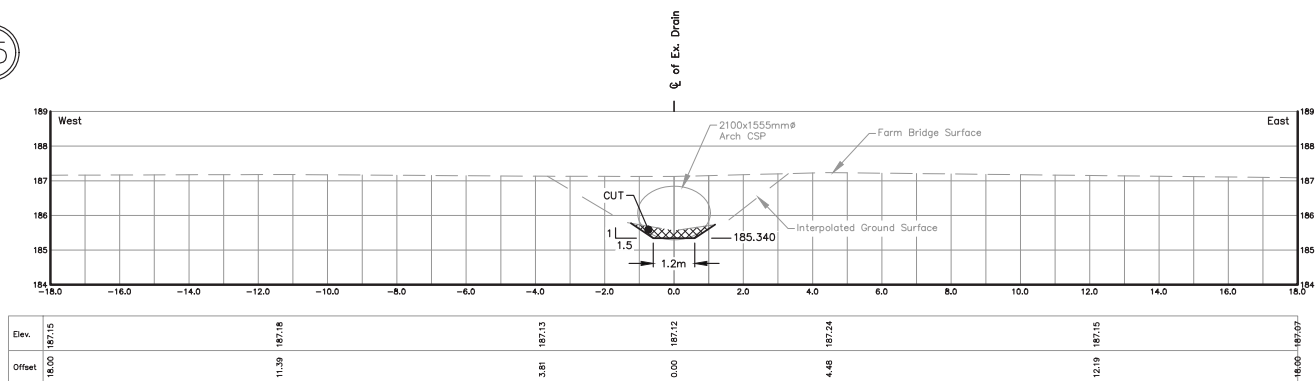
FILE No.: SHEET No.:
2015D010 25 OF 51

15



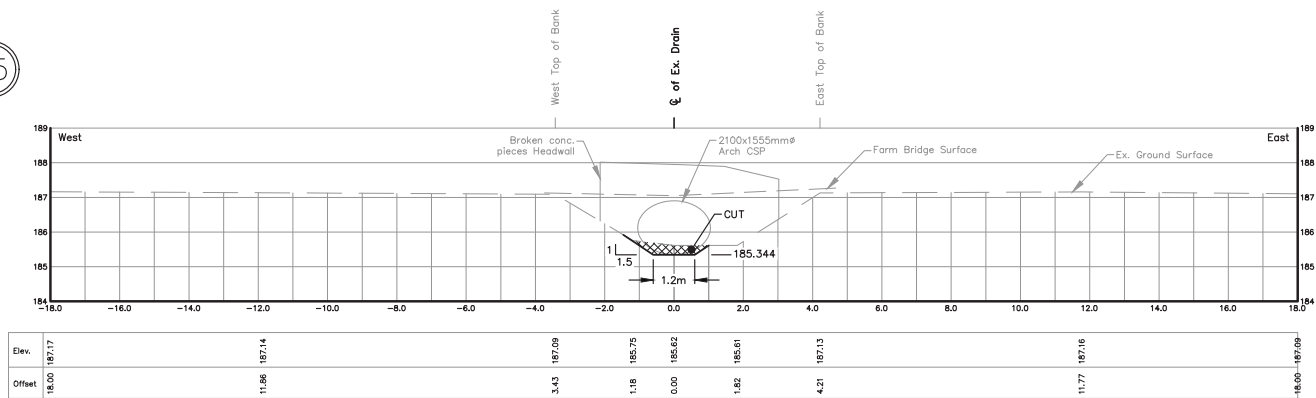
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15

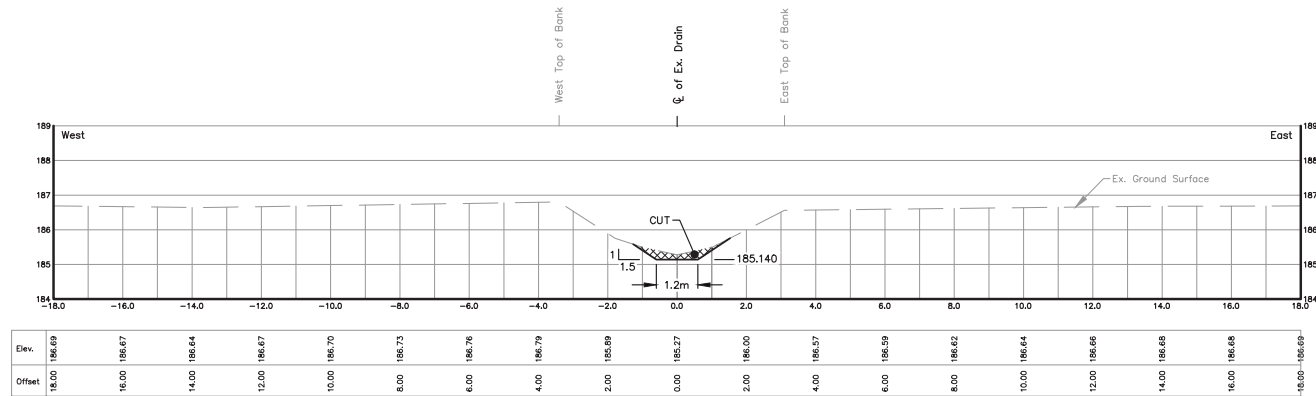


STA. 4+715.9
Scale = 1:100

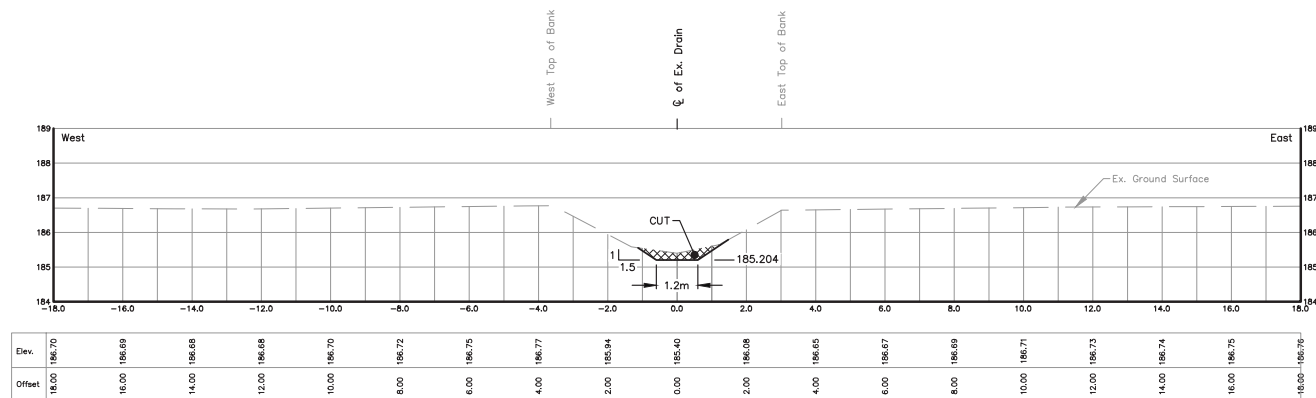
15



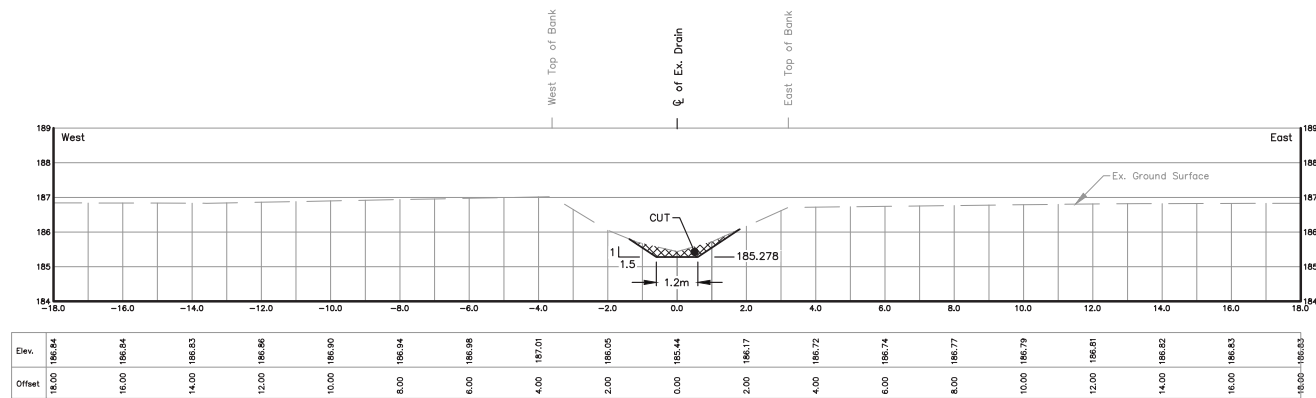
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STA. 4+869.6
Scale = 1:100



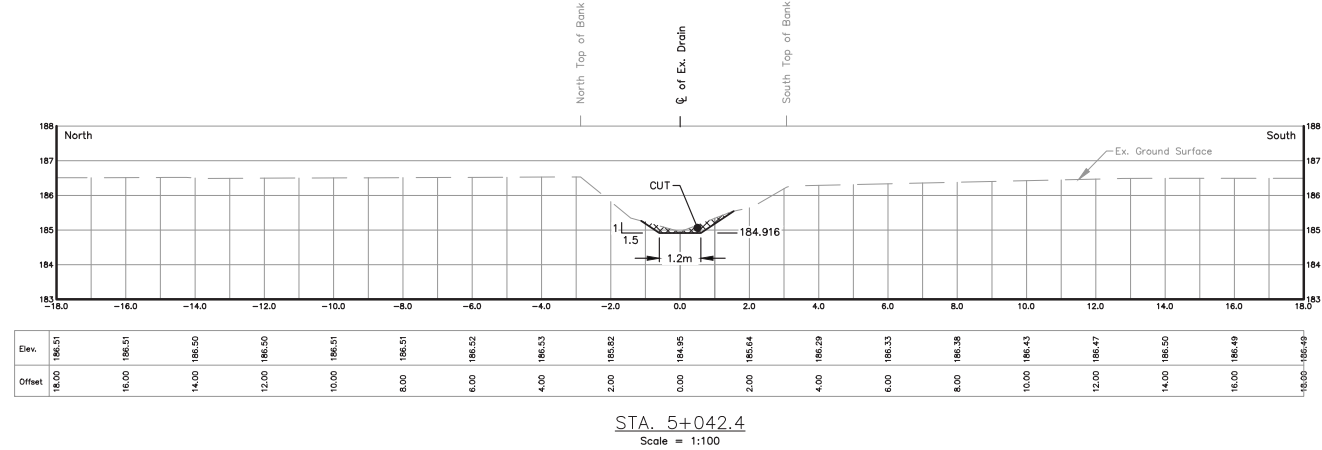
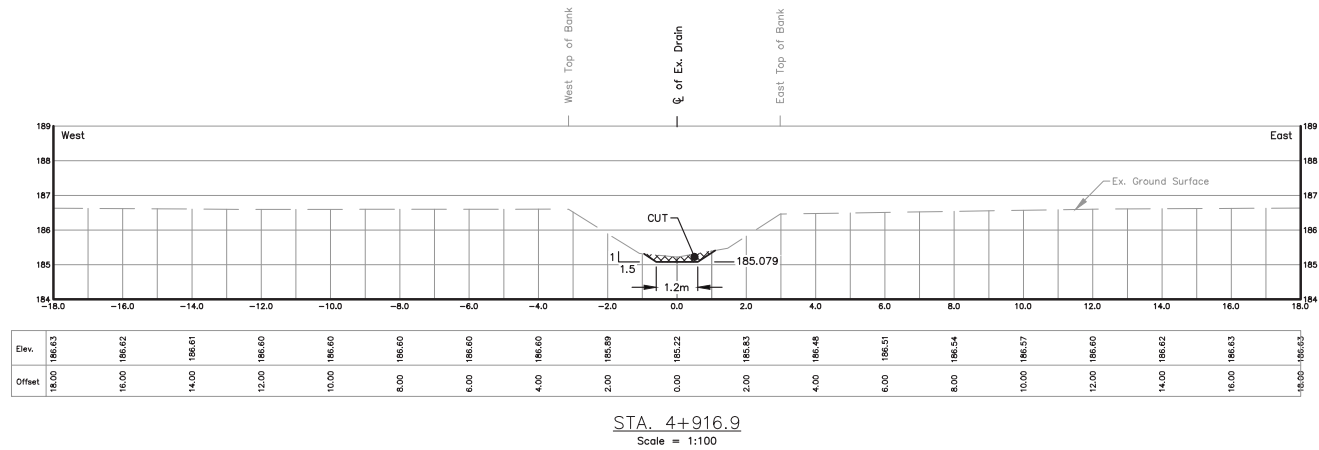
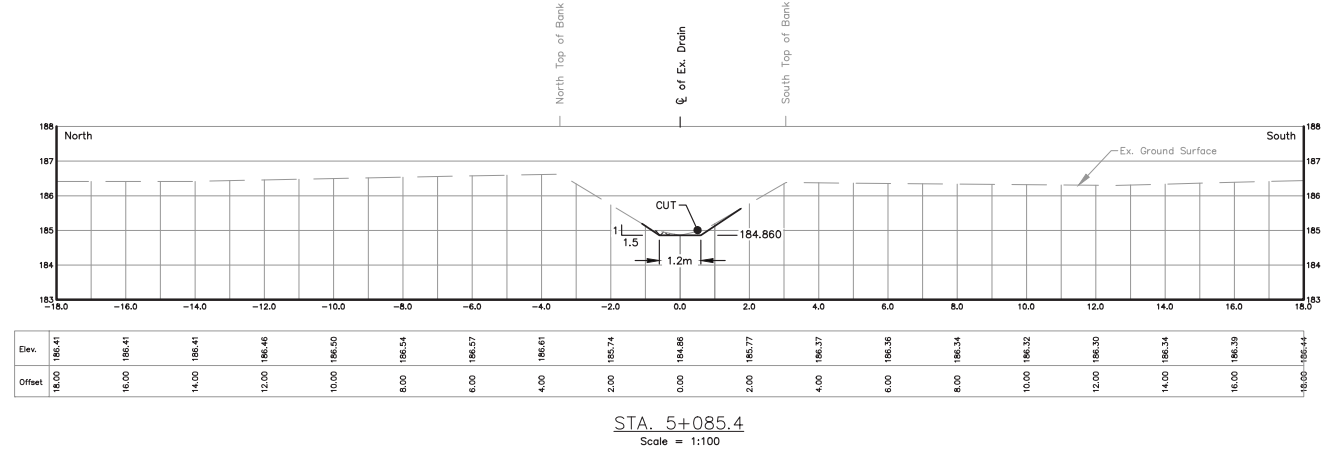
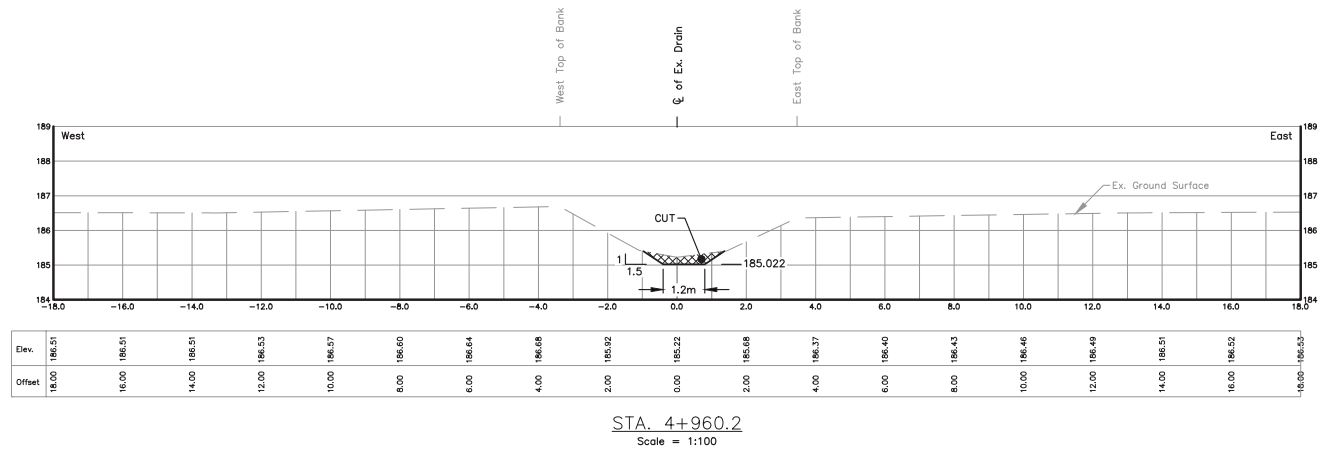
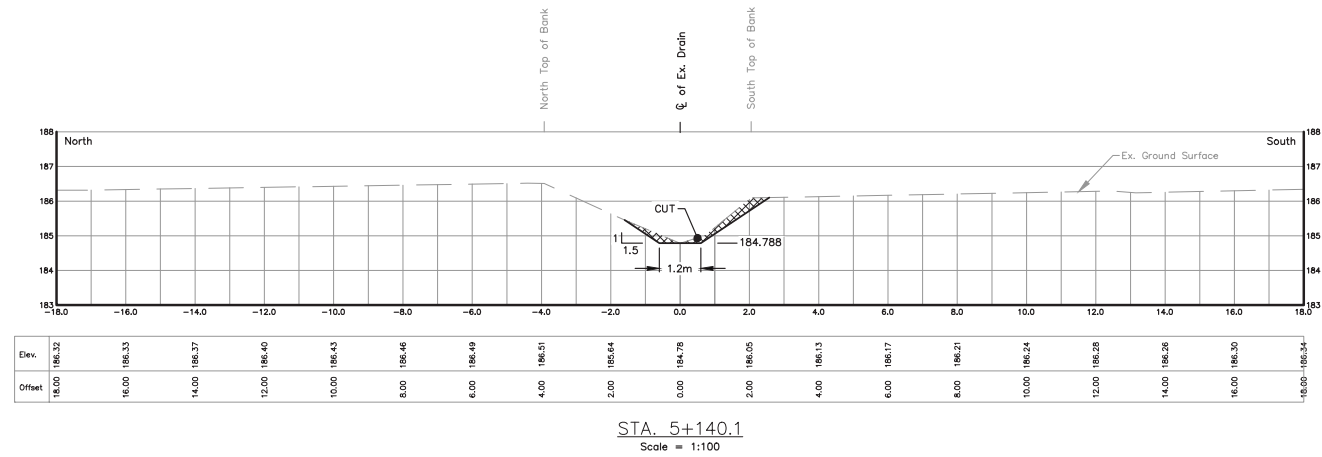
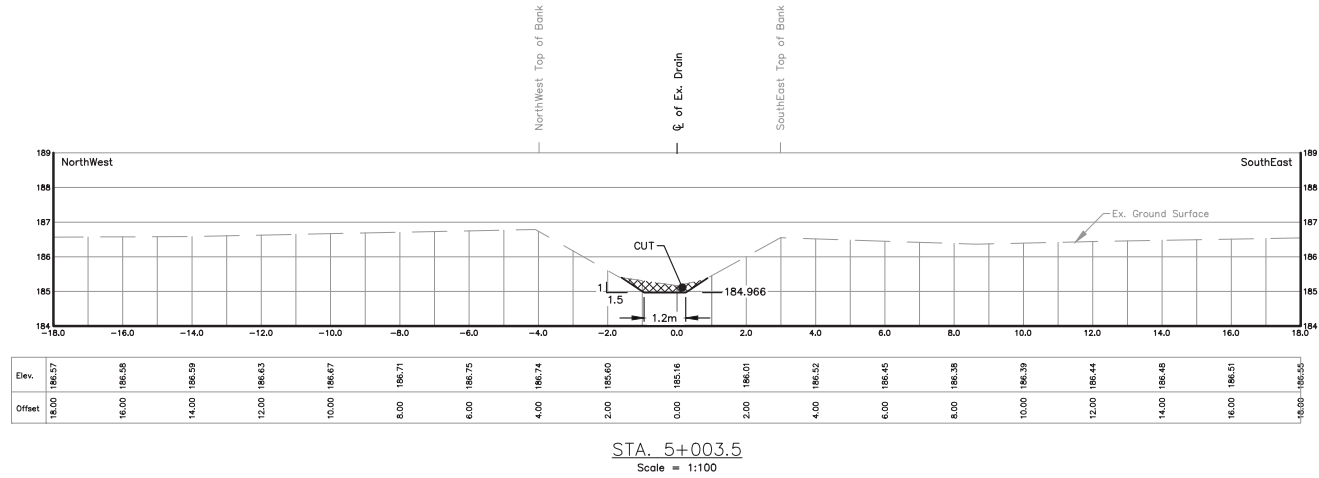
STA. 4+820.3
Scale = 1:100



STA. 4+763.8
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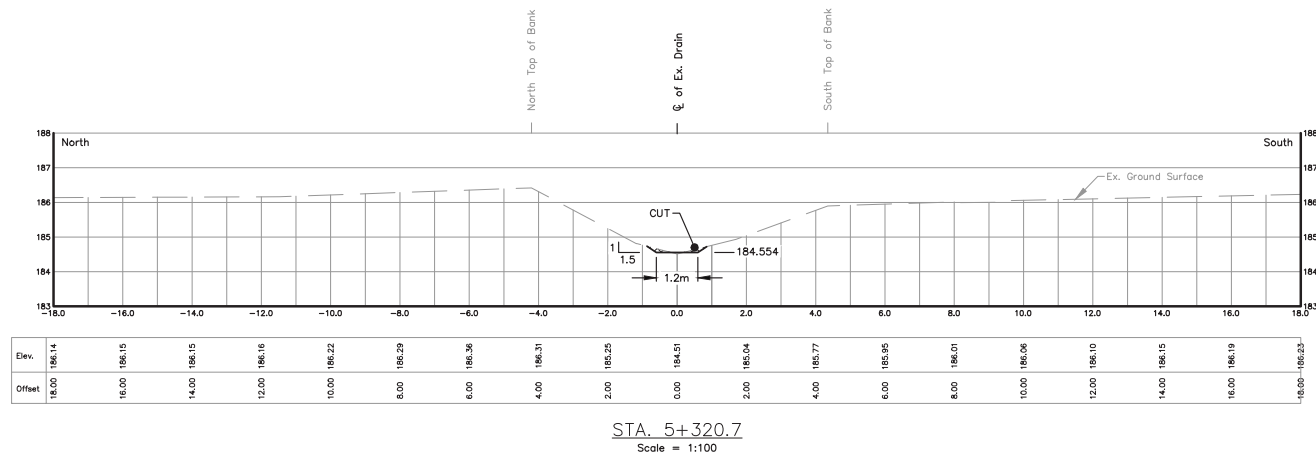
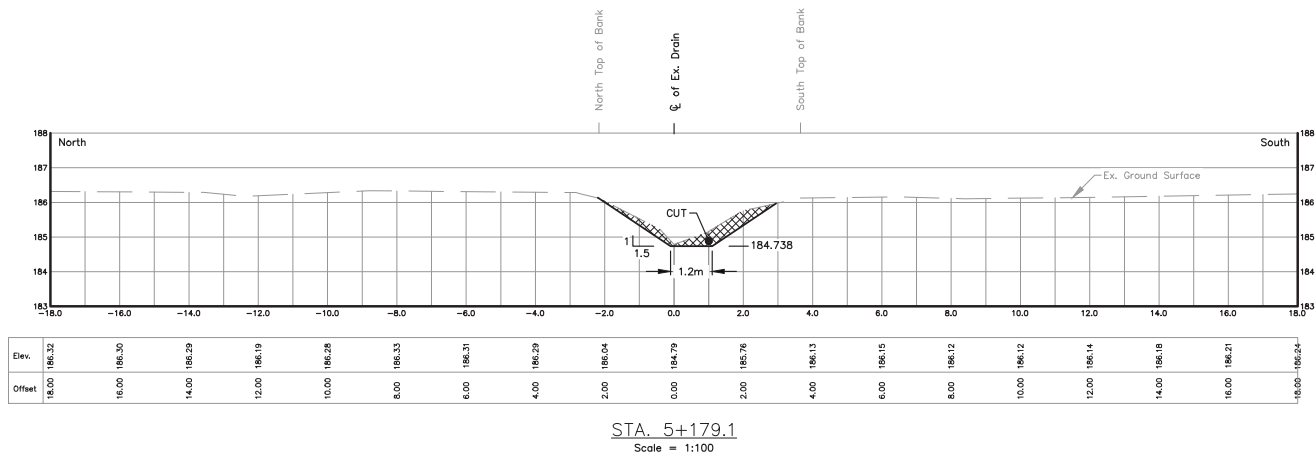
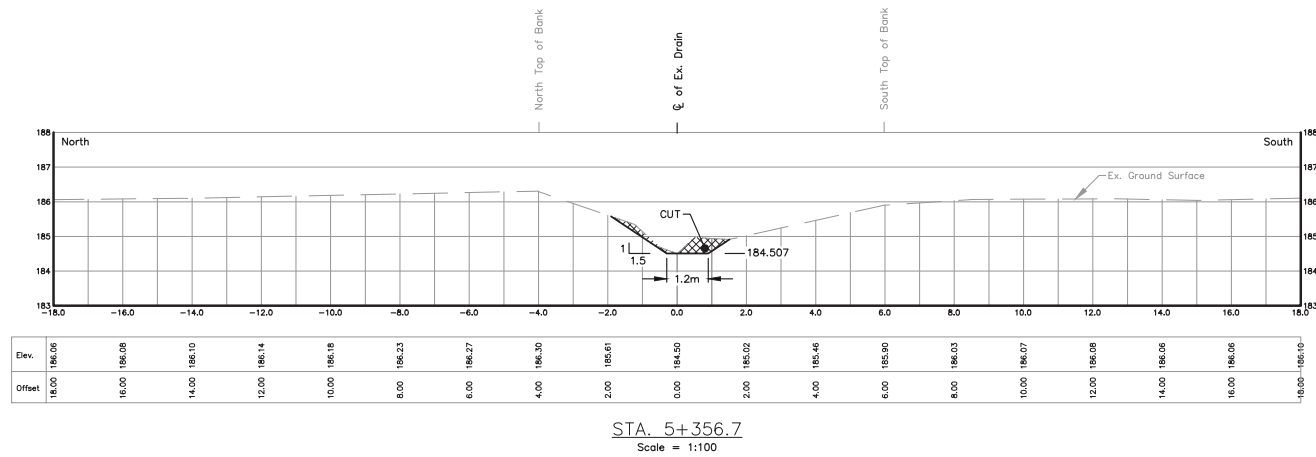
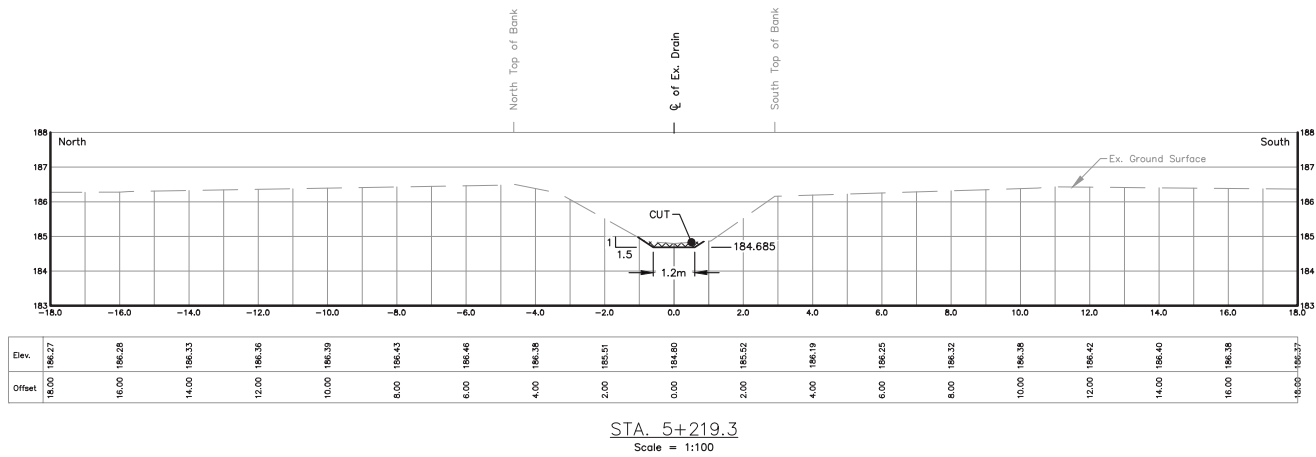
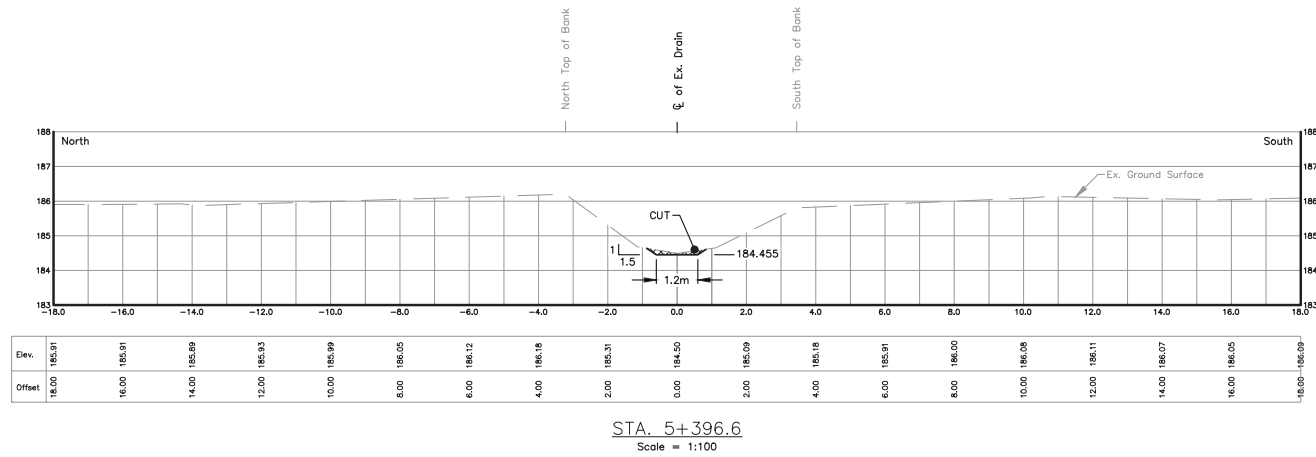
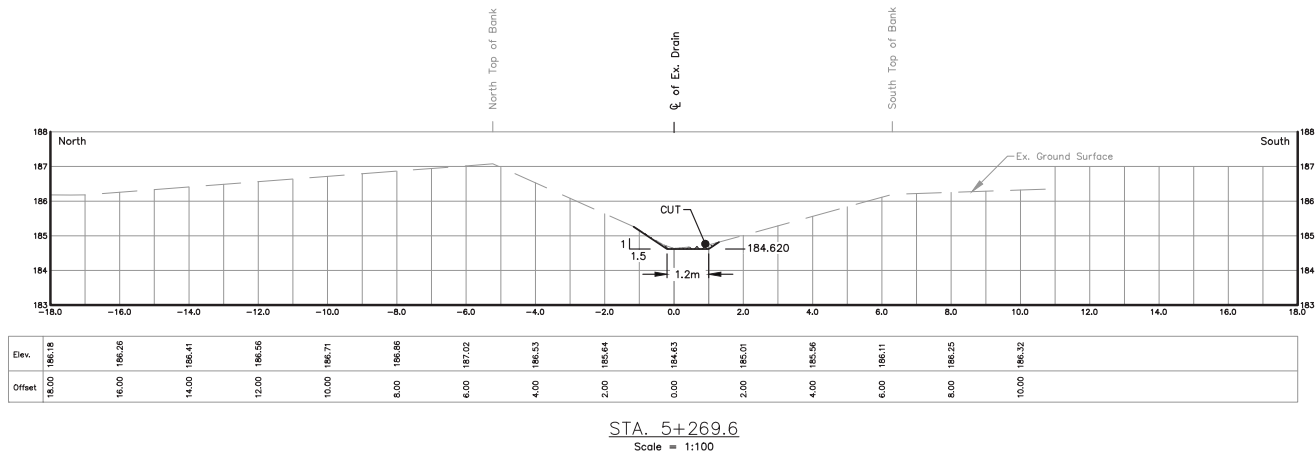
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
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2015D010 26 OF 51



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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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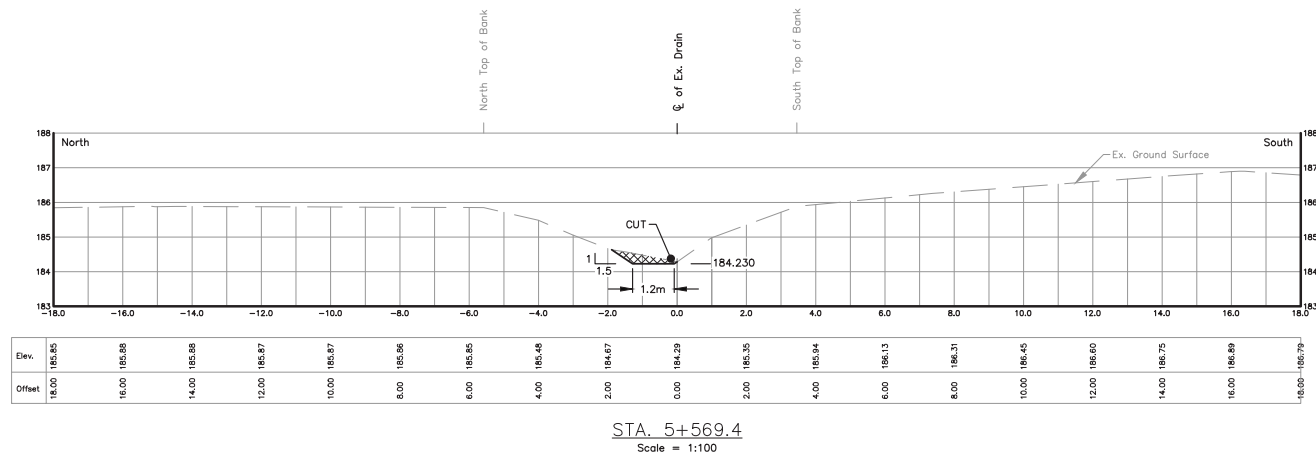
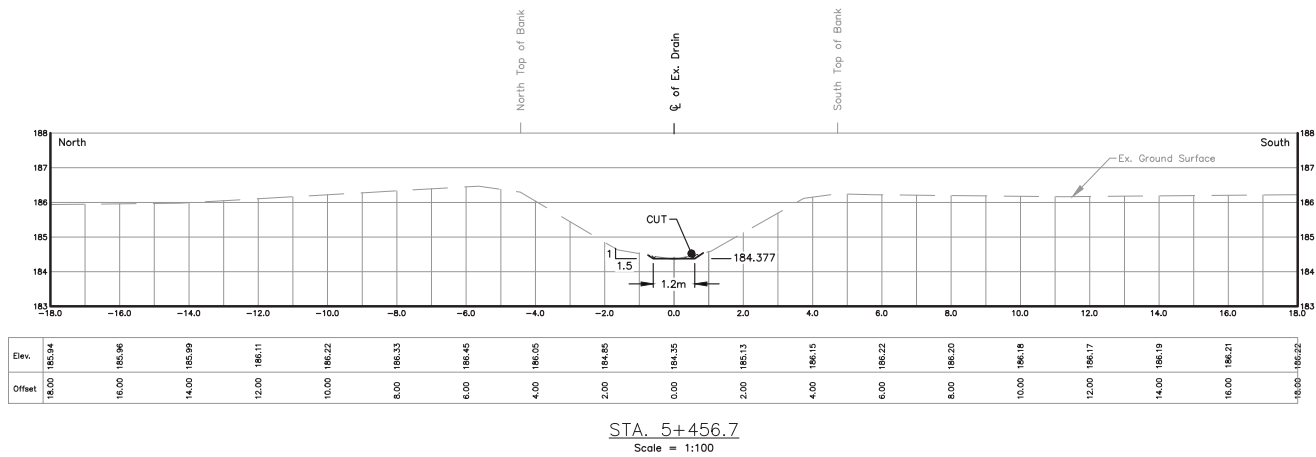
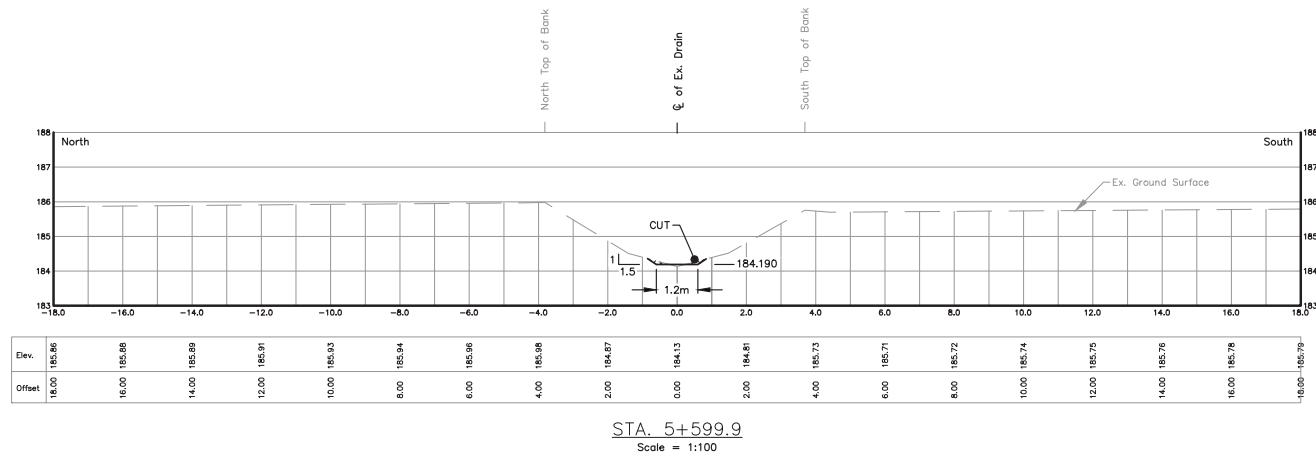
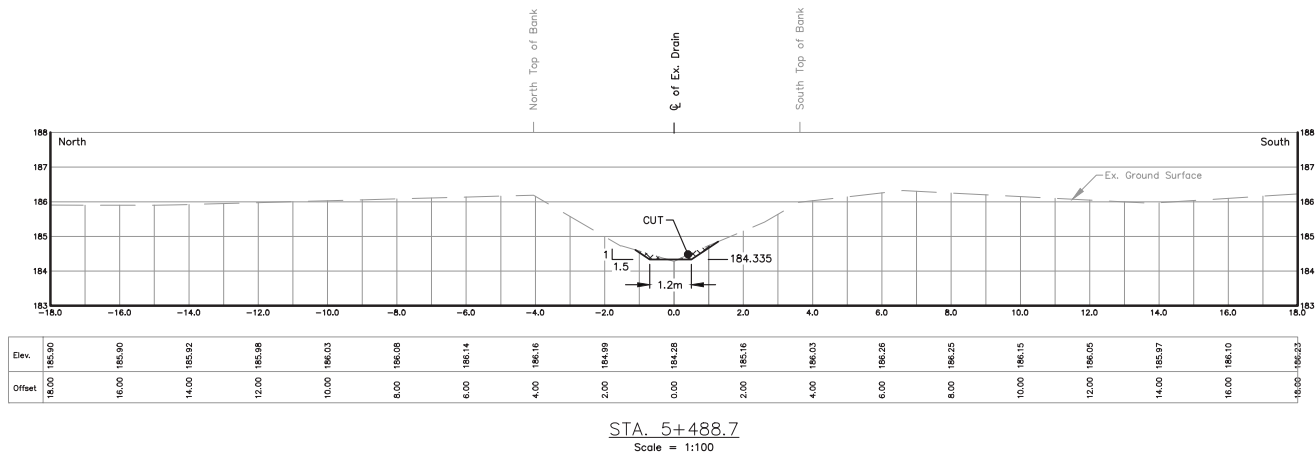
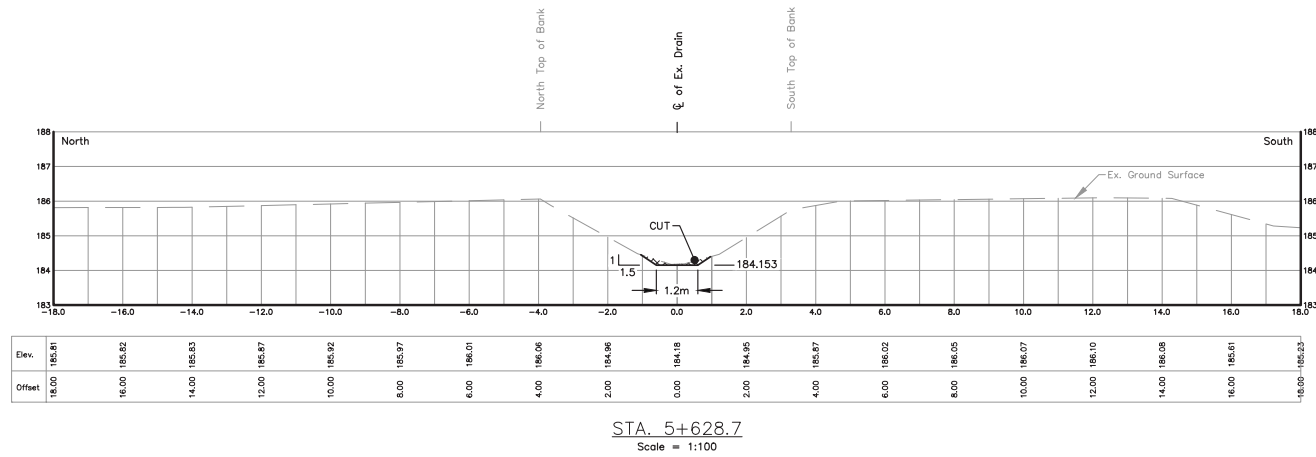
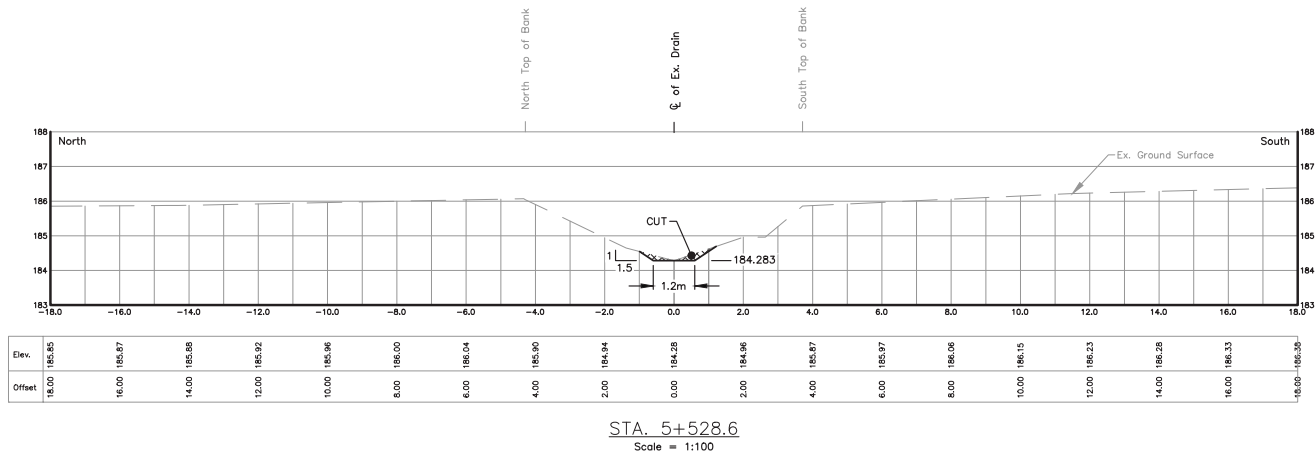
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COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 28 OF 51

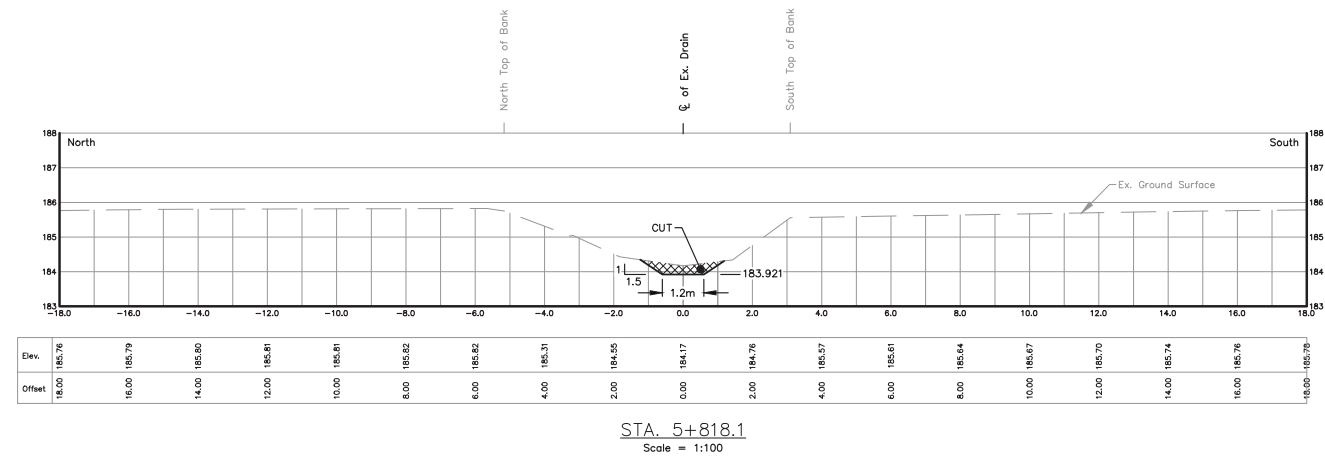
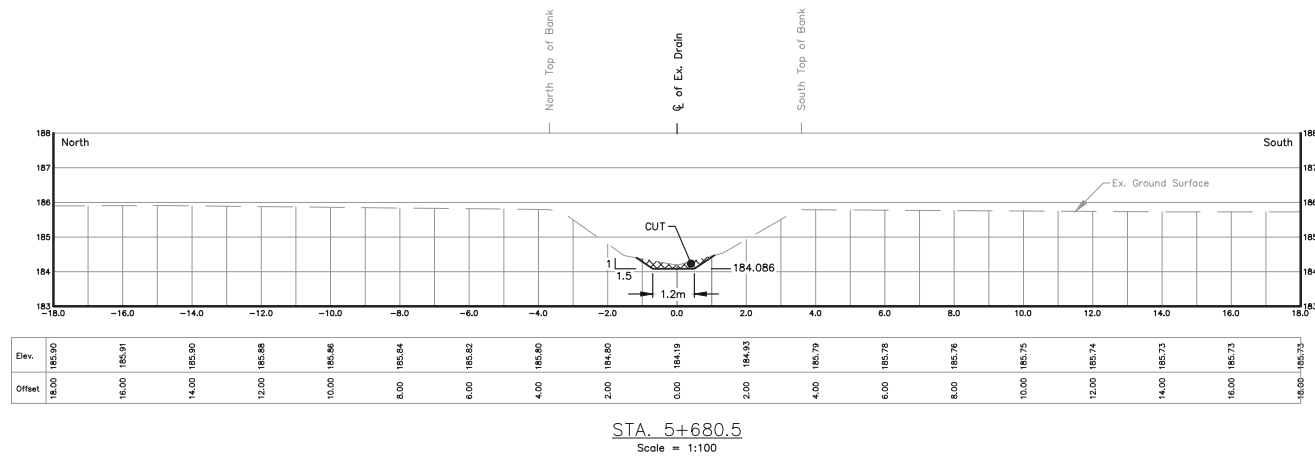
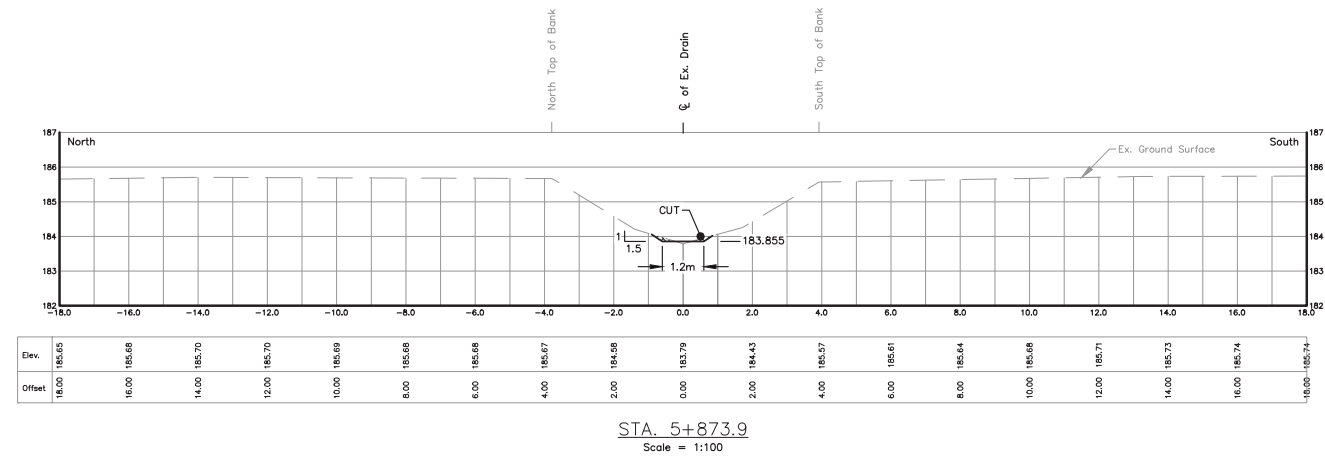
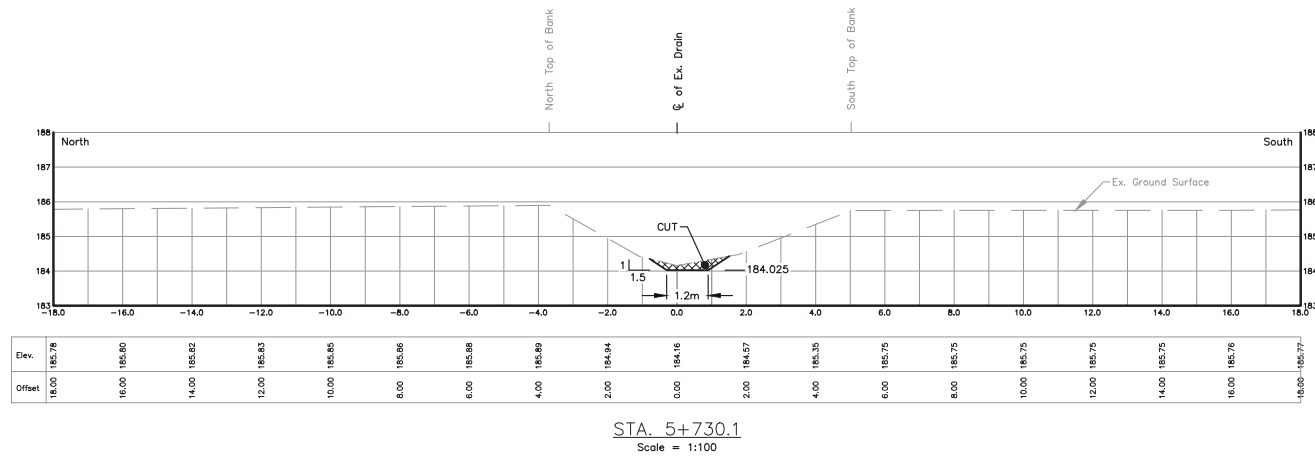
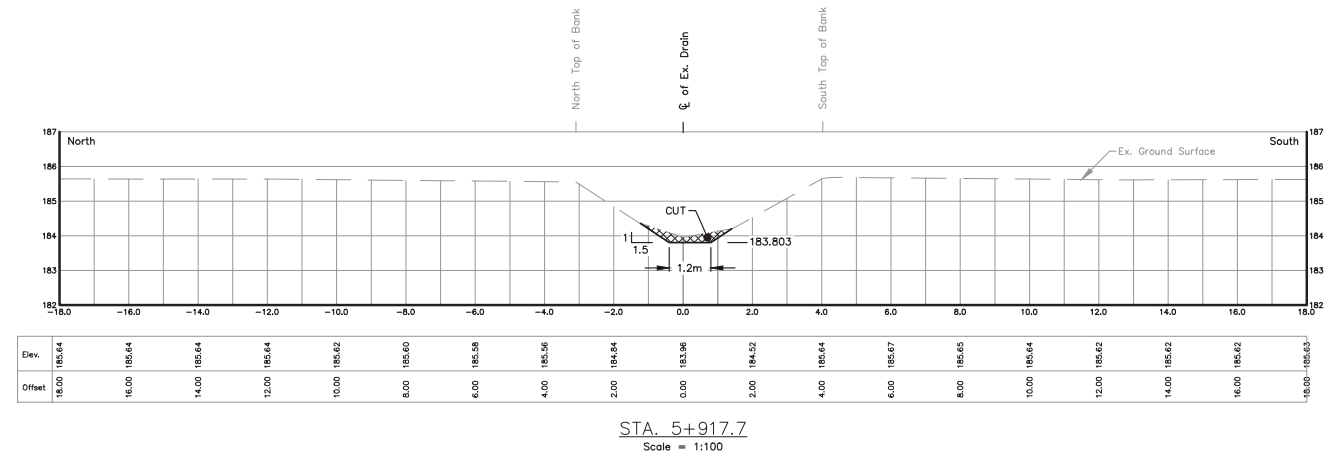
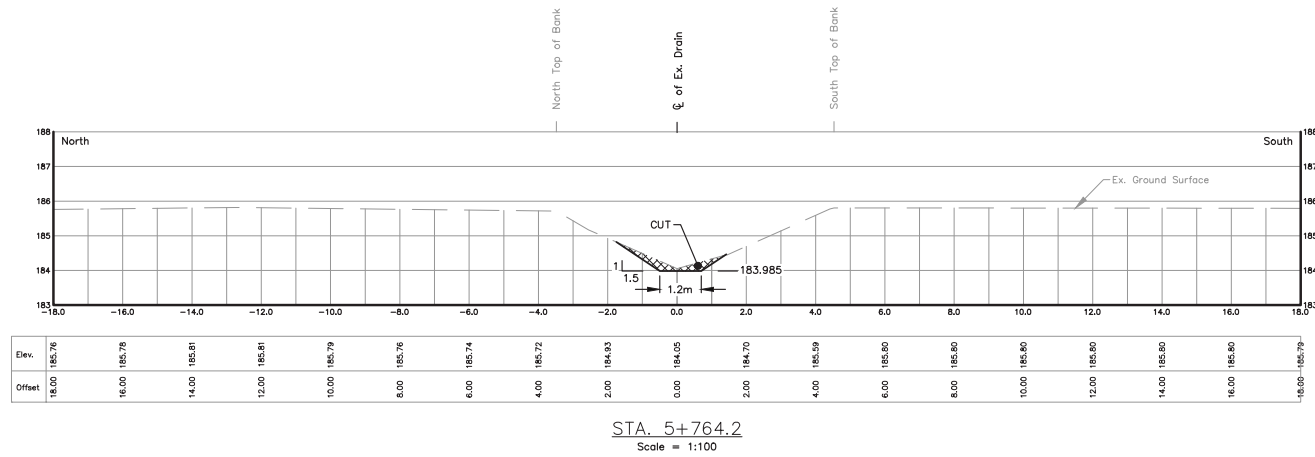
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COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 29 OF 51

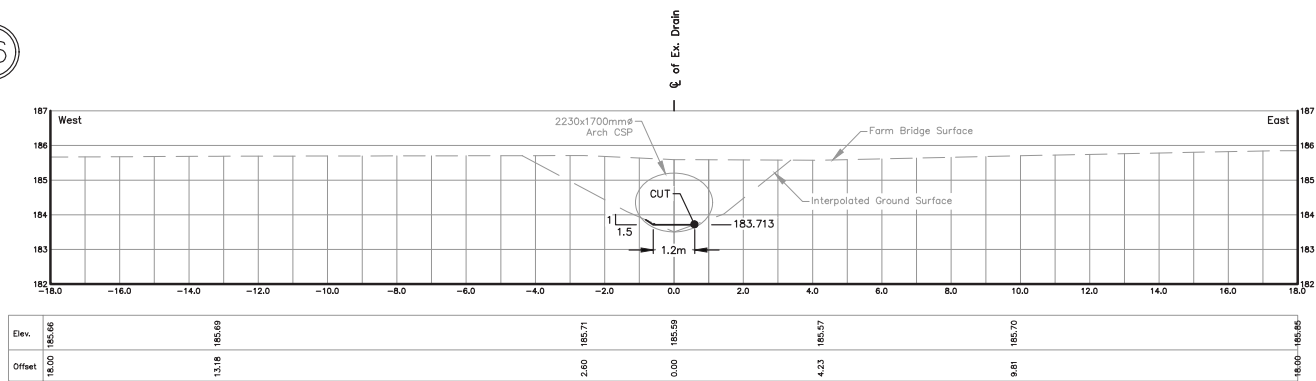
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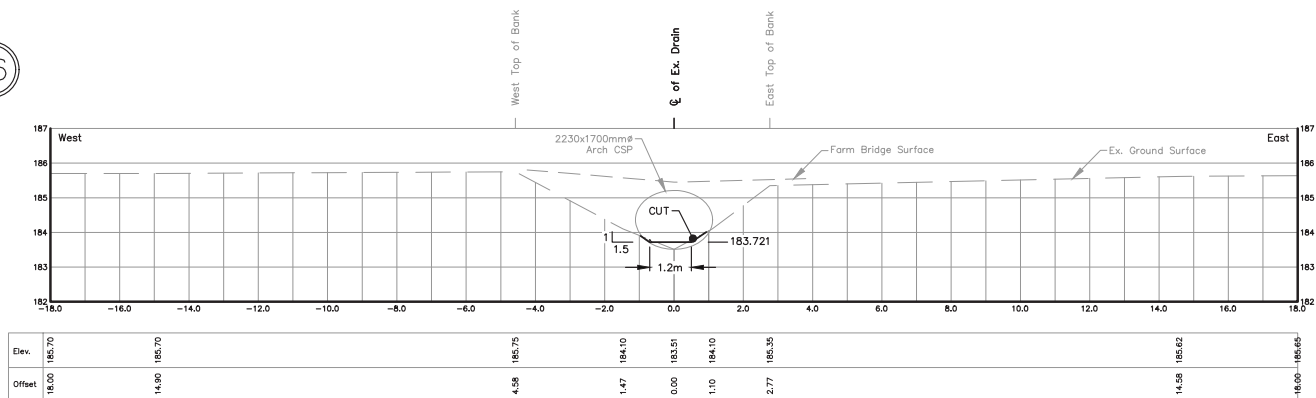
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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16

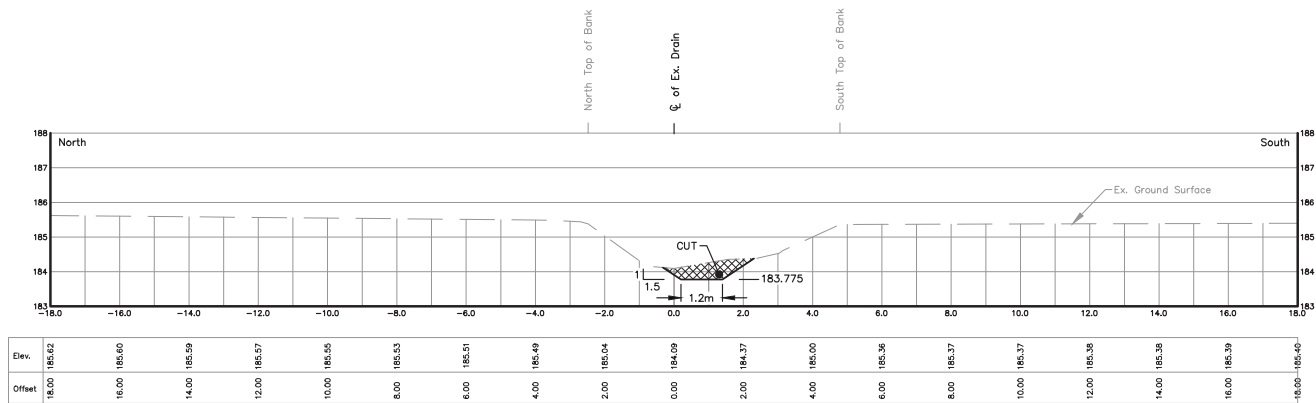


STA. 5+994.0
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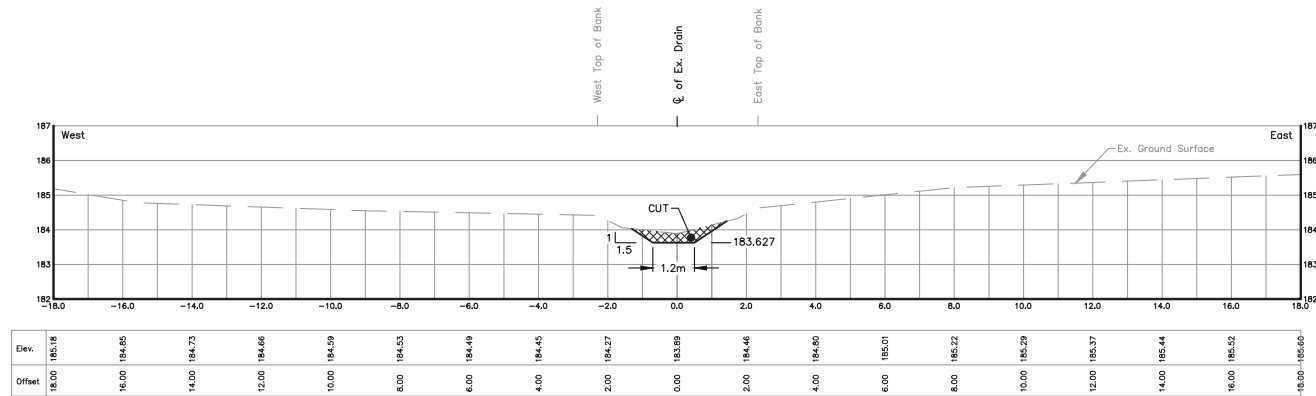
16



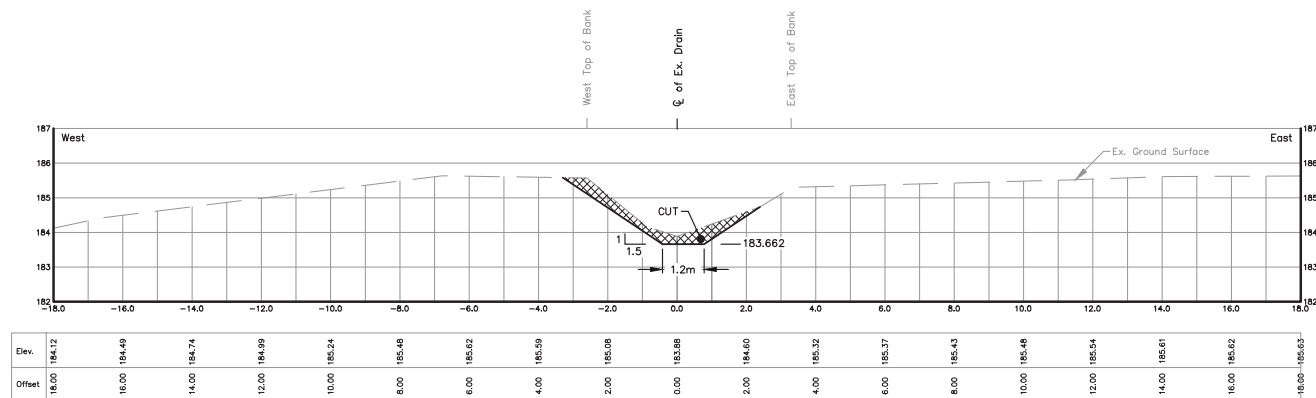
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STA. 5+941.9
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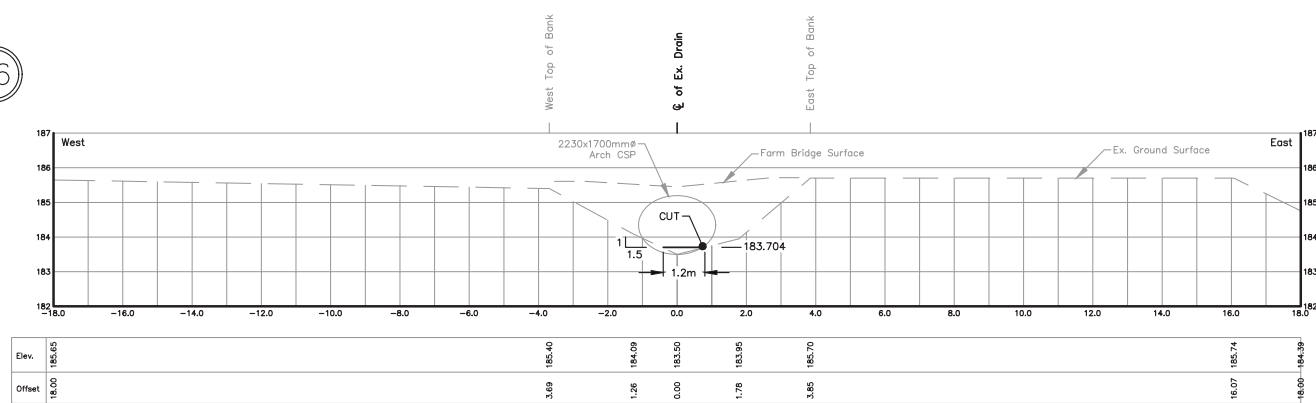


STA. 6+066.6
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STA. 6+037.4
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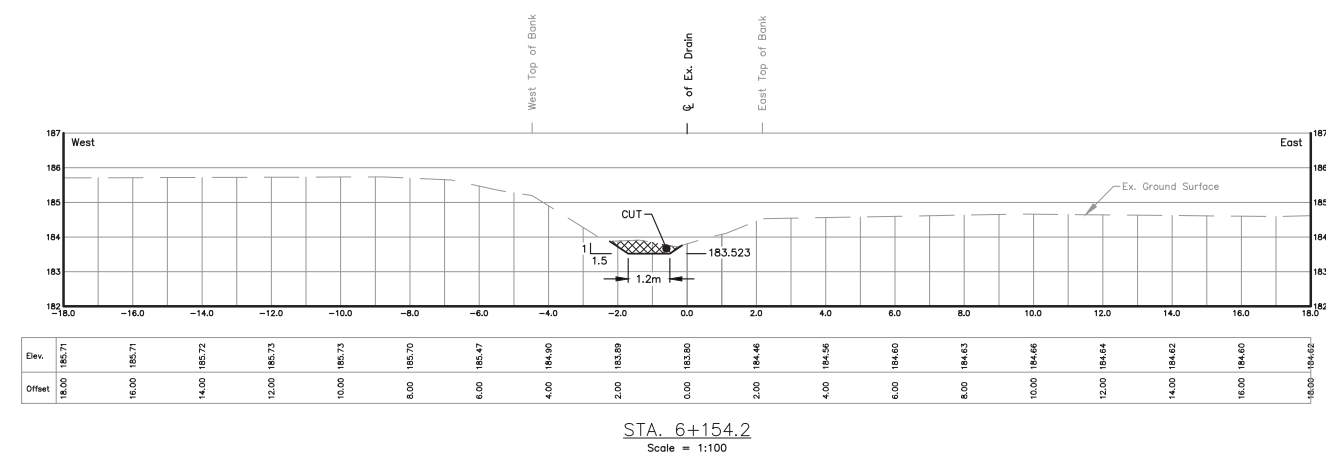
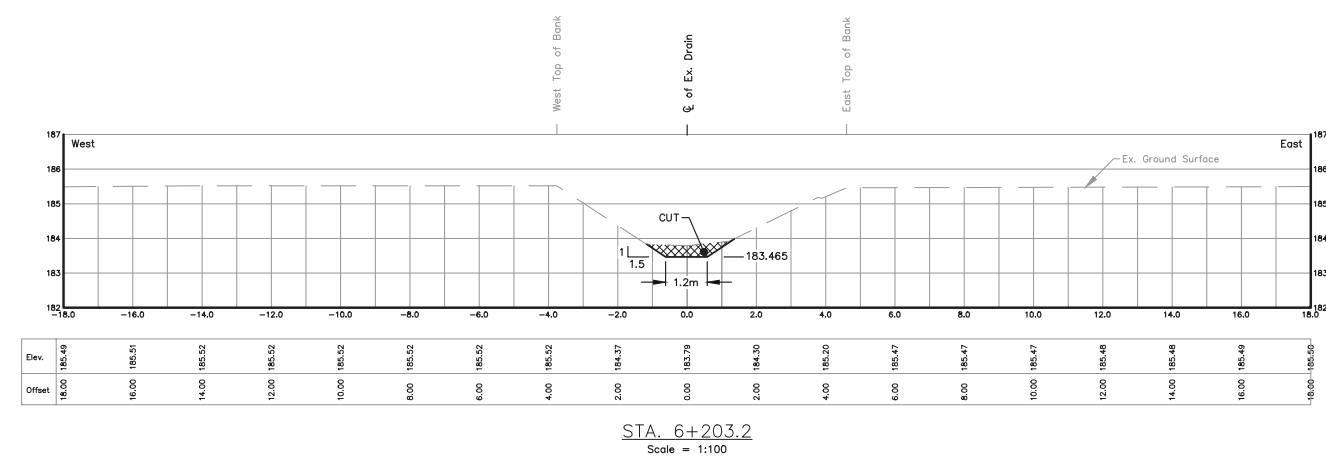
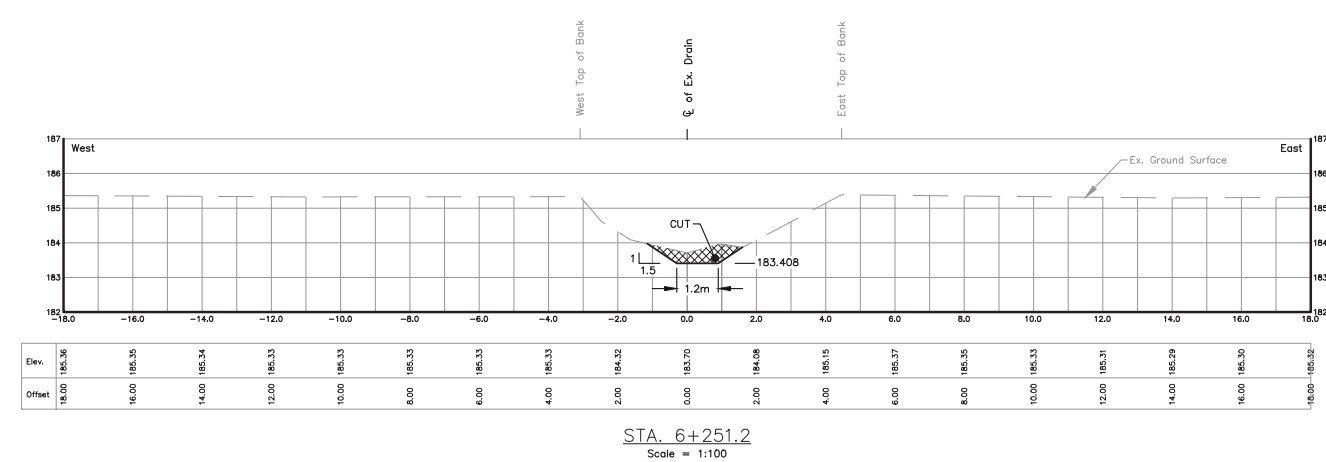
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STA. 6+001.4
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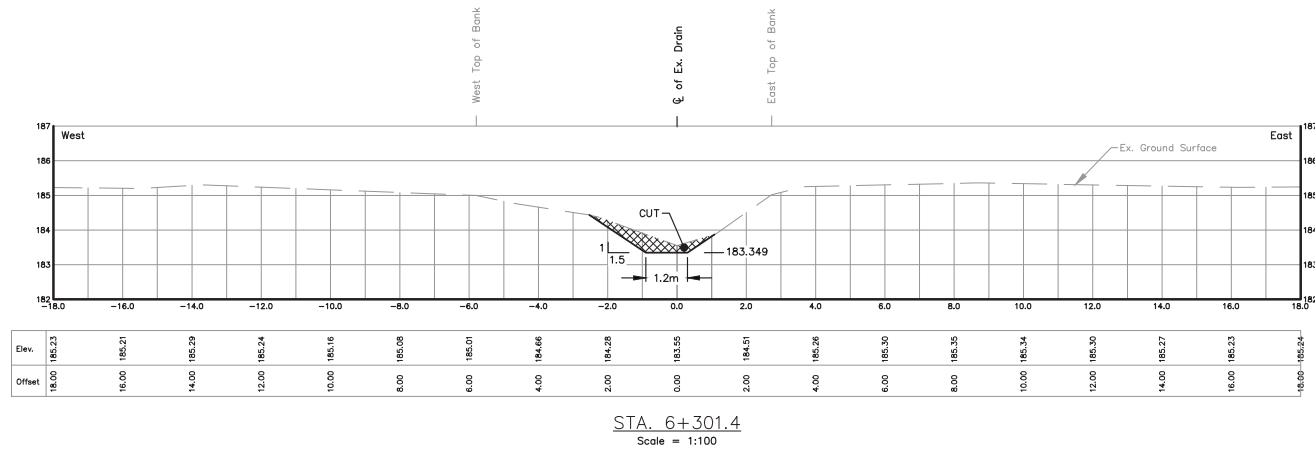
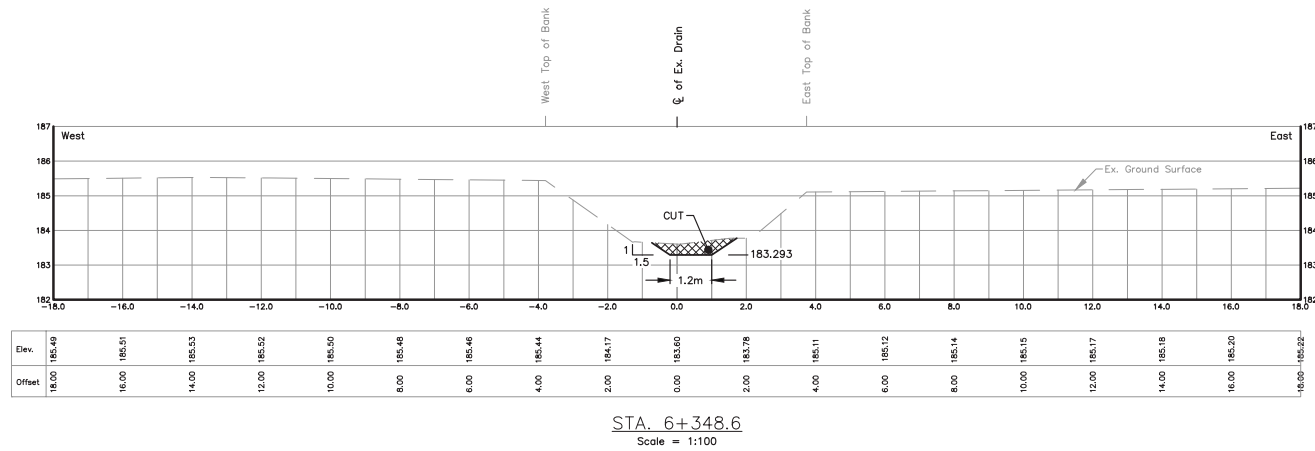
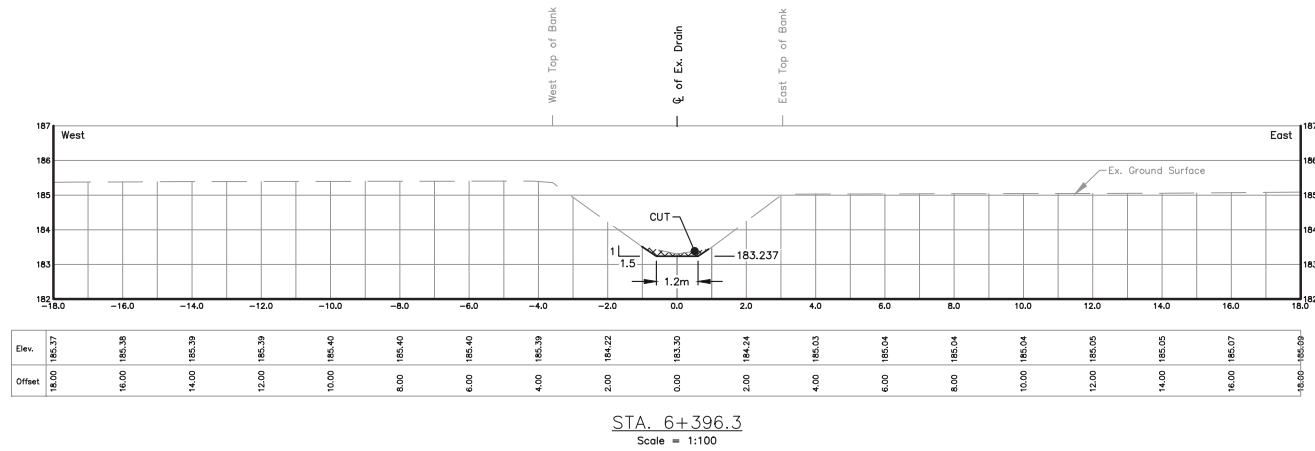
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: 2015D010
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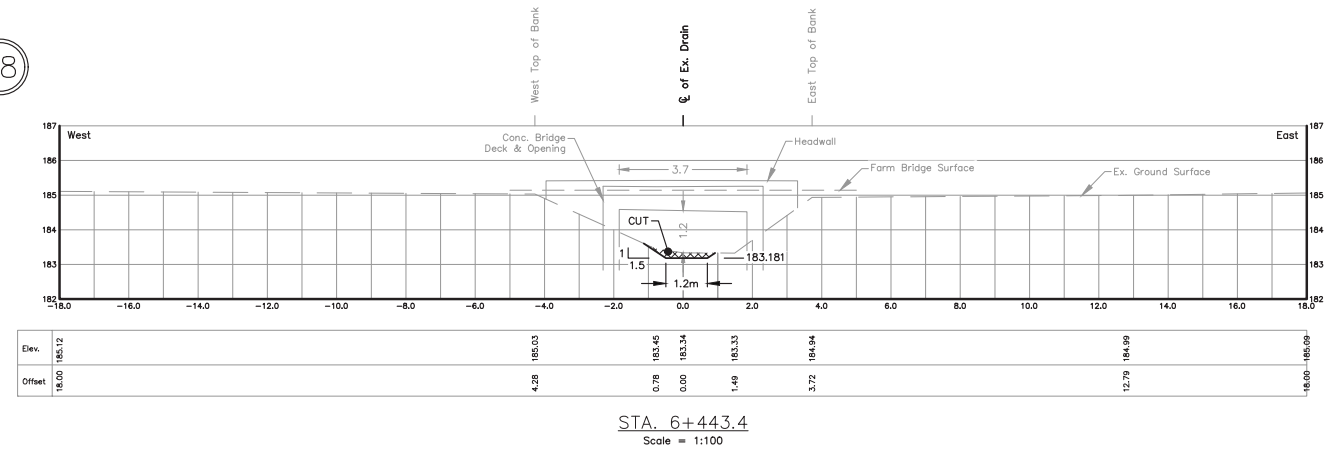


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PLOT CODE: 1:1	
COMPUTER FILE: REI2015D010.DWG	
FILE No.: 2015D010	SHEET No.: 32 OF 51

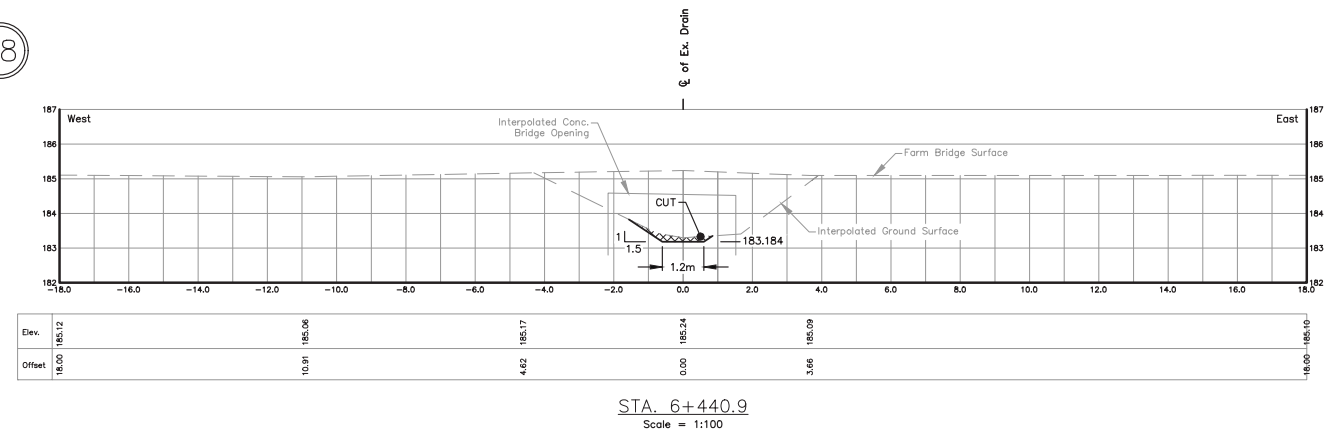
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections\Blang 2021-105-16



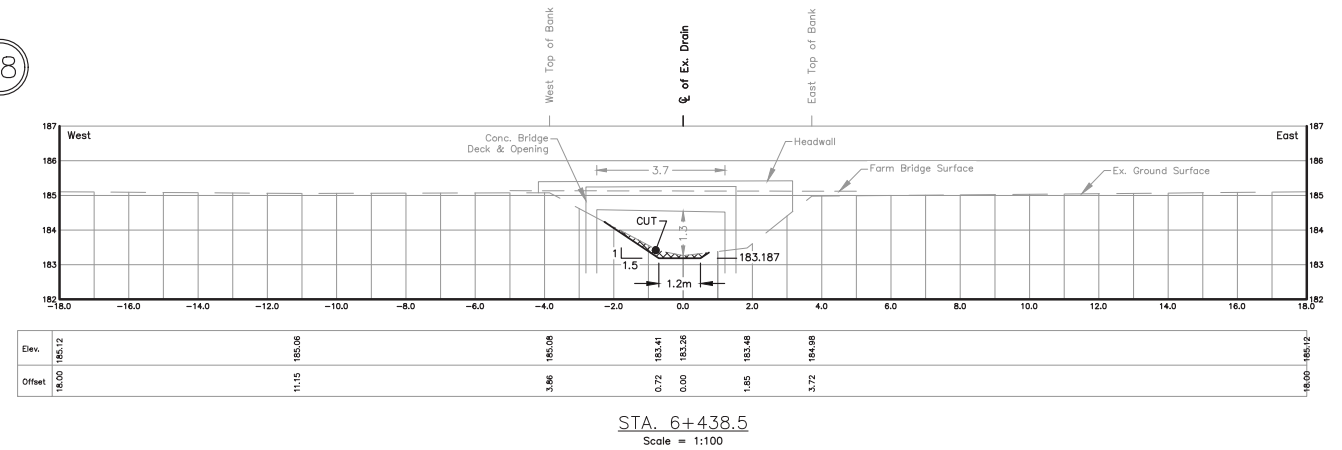
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18

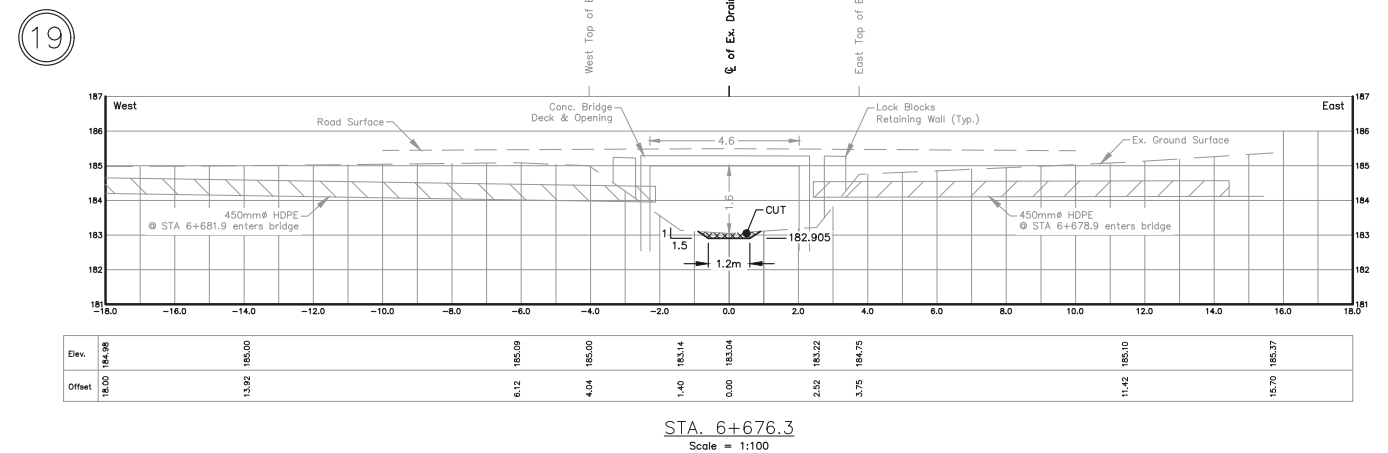
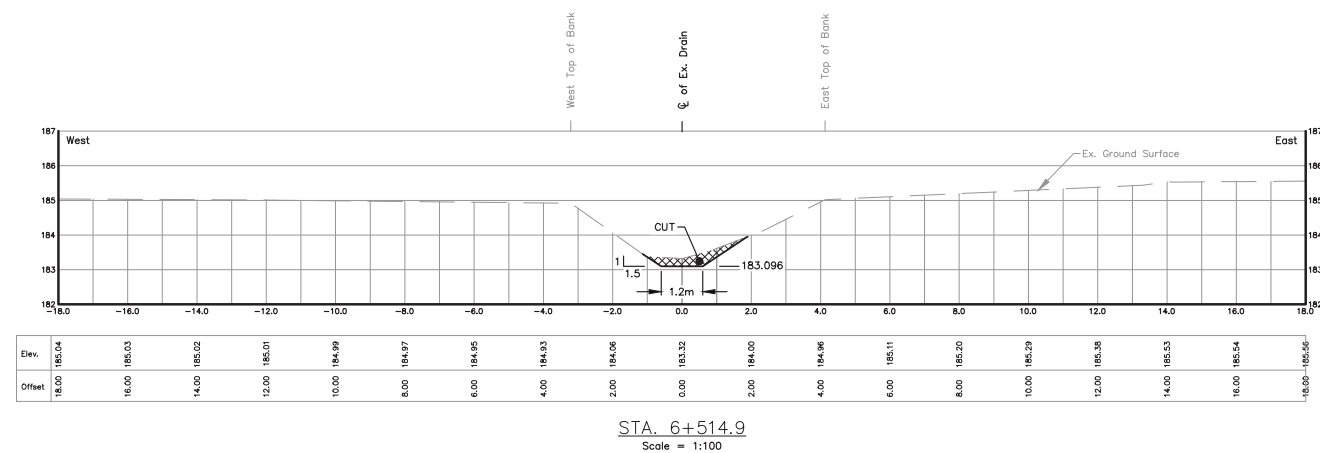


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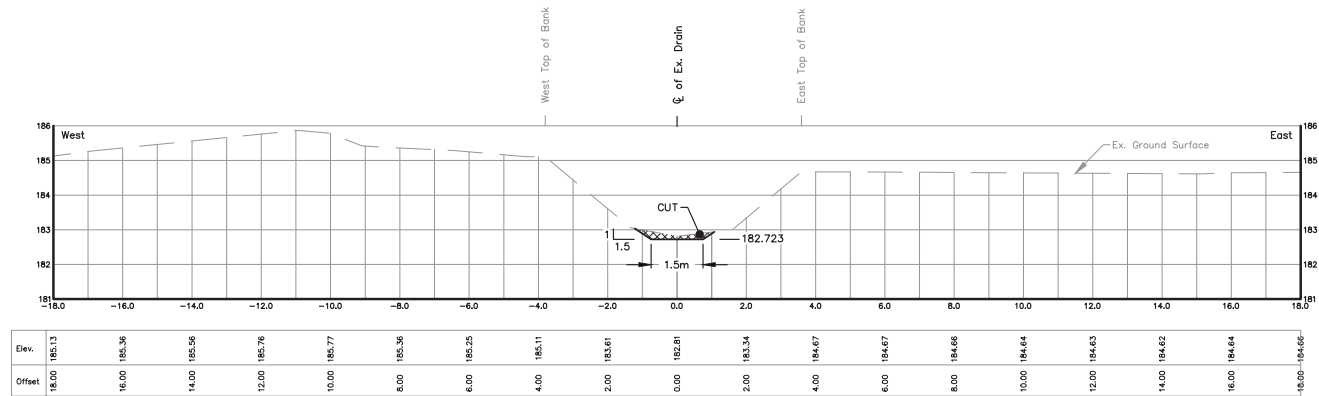
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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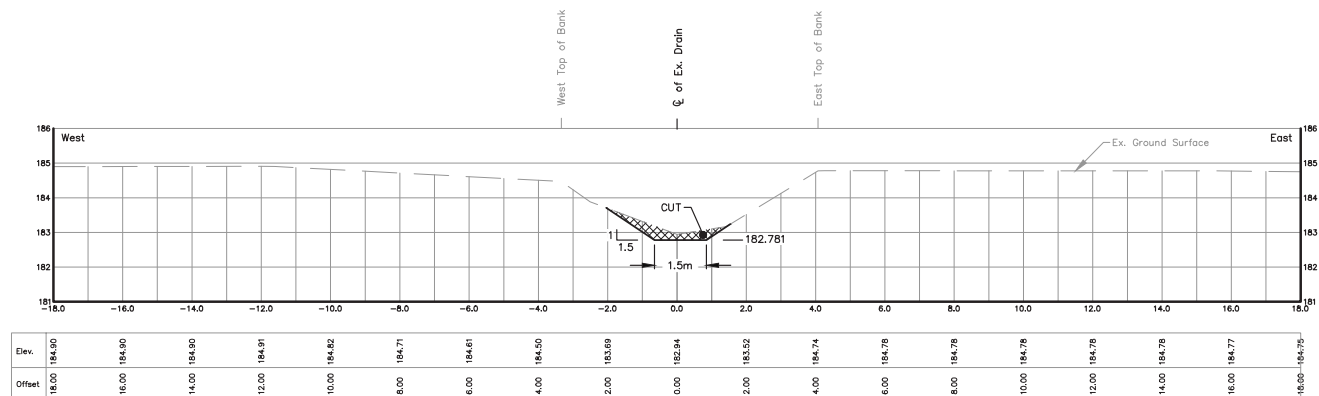


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PLOT CODE: 1:1	
COMPUTER FILE: REI2015D010.DWG	
FILE No.:	SHEET No.:
2015D010	34 OF 51

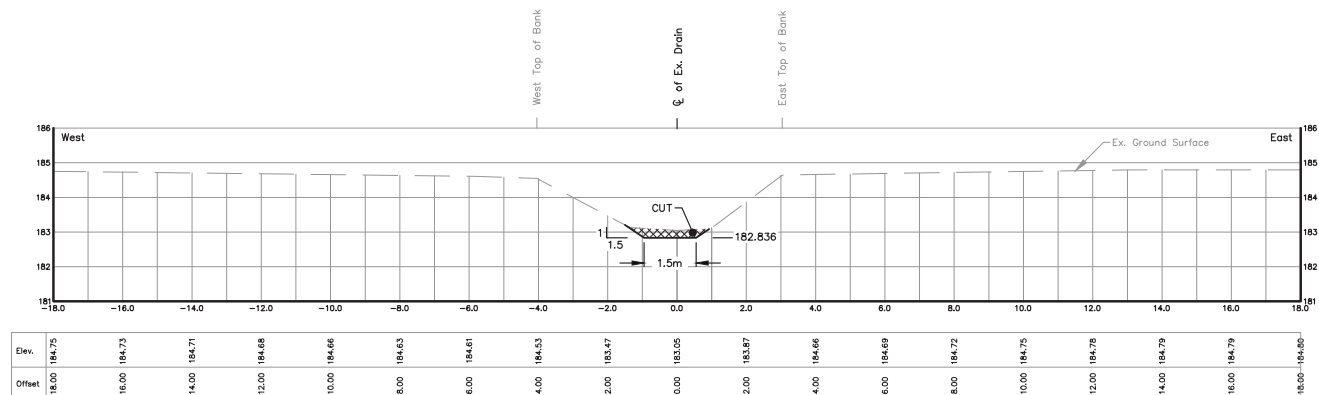
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections B.dwg 2/21/15 1:16



STA. 6+830.1
Scale = 1:100

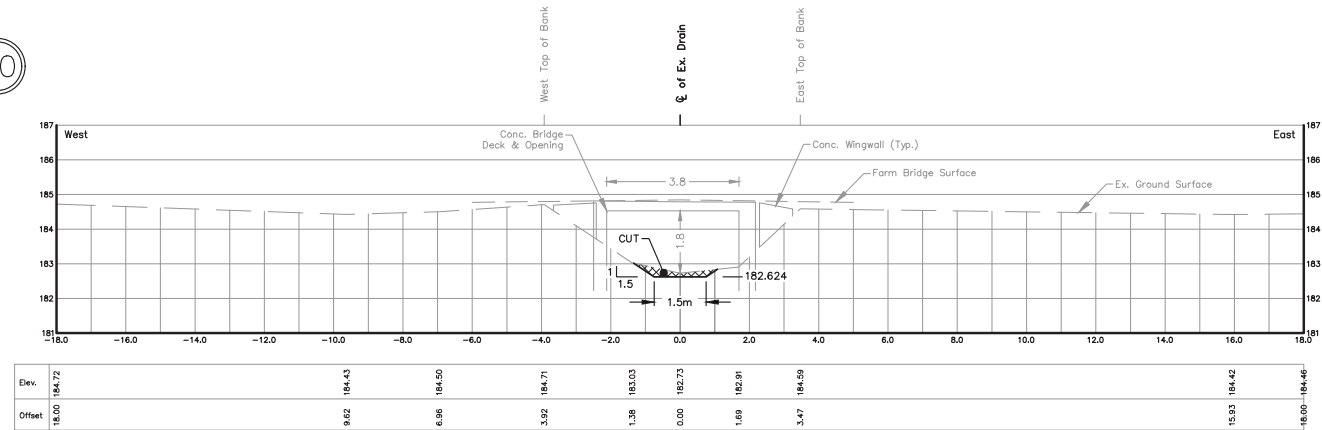


STA. 6+781.0
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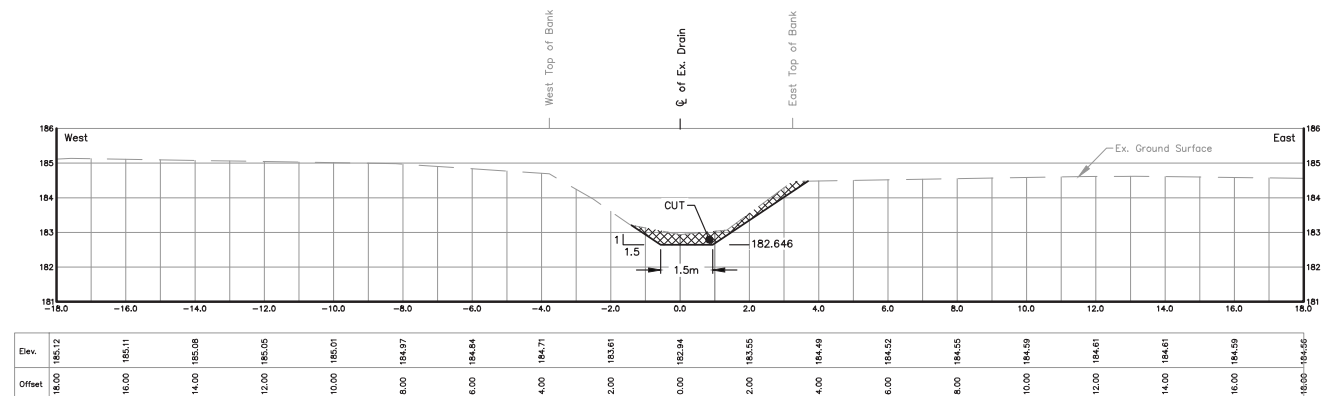


STA. 6+734.1
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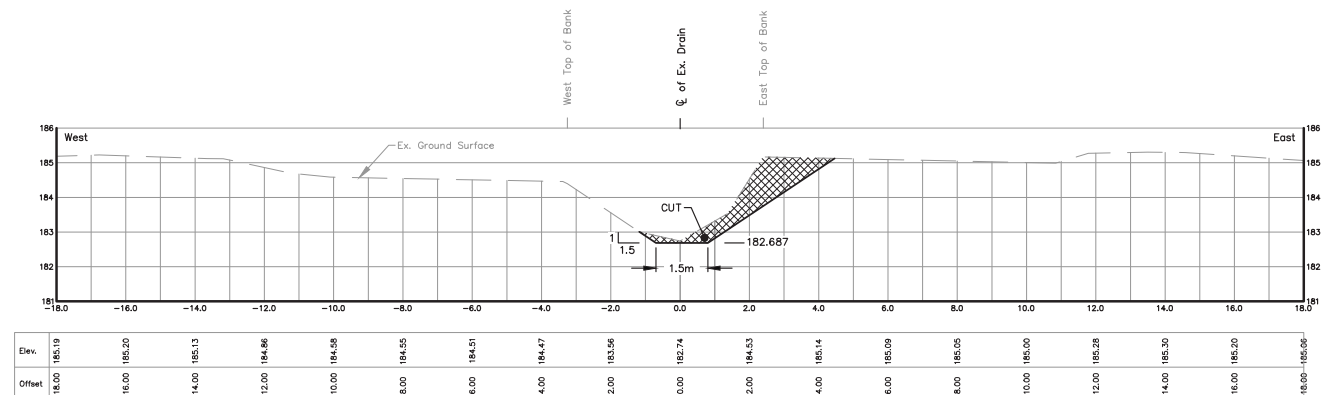
20



STA. 6+913.4
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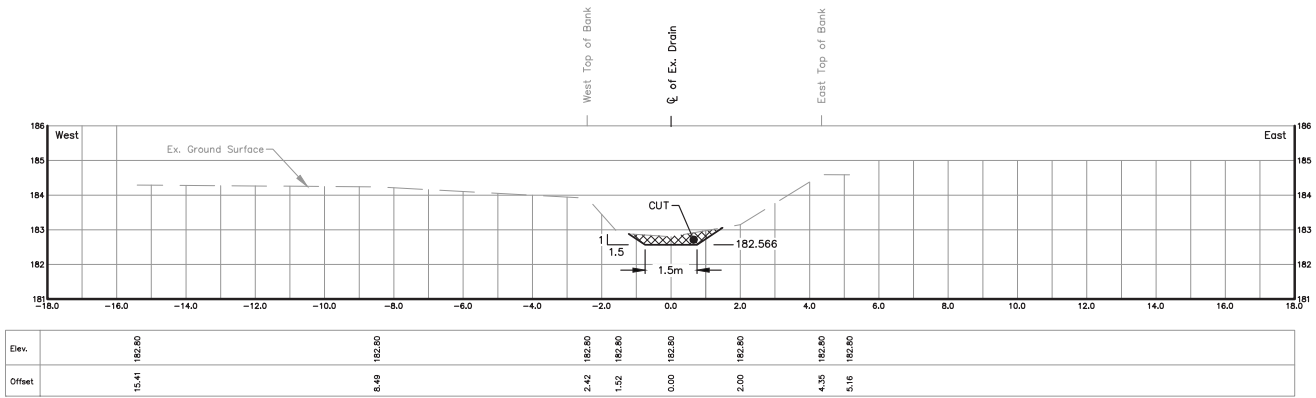
STA. 6+895.5
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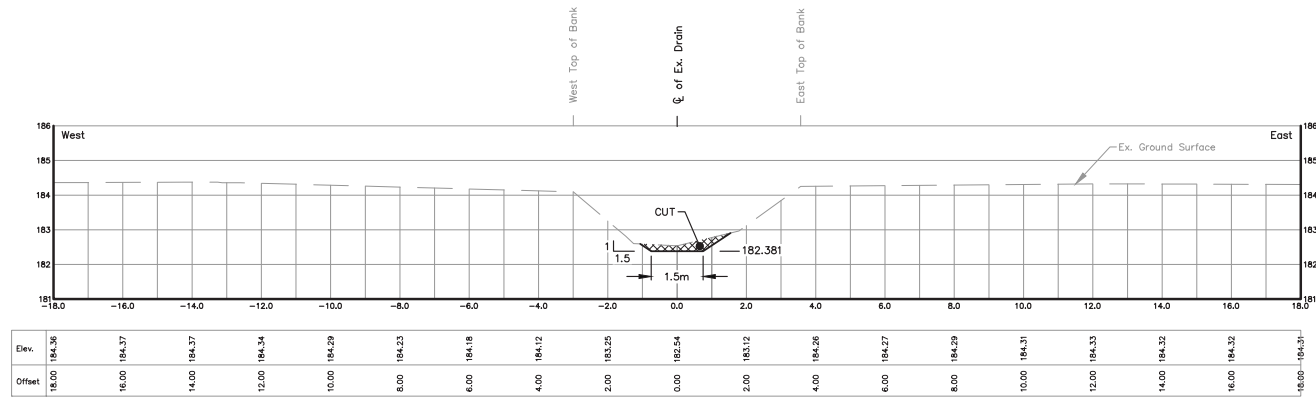
STA. 6+860.0
Scale = 1:100

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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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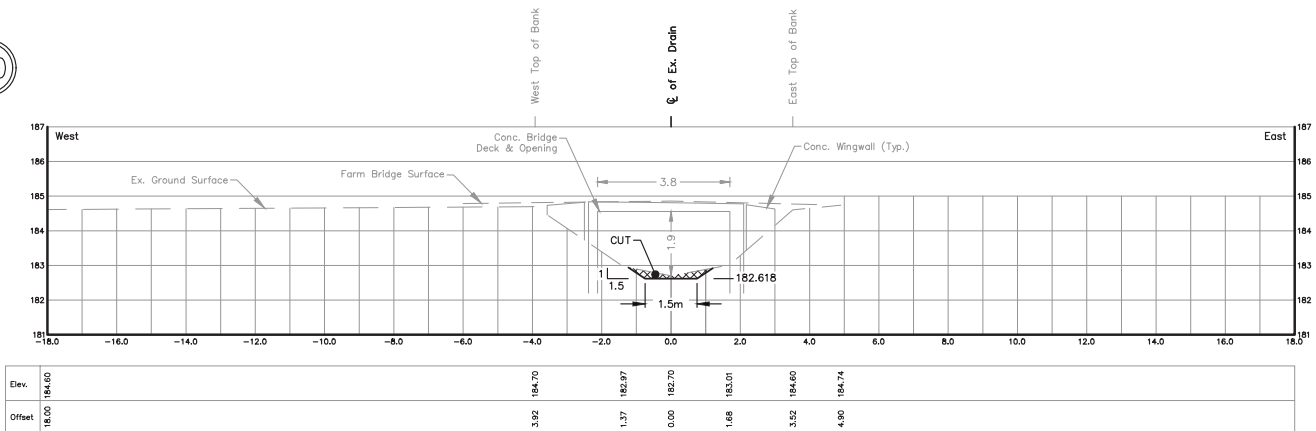


STA. 6+962.9
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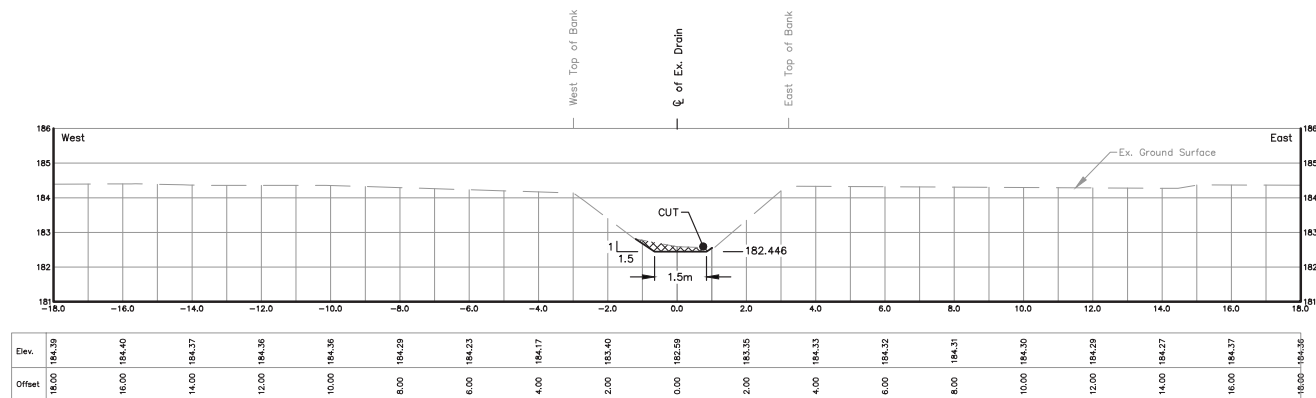


STA. 7+118.4
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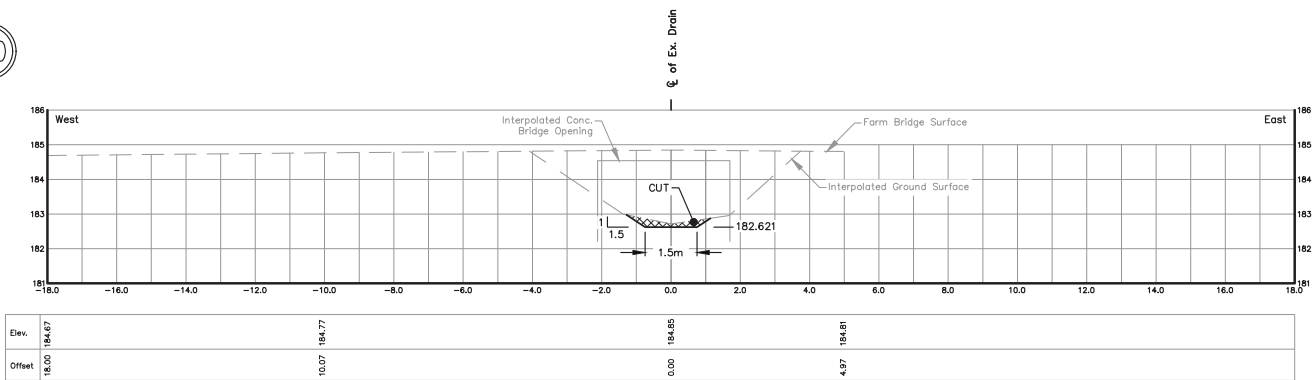


STA. 6+918.2
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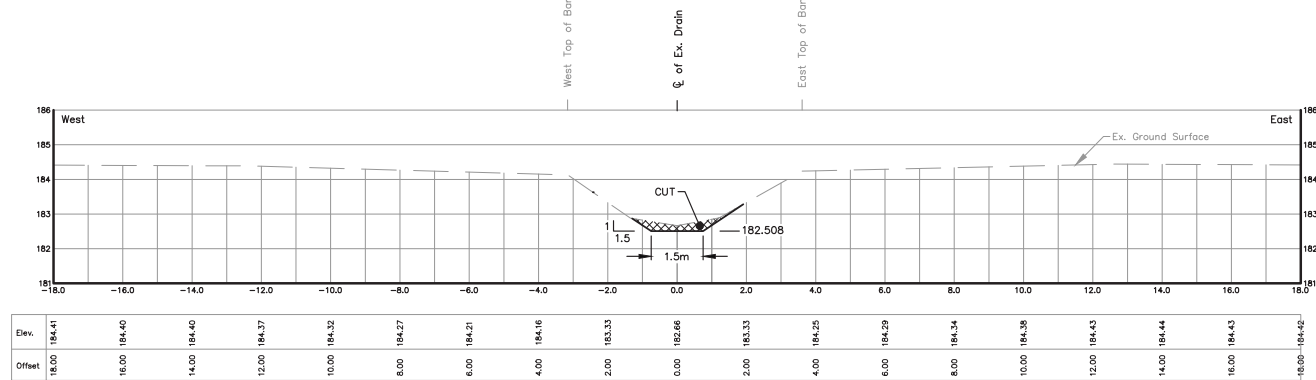


STA. 7+063.9
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20



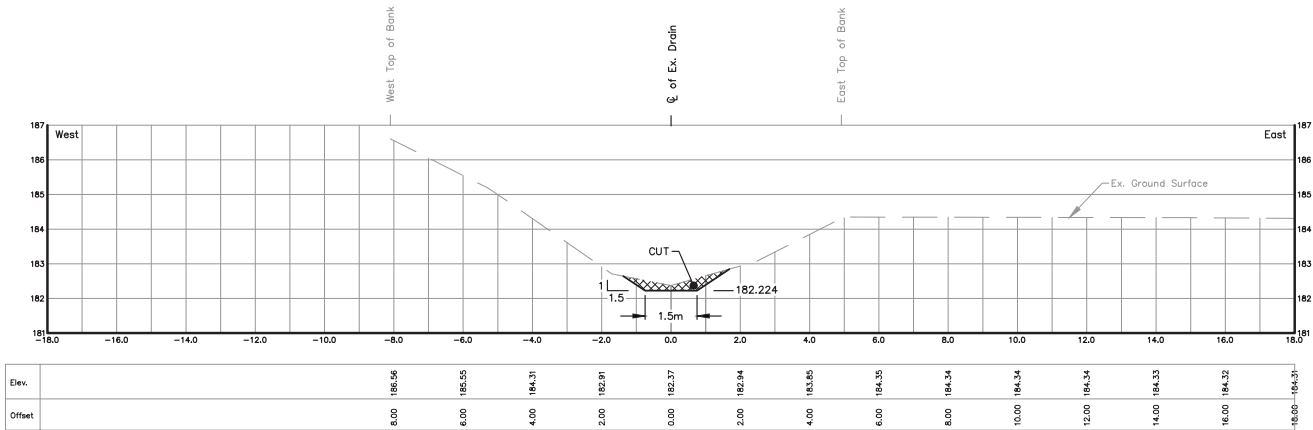
STA. 6+915.8
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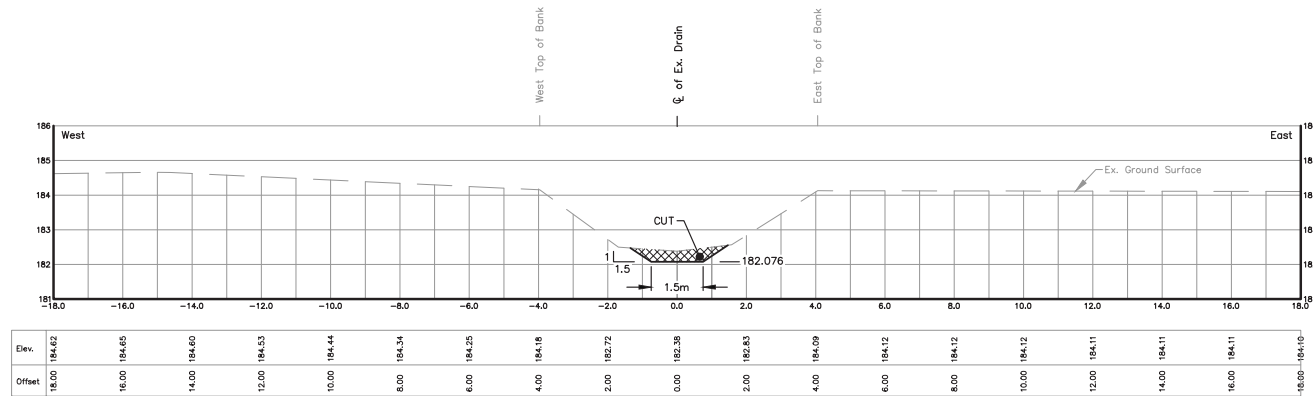
STA. 7+011.5
Scale = 1:100

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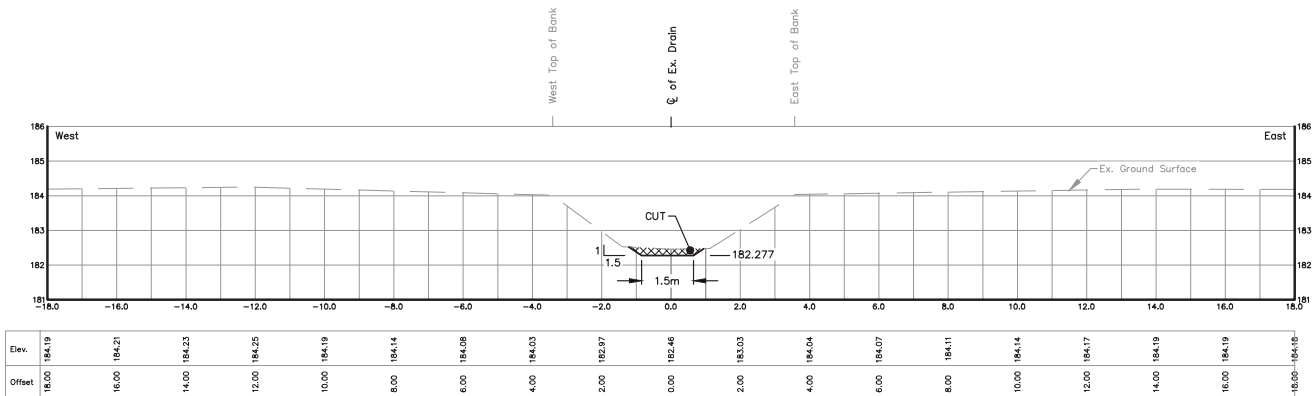
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 36 OF 51



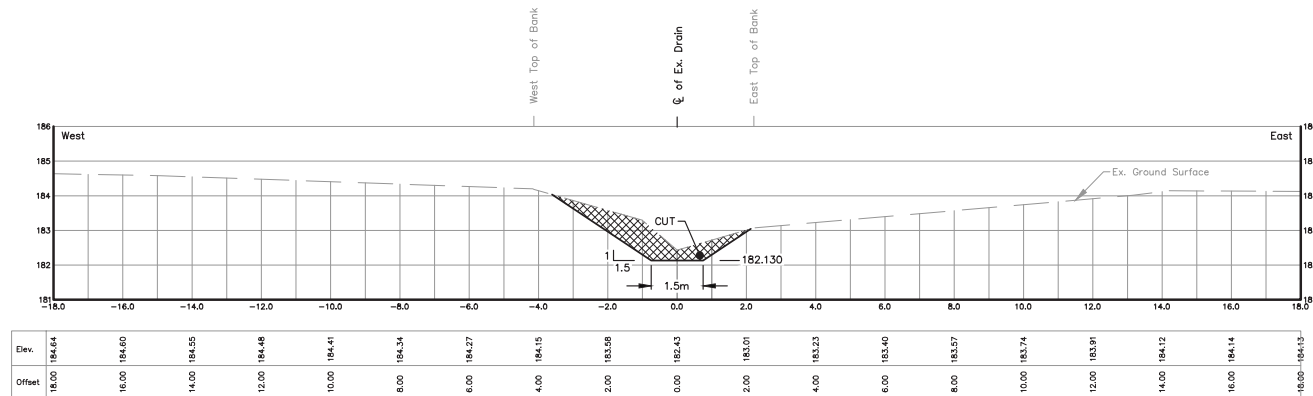
STA. 7+251.6
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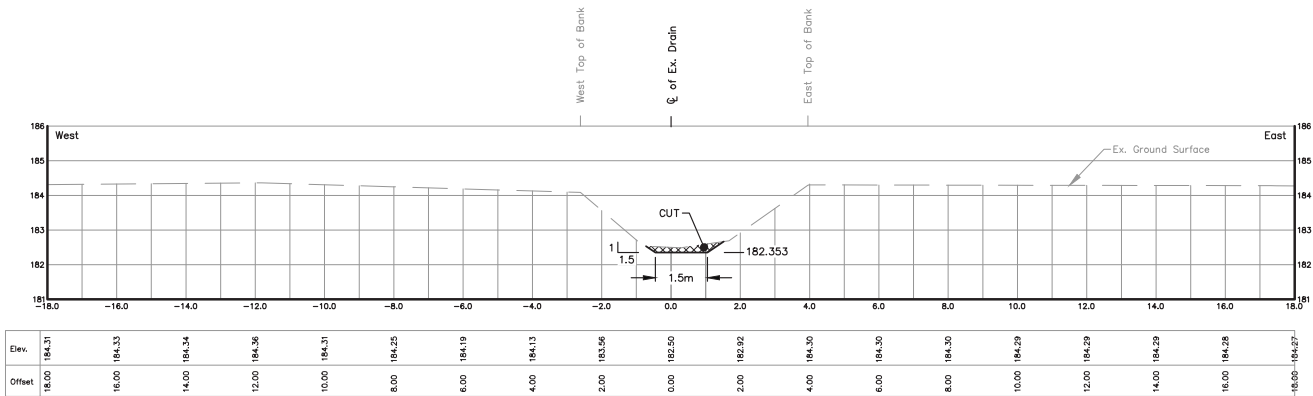
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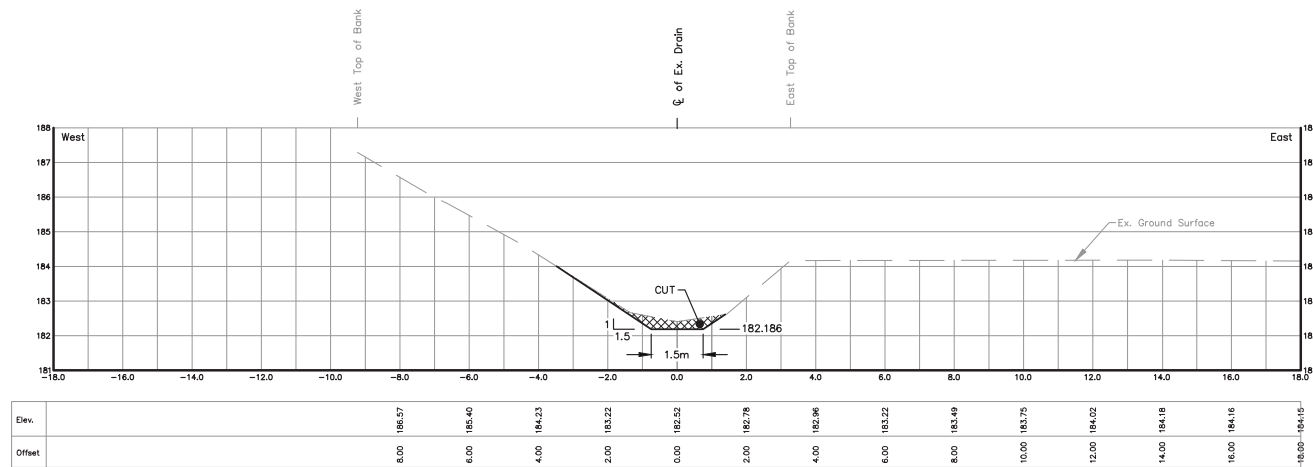
STA. 7+206.2
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STA. 7+330.3
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STA. 7+142.2
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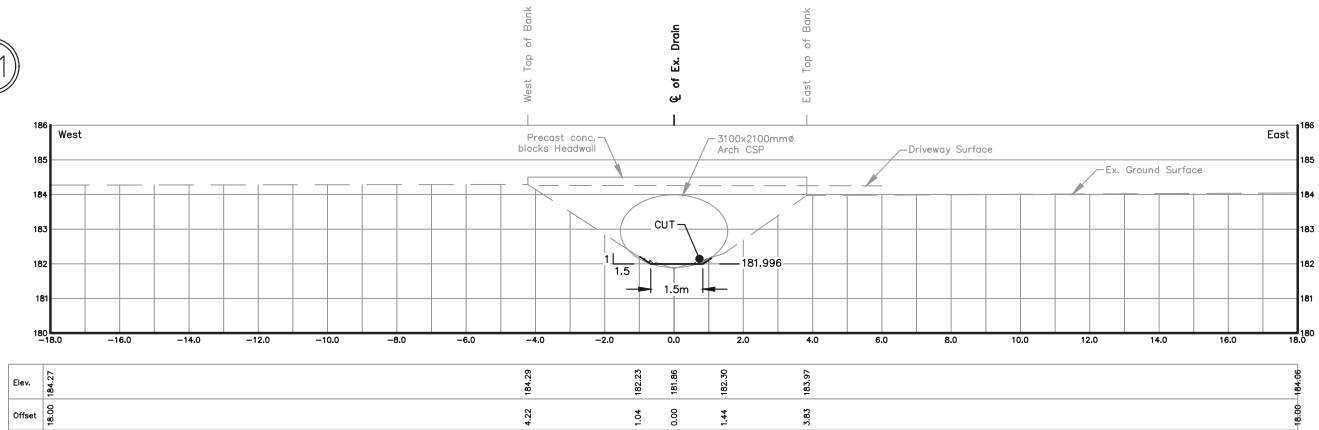


STA. 7+283.2
Scale = 1:100

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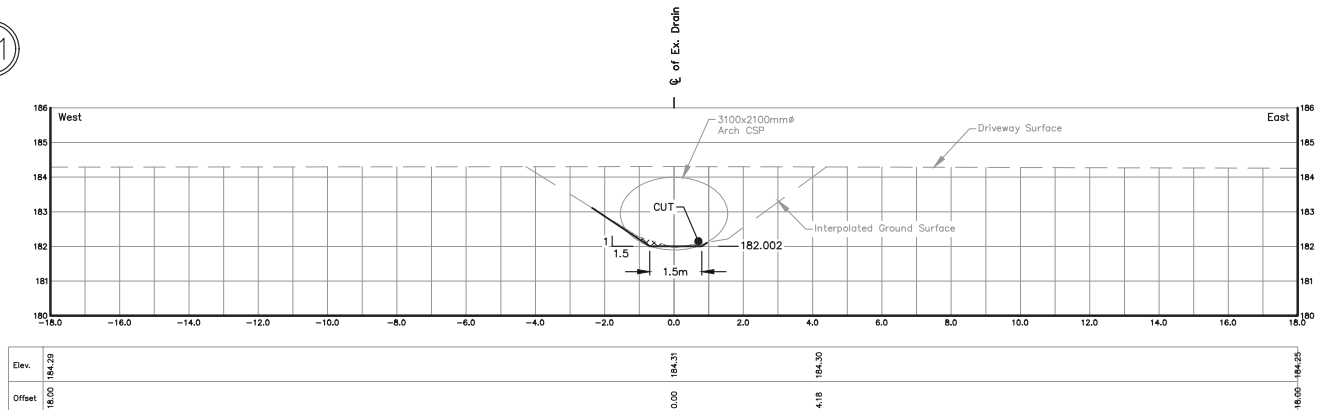
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
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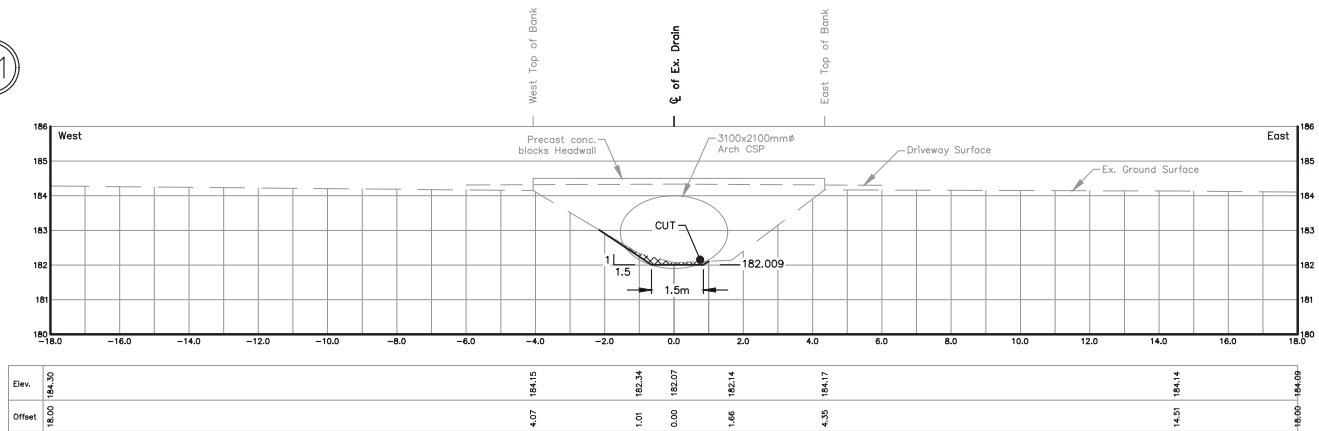
STA. 7+444.0
Scale = 1:100

21

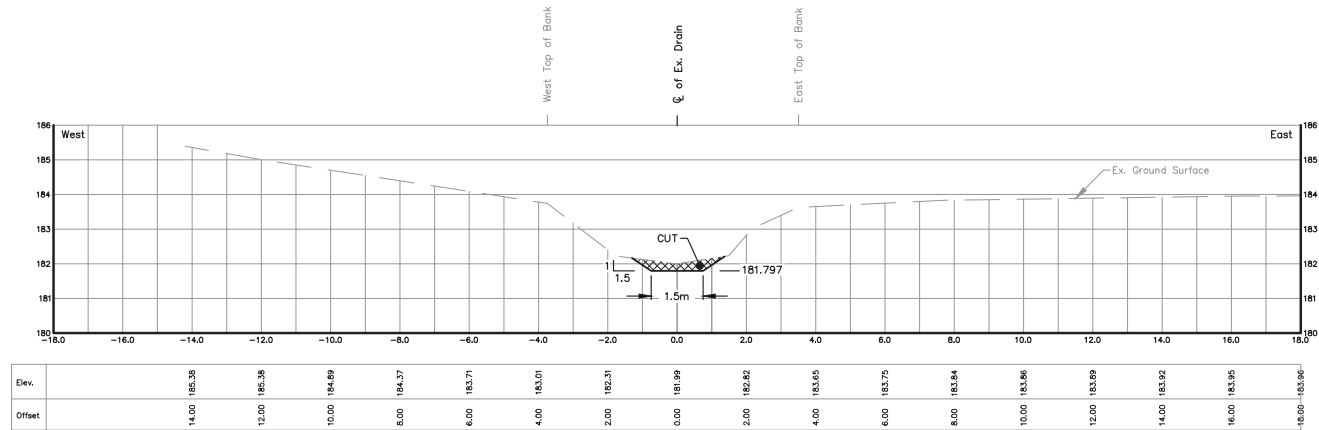


STA. 7+438.5
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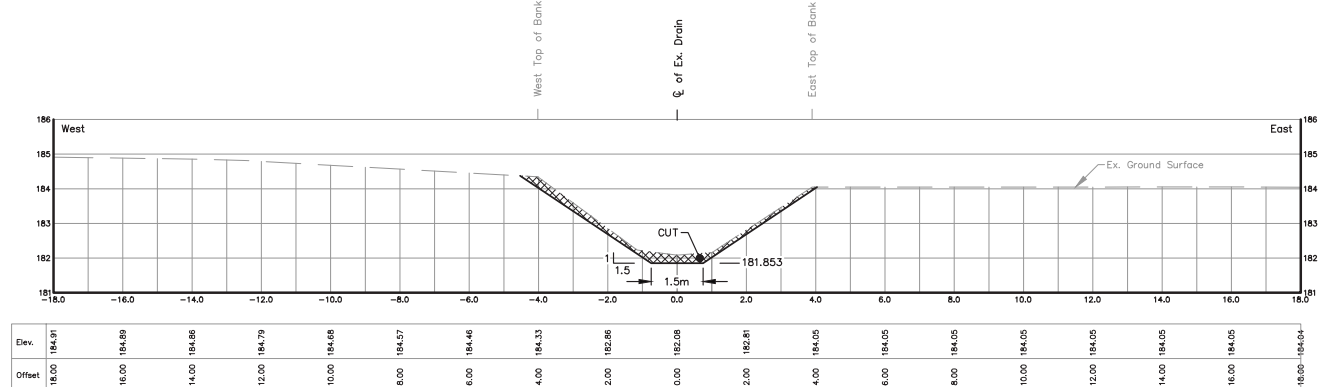
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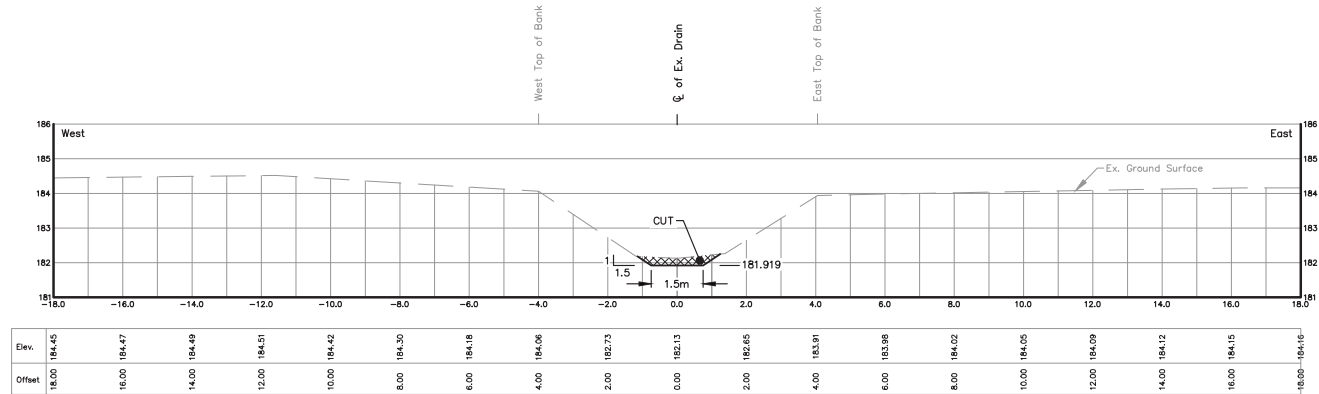
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STA. 7+612.0
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STA. 7+564.8
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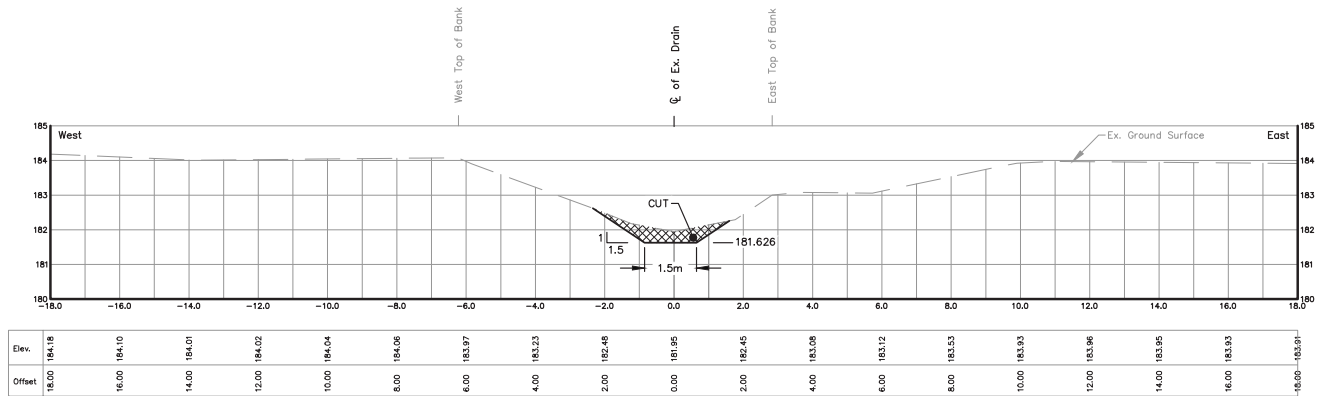


STA. 7+509.2
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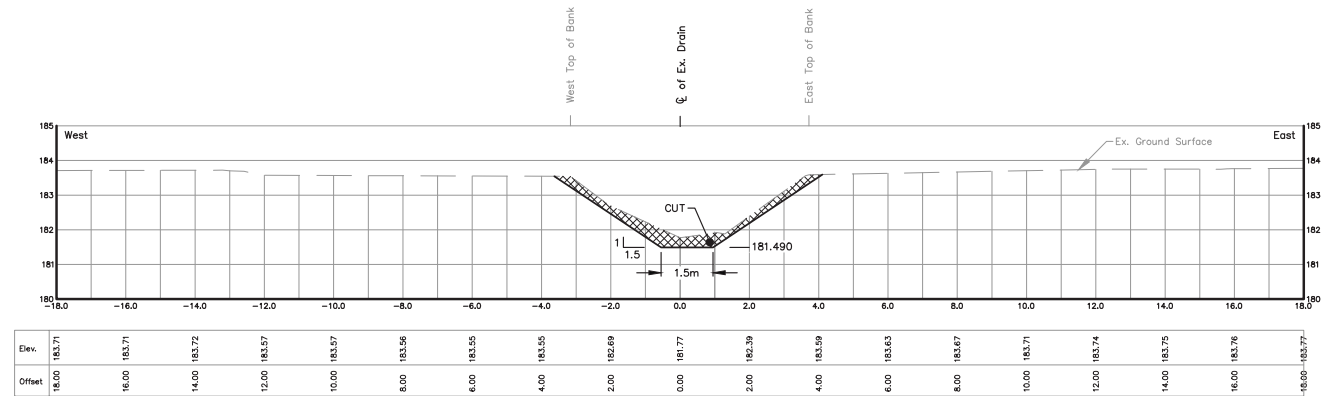
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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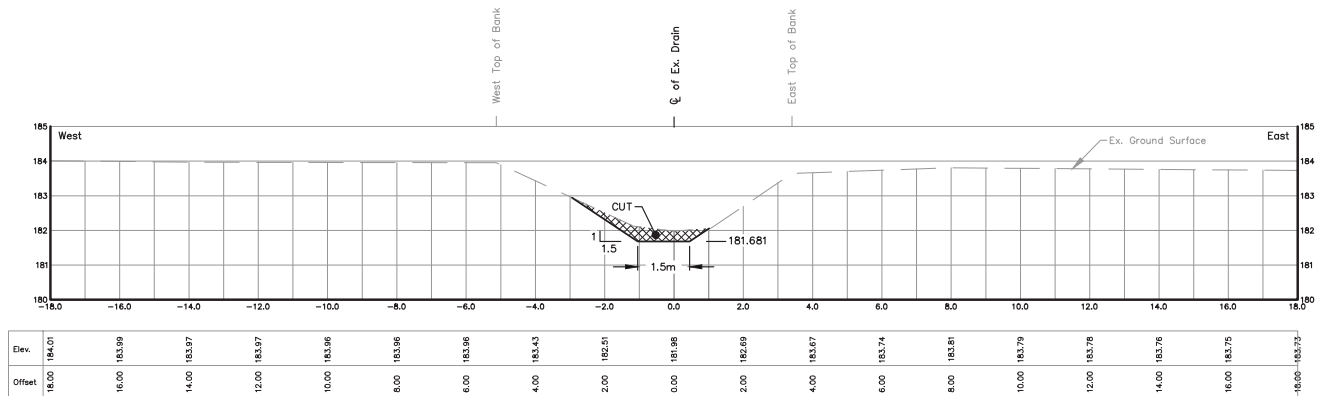
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections B.dwg 2/21/15 1:16



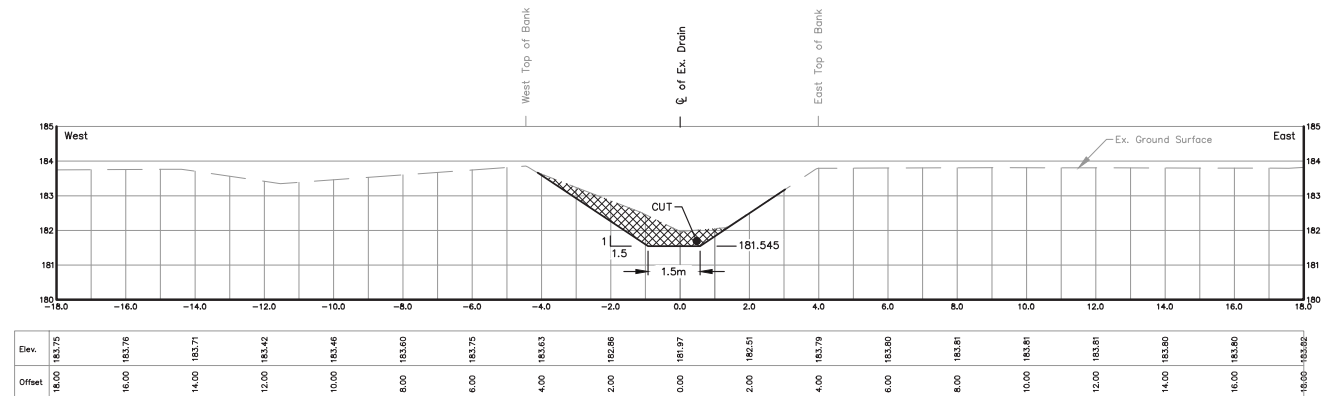
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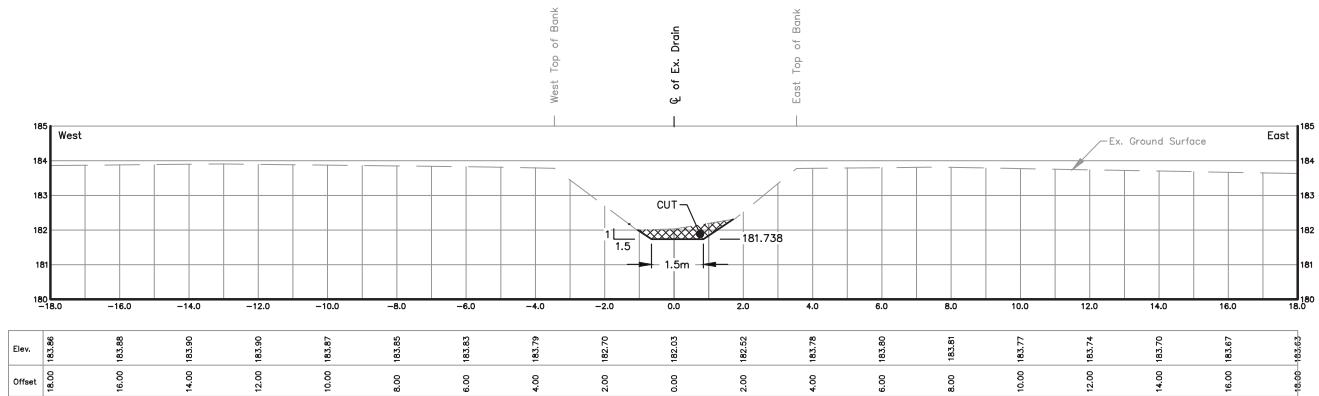
STA. 7+871.4
Scale = 1:100



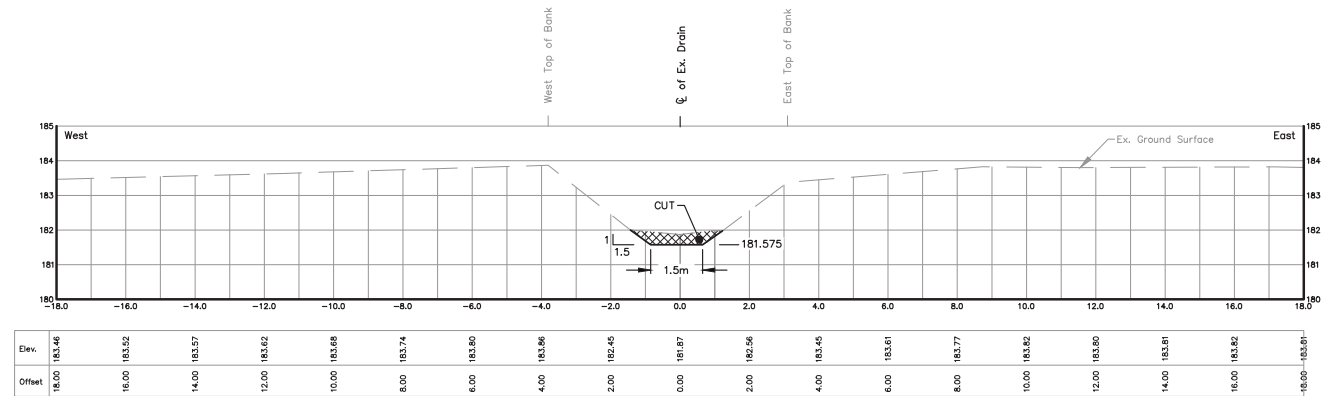
STA. 7+709.9
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STA. 7+824.6
Scale = 1:100



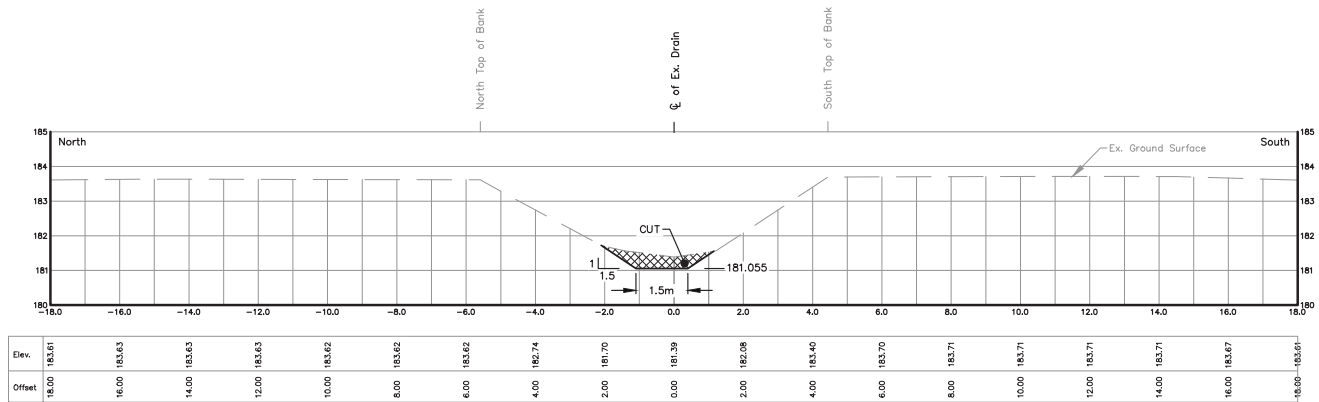
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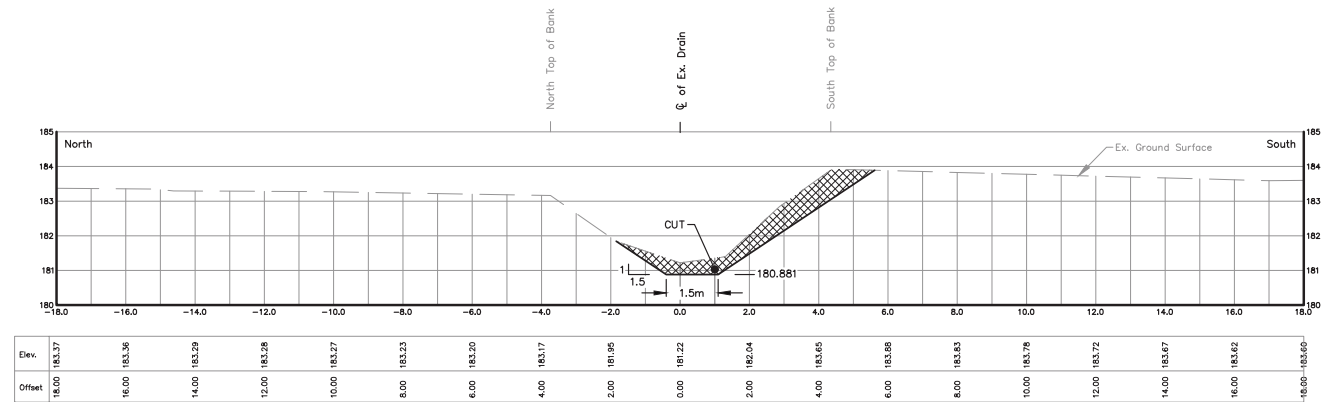
STA. 7+799.7
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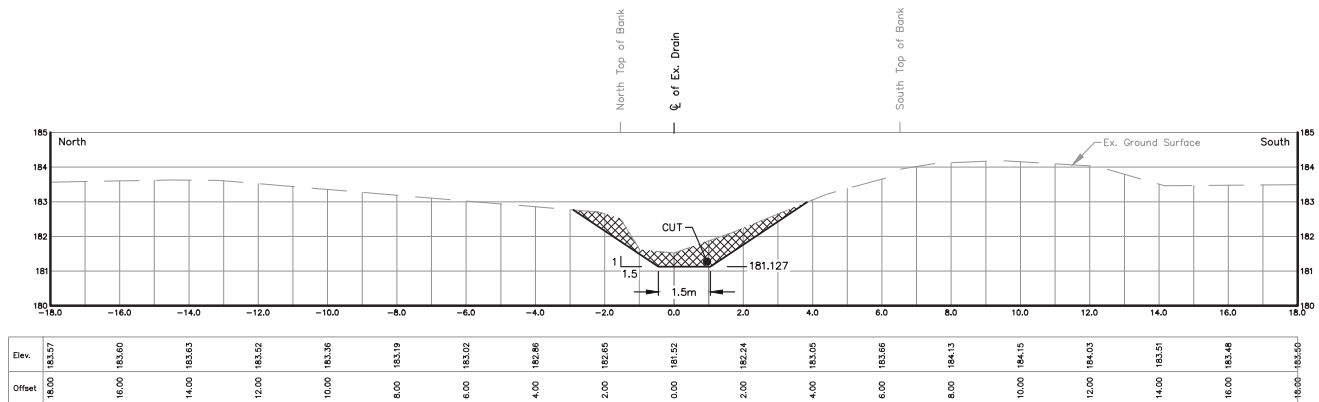
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 39 OF 51



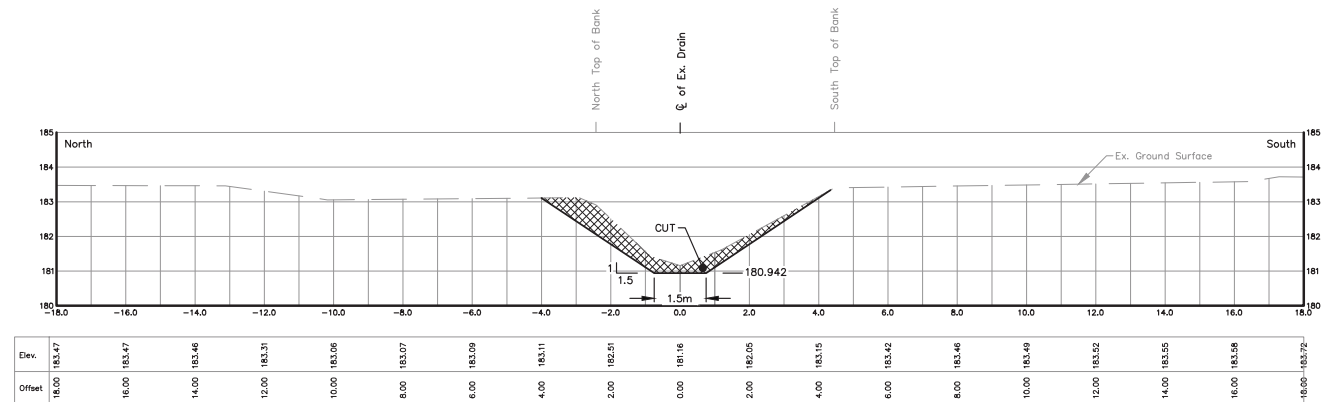
STA. 8+238.2
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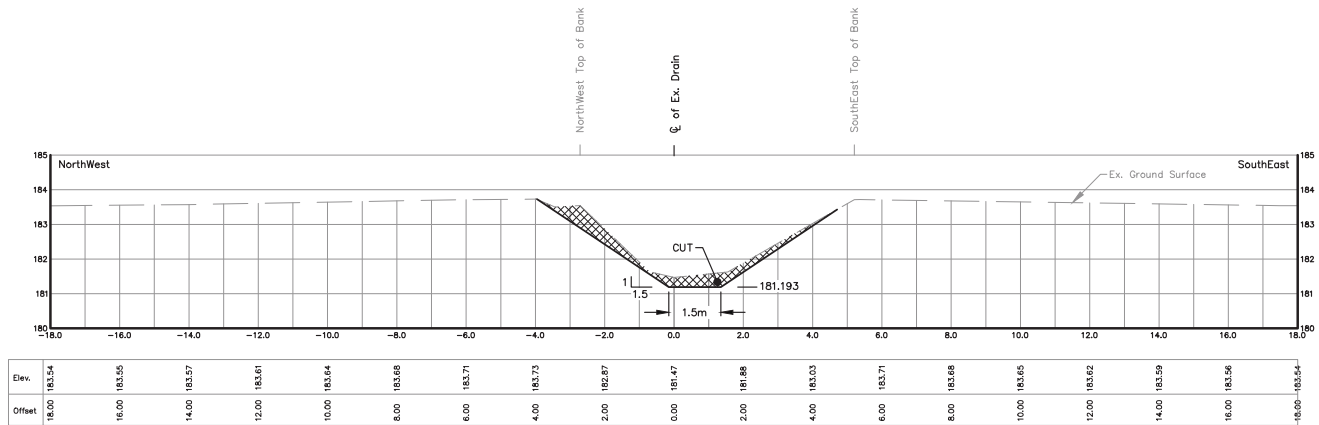
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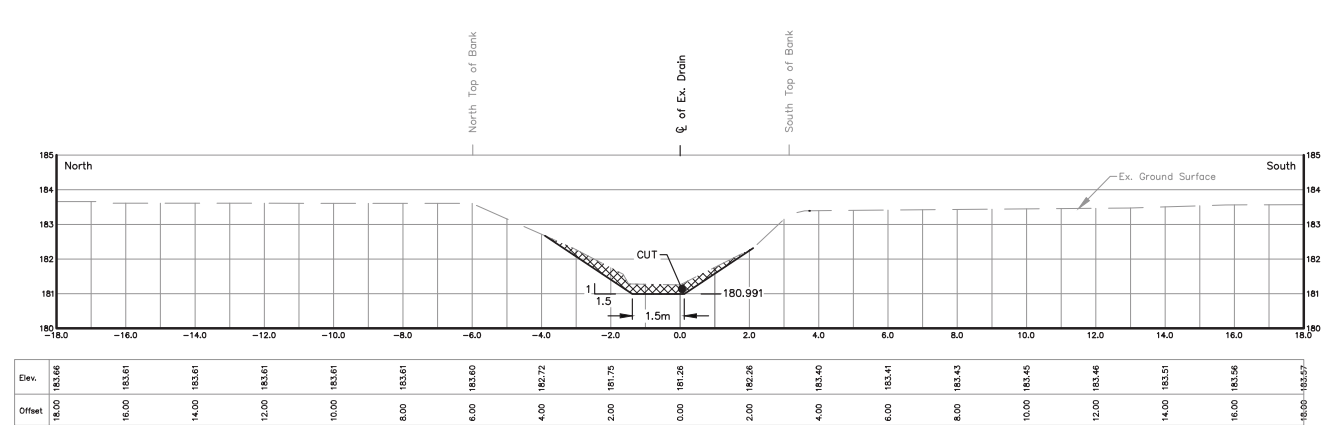
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STA. 8+333.7
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STA. 8+122.1
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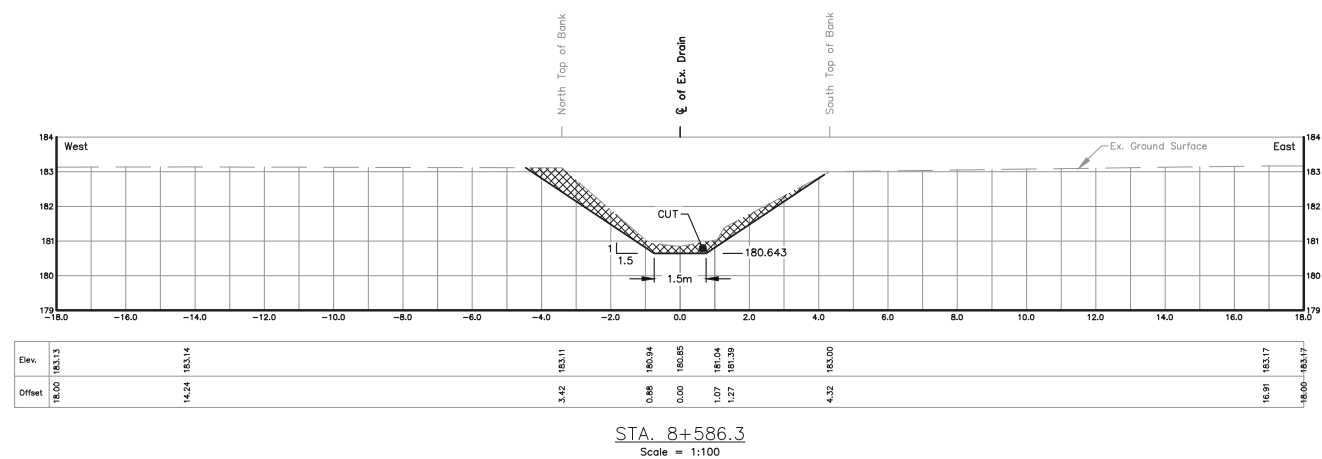
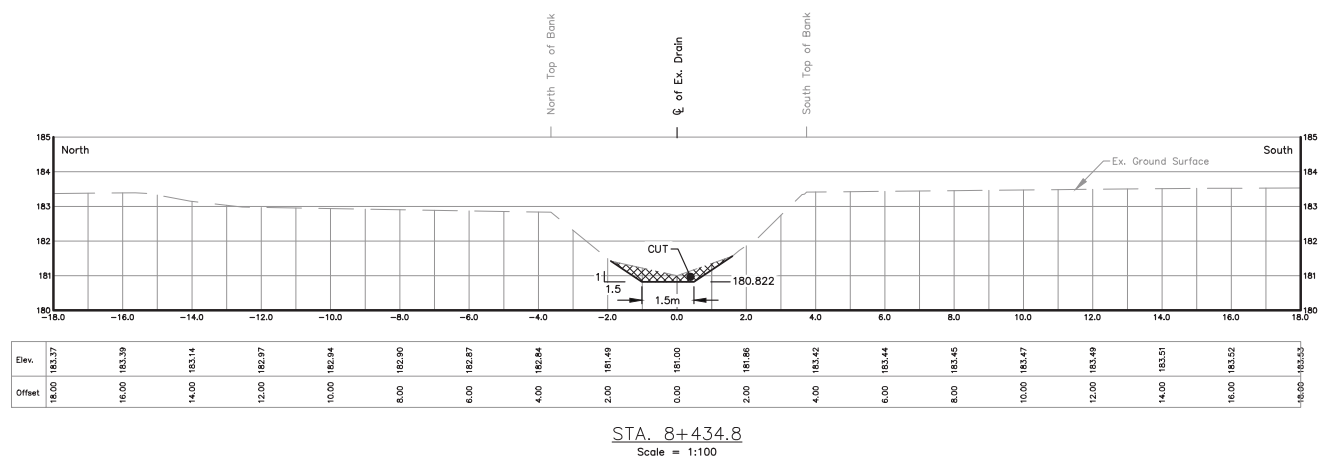
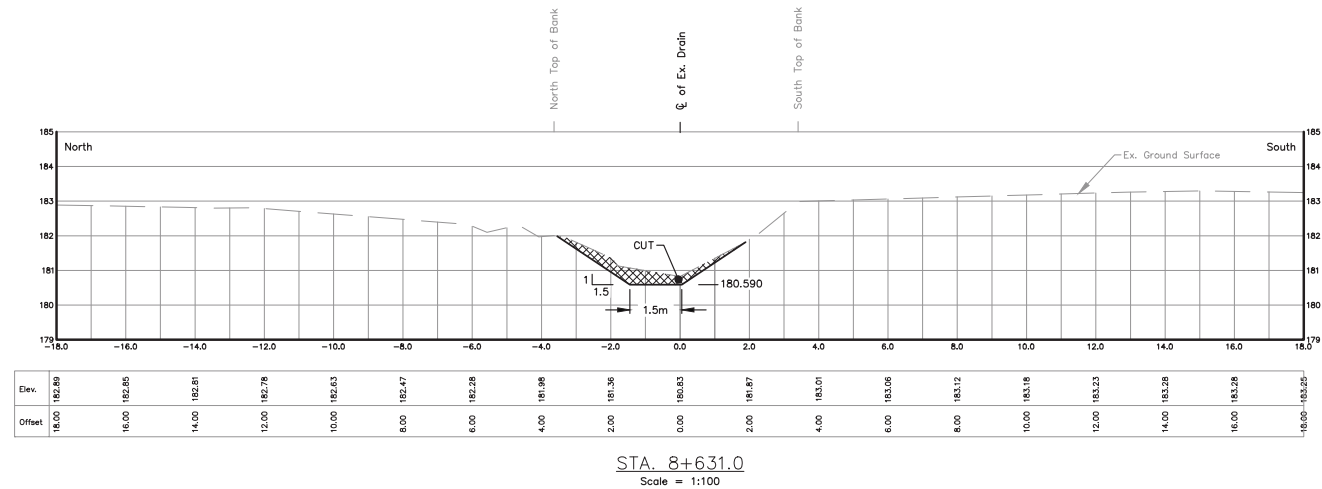
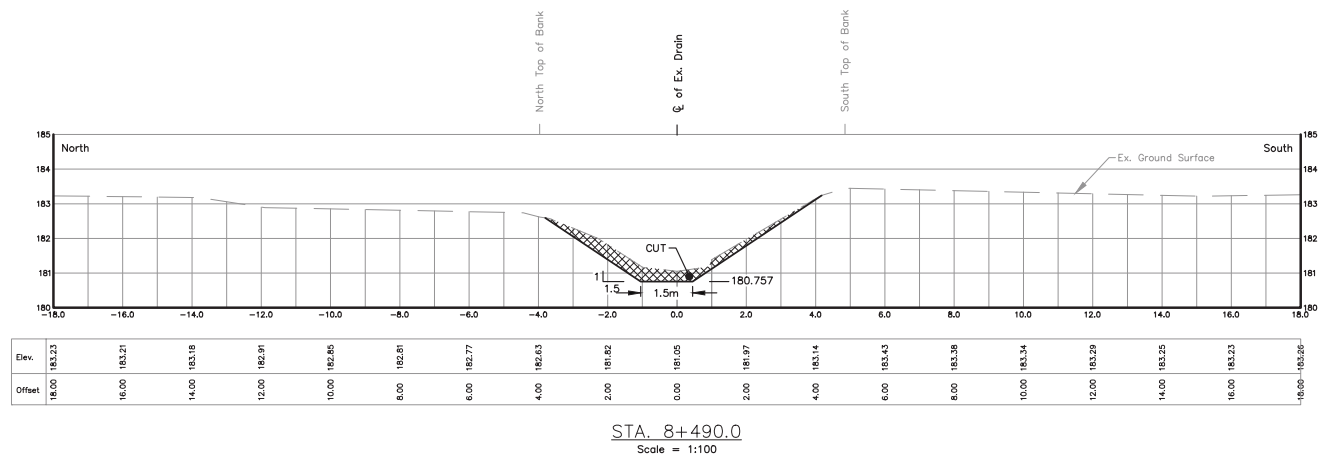
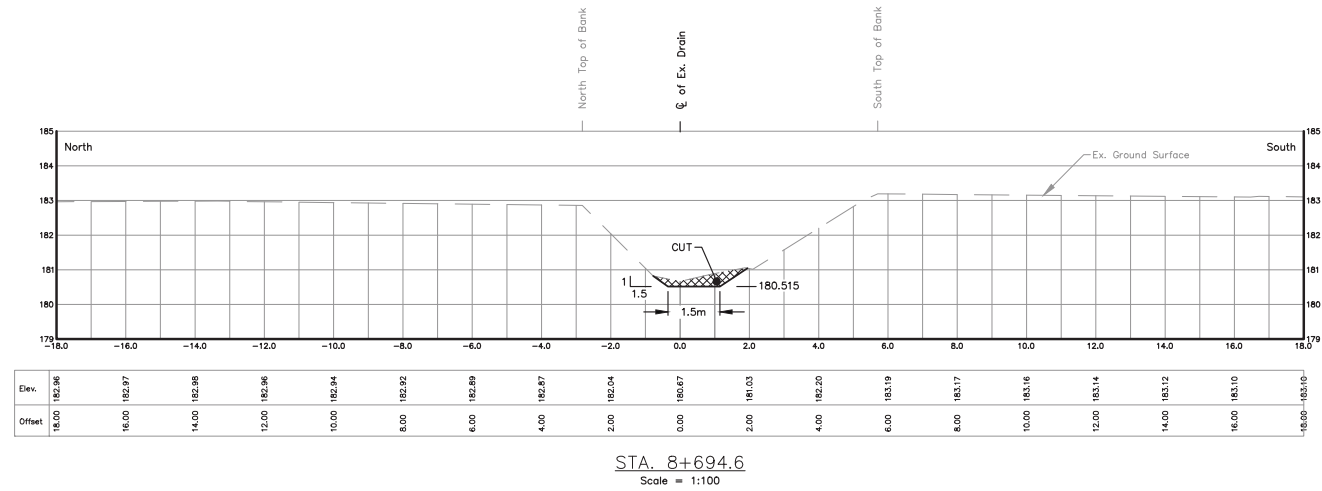
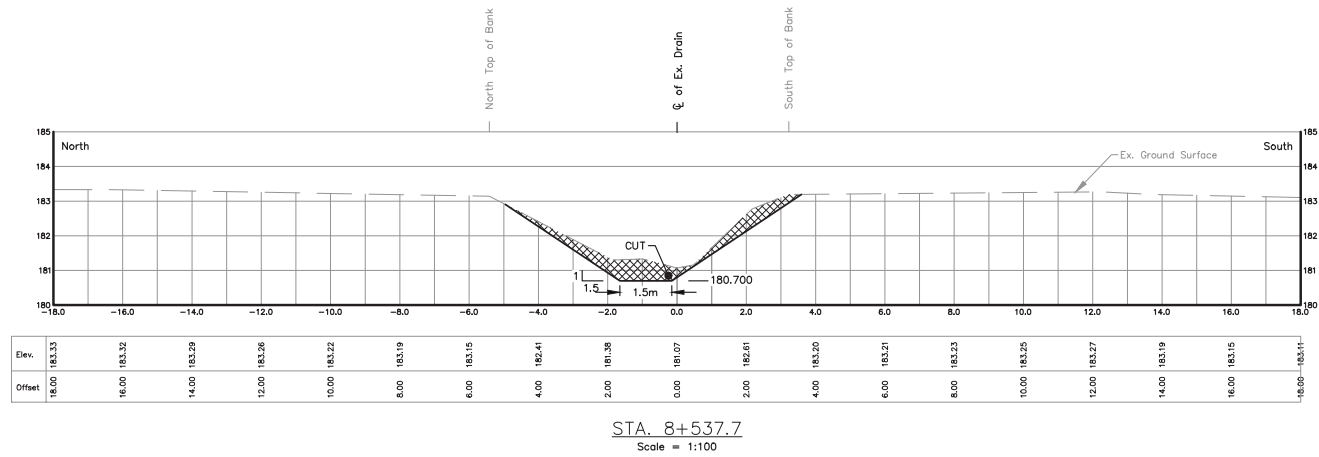


STA. 8+292.3
Scale = 1:100

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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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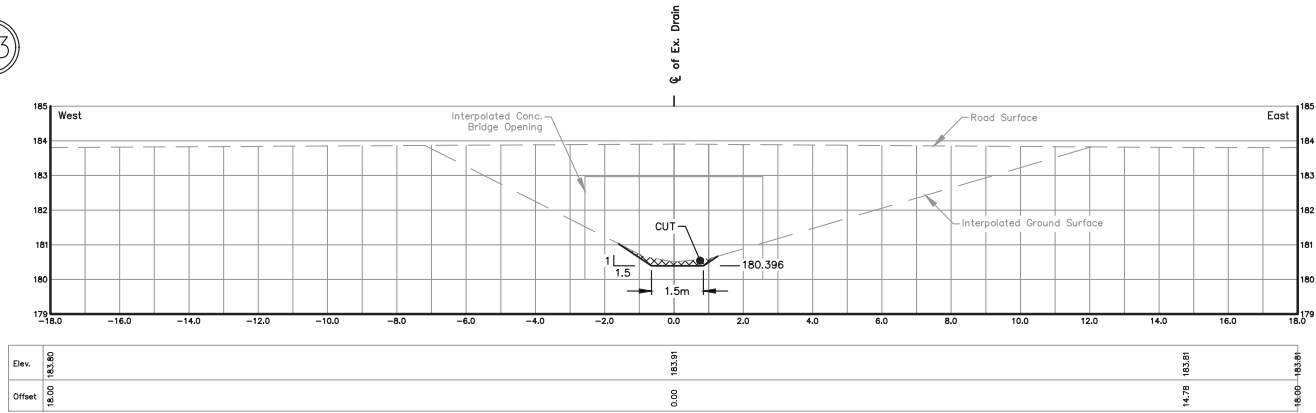
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections B.dwg 2/21/15 1:16



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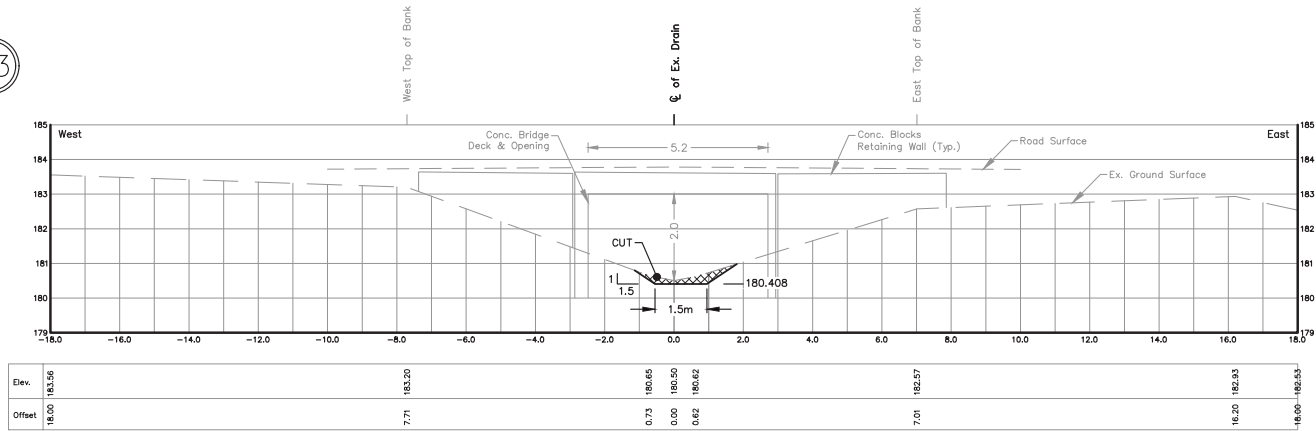
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
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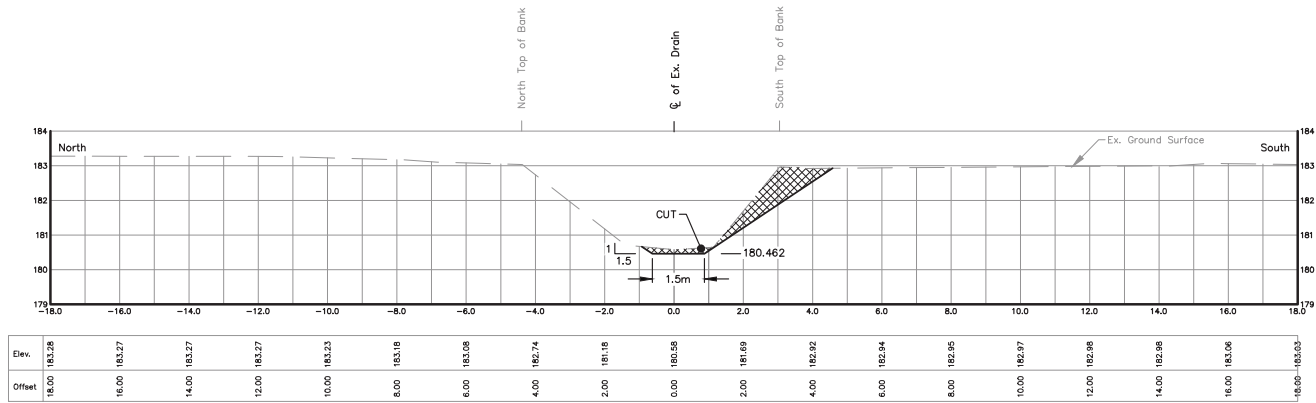


STA. 8+794.7
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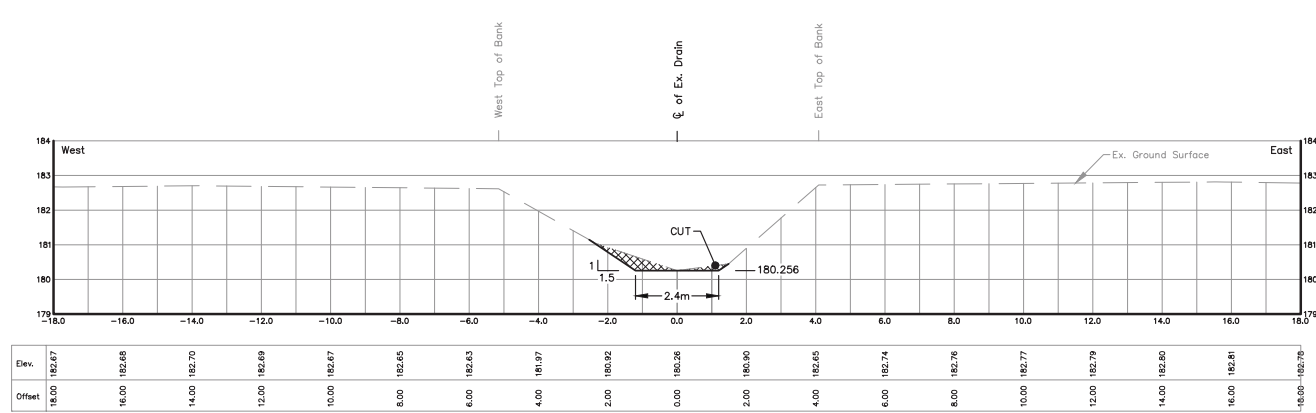
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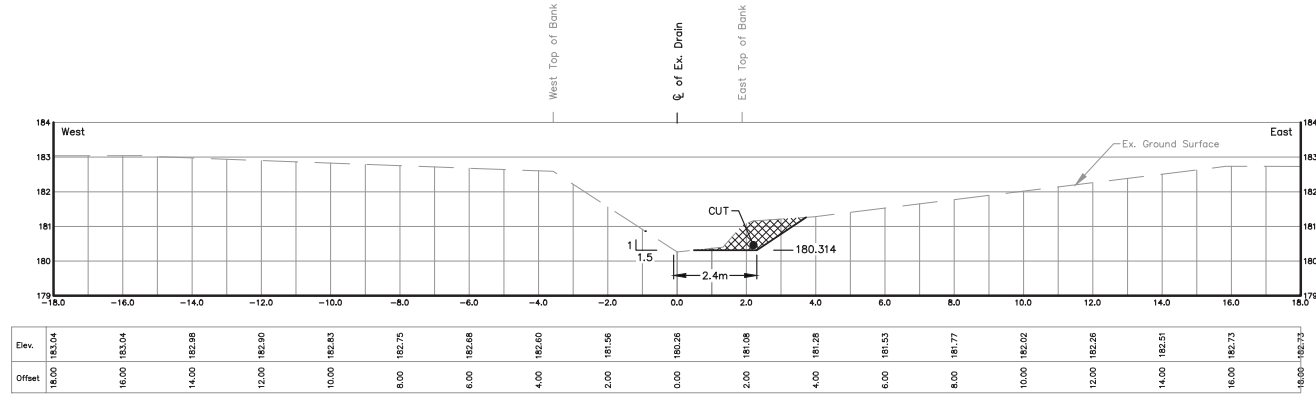
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STA. 8+739.5
Scale = 1:100

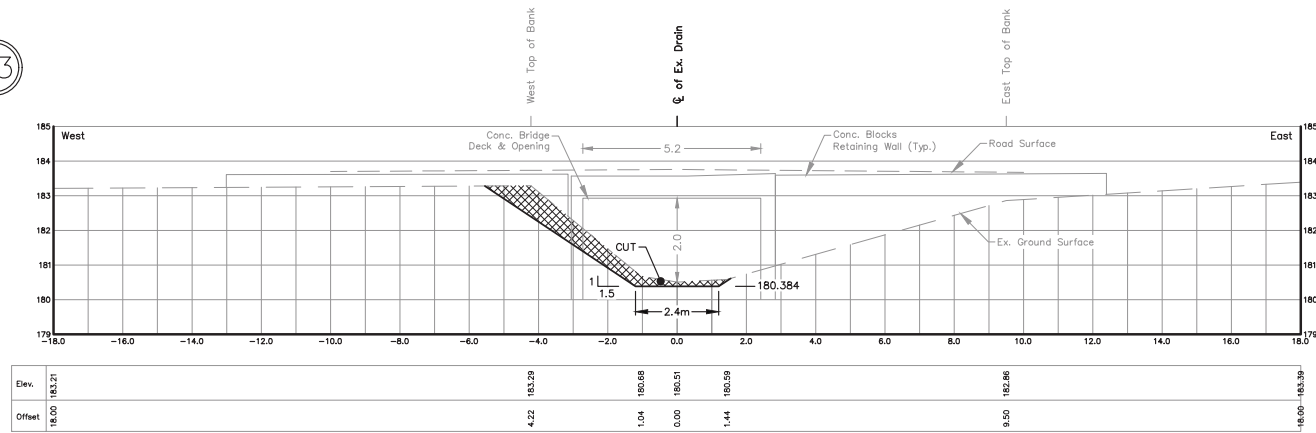


STA. 8+913.3
Scale = 1:100



STA. 8+864.3
Scale = 1:100

23

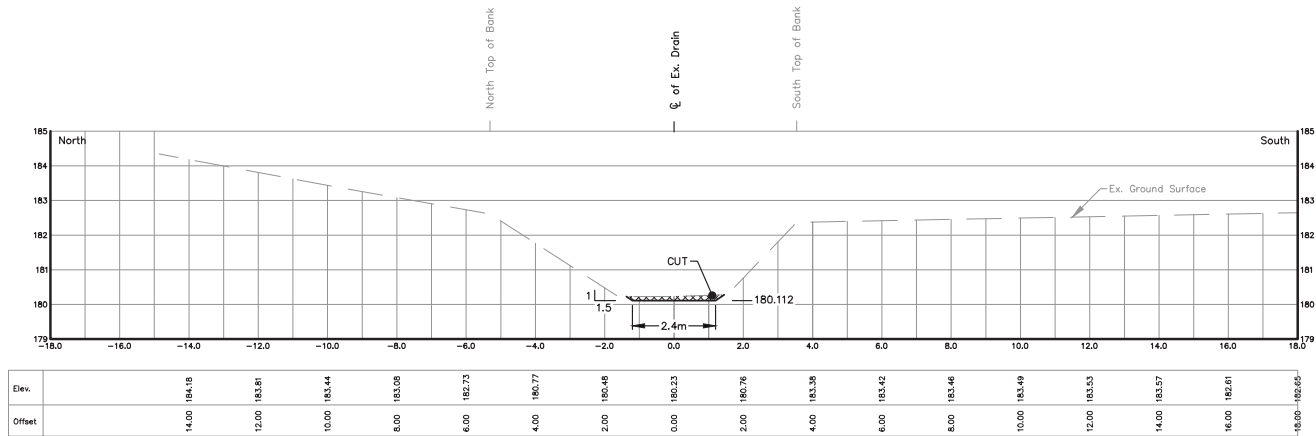


STA. 8+804.8
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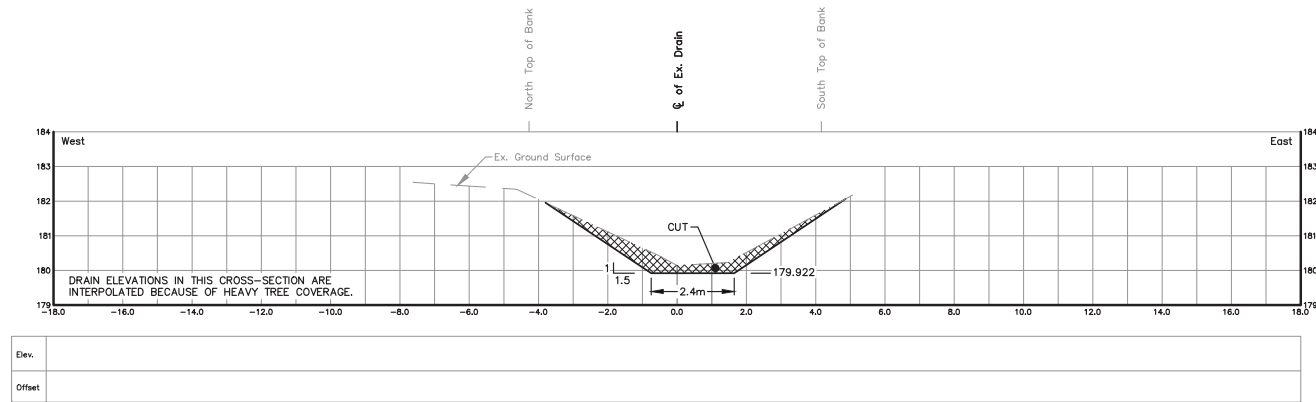
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
FILE No.: SHEET No.:
2015D010 43 OF 51

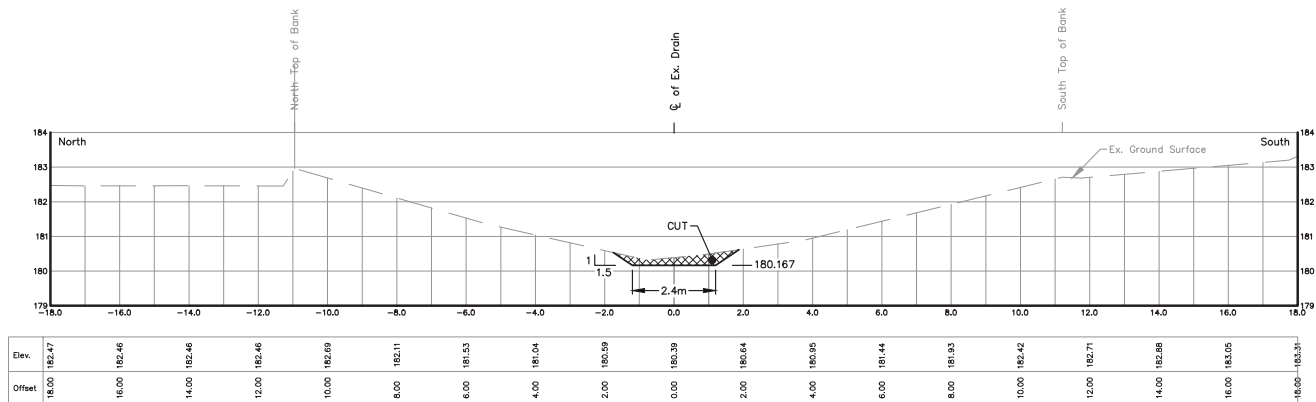
C:\Users\John\Desktop\REI-20150010 - Sullivan Creek Drain\REI20150010 Sections B.dwg 2/21/15 1:16



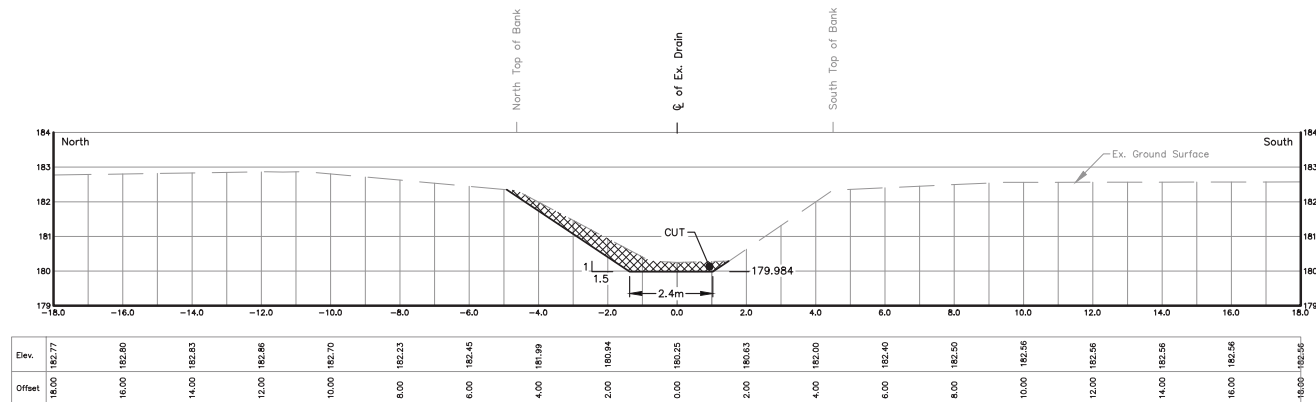
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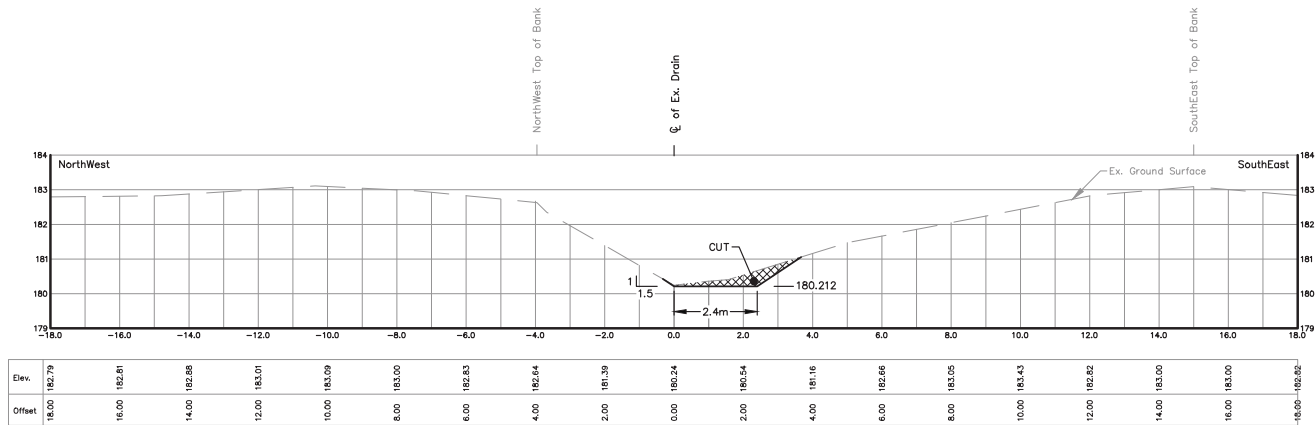
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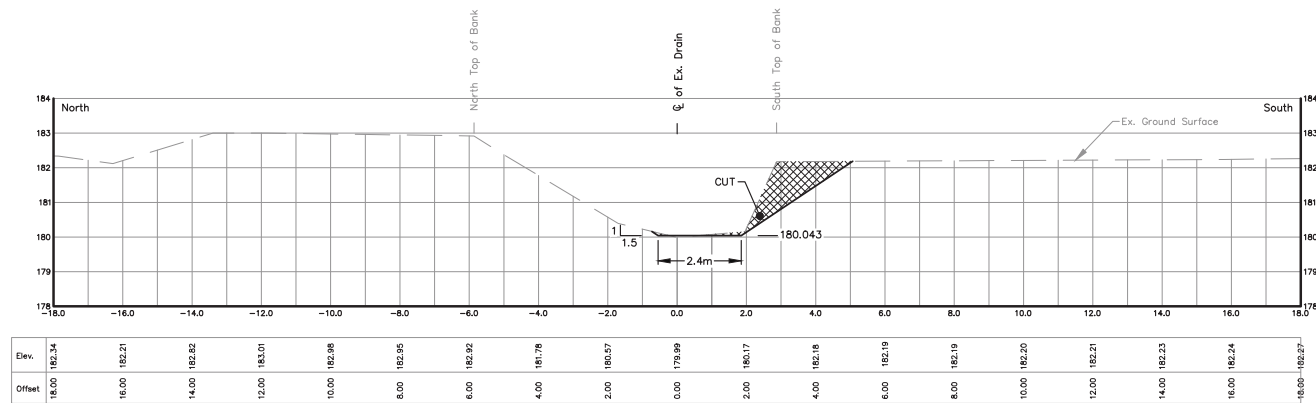
STA. 8+988.1
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STA. 9+140.4
Scale = 1:100



STA. 8+950.4
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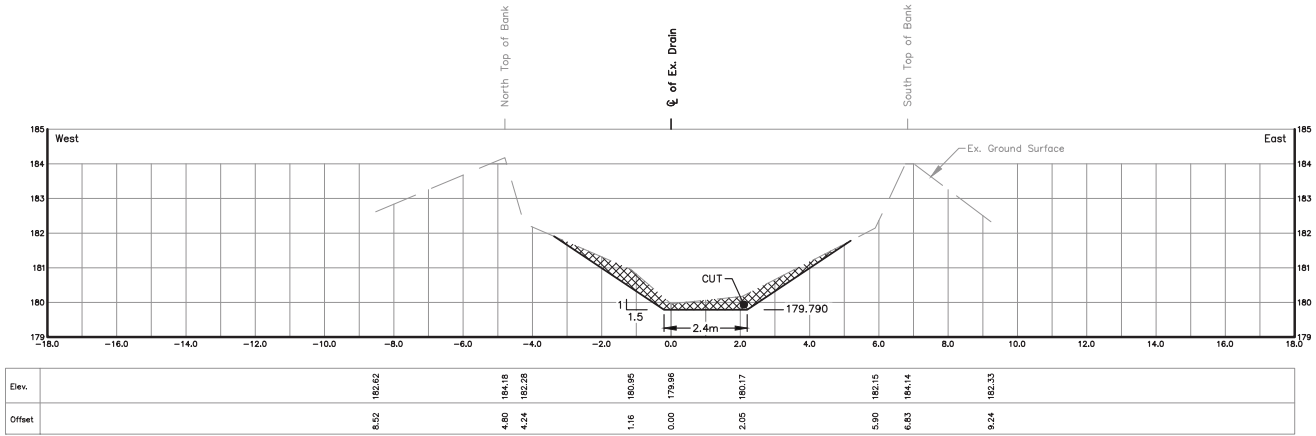


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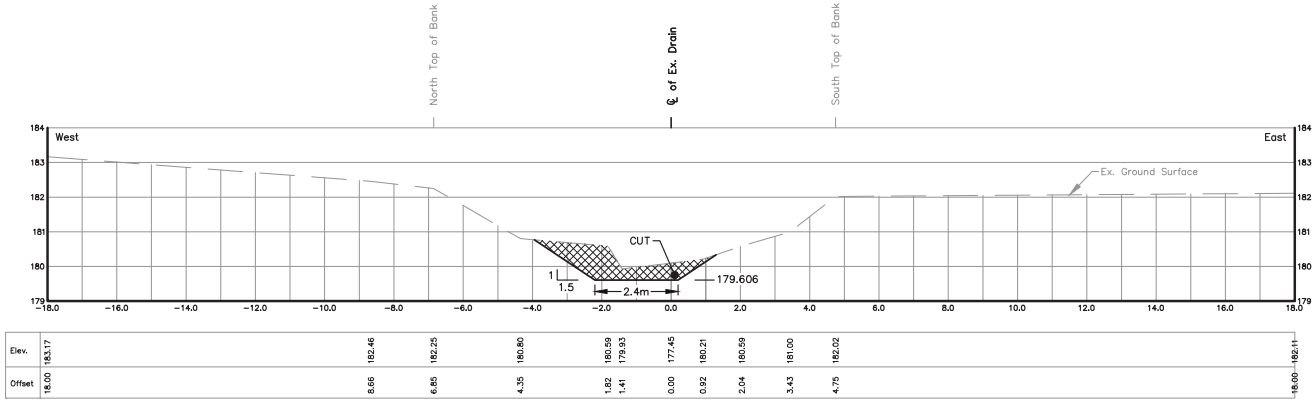
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PLOT CODE: 1:1
COMPUTER FILE: REI2015D010.DWG
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2015D010 44 OF 51

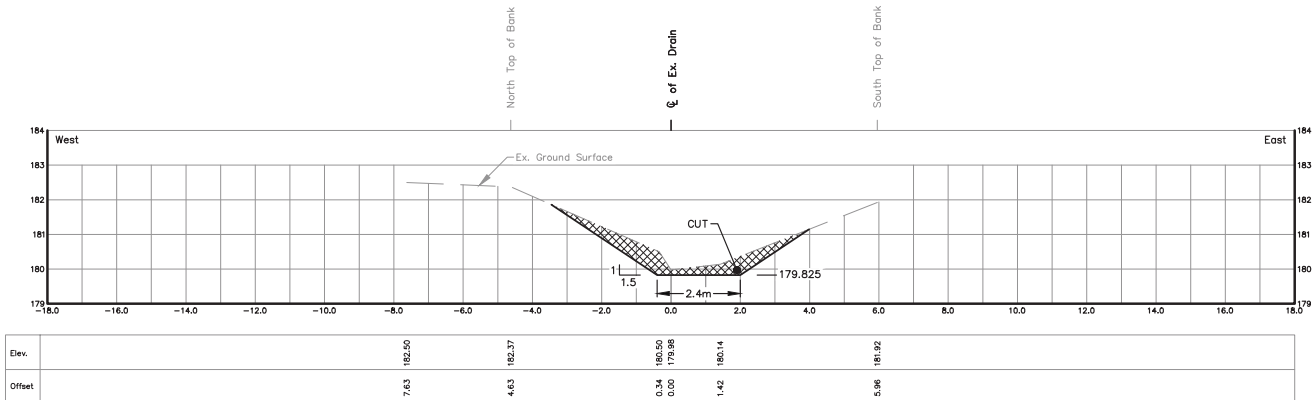
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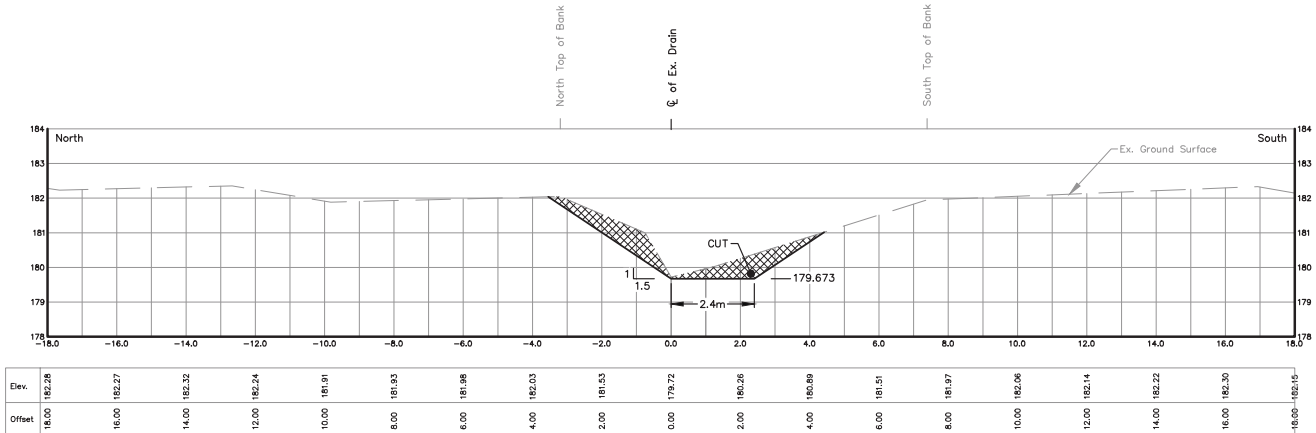
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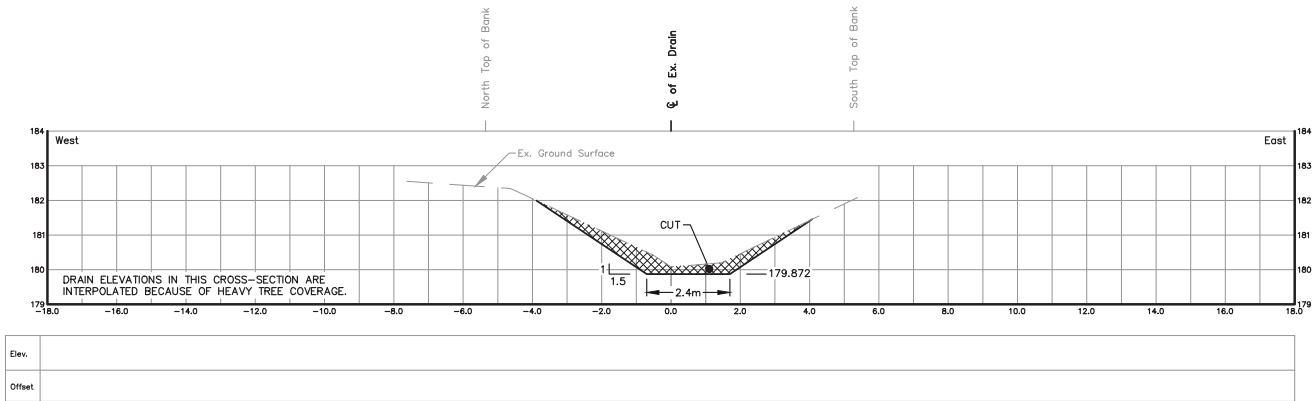
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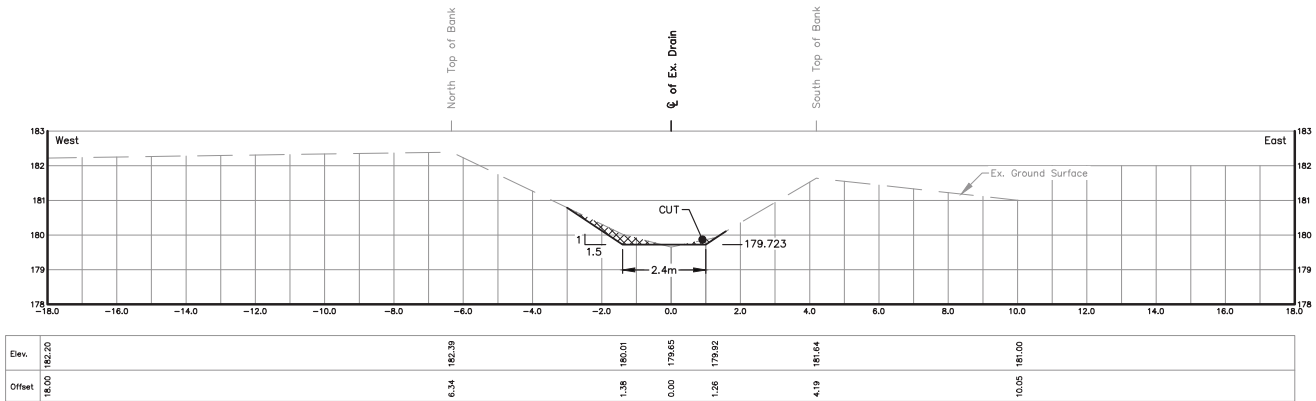
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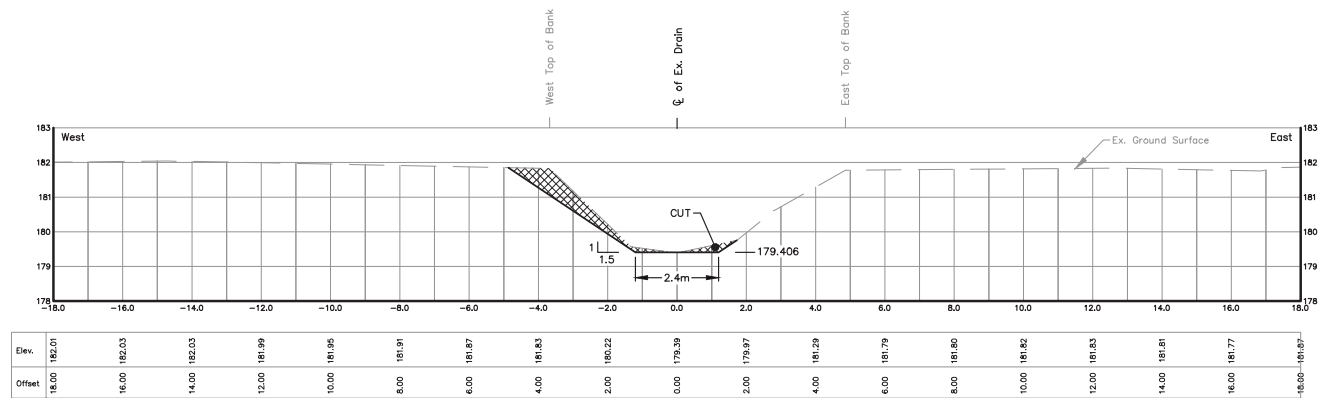


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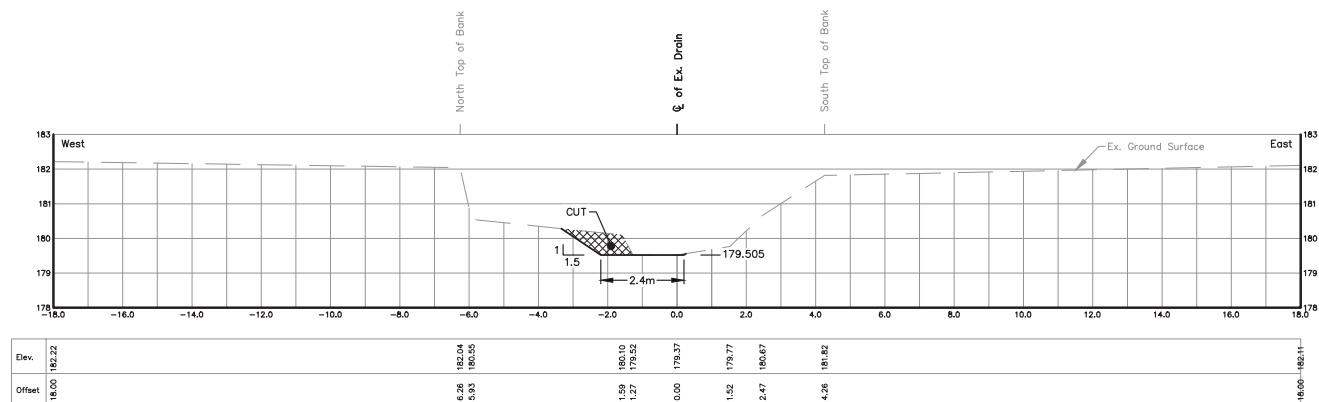
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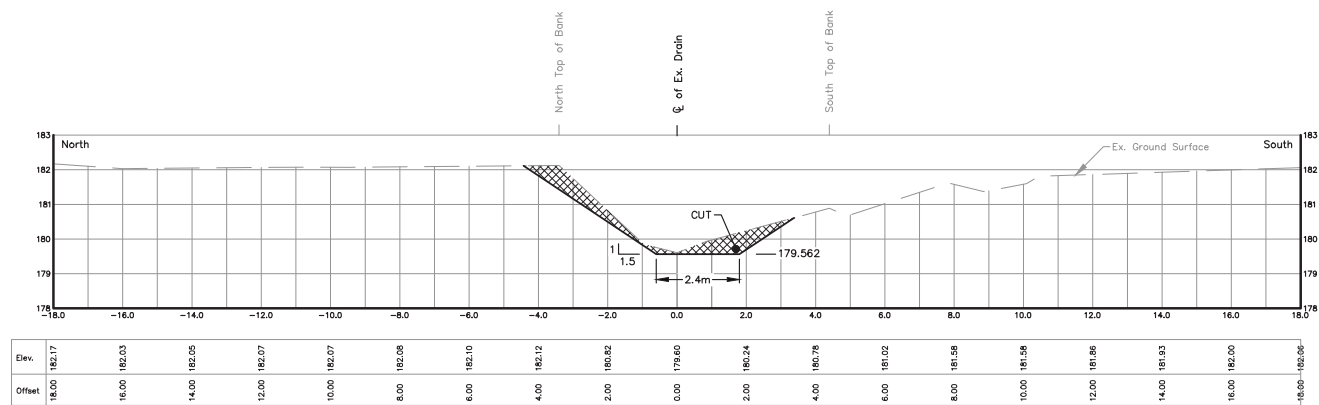
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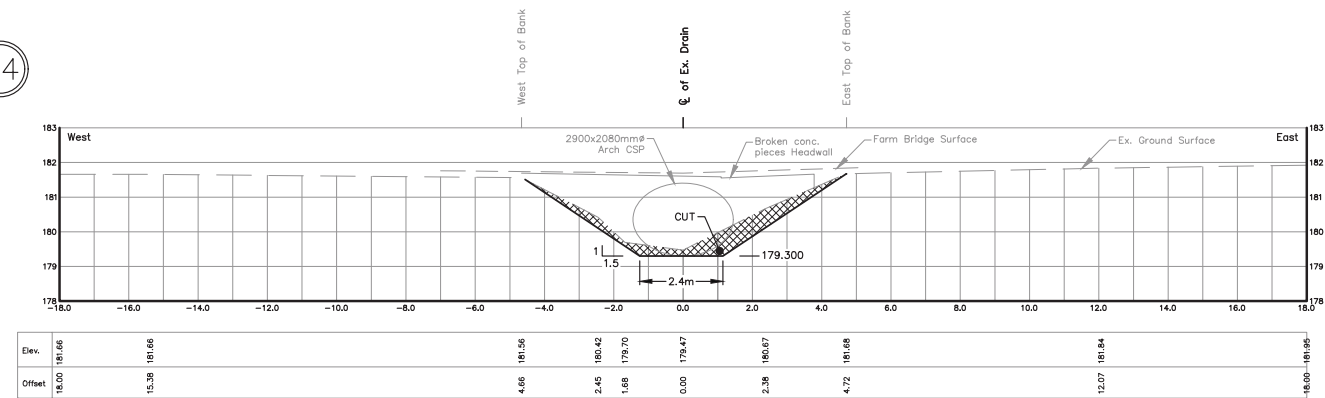


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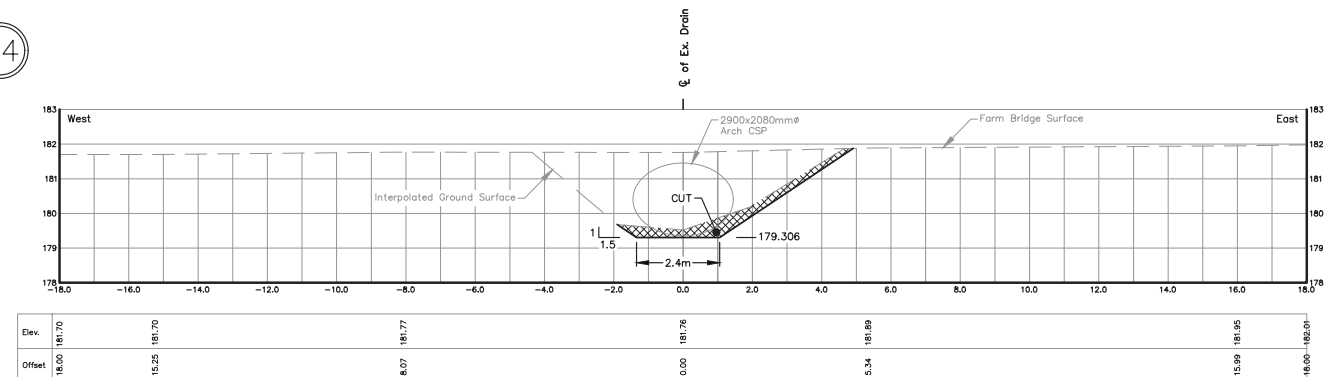
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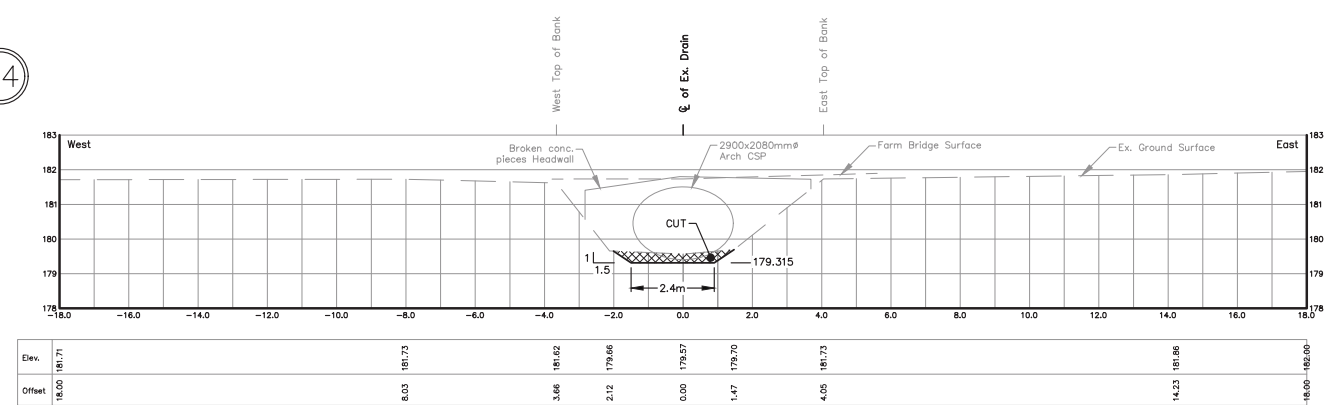
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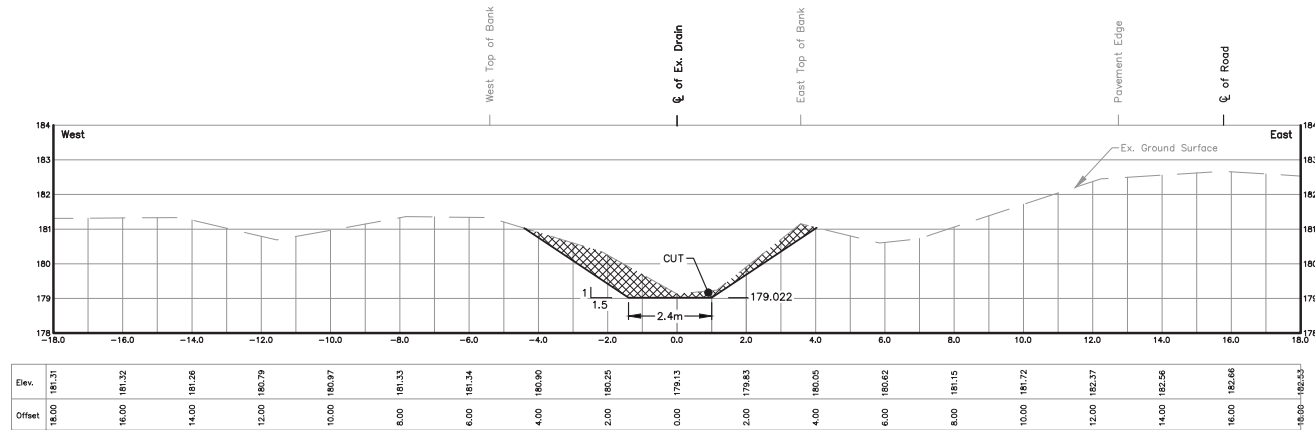


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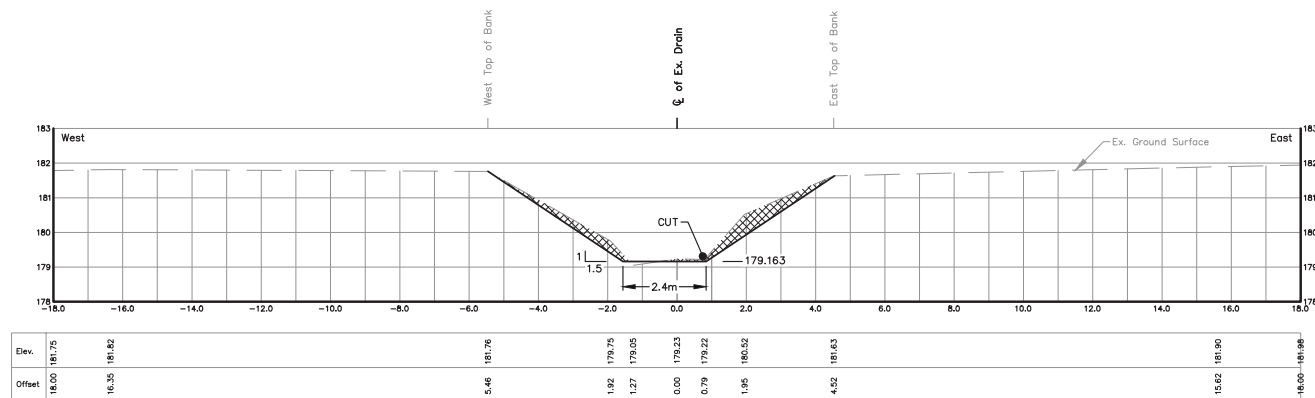
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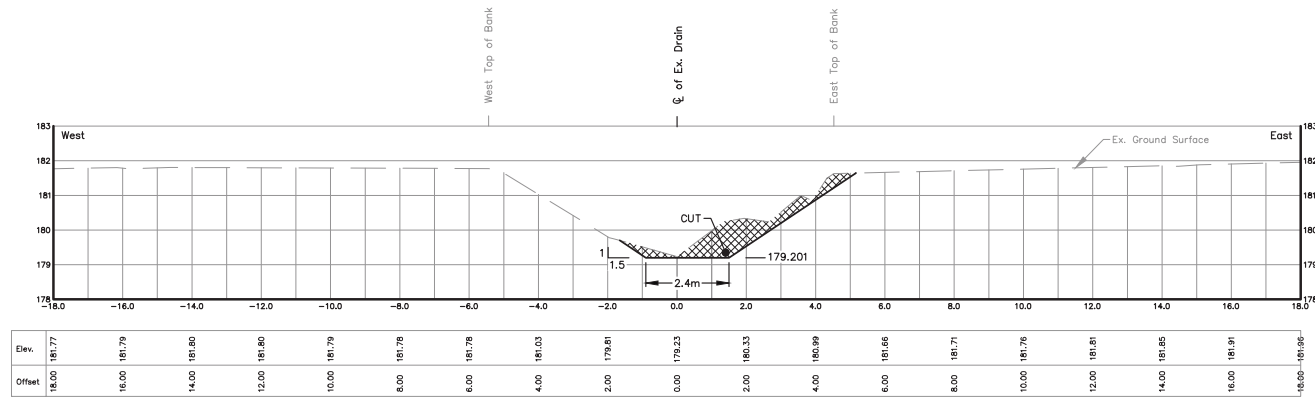
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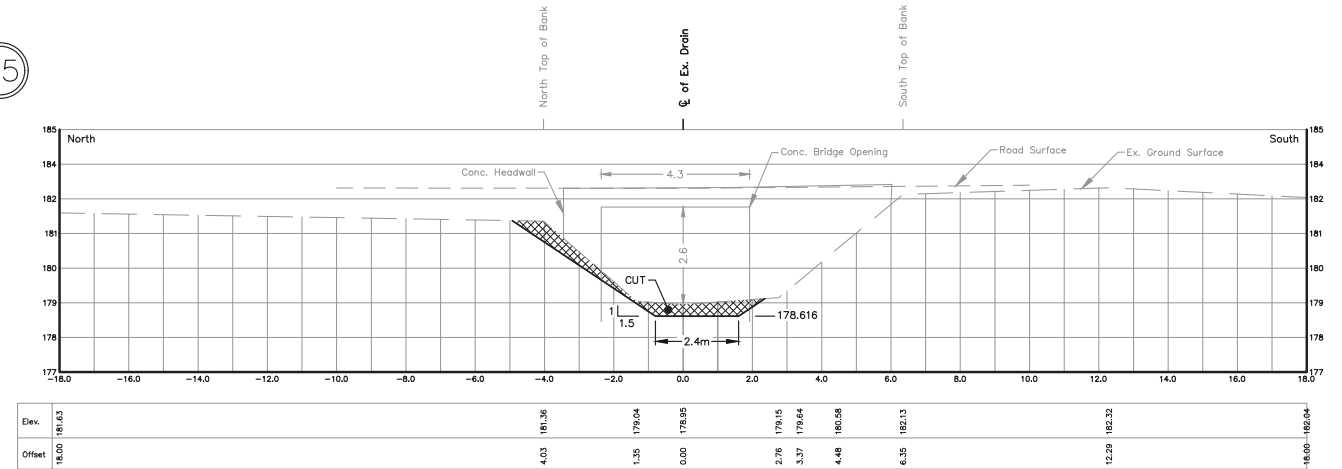


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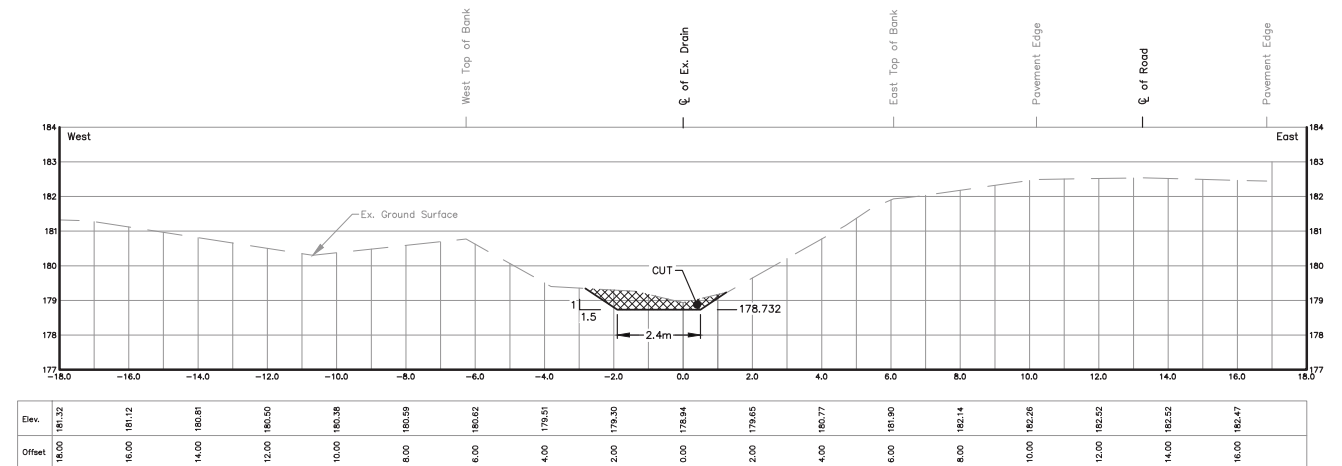


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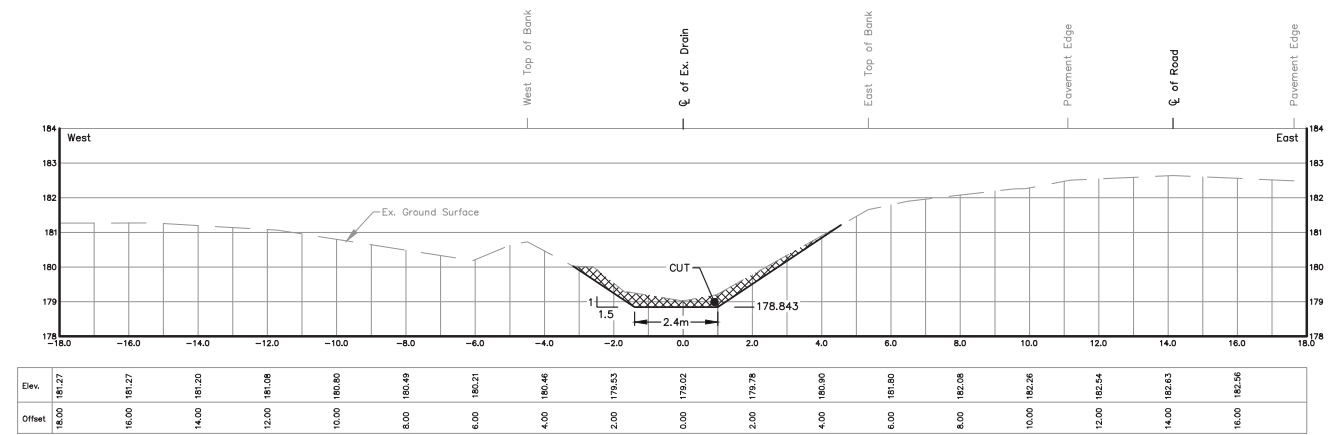
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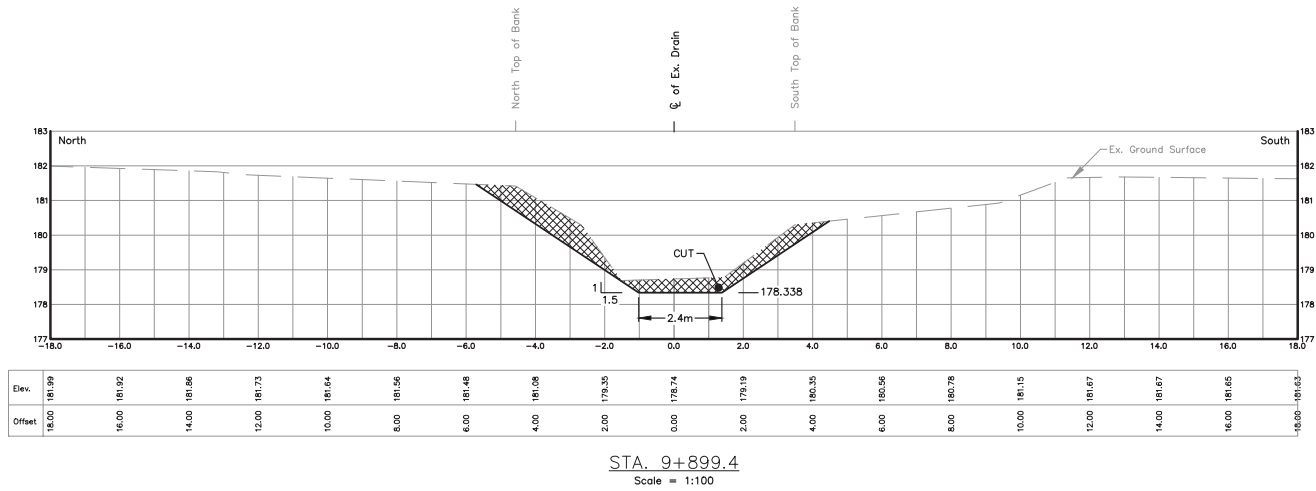


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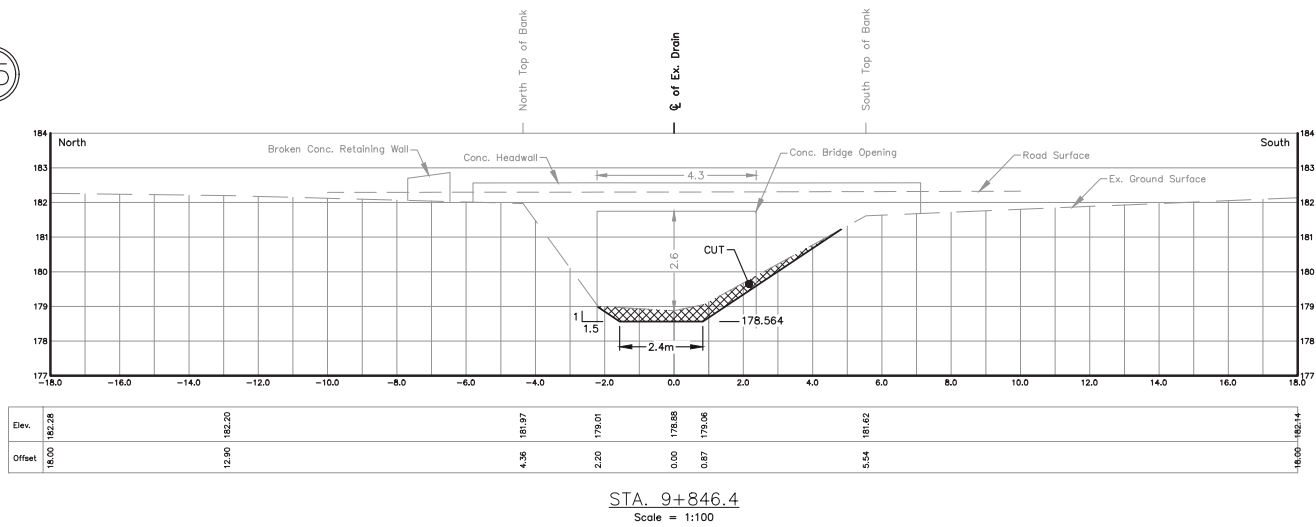
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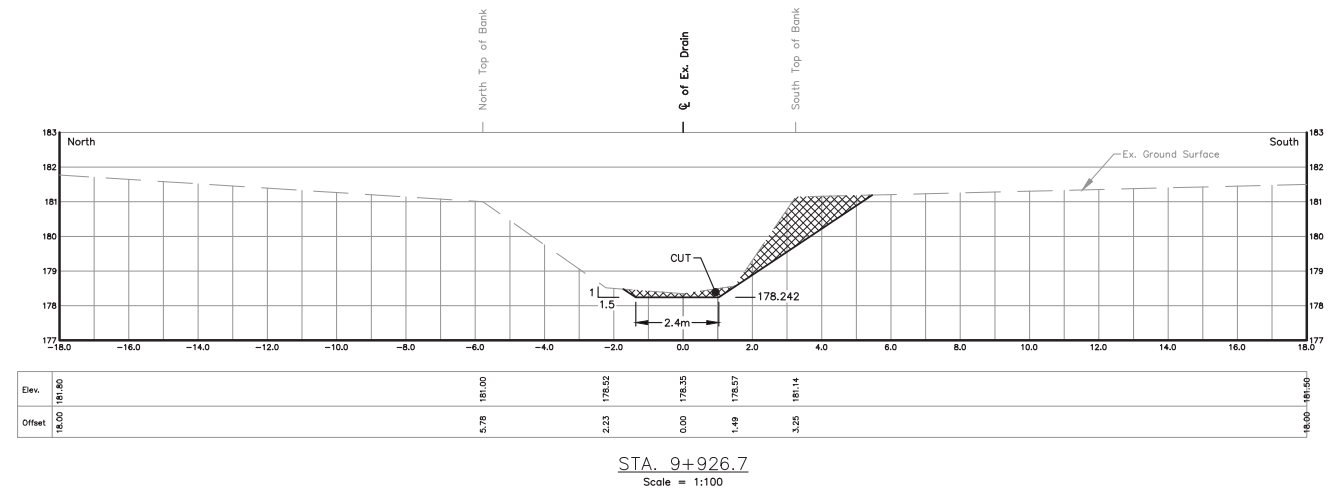
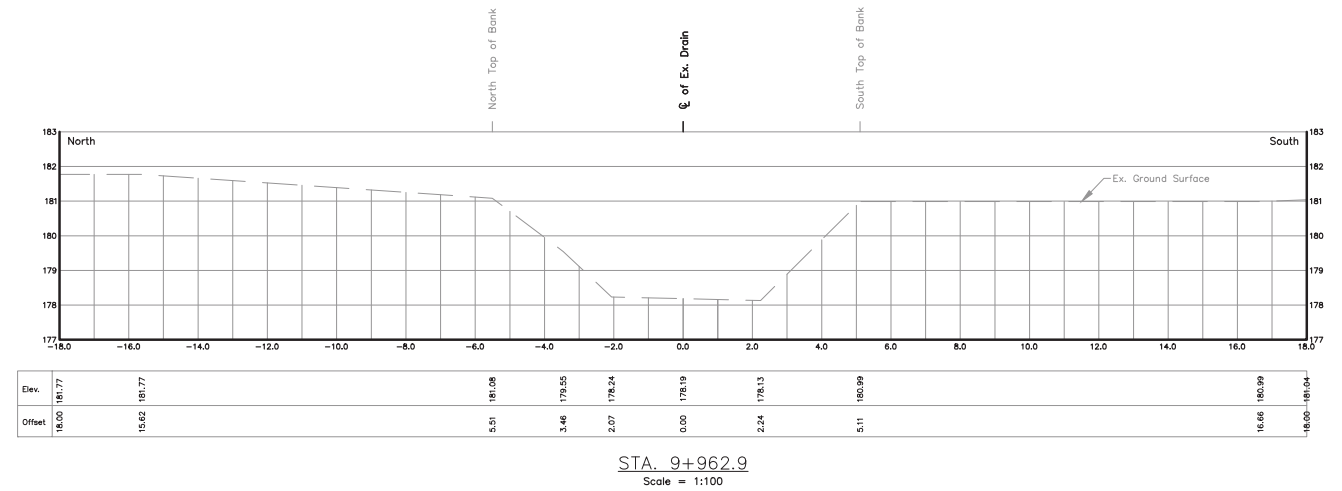
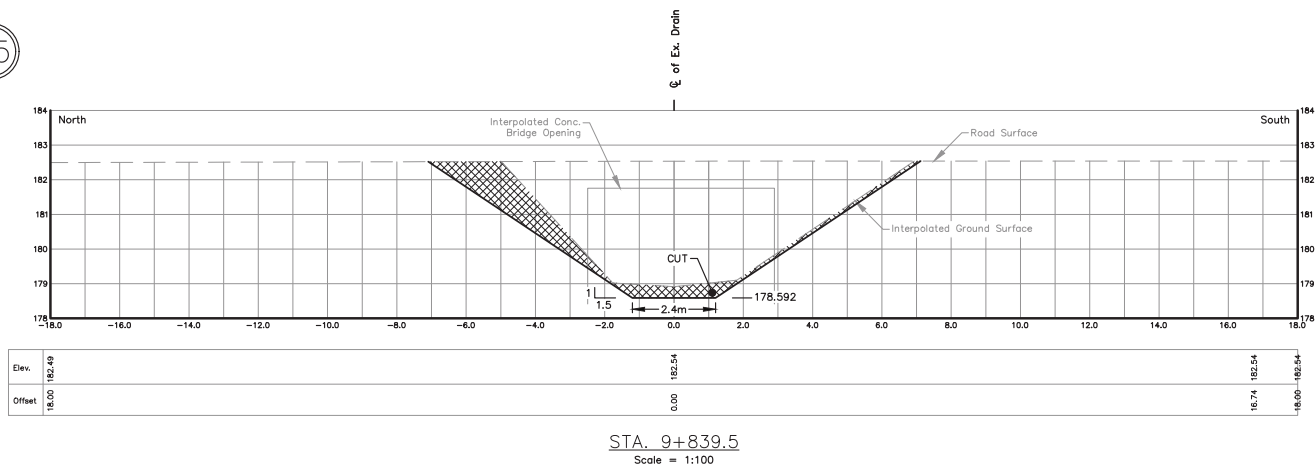


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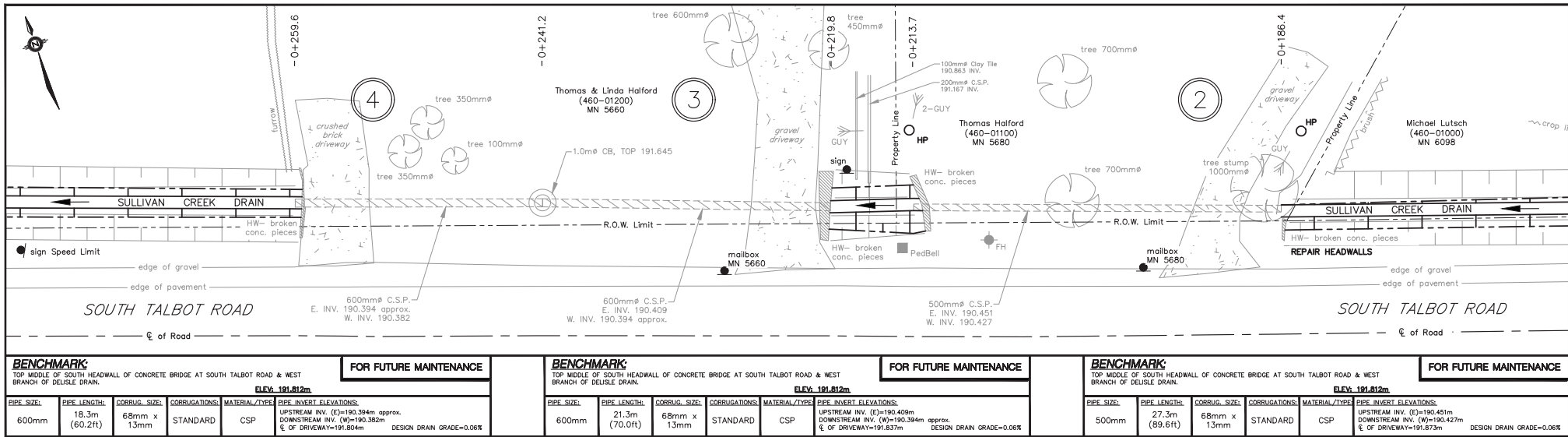


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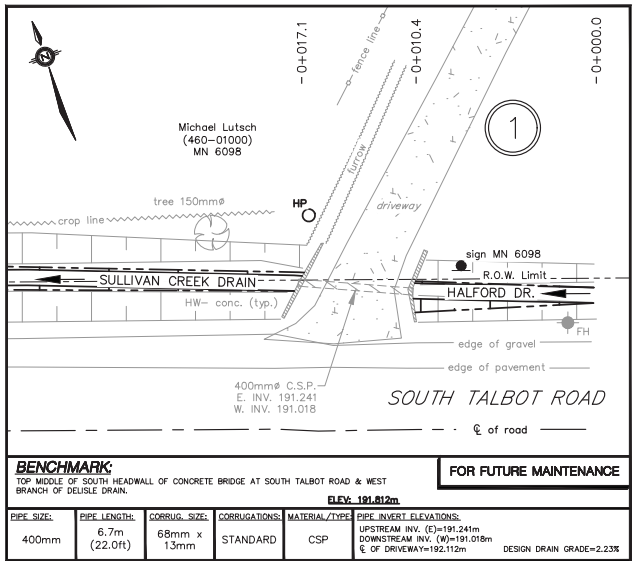
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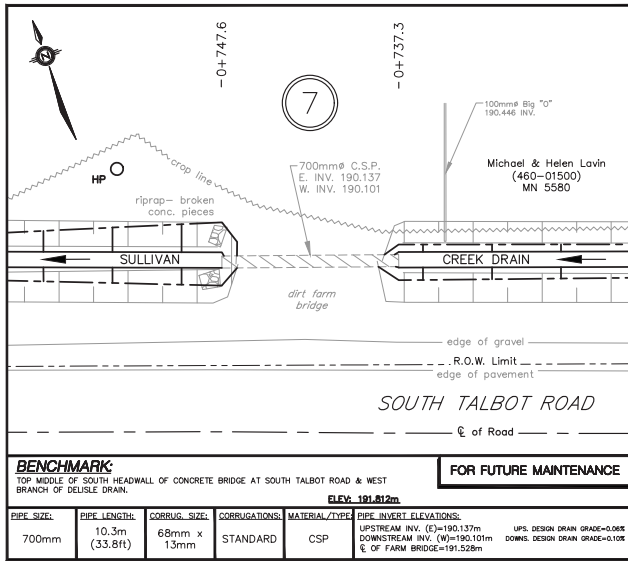
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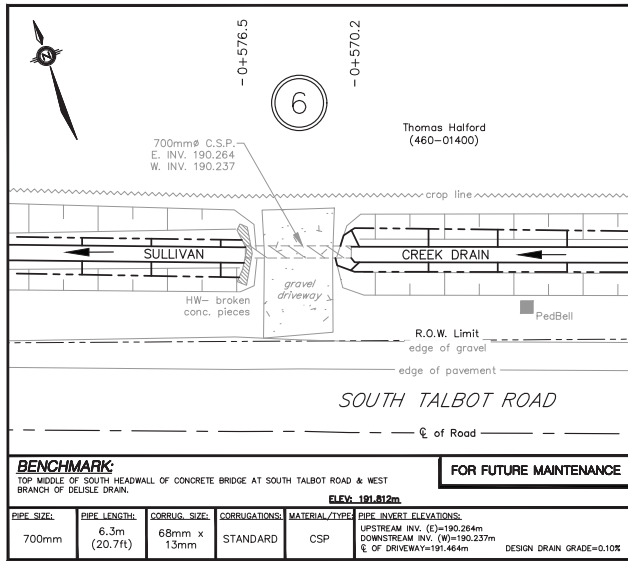
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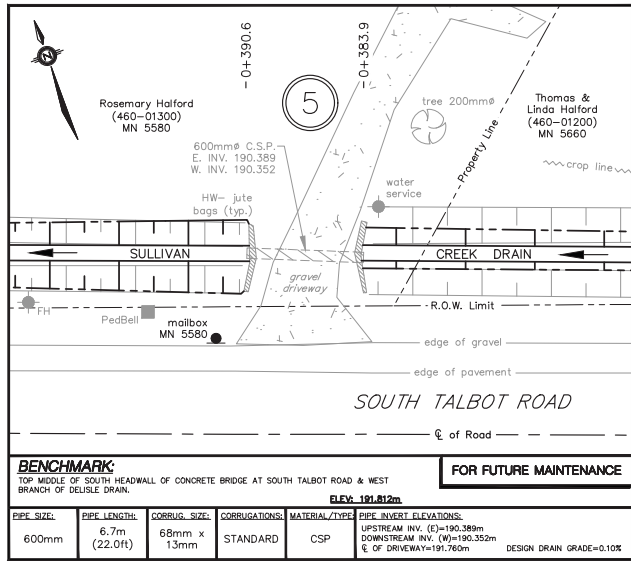
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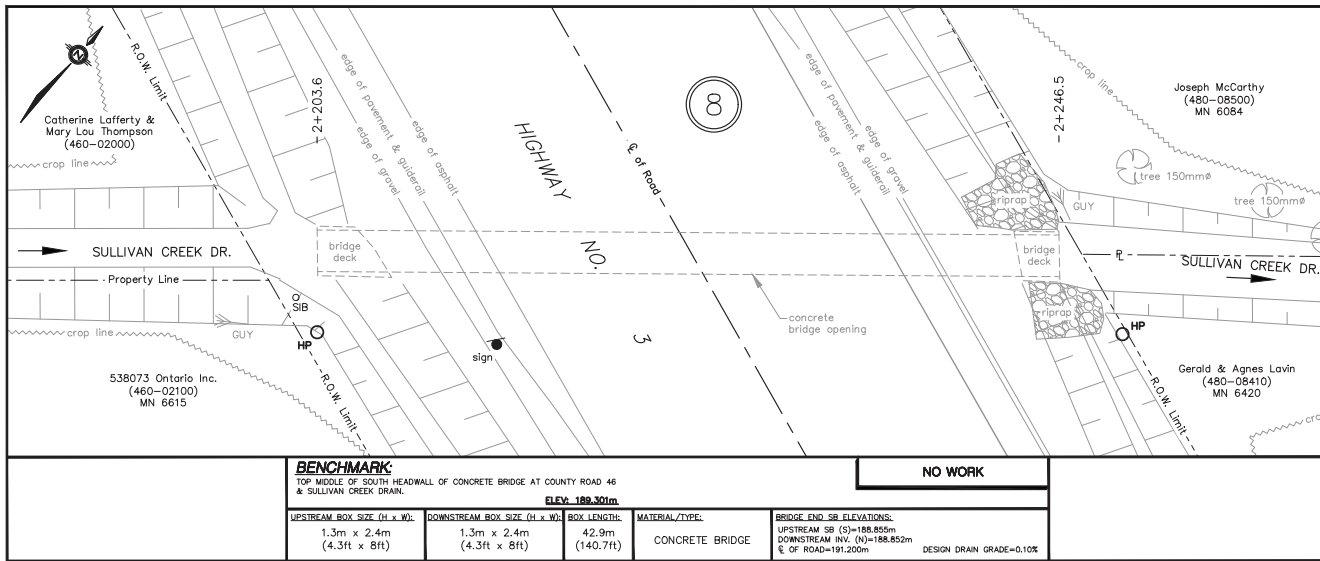
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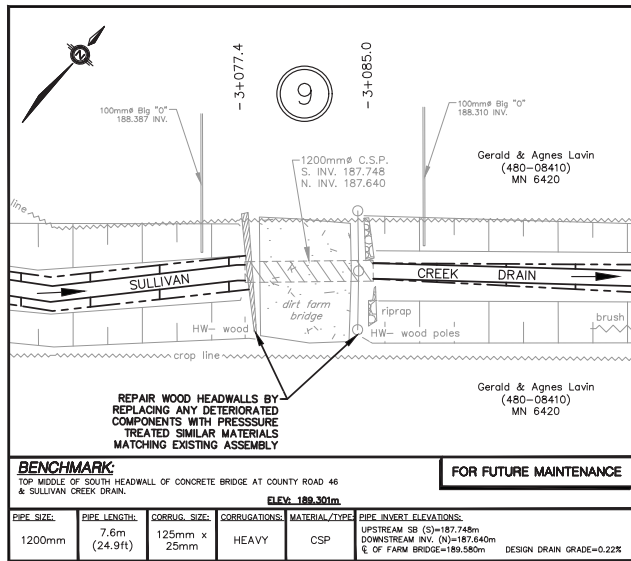
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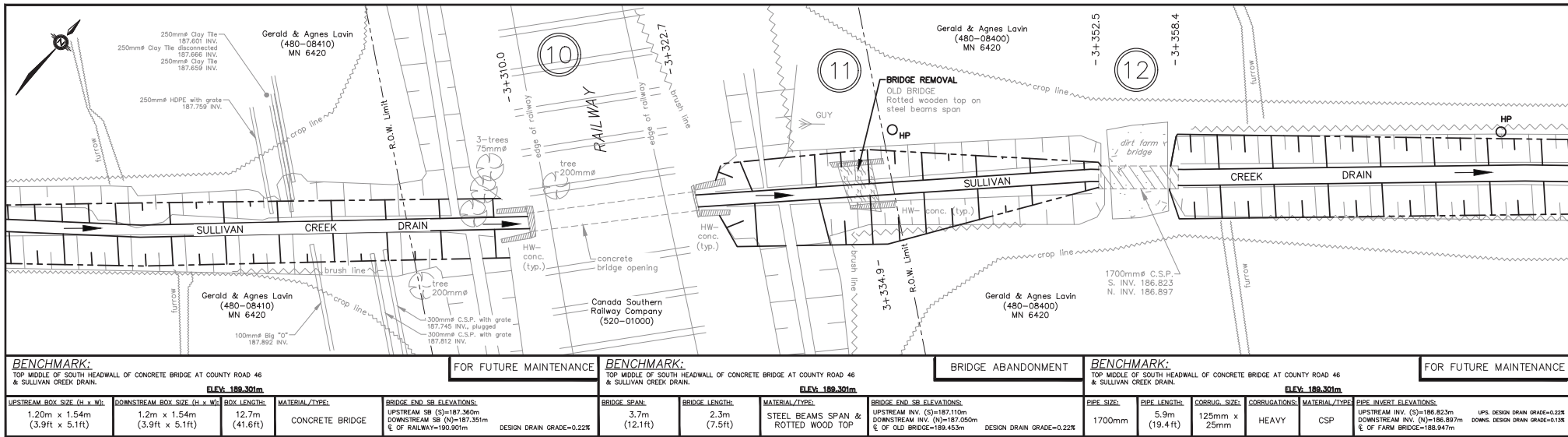
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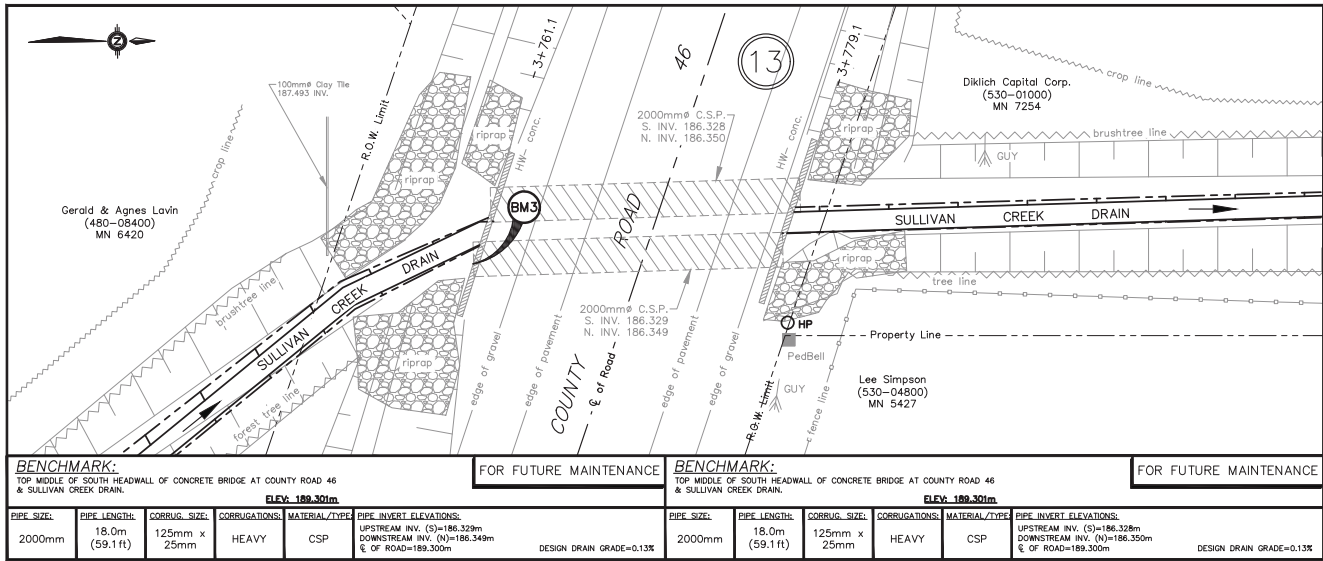
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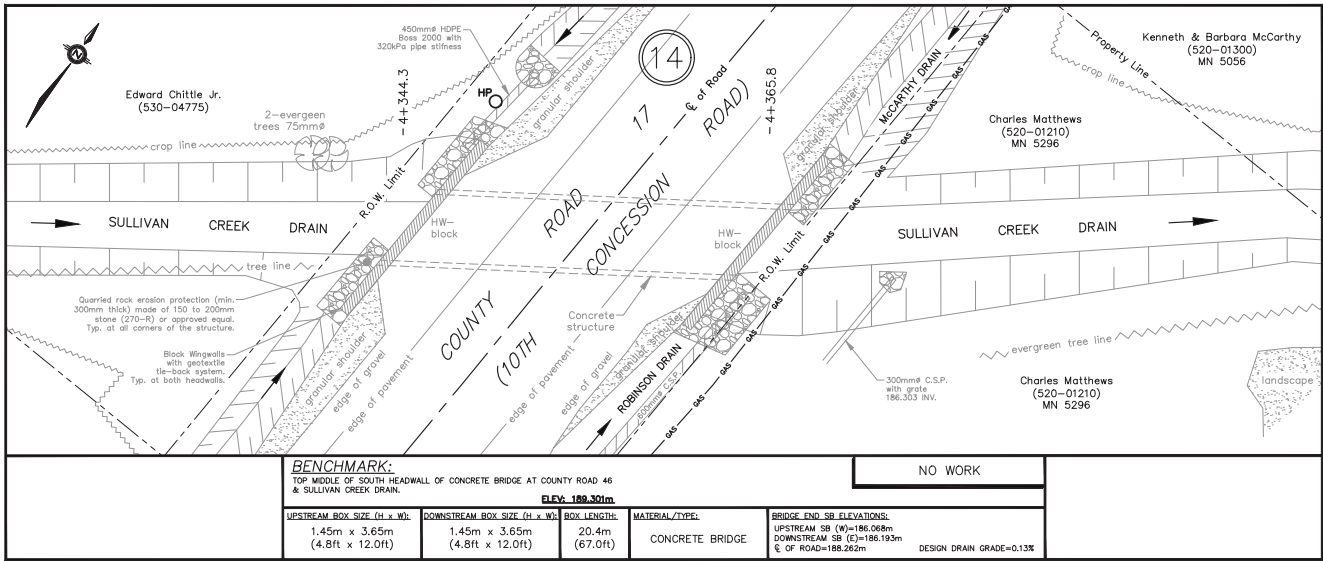
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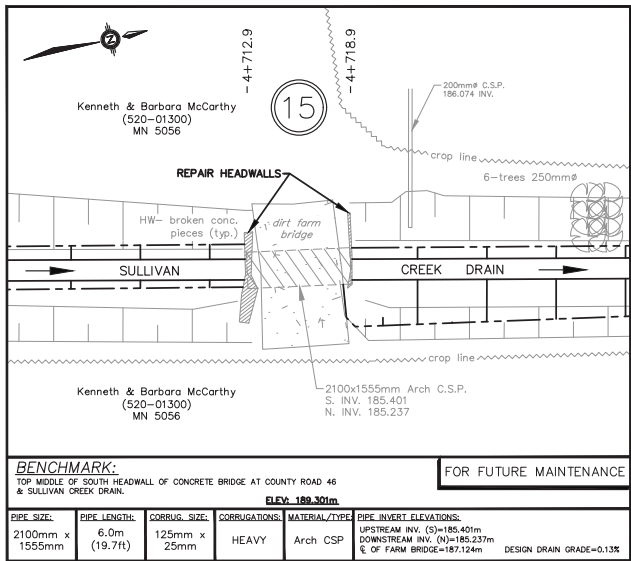
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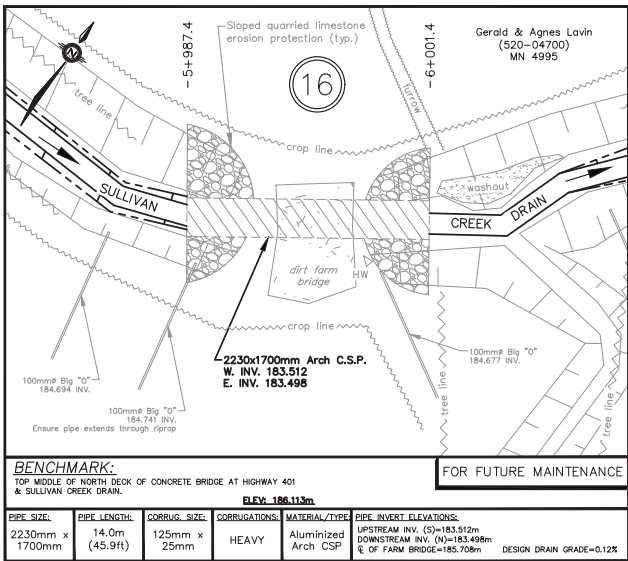
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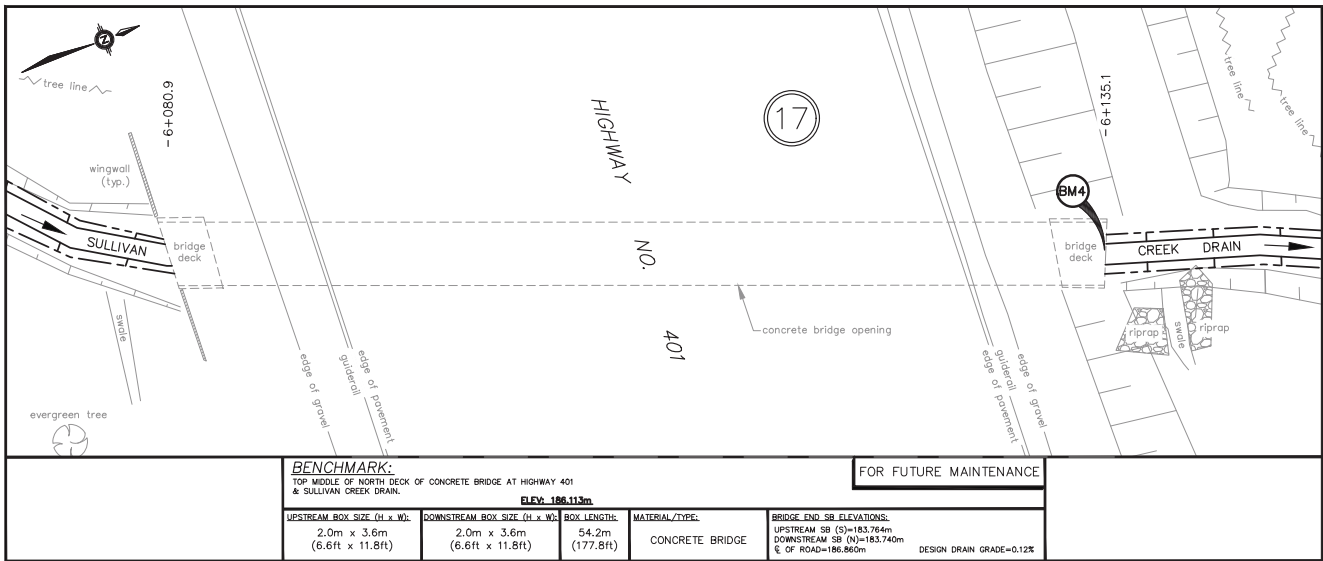
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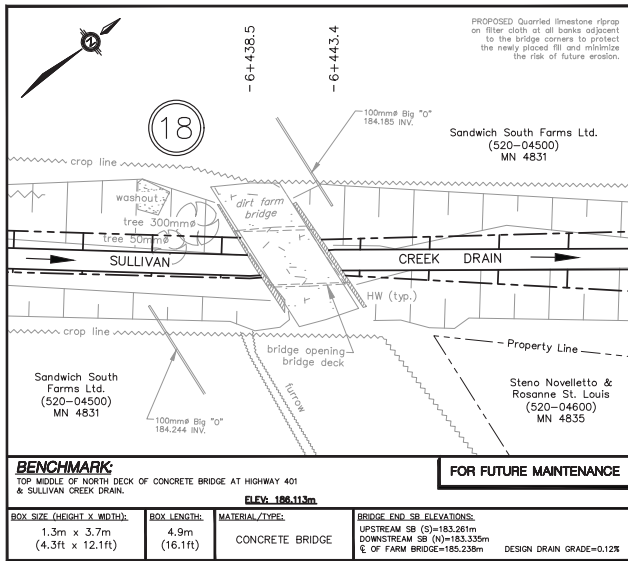
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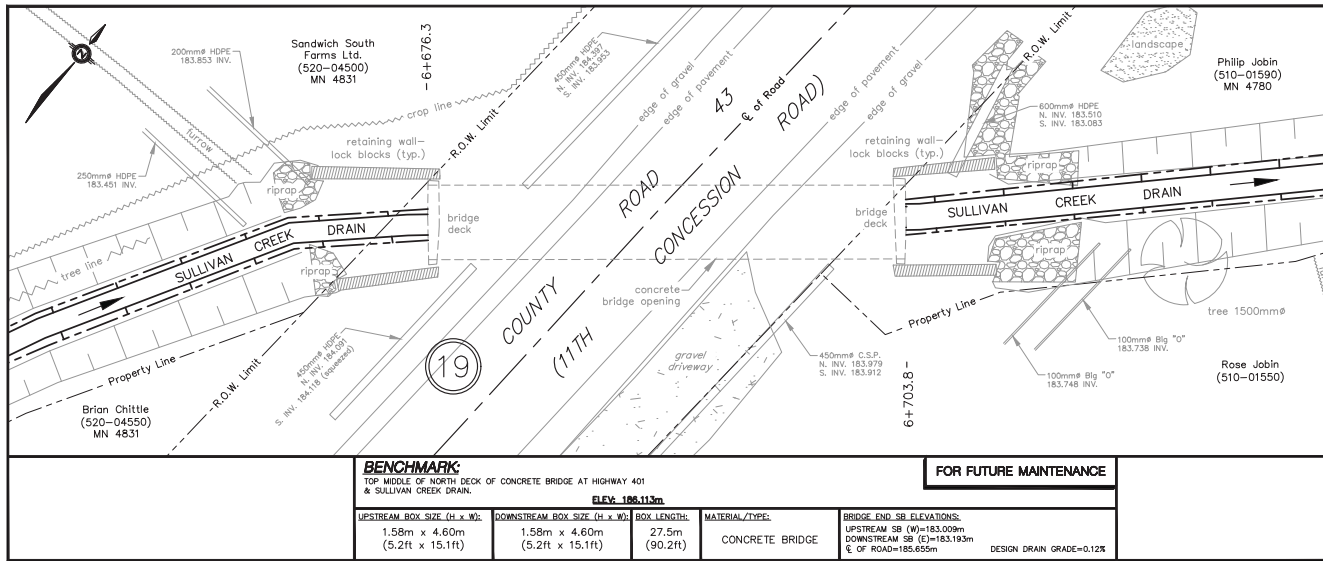
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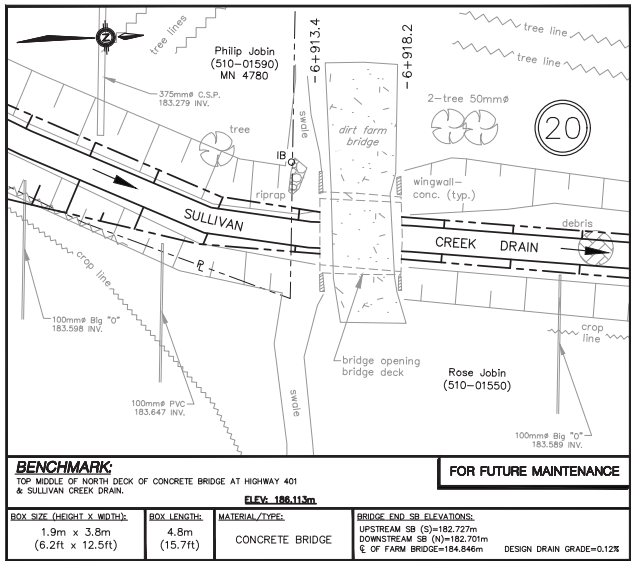
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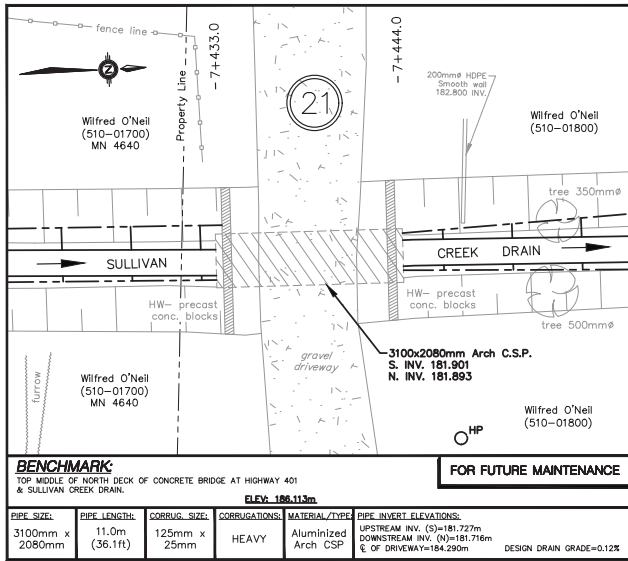
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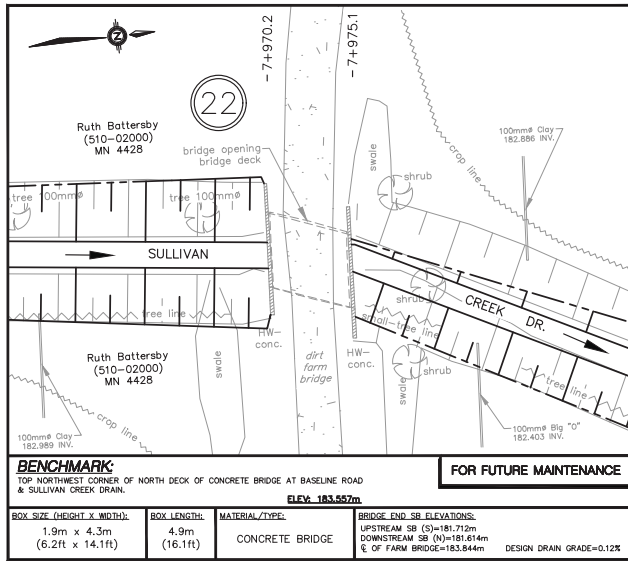
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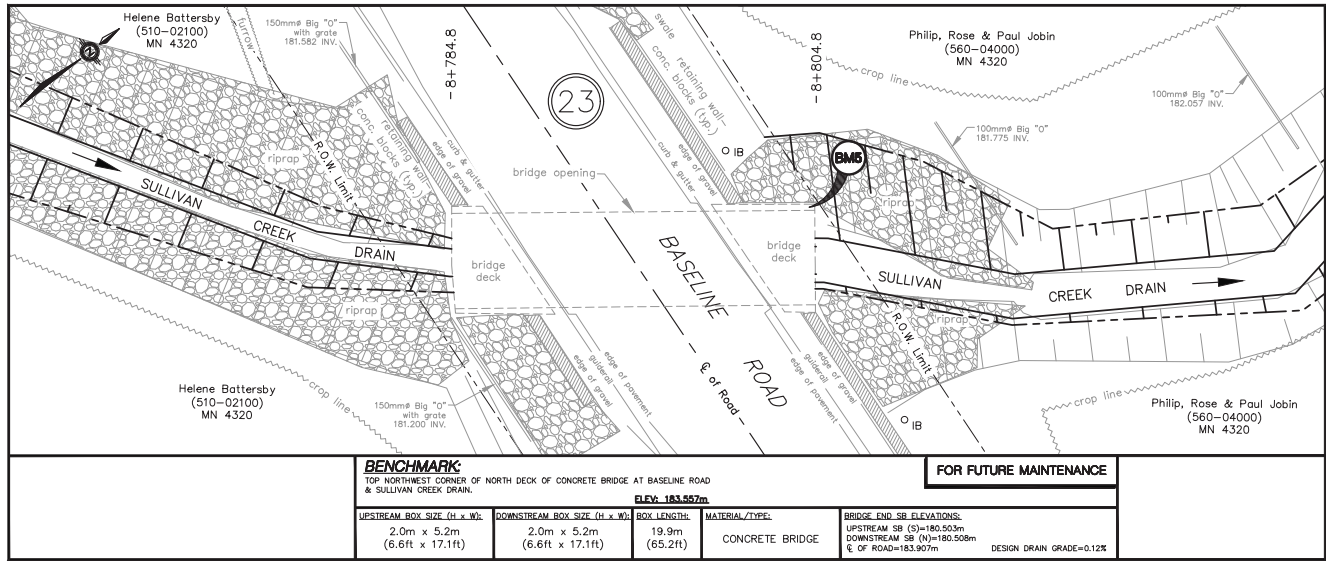
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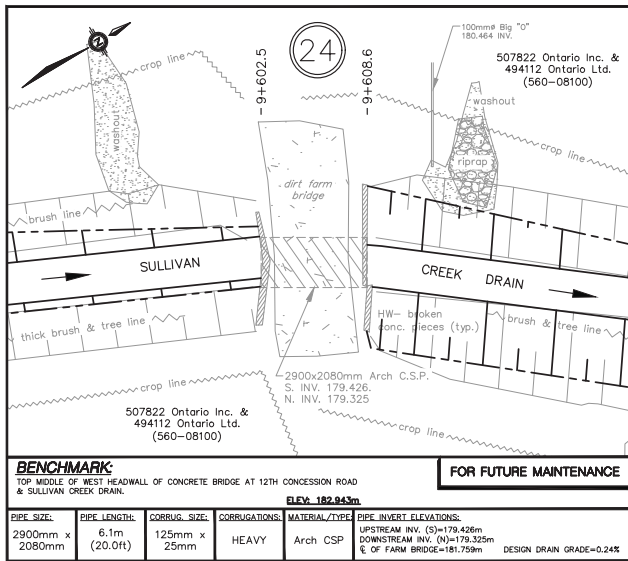
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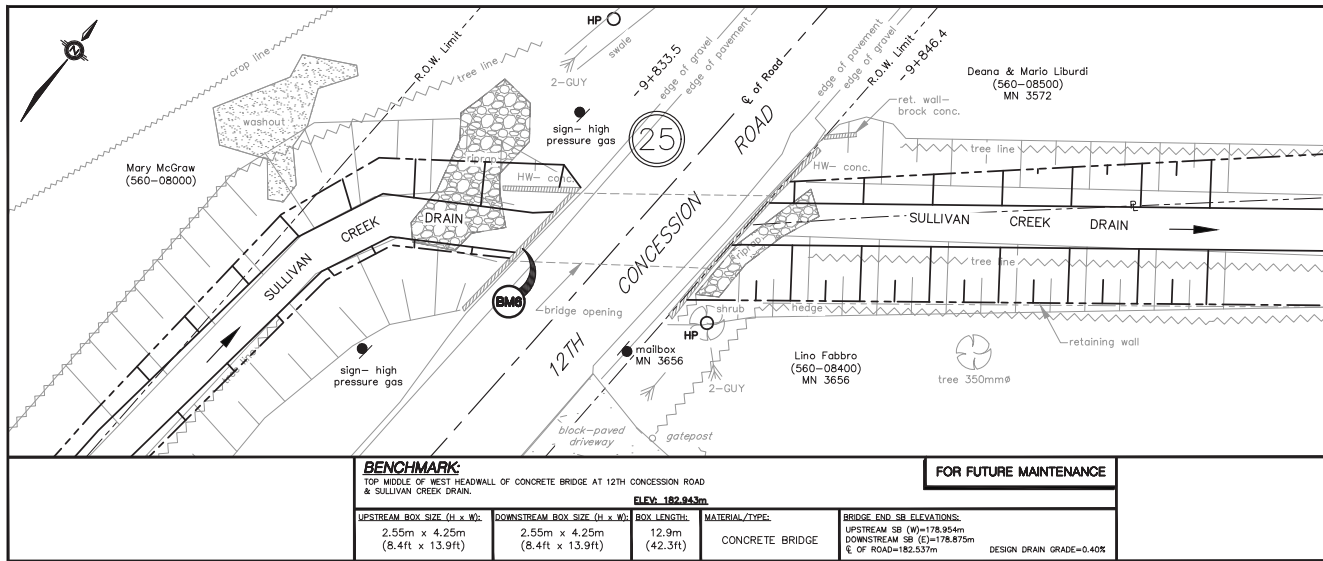
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WATERSHED PLAN & PROJECT AREA FOR EXCESS SOILS

OF THE

SULLIVAN CREEK DRAIN

(Geographic Township of Sandwich South)

IN THE

TOWN OF TECUMSEH

IN THE

COUNTY OF ESSEX • ONTARIO

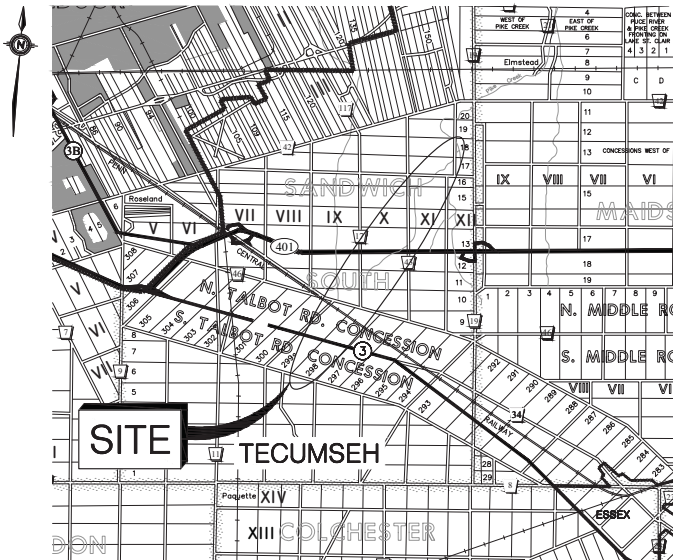
ROOD
ENGINEERING
INC.

CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: January 9th, 2023

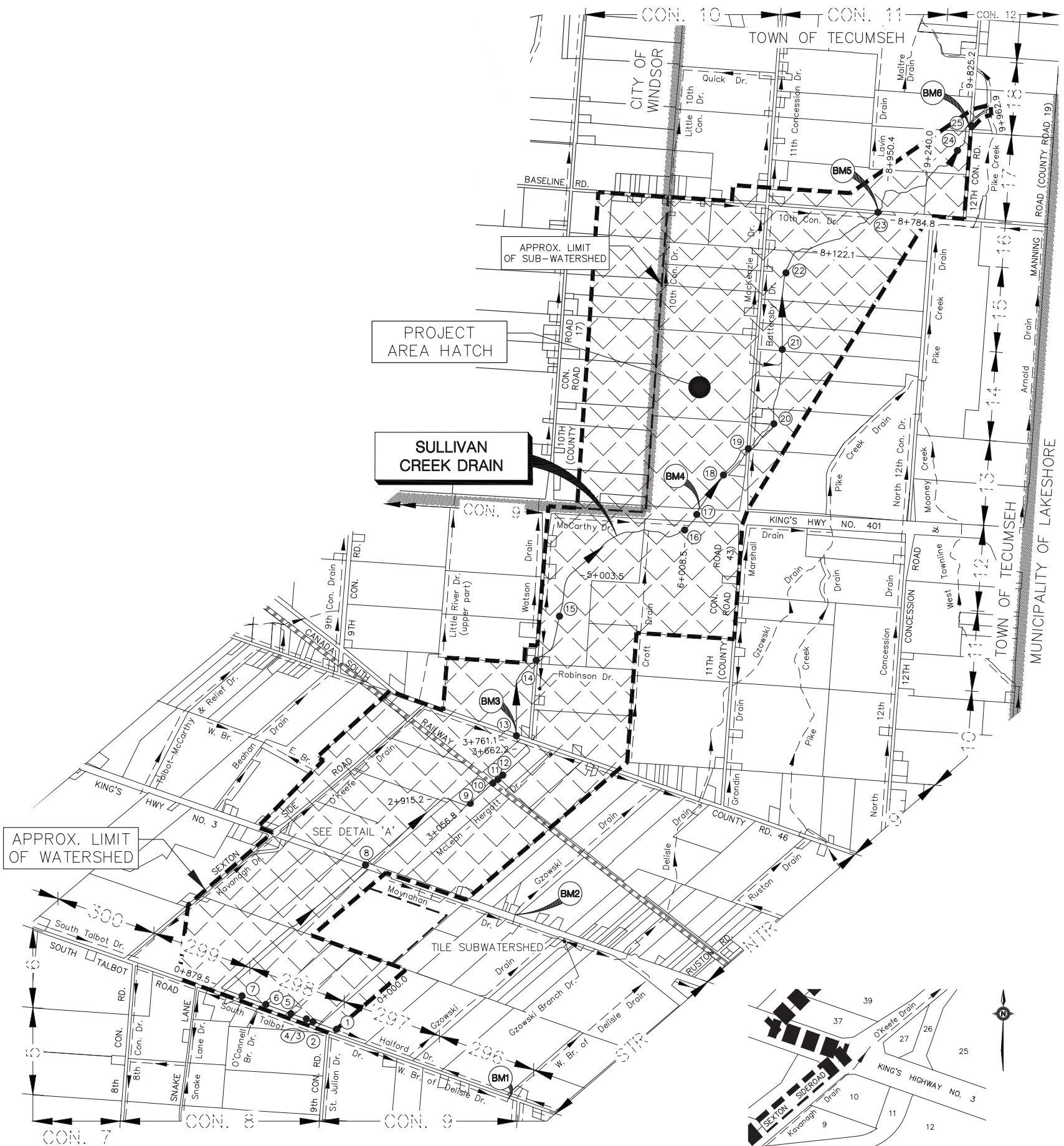
BENCHMARKS:

1. TOP MIDDLE OF SOUTH HEADWALL OF CONCRETE BRIDGE AT SOUTH TALBOT ROAD & WEST BRANCH OF DELISLE DRAIN.
ELEV. = 191.812m
2. CUT CROSS AT TOP NORTHEAST CORNER OF HEADWALL OF CONCRETE BRIDGE AT GZOWSKI DRAIN & NORTH SIDE OF HIGHWAY NO. 3.
ELEV. = 189.897m
3. TOP MIDDLE OF SOUTH HEADWALL OF CONCRETE BRIDGE AT COUNTY ROAD 46 & SULLIVAN CREEK DRAIN.
ELEV. = 189.301m
4. TOP MIDDLE OF NORTH DECK OF CONCRETE BRIDGE AT HIGHWAY 401 & SULLIVAN CREEK DRAIN.
ELEV. = 186.113m
5. TOP NORTHWEST CORNER OF NORTH DECK OF CONCRETE BRIDGE AT BASELINE ROAD & SULLIVAN CREEK DRAIN.
ELEV. = 183.557m
6. TOP MIDDLE OF WEST HEADWALL OF CONCRETE BRIDGE AT 12TH CONCESSION ROAD & SULLIVAN CREEK DRAIN.
ELEV. = 182.943m



KEY MAP

SCALE=1:100,000



WATERSHED PLAN

SCALE=1:15,000

DETAIL 'A'

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SHEET No.: 52

APPENDIX “REI-F”



Soil Characterization Report

Sullivan Creek Drain E09SH(102)

Tecumseh, Ontario

Project No. OESAW2233

Prepared for:

Rood Engineering Inc.

9 Nelson Street, Leamington, Ontario, N8H 1G6

December 2022



WSP E&I Canada Limited
11865 County Road 42
Tecumseh, ON N8N 0H1
Canada
T: 519-735-2499
www.wsp.com

22 December 2022

Reference No. OESAW2233

VIA EMAIL

Rood Engineering Inc.
9 Nelson Street
Leamington, Ontario
N8H 1G6

Attention: Mr. Gerard Rood, P.Eng., President

Dear Mr. Rood;

**RE: Final Report – Soil Characterization Report
Sullivan Creek Drain E09SH(102)
Tecumseh, Ontario**

Please find enclosed one (1) electronic copy, in PDF format, of our final report entitled "Soil Characterization Report, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario."

We thank you for entrusting us with this assignment and look forward to future opportunities with your firm. In the meantime, should you have any questions or require any additional information, please do not hesitate to contact the undersigned.

Sincerely,

WSP E&I Canada Limited

Derek Saliba, B.Sc.
Environmental Scientist
Direct Tel.: 519-735-2499
E-mail: derek.saliba@wsp.com

Cindy McKee, P.Geo., QP_{ESA}
Senior Environmental Geoscientist
Direct Tel.: 519-735-2499
E-mail: cindy.mckee@wsp.com



Soil Characterization Report

Sullivan Creek Drain E09SH(102)
Tecumseh, Ontario
Project No. OESAW2233

Prepared for:

Rood Engineering Inc.
9 Nelson Street, Leamington, Ontario, N8H 1G6

Prepared by:

WSP E&I Canada Limited
11865 County Road 42
Tecumseh, Ontario N8N 0H1
Canada
T: 519-735-2499
December 2022

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Executive Summary

WSP E&I Canada Limited (WSP), was retained by Rood Engineering Inc. (Client) to conduct a Soil Characterization Report (SCR) of the Sullivan Creek Drain E09SH(102) located in Tecumseh, Ontario (hereinafter referred to as the "Project Area"). A key plan showing the location of the Project Area is provided on Figure 1. Soil sample locations are shown on Figure 2.

The SCR was undertaken to: 1) assess Areas of Potential Environmental Concern (APECs) identified in a Assessment of Past Uses (APU) previously carried out at the Project Area by WSP, as documented in "Assessment of Past Uses, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario," dated 15 November 2022, (WSP APU); 2) Assess the identified APECs as per the Sampling and Analysis Plan (SAP) previously carried out at the Project Area by WSP, as documented in "Sampling and Analysis Plan, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario," dated 15 November 2022, (WSP SAP); and 3) determine the location and concentration of contaminants in the soil on, in or under the Project Area.

This SCR was conducted in general accordance with the requirements of clause 12 (4) (c) of Ontario Regulation 406/19 – *On-Site and Excess Soil Management* (O. Reg. 406/19). The SCR was conducted in accordance with the proposed scope of work and Terms of Reference provided in WSP's proposal / work agreement POESASW22371 dated 27 October 2022 and subsequent amendments.

Based on the results of the SCR, soil within the Project Area has been categorized into three zones (Excess Soil Zones 1, 2, and 3). The identified soil zones will be subject to specific requirements in terms of destination locations and/or on-Site reuse. The approximate extent of the Excess Soil Zones has been delineated to soil sample locations advanced as part of this investigation and the limits of the Project Area as shown on Figures 3 and 4. The requirements for each soil zone is provided below:

Excess Soil Zone 1 – Soil meeting Table 3 SCS for On-Site Reuse

Soils with concentrations below the Table 3 SCS were identified across the Project Area with the following exception: between S-SA3 and the northern end of the Project Area from surface to 0.3 mbgs.

The soil designated as Excess Soil Zone 1 (other than this one area) can be reused on-site.

Excess Soil Zone 2 – Soil meeting Table 3.1 ESQS for Beneficial Off-Site Reuse

Soils with concentrations below the Table 3.1 ESQS were not identified on the Project Area and therefore no soil is designated as Excess Soil Zone 2 and cannot be reused at beneficial reuse sites where Table 3.1 ESQS for I/C/C property use apply.

Excess Soil Zone 3 – Soil exceeding Table 3.1 ESQS for Off-Site Disposal

Impacted soils exceeding the Table 3.1 ESQS were identified as follows:

- Acenaphthylene at S-SA1, S-SA3, S-SA4, and S-SA6; and
- Anthracene at S-SA1 and S-SA4

Excess Soil Zone 3 is located across the entire Project Area from surface to 0.3 mbgs.

Soil excavated from this zone is not suitable for beneficial reuse off-site. Therefore, soil excavated from this zone that is being removed from the Project Area can be deposited at either one of the following:

- a reuse site for which site-specific ESQS are developed using the BRAT model or other risk assessment method to determine if this soil can still be reused beneficially off-Site
- a waste management facility such as a landfill for disposal; TCLP analysis results indicated the soil is non-hazardous.

WSP typically recommends a vertical and horizontal delineation program around the boreholes with soil exceedances to minimize the volume of soil in Excess Soil Zone 3. This delineation program could be completed prior to construction (borehole advancement), or at the beginning of construction (test pits with contractor assistance). However, WSP notes that based on the low volume of excess soil (236 m³), a delineation program may not be necessary.

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List of Acronyms and Abbreviations

ABNs	Acid, Base, Neutral Extractables
APEC	Area of Potential Environmental Concern
APU	Assessment of Past Uses
AST	Aboveground Storage Tank
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CALA	Canadian Association for Laboratory Accreditation
C of A	Certificate of Approval
CN	Cyanide
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
COV	Combustible Organic Vapour
CPs	Chlorophenols
CSM	Conceptual Site Model
DNAPL	Dense Non-aqueous Phase Liquid
DO	Dissolved Oxygen
EC	Electrical Conductivity
EPA	Environmental Protection Act
ESA	Environmental Site Assessment
ESQS	Excess Soil Quality Standards
I/C/C	Industrial/Commercial/Community
LNAPL	Light Non-aqueous Phase Liquid
LSL	Leachate Screening Level
mASL	Metres Above Sea Level
mbgs	Metres Below Ground Surface
MECP	Ministry of the Environment, Conservation and Parks
MOE	Ministry of the Environment
MOECC	Ministry of the Environment and Climate Change
MOEE	Ministry of the Environment and Energy
MTM	Modified Transverse Mercator
MW	Monitoring Well
NAPL	Non-aqueous Phase Liquid
PCA	Potentially Contaminating Activity
OCs	Organochlorine Pesticides
ORP	Oxidation Reduction Potential
PCBs	Polychlorinated Biphenyls
PCDDs/PCDFs	Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (Dioxins and Furans)
PHCs	Petroleum Hydrocarbons
PAHs	Polycyclic Aromatic Hydrocarbons
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RDL	Reporting Detection Limit
RL	Reporting Limit
RPD	Relative Percent Difference
R/P/I	Residential/Parkland/Institutional

RSC	Record of Site Condition
SAP	Sampling and Analysis Plan
SAR	Sodium Adsorption Ratio
SCC	Standards Council of Canada
SCS	Site Condition Standard
SOA	Standing Offer Agreement
SPLP	Synthetic Precipitate Leachate Procedure
TCLP	Toxicity Characteristic Leaching Procedure
THM	Trihalomethanes
TP	Test Pit
µg/g	Micrograms per Gram
USCS	Unified Soil Classification System
UTM	Universal Transverse Mercator
TOV	Total Organic Vapour
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.0 Introduction

WSP E&I Canada Limited ("WSP"), was retained by Rood Engineering Inc. ("Client") to conduct a Soil Characterization Report (SCR) of the Sullivan Creek Drain E09SH(102) located in Tecumseh, Ontario (hereinafter referred to as the "Project Area"). A key plan showing the location of the Project Area is provided on Figure 1.

The SCR was undertaken to: 1) assess Areas of Potential Environmental Concern (APECs) identified in a Assessment of Past Uses (APU) previously carried out at the Project Area by WSP, as documented in "Assessment of Past Uses, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario," dated 15 November 2022, (WSP APU); 2) Assess the identified APECs as per the Sampling and Analysis Plan (SAP) previously carried out at the Project Area by WSP, as documented in "Sampling and Analysis Plan, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario," dated 15 November 2022, (WSP SAP); and 3) determine the location and concentration of contaminants in the soil on, in or under the Project Area. This SCR was conducted in accordance with the requirements of clause 12 (4) (c) of Ontario Regulation 406/19 – *On-Site and Excess Soil Management* (O. Reg. 406/19). The SCR was conducted in accordance with the proposed scope of work and Terms of Reference provided in WSP's proposal / work agreement POESASW22371 dated 27 October 2022 and subsequent amendments.

1.1 Project Area Information

General information concerning the Project Area is provided in Table 1.1 below.

Table 1.1. Property Information

Municipal Address	County Road 46, southwest of County Road 17					
Current Project Area Use	Creek Drain					
Proposed Project Area Use	Creek Drain					
UTM (NAD 83)	Zone:	17T	Easting:	341884	Northing:	4676627
Estimated Excess Soil Volume	236 m ³					
Project Area Dimensions	Length:	451.1 m				
	Width:	Approximately 2.8 m				

Contact information for the Project Area Owner, Project Leader and Qualified Person are provided in Table 1.2 below.

Table 1.2. Project Area Owner, Project Leader and Qualified Person Information

Project Area Owner	Town of Tecumseh	Cameron Hedges Engineering Project Manager 519-735-2184 ext. 128 917 Lesperance Road Tecumseh, ON, N8N 1W9
Project Leader	Rood Engineering Inc.	Gerard Rood President Gerard.reinc@gmail.com 519-322-1621 9 Nelson Street Leamington, ON, N8H 1G6
Qualified Person	WSP E&I Canada Limited	Cindy McKee, P. Geo., QP _{ESA} Senior Environmental Geoscientist Cindy.mckee@wsp.com 519-735-2499 11865 County Road 42 Tecumseh, ON, N8N 0H1

2.0 Background Information

2.1 Assessment of Past Uses Summary

The findings of WSP APU are listed in the APEC table below.

Table 2.1. Areas of Potential Environmental Concern

Area of Potential Environmental Concern	Location/Area of APEC on Project Area	Potentially Contaminating Activity*	Location of PCA	Contaminants of Potential Concern
APEC-1: Former railway that cuts through southern portion of Project Area	Southern portion of Project Area (1,329 m ²)	PCA 1: 46. Rail Yards, Tracks and Spurs	On-Site: Southern portion of Project Area	PHC, BTEX, Metals, EC, SAR, pH, PAHs, OCs
N/A	Non-APEC-1 portions of Project Area (8,963 m ²)	N/A	On-Site: Central and northern portions of Project Area	PHCs, BTEX, Metals, EC, SAR, pH
PCA – *Potentially Contaminating Activity as provided in Schedule D of O.Reg. 153/04 as amended, where applicable.				
BTEX – Benzene, Toluene, Ethylbenzene and Xylenes OCs – Organochlorine Pesticides PAHs – Polycyclic Aromatic Hydrocarbons PHCs – Petroleum Hydrocarbons		M – Metals – (Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mo, Ni, Ag, Tl, U, V, Zn including hydrides, As, Sb, Se) EC – Electrical Conductivity SAR – Sodium Adsorption Ratio		

Based on the APU conducted by WSP, APECs were identified resulting from PCAs associated with known and suspected contaminants located on the Project Area. An SAP and SCR were recommended to address these APECs.

With the exception of the APU described above, no other environmental, geological or geotechnical reports for the Project Area were provided to or reviewed by WSP.

2.2 Sampling and Analysis Plan

Based at the volume of soil at each APEC and following the in-situ sampling protocol provided in Section 2 (3) (15) of the Excess Soil Rules Document, the sampling requirements for the Project Area and within each APEC are listed in Table 2.2 below.

Table 2.2. Summary of Required Number of Samples, Applicable Standards and Leachate Screening Levels

APEC	Approximate Soil Volume (m ³)	Associated Surface Samples	Required Number of Bulk Samples	Applicable Standards	Required Number of Leachate Samples	Applicable LSL
APEC-1	31	SA-A1 to SA-A3	3	Table 3.1 SCS	0	N/A

APEC	Approximate Soil Volume (m ³)	Associated Surface Samples	Required Number of Bulk Samples	Applicable Standards	Required Number of Leachate Samples	Applicable LSL
Non-APEC-1 portions of Project Area	206	SA-A4 to SA-A8	2	Table 3.1 SCS	0	N/A
Table 3 SCS – Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for Industrial/Commercial/Community Property Use Table 3.1 ESQS – Table 3.1 Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for Industrial/Commercial/Community Property Use						

Sampling locations have been assessed to address APECs identified in the APU, see Figure 2 for the surface sample locations. Table 2.3 below outlines the bulk soil sampling requirements at each borehole location to characterize the excess soil within each APEC.

Table 2.3. Summary of Required Bulk Soil Chemical Analysis Per Sampling Location

Proposed Borehole Identification	Metals	PHCs	BTEX	PAHs	OCs
S-SA1	1	1	1	1	1
S-SA2	1	1	1	1	1
S-SA3	1	1	1	1	1
S-SA4	0	0	0	0	0
S-SA5	0	0	0	0	0
S-SA6	1	1	1	0	0
S-SA7	0	0	0	0	0
S-SA8	1	1	1	0	0
Total	5	5	5	3	3
Duplicates	1	1	1	1	1
Duplicate samples should be collected at a rate of one (1) in ten (10) bulk samples and identified with the naming convention "DUP1, DUP2" etc. Metals includes EC, SAR, and pH					

Environmental soil chemical analysis is not required for S-SA4, S-SA5, and S-SA7 in order to satisfy O.Reg 406/19 requirements.

As the Project Area has an estimated excess soil volume under 350 m³ (236 m³), mSPLP laboratory analysis is not required under O.Reg 406/19.

3.0 Soil Characterization Scope of Work

3.1 Overview of Site Investigation

The investigations documented in this report were carried out to characterize the subsurface soil conditions within the Project Area with respect to the previously noted APECs and to provide an SCR compliant with the requirements of O. Reg. 406/19. This report is not intended to be a Phase Two Environmental Site Assessment and it is understood that a Record of Site Condition (RSC) filing is not required for the Project Area at this time.

The SCR was conducted on 29 November 2022 and involved the advancement of eight (8) shallow surface samples at the Project Area, identified as S-SA1 through S-SA8 to facilitate the collection of representative soil samples for laboratory analyses.

This SCR was conducted in accordance with the requirements set forth under O. Reg. 406/19 and related supporting documents established there under. The sampling methods employed in carrying out the investigations complied with the requirements established by the MECP in the document entitled *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (MOEE, 1996). The scope of work for the SCR included of the following tasks:

- Developing a site-specific Health & Safety Plan (HASP) for the intrusive work at the Project Area;
- Arranging for the locations of public and private underground and overhead;
- A surface soil sampling program including the sampling of eight (8) surface soil samples to facilitate the collection of fill and/or soil samples and field screening for evidence of negative impact including the presence of “free flowing product”, using visual, olfactory and sample headspace screening methods;
- Submitting select bulk soil samples for laboratory analysis as per Table 2.2 above, suspect contaminants of potential concern (COPC) include: metals (metals, hydrides, EC, SAR, pH); polycyclic aromatic hydrocarbons (PAHs); benzene, toluene, ethylbenzene, xylenes (BTEX); petroleum hydrocarbons (PHCs) F1-F4; and organochlorine pesticides (OCs);
- Submitting select leachate soil samples, representing worst case based on bulk chemical analysis, for toxic characteristic leachate procedure (TCLP) laboratory analysis including metals & inorganics, VOCs and benzo(a)pyrene (B(a)P);
- Soil samples should be collected using professionally accepted methods, minimizing the potential of cross contamination, under the supervision of a qualified person;
- Comparing the analytical results reported for the bulk soil samples to the appropriate generic Site Condition Standards (SCS) established by the Ministry of the Environment, Conservation and Parks (MECP) as provided in “*Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act*” dated April 15, 2011 in order to determine on-Site reuse options;
- Comparing the analytical results reported for the bulk and leachate soil samples to the appropriate generic Excess Soil Quality Standards (ESQS) established by the MECP as provided in “*Rules for Soil*”

Management and Excess Soil Quantity Standards" dated December 8, 2020 (Excess Soil Rules Document) in order to determine beneficial reuse options; and,

- Preparing a SCR, inclusive of figures, tables, and certificates of analysis, documenting the methodology and findings of the investigations and conclusions and recommendations regarding soil quality and the need for additional investigation and/or remedial activities, and determining the classification of potential receiver sites.

3.2 Deviations from Sampling and Analysis Plans

The following deviations to the work plan are noted:

- S-SA4 was submitted for laboratory analysis of PAHs in an attempt to delineate the Table 3 SCS exceedance at S-SA3.

4.0 Investigation Methods

4.1 General

The SCR was carried out in accordance with the SAP, with the deviations listed on Section 3.2, and in accordance with the WSP Standard Operating Procedures (SOP) cited therein.

4.2 Drilling and Excavating

The locations of all buried and overhead services were obtained prior to initiating any of the subsurface investigations.

4.2.1 Soil Sampling

The shallow soil investigation was completed by WSP utilizing a shovel. The shallow soil samples were advanced to depth of 0.3 metres below ground surface (mbgs) on 29 November 2022. Sampling tools were washed with phosphate free soap and rinsed with distilled water between samples.

4.2.2 Shallow Soil Sample Locations

The shallow soil sample locations, all collected at a depth of 0.3 mbgs, are provided in the table below and shown on Figure 2,

Table 4.1. Soil Sample Locations

Sample Location Identification	Northing	Easting	Soil Description	COVs
S-SA1	4676464	341698	Sandy clay with organics	0
S-SA2	4676465	341699	Sandy clay with organics	0
S-SA3	4676485	341714	Wet sand fill with clay	0
S-SA4	4676532	341768	Sandy clay with organics	0
S-SA5	4676575	341816	Soft dark brown clayey silt	0
S-SA6	4676612	341859	Soft dark brown clayey silt	0
S-SA7	4676709	341960	Sandy clay with organics	0
S-SA8	4676746	341930	Sandy clay with organics	0

4.3 Soil Sampling

4.3.1 Sampling Method

The soil samples retrieved during the shallow soil sampling program were examined, classified, and logged according to soil type, moisture content, colour, consistency, and presence of visual and/or olfactory indicators of negative impact. The soil samples recovered at the Project Area were subsampled based on visual observations including fill/soil type and visual/olfactory evidence of suspected impact.

Soil samples were split into duplicate fractions upon recovery at the surface. The primary sample fractions were placed in laboratory supplied glass sample jars and stored in coolers with ice for potential laboratory

analysis. Samples selected for analysis of volatile parameters including VOC (including BTEX) and PHC F1 were micro-cored and field preserved using methanol charged vials supplied by the analytical laboratory to minimize potential losses due to volatilization. The duplicate sample fractions were placed in "Ziploc" sample bags and stored at ambient temperature for subsequent field vapour screening purposes.

All soil samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. Disposable nitrile gloves were used and replaced between the handling of successive samples. All soil sampling equipment (stainless steel trowels, spatulas, etc.) was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination. Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in "Alconox" soap solution;
- Distilled water rinse;
- Methanol rinse; and
- Air dry.

Soil samples considered to be representative of "worst-case" environmental conditions were selected for chemical analysis based on visual and olfactory observations made in the field and on field screening results.

4.4 Field Screening Methods

All soil samples were screened in the field for gross evidence of negative environmental impact including staining and odours. Soil sample headspace screening was also performed to facilitate sample selections for laboratory analysis and to provide a semi-quantitative assessment of the vertical contaminant distributions at each borehole location. The duplicate soil sample fractions were screened for COV concentrations using the sample headspace method. COV concentrations were measured using an RKI Eagle 2 combined combustible gas analyzer (CGA). Where COV measurements were made, the instrument was operated in the methane elimination mode. The RKI Eagle 2 was calibrated at the start of each day of the field sampling programs using hexane reference gas (1650 ppm). It was also verified against the reference gases at the end of each day to assess potential instrument drift. The resolution of the instrument is 5 ppm hexane equivalent. The instrument response is compound specific. The measured soil vapour concentrations for COV are discussed in Section 4.2.2 and 5.2.2.

4.5 Analytical Testing

Representative soil samples collected during the investigation were submitted for laboratory analysis of suspect parameters of concern. All laboratory chemical analyses were conducted by Paracel Laboratories Ltd. of Ottawa, Ontario. Paracel is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) in accordance with ISO/IEC 17025:2017 – "General Requirements for the Competence of Testing and Calibration Laboratories" for the tested parameters set out in the Soil, Ground Water and Sediment Standards.

4.6 Residue Management Procedures

Investigation-derived wastes including soil cuttings generated during the investigation were placed back into the shallow soil sampling location.

4.7 Quality Assurance and Quality Control Measures

A strict Quality Control (QA/QC) program was implemented and maintained throughout the project to ensure that the Project Area data are representative of the actual Project Area conditions. The QA/QC program provides a method of documented checks to assess the precision and accuracy of collected data. The QA/QC program includes a set of standard procedures or protocols to be followed throughout the investigations. To this end, WSP field and QA/QC protocols have been developed to meet or exceed those defined in the Ministry of the Environment (MOE) documents entitled *"Guideline for Phase II Environmental Site Assessments in Ontario"* (Draft, March 2006) and *"Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario"* (1996) and Canadian Council of Ministers of the Environment (CCME) *"Guidance Manual Sampling, Analysis, and Data Management for Contaminated Sites"* (1993). The field QC program included the following components:

1. The use of personnel protective equipment including hard hats, safety glasses, safety work boots and chemically resistant latex/nitrile gloves for sample handling;
2. Thorough documentation of all field activities and sample handling practices including field notes, chain of custody forms, memos to file, etc.;
3. Thorough decontamination of non-dedicated sampling equipment employed in all investigation phases;
4. The use of laboratory analytical protocols and method detection limits that have been established in accordance with regulatory requirements for the Province of Ontario.

The *"Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act"*, 09 March 2004, amended as of 01 July 2011 (the "Analytical Protocol"), establishes performance criteria for use when assessing the reliability of data reported by analytical laboratories. These include maximum hold times for the storage of samples/sample extracts between collection and analysis, specified/approved analytical methods, required laboratory quality assurance samples such as blanks and field and laboratory duplicates, specified recovery ranges for spiked samples and surrogates (compounds added to samples in known concentrations for quality assurance purposes), Reporting Limits (RLs) and specified precision required when analyzing laboratory duplicate and spike/controlled reference material samples.

5.0 Review and Evaluation

5.1 Geology

The subsurface conditions encountered at the Project Area are described in Table 4.1. In general, the soil conditions at the Project Area consisted of surficial fill consisting of sandy clay with some organics.

One composite soil sample (consisting of S-SA1, S-SA5, and S-SA8) was submitted for grain size analysis. The grain size distribution curves are presented in Appendix A. Based on the grain size distribution, the predominant subsurface soil conditions across the Project Area are considered medium-fine textured for the purposes of assessment.

5.2 Soil: Field Screening

5.2.1 Staining and Odours

No odours or staining suggestive of petroleum hydrocarbon impacts were detected in any of the soil and/or sediment samples collected at the Project Area.

5.2.2 COV Concentrations

COV concentration headspace measurements recorded in the soil samples collected at the Project Area were all 0 ppm. These concentrations are not indicative of impact by petroleum hydrocarbons. The COV results are semi-quantitative at best and are generally only used for relative sample comparison purposes when selecting samples for laboratory analysis. The COV concentrations headspace measurements are summarized in Table 4.1.

6.0 Regulatory Framework

6.1 Ontario Regulation 406/19 – Generic Excess Soil Quality Standards

The analytical results were compared to the criteria presented in the MECP document titled *“Rules for Soil Management and Excess Soil Quality Standards”* dated December 8, 2020. Based on the proposed volume of excess soil to be generated at the project area (236 m³), the volume independent ESQS (applicable for excess soil quantities greater than 350 m³) were applied.

Based on the requirements of the Client and the intended reuse of the excess soil, the ESQS for industrial/commercial/community (ICC) property use in potable groundwater conditions were selected for assessment purposes. The soil analytical results were assessed using the Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition for ICC property Use (Table 3.1 ESQS).

6.2 Ontario Regulation 406/19 – Generic Leachate Screening Level

As the volumes of the soil being removed from the Project Area were less than 350 m³, mSPLP analysis was not required in accordance with O. Reg. 406/19.

6.3 Ontario Regulation 153/04 - Soil, Ground Water and Sediment Standards

In order to determine suitability of soil for on Site reuse, the analytical data has been compared to O. Reg 153/04 Site Condition Standards (SCS) as described in the *“Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act”* dated 15 April 2011. In order to determine the applicable SCS, WSP reviewed the existing Project Area use and site specific conditions including: 1) the existing/proposed property use; 2) the existing/potential ground water use; 3) depth of clean-up; 4) soil texture; 5) depth to bedrock; 6) proximity to a water body; and 7) soil pH.

The SCS applicable to the Project Area have been evaluated based on the following rationale:

- There are no known areas of natural significance¹ or conditions in the vicinity of the Project Area, which would cause the Project Area to be classified as potentially sensitive according to the Ministry of Natural Resources' Natural Heritage Information Centre web site;
- Based on knowledge of the surrounding area, the depth of the soil on the Project Area is greater than 2.0 mbgs;

1 An “Area of Natural Significance” means any of the following: 1) An area reserved or set apart as a provincial park or conservation reserve under the Provincial Parks and Conservation Reserves Act, 2006; 2) An area of natural and scientific interest (life science or earth science) identified by the Ministry of Natural Resources as having provincial significance; 3) A wetland identified by the Ministry of Natural Resources as having provincial significance; 4) An area designated by a municipality in its official plan as environmentally significant, however expressed, including designations of areas as environmentally sensitive, as being of environmental concern and as being ecologically significant; 5) An area designated as an escarpment natural area or an escarpment protection area by the Niagara Escarpment Plan under the Niagara Escarpment Planning and Development Act; 6) An area identified by the Ministry of Natural Resources as significant habitat of a threatened or endangered species; 7) An area which is habitat of a species that is classified under section 7 of the Endangered Species Act, 2007 as a threatened or endangered species; 8) Property within an area designated as a natural core area or natural linkage area within the area to which the Oak Ridges Moraine Conservation Plan under the Oak Ridges Moraine Conservation Act, 2001 applies; and 9) An area set apart as a wilderness area under the Wilderness Areas Act.

- The Project Area is not considered a “shallow soil property” as defined by O. Reg. 153/04;
- The Project Area is in an area of non-potable ground water and the Project Area and surrounding properties are supplied with municipal water system;
- The Project Area includes land that is within 30 m of a water body as it is a drainage ditch. Since the drainage ditch is generally dry, the Project Area is not considered a sensitive site under O.Reg. 153/04. The nearest waterbody is the Detroit River located approximately 12 km north of the Project Area. Regional ground water flow on the Project Area is anticipated to flow to the north (towards the Pike Creek Drain);
- The existing and intended future use of the Project Area is a drainage ditch (industrial use);
- Soil pH values measured at the Project Area were within the required range of 5 to 9 for surface soils and 5 to 11 for subsurface soils; and,
- Based on the grain size analysis, subsurface soil conditions across the Project Area are considered medium-fine.

Based on the Project Area characteristics and the continued use as a drainage ditch, the Table 3 SCS for I/C/C property use and medium-fine textured soils in a non-potable ground water condition as provided in *Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act* (MECP, April 15, 2011) have been applied in assessing the soil quality at the Project Area.

6.4 Ontario Regulation 347 Waste Classification

The legislative and regulatory requirements for contaminated soil disposal in Ontario are established by *Ontario Regulation 347/90 – General, Waste Management*, as amended (“O.Reg. 347/90”). The Schedule 4 Leachate Quality Criteria, as provided in O.Reg. 347/90, were developed as a guideline for waste classification and consequently determine the appropriate method of waste disposal. Analysis of soil samples in accordance with the toxicity characteristic leaching procedure (TCLP) is required in order to evaluate soil characteristics with respect to the Schedule 4 Leachate Quality Criteria.

7.0 Laboratory Analyses

The results of the soil sample analyses carried out as part of this investigation are summarized in Tables 1 and 2 (attached). Copies of the laboratory Certificates of Analysis are provided in Appendix B.

7.1 Soil Analysis

The results of the soil sample analyses in the context of the applicable ESQS and SCS are shown in Table 7.1 below,

Table 7.1. Soil Analysis

APEC	Approximate Soil Volume (m ³)	Table 3 SCS Exceedances	Table 3.1 ESQS Exceedances
APEC-1	31	No exceedances	Acenaphthylene – S-SA1 & S-SA3 Anthracene – S-SA1
Non-APEC-1 portions of Project Area	206	Acenaphthylene – S-SA4 Benzo(a)pyrene – S-SA4 & S-SA6	Acenaphthylene – S-SA4 & S-SA6 Anthracene – S-SA4

As per O.Reg 153/04 Section 48(2), two (or more) soil samples collected within a 2 m radius (same sampling location and depth), then the average of the sampling results can be compared to SCS. With respect to Table 3 SCS exceedances, at samples S-SA1 and DUPS-S1, as shown in Table 1, the average of benzo(a)pyrene is below Table 3 SCS and therefore would not be considered an exceedance.

7.2 Toxic Characteristic Leachate Procedure Analysis

One composite sample collected during the Excess Soil investigation was submitted for waste classification testing in accordance with *O.Reg. 347/90 – General, Waste Management* ("O.Reg. 347/90"). The sample was prepared as a composite sample by selecting soil aliquots from the excess soil cuttings generated during drilling. The sample was subject to flashpoint determination and analysis of general inorganics, metals, VOC, PCB, organochlorine pesticides and benzo[a]pyrene in accordance with the TCLP. The results of the waste classification testing along with the Schedule 4 leachate quality criteria are summarized in Table 2. The results of the waste classification indicate that the soil would be classified as non-hazardous solid waste if removed from the Project Area.

7.3 Quality Assurance Program

Duplicate samples are analyzed to assess the precision of the field sampling and laboratory analytical processes. Relative percent difference (RPD) acceptance limits only apply where the average of the results for the sample and its duplicate is greater than five times the laboratory reportable detection limit (RDL).

The soil field QA/QC program consisted of analyzing blind field duplicate samples for PHC F1 to F4, VOCs, PAHs, OC pesticides, and metals and inorganics. The RPD values could not be calculated for analyzed chemical parameters with measured concentrations less than five (5) times their respective RDLs. RPDs for those parameters with measured concentrations/values greater than five (5) times their RDLs were within acceptable limits, with exception of barium, cobalt, copper, lead, nickel, vanadium, zinc, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene at S-SA1 and its duplicate DUPS-S1. Other than

at benzo(a)pyrene, the original and duplicate samples were below Table 3 SCS. These elevated RPDs are not considered significant and do not impact the quality of the analytical results.

All samples/sample extracts were analyzed within their applicable hold times using approved analytical methods. The RLs were met for all tested parameters. No parameters were detected in any laboratory method blank. Surrogate recoveries were within acceptable ranges in all cases for all samples. Agreement between the corresponding datasets for the reference material samples where applicable and recoveries reported for spiked samples/blanks, where applicable, is acceptable. Agreement between the corresponding datasets for the laboratory duplicate samples is considered acceptable. The overall quality control for this analysis meets acceptability criteria. In summary, the analytical results reported for samples collected during this investigation are considered to have met the performance criteria of the Analytical Protocol.

8.0 Soil Reuse Protocol

Based on the results of the SCR, soil within the project area has been categorized into three zones (Zones 1, 2 and 3). The identified soil zones will be subject to specific requirements in terms of destination locations and/or on-Site reuse. The approximate extent of the Excess Soil Zones has been delineated to borehole locations advanced as part of this investigation and the limits of the Project Area as shown on Figures 3 and 4. The requirements for each soil zone is provided below:

8.1 Excess Soil Zone 1 – Soil meeting Table 3 SCS for On-Site Reuse

Soils with concentrations below the Table 3 SCS were identified across the Project Area with the following exception: between S-SA3 and the northern end of the Project Area from surface to 0.3 mbgs.

The soil designated as Excess Soil Zone 1 (other than this one area) can be reused on-site.

8.2 Excess Soil Zone 2 – Soil meeting Table 3.1 ESQS for Off-Site Beneficial Reuse

Soils with concentrations below the Table 3.1 ESQS were not identified on the Project Area and therefore no soil is designated as Excess Soil Zone 2 and cannot be reused at beneficial reuse sites where Table 3.1 ESQS for I/C/C property use apply.

8.3 Excess Soil Zone 3 – Soil exceeding Table 3.1 ESQS for Off-Site Disposal

Impacted soils exceeding the Table 3.1 ESQS were identified as follows:

- Acenaphthylene at S-SA1, S-SA3, S-SA4, and S-SA6; and
- Anthracene at S-SA1 and S-SA4

Excess Soil Zone 3 is located across the entire Project Area from surface to 0.3 mbgs.

Soil excavated from this zone is not suitable for beneficial reuse off-site. Therefore, soil excavated from this zone that is being removed from the Project Area can be deposited at either one of the following:

- a reuse site for which site-specific ESQS are developed using the BRAT model or other risk assessment method to determine if this soil can still be reused beneficially off-Site; and
- a waste management facility such as a landfill for disposal; TCLP analysis results indicated the soil is non-hazardous.

WSP recommends a vertical and horizontal delineation program around the boreholes with soil exceedances to minimize the volume of soil in Excess Soil Zone 3. This delineation program could be completed prior to construction (borehole advancement), or at the beginning of construction (test pits with contractor assistance). However, WSP notes that based on the low volume of excess soil (236 m³), a delineation program may not be necessary.

9.0 Signatures

I, Derek Saliba, B.Sc., by the signature provided below, certify that I conducted or supervised the carrying out of this SCR and the findings and conclusions of the report. I, Cindy McKee, P. Geo., QP_{ESA}, by the signature provided below, certify that I completed a technical review of this SCR and concur with the findings and conclusions of the report.

Respectfully Submitted,

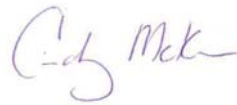
WSP E&I Canada Limited

Prepared by:



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Derek.saliba@wsp.com

Reviewed by:



Cindy McKee, P.Geo., QP_{ESA}
Senior Environmental Geoscientist
Cindy.mckee@wsp.com

10.0 References

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- Ontario Geologic Survey, 2010. "Surficial Geology of Southern Ontario (MRD128)".
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- Ontario Ministry of the Environment, 15 April 2011. "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act", PIBS # 7382e01.
- Ontario Ministry of Environment, Conservation and Parks, 2004. "Ontario Regulation 153/04 – Records of Site Condition – Part XV.1 of the Environmental Protection Act".
- Ontario Ministry of Environment, Conservation and Parks., 1990. "Ontario Regulation 347/90 – General – Waste Management".
- Ontario Ministry of Environment, Conservation and Parks, December 4, 2019. "Ontario Regulation 406/19 made under the Environmental Protection Act, On-Site and Excess Soil Management".
- Ontario Ministry of Environment, Conservation and Parks, 2022. "Rules for Soil Management and Excess Soil Quality Standards".
- Ontario Ministry of the Environment and Energy, December 1996. "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario".
- WSP, 14 November 2022. "Assessment of Past Uses, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario".
- WSP, 14 November 2022. "Sampling and Analysis Plan, Sullivan Creek Drain E09SH(102), Tecumseh, Ontario".



Tables



Notes on Excess Soil Analytical Summary Tables

All Units in Micrograms per Gram (µg/g) Except Where Indicated Otherwise.

RDL = Laboratory Analytical Reporting Detection Limit.

RL = MOE 2011 Analytical Protocol Reporting Limit.

- = Not Analyzed or No Published Value.

DUP = Quality Assurance/Quality Control Duplicate Sample.

RPD = Relative Percent Difference (Between Primary and Duplicate Samples).

* Denotes RPD Exceeds Recommended Alert Criterion Exceeded, However, Parameter Concentration Less than 5 Times Laboratory RDL.

< = Less Than Laboratory Analytical Reporting Detection Limit.

(a) The Boron Standards are for Hot Water Soluble Extract for All Surface Soils. For Subsurface Soils the Standards are for Total Boron (Mixed Strong Acid Digest), Since Plant Protection for Soils Below the Root Zone is not a Significant Concern.

(b) Analysis for Methyl Mercury Only Applies When Mercury (Total) Standard is Exceeded.

(c) F1 Fraction Does Not Include BTEX; However, the Proponent has the Choice as to Whether or not to Subtract BTEX from the Analytical Result.

(d) The Methylnaphthalene Standards are Applicable to Both 1-Methyl Naphthalene and 2-Methyl Naphthalene, with the Provision that if Both are Detected the Sum of the Two Must not Exceed the Standard.

55	Parameter Concentration May Exceed Applicable Standard Due to Elevated Method Detection Limit.
183	Parameter Concentration Exceeds MECP Table 3.1 Full Depth Excess Soil Standard for Industrial/Commercial/Community (I/C/C) Property Use.
797	Parameter Concentration Exceeds MECP Table 3 Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition for Industrial/Commercail/Community (I/C/C) Property Use.

Excess Soil Standards = Rules for Soil Management and Excess Soil Quality Standards, Ontario Ministry of the Environment, Conservation and Parks, 2019.

Inputted by: DS
Reviewed by: TG



Table 1. Summary of Excess Soil Analyses

Sample No.					Excess Soil ESQS	EPA Standard Full Depth	S-SA1	DUPS-S1 (of S-SA1)			S-SA2	S-SA3	S-SA4	S-SA6	S-SA8
Soil Type															
Sample Depth (m)															
Laboratory Name															
Laboratory Work Order No.															
Laboratory Sample ID															
Sample Date															
Reported Date															
Parameters	ATG	Units	RDL	RL											
Metals															
Antimony	Metal	µg/g	0.8	1	40	50	<	<	NC	NC	<	<	N/A	<	<
Arsenic	Metal	µg/g	1	1	18	18	5.4	3.4	4.4	NC	4.7	3.4	N/A	5.2	2.8
Barium	Metal	µg/g	2.0	5	670	670	55.9	34.4	45.15	47.6	52.2	48.2	N/A	63.7	30.6
Beryllium	Metal	µg/g	0.4	2	8	10	0.6	<	NC	NC	0.5	<	N/A	0.7	<
Boron (total)	Metal	µg/g	5	5	120	120	7.6	<	NC	NC	7.2	<	N/A	8.8	<
Cadmium	Metal	µg/g	0.5	1	1.9	1.9	<	<	NC	NC	<	<	N/A	<	<
Chromium Total	Metal	µg/g	5	5	160	160	14.4	8.9	11.65	NC	13.2	10.5	N/A	17.8	8.1
Cobalt	Metal	µg/g	0.5	2	80	100	6.8	4.3	5.55	45	6.2	6.1	N/A	6.6	3.4
Copper	Metal	µg/g	1.0	5	230	300	15.7	10.3	13	41.5	14.8	11.0	N/A	16.2	5.8
Lead	Metal	µg/g	1	10	120	120	11.2	6.7	8.95	50.3	10.4	8.2	N/A	11.7	6.3
Molybdenum	Metal	µg/g	0.5	2	40	40	1.5	<	NC	NC	1.4	<	N/A	1.3	<
Nickel	Metal	µg/g	1	5	270	340	15.4	9.9	12.65	43.5	13.9	11.9	N/A	18.8	7.7
Selenium	Metal	µg/g	0.8	1	5.5	5.5	<	<	NC	NC	<	<	N/A	<	<
Silver	Metal	µg/g	0.5	0.5	40	50	<	<	NC	NC	<	<	N/A	<	<
Thallium	Metal	µg/g	0.5	1	3.3	3.3	<	<	NC	NC	<	<	N/A	<	<
Uranium	Metal	µg/g	0.50	1	33	33	<	<	NC	NC	<	<	N/A	<	<
Vanadium	Metal	µg/g	0.4	10	86	86	24.0	14.6	19.3	48.7	22.0	16.9	N/A	26.8	12.5
Zinc	Metal	µg/g	5	30	340	340	63.8	39.1	51.45	48	61.3	42.6	N/A	81.3	30.5
Other Regulated Parameters															
Sodium Adsorption Ratio	ORP	-	n/a	5	12	12	0.55	0.55	0.55	0	0.62	0.19	N/A	0.42	0.86
Electrical Conductivity (mS/cm)	ORP	µS/cm	0.005	0.7	1400.0	1400.0	475	521	498	9.24	540	458	N/A	613	413
pH	ORP	-	n/a	0.1	12	12	7.11	7.03	7.07	1.13	6.90	6.98	N/A	6.97	6.96
Petroleum Hycrocarbons															
Petroleum Hydrocarbons F1 ^d	PHC	µg/g	7	10	25	55	<	<	NC	NC	<	<	N/A	<	<
Petroleum Hydrocarbons F2	PHC	µg/g	4	10	26	230	<	<	NC	NC	6	<	N/A	<	<
Petroleum Hydrocarbons F3	PHC	µg/g	8	50	1700	1700	32	42	37	NC	57	30	N/A	25	19
Petroleum Hydrocarbons F4	PHC	µg/g	6	50	3300	3300	20	26	23	NC	29	17	N/A	13	13
Volatile Organic Compounds															
Benzene	VOC	µg/g	0.02	0.02	0.034	0.4	<	<	NC	NC	<	<	N/A	<	<
Toluene	VOC	µg/g	0.05	0.2	7.8	19	<	<	NC	NC	<	<	N/A	<	<
Ethylbenzene	VOC	µg/g	0.05	0.05	1.9	78	<	<	NC	NC	<	<	N/A	<	<
Xylenes, m,p-	VOC	µg/g	0.05	-	-	-	<	<	NC	NC	<	<	N/A	<	<
Xylene, o-	VOC	µg/g	0.05	-	-	-	<	<	NC	NC	<	<	N/A	<	<
Xylene Mixture	VOC	µg/g	0.05	0.05	3	30	<	<	NC	NC	<	<	N/A	<	<
Semi-Volatiles															
Acenaphthene	sVOC	µg/g	0.02	0.02	15	96	<	<	NC	NC	<	<	0.03	<	N/A
Acenaphthylene	sVOC	µg/g	0.02	0.02	0.093	0.17	0.17	0.04	0.105	NC	0.08	0.12	0.46	0.13	N/A
Anthracene	sVOC	µg/g	0.02	0.02	0.16	0.74	0.20	0.04	0.12	NC	0.08	0.10	0.4	0.11	N/A
Benzo[a]anthracene	sVOC	µg/g	0.02	0.02	1	0.96	0.45	0.11	0.28	121.4	0.14	0.27	0.89	0.37	N/A
Benzo[a]pyrene	sVOC	µg/g	0.02	0.02	0.7	0.3	0.46	0.11	0.285	122.8	0.14	0.19	0.69	0.31	N/A
Benzo[b]fluoranthene	sVOC	µg/g	0.02	0.02	7	0.96	0.56	0.16	0.36	111.1	0.19	0.30	0.65	0.41	N/A
Benzo[g,h,i]perylene	sVOC	µg/g	0.02	0.02	13	9.6	0.24	0.07	0.155	NC	0.09	0.14	0.36	0.16	N/A
Benzo[k]fluoranthene	sVOC	µg/g	0.02	0.02	7	0.96	0.32	0.06	0.19	NC	0.09	0.28	0.30	0.20	N/A
Chrysene	sVOC	µg/g	0.02	0.02	14	9.6	0.45	0.15	0.3	100	0.17	0.30	0.63	0.39	N/A
Dibenzo[a,h]anthracene	sVOC	µg/g	0.02	0.02	0.7	0.1	0.07	<	NC	NC	0.03	0.04	0.17	0.04	N/A
Fluoranthene	sVOC	µg/g	0.02	0.02	70	9.6	0.99	0.21	0.6	130	0.32	0.49	1.62	0.74	N/A
Fluorene	sVOC	µg/g	0.02	0.02	6.8	69	<	<	NC	NC	<	<	0.02	<	N/A
Indeno [1,2,3-cd] pyrene	sVOC	µg/g	0.02	0.02	0.76	0.95	0.22	0.06	0.14	NC	0.08	0.13	0.48	0.15	N/A
1-Methylnaphthalene	sVOC	µg/g	0.02	0.02	8.7	85	0.05	0.04	0.045	NC	0.05	0.09	0.02	<	N/A
2-Methylnaphthalene	sVOC	µg/g	0.02	0.02	8.7	85	0.06	0.05	0.055	NC	0.06	0.08	0.03	<	N/A
Methylnaphthalene (1&2)	sVOC	µg/g	0.04	0.04	8.7	85	0.12	0.09	0.105	NC	0.10	0.17	0.05	<	N/A
Naphthalene	sVOC	µg/g	0.01	0.01	1.8	28	0.04	0.03	0.035	NC	0.03	0.04	0.01	<	N/A
Phenanthrene	sVOC	µg/g	0.02	0.02	12	16	0.12	0.07	0.095	NC	0.10	0.12	0.22	0.12	N/A
Pyrene	sVOC	µg/g	0.02	0.02	70	96	0.98	0.21	0.595	129.4	0.32	0.53	1.40	0.74	N/A
Pesticides, OC															
Aldrin	OC	µg/g	0.01	0.01	0.088	0.11	<	<	NC	NC	<	<	N/A	N/A	N/A
gamma-BHC (Lindane)	OC	µg/g	0.01	0.01	-	0.063	<	<	NC	NC	<	<	N/A	N/A	N/A
alpha-Chlordane	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
gamma-Chlordane	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
Chlordane	OC	µg/g	0.01	0.01	0.05	0.05	<	<	NC	NC	<	<	N/A	N/A	N/A
o,p-DDD	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
p,p-DDD	OC	µg/g	0.02	0.02	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
DDD	OC	µg/g	0.02	0.02	4.6	4.6	<	<	NC	NC	<	<	N/A	N/A	N/A
o,p-DDE	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
p,p-DDE	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
DDE	OC	µg/g	0.01	0.01	0.52	0.65	<	<	NC	NC	<	<	N/A	N/A	N/A
o,p-DDT	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
p,p-DDT	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
DDT	OC	µg/g	0.01	0.01	1.4	1.4	<	<	NC	NC	<	<	N/A	N/A	N/A
Dieldrin	OC	µg/g	0.02	0.02	0.088	0.11	<	<	NC	NC	<	<	N/A	N/A	N/A
Endrin	OC	µg/g	0.02	0.02	0.04	0.04	<	<	NC	NC	<	<	N/A	N/A	N/A
Endosulfan I	OC	µg/g	0.01	0.01	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
Endosulfan II	OC	µg/g	0.02	0.02	-	-	<	<	NC	NC	<	<	N/A	N/A	N/A
Heptachlor	OC	µg/g	0.01	0.01	0.072	0.19	<	<	NC	NC	<	<	N/A	N/A	N/A
Heptachlor Epoxide	OC	µg/g	0.01	0.01	0.05	0.05	<	<	NC	NC	<	<	N/A	N/A	N/A
Hexachlorobenzene	OC	µg/g	0.01	0.01	0.66	0.66	<	<	NC	NC	<	<	N/A	N/A	N/A
Hexachlorobutadiene	OC	µg/g	0.01	0.01	0.01	0.095	<	<	NC	NC	<	<	N/A	N/A	N/A
Hexachloroethane	OC	µg/g	0.01	0.01	0.13	0.43	<	<	NC	NC	<	<	N/A	N/A	N/A
Methoxychlor	OC	µg/g	0.01	0.01	0.19	1.6	<	<	NC	NC	<	<	N/A	N/A	N/A



Table 2. Summary of TCLP Analyses

Sample No. Laboratory ID Sample Date Reported Date			Reg. 558 Schedule 4	TCLP-Sul 2250418-01 8-Dec-22 13-Dec-22
Parameters	RDL	RL		
Ignitability	n/a	n/a	-	Not Ignitable
EPA 1331 - TCLP Leachate Metals				
Arsenic	0.05	n/a	2.5	<
Barium	0.05	n/a	100	0.19
Boron	0.05	n/a	500	0.10
Cadmium	0.01	n/a	0.5	<
Chromium	0.05	n/a	5	<
Lead	0.05	n/a	5	<
Mercury	0.005	n/a	0.1	<
Selenium	0.05	n/a	1	<
Silver	0.05	n/a	5	<
Uranium	0.05	n/a	10	<
EPA 1331 - TCLP Leachate Inorganics				
Fluoride	0.05	n/a	150	<
Nitrate as N	1	n/a	1000	<
Nitrite as N	1	n/a	1000	<
Cyanide, free	0.02	n/a	20	<
EPA 1331 - TCLP Leachate Volatiles				
Benzene	0.005	n/a	0.5	<
Carbon Tetrachloride	0.005	n/a	0.5	<
Chlorobenzene	0.004	n/a	8	<
Chloroform	0.006	n/a	10	<
1,2-Dichlorobenzene	0.004	n/a	20	<
1,4-Dichlorobenzene	0.004	n/a	0.5	<
1,2-Dichloroethane	0.005	n/a	0.5	<
1,1-Dichloroethylene	0.006	n/a	1.4	<
Methyl Ethyl Ketone (2-Butanone)	0.30	n/a	200	<
Methylene Chloride	0.04	n/a	5	<
Tetrachloroethylene	0.005	n/a	3	<
Trichloroethylene	0.004	n/a	5	<
Vinyl Chloride	0.005	n/a	0.2	<
EPA 1331 - TCLP Leachate Organics				
Benzo[a]pyrene	0.0001	n/a	0.001	<

797 Concentration exceeds Schedule 4 of O. Reg. 347

RDL = Laboratory Analytical Reporting Detection Limit.

< = Less than RDL



Figures


DATE PLOTTED: 12/15/2022 3:17:49 PM
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NOTES:
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WSP E&I CANADA LIMITED
REPORT No. OESAW2233. ALL LOCATIONS ARE APPROXIMATE.

REFERENCES:
CANMAP STREETFILES V2008.4.

ORIGINAL PAPER SIZE: 8½ x 11.

CLIENT: Rood Engineering Inc. 9 NELSON STREET LEAMINGTON, ONTARIO, N8H 1G6		DWN BY: LMK	PROJECT: SOIL CHARACTERIZATION REPORT SULLIVAN CREEK DRAIN E09SH(102) TECUMSEH, ONTARIO	DATE: DEC. 2022	
		CHK'D BY: CM		PROJECT No: OESAW2233	
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499		DATUM: NAD83	TITLE: KEY PLAN	REV No: 0	
		PROJECTION: UTM Zone 17		FIGURE No: 1	
		SCALE: 1:25,000			

DATE PLOTTED: 12/15/2022 3:18:03 PM
FILE LOCATION: W:\2022\ESA and Remediation\Projects\OESAW2233 - Road Engineering (Sullivan Creek Drain)\14 CAD\Drafting\AutoCAD files\OESAW2233 - R03001.dwg

Area of Potential Environmental Concern	Location/Area of APEC on Project Area	Potentially Contaminating Activity	Location of PCA	Contaminants of Potential Concern
APEC-1: Former railway that cuts through southern portion of Project Area	Southern portion of Project Area (1,329 m ²)	PCA 1: 46. Rail Yards, Tracks and Spurs	On-Site: Southern portion of Project Area	PHC, BTEX, Metals, EC, SAR, pH, PAHs, Ocs
N/A	Non-APEC portion of Project Area (8,963 m ²)	N/A	On-Site: Central and northern portions of Project Area	PHCs, BTEX, Metals, EC, SAR, Ph

LEGEND:

- APPROXIMATE SITE BOUNDARY
- 30m BUFFER FROM THE PIPELINES
- APEC-1
- × SURFACE SAMPLE LOCATION

NOTES:

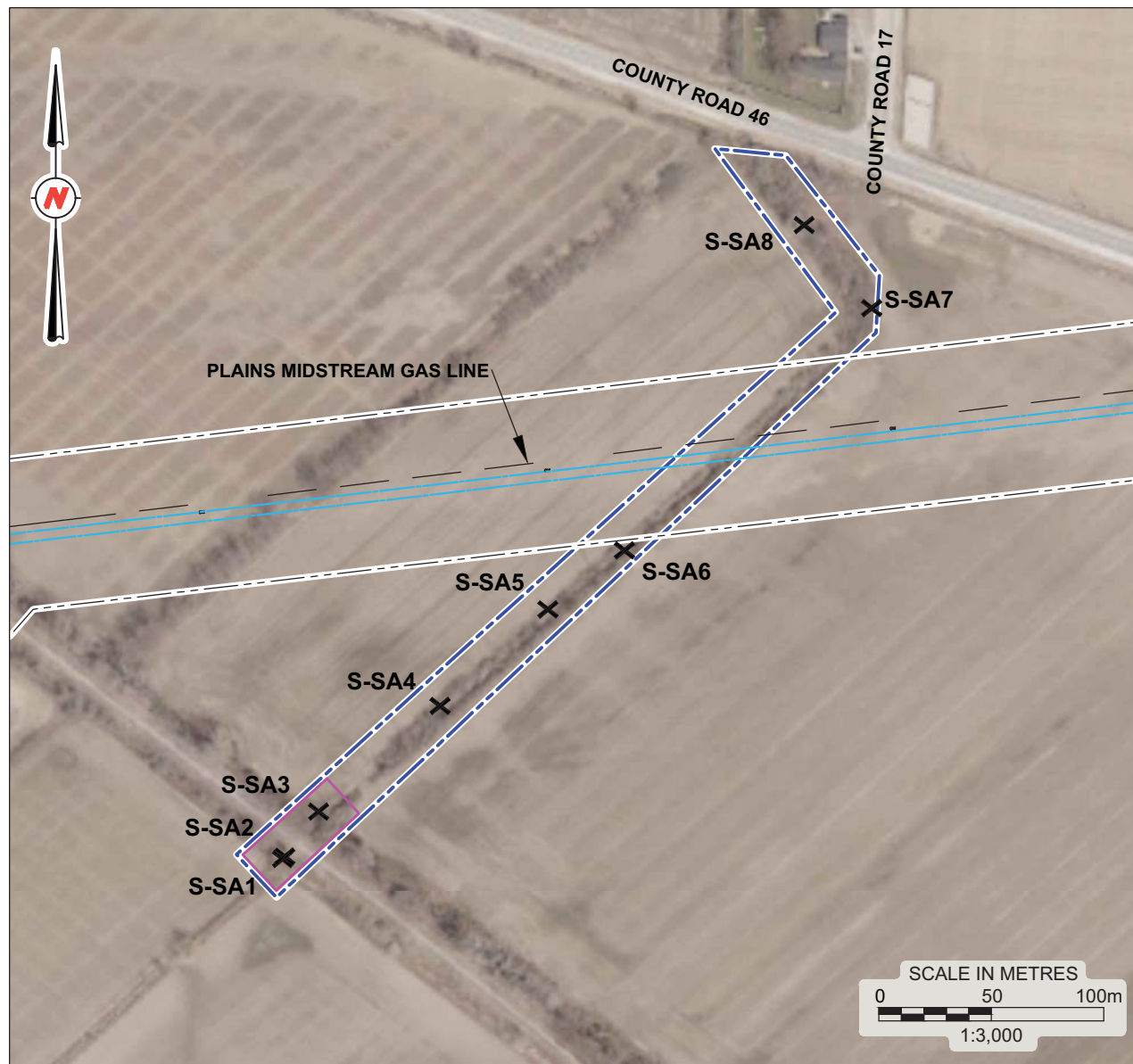
THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE WSP E&I CANADA LIMITED REPORT No. OESAW2233.


ALL LOCATIONS ARE APPROXIMATE.

ORIGINAL PAPER SIZE: 8 1/2 x 11

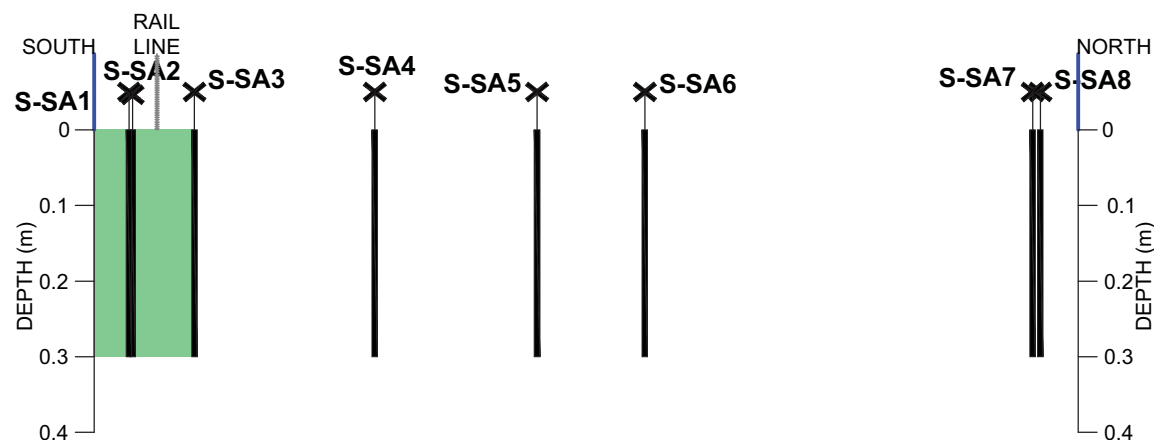
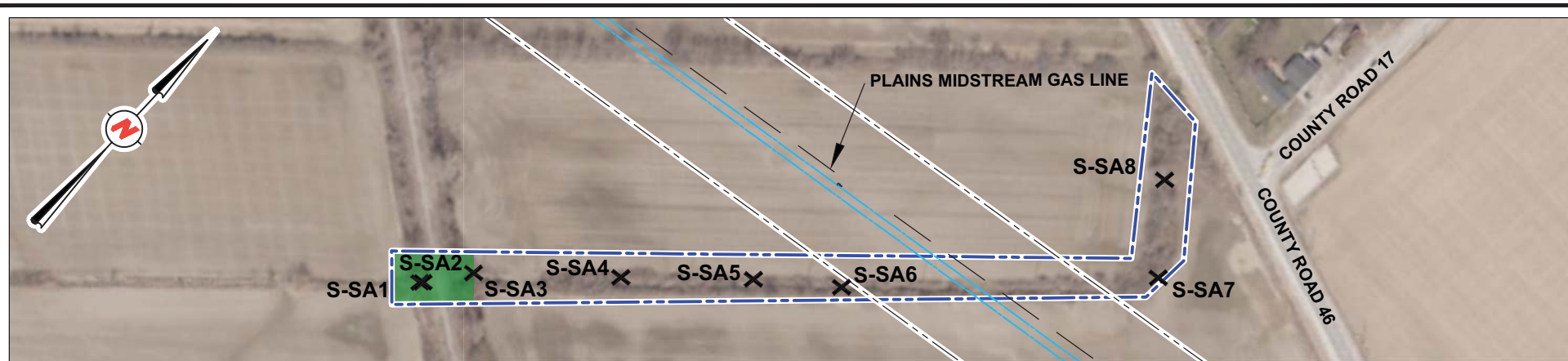
REFERENCES:

2022 AERIAL IMAGE FROM THE COUNTY OF ESSEX INTERACTIVE WEB MAPPING SITE.



CLIENT: Rood Engineering Inc. 9 NELSON STREET LEAMINGTON, ONTARIO, N8H 1G6		DWN BY: LMK	PROJECT: SOIL CHARACTERIZATION REPORT SULLIVAN CREEK DRAIN E09SH(102) TECUMSEH, ONTARIO	DATE: DEC. 2022
		CHK'D BY: CM		PROJECT No: OESAW2233
		DATUM: NAD83		
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499		PROJECTION: UTM Zone 17	TITLE: SURFACE SAMPLE LOCATION PLAN	REV. No: 0
		SCALE: 747 1:3,000		FIGURE No: 2

DATE PLOTTED: 12/22/2022 9:21:05 AM
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NOTES:
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 THE WSP E&I CANADA LIMITED REPORT No. OESAW2233.
 ALL LOCATIONS ARE APPROXIMATE.

ORIGINAL PAPER SIZE: 8 1/2 x 11

REFERENCES:
 2022 AERIAL IMAGE FROM THE COUNTY OF ESSEX
 INTERACTIVE WEB MAPPING SITE.

LEGEND:

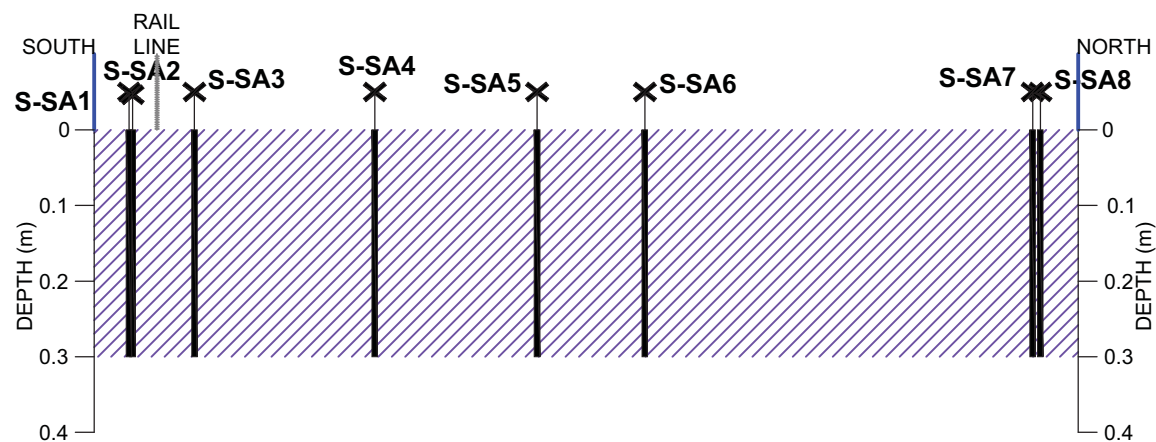
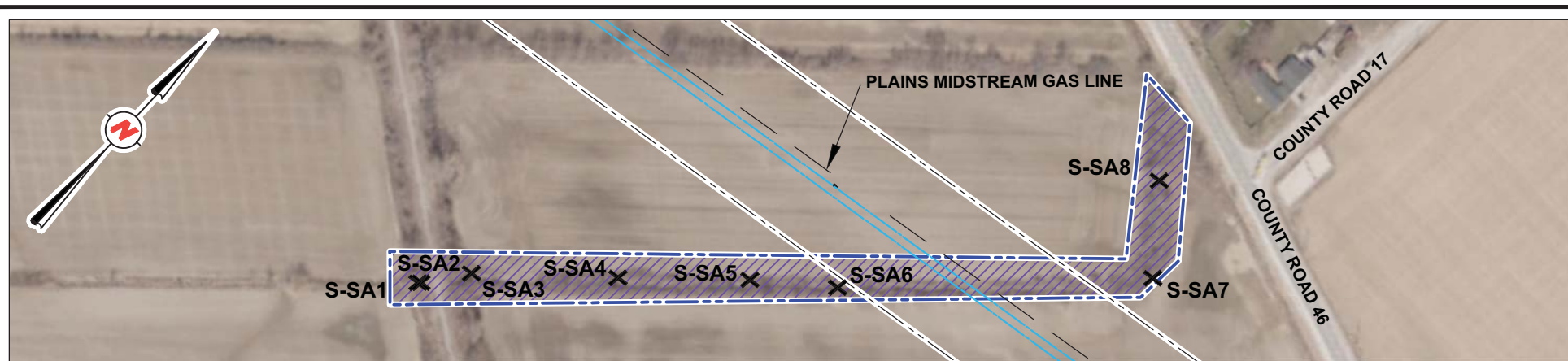
- APPROXIMATE PROJECT AREA BOUNDARY
- 30m BUFFER FROM THE PIPELINES
- X SURFACE SAMPLE LOCATION
- ZONE 1 - SOIL MEETING TABLE 3 SCS FOR ON-SITE REUSE

HORIZONTAL SCALE IN METRES
 0 50 100m
 1:3,000

VERTICAL SCALE IN METRES
 0 0.2 0.4m
 1:10

CLIENT:		DWN BY:	PROJECT:	DATE:
Rood Engineering Inc. 9 NELSON STREET LEAMINGTON, ONTARIO, N8H 1G6		LMK	SOIL CHARACTERIZATION REPORT SULLIVAN CREEK DRAIN E09SH(102) TECUMSEH, ONTARIO	DEC. 2022
		CHK'D BY:		PROJECT No:
		CM		OESAW2233
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499		DATUM:	TITLE:	REV. No:
		NAD83	PROJECT AREA PLAN VIEW AND CROSS SECTION FOR EXCESS SOIL ZONE 1	0
		PROJECTION:		FIGURE No:
		UTM Zone 17		3
		SCALE:		
		AS SHOWN		

DATE PLOTTED: 12/22/2022 10:04:09 AM
 FILE LOCATION: W:\2022 ESA and Remediation\Projects\OESAW2233 - Road Engineering (Sullivan Creek Drain)\14 CAD\Drafting\AutoCAD files\OESAW2233-RO3003.dwg



NOTES:
 THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH
 THE WSP E&I CANADA LIMITED REPORT No. OESAW2233.
 ALL LOCATIONS ARE APPROXIMATE.

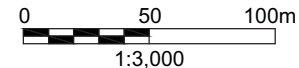
ORIGINAL PAPER SIZE: 8 1/2 x 11

REFERENCES:
 2022 AERIAL IMAGE FROM THE COUNTY OF ESSEX
 INTERACTIVE WEB MAPPING SITE.

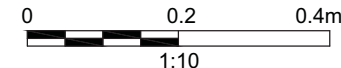
LEGEND:


- APPROXIMATE PROJECT AREA BOUNDARY
- 30m BUFFER FROM THE PIPELINES
- X** SURFACE SAMPLE LOCATION
- ZONE 2 – SOIL MEETING TABLE 3.1 ESQS FOR BENEFICIAL OFF-SITE REUSE
- ZONE 3 – SOIL EXCEEDING TABLE 3.1 ESQS FOR OFF-SITE DISPOSAL

HORIZONTAL SCALE IN METRES



VERTICAL SCALE IN METRES



CLIENT: Rood Engineering Inc. 9 NELSON STREET LEAMINGTON, ONTARIO, N8H 1G6		DWN BY: LMK	PROJECT: SOIL CHARACTERIZATION REPORT SULLIVAN CREEK DRAIN E09SH(102) TECUMSEH, ONTARIO	DATE: DEC. 2022
		CHK'D BY: CM		PROJECT No: OESAW2233
WSP E&I Canada Limited 11865 COUNTY ROAD 42 TECUMSEH, ONTARIO, N8N 0H1 519-735-2499		DATUM: NAD83	TITLE: PROJECT AREA PLAN VIEW AND CROSS SECTION FOR EXCESS SOIL ZONES 2 & 3	REV. No: 0
		PROJECTION: UTM Zone 17 SCALE: AS SHOWN		FIGURE No: 4



Appendix A

Grain Size Analysis

WSP E&I Canada Ltd.
11865 County Road 42
Tecumseh, Ontario N8N 0H1
Tel +1 (519) 735-2499
Fax +1 (519) 735-9669
www.wsp.com



Wash loss Passing 75µm

LS-601 / ASTM C 117

Project Details

Project Number: OESAW2233.1000
Project Client: Rood Engineering Inc.
Project Name: Sullican Drain

Date Sampled: 29-Nov-2022
Date Received: 29-Nov-2022
Date Tested: 6-Dec-2022

Sampled by: DS
Tested by: JP

Lab number: 1031

Location: S-Sa1, Sa5, Sa8
Source of Material: Native

Test Results

Moisture content of sample	36.6%
Total weight of sample	275.2 g
Total weight of sample after wash	187.7 g
Wash loss percent Passing 75µm	31.8%

Signed by:  Justin P., C.Tech. / Lab Manager

More information available upon request



Appendix B

Laboratory Certificates of Analysis

Certificate of Analysis

WSP E&I Canada Limited (Windsor)

11865 County Road 42
Tecumseh, ON N8N 2M1
Attn: Cindy McKee

Client PO: OESAW2233.****.****.5120.573000

Project: OESAW2233.****.****.5120.573000

Custody: Revised Report

Report Date: 19-Dec-2022

Order Date: 29-Nov-2022

Order #: 2249129

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2249129-01	S-SA1
2249129-02	S-SA2
2249129-03	S-SA3
2249129-04	S-SA6
2249129-05	S-SA8
2249129-06	DUPS-S1

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 8260 - P&T GC-MS	1-Dec-22	2-Dec-22
Conductivity	MOE E3138 - probe @25 °C, water ext	2-Dec-22	2-Dec-22
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	30-Nov-22	1-Dec-22
PHC F1	CWS Tier 1 - P&T GC-FID	1-Dec-22	2-Dec-22
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	30-Nov-22	2-Dec-22
REG 153: Metals by ICP/MS, soil	EPA 6020 - Digestion - ICP-MS	1-Dec-22	1-Dec-22
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	2-Dec-22	6-Dec-22
REG 153: Pesticides, OC	EPA 8081B - GC-ECD	30-Nov-22	6-Dec-22
SAR	Calculated	1-Dec-22	2-Dec-22
Solids, %	CWS Tier 1 - Gravimetric	2-Dec-22	2-Dec-22

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Summary of Criteria Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances.

Sample	Analyte	MDL / Units	Result	-	-
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Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA1	S-SA2	S-SA3	S-SA6		
Sample Date:	29-Nov-22 09:20	29-Nov-22 09:30	29-Nov-22 09:35	29-Nov-22 10:05	-	-
Sample ID:	2249129-01	2249129-02	2249129-03	2249129-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	82.3	84.4	76.1	60.7	-	-
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General Inorganics

SAR	0.01 N/A	0.55	0.62	0.19	0.42	-	-
Conductivity	5 uS/cm	475	540	458	613	-	-
pH	0.05 pH Units	7.11	6.90	6.98	6.97	-	-

Metals

Antimony	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Arsenic	1 ug/g	5.4	4.7	3.4	5.2	-	-
Barium	1 ug/g	55.9	52.2	48.2	63.7	-	-
Beryllium	0.5 ug/g	0.6	0.5	<0.5	0.7	-	-
Boron	5 ug/g	7.6	7.2	<5.0	8.8	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	<0.5	<0.5	-	-
Chromium	5 ug/g	14.4	13.2	10.5	17.8	-	-
Cobalt	1 ug/g	6.8	6.2	6.1	6.6	-	-
Copper	5 ug/g	15.7	14.8	11.0	16.2	-	-
Lead	1 ug/g	11.2	10.4	8.2	11.7	-	-
Molybdenum	1 ug/g	1.5	1.4	<1.0	1.3	-	-
Nickel	5 ug/g	15.4	13.9	11.9	18.8	-	-
Selenium	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Silver	0.3 ug/g	<0.3	<0.3	<0.3	<0.3	-	-
Thallium	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Uranium	1 ug/g	<1.0	<1.0	<1.0	<1.0	-	-
Vanadium	10 ug/g	24.0	22.0	16.9	26.8	-	-
Zinc	20 ug/g	63.8	61.3	42.6	81.3	-	-

Volatiles

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA1	S-SA2	S-SA3	S-SA6		
Sample Date:	29-Nov-22 09:20	29-Nov-22 09:30	29-Nov-22 09:35	29-Nov-22 10:05	-	-
Sample ID:	2249129-01	2249129-02	2249129-03	2249129-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	<0.05	<0.05	-	-
Toluene-d8	Surrogate	112%	114%	119%	129%	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	<7	<7	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	6	<4	<4	-	-
F3 PHCs (C16-C34)	8 ug/g	32	57	30	25	-	-
F4 PHCs (C34-C50)	6 ug/g	20	29	17	13	-	-

Semi-Volatiles

Acenaphthene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-
Acenaphthylene	0.02 ug/g	0.17	0.08	0.12	0.13	-	-
Anthracene	0.02 ug/g	0.20	0.08	0.10	0.11	-	-
Benzo [a] anthracene	0.02 ug/g	0.45	0.14	0.27	0.37	-	-
Benzo [a] pyrene	0.02 ug/g	0.46	0.14	0.19	0.31	-	-
Benzo [b] fluoranthene	0.02 ug/g	0.56	0.19	0.30	0.41	-	-
Benzo [g,h,i] perylene	0.02 ug/g	0.24	0.09	0.14	0.16	-	-
Benzo [k] fluoranthene	0.02 ug/g	0.32	0.09	0.28	0.20	-	-
Chrysene	0.02 ug/g	0.45	0.17	0.30	0.39	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	0.07	0.03	0.04	0.04	-	-
Fluoranthene	0.02 ug/g	0.99	0.32	0.49	0.74	-	-
Fluorene	0.02 ug/g	<0.02	<0.02	<0.02	<0.02	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Client ID:	S-SA1	S-SA2	S-SA3	S-SA6		
Sample Date:	29-Nov-22 09:20	29-Nov-22 09:30	29-Nov-22 09:35	29-Nov-22 10:05	-	-
Sample ID:	2249129-01	2249129-02	2249129-03	2249129-04		
Matrix:	Soil	Soil	Soil	Soil		
MDL/Units						

Semi-Volatiles

Indeno [1,2,3-cd] pyrene	0.02 ug/g	0.22	0.08	0.13	0.15	-	-
1-Methylnaphthalene	0.02 ug/g	0.05	0.05	0.09	<0.02	-	-
2-Methylnaphthalene	0.02 ug/g	0.06	0.06	0.08	<0.02	-	-
Methylnaphthalene (1&2)	0.04 ug/g	0.12	0.10	0.17	<0.04	-	-
Naphthalene	0.01 ug/g	0.04	0.03	0.04	<0.01	-	-
Phenanthrene	0.02 ug/g	0.12	0.10	0.12	0.12	-	-
Pyrene	0.02 ug/g	0.98	0.32	0.53	0.74	-	-
2-Fluorobiphenyl	Surrogate	70.1%	131%	82.4%	96.3%	-	-
Terphenyl-d14	Surrogate	96.4%	129%	100%	111%	-	-

Pesticides, OC

Aldrin	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
gamma-BHC (Lindane)	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
alpha-Chlordane	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
gamma-Chlordane	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Chlordane	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
o,p'-DDD	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
p,p'-DDD	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-
DDD	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-
o,p'-DDE	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
p,p'-DDE	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
DDE	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
o,p'-DDT	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
p,p'-DDT	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
DDT	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Dieldrin	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA1	S-SA2	S-SA3	S-SA6	
Sample Date:	29-Nov-22 09:20	29-Nov-22 09:30	29-Nov-22 09:35	29-Nov-22 10:05	-
Sample ID:	2249129-01	2249129-02	2249129-03	2249129-04	-
Matrix:	Soil	Soil	Soil	Soil	
MDL/Units					

Pesticides, OC

Endrin	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-
Endosulfan I	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Endosulfan II	0.02 ug/g	<0.02	<0.02	<0.02	-	-	-
Heptachlor	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Heptachlor epoxide	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Hexachlorobenzene	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Hexachlorobutadiene	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Hexachloroethane	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Methoxychlor	0.01 ug/g	<0.01	<0.01	<0.01	-	-	-
Decachlorobiphenyl	Surrogate	117%	89.0%	103%	-	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA8	DUPS-S1			
Sample Date:	29-Nov-22 10:20	29-Nov-22 00:00			-
Sample ID:	2249129-05	2249129-06			-
Matrix:	Soil	Soil			
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	81.6	82.9	-	-	-	-
----------	--------------	------	------	---	---	---	---

General Inorganics

SAR	0.01 N/A	0.86	0.55	-	-	-	-
Conductivity	5 uS/cm	413	521	-	-	-	-
pH	0.05 pH Units	6.96	7.03	-	-	-	-

Metals

Antimony	1 ug/g	<1.0	<1.0	-	-	-	-
Arsenic	1 ug/g	2.8	3.4	-	-	-	-
Barium	1 ug/g	30.6	34.4	-	-	-	-
Beryllium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Boron	5 ug/g	<5.0	<5.0	-	-	-	-
Cadmium	0.5 ug/g	<0.5	<0.5	-	-	-	-
Chromium	5 ug/g	8.1	8.9	-	-	-	-
Cobalt	1 ug/g	3.4	4.3	-	-	-	-
Copper	5 ug/g	5.8	10.3	-	-	-	-
Lead	1 ug/g	6.3	6.7	-	-	-	-
Molybdenum	1 ug/g	<1.0	<1.0	-	-	-	-
Nickel	5 ug/g	7.7	9.9	-	-	-	-
Selenium	1 ug/g	<1.0	<1.0	-	-	-	-
Silver	0.3 ug/g	<0.3	<0.3	-	-	-	-
Thallium	1 ug/g	<1.0	<1.0	-	-	-	-
Uranium	1 ug/g	<1.0	<1.0	-	-	-	-
Vanadium	10 ug/g	12.5	14.6	-	-	-	-
Zinc	20 ug/g	30.5	39.1	-	-	-	-

Volatiles

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA8	DUPS-S1			
Sample Date:	29-Nov-22 10:20	29-Nov-22 00:00			
Sample ID:	2249129-05	2249129-06			
Matrix:	Soil	Soil			
MDL/Units					

Volatiles

Benzene	0.02 ug/g	<0.02	<0.02	-	-	-	-
Ethylbenzene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene	0.05 ug/g	<0.05	<0.05	-	-	-	-
m,p-Xylenes	0.05 ug/g	<0.05	<0.05	-	-	-	-
o-Xylene	0.05 ug/g	<0.05	<0.05	-	-	-	-
Xylenes, total	0.05 ug/g	<0.05	<0.05	-	-	-	-
Toluene-d8	Surrogate	118%	114%	-	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g	<7	<7	-	-	-	-
F2 PHCs (C10-C16)	4 ug/g	<4	<4	-	-	-	-
F3 PHCs (C16-C34)	8 ug/g	19	42	-	-	-	-
F4 PHCs (C34-C50)	6 ug/g	13	26	-	-	-	-

Semi-Volatiles

Acenaphthene	0.02 ug/g	-	<0.02	-	-	-	-
Acenaphthylene	0.02 ug/g	-	0.04	-	-	-	-
Anthracene	0.02 ug/g	-	0.04	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	-	0.11	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	-	0.11	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	-	0.16	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	-	0.07	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	-	0.06	-	-	-	-
Chrysene	0.02 ug/g	-	0.15	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	-	<0.02	-	-	-	-
Fluoranthene	0.02 ug/g	-	0.21	-	-	-	-
Fluorene	0.02 ug/g	-	<0.02	-	-	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Client ID:	S-SA8	DUPS-S1			
Sample Date:	29-Nov-22 10:20	29-Nov-22 00:00			-
Sample ID:	2249129-05	2249129-06			-
Matrix:	Soil	Soil			
MDL/Units					

Semi-Volatiles

Indeno [1,2,3-cd] pyrene	0.02 ug/g	-	0.06	-	-	-
1-Methylnaphthalene	0.02 ug/g	-	0.04	-	-	-
2-Methylnaphthalene	0.02 ug/g	-	0.05	-	-	-
Methylnaphthalene (1&2)	0.04 ug/g	-	0.09	-	-	-
Naphthalene	0.01 ug/g	-	0.03	-	-	-
Phenanthrene	0.02 ug/g	-	0.07	-	-	-
Pyrene	0.02 ug/g	-	0.21	-	-	-
2-Fluorobiphenyl	Surrogate	-	83.2%	-	-	-
Terphenyl-d14	Surrogate	-	97.9%	-	-	-

Pesticides, OC

Aldrin	0.01 ug/g	-	<0.01	-	-	-
gamma-BHC (Lindane)	0.01 ug/g	-	<0.01	-	-	-
alpha-Chlordane	0.01 ug/g	-	<0.01	-	-	-
gamma-Chlordane	0.01 ug/g	-	<0.01	-	-	-
Chlordane	0.01 ug/g	-	<0.01	-	-	-
o,p'-DDD	0.01 ug/g	-	<0.01	-	-	-
p,p'-DDD	0.02 ug/g	-	<0.02	-	-	-
DDD	0.02 ug/g	-	<0.02	-	-	-
o,p'-DDE	0.01 ug/g	-	<0.01	-	-	-
p,p'-DDE	0.01 ug/g	-	<0.01	-	-	-
DDE	0.01 ug/g	-	<0.01	-	-	-
o,p'-DDT	0.01 ug/g	-	<0.01	-	-	-
p,p'-DDT	0.01 ug/g	-	<0.01	-	-	-
DDT	0.01 ug/g	-	<0.01	-	-	-
Dieldrin	0.02 ug/g	-	<0.02	-	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	S-SA8	DUPS-S1			
Sample Date:	29-Nov-22 10:20	29-Nov-22 00:00			-
Sample ID:	2249129-05	2249129-06			-
Matrix:	Soil	Soil			
MDL/Units					

Pesticides, OC

Endrin	0.02 ug/g	-	<0.02	-	-	-	-
Endosulfan I	0.01 ug/g	-	<0.01	-	-	-	-
Endosulfan II	0.02 ug/g	-	<0.02	-	-	-	-
Heptachlor	0.01 ug/g	-	<0.01	-	-	-	-
Heptachlor epoxide	0.01 ug/g	-	<0.01	-	-	-	-
Hexachlorobenzene	0.01 ug/g	-	<0.01	-	-	-	-
Hexachlorobutadiene	0.01 ug/g	-	<0.01	-	-	-	-
Hexachloroethane	0.01 ug/g	-	<0.01	-	-	-	-
Methoxychlor	0.01 ug/g	-	<0.01	-	-	-	-
Decachlorobiphenyl	Surrogate	-	119%	-	-	-	-

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics								
Conductivity	ND	5	uS/cm					
Hydrocarbons								
F1 PHCs (C6-C10)	ND	7	ug/g					
F2 PHCs (C10-C16)	ND	4	ug/g					
F3 PHCs (C16-C34)	ND	8	ug/g					
F4 PHCs (C34-C50)	ND	6	ug/g					
Metals								
Antimony	ND	1.0	ug/g					
Arsenic	ND	1.0	ug/g					
Barium	ND	1.0	ug/g					
Beryllium	ND	0.5	ug/g					
Boron	ND	5.0	ug/g					
Cadmium	ND	0.5	ug/g					
Chromium	ND	5.0	ug/g					
Cobalt	ND	1.0	ug/g					
Copper	ND	5.0	ug/g					
Lead	ND	1.0	ug/g					
Molybdenum	ND	1.0	ug/g					
Nickel	ND	5.0	ug/g					
Selenium	ND	1.0	ug/g					
Silver	ND	0.3	ug/g					
Thallium	ND	1.0	ug/g					
Uranium	ND	1.0	ug/g					
Vanadium	ND	10.0	ug/g					
Zinc	ND	20.0	ug/g					
Pesticides, OC								
Aldrin	ND	0.01	ug/g					
gamma-BHC (Lindane)	ND	0.01	ug/g					
alpha-Chlordane	ND	0.01	ug/g					
gamma-Chlordane	ND	0.01	ug/g					
Chlordane	ND	0.01	ug/g					
o,p'-DDD	ND	0.01	ug/g					

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
p,p'-DDD	ND	0.02	ug/g					
DDD	ND	0.02	ug/g					
o,p'-DDE	ND	0.01	ug/g					
p,p'-DDE	ND	0.01	ug/g					
DDE	ND	0.01	ug/g					
o,p'-DDT	ND	0.01	ug/g					
p,p'-DDT	ND	0.01	ug/g					
DDT	ND	0.01	ug/g					
Dieldrin	ND	0.02	ug/g					
Endrin	ND	0.02	ug/g					
Endosulfan I	ND	0.01	ug/g					
Endosulfan II	ND	0.02	ug/g					
Heptachlor	ND	0.01	ug/g					
Heptachlor epoxide	ND	0.01	ug/g					
Hexachlorobenzene	ND	0.01	ug/g					
Hexachlorobutadiene	ND	0.01	ug/g					
Hexachloroethane	ND	0.01	ug/g					
Methoxychlor	ND	0.01	ug/g					
Surrogate: Decachlorobiphenyl	0.104		ug/g	104	50-140			
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					
Benzo [g,h,i] perylene	ND	0.02	ug/g					
Benzo [k] fluoranthene	ND	0.02	ug/g					
Chrysene	ND	0.02	ug/g					
Dibenzo [a,h] anthracene	ND	0.02	ug/g					
Fluoranthene	ND	0.02	ug/g					
Fluorene	ND	0.02	ug/g					

Certificate of Analysis

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Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g					
1-Methylnaphthalene	ND	0.02	ug/g					
2-Methylnaphthalene	ND	0.02	ug/g					
Methylnaphthalene (1&2)	ND	0.04	ug/g					
Naphthalene	ND	0.01	ug/g					
Phenanthrene	ND	0.02	ug/g					
Pyrene	ND	0.02	ug/g					
Surrogate: 2-Fluorobiphenyl	0.996		ug/g	74.7	50-140			
Surrogate: Terphenyl-d14	1.17		ug/g	87.6	50-140			
Volatiles								
Benzene	ND	0.02	ug/g					
Ethylbenzene	ND	0.05	ug/g					
Toluene	ND	0.05	ug/g					
m,p-Xylenes	ND	0.05	ug/g					
o-Xylene	ND	0.05	ug/g					
Xylenes, total	ND	0.05	ug/g					
Surrogate: Toluene-d8	8.15		ug/g	102	50-140			

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
General Inorganics									
SAR	0.56	0.01	N/A	0.55			1.8	30	
Conductivity	473	5	uS/cm	475			0.4	5	
pH	7.01	0.05	pH Units	7.00			0.1	2.3	
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g	ND			NC	40	
F2 PHCs (C10-C16)	ND	4	ug/g	ND			NC	30	
F3 PHCs (C16-C34)	ND	8	ug/g	ND			NC	30	
F4 PHCs (C34-C50)	ND	6	ug/g	ND			NC	30	
Metals									
Antimony	ND	1.0	ug/g	ND			NC	30	
Arsenic	ND	1.0	ug/g	ND			NC	30	
Barium	7.1	1.0	ug/g	7.6			6.6	30	
Beryllium	ND	0.5	ug/g	ND			NC	30	
Boron	ND	5.0	ug/g	ND			NC	30	
Cadmium	ND	0.5	ug/g	ND			NC	30	
Chromium	ND	5.0	ug/g	ND			NC	30	
Cobalt	1.2	1.0	ug/g	1.1			11.1	30	
Copper	ND	5.0	ug/g	ND			NC	30	
Lead	1.1	1.0	ug/g	1.1			5.4	30	
Molybdenum	ND	1.0	ug/g	ND			NC	30	
Nickel	ND	5.0	ug/g	ND			NC	30	
Selenium	ND	1.0	ug/g	ND			NC	30	
Silver	ND	0.3	ug/g	ND			NC	30	
Thallium	ND	1.0	ug/g	ND			NC	30	
Uranium	ND	1.0	ug/g	ND			NC	30	
Vanadium	ND	10.0	ug/g	ND			NC	30	
Zinc	ND	20.0	ug/g	ND			NC	30	
Pesticides, OC									
Aldrin	ND	0.01	ug/g	ND			NC	40	
gamma-BHC (Lindane)	ND	0.01	ug/g	ND			NC	40	

Certificate of Analysis

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Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
alpha-Chlordane	ND	0.01	ug/g	ND			NC	40	
gamma-Chlordane	ND	0.01	ug/g	ND			NC	40	
o,p'-DDD	ND	0.01	ug/g	ND			NC	40	
p,p'-DDD	ND	0.02	ug/g	ND			NC	40	
o,p'-DDE	ND	0.01	ug/g	ND			NC	40	
p,p'-DDE	ND	0.01	ug/g	ND			NC	40	
o,p'-DDT	ND	0.01	ug/g	ND			NC	40	
p,p'-DDT	ND	0.01	ug/g	ND			NC	40	
Dieldrin	ND	0.02	ug/g	ND			NC	40	
Endrin	ND	0.02	ug/g	ND			NC	40	
Endosulfan I	ND	0.01	ug/g	ND			NC	40	
Endosulfan II	ND	0.02	ug/g	ND			NC	40	
Heptachlor	ND	0.01	ug/g	ND			NC	40	
Heptachlor epoxide	ND	0.01	ug/g	ND			NC	40	
Hexachlorobenzene	ND	0.01	ug/g	ND			NC	40	
Hexachlorobutadiene	ND	0.01	ug/g	ND			NC	40	
Hexachloroethane	ND	0.01	ug/g	ND			NC	40	
Methoxychlor	ND	0.01	ug/g	ND			NC	40	
Surrogate: Decachlorobiphenyl	0.135		ug/g		111	50-140			
Physical Characteristics									
% Solids	98.1	0.1	% by Wt.	98.2			0.1	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	ND	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] pyrene	ND	0.02	ug/g	ND			NC	40	
Benzo [b] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Benzo [g,h,i] perylene	ND	0.02	ug/g	ND			NC	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	ND	0.02	ug/g	ND			NC	40	

Certificate of Analysis

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Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	ND	0.02	ug/g	ND			NC	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g	ND			NC	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	ND	0.02	ug/g	ND			NC	40	
Surrogate: 2-Fluorobiphenyl	0.896		ug/g		64.8	50-140			
Surrogate: Terphenyl-d14	1.07		ug/g		77.5	50-140			
Volatiles									
Benzene	ND	0.02	ug/g	ND			NC	50	
Ethylbenzene	ND	0.05	ug/g	ND			NC	50	
Toluene	ND	0.05	ug/g	ND			NC	50	
m,p-Xylenes	ND	0.05	ug/g	ND			NC	50	
o-Xylene	ND	0.05	ug/g	ND			NC	50	
Surrogate: Toluene-d8	8.46		ug/g		103	50-140			

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	162	7	ug/g	ND	81.2	80-120			
F2 PHCs (C10-C16)	94	4	ug/g	ND	115	60-140			
F3 PHCs (C16-C34)	228	8	ug/g	ND	115	60-140			
F4 PHCs (C34-C50)	140	6	ug/g	ND	111	60-140			
Metals									
Arsenic	47.0	1.0	ug/g	ND	93.2	70-130			
Barium	45.7	1.0	ug/g	3.0	85.3	70-130			
Beryllium	46.6	0.5	ug/g	ND	93.1	70-130			
Boron	47.0	5.0	ug/g	ND	91.6	70-130			
Cadmium	42.3	0.5	ug/g	ND	84.5	70-130			
Chromium	47.4	5.0	ug/g	ND	91.7	70-130			
Cobalt	46.1	1.0	ug/g	ND	91.4	70-130			
Copper	44.1	5.0	ug/g	ND	86.9	70-130			
Lead	44.1	1.0	ug/g	ND	87.3	70-130			
Molybdenum	43.6	1.0	ug/g	ND	87.0	70-130			
Nickel	46.1	5.0	ug/g	ND	90.4	70-130			
Selenium	42.4	1.0	ug/g	ND	84.7	70-130			
Silver	44.5	0.3	ug/g	ND	89.0	70-130			
Thallium	46.2	1.0	ug/g	ND	92.3	70-130			
Uranium	48.8	1.0	ug/g	ND	97.4	70-130			
Vanadium	49.1	10.0	ug/g	ND	91.7	70-130			
Zinc	43.8	20.0	ug/g	ND	84.0	70-130			
Pesticides, OC									
Aldrin	0.34	0.01	ug/g	ND	140	50-140			
gamma-BHC (Lindane)	0.32	0.01	ug/g	ND	130	50-140			
alpha-Chlordane	0.31	0.01	ug/g	ND	127	50-140			
gamma-Chlordane	0.31	0.01	ug/g	ND	126	50-140			
o,p'-DDD	0.21	0.01	ug/g	ND	105	50-140			
p,p'-DDD	0.22	0.02	ug/g	ND	108	50-140			
o,p'-DDE	0.33	0.01	ug/g	ND	136	50-140			

Certificate of Analysis

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Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
p,p'-DDE	0.31	0.01	ug/g	ND	127	50-140			
o,p'-DDT	0.21	0.01	ug/g	ND	87.0	50-140			
p,p'-DDT	0.22	0.01	ug/g	ND	90.2	50-140			
Dieldrin	0.33	0.02	ug/g	ND	134	50-140			
Endrin	0.13	0.02	ug/g	ND	51.7	50-140			
Endosulfan I	0.33	0.01	ug/g	ND	137	50-140			
Endosulfan II	0.29	0.02	ug/g	ND	121	50-140			
Heptachlor	0.32	0.01	ug/g	ND	130	50-140			
Heptachlor epoxide	0.34	0.01	ug/g	ND	139	50-140			
Hexachlorobenzene	0.32	0.01	ug/g	ND	134	50-140			
Hexachlorobutadiene	0.30	0.01	ug/g	ND	122	50-140			
Hexachloroethane	0.32	0.01	ug/g	ND	132	50-140			
Methoxychlor	0.33	0.01	ug/g	ND	135	50-140			
Surrogate: Decachlorobiphenyl	0.145		ug/g		119	50-140			
Semi-Volatiles									
Acenaphthene	0.166	0.02	ug/g	ND	96.1	50-140			
Acenaphthylene	0.138	0.02	ug/g	ND	79.5	50-140			
Anthracene	0.138	0.02	ug/g	ND	79.6	50-140			
Benzo [a] anthracene	0.123	0.02	ug/g	ND	71.0	50-140			
Benzo [a] pyrene	0.127	0.02	ug/g	ND	73.3	50-140			
Benzo [b] fluoranthene	0.167	0.02	ug/g	ND	96.4	50-140			
Benzo [g,h,i] perylene	0.158	0.02	ug/g	ND	91.1	50-140			
Benzo [k] fluoranthene	0.116	0.02	ug/g	ND	67.1	50-140			
Chrysene	0.173	0.02	ug/g	ND	100	50-140			
Dibenzo [a,h] anthracene	0.148	0.02	ug/g	ND	85.6	50-140			
Fluoranthene	0.132	0.02	ug/g	ND	76.3	50-140			
Fluorene	0.152	0.02	ug/g	ND	87.6	50-140			
Indeno [1,2,3-cd] pyrene	0.130	0.02	ug/g	ND	75.0	50-140			
1-Methylnaphthalene	0.144	0.02	ug/g	ND	83.0	50-140			
2-Methylnaphthalene	0.176	0.02	ug/g	ND	102	50-140			
Naphthalene	0.168	0.01	ug/g	ND	96.9	50-140			

Certificate of Analysis

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Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Phenanthrene	0.158	0.02	ug/g	ND	91.1	50-140			
Pyrene	0.134	0.02	ug/g	ND	77.6	50-140			
Surrogate: 2-Fluorobiphenyl	1.30		ug/g		94.2	50-140			
Surrogate: Terphenyl-d14	1.62		ug/g		117	50-140			
Volatiles									
Benzene	4.10	0.02	ug/g	ND	102	60-130			
Ethylbenzene	3.71	0.05	ug/g	ND	92.8	60-130			
Toluene	3.86	0.05	ug/g	ND	96.5	60-130			
m,p-Xylenes	7.37	0.05	ug/g	ND	92.2	60-130			
o-Xylene	3.89	0.05	ug/g	ND	97.2	60-130			
Surrogate: Toluene-d8	7.80		ug/g		97.5	50-140			

Certificate of Analysis

Report Date: 19-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 29-Nov-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Qualifier Notes:

QC Qualifiers:

QR-05 Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.

Sample Data Revisions:

None

Work Order Revisions / Comments:

Revision 1 - This report includes additional PAH data.

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Client Name: WSP E&I Canada Limited	Project Reference: OESAW2233.***.***.5120.573000	TAT: <input checked="" type="checkbox"/> Regular <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day Date Required: _____
Contact Name: Cindy McKee	Quote #: 21-332	
Address: 11865 County Road 42, Tecumseh, Ontario, N8N 2M1	PO #: No PO, use project reference	
Telephone: 519-735-2499	Email Address: cindy.mckee@wsp.com derek.saliba@wsp.com	

Criteria: ☐ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☒ Other: O. Reg. 406/19

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Parcel Order Number:						Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	pH, SAR, EC	OCs <i>Post Analysis</i>							
Sample ID/Location Name									Date	Time																
1	S-SA1			2	29-Nov-22	- 0920	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	S-SA2			2	29-Nov-22	- 0930	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	S-SA3			2	29-Nov-22	- 0935	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	S-SA6			2	29-Nov-22	- 1005	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	S-SA8			2	29-Nov-22	- 1020	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6	DUPS-S1			2	29-Nov-22	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments: Use COC sample ID if difference between COC and soil jar
Compare to Table 1 SCS and Table 3.1

Method of Delivery:

Walk in

Relinquished By (Sign): <i>[Signature]</i>	Received by Driver/Depot: <i>K. Jakobsen</i>	Received at Lab: <i>Sumee Parn Parnmai</i>	Verified By: <i>K. Jakobsen</i>
Relinquished By (Print): Derek Saliba	Date/Time: Nov. 28/22 11:00	Date/Time: Nov. 29, 2022 10:40	Date/Time: Nov. 29/22 15:00
Date/Time: Nov 29, 2022 @ 1105	Temperature: 9.8 °C	Temperature: 3.4 °C	pH Verified [] By:

Certificate of Analysis

WSP E&I Canada Limited (Windsor)

11865 County Road 42
Tecumseh, ON N8N 2M1
Attn: Cindy McKee

Client PO: OESAW2233.****.****.5120.573000

Project: OESAW2233.****.****.5120.573000

Custody:

Report Date: 14-Dec-2022

Order Date: 8-Dec-2022

Order #: 2250416

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2250416-01	S-SA4

Approved By:



Alex Enfield, MSc

Lab Manager

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	13-Dec-22	14-Dec-22
Solids, %	CWS Tier 1 - Gravimetric	12-Dec-22	13-Dec-22

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Summary of Criteria Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

Paracel Laboratories has provided regulatory guidelines on this report for informational purposes only and makes no representations or warranties that the data is accurate or reflects the current regulatory values. The user is advised to consult with the appropriate official regulations to evaluate compliance. Sample results that are highlighted have exceeded the selected regulatory limit. Calculated uncertainty estimations have not been applied for determining regulatory exceedances.

Sample	Analyte	MDL / Units	Result	-	-
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Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Client ID:	S-SA4	-	-	-	-
Sample Date:	29-Nov-22 00:00	-	-	-	-
Sample ID:	2250416-01	-	-	-	-
Matrix:	Soil	-	-	-	-
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	72.2	-	-	-	-
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Semi-Volatiles

Acenaphthene	0.02 ug/g	0.03	-	-	-	-
Acenaphthylene	0.02 ug/g	0.46	-	-	-	-
Anthracene	0.02 ug/g	0.40	-	-	-	-
Benzo [a] anthracene	0.02 ug/g	0.89	-	-	-	-
Benzo [a] pyrene	0.02 ug/g	0.69	-	-	-	-
Benzo [b] fluoranthene	0.02 ug/g	0.65	-	-	-	-
Benzo [g,h,i] perylene	0.02 ug/g	0.36	-	-	-	-
Benzo [k] fluoranthene	0.02 ug/g	0.30	-	-	-	-
Chrysene	0.02 ug/g	0.63	-	-	-	-
Dibenzo [a,h] anthracene	0.02 ug/g	0.17	-	-	-	-
Fluoranthene	0.02 ug/g	1.62	-	-	-	-
Fluorene	0.02 ug/g	0.02	-	-	-	-
Indeno [1,2,3-cd] pyrene	0.02 ug/g	0.48	-	-	-	-
1-Methylnaphthalene	0.02 ug/g	0.02	-	-	-	-
2-Methylnaphthalene	0.02 ug/g	0.03	-	-	-	-
Methylnaphthalene (1&2)	0.03 ug/g	0.05	-	-	-	-
Naphthalene	0.01 ug/g	0.01	-	-	-	-
Phenanthrene	0.02 ug/g	0.22	-	-	-	-
Pyrene	0.02 ug/g	1.40	-	-	-	-
2-Fluorobiphenyl	Surrogate	59.8%	-	-	-	-
Terphenyl-d14	Surrogate	61.8%	-	-	-	-

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles								
Acenaphthene	ND	0.02	ug/g					
Acenaphthylene	ND	0.02	ug/g					
Anthracene	ND	0.02	ug/g					
Benzo [a] anthracene	ND	0.02	ug/g					
Benzo [a] pyrene	ND	0.02	ug/g					
Benzo [b] fluoranthene	ND	0.02	ug/g					
Benzo [g,h,i] perylene	ND	0.02	ug/g					
Benzo [k] fluoranthene	ND	0.02	ug/g					
Chrysene	ND	0.02	ug/g					
Dibenzo [a,h] anthracene	ND	0.02	ug/g					
Fluoranthene	ND	0.02	ug/g					
Fluorene	ND	0.02	ug/g					
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g					
1-Methylnaphthalene	ND	0.02	ug/g					
2-Methylnaphthalene	ND	0.02	ug/g					
Methylnaphthalene (1&2)	ND	0.03	ug/g					
Naphthalene	ND	0.01	ug/g					
Phenanthrene	ND	0.02	ug/g					
Pyrene	ND	0.02	ug/g					
Surrogate: 2-Fluorobiphenyl	0.450		ug/g	89.9	50-140			
Surrogate: Terphenyl-d14	0.339		ug/g	67.9	50-140			

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Physical Characteristics									
% Solids	82.7	0.1	% by Wt.	83.5			1.0	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g	ND			NC	40	
Acenaphthylene	0.023	0.02	ug/g	ND			NC	40	
Anthracene	ND	0.02	ug/g	ND			NC	40	
Benzo [a] anthracene	0.037	0.02	ug/g	0.035			3.7	40	
Benzo [a] pyrene	0.054	0.02	ug/g	0.054			0.6	40	
Benzo [b] fluoranthene	0.038	0.02	ug/g	0.035			9.7	40	
Benzo [g,h,i] perylene	0.072	0.02	ug/g	0.067			7.2	40	
Benzo [k] fluoranthene	ND	0.02	ug/g	ND			NC	40	
Chrysene	0.041	0.02	ug/g	0.037			9.7	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g	ND			NC	40	
Fluoranthene	0.046	0.02	ug/g	0.044			6.4	40	
Fluorene	ND	0.02	ug/g	ND			NC	40	
Indeno [1,2,3-cd] pyrene	0.063	0.02	ug/g	0.064			1.8	40	
1-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
2-Methylnaphthalene	ND	0.02	ug/g	ND			NC	40	
Naphthalene	ND	0.01	ug/g	ND			NC	40	
Phenanthrene	ND	0.02	ug/g	ND			NC	40	
Pyrene	0.075	0.02	ug/g	0.063			17.8	40	
Surrogate: 2-Fluorobiphenyl	0.391		ug/g		70.7	50-140			
Surrogate: Terphenyl-d14	0.365		ug/g		66.0	50-140			

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Semi-Volatiles									
Acenaphthene	0.479	0.02	ug/g	ND	86.7	50-140			
Acenaphthylene	0.524	0.02	ug/g	ND	94.8	50-140			
Anthracene	0.489	0.02	ug/g	ND	88.4	50-140			
Benzo [a] anthracene	0.625	0.02	ug/g	0.035	107	50-140			
Benzo [a] pyrene	0.499	0.02	ug/g	0.054	80.3	50-140			
Benzo [b] fluoranthene	0.445	0.02	ug/g	0.035	74.1	50-140			
Benzo [g,h,i] perylene	0.582	0.02	ug/g	0.067	93.1	50-140			
Benzo [k] fluoranthene	0.391	0.02	ug/g	ND	70.7	50-140			
Chrysene	0.585	0.02	ug/g	0.037	99.1	50-140			
Dibenzo [a,h] anthracene	0.534	0.02	ug/g	ND	96.6	50-140			
Fluoranthene	0.595	0.02	ug/g	0.044	99.7	50-140			
Fluorene	0.517	0.02	ug/g	ND	93.5	50-140			
Indeno [1,2,3-cd] pyrene	0.596	0.02	ug/g	0.064	96.3	50-140			
1-Methylnaphthalene	0.559	0.02	ug/g	ND	101	50-140			
2-Methylnaphthalene	0.549	0.02	ug/g	ND	99.3	50-140			
Naphthalene	0.511	0.01	ug/g	ND	92.4	50-140			
Phenanthrene	0.498	0.02	ug/g	ND	90.1	50-140			
Pyrene	0.651	0.02	ug/g	0.063	106	50-140			
Surrogate: 2-Fluorobiphenyl	0.360		ug/g		65.1	50-140			
Surrogate: Terphenyl-d14	0.386		ug/g		69.8	50-140			

Certificate of Analysis

Report Date: 14-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Qualifier Notes:**Sample Data Revisions:**

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Client Name: WSP E&I Canada Limited	Project Reference: OESAW2233. 5120.573000	TAT: <input checked="" type="checkbox"/> Regular <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day Date Required: _____
Contact Name: Cindy McKee	Quote #: 21-332	
Address: 11865 County Road 42, Tecumseh, Ontario, N8N 2M1	PO #: No PO, use project reference	
Telephone: 519-735-2499	Email Address: cindy.mckee@wsp.com derek.saliba@wsp.com	
Criteria: <input type="checkbox"/> O. Reg. 153/04 (As Amended) Table <input type="checkbox"/> RSC Filing <input checked="" type="checkbox"/> O. Reg. 558/00 <input type="checkbox"/> PWQO <input type="checkbox"/> CCME <input type="checkbox"/> SUB (Storm) <input type="checkbox"/> SUB (Sanitary) Municipality: _____ <input checked="" type="checkbox"/> Other: O. Reg. 406/19		

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 2250416 and 2250418 (TCLP)						Required Analyses											
Sample ID/Location Name		Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	TCLP M&I	TCLP VOCs	TCLP B(a)P	TCLP Ignitability
Date	Time																
1	S-SA4	S		2	29-Nov-22	--	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	TCLP-Sul	S		3	8-Dec-22	- 1115	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments: Use COC sample ID if difference between COC and soil jar Compare to Table 1 SCS and Table 3.1		Method of Delivery: Walk in	
Relinquished By (Sign): <i>Cindy McKee</i>	Received by Driver/Depot: <i>Pat</i>	Received at Lab: <i>Km'ella</i>	Verified By: <i>K. Jakobsen</i>
Relinquished By (Print): Cindy McKee	Date/Time: Dec 8/22 11:45	Date/Time: 12/09/22 10:07	Date/Time: Dec. 8/22 14:00
Date/Time: Dec 8, 2022 @ 11:25am	Temperature: 9.8 °C	Temperature: 6.7 °C	pH Verified [] By: NA

Certificate of Analysis

WSP E&I Canada Limited (Windsor)

11865 County Road 42
Tecumseh, ON N8N 2M1
Attn: Cindy McKee

Client PO: OESAW2233.****.****.5120.573000

Project: OESAW2233.****.****.5120.573000

Custody:

Report Date: 13-Dec-2022

Order Date: 8-Dec-2022

Order #: 2250418

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2250418-01	TCLP-Sul

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Ignitability	based on EPA 1030	12-Dec-22	12-Dec-22
REG 558 - Cyanide	TCLP MOE E3015- Auto Colour	12-Dec-22	12-Dec-22
REG 558 - Fluoride	TCLP EPA 340.2 - ISE	12-Dec-22	12-Dec-22
REG 558 - Mercury by CVAA	TCLP EPA 7470A, CVAA	12-Dec-22	12-Dec-22
REG 558 - Metals, ICP-MS	TCLP EPA 6020 - Digestion - ICP-MS	12-Dec-22	12-Dec-22
REG 558 - NO3/NO2	TCLP EPA 300.1 - IC	12-Dec-22	12-Dec-22
REG 558 - PAHs	TCLP EPA 625 - GC-MS	12-Dec-22	12-Dec-22
REG 558 - VOCs	TCLP ZHE EPA 624 - P&T GC-MS	13-Dec-22	13-Dec-22
Solids, %	CWS Tier 1 - Gravimetric	9-Dec-22	12-Dec-22

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Summary of Criteria Exceedances

(If this page is blank then there are no exceedances)

Only those criteria that a sample exceeds will be highlighted in red

Regulatory Comparison:

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Sample	Analyte	MDL / Units	Result	Reg 558 Schedule 4	-
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Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Client ID:	TCLP-Sul	-	-	-	Criteria:
Sample Date:	08-Dec-22 11:15	-	-	-	Reg 558 Schedule 4
Sample ID:	2250418-01	-	-	-	-
Matrix:	Soil	-	-	-	
MDL/Units					

Physical Characteristics

% Solids	0.1 % by Wt.	75.0	-	-	-	-
Ignitability		Negative	-	-	-	-

EPA 1311 - TCLP Leachate Inorganics

Fluoride	0.05 mg/L	<0.05	-	-	-	150 mg/L	-
Nitrate as N	1 mg/L	<1	-	-	-	1000 mg/L	-
Nitrite as N	1 mg/L	<1	-	-	-	1000 mg/L	-
Cyanide, free	0.02 mg/L	<0.02	-	-	-	20 mg/L	-

EPA 1311 - TCLP Leachate Metals

Arsenic	0.05 mg/L	<0.05	-	-	-	2.5 mg/L	-
Barium	0.05 mg/L	0.19	-	-	-	100 mg/L	-
Boron	0.05 mg/L	0.10	-	-	-	500 mg/L	-
Cadmium	0.01 mg/L	<0.01	-	-	-	0.5 mg/L	-
Chromium	0.05 mg/L	<0.05	-	-	-	5 mg/L	-
Lead	0.05 mg/L	<0.05	-	-	-	5 mg/L	-
Mercury	0.005 mg/L	<0.005	-	-	-	0.1 mg/L	-
Selenium	0.05 mg/L	<0.05	-	-	-	1 mg/L	-
Silver	0.05 mg/L	<0.05	-	-	-	5 mg/L	-
Uranium	0.05 mg/L	<0.05	-	-	-	10 mg/L	-

EPA 1311 - TCLP Leachate Volatiles

Benzene	0.005 mg/L	<0.005	-	-	-	0.5 mg/L	-
Carbon Tetrachloride	0.005 mg/L	<0.005	-	-	-	0.5 mg/L	-
Chlorobenzene	0.004 mg/L	<0.004	-	-	-	8 mg/L	-
Chloroform	0.006 mg/L	<0.006	-	-	-	10 mg/L	-
1,2-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-	20 mg/L	-
1,4-Dichlorobenzene	0.004 mg/L	<0.004	-	-	-	0.5 mg/L	-

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Client ID:	TCLP-Sul	-	-	-	Criteria:
Sample Date:	08-Dec-22 11:15	-	-	-	Reg 558 Schedule 4
Sample ID:	2250418-01	-	-	-	-
Matrix:	Soil	-	-	-	
MDL/Units					

EPA 1311 - TCLP Leachate Volatiles

1,2-Dichloroethane	0.005 mg/L	<0.005	-	-	-	0.5 mg/L	-
1,1-Dichloroethylene	0.006 mg/L	<0.006	-	-	-	1.4 mg/L	-
Methyl Ethyl Ketone (2-Butanone)	0.3 mg/L	<0.30	-	-	-	200 mg/L	-
Methylene Chloride	0.04 mg/L	<0.04	-	-	-	5 mg/L	-
Tetrachloroethylene	0.005 mg/L	<0.005	-	-	-	3 mg/L	-
Trichloroethylene	0.004 mg/L	<0.004	-	-	-	5 mg/L	-
Vinyl chloride	0.005 mg/L	<0.005	-	-	-	0.2 mg/L	-
Toluene-d8	Surrogate	106%	-	-	-	-	-
4-Bromofluorobenzene	Surrogate	90.3%	-	-	-	-	-
Dibromofluoromethane	Surrogate	69.1%	-	-	-	-	-

EPA 1311 - TCLP Leachate Organics

Benzo [a] pyrene	0.0001 mg/L	<0.0001	-	-	-	0.001 mg/L	-
Terphenyl-d14	Surrogate	125%	-	-	-	-	-

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics								
Fluoride	ND	0.05	mg/L					
Nitrate as N	ND	1	mg/L					
Nitrite as N	ND	1	mg/L					
Cyanide, free	ND	0.02	mg/L					
EPA 1311 - TCLP Leachate Metals								
Arsenic	ND	0.05	mg/L					
Barium	ND	0.05	mg/L					
Boron	ND	0.05	mg/L					
Cadmium	ND	0.01	mg/L					
Chromium	ND	0.05	mg/L					
Lead	ND	0.05	mg/L					
Mercury	ND	0.005	mg/L					
Selenium	ND	0.05	mg/L					
Silver	ND	0.05	mg/L					
Uranium	ND	0.05	mg/L					
EPA 1311 - TCLP Leachate Organics								
Benzo [a] pyrene	ND	0.0001	mg/L					
Surrogate: Terphenyl-d14	0.031		mg/L	125	40-150			

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Fluoride	ND	0.05	mg/L	ND			NC	20	
Nitrate as N	ND	1	mg/L	ND			NC	20	
Nitrite as N	ND	1	mg/L	ND			NC	20	
Cyanide, free	ND	0.02	mg/L	ND			NC	20	
EPA 1311 - TCLP Leachate Metals									
Arsenic	ND	0.05	mg/L	ND			NC	29	
Barium	0.079	0.05	mg/L	0.074			6.2	34	
Boron	0.089	0.05	mg/L	0.054			NC	33	
Cadmium	ND	0.01	mg/L	ND			NC	33	
Chromium	ND	0.05	mg/L	ND			NC	32	
Lead	ND	0.05	mg/L	ND			NC	32	
Mercury	ND	0.005	mg/L	ND			NC	30	
Selenium	ND	0.05	mg/L	ND			NC	28	
Silver	ND	0.05	mg/L	ND			NC	28	
Uranium	ND	0.05	mg/L	ND			NC	27	
Physical Characteristics									
% Solids	77.4	0.1	% by Wt.	79.1			2.2	25	

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Fluoride	0.51	0.05	mg/L	ND	103	70-130			
Nitrate as N	10	1	mg/L	ND	102	70-130			
Nitrite as N	9	1	mg/L	ND	93.7	80-120			
Cyanide, free	0.060	0.02	mg/L	ND	60.1	60-136			
EPA 1311 - TCLP Leachate Metals									
Arsenic	0.585	0.05	mg/L	ND	117	83-119			
Barium	0.633	0.05	mg/L	0.074	112	83-116			
Boron	0.576	0.05	mg/L	0.054	105	71-128			
Cadmium	0.550	0.01	mg/L	ND	110	78-119			
Chromium	0.547	0.05	mg/L	ND	109	80-124			
Lead	0.484	0.05	mg/L	ND	96.7	77-126			
Mercury	0.0265	0.005	mg/L	ND	88.2	70-130			
Selenium	0.579	0.05	mg/L	ND	116	81-125			
Silver	0.480	0.05	mg/L	ND	96.1	70-128			
Uranium	0.562	0.05	mg/L	ND	112	70-131			
EPA 1311 - TCLP Leachate Organics									
Benzo [a] pyrene	0.0219	0.0001	mg/L	ND	87.7	40-150			
Surrogate: Terphenyl-d14	0.025		mg/L		102	40-150			
EPA 1311 - TCLP Leachate Volatiles									
Benzene	38.5	0.005	mg/L	ND	95.9	60-130			
Carbon Tetrachloride	40.6	0.005	mg/L	ND	100	60-130			
Chlorobenzene	40.9	0.004	mg/L	ND	102	60-130			
Chloroform	46.5	0.006	mg/L	ND	116	60-130			
1,2-Dichlorobenzene	42.4	0.004	mg/L	ND	105	60-130			
1,4-Dichlorobenzene	41.0	0.004	mg/L	ND	102	60-130			
1,2-Dichloroethane	38.9	0.005	mg/L	ND	96.7	60-130			
1,1-Dichloroethylene	37.8	0.006	mg/L	ND	93.6	60-130			
Methyl Ethyl Ketone (2-Butanone)	77.0	0.30	mg/L	ND	77.0	50-140			
Methylene Chloride	35.3	0.04	mg/L	ND	88.2	60-130			
Tetrachloroethylene	40.6	0.005	mg/L	ND	101	60-130			

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.5120.573000

Project Description: OESAW2233.****.5120.573000

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichloroethylene	42.0	0.004	mg/L	ND	104	60-130			
Vinyl chloride	32.8	0.005	mg/L	ND	82.1	50-140			
Surrogate: 4-Bromofluorobenzene	0.0838		mg/L		104	50-140			
Surrogate: Dibromofluoromethane	0.0886		mg/L		111	50-140			
Surrogate: Toluene-d8	0.0790		mg/L		98.8	50-140			

Certificate of Analysis

Report Date: 13-Dec-2022

Client: WSP E&I Canada Limited (Windsor)

Order Date: 8-Dec-2022

Client PO: OESAW2233.****.****.5120.573000

Project Description: OESAW2233.****.****.5120.573000

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers:

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unless otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Client Name: WSP E&I Canada Limited
Contact Name: Cindy McKee
Address: 11865 County Road 42, Tecumseh, Ontario, N8N 2M1
Telephone: 519-735-2499

Project Reference: OESAW2233. 5120.573000
Quote #: 21-332
PO #: No PO, use project reference
Email Address: cindy.mckee@wsp.com
derek.saliba@wsp.com

Criteria: ☐ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☒ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: ☒ Other: O. Reg. 406/19

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Page 1 of 1

TAT: ☒ Regular ☐ 3 Day

☐ 2 Day ☐ 1 Day

Date Required:

Paracel Order Number:

2250416 and 2250418
(TCLP)

Required Analyses

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	TCLP M&I	TCLP VOCs	TCLP B(a)P	TCLP Ignitability		
				Date	Time													
1 S-SA4	S		2	29-Nov-22	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 TCLP-Sul	S		43	8-Dec-22	- 1115	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments: Use COC sample ID if difference between COC and soil jar
Compare to Table 1 SCS and Table 3.1

Method of Delivery:

Relinquished By (Sign): *Cindy McKee* Received by Driver/Depot: *Pat* Received at Lab: *Km'Calla* Verified By: *K. Jakobson*

Relinquished By (Print): Cindy McKee Date/Time: Dec 8/22 11:45 Date/Time: 12/09/22 10:00 Date/Time: Dec 8/22 14:15

Date/Time: Dec 8, 2022 @ 11:25am Temperature: 9.8 °C Temperature: 6.9 °C pH Verified [] By: *NA*



Appendix C

Limitations

Limitations

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
 - (a) The Standard Terms and Conditions which form a part of our Professional Services Contract;
 - (b) The Scope of Services;
 - (c) Time and Budgetary limitations as described in our Contract; and,
 - (d) The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The conclusions presented in this report were based, in part, on visual observations of the site and attendant structures. Our conclusions cannot and are not extended to include those portions of the site or structures which were not reasonably available, in WSP's opinion, for direct observation.
4. The environmental conditions at the site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the site with any applicable local, provincial or federal by-laws, orders-in-council, legislative enactments and regulations was not performed.
5. The site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on site and may be revealed by different of other testing not provided for in our contract.
7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, WSP must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
8. The utilization of WSP's services during the implementation of any remedial measures will allow WSP to observe compliance with the conclusions and recommendations contained in the report. WSP's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or in part, or any reliance thereon, or decisions made based on any information of conclusions in the report, is the sole responsibility of such third party. WSP accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of WSP.
11. Provided that the report is still reliable, and less than 12 months old, WSP will issue a third-party reliance letter to parties client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on WSP's report, by such reliance agree to be bound by our proposal and WSP's standard reliance letter. WSP's standard reliance letter indicates that in no event shall WSP be liable for any damages, howsoever arising, relating to third-party reliance on WSP's report. No reliance by any party is permitted without such agreement.



Unfinished Regular Council Business

No.	Meeting Date	Resolution	Subject	Action/Direction	Depart.	Status/Action Taken
19/18	May 22, 2018		Property Standards By-Law (Zoning)	It is directed that Administration harmonize the by-law regarding disconnected tractor-trailers on residential properties to be consistent within the Town.	DS	To be addressed in the new Comprehensive Zoning By-law commencing in 2022.
02/20	October 27, 2020	RCM 318/20	Regulations Regarding Storage and Parking of Commercial and Recreational Vehicles/Trailers in Residents' Zones	Administration to bring considerations to regulate the parking of these vehicles, units and trailers within the municipal right-of-way in the former Town of Tecumseh, to ensure that visibility sightlines are maintained to private driveways, and to recommend appropriate regulations surrounding the parking of such vehicles, units and trailers in the minimum side yard of a private property at the time the Town's zoning By-law is reviewed.	DS	To be addressed in the new Comprehensive Zoning By-law commencing in 2022.
03/20	October 27, 2020	RCM 319/20	Short Term Rentals	Administration undertake a regulatory review for both the short-term, owner-absent rental and the home-sharing short term rental categories.	DS	To be addressed in the new Comprehensive Zoning By-law commencing in 2022.
04/20	November 10, 2020	RCM 341/20	By-law to Prohibit and Regulate Public Nuisances Related to Odours and Lighting from Cannabis Cultivation	Administration to review and report back to Council on the appropriateness of a By-law in accordance with the <i>Municipal Act</i> that will address and regulate nuisances related to odour and lighting from the cultivation of cannabis plants; and investigate opportunities to consider the matter with the other municipalities in Essex County to try to seek a common regional regulatory approach.	DS	To be addressed in the new Comprehensive Zoning By-law commencing in 2022.
01/22	September 13, 2022	RCM 269/22	E Scooters/ Bike Program	That Administration be directed to investigate the possibility of a pilot project with vendors that offer public access to utilize their e scooters or e bikes as an alternative mode of transportation on a pay-to-ride basis, and report back to Council with options and budget implications in time for consideration during the 2023 budget deliberations.	CRS	Report to Council in Q2.

The Corporation of the Town of Tecumseh

By-Law Number 2023-029

Being a by-law to confirm the proceedings of the February 28, 2023 Regular Meeting of the Council of The Corporation of the Town of Tecumseh.

Whereas pursuant to Section 5(1) of the Municipal Act, 2001, S.O. 2001, c.25 as amended, the powers of a municipality shall be exercised by its Council; and

Whereas pursuant to Section 5(3) of the *Municipal Act, 2001*, S.O. 2001, c.25 as amended, a municipal power, including a municipality's capacity, rights, powers and privileges under Section 8 of the *Municipal Act, 2001*, S.O. 2001, c.25 as amended, shall be exercised by by-law unless the municipality is specifically authorized to do otherwise; and

Whereas it is deemed expedient that the proceedings of the Council of The Corporation of the Town of Tecumseh at this meeting be confirmed and adopted by by-law.

Now Therefore the Council of The Corporation of The Town of Tecumseh Enacts as follows:

1. **That** the actions of the Council of The Corporation of the Town of Tecumseh in respect of all recommendations in reports and minutes of committees, all motions and resolutions and all other action passed and taken by the Council of The Corporation of the Town of Tecumseh, inclusive of documents and transactions approved and/or entered into during the February 28, 2023, meeting of Council, are hereby adopted and confirmed, as if the same were expressly embodied in this By-law.
2. **That** the Mayor and proper officials of The Corporation of the Town of Tecumseh are hereby authorized and directed to do all the things necessary to give effect to the action of the Council of The Corporation of the Town of Tecumseh during the said February 28, 2023, meeting referred to in paragraph 1 of this By-law.
3. **That** the Mayor and the Clerk are hereby authorized and directed to execute all documents necessary to give effect to the action(s) taken by this Council as described in Section 1 of this By-law and to affix the Corporate Seal of The Corporation of the Town of Tecumseh to all documents referred to in said paragraph 1.

Read a first, second, third time and finally passed this 28th day of February, 2023.

Gary McNamara, Mayor

Robert Auger, Clerk